University of Nevada, Reno

Fate and transport of contaminants from acid mine drainage in the Perry Canyon Abandoned Mine Land, Washoe County, Nevada

A thesis submitted in partial fulfillment
of the requirements for the degree of
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by

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THE GRADUATE SCHOOL

We recommend that the thesis
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MASTER OF SCIENCE

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Abstract

Perry Canyon abandoned mine land (AML) hosts acid mine drainage from abandoned mine workings with elevated levels of toxic heavy metals that may be contaminating municipal water in the town of Sutcliffe, Nevada. The objective of this thesis is to assess the potential for contamination of downgradient municipal supply wells and natural resources through data analysis and modeling techniques. Results from the data analysis show that contamination is present near the sources but diminishes downgradient. Additionally, an analytical water balance analysis predicts that percolation is occurring through the thin sections of waste rock and is confirmed by a numerical water balance model that predicts percolation rates of 2 – 183 mm/year.

Groundwater and contaminant transport models are developed for the AML to further evaluate the potential of downgradient contamination. The groundwater model shows that there are gaining and losing reaches of the ephemeral Perry Creek, indicating contaminants may be exchanged between groundwater and surface water. The transport model simulates the estimated time for contaminants to reach the boundaries of Perry Canyon and the mass fluxes. The model results suggest that the estimated concentrations at the system boundaries are lower than the Environmental Protection Agency (EPA) maximum contaminant levels (MCLs). Thus, results indicate that the potential for downgradient contamination exposure to humans near municipal supply wells is low, however, there is contamination approximate to the sources that can have negative impacts on the ecology and environmental resources in the AML.

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Introduction

There are estimated to be 225,000 to 310,000 abandoned mine sites in Nevada; of these sites, only 0.05% may be contributing to environmental contamination (Price and others, 1995). As population growth causes people to move closer to remote abandoned mine land (AML) sites, there is an increasing concern for the potential contamination exposure for nearby residents (USDA, 2007). Additionally, the State of Nevada requires that suppliers of water ensure that sources of pollution or contaminates must not be drawn into a public water supply (*Nev. Admin Code 445A.67185, 2016*). Many of these AML sites were built before these laws and regulations were established and may be contaminating public water supply, thus a greater understanding of the movement and pathways of the contaminants must be known for remediation.

One site of concern for groundwater and surface water contamination is the Perry Canyon AML, which is in northwestern Nevada, 30 miles northeast of Reno, Nevada (Fig. 1). Historic mining of Perry Canyon occurred in the 1870s that consisted of silver-bearing copper-ore in quartz-alunite mineral deposits. (Bonham, 1969). This mineral deposit has abundant arsenic and lead-bearing sulfidic minerals such as pyrite and enargite (Price and others, 1995). When the sulfidic minerals oxidize in the presence of water, the sulfides are oxidized into sulfates and hydrogen ions are released into solution, this acidifies the water and can dissolve and mobilized heavy metals such as lead and arsenic, and the result is acid mine drainage (AMD) (Akcil and Soner, 2006). The metals and sulfates in AMD cause the water to be a reddish-brown color that is observed in the Perry Canyon AML (Fig. 2) (Akcil and Soner, 2006).

Drainage from the closed adits has been observed to be acidic (pH 2-3) and the waste rock is considered to be potentially acid generating material (PAG). Thus, the waste rock deposits may be producing AMD and introducing heavy metals into Perry Creek, which is a tributary of Mullen Creek. Mullen Creek is an ephemeral creek that, when flowing, has the potential of flowing towards areas where municipal wells are located serving the town of Sutcliffe, Nevada. Drainage from the closed adits may also be damaging to the wildlife in the AML, which include mule deer, antelope, chukar partridge, and wild horses.

Consequently, there are many potential negative consequences from the PAG material in Perry Canyon AML. The objective of this research is to characterize the potential for negative impacts on natural resources and to characterize the meteorological conditions that generate the greatest contamination risk in Perry Canyon AML. The objective is completed by identifying the transport and pathways of contaminants of concern (CoC) in the AML through data analysis, fine-scale, and large-scale models. The models are simulated for periods of large meteorological forcing, such as large precipitation winters, and for the future using climate normals. These techniques yield estimates for potential contamination downgradient and how hydrologic conditions affect the potential for contamination.

An analytical and numerical water balance model of the Jones-Kincaid waste rock repository completes the fine-scale method. The analytical method determines the necessary depth of the waste rock to mitigate percolation, the migration of water past the waste rock and into the underlying saturated zone. This method is done using an analytical technique that incorporates the soil-water characteristic curve (SWCC) and meteorological forcing, which is developed by Albright and others (2010). A numerical water balance model is developed in HYDRUS 2D/3D (Radcliffe and Simunek, 2010) to further evaluate the percolation and source loading of contaminants into the saturated zone. The model is developed using techniques from Albright and others (2010), with a numerical modeling basis given by Radcliffe and Simunek (2010).

For the large-scale method, a groundwater model and a transport model are used to understand the movement of contaminants through Perry Canyon. A groundwater model is developed using the U.S. Geological Survey’s Modular Finite Difference Groundwater Flow Model (MODFLOW) (Harbaugh, 2005) through a graphical user interface (GUI) called groundwater modeling software (GMS) developed by Aquaveo, Inc (Aquaveo, 2018). The framework for the groundwater model is based on a conceptual model that incorporates the hydrologic characteristics of the site based on geology and previous hydrologic work done by Rush and Glancy (1967). The groundwater model is calibrated to a steady-state simulation with the stress on the system being recharge calculated from a monthly water balance of precipitation and potential evapotranspiration (PET), and then a transient model is simulated for the duration of data collection and for the future using climate normals.

A conservative transport model is developed and estimates the potential for downgradient contamination by incorporating the groundwater model, seepage fluxes near the sources of pollution determined from the water balance model, and concentrations of CoCs near monitoring points. The model is developed by assuming the porosity of the material and using a range of longitudinal dispersivities. The results give a range of possible mass fluxes and mass flows of contaminants out of the Perry Canyon system. The transport model is completed using GMS GUI (Aquaveo, 2018) and the Modular Transport, 3-Dimensional, Multi-Species (MT3DMS) model (Bedekar and others, 2016; Zheng and Wang, 1999)

Description of System

Geology

Perry Canyon is in the block-faulted Pah Rah Mountain range that trends northwest and is bounded by Pyramid Lake and the Truckee River to the east and by Warm Springs and Spanish Springs Valley to the west (Bonham, 1969). Perry Canyon AML is also located in the Pyramid Mining District (Bonham, 1969). The oldest exposed rocks are ash-flow tuffs of the Hartford Hill Rhyolite that are extensive in the Perry Canyon AML and are informally named the tuffs of Perry Canyon (Bonham, 1969). The Hartford Hill Rhyolite is unconformably overlain by mafic volcanic rocks of Miocene age (Bonham, 1969). Pleistocene sediments unconformably overlie the Hartford Hill Rhyolite and mafic volcanic rocks (Bonham, 1969).

The two major fault systems in the Pah Range are an east-northeast-trending system, and a northwest-trending system (Bonham, 1969). The northwest-trending system is associated with the Walker Lane zone of oblique-slip faults with a cumulative displacement on the order of miles (Bonham, 1969). The east-northeast-trending systems are oblique-slip faults with a cumulative displacement of 2,000 feet (Bonham, 1969).

The ore deposits of the Pyramid District are located in northwest-trending veins in the Hartford Hill Rhyolite (Bonham, 1969). The vein system in the Perry Canyon AML can be traced for over 2 miles and is approximately 6 to 10 feet in width (Bonham, 1969).

The vein is emplaced in a brecciated and highly silicified ash-flow tuff of the Hartford Hill Rhyolite with pyrite and silver-bearing enargite (Bonham, 1969). It is proposed that the Crown-Prince Mine and the Jones-Kincaid Mine are along the same Burrus vein system (Garside and others, 2000), with the Jones-Kincaid shaft being approximately 500 feet deep and an adit that is 1,000 feet in length, and the length of the Crown-Prince adit is unknown (Bonham, 1969).

Hydrology

The main hydrologic feature in Perry Canyon is an ephemeral creek that flows through the middle of the canyon and is unofficially named Perry Creek. There are a few drainages adjacent to the creek that have flowing water during high precipitation or large snowmelt events. There are also several springs and adit seeps located along Perry Canyon that contribute to the flow of Perry Creek. The main adit seep is from the Jones-Kincaid adit and flows at approximately 1-3 gallons per minute (GPM) (MWH, 2004). The Crown-Prince adit only has water discharge during large winters, such as the winters of 2016-2017 and 2018-2019 (Thomas, 2017). The springs have flowing water during the entire year, although the amount of flow is much higher during the winter to early summer, and much lower in the late summer to late fall as most of the flow seeps back into the ground (MWH, 2004). Perry Creek is approximately one foot deep in the canyon (MWH, 2004), although recent high flows during large winter storm events have incised the canyon from 2 to 5 feet in some areas (Thomas, 2017).

Perry Creek contains water flow throughout the canyon from winter to early summer. Flow in the late winter to early spring is dominantly from snowmelt, and flow during most of the spring and summer is dominantly from spring flow and baseflow. Groundwater inflow to the creek is commonly seen during the early summer (Fig. 3). The creek only flows within approximately a quarter-mile of springs and seeps from July to September. The period of flow throughout the canyon depends on the meteorological conditions for that year; for example, the ephemeral creek stopped flowing at the mouth of the canyon, near MWPC4, in June after the winter of 2017-2018, and the creek stopped flowing in October after the winter of 2018-2019, as a result of the much larger winter compared to 2017-2018.

Groundwater in Perry Canyon is present in the bedrock and the alluvial deposits (MWH, 2004) as shown in the drill logs for MWPC1 (Fig 5.), MWPC2 (Fig. 6), MWPC3 (Fig 7.), and MWPC4 (Fig. 8). MWPC1 and MWPC3 are screed in a fractured tuff aquifer; MWPC2 is screened in both tuff and a red clay layer, and MWPC4 is screened in alluvium. MWPC1 and MWPC2 are mostly drilled in a tuffaceous rock with a red clay interbedded layer. MWPC3 is completely drilled in a fractured tuff rock, and MWPC4 is drilled in alluvium and five feet of tuff at the bottom of the 40-foot monitoring well. Groundwater flow occurs as Darcian flow in the alluvium and through fractured channels in the fractured tuff.

Climate

Perry Canyon is in a semi-arid high desert climate (Thomas, 2017). The average precipitation is approximately 200 mm per year measured nearby at Sutcliffe, with 163 mm of snowpack (MWH, 2004), and the average grass reference PET is 1,400 mm as determined from gridMET (Abatzoglou, 2013). Most of the precipitation occurs in the winter months and the majority of PET occurs in the summer to early fall. The average high temperature is 32°C that is reached in July, and the average low temperature is -2°C that is reached in January. The climate creates optimal conditions for sagebrush, cheat grass, and pinion-juniper trees vegetation. The riparian zone, which is the area adjacent to Perry Creek, primarily contains willows, grass, and wild rose bushes.

Previous Work

Original studies in Perry Canyon are geological maps at fine and large scales, not much research was done prior to 1969 (Bonham, 1969). Bonham (1969) did extensive research into the mineral deposits but also included PAG conditions from the closed adits. Bonham (1969) stated that the water table occurs around 200 ft below the ridgeline, and the Jones-Kincaid adit intersects the water table and results in groundwater drainage and accelerated oxidation near the adits. Most research done between 1969 and 1995 investigated the encouraging mineral deposits and geology of the Pyramid Lake mining district (Garside and others, 2000; Wallace, 1975). Nielsen (1981) continued investigating mineral deposits in Perry Canyon to evaluate the potential for large-scale mine operations at the site. His work included fine-scale geologic mapping, limonite evaluation, alteration studies, rock-chip geochemical data analyses, and drill programs (Nielsen, 1981). Nielsen (1981) did make statements on the hydrologic conditions at the site including that deep drilling is difficult due to the high groundwater pressures.

Investigations into the environmental contamination from historic mining began in about 1995 (MWH, 2004). The Nevada Bureau of Mines and Geology (NBMG) sampled the Crown-Prince Adit discharge in 1995 and the monitoring wells after their installation in 2002 (Price and others, 1995). The BLM installed four monitoring wells in October of 2002. The purpose of these wells is to monitor the chemistry at varying elevations in the canyon, with MWPC1 at the top of the canyon and representing background chemistry; MWPC4 is at the mouth of the canyon and represents that chemistry downgradient of the sources of contamination; MWPC2 and MWPC3 represent chemistry near the contamination sources.

A Perry Canyon site investigation report for the U.S Army Corps of Engineers (USACE) and the BLM was prepared by MWH in September of 2004 (MWH, 2004). The report includes surface solids sampling, water quality sampling, and associated data and interpretation. The main results from the report are that the only contaminant that may be moving downgradient is sulfate because of its conservative behavior and that the possibility of downgradient domestic and municipal well contamination is very low (MWH, 2004). Since sulfate is observed at the mouth of the canyon, and lead and arsenic are not observed, lead and arsenic are assumed to be adsorped to soil or rock when flowing downgradient (MWH, 2004). The report also states that remedial options may change the chemistry of the site and desorb arsenic and lead and cause increase potential for downgradient contamination (MWH, 2004).

A Master of Science thesis from the University of Nevada, Reno is completed in 2017 that evaluates the risk of contaminates from Perry Canyon (Thomas, 2017). The investigation collected data on meteorology, soil chemistry, water quality sampling, and groundwater head data. The work of this thesis is a continuation of the work of Thomas (2017), and includes a quantitative risk assessment to human health from contaminants that follows guidelines by Fjeld and others (2007). The assessment results showed that the potential of risk to human health is very low, although contamination threatens environmental resources due to decreasing water quality (Thomas, 2017). Thomas (2017) also developed a groundwater and particle-tracking model that shows the pathways of contaminants from advection is to Perry Creek, which is the dominant hydrologic feature at the site. Thomas (2017) also recommend ideas for future work that includes the development of an infiltration model and continued data monitoring for Perry Canyon for future climate scenarios.

The most recent study in Perry Canyon is another Master of Science thesis that estimates spatial and temporal volumetric water content (VWC) distribution in the Jones-Kincaid waste rock using geophysical seismic methods (McCullough, 2019). The study did six refraction and Remi surveys to obtain primary (P) and secondary (S) wave velocities and then estimate field VWC from laboratory measurements of P and S waves at varying VWC values. The results showed values of VWC that are reasonable for the site and correlated well with meteorological data. The results also showed the geometry of the waste rock that is valuable for the development of a numerical water balance model. One reason for the investigation by McCullough (2019) is to constrain hydrological models of the waste rock (McCullough, 2019) that is done in this study.

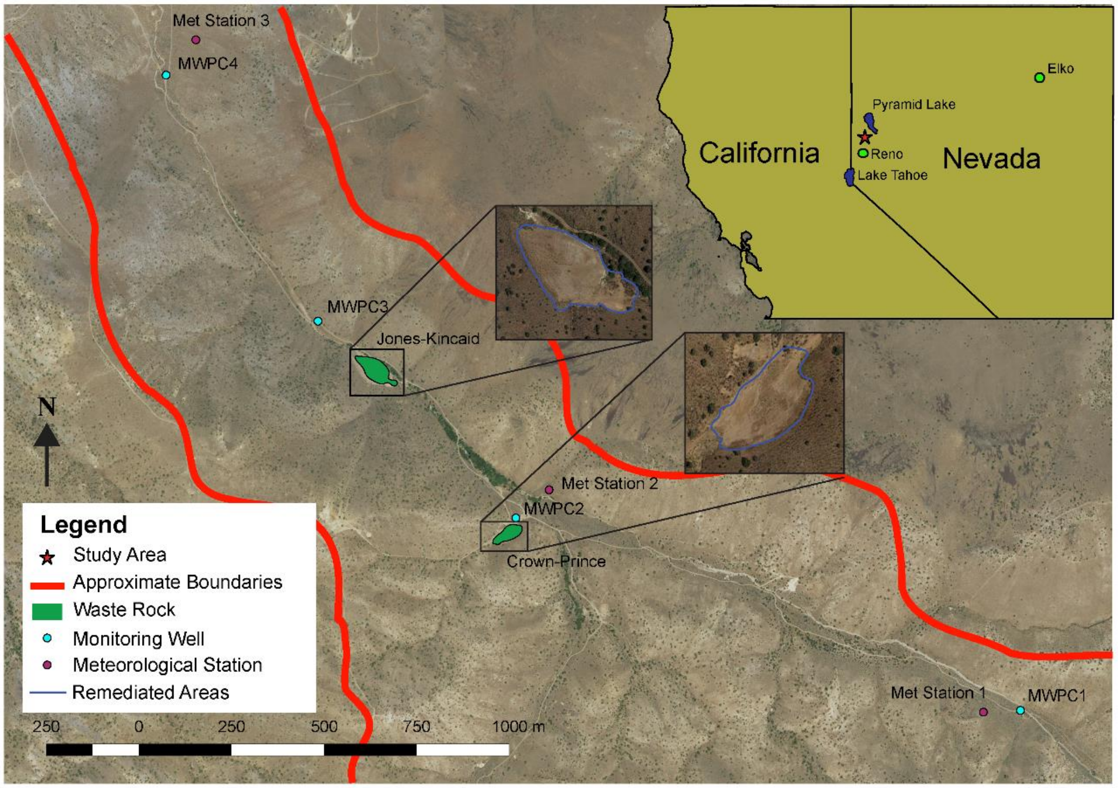
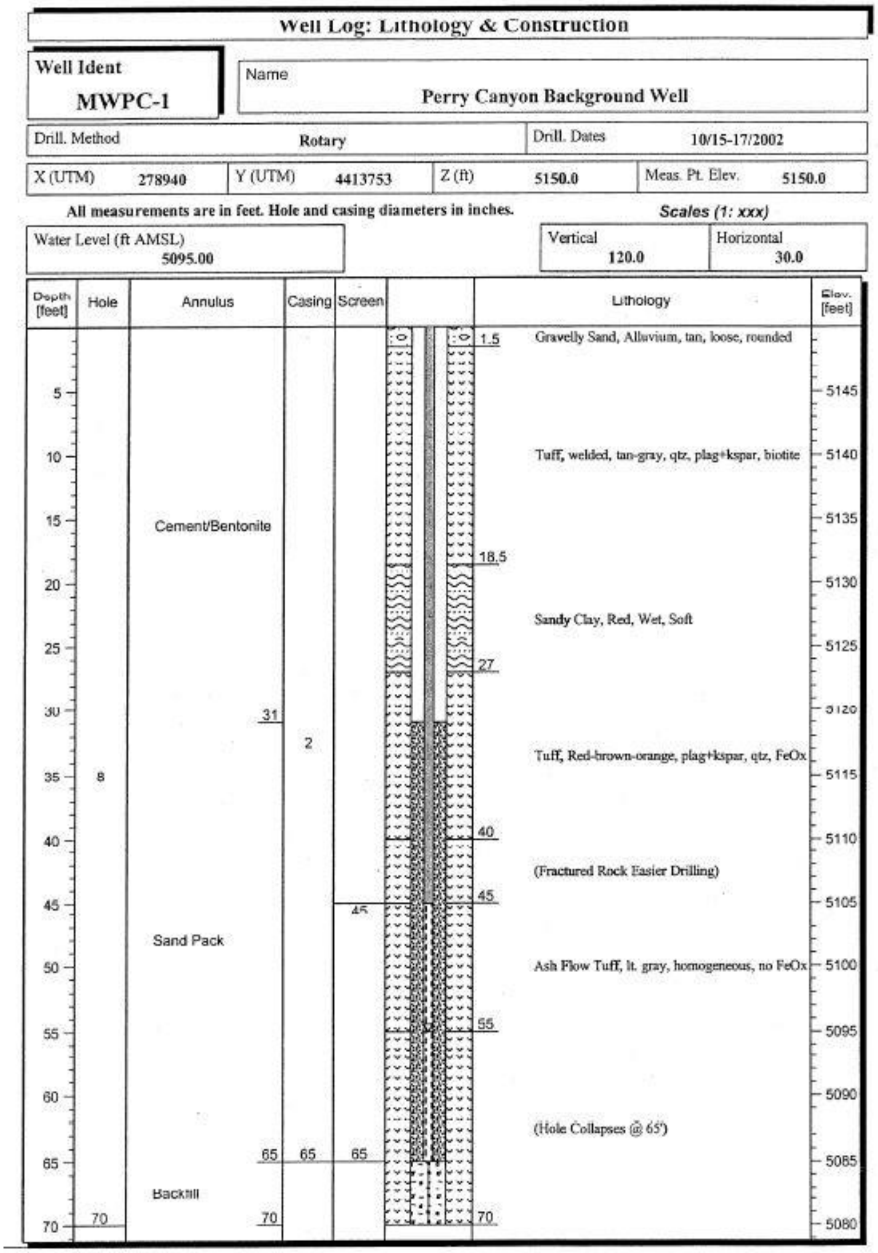


Figure 1: Map showing the location of Perry Canyon AML in reference to major geographic features in Nevada, and a satellite image of Perry Canyon AML with approximate boundaries, waste rock repositories, monitoring wells, meteorological stations, and remediated areas.

Figure 2: Picture showing AMD in Perry Creek. Picture is taken at the toe of the Jones-Kincaid waste rock slope.

Figure 3: Picture showing Perry Creek and the groundwater inflow during early summer. The groundwater inflow is seen by the darker colored soil that is saturated.



Well Log: Lithology & Construction

Well Ident MWPC-1

Name: Perry Canyon Background Well

Drill. Method: Rotary

Drill. Dates: 10/15-17/2002

X (UTM): 278940

Y (UTM): 4413753

Z (ft): 5150.0

Meas. Pt. Elev.: 5150.0

All measurements are in feet. Hole and casing diameters in inches.

Scales (1: xxx)

Vertical: 120.0

Horizontal: 30.0

Water Level (ft AMSL): 5095.00

Gravelly Sand, Alluvium, tan, loose, rounded

Tuff, welded, tan-gray, qtz, plag+kspar, biotite

Sandy Clay, Red, Wet, Soft

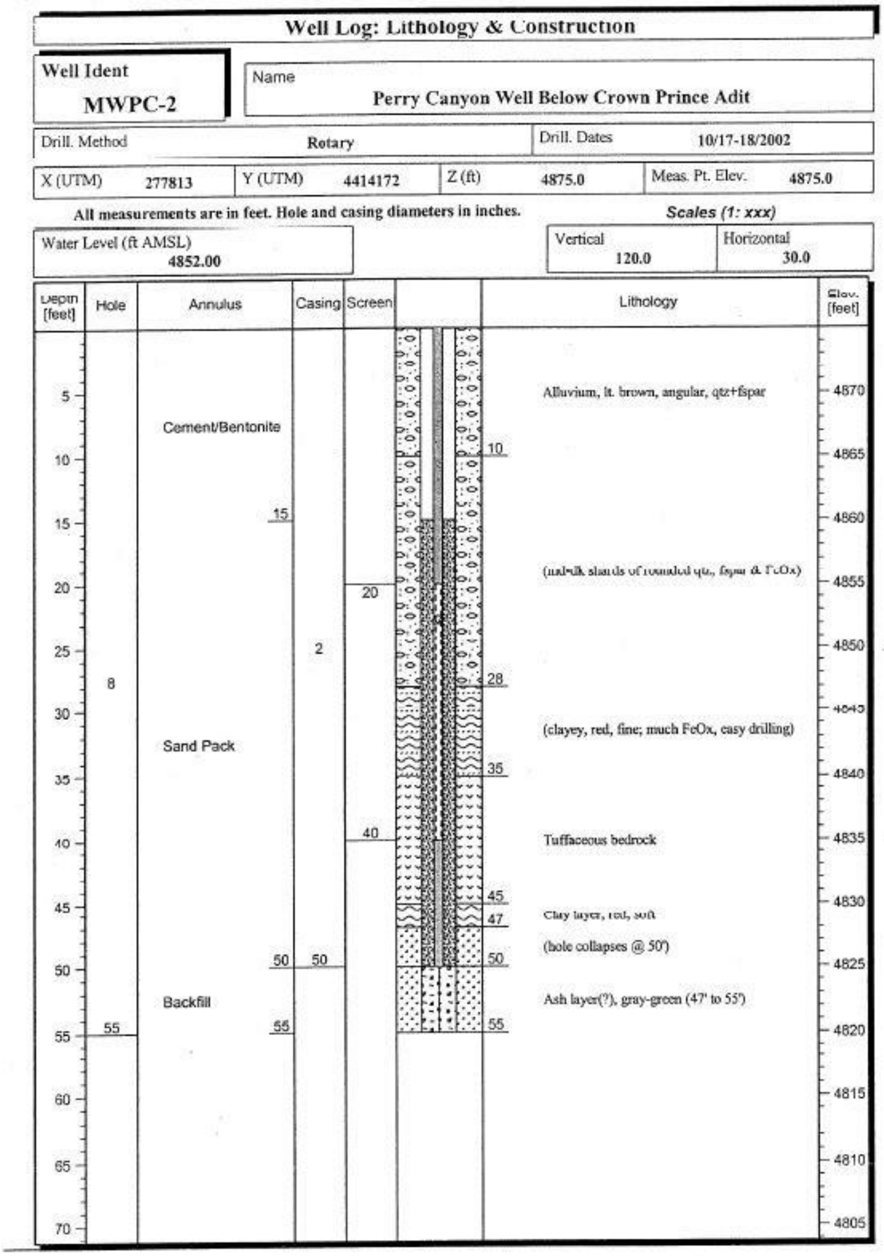
Tuff, Red-brown-orange, plag+kspar, qtz, FeOx

(Fractured Rock Easier Drilling)

Ash Flow Tuff, lt. gray, homogeneous, no FeOx

(Hole Collapses @ 65')

Figure 4: Drill Log for MWPC1 (MWH, 2004).



Well Log: Lithology & Construction

Well Ident MWPC-2

Name Perry Canyon Well Below Crown Prince Adit

Drill. Method Rotary

Drill. Dates 10/17-18/2002

X (UTM) 277813

Y (UTM) 4414172

Z (ft) 4875.0

Meas. Pt. Elev. 4875.0

All measurements are in feet. Hole and casing diameters in inches.

Scales (1: xxx)

Water Level (ft AMSL) 4852.00

Vertical 120.0

Horizontal 30.0

Alluvium, lt. brown, angular, qtz+fspar

(med-dk shards of rounded qtz., fspar & FeOx)

(clayey, red, fine; much FeOx, easy drilling)

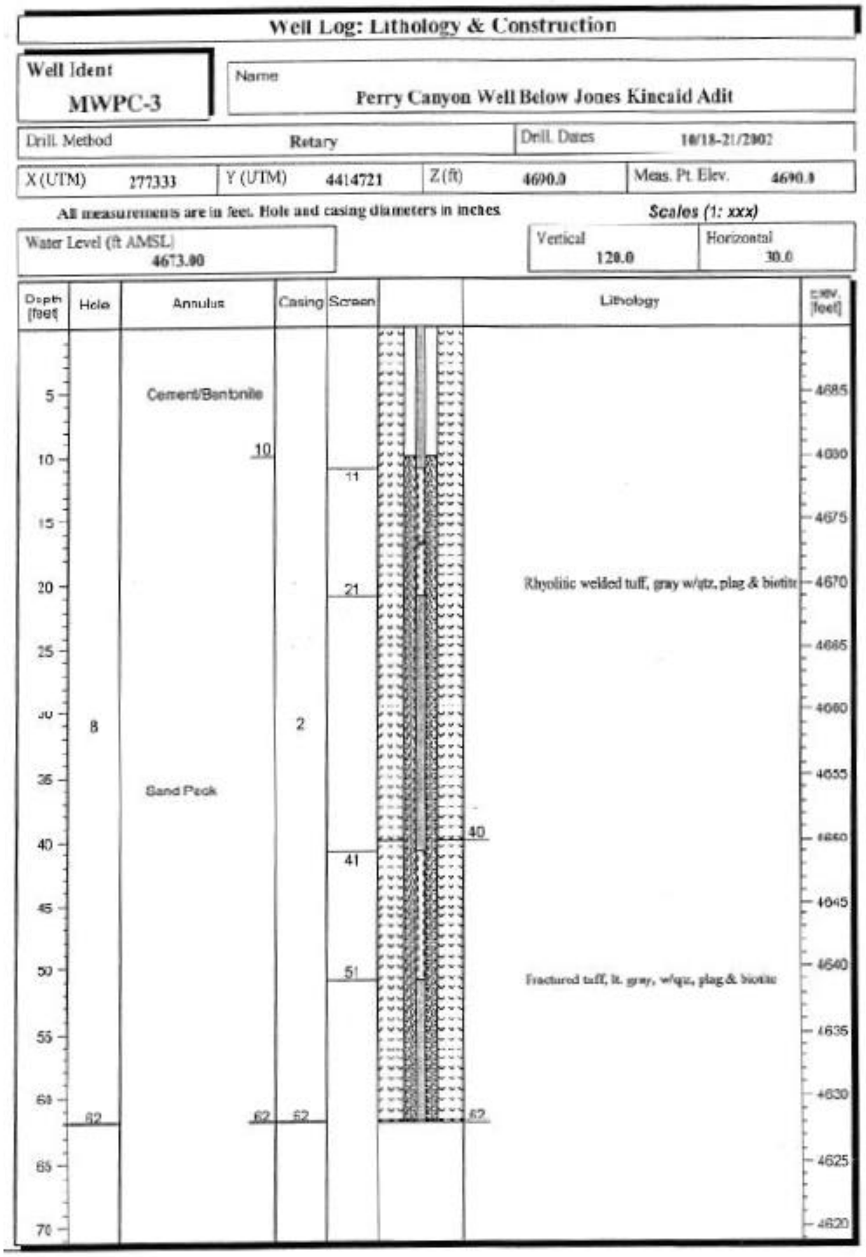
Tuffaceous bedrock

Clay layer, red, soft

(hole collapses @ 50')

Ash layer(?), gray-green (47' to 55')

Figure 5: Drill Log for MWPC2 (MWH, 2004).



Well Log: Lithology & Construction

Well Ident: MWPC-3

Name: Perry Canyon Well Below Jones Kincaid Adit

Drill. Method: Retary

Drill. Dates: 10/18-21/2002

X (UTM): 277333

Y (UTM): 4414721

Z (ft): 4690.0

Meas. Pt. Elev.: 4690.0

All measurements are in feet. Hole and casing diameters in inches.

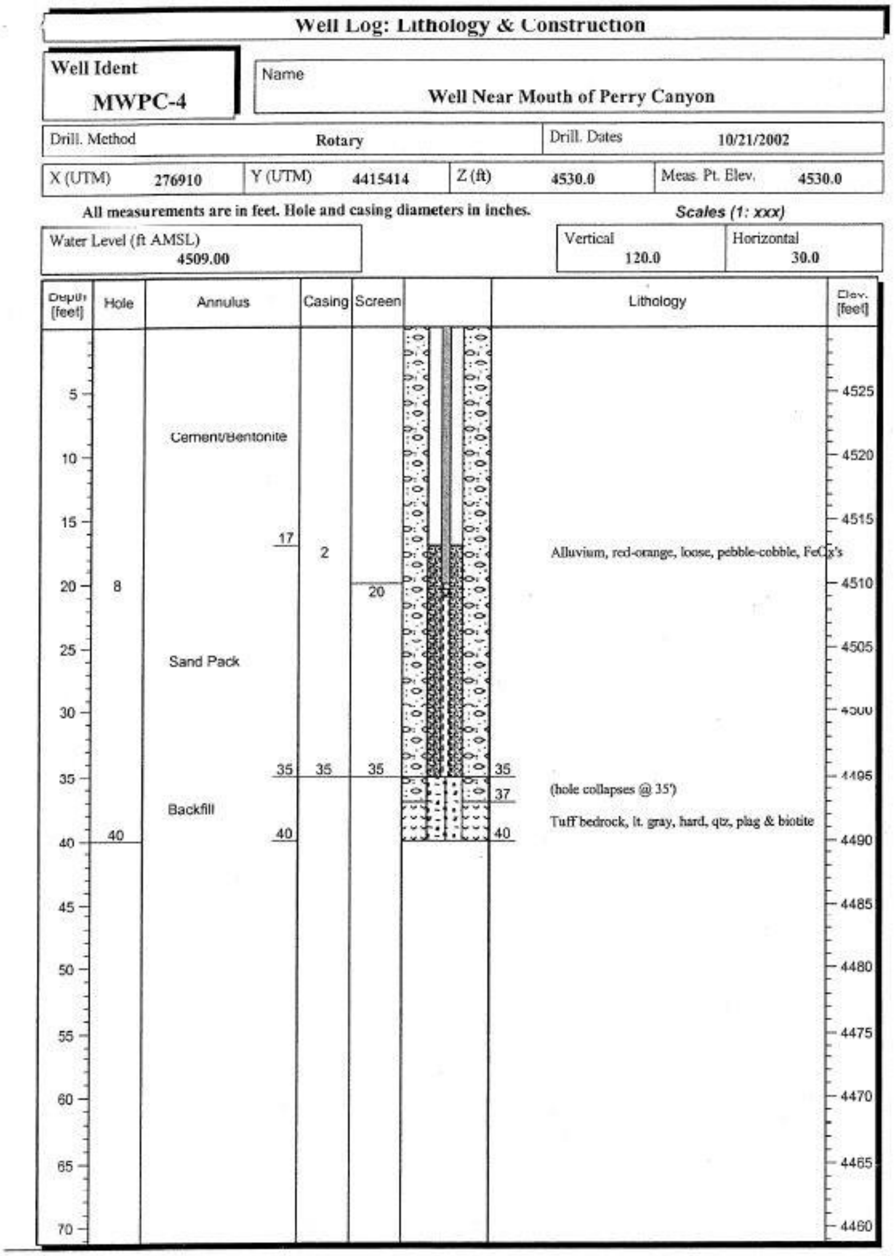
Water Level (ft AMSL): 4673.00

Scales (1: xxx)

Vertical: 120.0

Horizontal: 30.0

Figure 6: Drill Log for MWPC3 (MWH, 2004).



Well Log: Lithology & Construction

Well Ident MWPC-4

Name Well Near Mouth of Perry Canyon

Drill. Method Rotary

Drill. Dates 10/21/2002

X (UTM) 276910

Y (UTM) 4415414

Z (ft) 4530.0

Meas. Pt. Elev. 4530.0

All measurements are in feet. Hole and casing diameters in inches.

Scales (1: xxx)

Water Level (ft AMSL) 4509.00

Vertical 120.0

Horizontal 30.0

Figure 7: Drill Log for MWPC4 (MWH, 2004).

Methods

Data

Data is collected on biweekly to quarterly intervals, except periods when sites are not accessible due to road and weather conditions. Groundwater head data is collected on biweekly to monthly intervals to capture the large fluctuations of the groundwater, and water quality data is collected quarterly. Meteorological data are collected during every field visit to ensure the stations are collecting reasonable data and equipment inspections are completed monthly for quality assurance (QA) purposes.

Groundwater

Groundwater data is collected using a Heron Instruments, Inc. dipper-T water level meter (Heron Instruments Inc.), and is measured from a consistent measuring point and is recorded as depth to groundwater in feet. Then the head is calculated by subtracting the depth to water from a consistent measuring point, which is measured using an accurate Trimble GPS.

In addition to head data collection, slug tests are also performed on the four monitoring wells to estimate the hydrologic properties of the aquifers. The slug tests and the analyses are done following the Bouwer and Rice method (Bouwer and Rice, 1976). A slug test is a simple and quick method for estimates of hydraulic conductivity by injecting or “slugging” a well with a known volume and measuring the head displacement over time. The Bouwer and Rice (1976) analysis is used because it can be completed in fully or partially penetrating wells, and three of the four wells are partially penetrating. Bouwer and Rice (1976) found a solution to the Thiem Equation, which is the governing equation for water flow into a well, to estimate the hydraulic conductivity (K) of the immediate area surrounding the well. The method is done by “slugging” a well and measuring the displacement over time. Then the relative displacement, which is defined as the maximum displacement divided by the displacement at a certain time (t) is plotted against time on a semi-log plot. The results should yield a linear portion that then curves towards a horizontal asymptote as time approaches infinity. The slope of the straight line is multiplied by a constant based on the geometry of the well to determine the hydraulic conductivity (Eq. 1).

$$K = C\frac{\ln({}^{y_0}/_{y_t})}{t} \qquad \text{Equation 1}$$

where C is a constant based on the geometry of the well, y_0 is the displacement when time is 0 (maximum displacement), and y_t is the displacement at time, t. This method is a rough estimate of hydraulic conductivity, although it can be used to validate calibrated hydraulic conductivities in the groundwater model.

MET Data

There are three meteorological (MET) stations located in Perry Canyon for this project (Fig. 1). The first station that is installed is MET station 2 and is located near MWPC2 in the middle of the canyon. The station is installed in late January of 2016 and has been continuously recording data since it is installed, except for July 29, 2018 to October 25, 2018 because it was destroyed in the Perry Fire (Fig. 8). MET station 2 (Fig. 9) records precipitation, net radiation, relative humidity, atmospheric temperature, and wind speed and direction. The sensors on the station are a Texas Electronics 0.1 m tipping rain bucket gauge (Campbell Scientific, Inc, 2016d), R.M. Young wind sentry set (Campbell Scientific, Inc, 2016a), Kipp and Zonen net radiometer (Campbell Scientific, Inc, 2016b), Campbell Scientific temperature and relative humidity probe (Campbell Scientific, Inc, 2016c), and a Campbell Scientific CR1000 datalogger (Campbell Scientific, Inc, 2018b). The sensors are powered by a 12-volt rechargeable battery that is connected to a solar panel for recharge. The datalogger is in an enclosed case that contains desiccant to prevent damage from moisture. All sensors and the datalogger are mounted on a tripod, except the rain bucket that is mounted to a post, and are grounded to a grounding rod. There is also a lightning rod at the top to mitigate damage from a lightning strike. The datalogger collects minute data that is summarized into hourly minimums, maximums, and average data. The datalogger is programmed using the Shortcut Software through Campbell Scientific.

MET stations 1 and 3 (Fig. 11) are located at the top and the mouth of the canyon, respectively. MET station 1 is near MWPC1 and MET station 3 is located near MWPC4. MET station 1 is installed on February 16, 2018 and has been continuously collecting data, except for July 20, 2018 to October 11, 2018 because it was destroyed in the Perry Fire. MET Station 3 is installed on March 3, 2018 and has been continuously collecting data. The only sensor destroyed on MET station 3 in the Perry Fire was the wind vane sensor that is replaced on September 13, 2018. MET stations 1 and 3 are identical in their set up and programming. They are collecting the same data as MET station 2, except they are monitoring incoming solar radiation, rather than net radiation, and they are collecting barometric pressure. The sensors used for MET stations 1 and 3 are: Texas Electronics 0.01 inch tipping bucket (Campbell Scientific, Inc, 2016d), R.M. Young wind monitor

(Campbell Scientific, Inc, 2005), Campbell Scientific digital thermopile pyranometer (Campbell Scientific, Inc, 2018d), Campbell Scientific temperature and relative humidity probe (Campbell Scientific, Inc, 2018e), Campbell Scientific CR6 datalogger (Campbell Scientific, Inc, 2018a), Vaisala PTB110 Barometer (Campbell Scientific, Inc, 2018c), and a 12-volt rechargeable battery that is connected to a 20 watt solar panel.

Water Chemistry

Water chemistry samples are taken quarterly at the four monitoring wells and the Jones-Kincaid Adit discharge. Samples are rarely taken at the Crown-Prince adit because discharge is rare and only occurs during wet winters, such as the winters of 2016-2017 and 2018-2019. For every sampling event, a duplicate is taken from a well for quality control (QC) and QA purposes.

The equipment used for water chemistry sampling are a water chemistry sonde and a pump. The pump is a Proactive Supernova Pump (ECT, 2017), and the chemistry sonde is a YSI Professional Plus Multiparameter Sonde (YSI, 2009) that measures temperature, pH, specific conductance (SC), oxidation-reduction potential (ORP), and dissolved oxygen (DO). All the equipment is decontaminated by rinsing with tap water, then washing thoroughly with a nonphosphatic soap, followed by a thorough rinse of tap water then a rinse with deionized water. This method follows the U.S. Geological Survey’s protocols for cleaning of equipment for water quality sampling (U.S. Geological Survey, n.d.).

Before a sample is taken place at the well, the water level is measured and recorded. The pump is placed 5 feet above the screened interval of the well, which is determined using lithologic logs to prevent turbid flow from occurring in the aquifer and introducing sediment (U.S. Geological Survey, n.d.). The pump is started, and parameters are initially recorded at 30 seconds, then parameter records are gradually increased to 5 minutes as parameters stabilize. Recorded parameters include temperature, pH, DO, SC, and ORP. Once the parameters stabilize for every 5 minutes (stabilization criteria are given in Table 2) sampling occurs. This method deviates from the USGS procedure of purging three well volumes of water (U.S. Geological Survey, n.d.) because the well goes dry before three well volumes can be purged. The major ion sample container is rinsed three times with aquifer water before the sample is taken, and the metal containers are not rinsed three times because they contain acid for preservation. Adit effluent is sampled directly from the adit into the sample container. The major ions container is rinsed three times and the metals containers are not rinsed because they contain acid for preservation.

During sampling, nitrile gloves are worn to prevent any possible contamination. Samples are filled to requirements and are delivered to the Nevada State Health Laboratory (NSHL) with the proper paperwork. The samples are analyzed for routine domestic panel, which is all major ions and metals, and lead. As data is received from the NSHL, it is input into a database for processing.

Water chemistry is analyzed using time-series of data, a piper plot, and aqueous stability diagrams of iron, arsenic, and lead. A piper plot is a method of using two ternary plots of major cations and ions. The ternary plots are then moved onto a diamond plot of all major cations and anions incorporated. The piper plot is valuable for understanding mechanisms for each water quality sample and how all water samples compare to each other. A pe-pH diagram is a thermodynamic plot that shows the aqueous species that is present under the ORP and pH environments. ORP is converted to pe using the Nerst Equation. Typically, high pe values are considered to be oxidizing conditions and low pe values are reducing conditions. Since AMD is dependent upon the ORP and pH, these plots are valuable for understanding what species may be present. Additionally, certain iron hydroxides, such as hydrous ferric oxide ($Fe(OH)_3$), are known for adsorping metal species in AMD (Swallow and others, 1980). Thus, the plots can reveal important information on the chemistry of the system and adsorption capabilities. However, ORP measurements are known to be highly erroneous in environmental systems, usually from the system not being equilibrium (Appelo and Postma, 1996). Therefore, analyses are done with caution and may not fully represent the system.

Soil

Soil chemistry data are collected in the summer of 2018 and analyzed for mercury, lead, arsenic, iron, and sulfate. The samples are collected using a decontaminated shovel that is sealed in a bag. The shovel is cleaned with deionized water after each sample is taken. Soil samples are placed in a glass jar, labeled, and then sealed. Samples are analyzed at WETLAB Environmental Testing Laboratory. The locations of soil samples (Figure 11) are throughout the canyon and only select locations are used for analysis.

SWCC samples are collected in the Jones-Kincaid waste rock using a METER HYPROP (UMS GmbH Munich, 2011) ring. Three samples are collected at three different locations on the waste rock. The samples are sealed and brought into the lab for testing. SWCC is modeled using the van Genuchten model (Eq. 2) (Van Genuchten, 1980).

$$\theta(\psi) = \theta_r + \frac{\theta_s - \theta_r}{(1 + (\alpha\psi)^n)^{1-\frac{1}{n}}}$$ Equation 2

where θ is the VWC, ψ is the matric pressure, θ_r is the residual VWC, θ_s is the saturated VWC, and α and n are curve fitting parameters, also called van Genuchten parameters.

Models

Water Balance

Computer models of water balance are done by simulating water flow through a variably saturated media (Albrights and others, 2010). The governing equation of water flow through unsaturated media is the Richard' Equation:

$$\frac{\partial\theta}{\partial t} = K(\theta)\left[\frac{\partial h}{\partial z} + 1\right] + K(\theta)\left[\frac{\partial h}{\partial x}\right]$$ Equation 3

where h is the matric head, z and x are dimensions, and $K(\theta)$ is the hydraulic conductivity as a function of the VWC, θ. Here, the Richards' Equation is shown in two-dimensions (2D) because simulations for this study are done using two-dimensional applications.

The model HYDRUS Version 2.04.0570, a variably-saturated water flow model that uses a finite-element solution to the Richards' Equation (Radcliffe and Simunek, 2010), is used for this study because research shows that Richard's Equation approach adequately represents the flow system in semi-arid environments (Scanlon and others, 2002). Guidance for the finite element mesh, boundary conditions, and hydrologic parameters follow recent research and advancements in the field of water balance modeling (Albrights and others, 2010; Radcliffe and Simunek, 2010; Scanlon and others, 2002; Whitman and Breitmeyer, 2019). The model is applied for the Jones-Kincaid waste rock repository because the geometry of the site is defined by McCullough (2019)

This site does not have any observed matric pressure, VWC, or percolation. Therefore, the model is a forward solution and the spatial and temporal distribution of VWC is compared to modeled VWC from McCullough (2019). The objectives of the water balance models are to determine:

- Is the current thickness of the Jones-Kincaid waste rock repository sufficiently thick to prevent percolation?
- If percolation is occurring, what is the rate?
- What is the percolation rate for an average water year?
- What is the percolation rate for the wettest water year on record?
- What is the percolation rate using MET station 2 data?

Water Balance Preliminary Design

Water balance assessments are usually done in two phases; the first phase is a preliminary design that answers the questions: What is the required water storage? What is the available water storage? (Albrights and others, 2010). The second phase is predicting the water balance using a numerical model. The required storage (S_r) is the amount of storage needed for a water balance based on the climate. The available storage (S_a) is the storage that is available based on the soil-water properties from the SWCC.

S_r is determined using an analysis detailed by Albright and others (2010) and meteorological data. Albright and others (2010) used a large database from the Alternative Cover Assessment Program (ACAP) (Albright and others, 2010) to estimate S_r (Eq. 4) as a seasonal monthly water balance (ΔS) (Eq. 3) using monthly precipitation

(P), monthly runoff (R), monthly PET, monthly internal drainage (L), and monthly percolation (P_r). Through regressional analysis and thresholds of precipitation and PET ratios based on climates, the method is simplified by using a fraction (β) of PET, assuming L is small and negligible, and R and P_r are combined into a loss term ($\mathit{\Lambda}$). β and $\mathit{\Lambda}$ are parameters that are defined by the climate (Table 2).

$$\Delta S = P - \ \beta PET - \Lambda \qquad \text{Equation 3}$$

$$S_r = \sum_{i=1}^{6} \Delta S_{i,FW} + \sum_{i=7}^{12} \Delta S_{i,ss} \text{ for } \Delta S_{i,FW} \geq 0 \text{ and } \Delta S_{i,SS} \geq 0 \qquad \text{Equation 4}$$

where $\Delta S_{i,FW}$ is the change in storage for the i-th month of fall and winter and $\Delta S_{i,SS}$ is the change in storage for the i-th month of spring and summer. For Equation 3, only the monthly storage terms greater than zero are included and values are calculated using monthly sums of precipitation and PET. In this study, the average and wettest years on record from the gridMET database (Abatzoglou, 2013) are used for calculations. Additionally, research shows that the use of gridMET for S_r calculations is equivalent for sites between 0 and 1,500 m above mean sea level (amsl) and conservative (overestimates) compared to station-based data for sites above 1,500 m amsl (Breitmeyer and others, 2018). Station data in Perry Canyon ranges from 1,400 to 1,700 m amsl. Thus, this analysis is on the transition of equivalent to conservative estimates of S_r and is an appropriate analysis for the site.

The next step is to determine S_a for the system. This amount of water is defined as the field capacity of the soil (θ_c) and represents that a drop of water into a system equals a drop of percolation (Albrights and others, 2010). Multiplying θ_c by the length (L) of the cover or system gives the total amount of water that can be stored. However, there is some water that cannot be removed from the soil under natural conditions and is defined as the wilting point (θ_m). θ_m must be subtracted from θ_c and then multiplied by the length of the cover to get the true storage value and is shown mathematically in Equation 5.

$$S_a = (\theta_c - \theta_m)L \qquad \text{Equation 5}$$

θ_c is represented by the VWC at 33 kPa and θ_m is the VWC at 1,500 kPa, which are determined from the SWCC. Equating S_r (Eq. 4) and S_a (Eq. 5) and solving for L gives the required cover thickness to mitigate percolation (Eq. 6). The thickness of cover from the analysis is compared to geophysical results of the Jones-Kincaid Waste Rock repository (McCullough, 2019) to determine if the waste rock is sufficiently thick to prevent percolation.

$$L = \frac{S_r}{\theta_c - \theta_m} \qquad \text{Equation 6}$$

Numerical Conceptual Model

Figure 12 shows a diagram of the conceptual model that is used for the numerical water balance model. The input is precipitation, which is determined from MET station 2 because it is the longest recording station, is the closest to the Jones-Kincaid waste rock repository and has verified data. Outputs from the conceptual model are evaporation, runoff, and percolation. The conceptual model only includes evaporation (ET) and not PET because there is no vegetation on the waste rock for transpiration.

The hydrologic boundaries of the model include an atmospheric boundary at the top, the west side (left side of the domain in Figure 12) is a groundwater inflow boundary, and the bottom of the boundary is considered saturated. The reason for a saturated bottom boundary is that the level at the bottom is approximate to the level of Perry Creek. Data also shows that the Perry Creek and groundwater are connected (Fig. 3 and Fig. 15). Additionally, the geophysics model results from McCullough (2019) show VWC values at the bottom that are at or near saturation. For these reasons, the bottom of the boundary is assumed to be saturated.

Numerical Model Development

The numerical model is developed through the HYDRUS 2D/3D GUI. The geometry is determined from geophysical results from McCullough (2019). McCullough (2019) used jumps in the p-waves to determine the approximate location of the waste rock and bedrock boundary. The rest of the boundary for the HYDRUS model is the same as the geophysical model. The geometry is imported into HYDRUS by first importing the geometry into a digital exchange format (DXF) file and then directly into HYDRUS. The geometry of the model domain is shown in Figure 13.

The top boundary condition of the model is an atmospheric boundary condition with inputs of precipitating and PET from MET station 2. The west side (left side in Figure 13) is set as a gradient boundary condition. This boundary condition is the same as a unit gradient boundary condition, but the head gradient is set equal to the sine of the hillslope. Radcliffe and Simunek (2010) state that a gradient boundary is a proper boundary for a hillslope.

The bottom boundary condition is the most important boundary condition because it controls the percolation (Scanlon and others, 2002). The options for the bottom boundary are a unit gradient, which acts as a free drainage boundary condition generated by gravity, and matric gradients are negligible. A constant head boundary with the pressure head at Perry Creek equal to zero can be applied and is most likely the realistic scenario for the site. Setting the head to zero at the creek simulates the creek level as the groundwater level. This method is tried for the simulation, although, convergence issues are encountered. Convergence issues at or near saturation have been documented for variably-saturated fluid flow modeling (Vogel and others, 2000; Whitman, 2016). Whitman (2016) explained steps to allow the solution to converge by modifying the finite-element mesh, using a different hydrologic property model, and decreasing the time step. All these methods are applied to the model, and none succeeded in converging the solution. The problem is that the creek introduced large quantities of water into the system and the model became unstable under these conditions. Although this boundary condition seems to be the most realistic, it might not actually introduce large quantities of water into the system.

The bottom boundary condition that is selected is a seepage face. A seepage face simulates a boundary where the porous media is exposed to the air and fluid flows across the face when the head is zero (saturation) (Scanlon and others, 2002; Whitman and Breitmeyer, 2019). Scanlon (2002) explained that a seepage face is similar to a finely grained material over a coarse gravel material, although, this may not be the scenario for this case, it is unknown what material is beneath the waste rock, it is either bedrock or alluvial deposits. Whitman and Breitmeyer (2019) showed that seepage face estimates less percolation and higher water storage than a free drainage boundary condition. However, a seepage face may be more representative because the bottom boundary may be near the groundwater table.

The finite element mesh is set to 25 cm for the middle of the waste rock, and the atmospheric boundary and the seepage face boundary have mesh refinements of 5 cm to account for the large matric potential gradients at the boundaries (Whitman and Breitmeyer, 2019). Lastly, the hydraulic property model is set to the van Genuchten model (1980) where the parameters are shown in Table 3.

Whitman and Breitmeyer (2019) showed that the model must be simulated under average water years to obtain steady-state percolation rates, and is also consistent with groundwater modeling techniques to obtain equilibrium (Anderson and others, 2005). The model is originally simulated for three average water years determined from gridMET to reach equilibrium conditions. Next, the model is simulated for June 18th, 2018 to March 31st, 2019 using meteorological data from MET station 2, and the VWC content results are compared to the geophysical VWC results from McCullough (2019). The model is then simulated for the length of record for MET station 2 (February 1, 2016 to December 31, 2019) and for the wettest year on record, which is water year 1983.

Groundwater Flow Model

A numerical groundwater flow model is developed for the Perry Canyon aquifer system using the MODular groundwater FLOW model (MODFLOW) (Harbaugh, 2005) developed by the USGS to estimate the direction and velocity of groundwater flow. MODFLOW uses a finite-difference method to solve for the groundwater flow equation (Harbaugh, 2005). The results from the model are used to develop a transport model based on the groundwater flow directions and velocities. The groundwater model is developed using recommendations from ASTM D5447 (ASTM, 2017), ASTM D5718 (ASTM, 2013), and Applied Groundwater Modeling (Anderson and others, 2005). The model is calibrated to hydrologic data gathered in Perry Canyon using the pilot point method (Doherty, 2003). A transient simulation is developed with monthly stress periods, where the stress on the system is the recharge rate and is determined using a water balance of PET and precipitation from MET station 2.

Conceptual Model

Inputs into the Perry Canyon groundwater system are recharge and groundwater inflow from the Mullen Creek aquifer (Rush and Glancy, 1967). Recharge consists of precipitation, runoff, surface water inflow, and snowmelt. The outputs from the model are groundwater discharge to Perry Creek, groundwater discharge to the boundaries of the system, and ET.

The two main aquifers in the groundwater system are a fractured tuff aquifer and an alluvium aquifer. The fractured tuff composes most of the system and is in the main canyon and the alluvium aquifer starts at the mouth of the canyon and reaches to Mullen Creek in the north (Fig. 14). MODFLOW uses a Darcian approach to predict the groundwater, which assumes a porous media approach. However, the fractured tuff has flow through fractures rather than porous media. Modeling flow through fractures is very complex, and for simplicity, it is assumed that all groundwater flow can be predicted using a porous media approach.

Perry Creek acts as the main hydrologic control in the system. Perry Creek is also connected to the groundwater system (Fig. 3 and Fig. 15) and is incorporated into the groundwater as a boundary where fluxes are dependent upon the head and conductivity of the boundary. Mullen Creek is similar to Perry Creek and is a boundary where fluxes are dependent upon the head in the creek and the conductivity, although, Mullen Creek rarely flows near the location of the Perry Canyon groundwater system and the head is assumed to approximately the land surface and is constant through time. Additionally, the ridgeline surrounding Perry Canyon is assumed to be a groundwater divide and a barrier to flow, although, there may be some interbasin flow occurring. Groundwater inflow is assumed to be occurring in the northwest and discharge is occurring in the northeast of the model domain as flow from Warm Springs valley enters the Mullen Creek aquifer and flows towards Pyramid Lake where it discharges (Rush and Glancy, 1967).

Model Development

The domain of the groundwater model is determined using the ridgeline surrounding the Perry Canyon System and Mullen Creek. The ridgeline is assumed to be a groundwater divide, so a no-flow boundary condition is set for the ridgeline. Mullen Creek is assumed to be a boundary that is dependent upon the stage in the creek, so this boundary is set as a general-head boundary condition. The initial stage values for the Mullen Creek general-head boundary are estimated from a USGS Moses Rock topographic map (USGS, 2015). The northwest and northeast boundary conditions are groundwater inflow and outflow from the Mullen Creek aquifer system, respectively, which are estimated from Rush and Glancy (1967) and are set as a specified flux of 50,000 m^3/day. Figure 14 shows the boundary conditions of the groundwater model.

Perry Creek is a dominant mechanism of the hydrology in Perry Canyon. The stage of the creek varies during the year and is dry during the summer and fall months in Perry Canyon, thus, the stage cannot be measured during most of the year. From visual observations during field visits, monitoring well data shows that the head in the piezometers is comparable to the stage in the creek, so the monitoring well data is used to estimate the stage in the creek. Perry Creek is set as a time-dependent general-head boundary condition, which means that the fluxes in and out of the boundary are controlled by the head and the conductivity (Harbaugh, 2005). Any drainage in the canyon that has flow during wetter months is incorporated into Perry Creek. Springs located at higher elevations in the canyon are set at constant stage values. The endpoints of Perry Creek are set as constant stage values using a topographic map elevation.

The two main aquifers are the alluvium aquifer and the fractured tuff aquifer. Garside and others (2003) estimated that the fractured tuff aquifer extends down to 1,000 m amsl and is set as the bottom of the model. The top of the model is determined from a digital elevation model (DEM). Both aquifers are mapped according to the geologic map by Garside and others (2003) and are shown in Figure 14. The aquifers are set as a convertible aquifer, this means that MODFLOW designates the aquifer as confined if the head is above the aquifer and unconfined if the head is below the top of the aquifer.

The model is assumed to be isotropic where the vertical hydraulic conductivity is set equal to the horizontal conductivity. The specific storage is set to $3.60\text{x}10^{-5}$ 1/m and $1.66\text{x}10^{-4}$ 1/m for the fractured tuff aquifer and the alluvium aquifer, respectively. The specific yield is set as 21% and 28% for the fractured tuff aquifer and the alluvium aquifer, respectively. Specific storage and specific yield values are obtained from Freeze and Cherry (1979).

The model grid is set to 25 m and oriented 25 degrees northwest to match the orientation of flow. The 25 m spacing is used to reduce the influence of the creek on the observation points. Any spacing larger than 25 m would have put the observation points inside the same cell as the creek; this would make comparing model outputs to observation points not possible. Therefore, the value calculated in the observation point is not directly controlled by the stage value in the creek, it is more directly influenced by the groundwater flow equation. The orientation is set at 25 degrees to the northwest because this is the dominant direction of Perry Creek and is a reasonable estimate for the flow direction in Perry Canyon, and the model grid should be aligned with flow direction (Anderson and others, 2005)

Transient model parameters are the recharge rate and the stage values of the creek. The stage values of the creek are determined using the measured head in the monitoring wells adjacent to the creek. The recharge rate is determined using a water-balance method of hourly PET and precipitation of MET station 2. PET is calculated using the hourly Penman-Monteith Equation (Allen and others, 1998) because hourly PET is more representative of conditions than daily PET (Ji and others, 2017). The hourly PET is subtracted from precipitation, and negative values are set to zero. The difference between precipitation and PET are then summed into monthly values for the entire record of the middle station. The monthly values are converted to m/day and are used for the stress periods. The months of June, July, August, and September are set to a recharge rate of zero because it is assumed that all precipitation is removed by ET during the summer.

Initial conditions are set to the head values and hydraulic conductivity of the calibrated period of February 2016. Typically, initial values are set to head values after the model is simulated to achieve an equilibrium condition (Anderson and others, 2005). This method is not used for this model because the equilibrated head values caused convergence issues for the model. The model is simulated from February 2016 to January 2020, and with each month being a stress period that results in 48 stress periods. The model has daily outputs resulting in 1,460 output values. The results are shown in the model results section. Finally, the model is simulated for February 2016 to August 2049 for future predictions.

Model Calibration

The fractured tuff aquifer has a variety of fractures that the groundwater flows through. These fractures vary in size from the centimeter to the meter scale, thus, the aquifer is assumed to be heterogeneous. The alluvium aquifer has many different deposits that are a result of alluvial fan deposits. These deposits range in composition, grain size, and sorting, making the alluvium aquifer heterogeneous. For these reasons, the model is calibrated for heterogeneous conditions using the pilot point method through the parameter estimation software (PEST) (S.S. Papadopulos & Associates, 2018) and is incorporated into the GMS software.

The pilot point method is a way of spatially defining the hydraulic conductivity through a domain using an inverse solution to the groundwater flow equation (Doherty, 2003). Hydraulic conductivity values are spatially interpolated which results in a smooth variation of hydraulic conductivity (Doherty, 2003). Spatial interpolation can be done through either inverse-distance weighing or kriging. The analyses done for the Perry Canyon groundwater model is done using an inverse-distance weighing method. It is recommended that the number of pilot points selected is less than or equal to the number of observation points in the model domain. There are four observations points in the Perry Canyon groundwater model, thus, only for pilot points are defined, shown in Figure

46. The start of the model is the beginning of MET Station 2 data, which is in February of 2016, and is the date for which the model will be calibrated.

Perry Creek and Mullen Creek are dependent upon the head at the boundary and the conductivity of the boundary. The conductivity is unknown and is estimated in the model calibration. The calibrated conductivities are then imported into the model for forward solutions.

Transport Model

The transport model is completed through the MT3DMS modeling code that simulates species transport by advection, dispersion, and chemical reactions in groundwater systems (Zheng and Wang, 1999). The model estimates transport using a finite-difference solution of the advection-dispersion equation (ADE). Advection is the transport of miscible contaminants through the groundwater velocity and dispersion is the movement of miscible contaminants by deviations of actual velocity on a microscale from actual groundwater velocities (Zheng and Wang, 1999). Diffusion is also simulated through MT3DMS and is the movement of contaminants by chemical gradients, but diffusion is often negligible and small compared to advection and dispersion (Zheng and Wang, 1999). Advection is estimated using the groundwater flow solution and porosity (η) and the dispersion is simulated using the dispersion coefficient, which is a function of the groundwater velocity and the longitudinal dispersivity (α_l) (Zheng and Wang, 1999). The groundwater velocities are estimated using the groundwater flow model, and the porosity and longitudinal dispersivity are unknown. The problem is that the site has limited data monitoring points for proper calibration of the MT3DMS model, and the unknown parameters cannot be calibrated. Thus, this method will use estimates of porosity and longitudinal dispersivity to estimate contaminant transport.

Model Development

The sources of contaminants for the site are the waste rock repositories. The input concentrations are set to the measured concentration of lead and arsenic from MWPC2 that is adjacent to the Crown-Prince waste rock repository. This method is done because MWPC2 has the highest contaminant concentrations, has water that percolated through the waste rock, and is representative of Jones-Kincaid waste rock because the material is from adits that are in the same vein system (Bonham, 1969; Garside and others, 2000). The recharge rate at the waste rock repositories is set to the current conditions (January 2016 to January 2020) percolation rate from the numerical water balance model.

The porosity of the tuff should be very small but may have high porosities based on the number of fractures, thus, a range should be used to estimate porosity. The alluvium aquifer might also have a long-range of porosities from the heterogeneity of the site. However, the porosity changes the seepage velocity, which estimates the time of arrival of contaminants at the site (Anderson and others, 2005; Fetter, 2001; Freeze and Cherry, 1979), and using the lowest value of porosity will estimate the most conservative (fastest) arrival time. Additionally, lower porosities will have a higher seepage velocity and a higher mass flux rate. Therefore, the lower end of porosity values are used for estimation to be conservative. The porosity of the alluvium is set to 35%, which is consistent with porosities in arid basins (Wagoner and McKague, 1986) and the porosity of the tuff is set to 5%, which is the low range of tuff porosity presented by INTERA Environmental Consultants, Inc. (1983).

The MT3DMS code simulates dispersion for isotropic aquifers for simplicity, which reduces the dispersion coefficients to three and can be defined by three terms: longitudinal dispersivity (α_l), horizontal transverse dispersivity (α_h), and vertical transverse dispersivity (α_v). For simplicity, this model will estimate transverse dispersivity as 1% of longitudinal dispersivity, and vertical dispersivity as 0.1% of longitudinal dispersivity. This assumption is commonly used in transport modeling (Anderson and others, 2005; Bear and Verruijt, 1987; Zheng and Wang, 1999). The longitudinal dispersivity is still being researched and is a difficult parameter to estimate and measure. There is also a known occurrence that the longitudinal dispersivity varies based on the scale of the problem (Chuang and others, 1989; Gelhar and others, 1992; Schulze-Makuch, 2005). There have been methods to adjust longitudinal dispersivity based on the scale but that is not done in this study. Estimates of longitudinal dispersivity are over a range of 0.1 to 10 m for the alluvium and 2 to 79.4 m for the fractured tuff. Estimates of longitudinal dispersivity are from Gelhar and others (1992) and Schulze-Makuch (2005). These ranges do not cover the entire range of estimates, but these are the maximum ranges for which the model converged.

Finally, the two main questions to address for the transport model are: What is the approximate time the constituents will arrive at the Mullen Creek aquifer? What is the steady-state mass flux? The first question is solved using the same period as the groundwater flow model (February 2016 to August 2049). To solve the second question, the models are simulated to January 2083 to achieve an equilibrium condition using MWPC2 CoC concentration averages for input and steady-state groundwater discharge rates

Table 1: Stabilization criteria for purging of monitoring wells before sampling.

Field Measurement	**Stability Criteria**
pH	± 0.1 standard units
Temperature	± 0.5 ^{o}C
Specific Conductance	± 0.5%
Dissolved Oxygen	± 0.3 mg/L

Source: U.S. Geological Survey (n.d.)

Table 2: Parameter values for β and Λ based on different climates.

Climate Type	**Seasonal Period**	β **(-)**	Λ **(mm)**
No Snow or Frozen Ground	Fall – Winter	0.3	27.1
	Spring - Summer	1.00	167.8
Snow and/or Frozen Ground	Fall – Winter	0.37	-8.9
	Spring - Summer	1.00	167.8

Source: Apiwantragoon (2007)

Figure 8: Picture of the MET Station after being destroyed in the Perry Fire in July 2018.

Figure 9: Picture of MET Station 2 in Perry Canyon.

Figure 10: Picture of MET Station 3 located at the top of Perry Canyon.

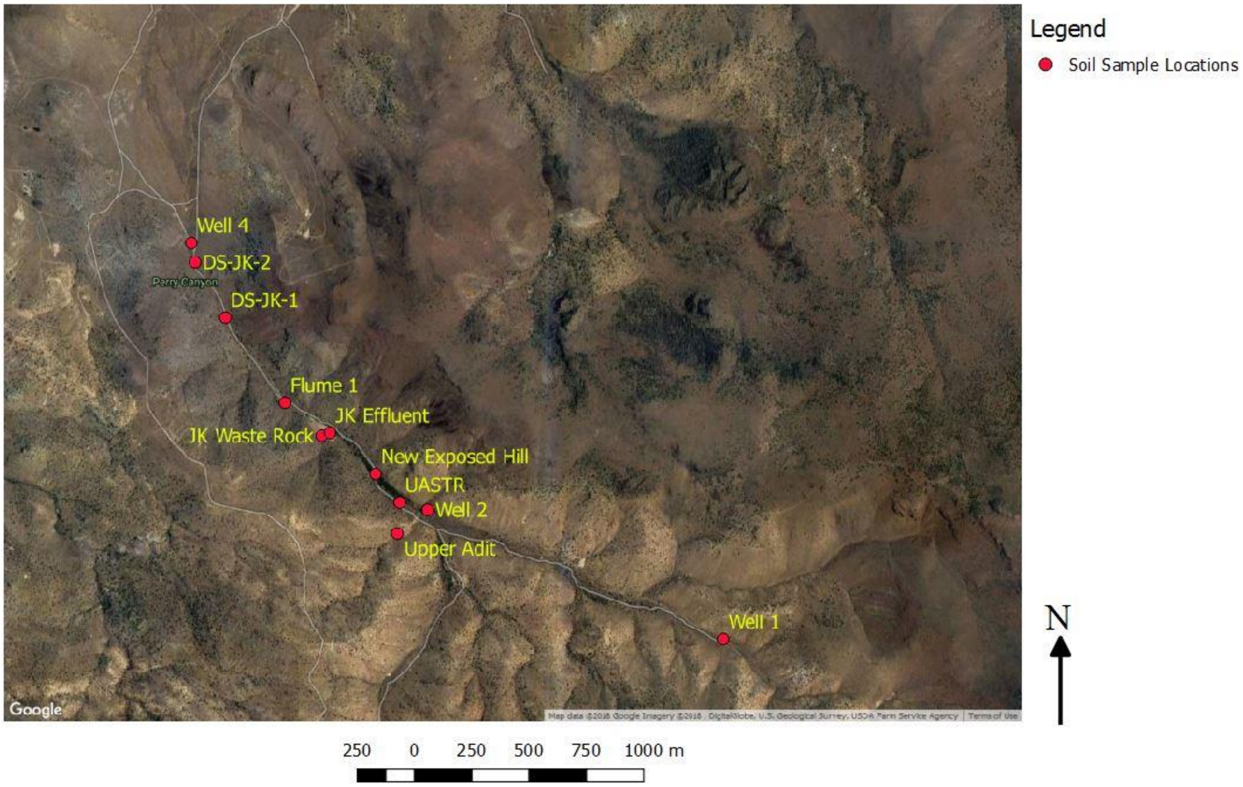


Figure 11: Map of soil chemistry locations in Perry Canyon.

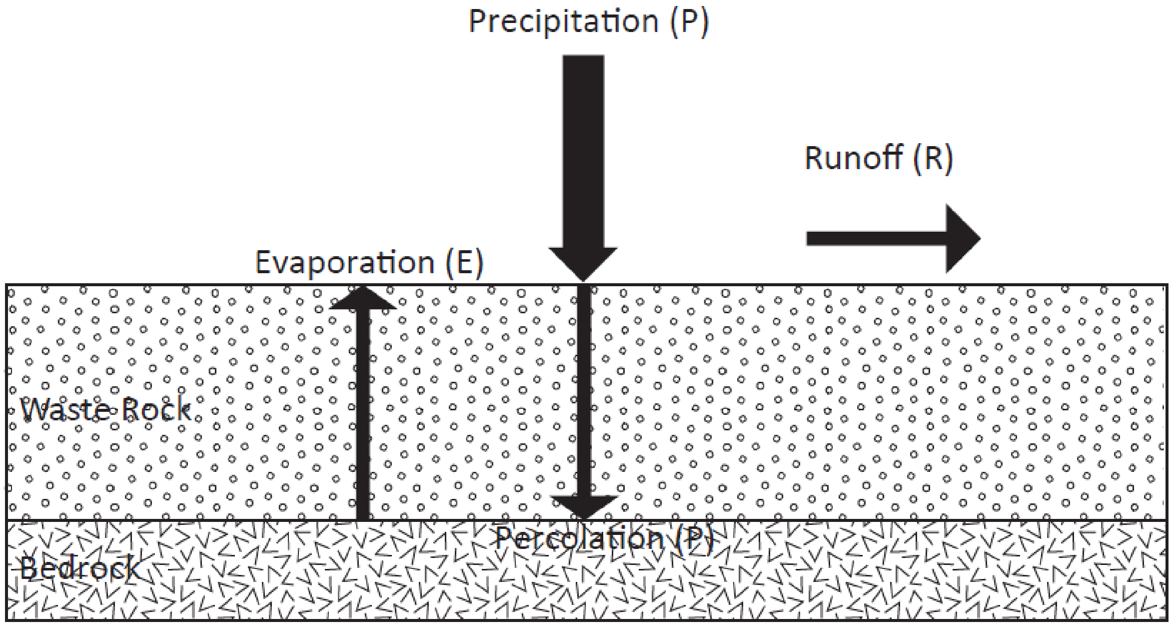


Figure 12: Conceptual model of the numerical water balance.

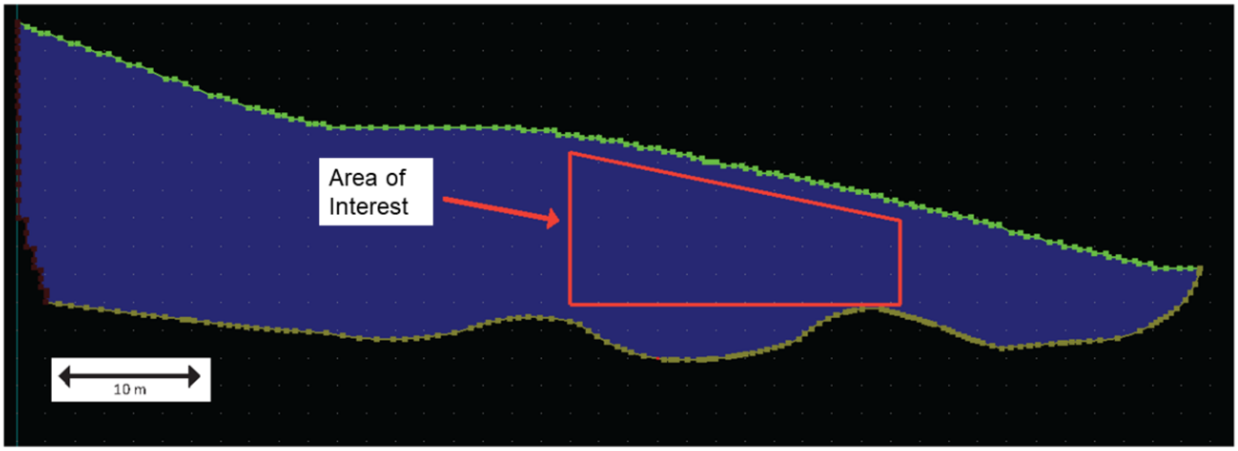


Figure 13: Domain of HYDRUS model in the HYDRUS 2D/3D GUI with the area of interest. The top is an atmospheric boundary condition, the west (left) is a gradient boundary condition, and the bottom is a seepage face boundary condition.

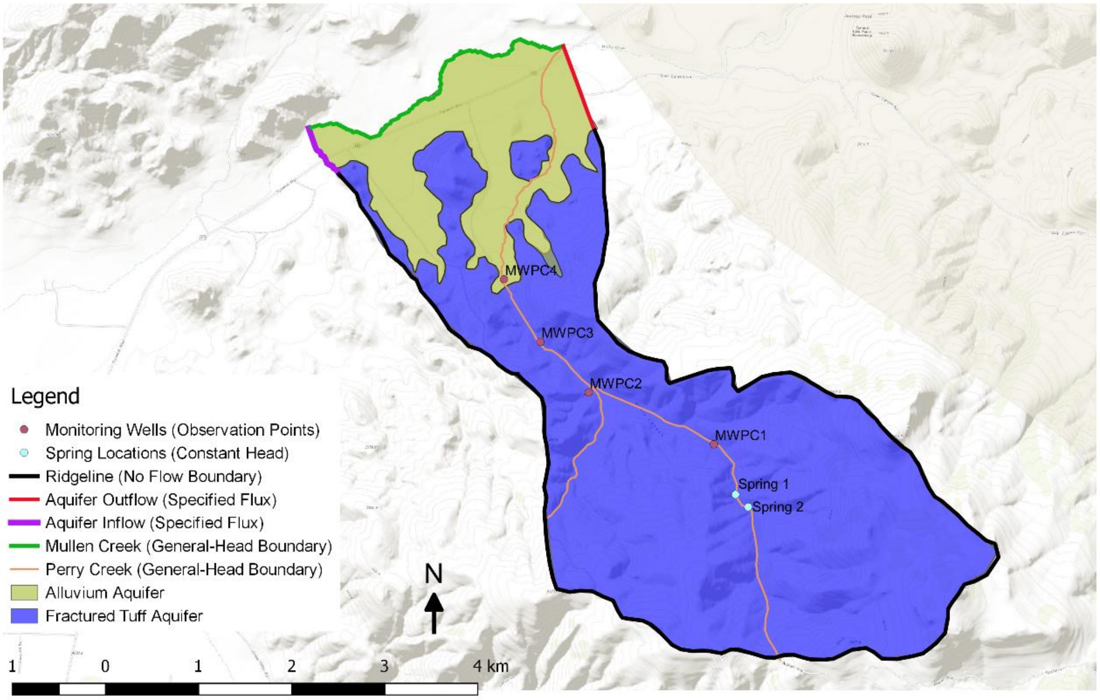


Figure 14: Groundwater model development with monitoring points, boundary conditions, and aquifers.

Results

Data Presentation and Interpretation

Groundwater

Groundwater head time-series with a bar graph of monthly precipitation is shown in Figure 15. Groundwater head has a seasonal trend, with peaks occurring in the late winter and early spring that coincide with spring runoff, and the minimums occur in the late summer and early fall, following dry periods. Groundwater head is linked to the meteorological conditions (Fig. 15) evidenced by the lowest measured heads in October of 2016 following a long drought in northern Nevada (Swaim and others, 2014). The winter of 2016-2017 was one of the largest in northern Nevada (Hatchett and others, 2017) and resulted in some of the highest measured heads in Perry Canyon. The following winter of 2017-2018 was a milder winter and the groundwater responded with lower measured heads. Then the larger winter of 2018-2019, compared to 2017-2018, caused groundwater heads to be similar to measured heads after the large 2016-2017 winter. For this reason, it is assumed that the groundwater system is dynamic with the main stress on the system being recharge from precipitation.

Groundwater also seems to have large changes in short periods (Fig. 15). In some cases, the groundwater head can change over 3 m in a month, as shown in MWPC1 between June and July 2018. The highest rate of change is in MWPC4, where the head increased 2 m over 19 days (12/20/2018 – 1/8/2019). Monitoring wells closest to the stream also observed the highest changes in head. MWPC2, which is the furthest from Perry Creek, has longer delays to head changes from precipitation than the other three monitoring wells that are adjacent to Perry Creek. This indicates that there is a strong connection between Perry Creek and the groundwater (Fig. 3) and that Perry Creek may be a source and a sink for groundwater depending on hydrologic conditions.

Results from the aquifer slug tests are shown in Figure 16. The results show a hydraulic conductivity of 0.5 m/day and 0.04 m/day for MWPC1 and MWPC2, respectively, which is consistent with hydraulic conductivities for fractured tuffs (Heath, 1983). MWPC3 yielded a hydraulic conductivity of 53.0 m/day, which is higher than those predicted by Heath (1983). However, MWPC3 has an oscillating relative displacement that indicates high conductivities (Butler and others, 2003) and may be caused by being screened in a large fracture that is able to conduct large amounts of water. MWPC4 has a result of 3.0 m/day, which is acceptable for hydraulic conductivities for unconsolidated alluvial material (Domenico and Schwartz, 1998).

MET Data

Mean air temperature, wind speed, relative humidity, and radiation time-series are shown in Figures 17, 18, and 19 for MET stations 1, 2, and 3, respectively. MET stations 1 and 3 measures incoming solar radiation and MET station 2 measures net radiation. MET station 1 (Fig. 17) is burned and destroyed in the Perry Fire and was out of service for July 20, 2018 to October 11, 2018, and missing data is estimated using gridMET. Comparing the gridMET and MET station 1 data, the data is comparable, although gridMET may estimate higher wind speed than is measured at the site, which may be caused by the location of the MET station on an east-facing hillslope that is blocked from the prevailing westerly wind direction. Air temperature, relative humidity, and solar radiation do not deviate between gridMET and MET station 1 and are representative of the site.

MET station 2 (Fig. 18) is the longest recording MET station in Perry Canyon, and was also destroyed in the Perry Fire and is out of commission from July 20, 2018 to October 26, 2018, and missing data is estimated from gridMET as well. Although, gridMET cannot be used to estimate net radiation because gridMET predicts incoming solar radiation. There are no large deviations from MET station 2 for mean air temperature and mean relative humidity, but there is a large jump from MET station data to gridMET for mean wind speed, which is also observed by MET station 1.

MET station 3 (Fig. 19), located at the transition from Perry Canyon to the alluvial valley, only had the anemometer (wind speed sensor) destroyed in the Perry Fire. Wind speed data is estimated using gridMET for July 20, 2018 to September 14, 2018 and appears to be representative of the site.

Wind speed for MET station 3 and gridMET are comparable, but gridMET predicts higher wind speeds than MET stations 1 and 2. This phenomenon may be caused by microclimates in the canyon that gridMET cannot predict, and is also noticed by Breitmeyer and others (2018) that microclimates can develop in highly variable topographic areas such as Perry Canyon.

Measured precipitation and PET are shown for MET stations 1, 2, and 3 in Figures 20, 21, and 22, respectively. Missing data from the Perry Fire is estimated using gridMET because gridMET estimates comparable values of PET for Perry Canyon (Thomas, 2017). The Figures for precipitation and PET show that most of the precipitation occurs in the winter months and very little occurs in the summer, and PET is larger in the summer and lower in the winter.

Figure 23 is a comparison of mean air temperature, mean wind speed, and mean relative humidity for MET stations 1, 2, and 3 for a period that all stations are recording verified data (October 26, 2018 to December 20, 2019). Only MET stations 2 and 3 are compared for net solar radiation because MET station 1 had a faulty pyranometer from October 20, 2018 to December 1, 2018. Also, net radiation must be calculated for MET station 3 and is done using directions by Snyder and Eching (2002). Mean air temperatures are consistent for all three sites, which means that there is not much difference between daily temperatures at the top and bottom of Perry Canyon. The mean relative humidity for the three sites is comparable and there is no observable deviation between the three, which concludes that relative humidity is consistent through the canyon. There is an observable difference between wind speed measurements for all three stations. MET station 3 observed the highest wind speeds, followed by MET station 1 then MET station 2. The maximum difference in daily average wind speed is 80%, between MET stations 2 and 3. Skidmore and others (1969) showed that a 100% increase in wind speed can double the PET, therefore, an 80% increase in wind speed can have a major influence on calculated PET. This microclimatic effect can have major implications on interpretation and modeling methods that use PET such as the numerical water balance model and the groundwater model.

The comparison for net radiation (Fig. 23) shows that MET station 2, which measures net radiation, estimates higher values in the winter and lower values in the summer compared to MET station 3, which is net radiation calculated from solar radiation. This may be from assumptions made when calculating net radiation from solar radiation including clear-sky and emissivity values or may be from site-specific factors that the calculation method does not address, such as snow-covered ground. Net radiation does have an impact on PET (Snyder, 1969), but the observed differences will not have any effect on analysis and modeling results.

Figure 24 is a comparison of precipitation and PET for the three sites. MET station 2 generally captures the highest amounts of precipitation in Perry Canyon, followed by MET station 3 then MET station 1. One would expect that MET station 1 should capture the highest precipitation because it is located at the highest elevation, but the location on a hillslope might have a strong influence on precipitation and therefore records lower precipitation. Generally, MET station 2 precipitation data is much larger than the other two stations, which may be attributed to its location at a high elevation and in a large basin with low wind speeds, which makes it a favorable location for precipitation measurement. The wind speeds at MET station 3 are much higher and the precipitation record is lower than MET station 2, which is consistent with studies that show that precipitation is sensitive to wind speeds (WMO, 2017). PET comparison between the three sites shows that MET station 2 predicts the lowest PET and MET station 1 predicts higher PET during the winter and about the same as MET station 3 during the summer. The differences in PET can be attributed to the microclimates of each station. Since MET station 2 observes the lowest wind speed, it also calculates the lowest PET, and the higher wind speeds observed at MET stations 1 and 3 results in higher calculated PET values.

Water Chemistry

Figures 25, 26, 27, 28, and 29 show the time-series of selected CoCs and a bar graph of pH for MWPC1 (background chemistry), MWPC2, MWPC3, MWPC4, and the

Jones-Kincaid adit, respectively. Lead and arsenic are selected as CoCs based on high concentrations and adverse human health effects (Thomas, 2017), and sulfate is selected as a CoC because of its relation to AMD. MWPC1 shows sulfate concentrations elevated during the winter, possibly from increased runoff that may mobilize more sulfate that is naturally occurring in the system. Lead is also observed in MWPC1, although there is no trend for lead and it only spiked in March of 2019. Arsenic is very low for the background well indicating that there might not be much naturally occurring arsenic in Perry Canyon. There is a slight trend in the pH in MWPC1, with the peaks occurring during May-June, and the lows occurring in the late summer (August-September), which may indicate the neutral waters from spring runoff are increasing the pH and then decreases during the dry summer months from naturally acid-producing reactions in the system.

MWPC2 (Fig. 26) has the highest measured concentrations of all CoCs and the lowest pH for all four monitoring wells. Arsenic and lead generally have concentrations between 0 and 100 µg/L, with some deviations occurring. Arsenic had a few spikes in March 2018, November 2018, and December 2019 at 270, 550, and 290 µg/L, respectively. Lead had only two spikes in concentration at MWPC2 in November 2018 and December 2019, at 260 and 180 µg/L, respectively. According to Akcil and Koldas (2006), the AMD reactions should increase the sulfate concentration, which is observed in MWPC2 as the sulfate concentrations are an order of magnitude larger than the background chemistry (MWPC1). This proves that AMD is present from sulfide oxidizing reactions. Akcil and Koldas (2006) also state that heavy metal concentrations should increase during AMD reactions, so there should be a correlation between sulfate concentration and heavy metal concentrations, but the MWPC2 data does not show this relationship. For example, February 2017 has the highest sulfate concentrations and lowest pH value but has relatively low arsenic and lead concentrations. Also, the November 2018 sample has the highest pH values and average sulfate concentrations but has the highest arsenic and lead concentrations. This may indicate other processes are controlling heavy metal concentrations such as geometry and the flow system around MWPC2.

MWPC3 is located on the opposite side of the creek from the Jones-Kincaid and Crown-Prince repositories, thus, might be hydrologically blocked from contaminants. Although, MWPC3 data (Fig. 27) does show elevated concentrations of lead and arsenic compared to background chemistry. There are two spikes of arsenic in January 2017 and February 2019 at 60 and 53 µg/L, and there is a period of elevated lead levels from November 2017 to November 2018 at approximately 57 µg/L. These elevated levels are an order of magnitude smaller than elevated levels in MWPC2 but are three times the concentrations of background data (MWPC1). This may indicate that MWPC3 is not hydrologically blocked from the waste rock repositories and may be connected through a system of fracture networks. However, the pH levels in MWPC3 are consistent around 7 that may indicate that the waste rock has no effect on this well and the elevated concentrations are naturally occurring, which is also theorized by Thomas (2017).

MWPC4 chemistry data (Fig. 28) has the lowest arsenic and lead concentrations of all four monitoring wells, including background chemistry (MWPC1), and has pH values around 7. MWPC4 does have sulfate concentrations greater than MWPC1, but much lower than MWPC2 and MWPC3. The increase in sulfate may be from naturally occurring sulfate in the system or may also be from the PAG waste rock repositories because of sulfate's conservative behavior. Akcil and Dondas (2006) do state that sulfate concentrations are not affected by neutralization of water, thus, if the water is neutralized, sulfate should be detected. The reason for lower lead and arsenic concentrations may be the placement of MWPC4, which may be out of the flow paths from the PAG waste rock repositories or lead and arsenic may be adsorped before reaching MWPC4 as theorized by MWH (2004). Thomas (2017) made a similar conclusion based on Piper diagrams that showed that water downgradient of sources is similar to background water chemistry rather than the water chemistry at pollutant sources, indicating that contamination is only approximate to the contamination sources.

The Jones-Kincaid adit discharge (Fig. 29) data shows zero observed arsenic, and lead levels between 0 to 12 µg/L and relatively high sulfate concentrations compared to the background data. The high sulfates may indicate AMD producing reactions, and the discharge has AMD characteristics (Fig. 2), but there are low concentrations of heavy metals. This may indicate that AMD is occurring but there is no arsenic or lead present to be mobilized from the adit. It is highly unlikely that the limestone that BLM installed at the site is neutralizing the water and removing lead and arsenic because the adit discharge is acidic at pH values between 2.5 and 3. Based on current data, there is no arsenic or lead in the system, but there are elevated levels of copper and iron from the adit discharge (Appendix A) compared to background data, indicating that AMD is occurring but not mobilizing arsenic and lead.

Figure 30 shows the lead, arsenic, and sulfate concentrations from MWPC1 to MWPC4 (downgradient) for every sample with the y-axis being log scale. The major takeaway from this figure is that the lead and arsenic concentrations are low in MWPC1 (background chemistry), then increase by one to two orders of magnitude at MWPC2, then decrease one order of magnitude at MWPC3, and finally decrease one more magnitude of order at MWPC4. MWH (2004) noticed this behavior and concluded that it is a cause of lead and arsenic being adsorped through the system, but they also stated that sulfate is not being adsorped because of its conservative behavior. Although, the sulfate concentrations are much lower at MWPC3 and MWPC4 than MWPC2, which proves that the constituent is not being adsorped but rather that MWPC4 is not in the groundwater flow path.

Figure 31 is a piper plot of all the samples collected in Perry Canyon. The Jones-Kincaid data is represented by a red triangle, MWPC1 is a green diamond, MWPC2 is a blue circle, MWPC3 is a brown square, and MWPC4 is a pink cross. MWPC1 samples are separate from all the other monitoring points with a relative even distribution of cations, although, has high sulfate concentrations similar to other monitoring points. MWPC2 is dominated by calcium and sulfate. MWPC3 and the Jones-Kincaid adit are very similar in chemistry, which may indicate that water in MWPC3 is sourced from the Jones-Kincaid adit and explains spikes in arsenic concentrations.

Figure 32 is a pe-pH diagram of iron species and samples where ORP is measured. Swallow and others (1980) states that $Fe(OH)_3$ can adsorp metal species in AMD unlike the other species present in Figure 32. All MWPC2 samples are in the ferrous iron (Fe^{2+}) which has no sorption capabilities and may explain why concentrations arsenic and lead concentrations in MWPC2 are high. Additionally, only Jones-Kincaid sample is in the ferrous iron but has low reported values of arsenic and lead. MWPC3 has samples in ferrous iron and hydrous ferric oxide and experiences occasional spikes in metal concentrations that may be attributed to this transition. Figure 33 is a pe-pH stability diagram of aqueous arsenic species that may be present in the system. MWPC1, MWPC3, and MWPC4 are all in the transition from $H_2AsO_4^-$ and H_3AsO_3 phases. H_3AsO_3 is known to be difficult to remove because of its neutrality while $H_2AsO_4^-$ is known to adsorp to clay and positively charged ions. This may explain the elevated arsenic levels measured in MWPC3 from the transition of arsenic species. Additionally, all MWPC2 samples are in the H_3AsO_3 phase and explains why arsenic is consistently high. Figure 34 shows the pe-pH stability diagram of aqueous lead species, and the data suggests that only lead (II) is present in solution, indicating that lead adsorption may be possible in the presence of iron hydroxides (Swallow and others, 1980).

Figures 35 and 36 show the relationship between head and arsenic and lead for MWPC2 and MWPC3, respectively. The purpose of these Figures is to find a possible relationship between the contaminant levels and the head, which is directly influenced by the meteorological conditions. MWPC2 shows a possible zone of elevated contamination between 1,479.5 and 1,480.5 m. There are 3 samples in this range that yielded concentrations that are relatively low, but 3 other samples in this range had the highest concentrations of lead and arsenic. These samples correspond to heads that are observed in the late summer and early fall, when the groundwater heads are the lowest, but the lowest observed head at 1479.1 m had relatively low arsenic and lead concentrations. The relatively low heads and high concentrations can be attributed to the geometry of the site, as the groundwater lowers, the flow paths might change and introduce metals to

MWPC2. Therefore, low groundwater heads in MWPC2 create the greatest potential for contamination risk. MWPC3 only observes high arsenic concentrations compared to lead, and the highest arsenic concentrations occur at the highest groundwater heads. This may be caused by more water that increases arsenic mobilizing reactions or may be caused from a fracture that is filled with water during periods of high head and is carrying elevated levels of arsenic.

Appendix B shows the duplicates compared to reported values for the well location a duplicate is taken. The graphs are a radial graph with lead, calcium, copper, iron, magnesium, manganese, zinc, alkalinity, sulfate, and arsenic with a bar graph of pH. Generally, the duplicates are similar to the reported values, although the dates of 11/14/2016, 8/21/2018, and 12/20/2019 have some constituents from duplicates and samples that have a high difference (up to 80%). These differences can be attributed to sampling contamination, changes in aquifer water chemistry, or errors from the analytical laboratory. Although the differences between the sample and duplicate can be large, it does not change the results of the study.

Soil

Figures 37 and 38 show the downgradient soil chemistry data for arsenic and lead, respectively, for samples collected by Thomas (2017) for June 2016 and February 2017, and samples collected in June 2018. The soil chemistry locations (Fig. 11) are chosen based on the continuity of data, the importance of location, and data worthy of attention (data above the reporting limits). Since the lead and arsenic concentrations are one to two orders of magnitude higher at the waste rock repositories, Figures 37 and 38 are plotted as a log scale on the y-axis to observe trends. Well 1 soil represents soil at MWPC1 and can be considered background soil chemistry, CP stands for Crown-Prince soil, Well 2 Soil stands for soil near MWPC2, UASTR stands for soil near the runoff of the Crown-Prince adit, JK stands for soil at the Jones-Kincaid adit, Flume 1 stands for soil near a flume used by Thomas (2017) and is downstream from the Jones-Kincaid adit, and Well 4 soil stand for soil near MWPC4.

For the 3 dates of soil collection, some trends in downgradient lead concentrations are noticeable, such as the increase in lead observed at the Jones-Kincaid adit, although there are no large increases in the Crown-Prince adit for June 2016 and 2018. February 2017 experienced a decrease in lead concentrations at Crown-Prince adit compared to background concentrations. All three dates do show a trend that lead increases to a max from Well 2 soil to the Jones-Kincaid adit, then experiences a sharp decrease to Flume 1, then a slight increase to Well 4 soil. However, February 2017 and June 2016 both show increases in lead at Well 4 soil that may indicate that some lead is transported downstream from the large source at the adits, but a large portion of the transported material may be deposited as it moves downstream, or that a small amount of lead with respect to the source is being mobilized.

A consistent trend for all dates of sampling is observed for arsenic. Background arsenic from Well 4 soil ranges from values below the reporting limit of 12 µg/kg to 22 µg/kg. The arsenic at the Crown-Prince soil is the highest measured value for all dates and is 5,400 µg/kg (June 2016), 3,300 µg/kg (February 2017), and 1,600 µg/kg (June 2018). The arsenic decreases to values closer to background data at Well 2 soil, then a slight increase at UASTR, then to another local maximum at the Jones-Kincaid adit, although the Jones-Kincaid adit concentrations are lower than the Crown-Prince adit concentrations. Arsenic concentrations decrease at Flume 1 soil, then a slight increase at Well 4 soil. Arsenic concentrations at Well 4 soil are a magnitude higher than background concentrations, therefore, the arsenic may be mobilized at the Crown-Prince and Jones-Kincaid sources and transported downgradient.

Water balance models are constructed for the Jones-Kincaid waste rock repository, and SWCC parameters are required for the development of the models. Thus, SWCC tests are completed for the porous media of the waste rock repository. Samples are collected in March of 2019 and are simulated using the HYPROP (UMS GmbH Munich, 2011) and chilled mirror hygrometer method (ASTM, 2014). Three tests are evaluated because of the variability of parameters that result from HYPROP SWCC (Breitmeyer and Fissel, 2017). Figures 39, 40, 41 show the SWCC data with the matric potential (ψ) plotted on the x-axis in log scale with the VWC (θ) plotted on the x-axis with the van Genuchten (1980) model fit. The test results are unrepresentative for the first two tests (Fig. 39 and Fig. 40), which is caused by the soil desiccation cracking as the sample is drying. Desiccations or tension cracks facilitate water movement and changes in pore water pressures (Krisnanto and others, 2014). When the soil cracks, there is a decrease in ψ with a constant θ, followed by a linear decrease in θ with increasing ψ. These results deviate from an SWCC (van Genuchten, 1980) and are not used for modeling purposes. Test 3 went well with a smooth SWCC and no desiccation cracking is experienced. Therefore, test 3 parameters are used for modeling purposes. However, it is important to note that the desiccation cracking will have a major contribution to the flow of water through the repository and neglecting this phenomenon may underestimate percolation rates. Although, implementing preferential flow through cracks is very difficult to implement in an unsaturated model, and for that reason, it is not included in the analysis.

Water Balance Model

Numerical Model Comparisons

The comparison for the HYDRUS and geophysics models are shown through a box and whisker plot time-series (Fig. 44) and a filled contour map of VWC distribution (Fig. 45). The box and whisker plot (Fig. 44) shows a similar distribution of VWC for both modeling results, although, the geophysics model consistently estimates a higher VWC for all dates of comparison and the HYDRUS model consistently estimates lower VWC than the geophysics results. The differences in the results may come from the limitations of each model. The geophysics may not be able to capture lower VWC because the energy is dissipated (McCullough, 2019), and the HYDRUS may be limited to the θ_r and θ_s values of the SWCC (Fig. 41). For this reason, multiple SWCC tests should be completed for a full range of model capabilities.

The filled contour map (Fig. 45) shows a comparison for each date of geophysics in a lateral view of the domain for the area on interest (Fig. 13). The results comparison for June 18, 2018 shows a similar profile of VWC, but the geophysics shows higher VWC on the east side (right side in Fig. 45) that is located near Perry Creek, and the HYDRUS results show a VWC profile of a Darcy-Richards flow representation (Beven and Germann, 2013). The geophysics from July 23, 2018 shows an “artifact” as a large spot of elevated VWC values. This may be true because there is a large precipitation event the day before and the waste rock is subject to desiccation cracks (Fig. 39 and Fig. 40) that may present pathways for fracture flow and infiltration and is also proposed by McCullough (2019). Although, the high amount of water from elevated VWC levels is unrealistic and the “artifact” may be from incorrect geophysical data. September 3, 2018 results for HYDRUS are similar to the previous date’s results and the geophysics results are showing a much different scenario. There are elevated VWC levels on the east side (right side of domain) and is also shown for the December 8, 2019 and January 5, 2020 results. The HYDRUS results are starting to see increases in VWC at the top from meteoric water. The March 30, 2020 results show the highest VWC for HYDRUS and an evenly distributed VWC for the geophysics model.

The main implication seen in the filled contour map results (Fig. 45) is that the HYDRUS model is predicting the movement of water from the top that is sourced from precipitation and the geophysics model is predicting movement from Perry Creek. Perry Creek typically flows from December to June, which matches the results from the geophysics models. Additionally, there is evidence of groundwater-surface water connections in the canyon (Fig. 3 and Fig. 15). Therefore, the HYDRUS model should account for this inflow from Perry Creek, although it is difficult to implement in the model. Methods for estimating the flow from Perry Creek and then percolation estimates are attempted, but the HYDRUS model had difficult problems converging. Convergence issues arising from near to saturation for HYDRUS have been fully documented by Whitman and Breitmeyer (2018) and Scanlon and others (2002).

Model Results

Preliminary Water Balance Results

Table 4 shows the results of the preliminary water balance design for the three tests and average and wettest water years on record. The results show a range of 0.03 m to 2.16 m and comparing this to the length of the waste rock from the geophysical surveys, which estimates the maximum thickness to be 15 m, seems to mitigate percolation. However, there are some spots on the east side of the waste rock where the estimation is below the maximum reported value of 2.16 m. From these results, there is a possibility that percolation is occurring near the thinnest sections of the waste rock, especially near Perry Creek.

For future designs, the most conservative thickness from Table 4 should be used. This means that the data from test 3 and the wettest year on record should be used to determine thin areas of waste rock that may experience percolation. Test 3 also had the most successful soil SWCC and is the best representation of the system.

Numerical Model Results

Figure 46 shows the water balance graph from HYDRUS for the period of geophysical surveys at the Jones-Kincaid waste rock. The percolation rate starts at average conditions, but as cumulative precipitation becomes larger than cumulative ET, the percolation rate increases. Since this water balance is for a short period, not much interpretation is shown. Figure 47 shows the water balance graph for current conditions (Jan. 2016 – Jan. 2020), and the estimated steady-state percolation rate for this time period starts at the average conditions rate of 4 x 10^{-6} m/day (1.8 mm/year), but as the winter of 2016-2017 arrives, the percolation rate increases to 1 x 10^{-4} m/day (36.5

mm/year). Thus, a large precipitation winter can increase the percolation rate by two orders of magnitude. Figure 48 shows the water balance for the wettest water year on record (1983) and an estimated percolation rate of 5 x 10^{-4} m/day (182.5 mm/year) that is similar to the current conditions percolation rate indicating that the current wet period is mass loading similar amounts of CoCs as the wettest year on record.

Groundwater Flow Model

Model Calibration

The groundwater model calibration for the initial steady-state period has a root mean square error (RMSE) of 0.46 m. Typically, groundwater model calibrations are evaluated by comparing to the relative error, which is the RMSE divided by the largest head difference of the model (Anderson and others, 2005). The relative error for the initial steady-state period is 0.22%, which is well under the accepted limit of 10% (Anderson and others, 2005). Figure 49 shows the observed head on the x-axis with the computed head on the y-axis with a straight line for a one to one ratio. The model fit is relatively good, all four points are on the straight line with no deviations.

Figure 50 shows the hydraulic conductivity calibration results along with the pilot points for the calibration. The hydraulic conductivities are relatively low at the top of the canyon at about 0.5 m/day and steadily increase towards the bottom of the canyon and into the alluvium aquifer to a max of 1.7 m/day. The increase in hydraulic conductivity is also seen in the slug tests (Fig. 16). Table 6 shows the hydraulic conductivities and monitoring points for the slug tests and the model calibrated values. The hydraulic conductivity at MWPC1, which is near the top of the canyon, is consistent with model hydraulic conductivities with a value of 0.5 m/day for the slug test and 0.6 m/day for the model. However, MWPC2 estimated 0.04 m/day hydraulic conductivity with the slug test, which is an order of magnitude lower than the modeled hydraulic conductivity of 0.7 m/day and may be a result of the clay layer that is in the well that causes a reduction in the slug test hydraulic conductivity or may be from the scale of the slug test, which estimates hydraulic conductivity adjacent to the well rather than the surrounding area. MWPC3 estimated a hydraulic conductivity of 53.0m/day, which is an order of magnitude higher than the modeled hydraulic conductivity, however, this may be a result of large fractures in the well that cause high a hydraulic conductivity value or may be attributed to a scale problem. MWPC4 estimated a hydraulic conductivity of 3.0 m/day that is consistent with the modeled value of 1.7 m/day and shows that calibrated hydraulic conductivities may be representative of the system.

Figure 51 shows the composite sensitivity for each calibrated parameter. The composite sensitivity is a method of determining the parameters that have a significant effect on each model iteration and is calculated using a method to normalize the parameter with respect to the observations (S.S. Papadopulos & Associates, 2018). Parameters with a higher composite sensitivity have a larger effect on the results. Perry Creek has the highest composite sensitivity indicating that the conductivity of the creek can have larger alterations on the results. Pilot points 1, 2, and 3 (shown in Fig. 50) have the next highest composite sensitivity, then Mullen Creek, then pilot point 4. Previous research has also shown that Perry Creek is the dominant hydrologic mechanism in Perry Canyon (MWH, 2004; Thomas, 2017) and is also shown through model calibration and sensitivity.

Figure 52 shows a map of the calculated heads for the groundwater system. The heads start at about 1,746 m at the top of the canyon and reach a low of 1,300 m at the bottom of the model domain near Mullen Creek. There is an increase in the head near the northwest that is from the groundwater inflow from the Mullen Creek aquifer. The head values show a trend of water flowing down the canyon and then flows to the northeast as it leaves the canyon and is consistent with the actual flow of Perry Creek, which is northwest down the canyon then flows northeast as it leaves the canyon. Figure 53 shows a time-series of the relative error for the transient model. The maximum relative error is 0.79% and is reached in September 2019. Generally, the relative error stays between 0.1 to 0.6% indicating that the results are acceptable.

Model Results

Table 7 shows the flow budget for the initial steady-state model results. The difference between inflows and outflows is 2 m^3/day and the percent difference is 0.00136%, indicating acceptable differences from the model output. Figure 54 shows the model prediction of groundwater head at each well with the observations at each well. The model shows similar trends that are observed in the observation well, although it does not capture the extreme values of trends. The results follow similar trends of observations, but the model has a difficult time adjusting to the large fluctuations of the observed head time-series. While short term resolution is not captured by the model, long-term deviations will be captured and are representative of the system.

Figure 55 shows the predicted model heads for the groundwater system to August 2049. Since this method used consistent recharge values calculated from climate normals, the system should enter an equilibrium condition. Although the climate normal predictions are done using monthly water balances, a seasonal change is predicted. The model predicts that in 2025, the model enters a dynamic equilibrium state, where the heads fluctuate on a seasonal basis but are consistent.

Figure 56 shows the model results for flow into aquifers from Perry Creek (stream recharge), flow from aquifers into Perry Creek (baseflow), and the difference between flow into the aquifer and flow out of the aquifer. The flow into the aquifer reaches a dynamic equilibrium state where the maximum occurs in March and the minimums occur in October, and baseflow also has maximums in March and minimums in October. This represents that the maximum inflow and outflows from the groundwater occur at the same time. Additionally, analyzing Figure 52, there is a trend that the stream is a gaining stream in the upper portion of the canyon and then transitions into a losing stream at the bottom of the canyon and into the alluvium aquifer. This shows that water is entering the Perry Creek near the top of the canyon and is then discharging into the aquifer at the bottom of the canyon. This is consistent with observations of streamflow occurring in the canyon and then not flowing at the bottom and into the alluvium aquifer (MWH, 2004). Net flow from Figure 56 shows that more water is discharging from the creek than flowing into the creek. This may indicate that contaminant transport may be entering the system from the creek and then later discharging into the groundwater system in the alluvial aquifer. Additionally, the model does show that the transition from gaining to losing is approximately at MWPC3, which may indicate that sources of contamination are from the stream flowing into the groundwater, however, more data is required to support this claim.

Figure 57 shows the total groundwater discharge for the model output. Maximum discharge is predicted in the winters of 2016-2017 and 2018-2019 and then moves toward a dynamic equilibrium of 155,000 m^3/day. Comparing the groundwater discharge with 2015 estimated pumping of 66 acre-ft/year from the Sutcliffe, Nevada area from the Nevada Division of Water Resources (Nevada Division of Water Resources, 2017), the total pumping is only 0.06% of the amount of water leaving the Perry Canyon groundwater system. The discharge cannot be compared to actual data and the discharge is just an estimate that seems to be too large. This may be attributed to setting the aquifer bottom at 1,000 m amsl, which creates a 300 m aquifer that is most likely much larger than the actual aquifer, however there is no data to support this. Adjusting the aquifer depth will decrease the total discharge but the final conclusions will be the same.

Transport Model

Results

Table 8 shows the time of arrival for different values of longitudinal dispersivity for the alluvium and fractured tuff aquifers and Table 9 shows the estimated mass flux equilibrium conditions. The results show that the maximum amount of time for lead to reach the Mullen Creek aquifer at a maximum concentration is 14 to 29 years and is 11 to 28 years for arsenic. The steady-state mass flux rates for lead vary from 3.4×10^{-4} to 7.7×10^{-4} kg/day·m^2 . This corresponds to an average concentration level of 0.1 to 0.2 µg/L that is well below the environmental protection agency (EPA) maximum contaminant level (MCL) of lead at 15 µg/L (EPA, 2009). Arsenic steady-state max flux rates vary from 2.2×10^{-2} to 5.0×10^{-2} kg/day·m^2. The mass flux and flow rates of arsenic are two orders of magnitude higher than lead because the concentrations of arsenic are much higher than lead at MWPC2, which corresponds to higher mass flux and flow rates. However, these flux rates correspond to an average concentration of 0.6 to 1.4 µg/L of arsenic that is also well below the EPA MCL of arsenic at 10 µg/L. Additionally, this analysis does not incorporate any chemical reaction or adsorption that may be occurring in the system and further decreasing the lead and arsenic concentrations downgradient.

Figure 58 shows the time-series for mass flux and mass flow for lead and arsenic with the range of longitudinal dispersivity for the alluvium and fractured tuff aquifer for the period of January 2016 to July 2050 at the model boundaries. The model predicts the amount of time that maximum levels of lead and arsenic are observed. Both lead and arsenic predict a maximum concentration that is a likely result of high reported concentrations of lead and arsenic measured at MWPC2, and then decrease from lower measured values of lead and arsenic.

Figure 59 shows the prediction of arsenic and lead until 2089 and a steady state (equilibrium) condition is reached. This condition is estimated from using the average value of arsenic and lead concentration in MWPC2 and the steady-state percolation rate under current conditions from the water balance model. When α_t and α_a are selected as 2 m and 0.1 m for the fractured tuff and alluvium aquifer, respectively, the steady-state mass flux is lower by two orders of magnitude when compared to when α_t is 79.4 m and α_a is 10m. The phenomenon occurs because larger longitudinal dispersivities cause the concentration to extend vertically and horizontally and increases the total mass flux, thus, larger longitudinal dispersivities will have larger mass fluxes. However, this system is an advection dominant system in the fractured tuff because there is preferential flow in the fractures, thus, the smaller values of longitudinal dispersivity are much more reasonable than larger values. Although, the dominant contaminant transport mechanism, either dispersion or advection, for the alluvium aquifer cannot be determined because of the porous media.

Conclusions

Perry Canyon AML, located in northwest Nevada, hosts AMD from adit discharge and waste rock repositories as a result of historic mining activities of the late 19th century. The concern is that contamination from lead and arsenic are entering the natural resource system and degrading the waters of the state. Additionally, there is concern that contaminants are being transported to the nearby town of Sutcliffe, Nevada and contaminating municipal water supply. This study investigates the potential for municipal water supply contamination and natural resource degradation through data analysis and modeling techniques.

Data collection included groundwater head, water chemistry, meteorological data, soil chemistry, and soil hydrologic properties. Groundwater head data shows that there are seasonal fluctuations of head that are controlled by the climate conditions. The highest heads are measured in January of 2017 and January 2019, which are in large precipitation winters. Conversely, the lowest measured heads are in October 2016, which is at the end of a long drought in the region.

Water chemistry data shows that MWPC2 consistently has the highest measured CoCs concentrations likely from it being adjacent to the Crown-Prince well. The chemistry data also shows that arsenic and lead are not present in MWPC1, which is considered background chemistry, and is present at MWPC2 and MWPC3, but is not present in MWPC4. Additionally, sulfate, which is a CoC, has the same trend as lead and arsenic but is detected in MWPC4. One reason for this trend is that arsenic and lead are being adsorped in the system and that sulfate is not because it is conservative, and another reason is that the flow paths do not lead to MWPC4 and the elevated sulfate in MWPC4 is naturally occurring. Pe-pH diagrams of iron and arsenic species are presented with sample locations. The results show that adsorption of metals is possible from hydrous ferric oxide ($Fe(OH)_3$) at MWPC3, and arsenic is present in species that are easily adsorb and difficult to adsorb in MWPC3, which may explain the associated spikes seen in MWPC3.

There are three meteorological stations in Perry Canyon. MET station 1 is located at the top of the canyon, MET station 2 is in the middle of the canyon, and MET station 3 is located at the transition from the canyon into the alluvial valley. All three stations are collecting data on temperature, relative humidity, wind speed and direction, radiation, and precipitation. Comparisons for all three sites show that MET station 2 estimates the lowest wind speed and as a result, estimates the highest precipitation and the lowest PET. MET station 2 is also the longest-running station in Perry Canyon (January 2016 – present), thus, MET station 2 data is used for all analysis and modeling.

Soil chemistry data shows that arsenic and lead are elevated at the waste rock repositories and then decrease downgradient of the repositories, but are much higher than background soil chemistry, which is soil at MWPC1. This means that some lead and arsenic may be transported downgradient from the sources, but the extent of the transportation is unknown.

SWCC tests are conducted on the Jones-Kincaid waste rock. Two of the tests desiccated and caused erroneous results, although, one test did not desiccate and is representative of the hydrologic properties of the waste rock. However, it must be recognized that the desiccation cracks in the first two test show that desiccation does happen in the field and can create macropores and preferential flow paths that can increase actual percolation compared to estimated percolation.

Analytical and numerical water balance methods are conducted on the Jones-Kincaid waste rock repository. The analytical method showed that the maximum length of the waste rock to mitigate percolation is 2.16 m. The thickest section of the waste rock is 15 m, but the waste rock is less than 2 m near Perry Creek, indicating that percolation is the highest at this section. Future remediation designs should focus on improvements at the area adjacent to the creek to mitigate any percolation.

The numerical water balance model is completed through HYDRUS 2D/3D modeling software. The results showed that percolation can range from 1.8 mm/year to 182.5 mm/year. 1.8 mm/year is considered to be small and negligible but 182.5 mm/year is considered a large percolation rate (Apiwantragoon and others, 2015). Additionally, a change of an average water year to the wettest water year can increase the percolation rate by two orders of magnitude, thus, cover designs should be made for the wettest year on record.

Comparisons to a geophysical estimation of VWC (McCullough, 2019) and the HYDRUS results is done for the Jones-Kincaid waste rock repository. Both models estimate similar ranges of VWC for the site, although, the geophysics method consistently predicts higher VWC and the HYDRUS model predicts lower VWC. The discrepancies can be attributed to the assumptions and limitations of both methods. The HYDRUS range of VWC is limited to results of the SWCC and the geophysics may overestimate the total VWC because of seismic energy dissipation. However, the models are comparable and may indicate reasonable results. The spatial comparisons of the two sites are much different. HYDRUS predicts the input of water is through meteoric water at the top and the geophysical model predicts that the source of water is recharge from the creek. While this may be true, current data cannot show the method of inputs into the Jones-Kincaid waste rock repository with accuracy. Additionally, if the main input is from the creek, the numerical water balance percolation estimation may be underestimated, and further improvements must be made for the model for representable results.

The groundwater model for the Perry Canyon system is completed using MODFLOW (Harbaugh, 2005) through the GMS GUI (Aquaveo, 2018). The boundary conditions are a no flow for the ridgeline, specified flow for the northwest section of the Mullen Creek aquifer, specified discharge for the northeast section of the aquifer, and a general-head boundary for the Mullen Creek and Perry Creek. All springs are surveyed and set as a constant head. The model is oriented to 25 degrees northwest to match the direction of flow and set at 25 m spacing to reduce the influence of monitoring points on the results. The model is calibrated using a pilot point method to account for the heterogeneity of the system and four pilot points are used to match the four observation points (Doherty, 2003). The model is calibrated for February 2016, which is the beginning of the transient model and the start of MET station 2 data. The calibration and sensitivity results show a good calibration with a relative error of 0.22%, and the sensitivity analysis shows that Perry Creek conductivity is the most sensitive parameter, which is expected because it is the dominant hydrologic mechanism in the system. The calibrated heads show a trend of high heads at the top of the canyon where Perry Creek begins that steadily decreases towards the northeast of the model domain, with slight increases in heads at the northwest from the groundwater inflows from the Mullen Creek aquifer.

Groundwater model transient results show a trend that follows the observed heads but is unable to capture the extreme fluctuations observed at the site. Future predictions of groundwater heads show a consistent seasonal trend of groundwater that is considered to be a dynamic equilibrium condition. This is also seen for groundwater flows into and out of Perry Creek and total groundwater discharge. Model results for flows into and out of Perry Creek show that the maximums amount of flow into and out of the creek occur in March and minimums occur in October, although, the net flow is out of Perry Creek and into the aquifer. This shows that water is entering Perry Creek in the top of the canyon and then transitions into a losing stream at the bottom of the canyon and water is discharging into the aquifer at the lower reaches of the canyon and into the alluvial valley and Mullen Pass. This mechanism may be the dominant transport mechanism, meaning that contaminants are entering the creek from the waste rock and then discharging into the aquifer, however, more data is required to prove this idea.

Finally, a transport model is developed using MT3DMS (Bedekar and others, 2016, Zheng and Wang, 1999) through the GMS GUI (Aquaveo, 2018). The model development consists of setting the waste rock repositories as the source of contaminants with the recharge rate being the current conditions percolation from the numerical water balance model. The input concentrations are set as the concentration of lead and arsenic from MWPC2 water chemistry data because it is assumed that this chemistry is representative of both repositories because they are in the same vein system (Bonham, 1969; Garside and others, 2000). The porosity is set as a constant value that is considered to be in the lower range from literature. The longitudinal dispersivity is set as a range from literature and then further adjusted to obtain model convergence with the largest range possible. The results show that estimated time for contaminants to arrive at the boundaries of the Perry canyon model are 11 to 29 years for lead and 11 to 28 years for arsenic, based on chemistry and current climate data. The model is then simulated to reach a steady-state (equilibrium) condition for mass flow and mass flux using the average concentrations of measured lead and arsenic in MWPC2 and steady-state groundwater discharge rates. The amount of time to reach steady-state for lead is 62 to 64 years and 61 to 66 years for arsenic. The steady-state mass flux for lead is 3.4×10^{-4} to 7.7×10^{-4} kg/day·m^2 and 2.2×10^{-2} to 5.0×10^{-2} kg/day·m^2 for arsenic. The reason for the large increase from lead to arsenic is the larger measured concentrations of arsenic at MWPC2 and results in larger mass flows of arsenic. Additionally, the estimated concentrations at the output of the Perry Canyon domain is much lower than EPA MCL, and assuming more water will enter the system before reaching the municipal wells and some contaminants may be adsorped in the flow paths, it is unlikely that CoC are contaminating and degrading the public water supply in Sutcliffe, Nevada.

The potential for downgradient contamination to human populations is low, however, the decrease in pH and increase in lead and arsenic near the waste rock repositories indicates that contamination may be approximate to the sources and can have negative ecological impacts. Therefore, more work can be done to mitigate the AMD in the system and improve the ecosystem’s health.

Recommendations for future work

The lack of data for analysis and modeling is discernible. Future work may include additional monitoring wells in the alluvial system to possibly detect CoC further downgradient of MWPC4 and improve the calibrated groundwater model. Additionally, more water chemistry data will allow for the development of a calibrated transport model that will be more representative of the system than what is done in this study.

Furthermore, a major takeaway from this study is that contaminants may be entering the system through gaining reaches of the creek and then discharging into the aquifer through the losing reaches of the creek. Deployment of pressure transducers and piezometers at the surface water-groundwater interface will be able to detect and specify the areas that the creek is either a gaining or losing reach, which will then prove or disprove the theories presented in this thesis.

Sensors can be installed in the Jones-Kincaid waste rock repository and the adjacent creek for an improved numerical water balance model to obtain more represented percolation rates. This may also improve the transport model to obtain better flux and flow rate of CoC.

Finally, designs can be made to mitigate percolation at the waste rock repositories. This can be done using materials already in Perry Canyon for cost designs, however, more tests must be done on the materials to develop the most effective solution.

Table 3: Parameters from the van Genuchten model results for the three SWCC with the mean and standard deviation.

Test	α (1/m)	n (-)	θ_r (m³/m³)	θ_s (m³/m³)	K_s (m/day)	τ (-)
1	2.82	1.148	0	0.560	9.92×10^{-2}	-5.009
2	1.36	1.157	0	0.454	4.49×10^{-2}	-3.131
3	3.19	1.398	0.116	0.396	2.30×10^{-2}	-3.226
Mean	2.46	1.234	0.0387	0.470	5.57×10^{-2}	-3.789
σ	0.79	0.116	0.0547	0.0680	3.23×10^{-2}	0.864

Table 4. Results from the preliminary water balance design of the Jones-Kincaid waste rock.

SWCC Test	θ_c (m³/m³)	θ_m (m³/m³)	Water Year	S_r (m)	L (m)
1	0.407	0.202	Average	0.0059	0.03
			Wettest	0.18	0.89
2	0.352	0.195	Average	0.0059	0.04
			Wettest	0.18	1.17
3	0.224	0.139	Average	0.0059	0.07
			Wettest	0.18	2.16

Table 5: Steady state percolation rates for current, average, and wettest conditions from HYDRUS results.

Conditions	Steady State Percolation Rate (m/day)	Steady State Percolation Rate (mm/year)
Current (Jan. 2016 – Jan. 2020)	1×10^{-4}	36.5
Average (Water Year 1991)	4×10^{-6}	1.8
Wettest (Water Year 1983)	5×10^{-4}	182.5

Table 6: Estimated slug test and groundwater model hydraulic conductivities.

Site	**Slug Test Hydraulic Conductivity (m/day)**	**Modeled Hydraulic Conductivity (m/day)**
MWPC1	0.5	0.6
MWPC2	0.04	0.7
MWPC3	53.0	1.4
MWPC4	3.0	1.7

Table 7: Groundwater model calibration flow budget results.

Sources/Sinks	**Flow In (m^3/day)**	**Flow Out (m^3/day)**
Mullen Creek Aquifer Groundwater Inflow	49,895	0
Mullen Creek Aquifer Groundwater Discharge	0	50,000
Perry Creek	89,433	19,367
Mullen Creek	0	77,823
Recharge	7,860	0
Total	**147,188**	**147,190**
Summary	In - Out	% Difference
Sources/Sinks	2	0.00136%

Table 8: Time to reach maximum concentrations for lead and arsenic based on range of parameters.

Species	**η_a (%)**	**η_t (%)**	**α_a (m)**	**α_t (m)**	**Time to reach maximum mass flux/flow (years)**
Lead (Pb)	35	5	0.1	2	29
			10	79.4	14
Arsenic (As)	35	5	0.1	2	28
			10	79.4	11

Note: η_a and η_t are the porosity of alluvium and fractured tuff, respectively. α_a and α_t are the longitudinal dispersivity values for alluvium and fractured tuff, respectively.

Table 9: Future estimations of contaminant fate and transport of lead and arsenic for the Perry Canyon system.

Species	**η_a (%)**	**η_t (%)**	**α_a (m)**	**α_t (m)**	**Time to reach equilibrium conditions (years)**	**Steady state average concentration (μg/L)**	**Steady State Flux (kg/day·m^2)**
Lead (Pb)	35	5	0.1	2	62	0.1	3.4 x 10^{-4}
			10	79.4	64	0.2	7.7 x 10^{-4}
Arsenic (As)	35	5	0.1	2	61	0.6	2.2 x 10^{-2}
			10	79.4	66	1.4	5.0 x 10^{-2}

Note: η_a and η_t are the porosity of alluvium and fractured tuff, respectively. α_a and α_t are the longitudinal dispersivity values for alluvium and fractured tuff, respectively.

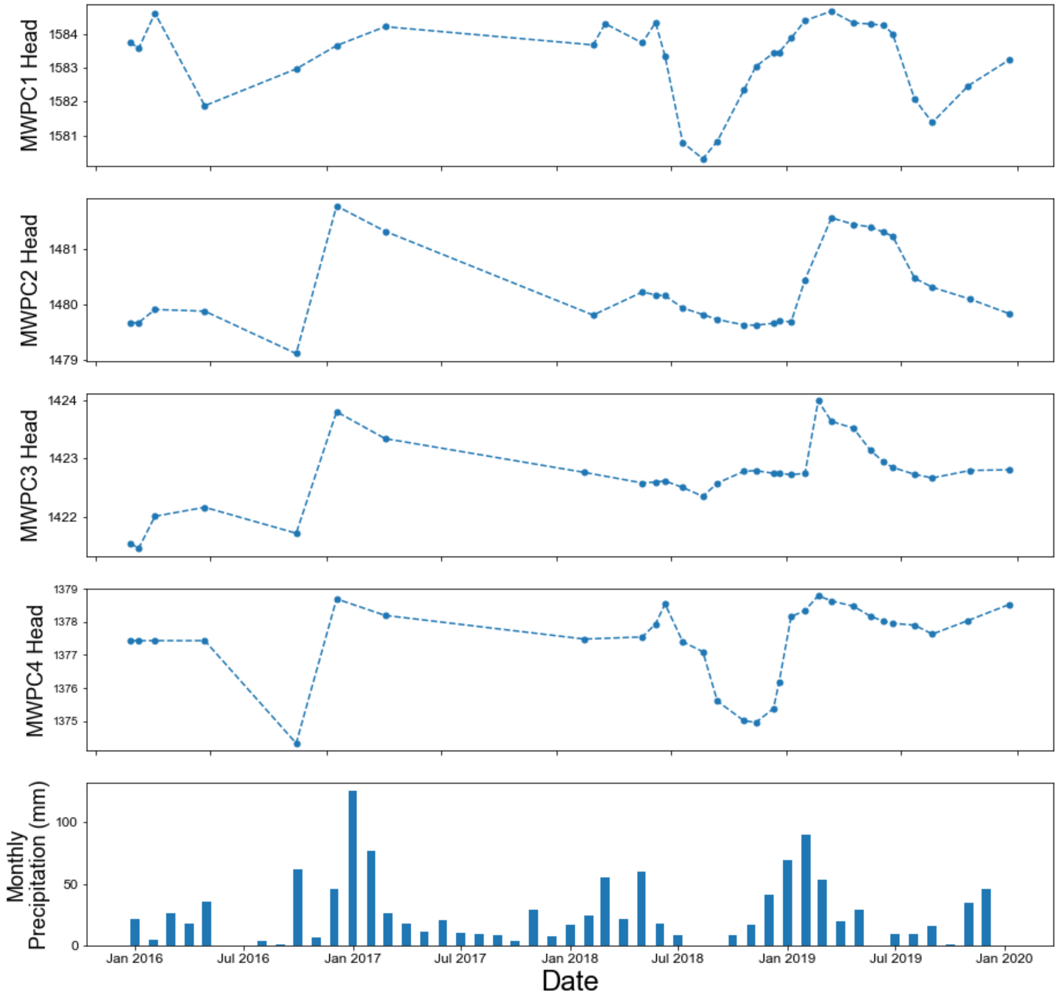


Figure 15: Time-series of groundwater head measurements at the four monitoring wells for January 2016 to January 2020 and a bar graph of monthly precipitation for the same period. Groundwater heads have a trend similar to meteorological data, as increases so do the groundwater heads, and groundwater heads decrease after dry periods.

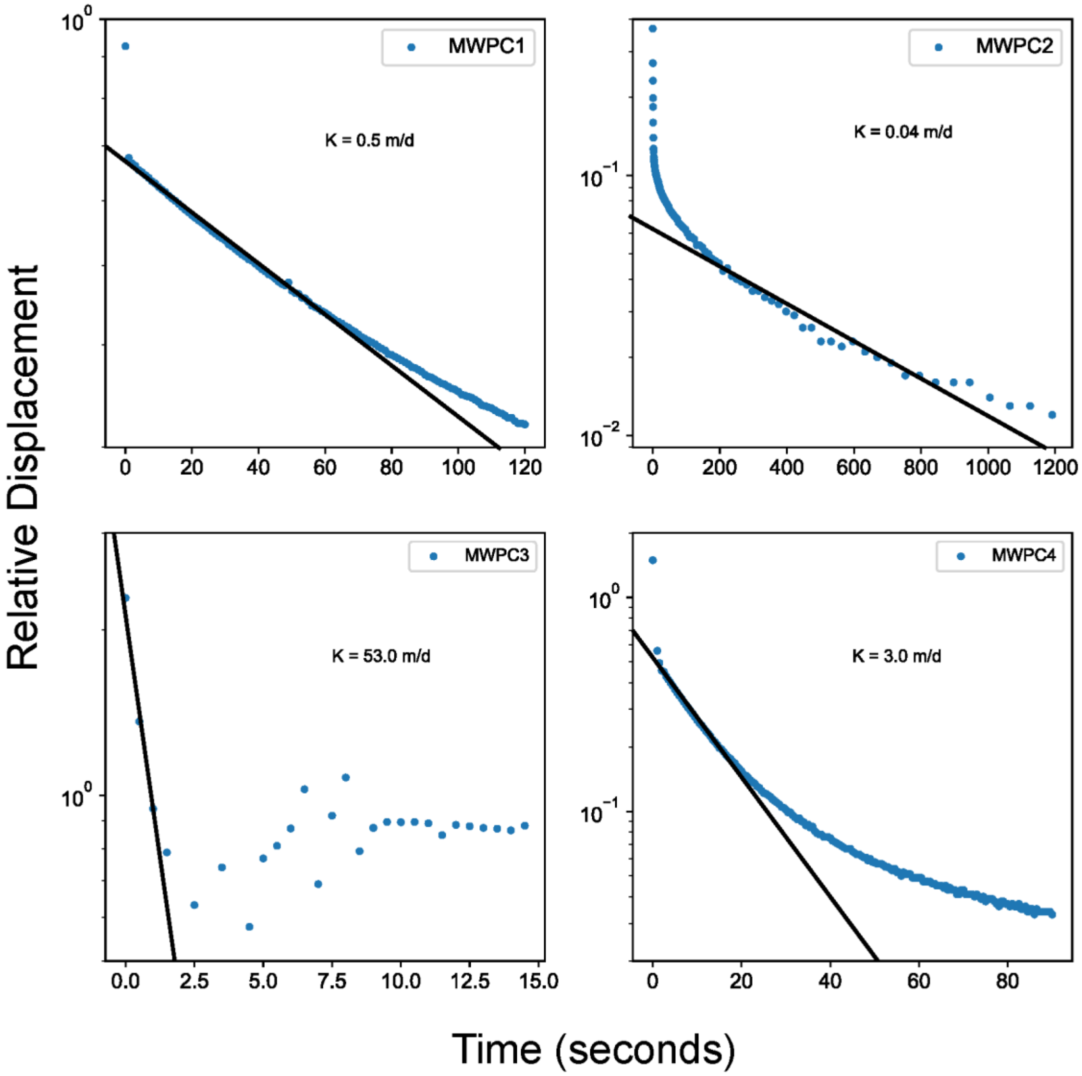


Figure 16: Four graphs showing the relative displacement data for the slug tests of the four monitoring wells and the best approximate straight line to determine the hydraulic conductivity (Eq. 1) based on the Bouwer and Rice method (1976). MWPC1, MWPC2, and MWPC4 hydraulic conductivity estimates are reasonable for the aquifer, but MWPC3 estimates a high conductivity for fractured tuff that may be a result of a large fracture that has a high conductivity.

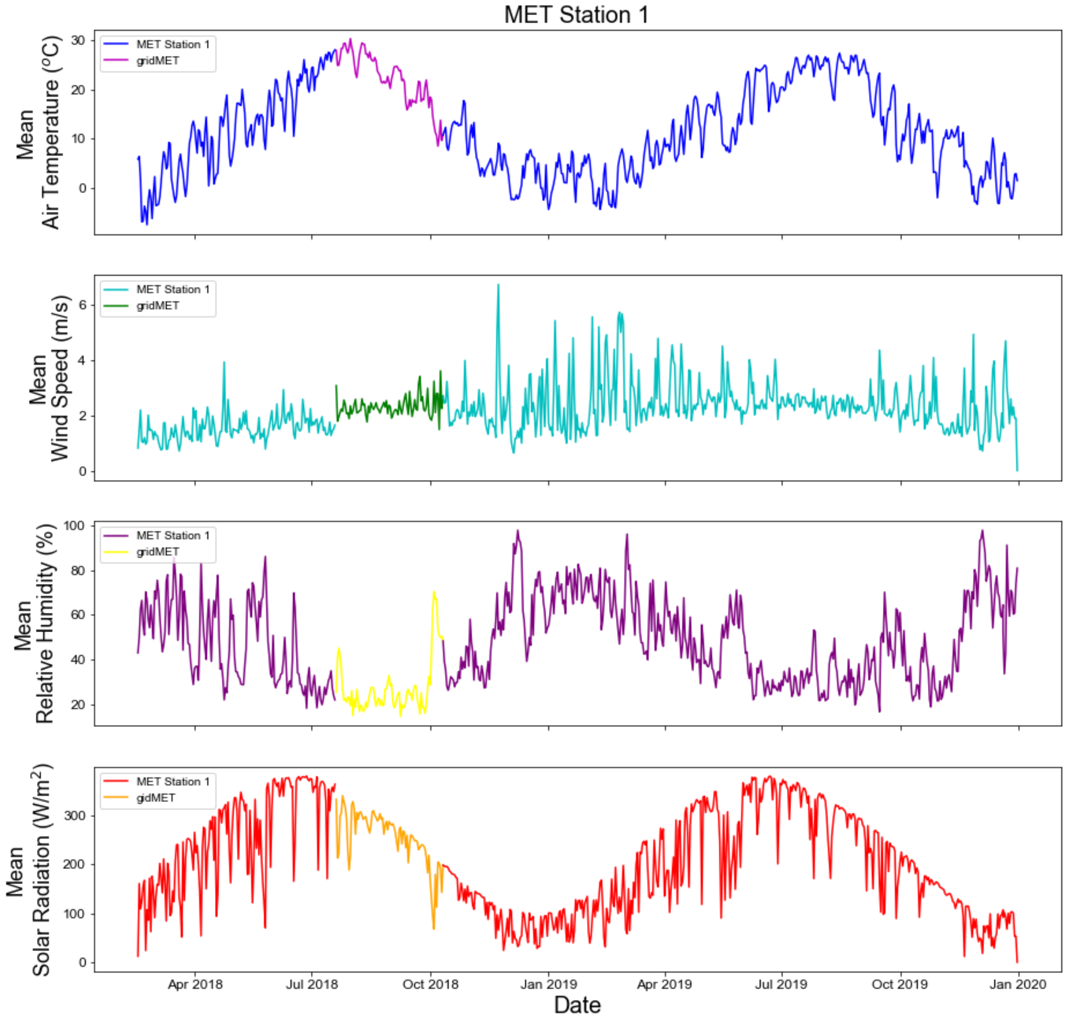


Figure 17: Daily mean air temperature, daily mean wind speed, daily mean relative humidity, and daily mean solar radiation for MET station 1. Missing data is estimated using gridMET, and is comparable for all measurement except wind speed, where gridMET estimates a higher wind speed than measured.

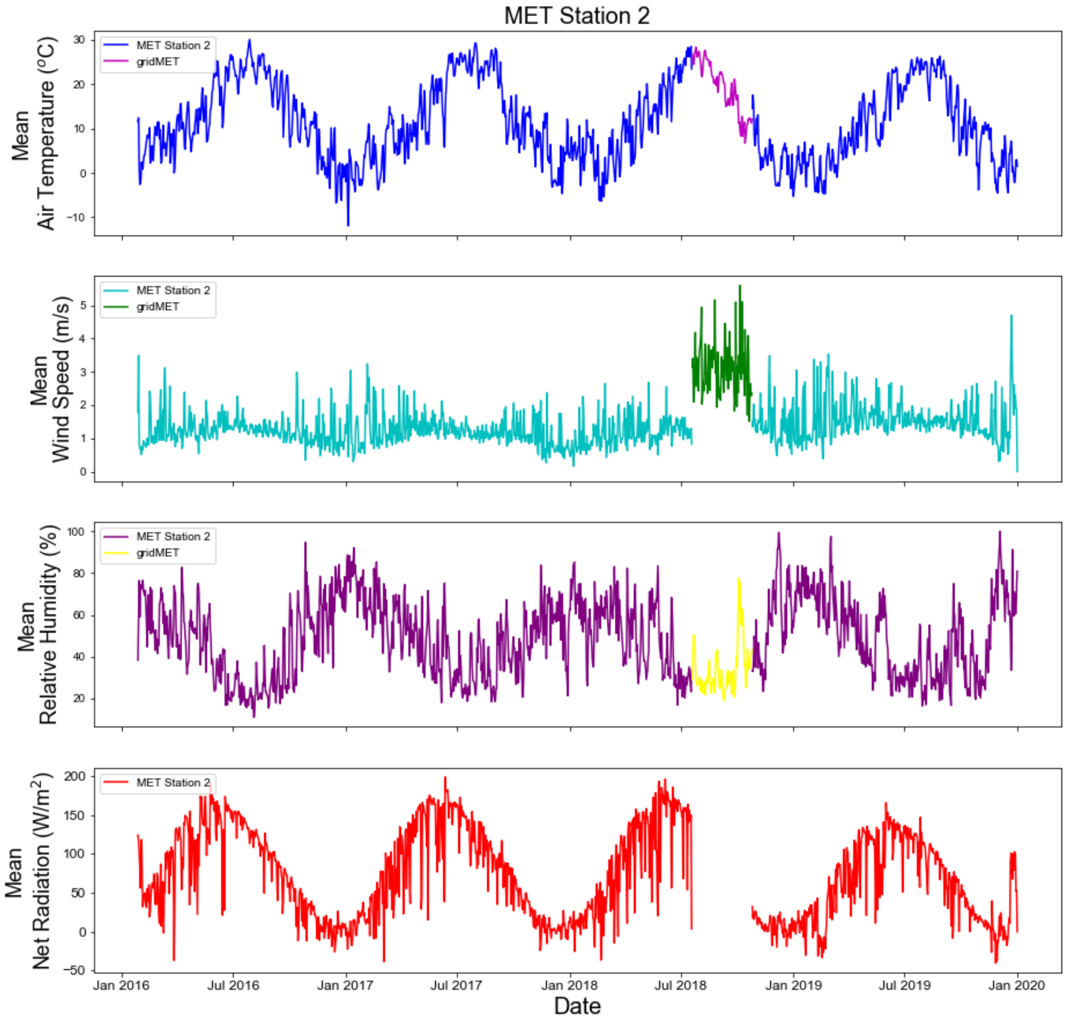


Figure 18: Daily mean air temperature, daily mean wind speed, daily mean relative humidity, and daily mean net radiation for MET station 2. Missing data is estimated using gridMET except for mean net solar radiation because gridMET reports solar raditation and not net radiation. GridMET and station data are comparable except for wind speed, gridMET predicts higher wind speeds than MET station 2 measures.

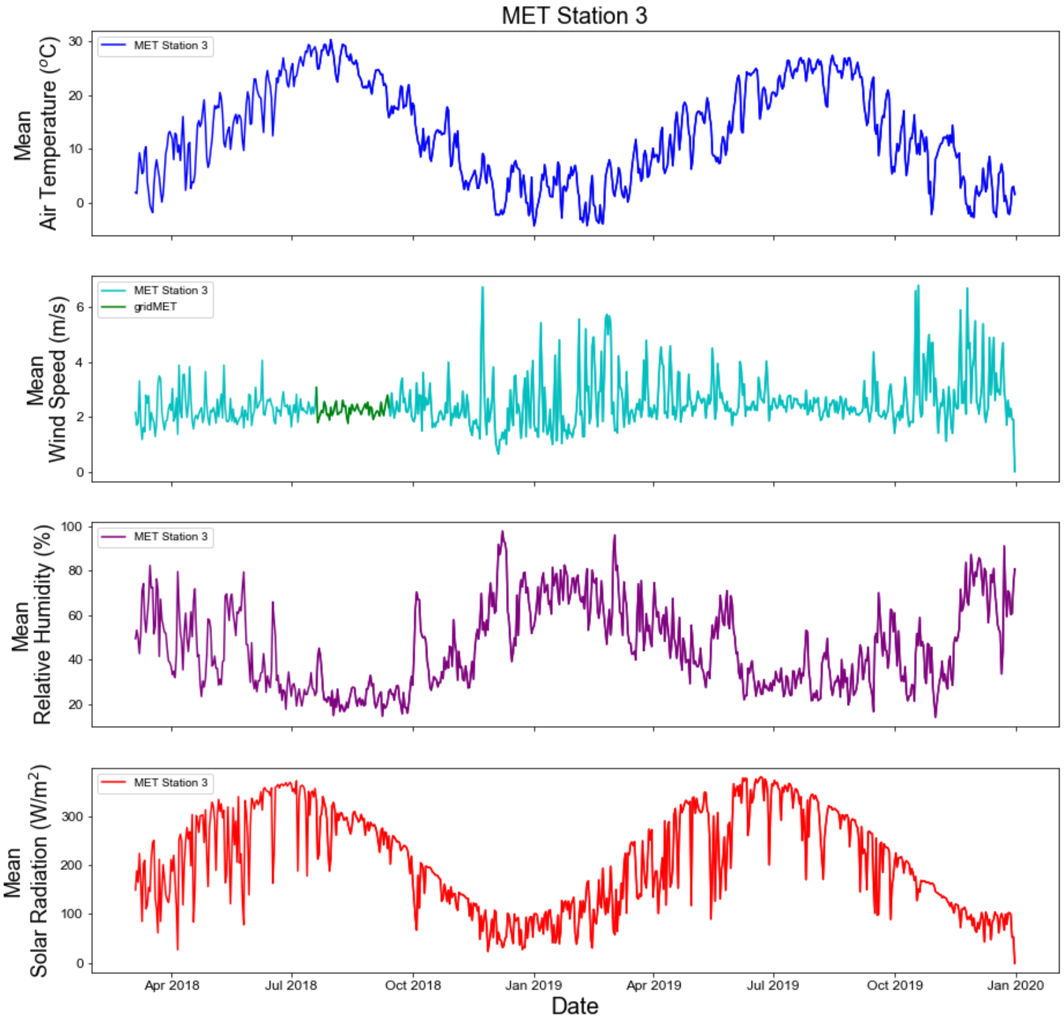


Figure 19: Daily mean air temperature, daily mean wind speed, daily mean relative humidity, and daily mean solar radiation for MET station 3. Missing wind speed data is estimated using gridMET and is comparable to measured data.

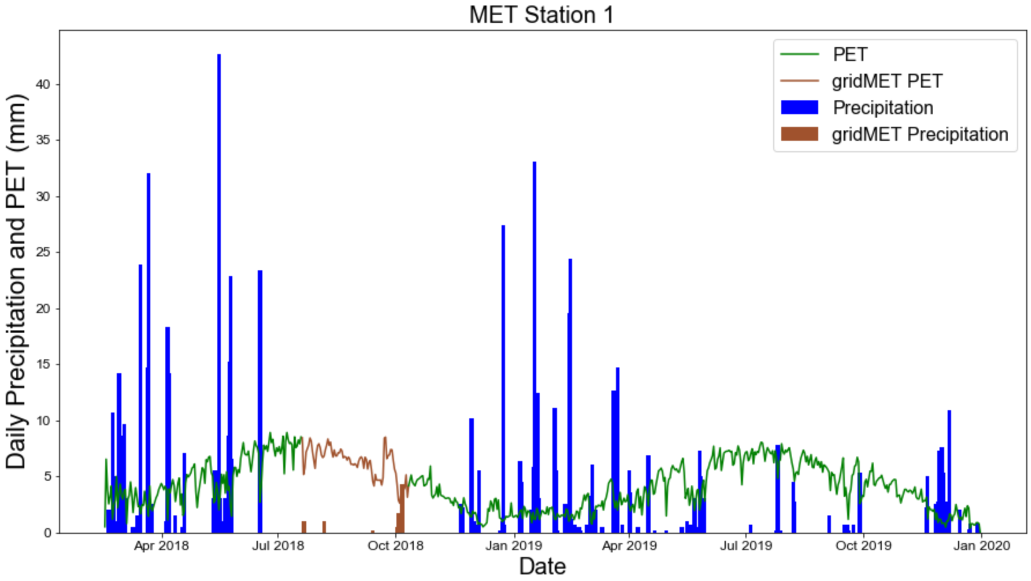


Figure 20: Daily precipitation plotted as a bar graph with daily PET plotted as line for MET station 1 with missing data estimated from gridMET.

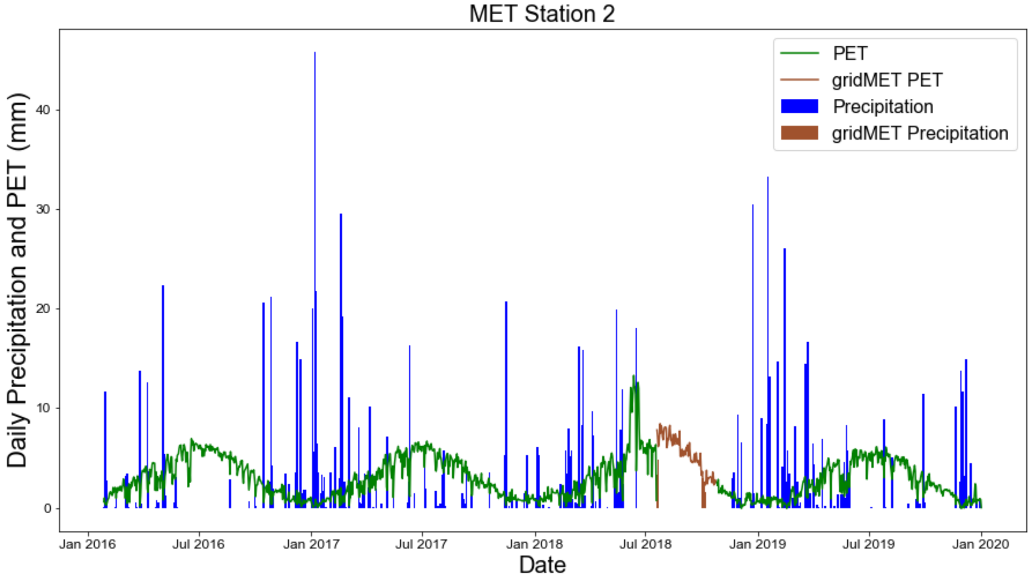


Figure 21: Daily precipitation plotted as a bar graph with daily PET plotted as line for MET station 2 with missing data estimated from gridMET.

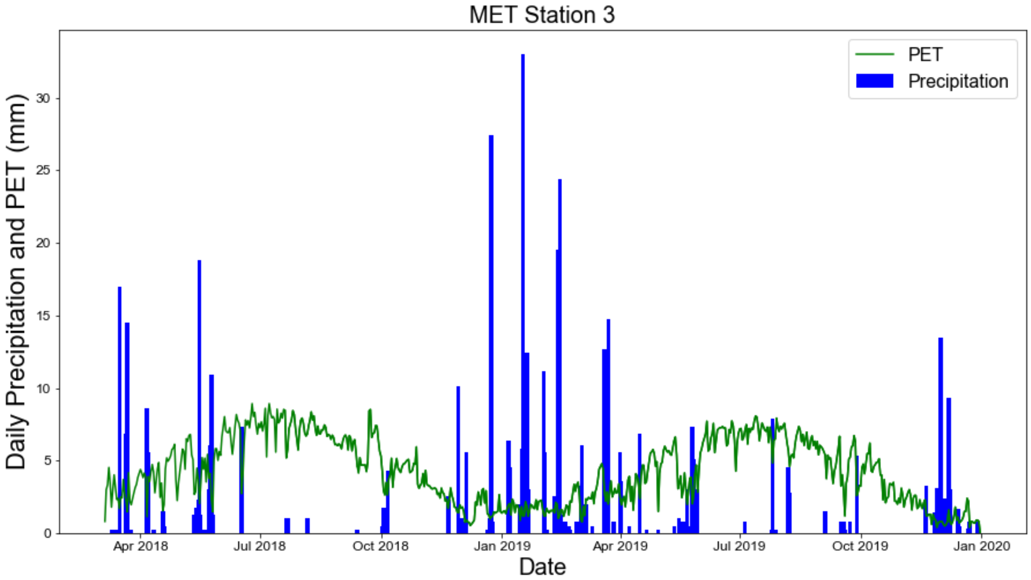


Figure 22: Daily precipitation plotted as a bar graph with daily PET plotted as line for MET station 3.

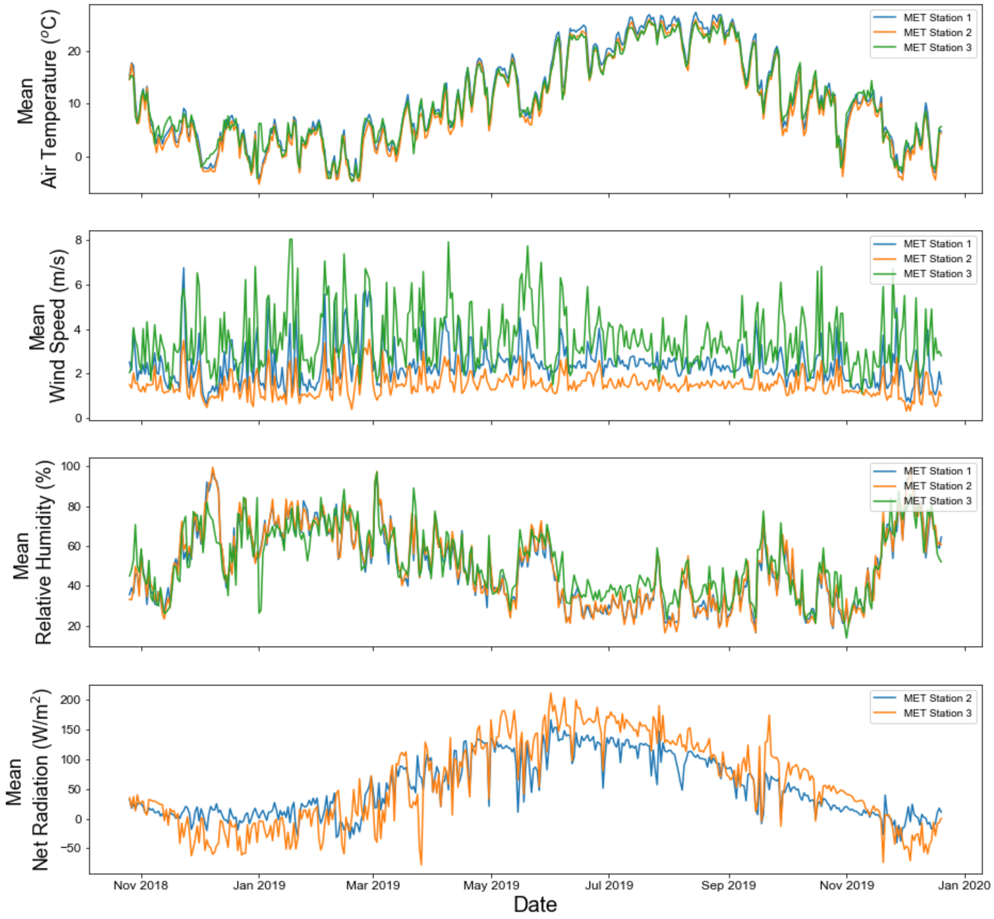


Figure 23: Comparisons of daily mean air temperature, daily mean wind speed, daily mean relative humidity for MET stations 1,2, and 3, and a comparison of measured net radiation for MET station 2 and calculated net radiation for MET station 3. Comparison is for verfified data from all three MET staions for October 26, 2018 to December 31, 2019.

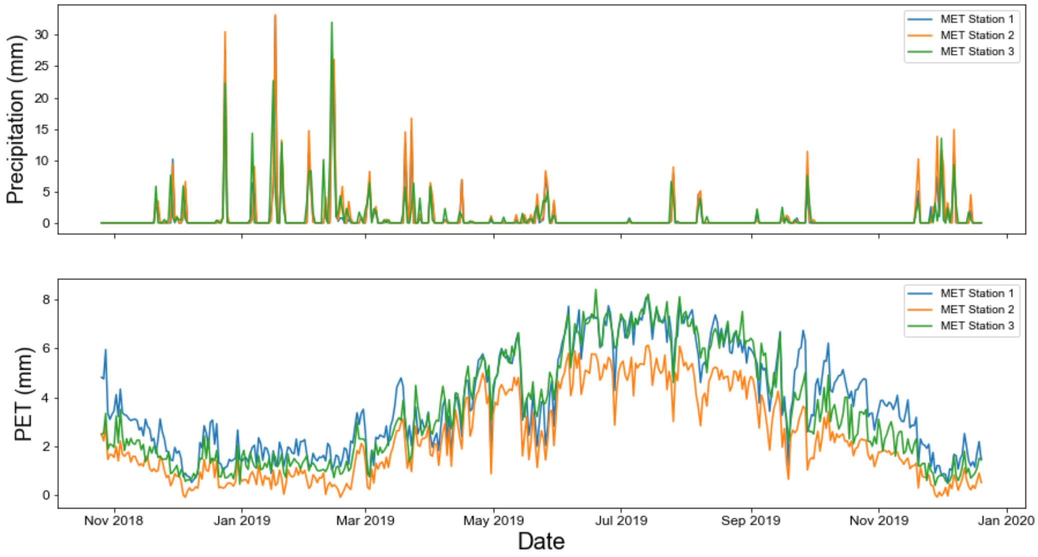


Figure 24: Comparisons of precipitation and PET for all three MET stations for October 26, 2018 to December 31, 2019. MET station 2 predicts the highest amount of P, followed by MET station 3, then MET station 1. MET station 2 predicts the lowest PET and MET station 1 predicts the highest PET, although MET stations 1 and 3 estimates comparable results in the summer.

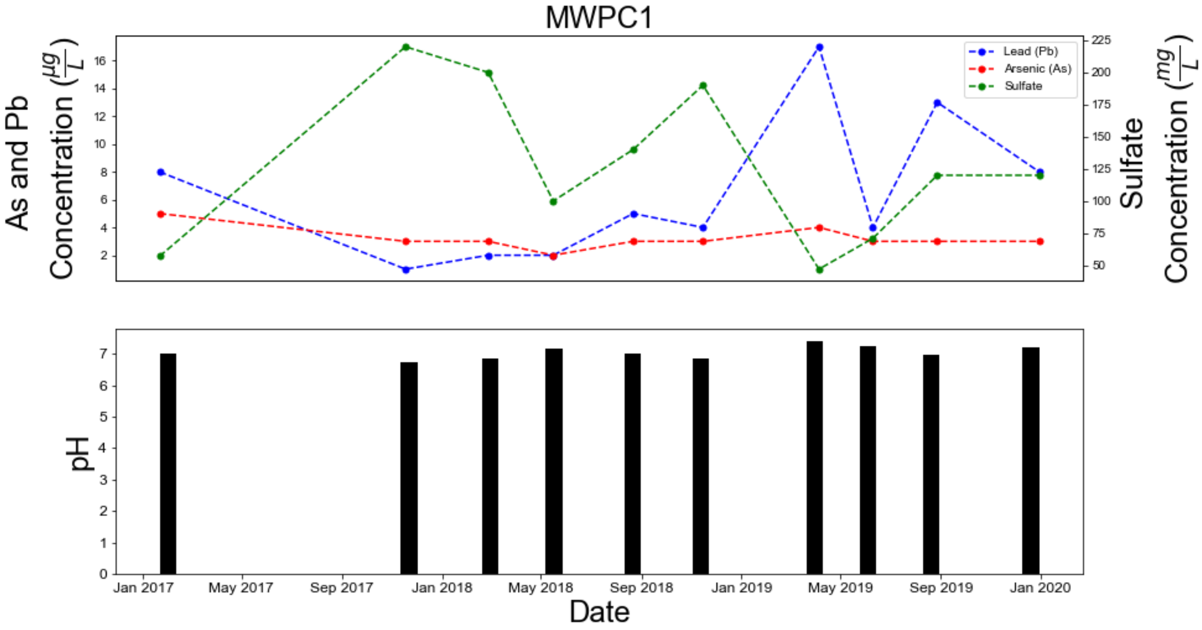


Figure 25: Time-series of MWPC1 chemistry data with arsenic and lead plotted on the top left y-axis, sulfate on the top right y-axis, and pH plotted below as a bar graph for January 2016 to December 2019. This data is considered background chemistry so all contaminants are considered naturaaly-occuring. There is some naturally-occuring lead and sulfate in the system evidenced from 16 µg/L of lead and 225 mg/L of sulfate. There is almost no naturally-occurring arsenic in the system.

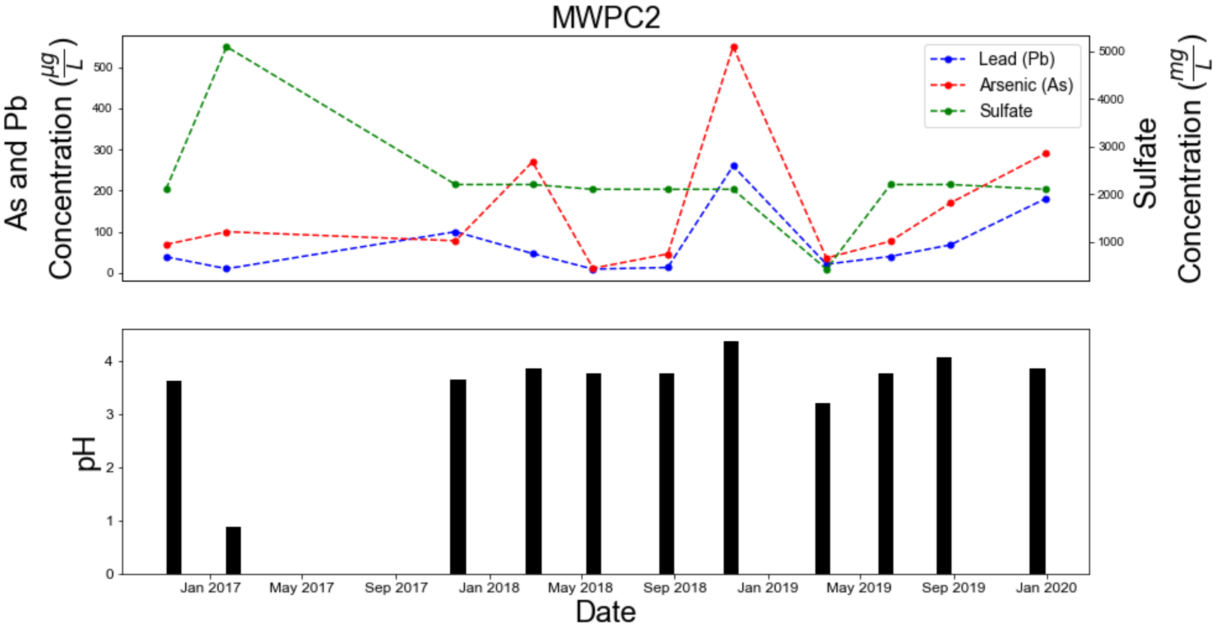


Figure 26: Time-series of MWPC2 chemistry data with arsenic and lead plotted on the top left y-axis, sulfate on the top right y-axis, and pH plotted below as a bar graph for January 2016 to December 2019. MWPC2 has the highest concentrations of CoC of all monitoring points. The highest measured lead and arsenic are 260 µg/L and 550 µg/L, respectively. The water is acidic with pH values between 1 and 4.

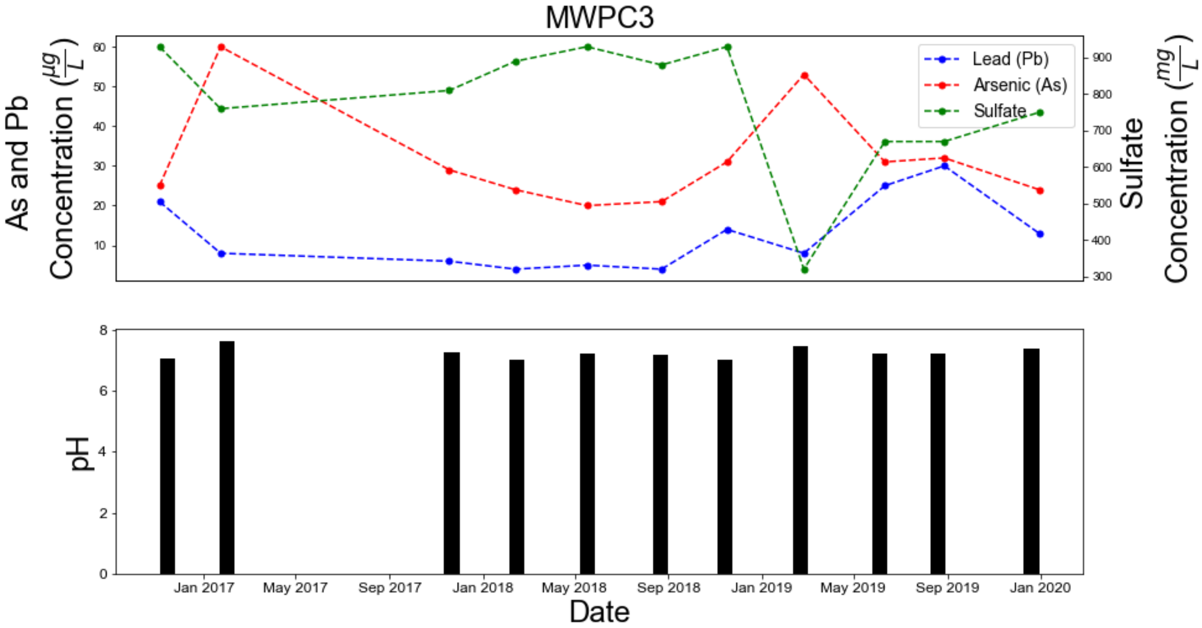


Figure 27: Time-series of MWPC3 chemistry data with arsenic and lead plotted on the top left y-axis, sulfate on the top right y-axis, and pH plotted below as a bar graph for January 2016 to December 2019. Although MWPC3 is considered to be hydrologically block from the waste rock repositories, there are elevated levels of contaminants compared to background chemistry. The pH of the water is around 7, indicating that it may not be connected to the waste rock repositories.

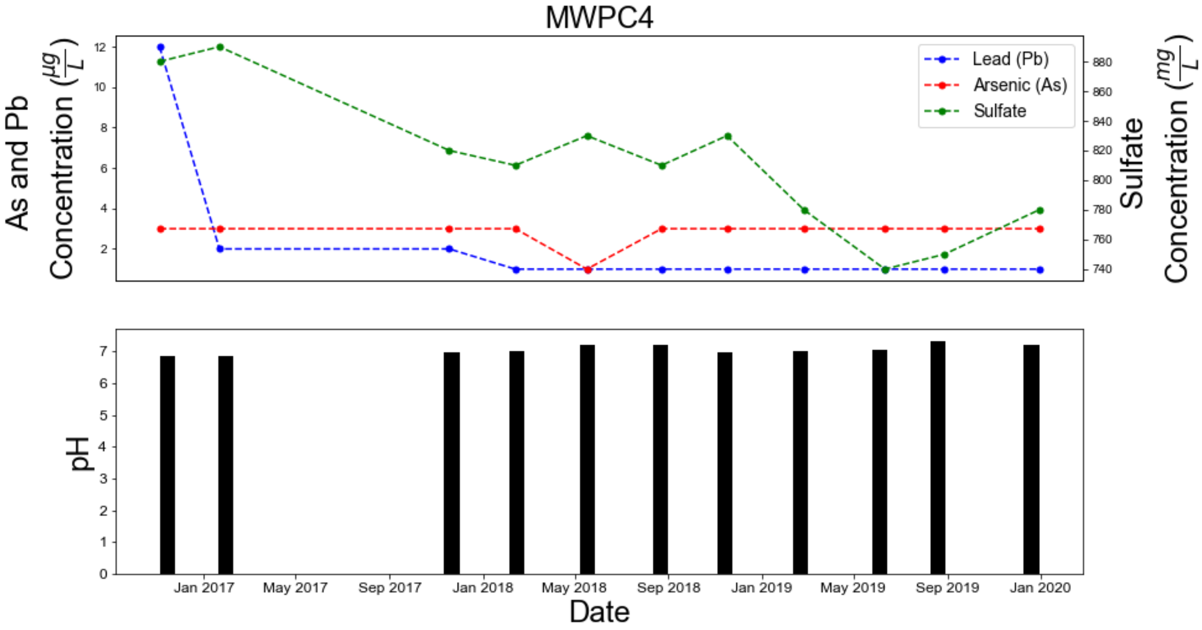


Figure 28: Time-series of MWPC4 chemistry data with arsenic and lead plotted on the top left y-axis, sulfate on the top right y-axis, and pH plotted below as a bar graph for January 2016 to December 2019. MWPC4 has the lowest concentrations of CoC of all monitoring points. This may be from postivie remediation results or the well is not in the groundwater flowpaths.

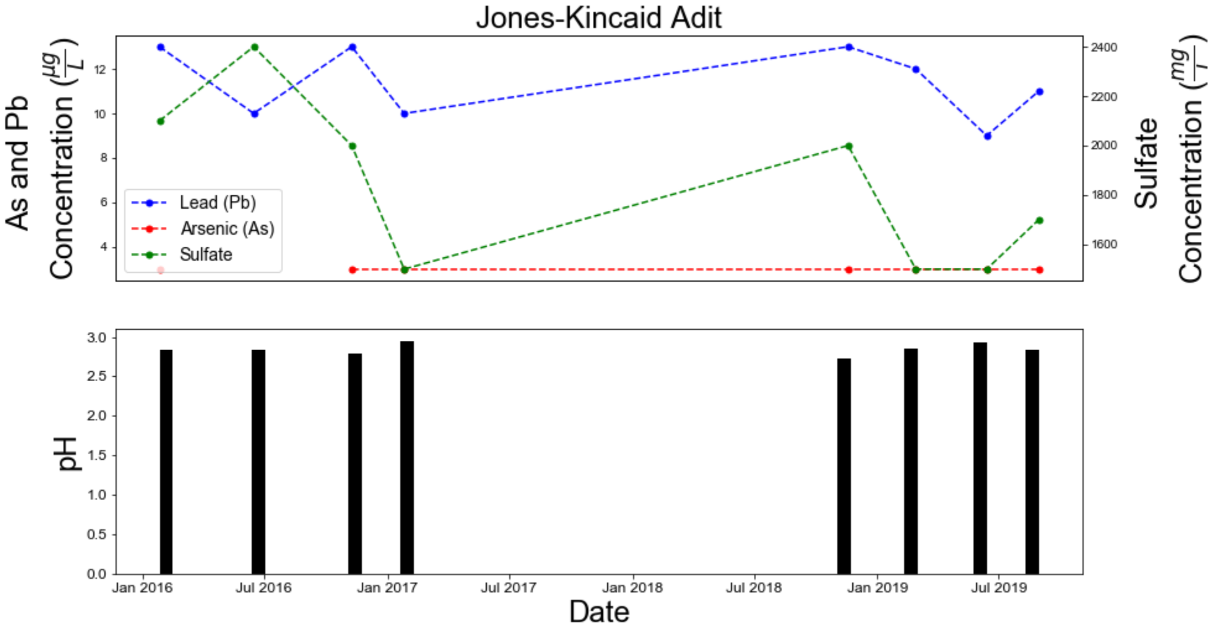


Figure 29: Time-series of the Jones-Kincaid adit chemistry data with arsenic and lead plotted on the top left y-axis, sulfate on the top right y-axis, and pH plotted below as a bar graph for January 2016 to December 2019. The Jones-Kincaid adit has no measured arsenic concentrations and low lead concentrations but high sulfate concentrations and low pH values compared to background chemistry.

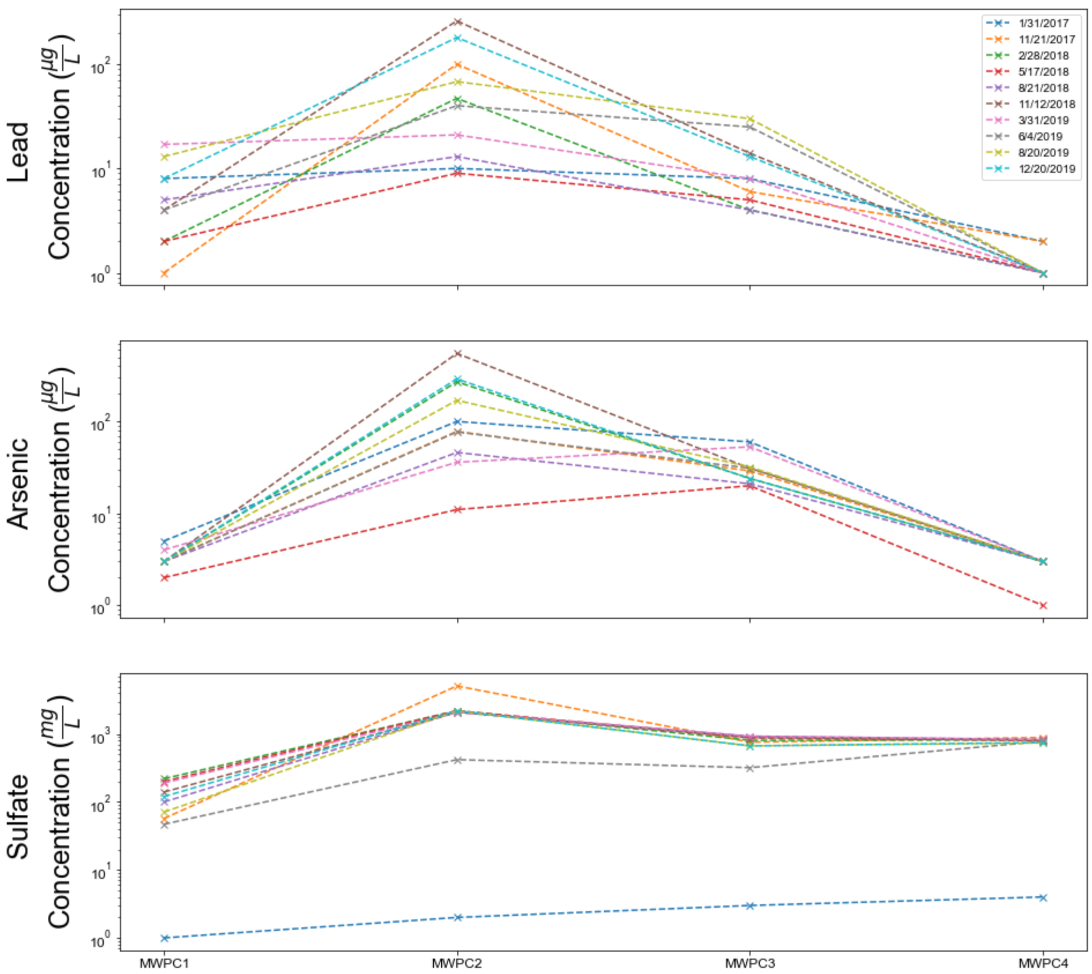


Figure 30: Gradient concentrations for lead, arsenic, and sulfate for all samples with a log scale on the y-axis. All CoCs are low at background chemistry, then elevate at MWPC2, then decrease at MWPC3 to MWPC4. The implication is that arsenic and lead are being introduced into the system but not measured downgradient either from sorption or groundwater flowpaths.

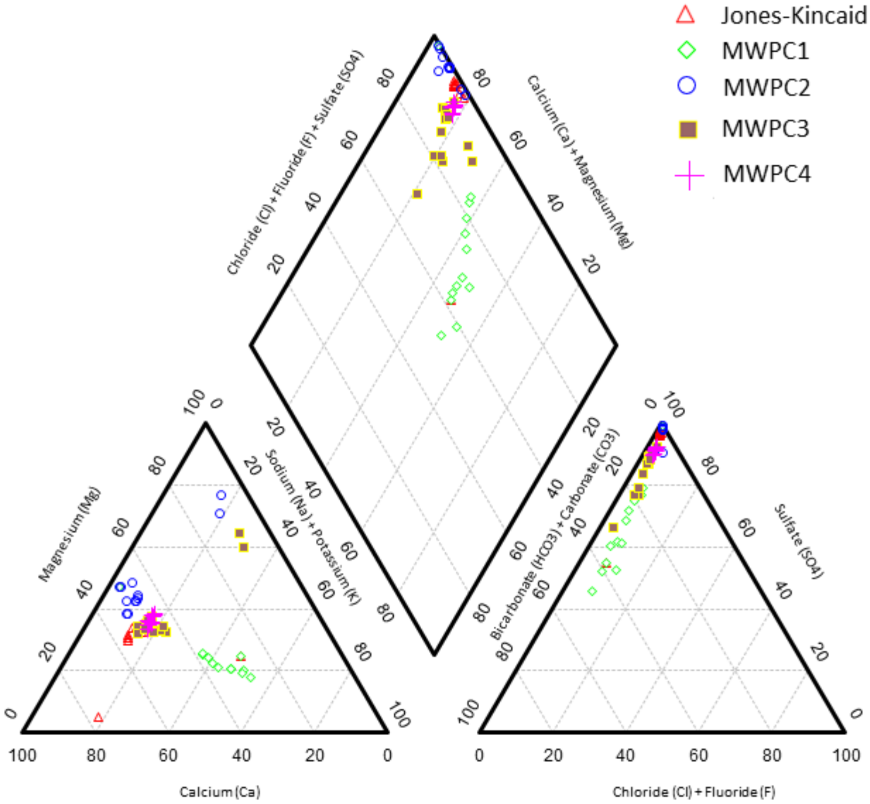


Figure 31: Piper plot of all water chemistry data collected in Perry Canyon. Red triangle represents the Jones-Kincaid adit chemistry, green diamond is MWPC1, blue circle is MWPC2, brown square is MWPC3, and pink cross is MWPC4.

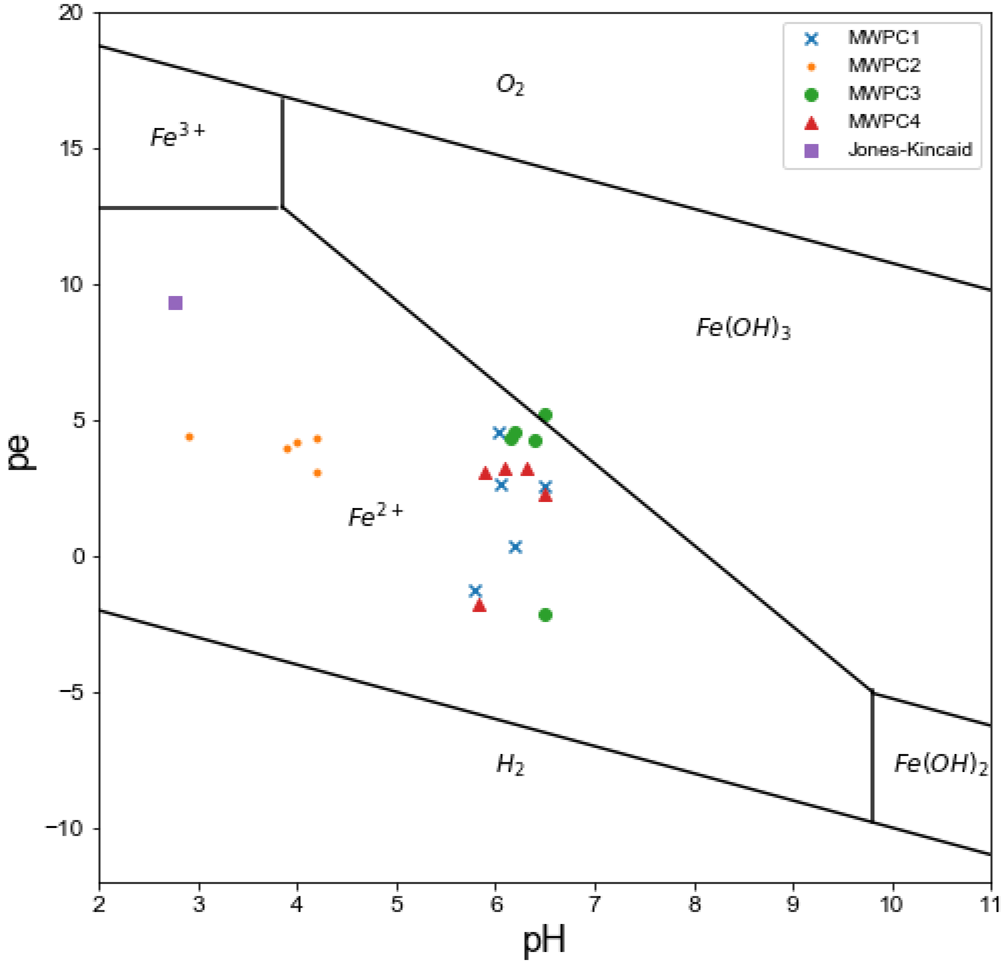


Figure 32: pd-pH stability diagram of aqueous iron species and samples where ORP is present to determine pe. Hydrous ferric oxide ($Fe(OH)_3$) has been known to adsorp metal species in AMD (Swallow and others, 1980) and may have an impact in the measured concentrations of arsenic and lead samples.

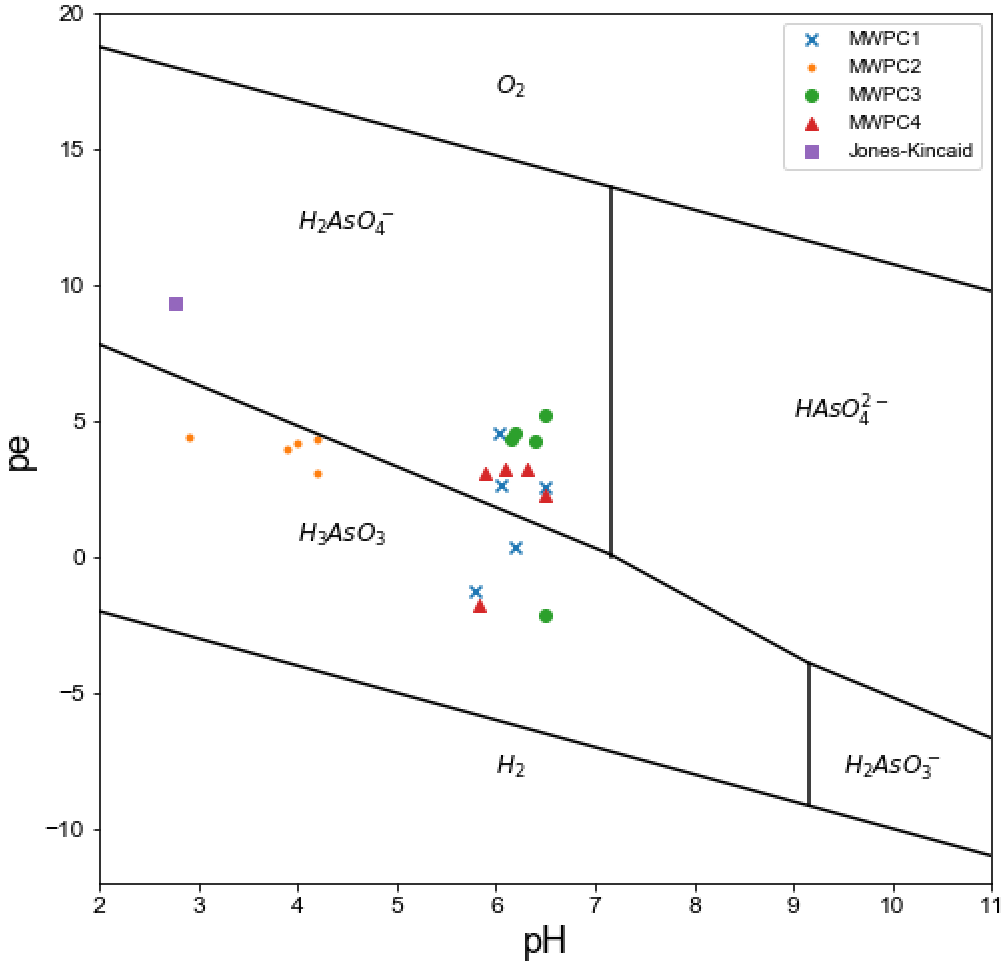


Figure 33: pe-pH stability diagram of arsenic species and samples where ORP is measured. H_3AsO_3 is known to be difficult to remove by adsorption processes and its neutrality (Stollenwerk, 2003). This may explain why arsenic concentrations are high in MWPC2.

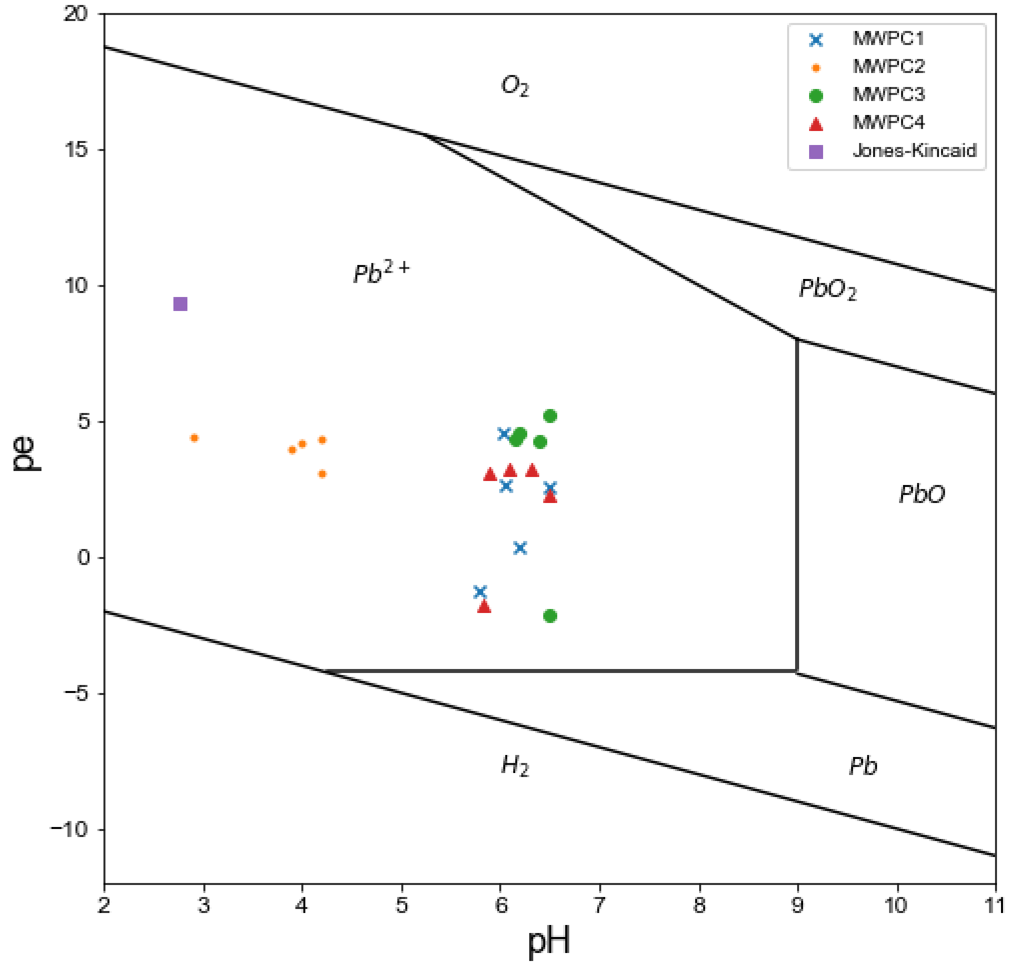


Figure 34: pe-pH stability diagram of arsenic species and samples where ORP is measured. Data suggests that only lead (II) (Pb^{2+}) is present.

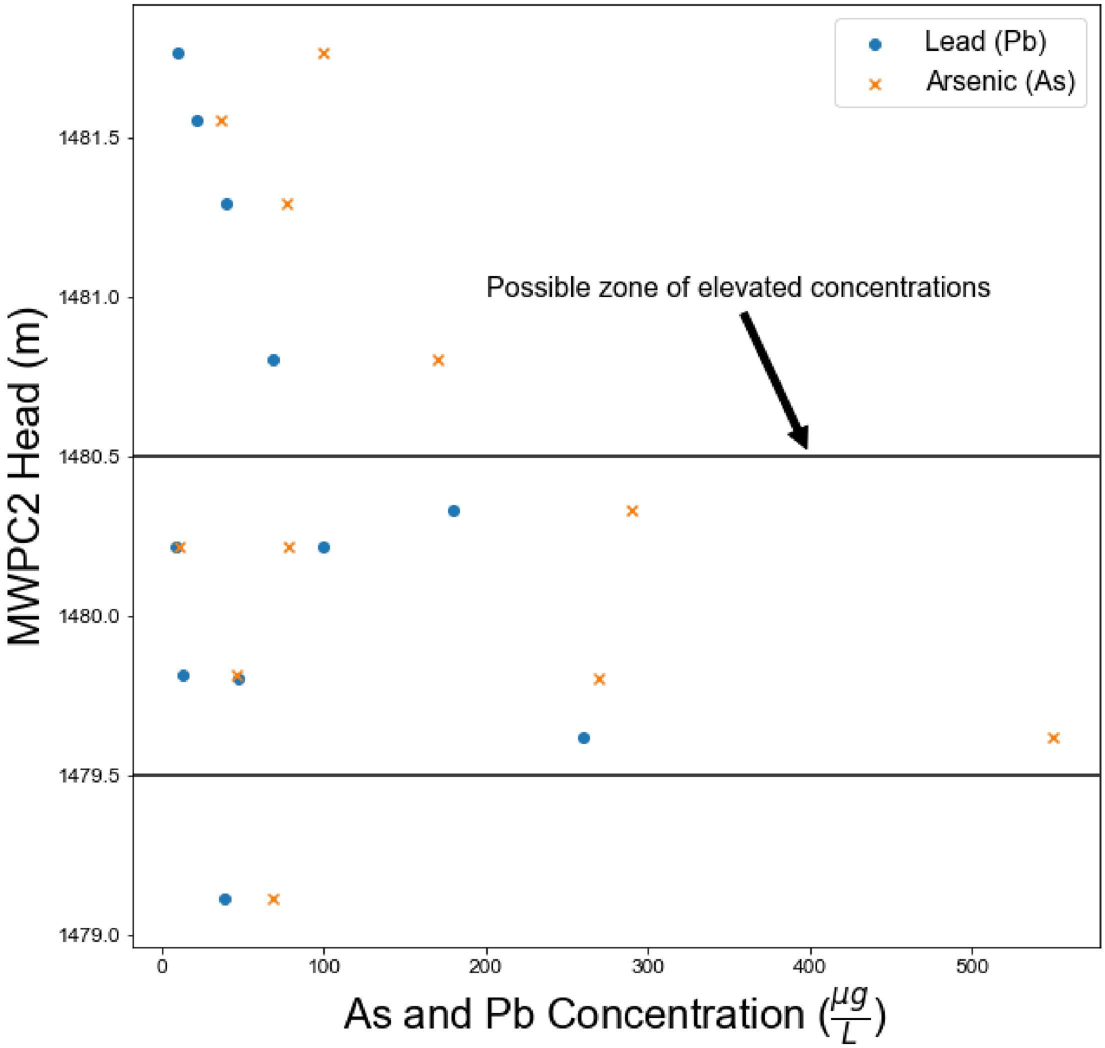


Figure 35: Graph showing the arsenic and lead concentrations plotted against the measured head for that sample for MWPC2. There is a zone of elevated concentrations of arsenic and lead at 1479.5 to 1480.5 m.

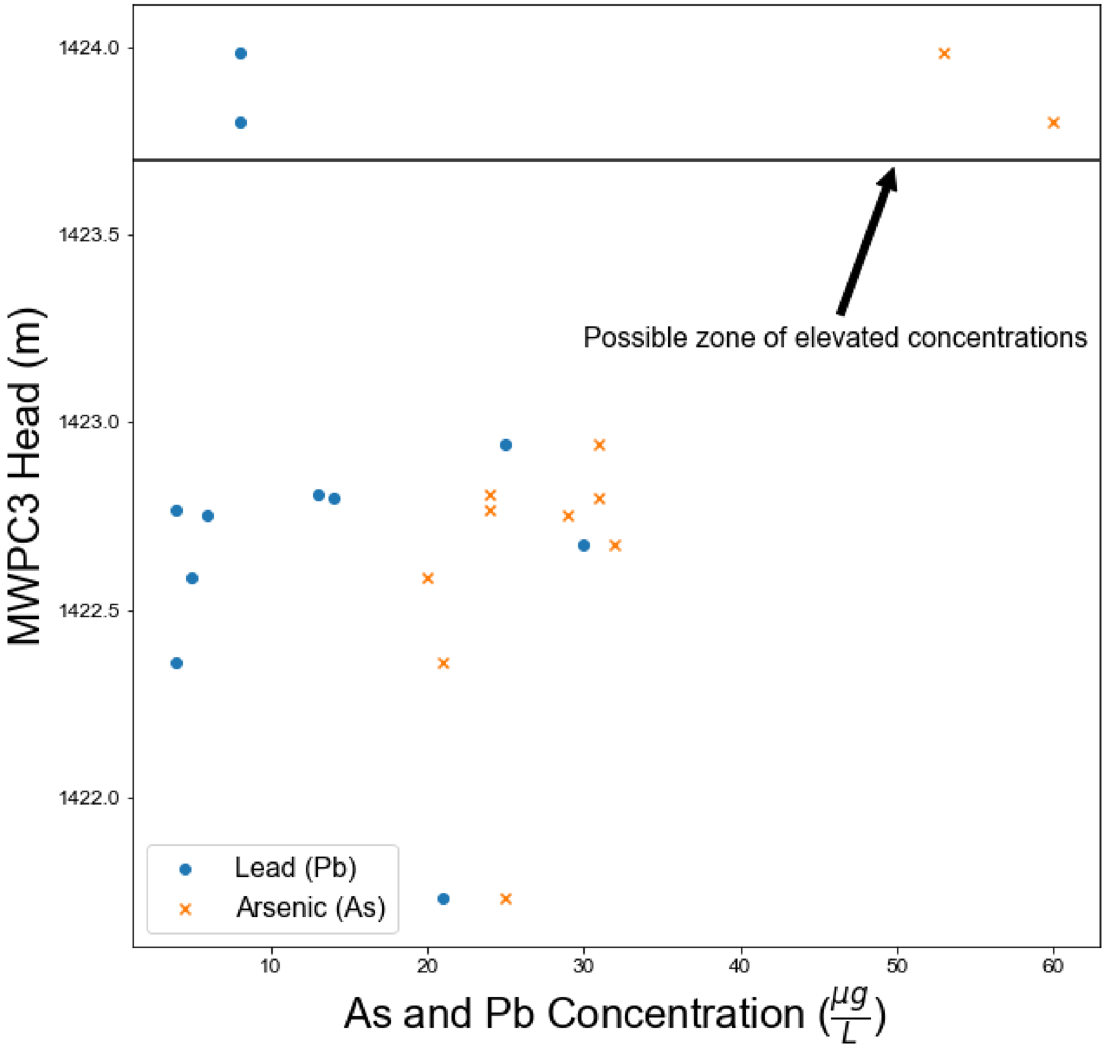


Figure 36: Graph showing the arsenic and lead concentrations plotted against the measured head for that sample for MWPC3. There is a zone of elevated arsenic concentrations above 1423.75 m of head.

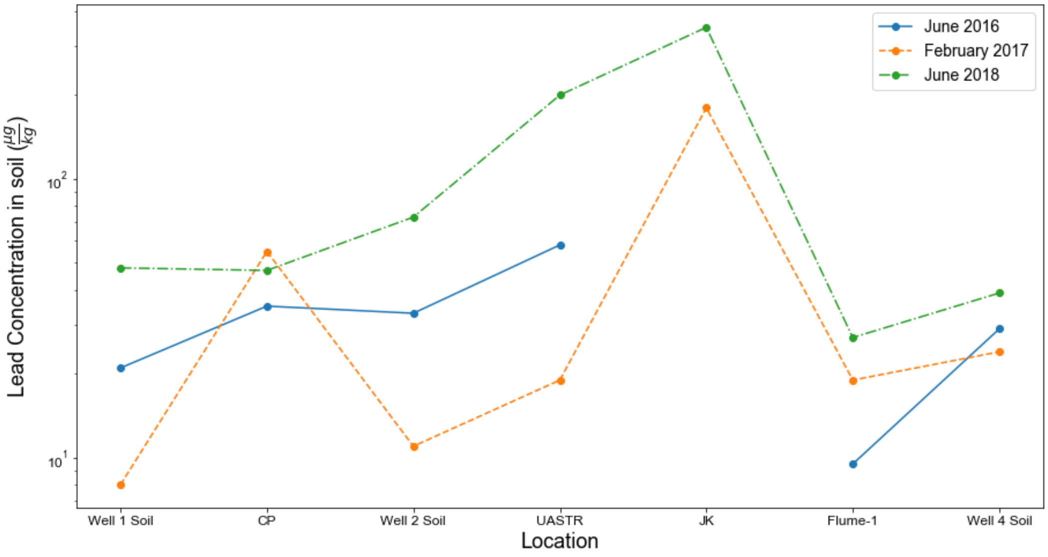


Figure 37: Graph showing gradient concentrations of lead in soil samples for the three dates soil samples are collected. June 2016 and February 2017 show a trend that lead concentrations are the highest at the waste rock repositories and lower at sites above, between, and below the repositories.

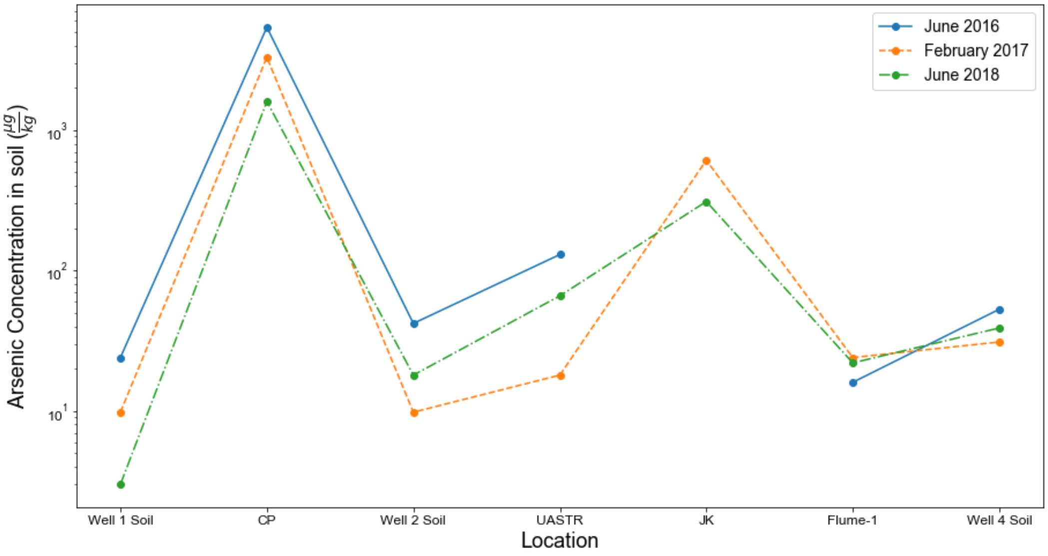


Figure 38: : Graph showing gradient concentrations of arsenic in soil samples for the three dates soil samples are collected. The highest concentrations are measured at the waste rock repositories and decrease above, between, and below the repositories.

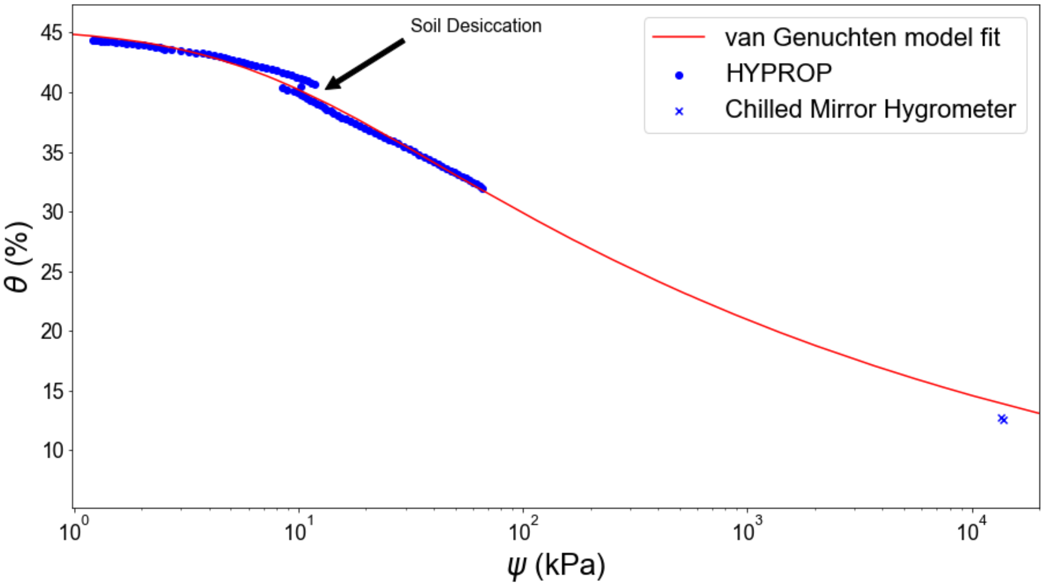


Figure 39: Graph showing the SWCC for the first test with the soil desiccation.

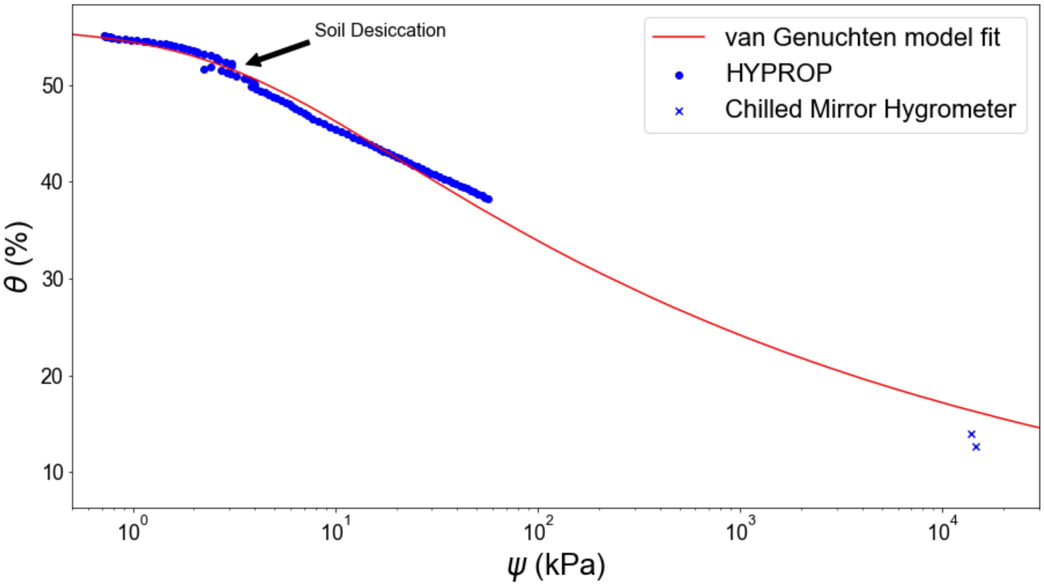


Figure 40: Graph showing the SWCC for the second test with the soil desiccation.

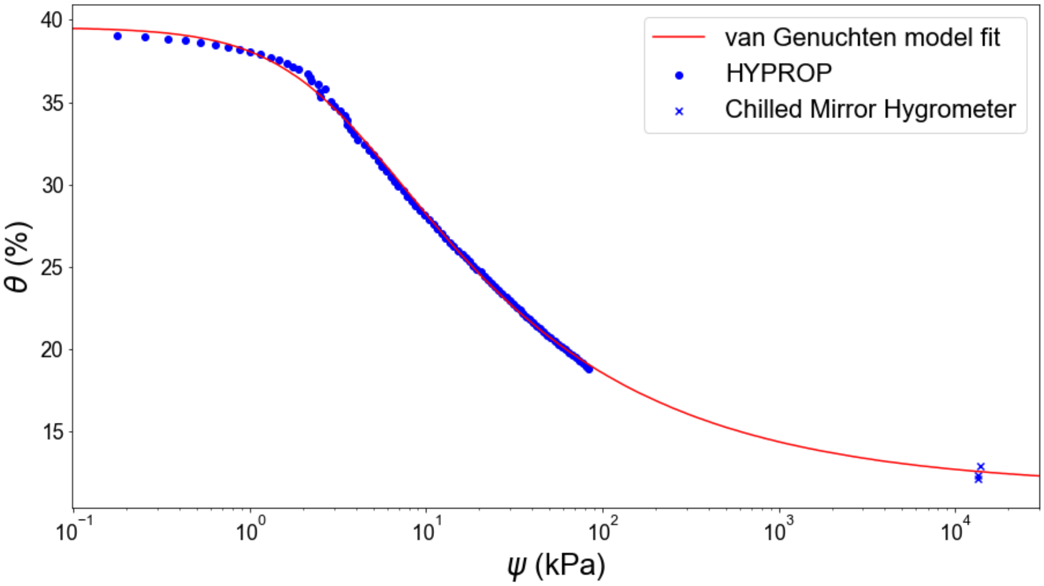


Figure 41: Graph showing the SWCC for the third test. The soil did not desiccate for this test and this model fit is used for analysis and modeling techniques.

Figure 42: Picture of the HYPROP test for the first SWCC. The large crack is the soil desiccation that cause problems with the test.

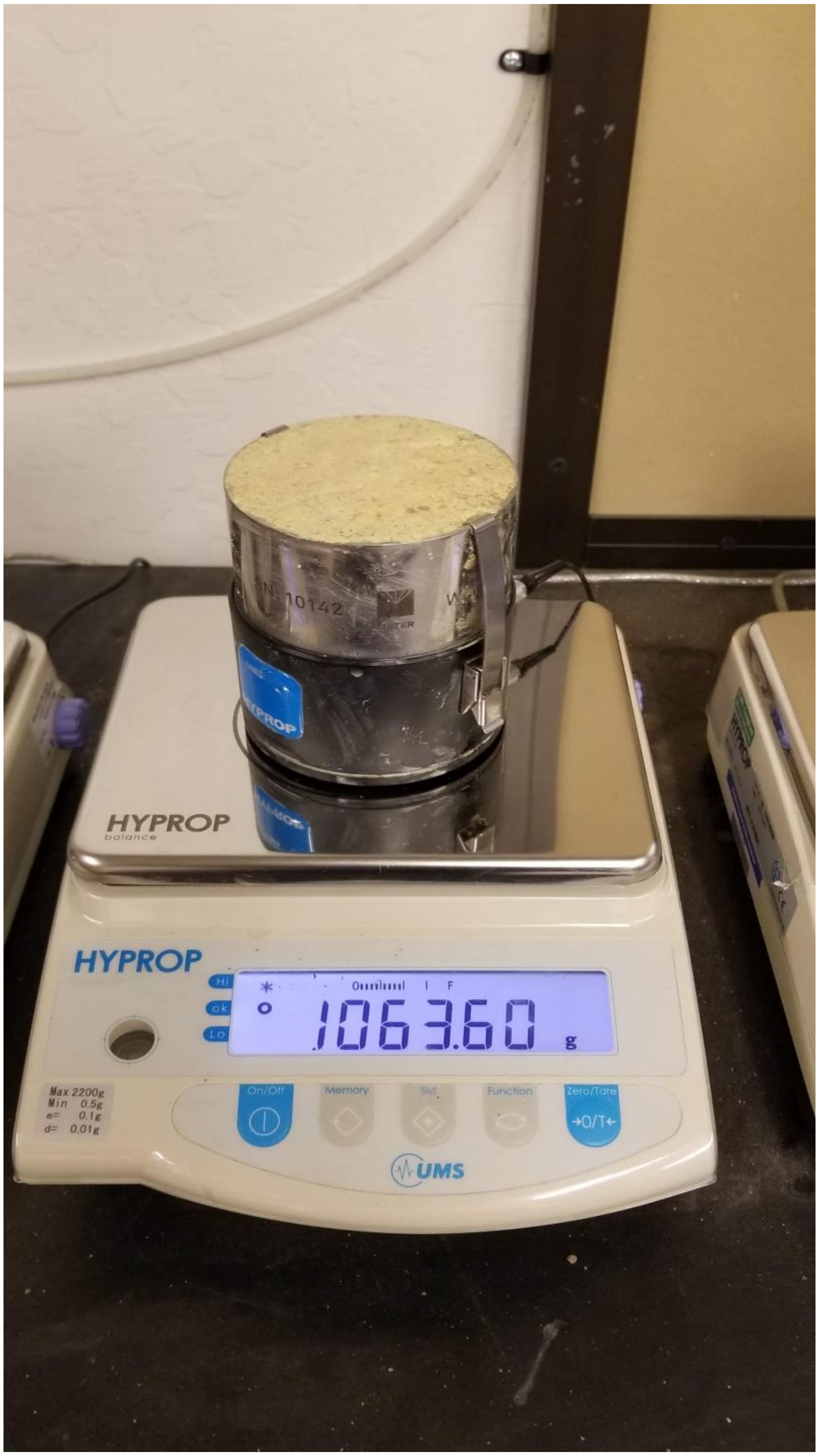


Figure 43: Picture of the HYPROP for the third SWCC and the soil did not desiccate for this test.

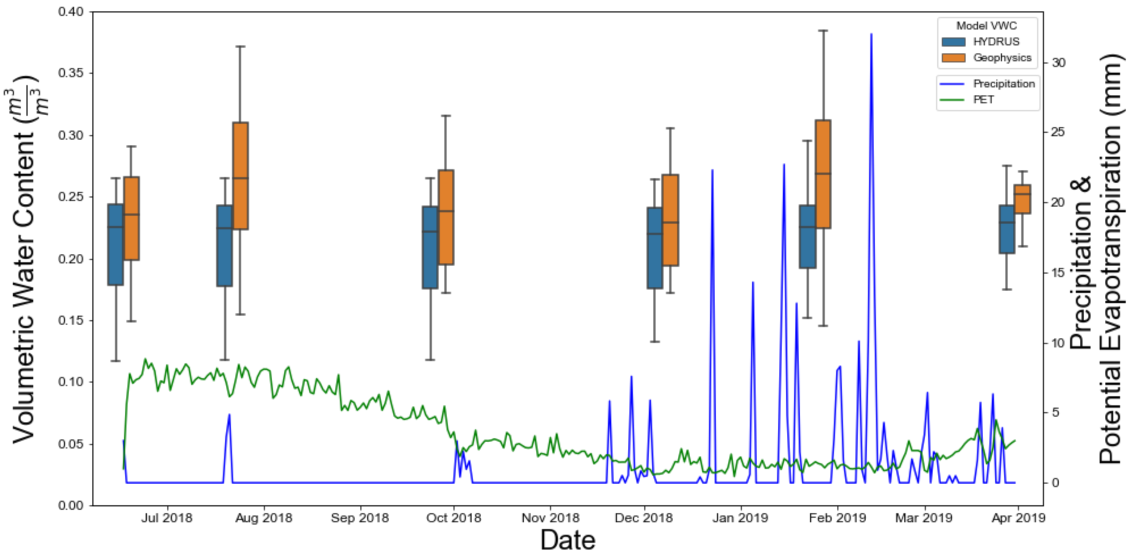


Figure 44: Box and whisker plot of VWC for the geophysics and HYDRUS models plotted with P and PET. The geophysics model consistently predicts higher values of VWC compared to the HYDRUS model.

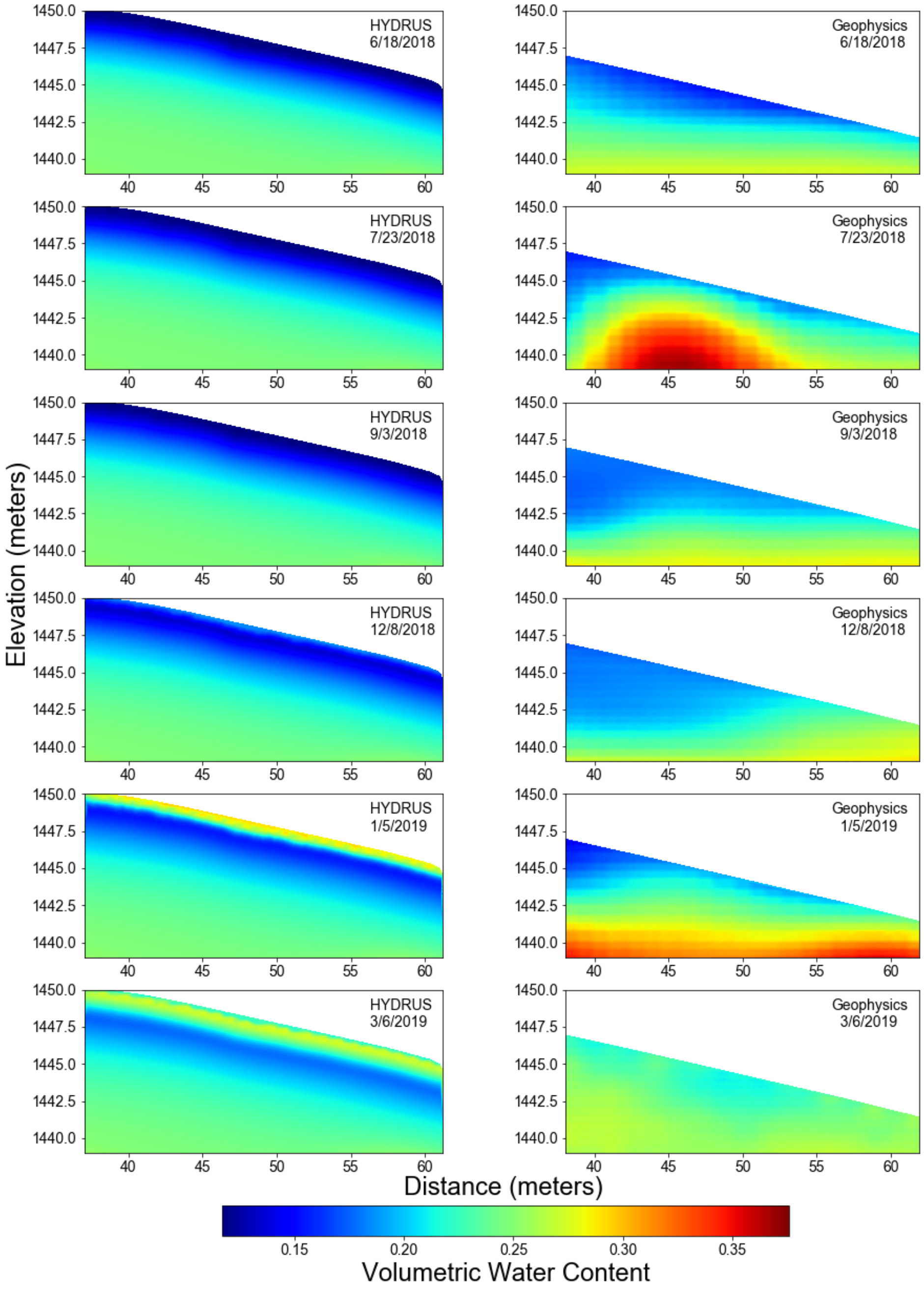


Figure 45: Comparisons of HYDRUS VWC results (left) and the geophysics VWC results (right) from the area of interest. The geophysics model captures water movement from the creek that the HYDRUS model does not.

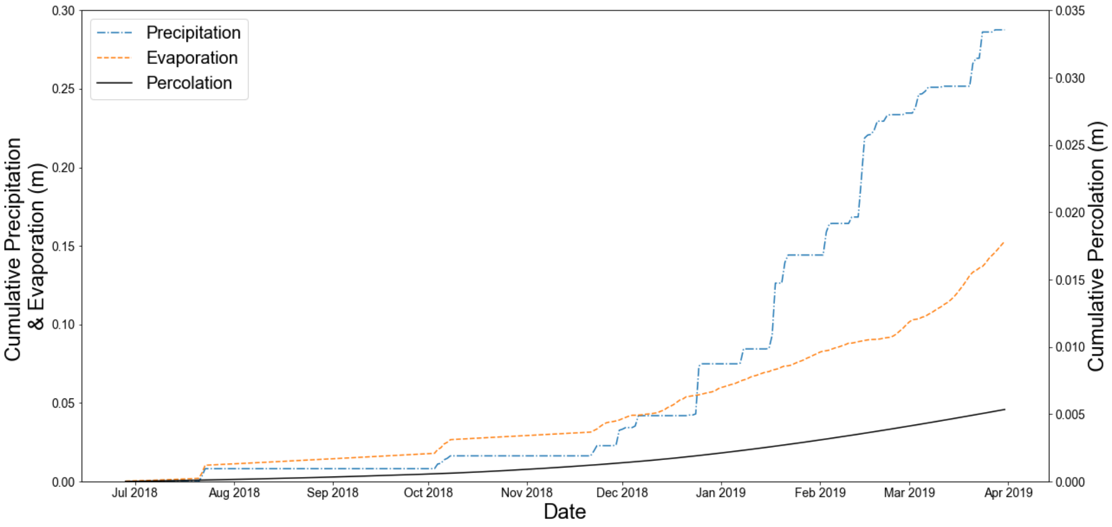


Figure 46: Water balance output for the model simulation for geophysics comparison (June 18, 2018 to March 31, 2019).

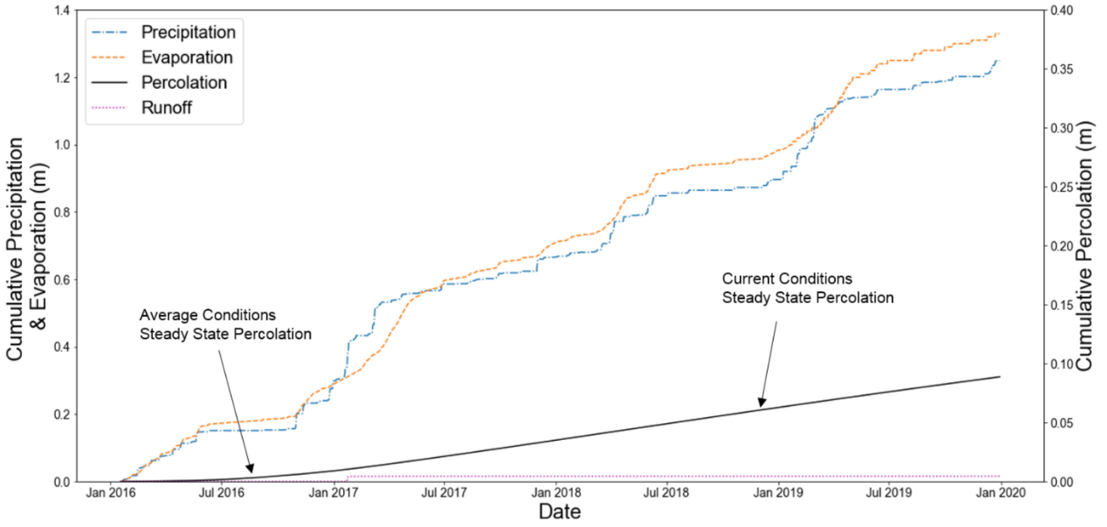


Figure 47: Water balance output for the duration of MET station 2 data (Feb. 2016 to Jan. 2020)

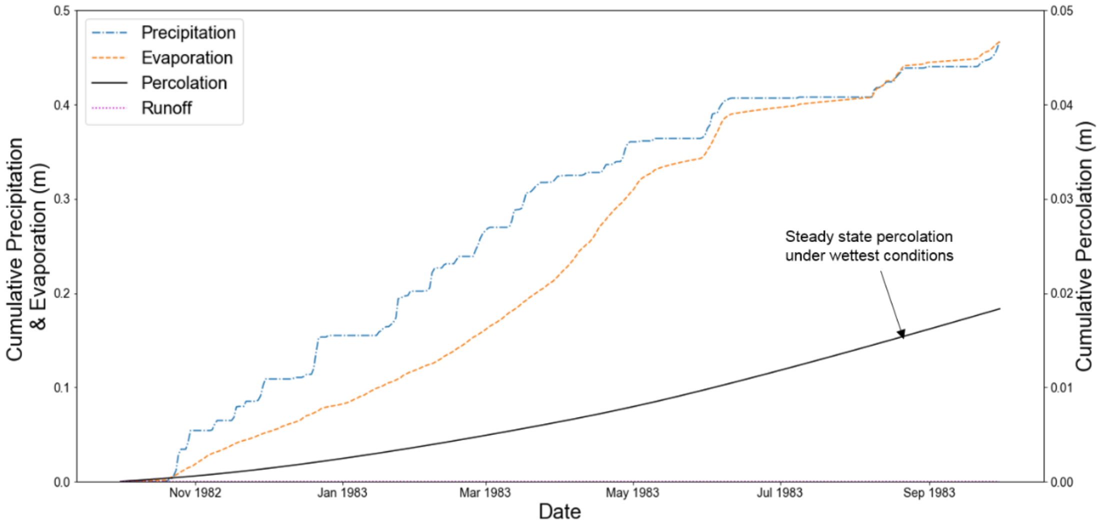


Figure 48: Water balance output for wettest year on record (Water Year 1983).

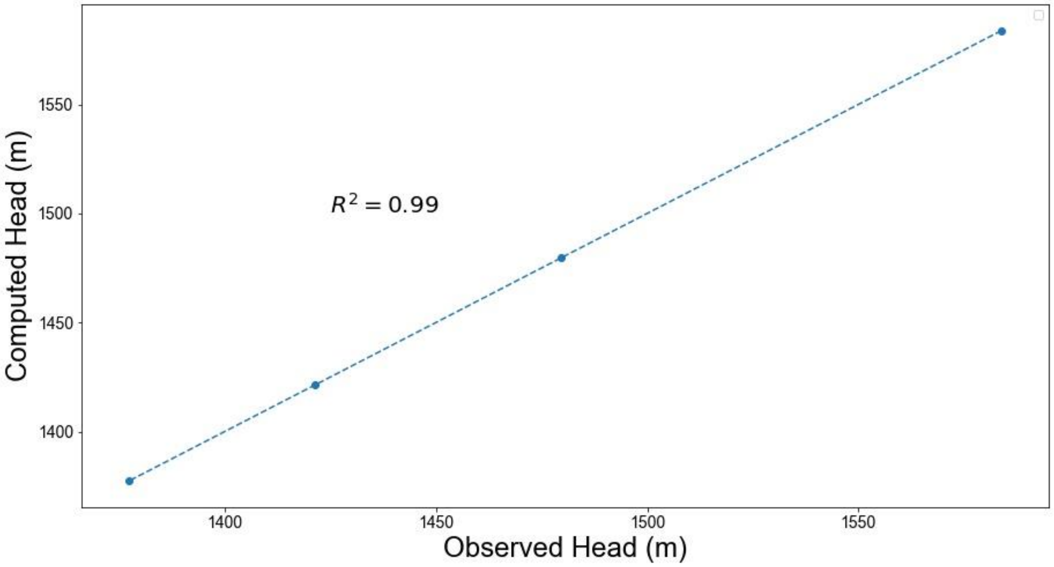


Figure 49: Observed and model head comparisons for calibrated model. The line represents a one to one line, and the R^2 value of 0.99 shows acceptable results.

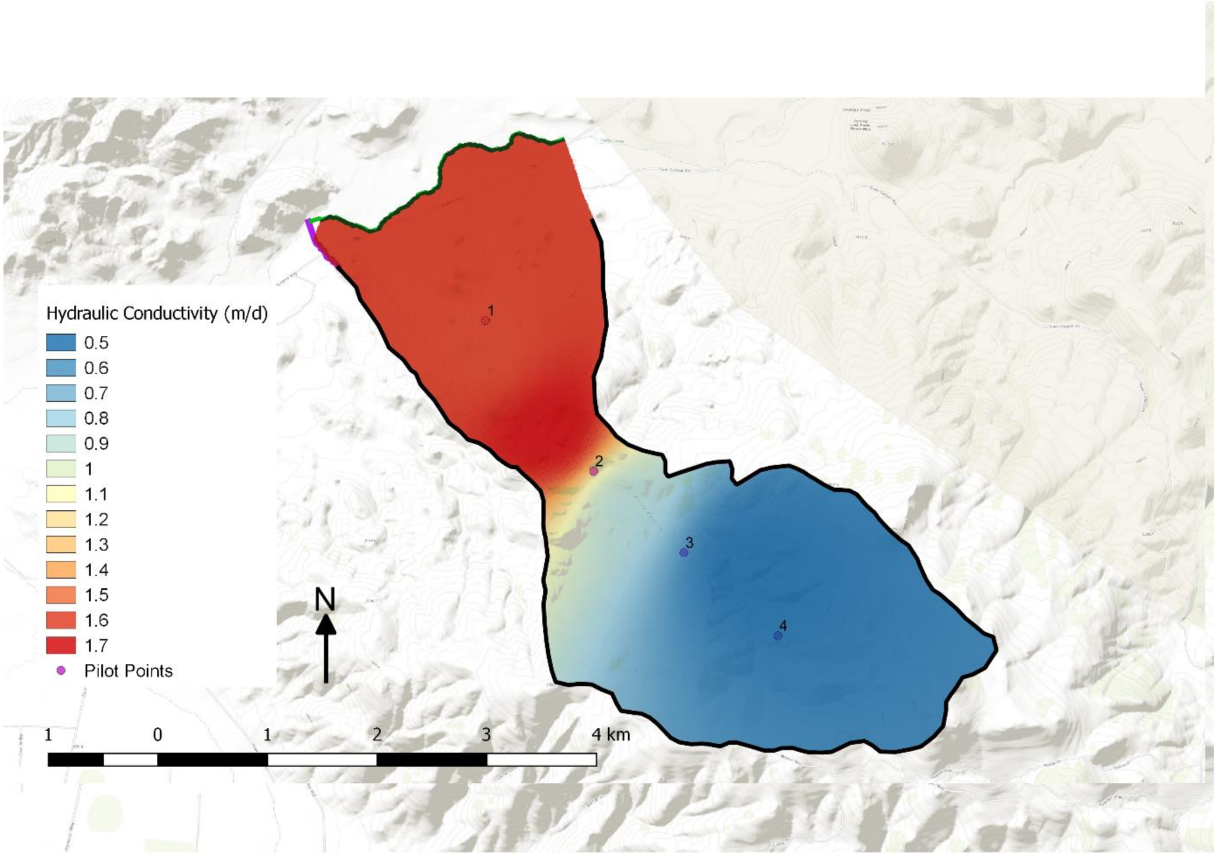


Figure 50: Calibrated hydraulic conductivities filled contour map with pilot points. The hydraulic conductivity values start at 0.5 m/day at the top of the canyon (southeast) and steadily increase out of the canyon to a max of 1.7 m/day at the bottom of the model domain (north).

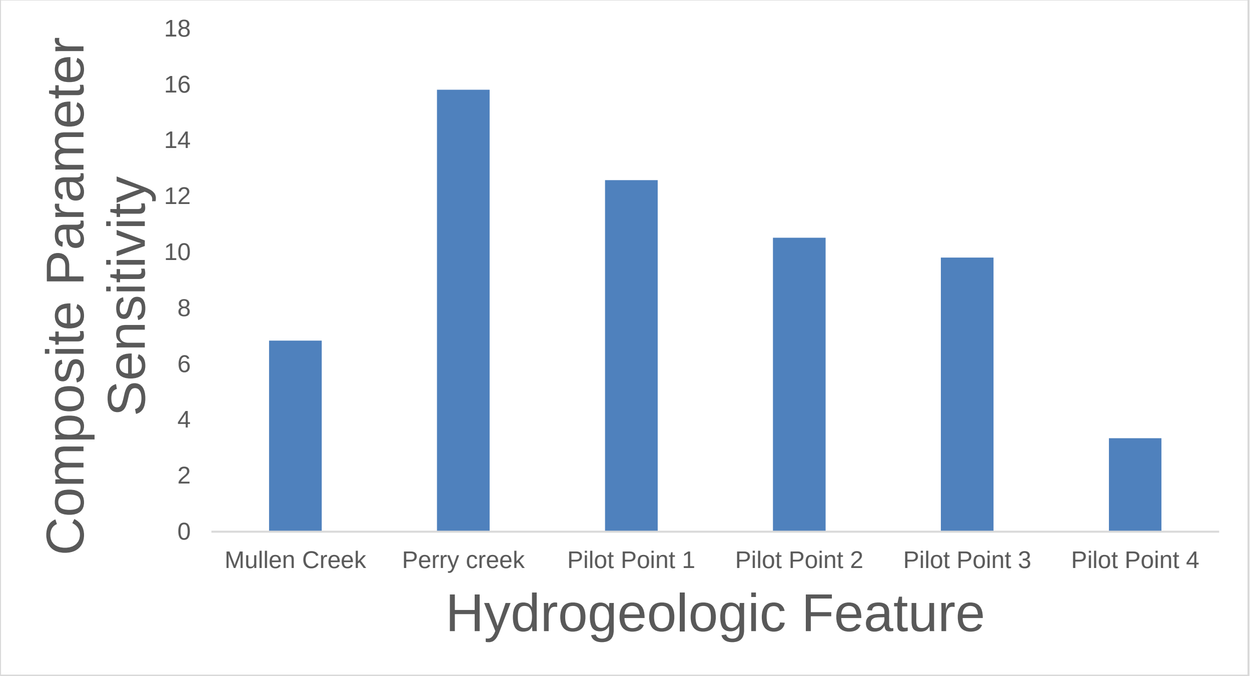


Figure 51: Composite parameter sensitivities from the calibrated groundwater model. The composite sensitivity is calculated using a weighted observation approach from parameter estimation output files **(**S.S. Papadopulos & Associates, 2018). The higher the sensitivity, the greater effect changing that parameter has on the results. In this case, Perry Creek is the most sensitive parameter.

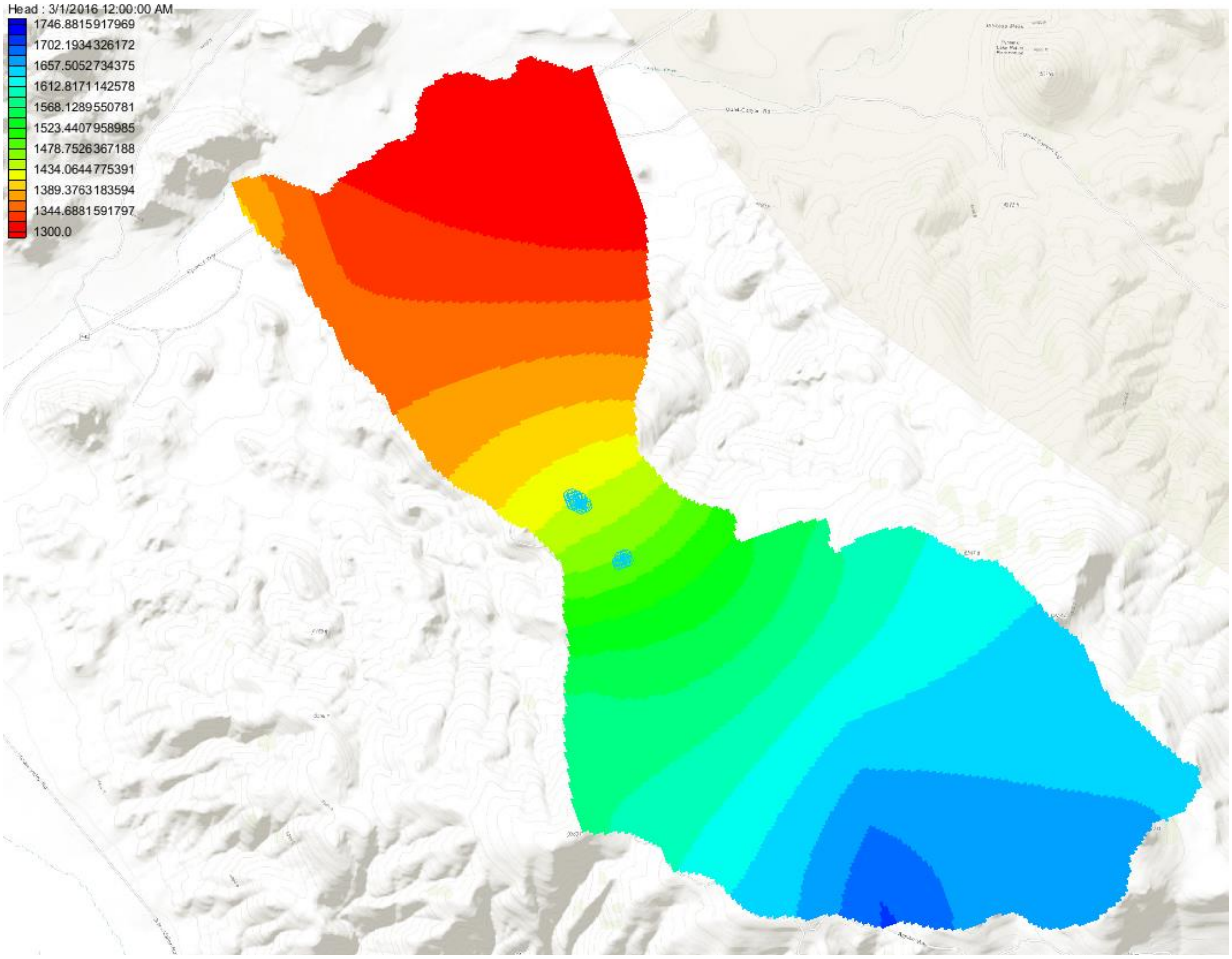


Figure 52: Starting head values from the groundwater model calibration. The starting heads are the highest at the top of the canyon (southeast) and the lower to a low in the northwest portion of the model domain. High head values in the northwest are from groundwater inflow from the Mullen Creek aquifer.

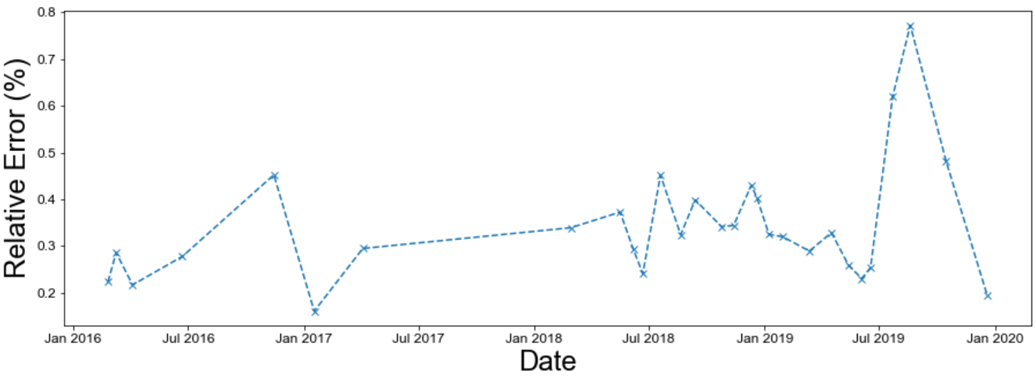


Figure 53: Relative error time-series of the transient groundwater model. All relative errors are considered to be acceptable under 10% (Anderson and others, 2005).

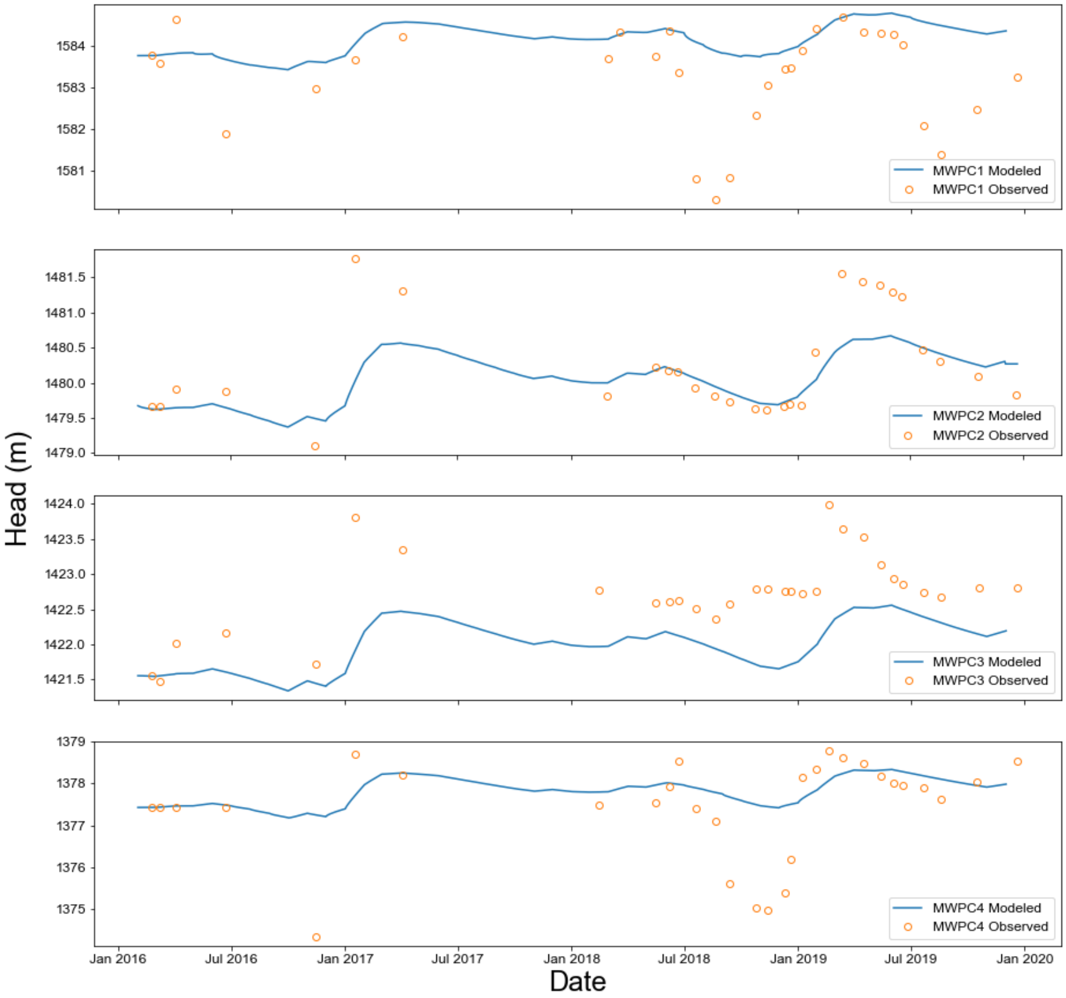


Figure 54: Modeled head at four monitoring wells with observation points. Model captures changes in head but does not capture extreme fluctuations.

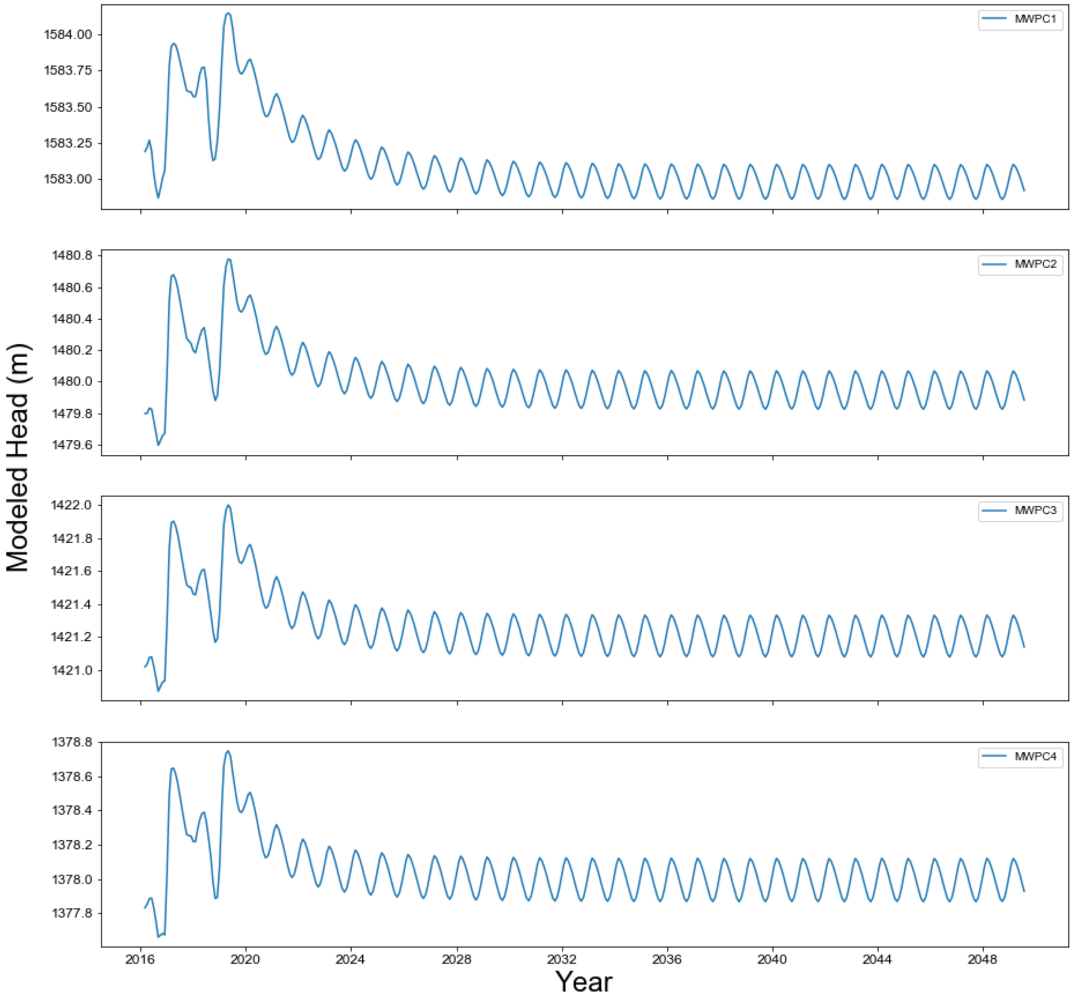


Figure 55: Predicted model heads for January 2016 to August 2049. Model predicts system enters a dynamic equilibrium in 2025.

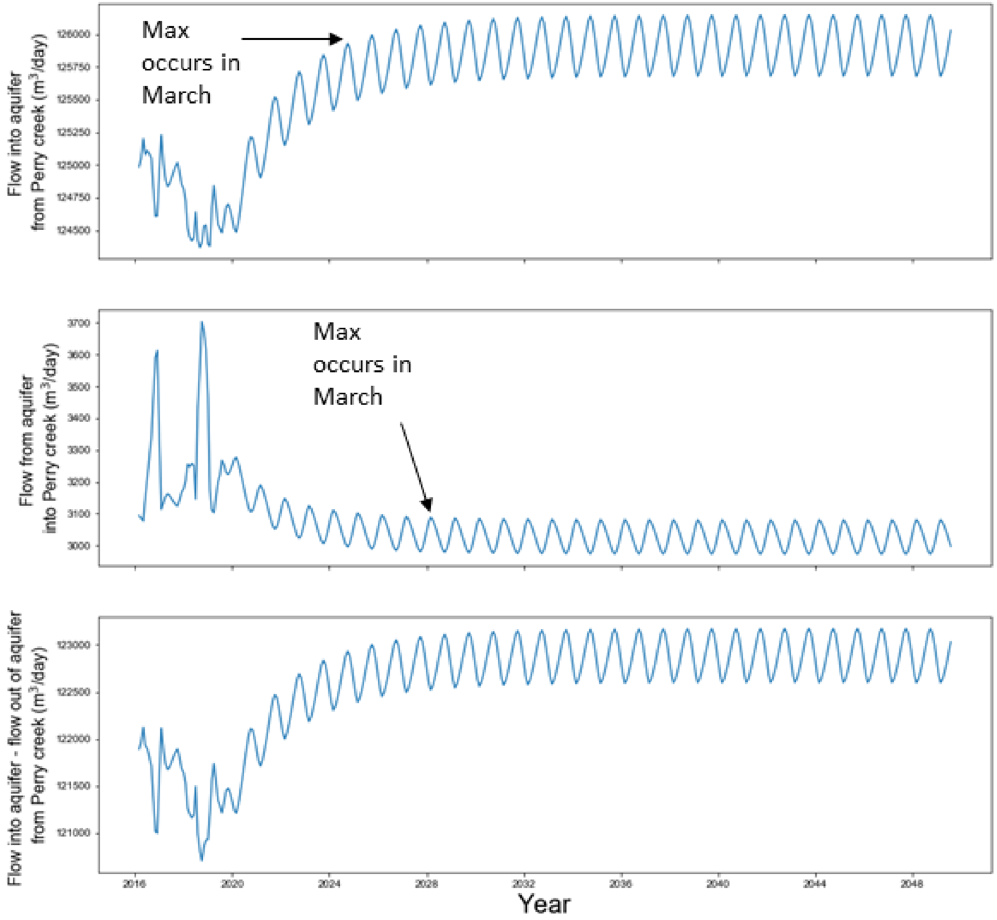


Figure 56: Flow into aquifer from Perry Creek, flow out of aquifer from Perry Creek, and flow into aquifer minus flow out of aquifer from Perry Creek from the groundwater model results. The model estimates that the maximum for both inflow and outflow from Perry Creek into the aquifer occurs in March.

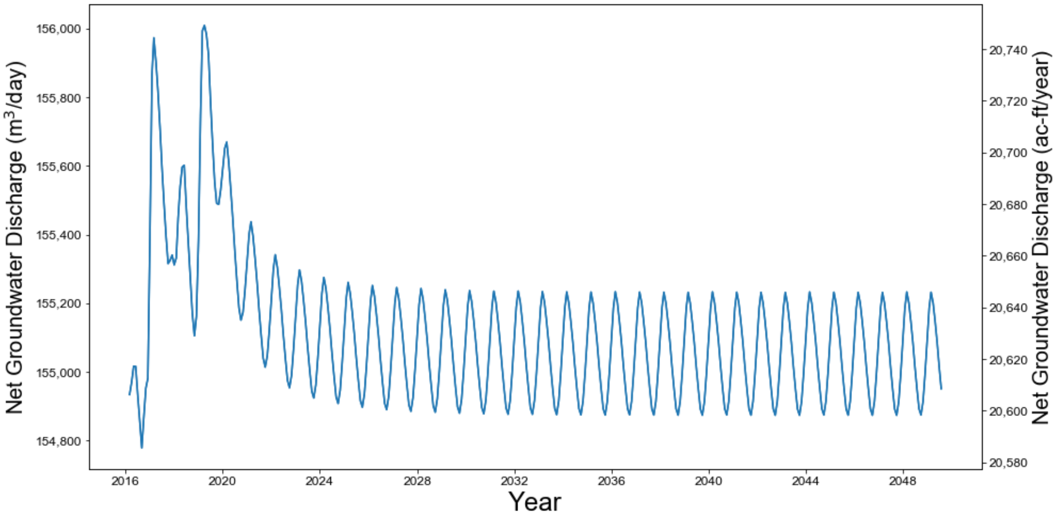


Figure 57: Net groundwater discharge from the groundwater model for January 2016 to August 2049 for both m^3/day and acre-ft/year. The system enters a dynamic equilibrium state with groundwater discharge at approximately 155,000 m^3/day.

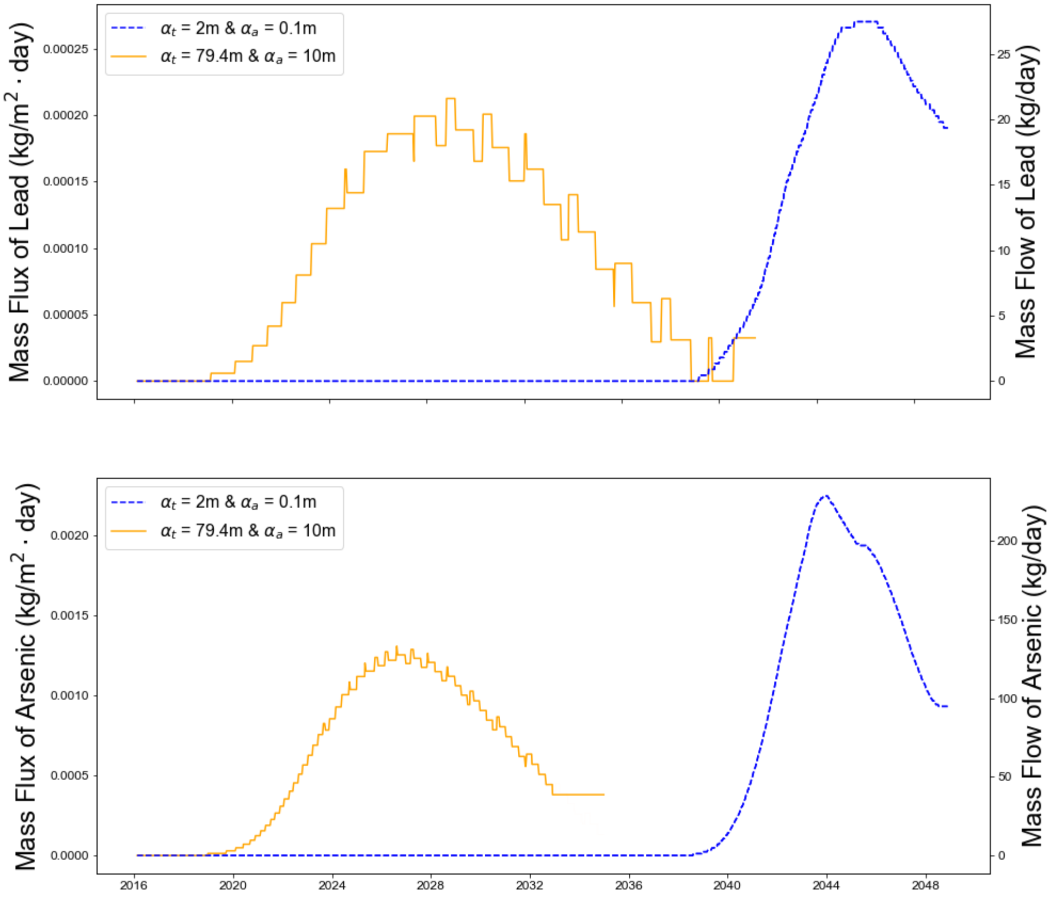


Figure 58: Transport model outputs for varying longitudinal dispersivities for arsenic and lead at the model boundaries. Arsenic flux and flow rates are larger than lead because arsenic has higher observed concentrations in Perry Canyon.

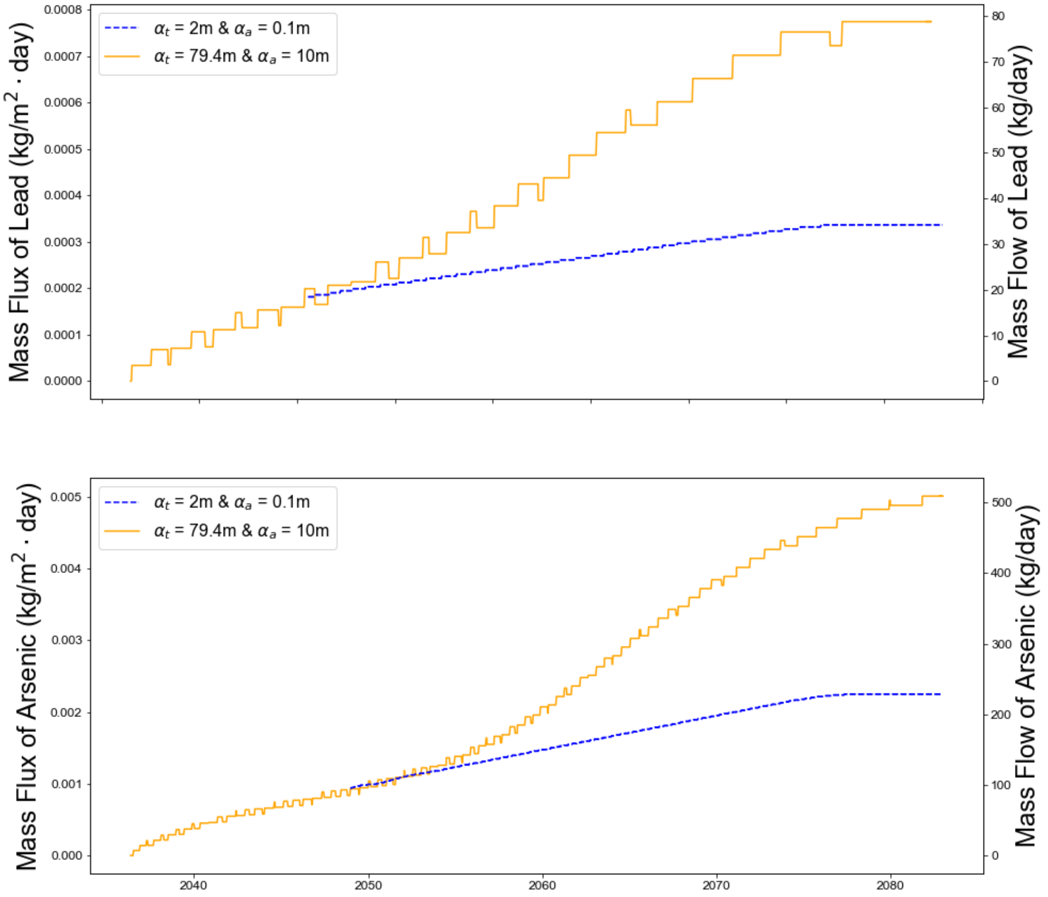


Figure 59: Model outputs for Jan 2035 to January 2089. Model is simulated until January 2089 to reach an equilibrium state for analysis.

Appendix A: Water Chemistry Data Tables

Table 10: Water chemistry results from MWPC1.

Date	Lead (ug/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Silica (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
2/25/2016	840	0.12	ND	14	ND	20	7	0.35	6	130	59	24	0.16	6	0.2
6/23/2016	130	0.025	ND	20	ND	1.2	7.6	0.025	3.5	52	ND	31	ND	6	0.14
11/14/2016	1200	0.04	ND	32	ND	1.2	12	ND	ND	51	24	38	ND	8	ND
1/31/2017	8	0.03	ND	13	ND	2.5	5	ND	ND	62	24	25	ND	6	ND
11/21/2017	1	0.05	ND	42	ND	0.05	17	ND	ND	56	26	44	ND	13	ND
2/28/2018	2	0.05	ND	39	ND	0.05	16	ND	ND	51	24	40	ND	10	ND
5/17/2018	2	0.02	ND	18	ND	0.3	7	ND	ND	49	23	27	ND	8.2	ND
8/21/2018	5	0.03	ND	28	ND	0.09	10	ND	ND	45	21	36	ND	9	ND
11/12/2018	4	0.05	ND	35	ND	0.063	14	ND	ND	54	25	39	ND	9	ND
3/31/2019	17	0.03	ND	12	ND	2.2	5	ND	ND	57	27	21	ND	6	ND
6/4/2019	4	0.02	ND	18	ND	0.35	7	ND	ND	50	23	27	ND	11	ND
8/20/2019	13	0.03	ND	28	ND	0.16	11	ND	ND	61	28	34	ND	12	ND
12/20/2019	8	0.03	ND	26	ND	0.37	9.7	ND	ND	46	21	30	ND	13	ND

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 10 Continued: Water chemistry results from MWPC1.

Date	Nitrate + Nitrite (mg/L)	Alkalinity as CaCO3 (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Arsenic (ug/L)	Total Coliform /100mL	Escerichia Coli /100mL	TDS (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	PH	Turbidity (NTU)
2/25/2016	0.5	20	29	12	66	23	NA	NA	310	64	220	7.06	310
6/23/2016	0.16	38	38	ND	87	ND	1	0	240	82	NA	6.98	NA
11/14/2016	ND	34	42	ND	160	ND	NA	NA	320	130	440	6.62	12
1/31/2017	ND	26	32	ND	57	ND	NA	NA	250	52	210	7	50
11/21/2017	ND	31	38	ND	220	ND	NA	NA	390	170	10	6.73	0.65
2/28/2018	ND	21	26	ND	200	ND	NA	NA	380	160	530	6.83	1.6
5/17/2018	ND	33	40	ND	100	ND	NA	NA	250	74	310	7.15	6.1
8/21/2018	ND	34	42	ND	140	ND	NA	NA	290	110	420	7.02	2.4
11/12/2018	ND	33	41	ND	190	ND	NA	NA	370	140	500	6.84	1.1
3/31/2019	1.6	30	36	ND	47	ND	NA	NA	230	48	200	7.41	34
6/4/2019	ND	31	38	ND	71	ND	NA	NA	190	74	260	7.23	6.5
8/20/2019	ND	43	52	ND	120	ND	NA	NA	280	120	400	6.98	2.1
12/20/2019	ND	26	32	ND	120	ND	NA	NA	270	110	380	7.21	2.8

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 11: Water chemistry results from MWPC2.

Date	Lead (ug/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Silica (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
2/11/2016	3100	0.03	ND	330	210	310	190	36	ND	240	110	21	19	15	5.7
6/23/2016	240	0.06	ND	370	22	54	200	18	5.8	93	NA	84	8.4	11	3.9
11/14/2016	39	ND	ND	420	15	24	190	17	ND	70	37	88	8.1	11	2.9
1/31/2017	10	ND	ND	400	200	27	230	39	ND	180	84	31	16	12	5.1
11/21/2017	100	ND	ND	380	16	29	220	18	ND	83	39	86	8.4	12	3
2/28/2018	47	0.04	ND	390	130	45	250	34	ND	120	58	55	15	12	3
5/17/2018	9	ND	ND	390	16	15	210	18	ND	77	36	90	8.6	12	3
8/21/2018	13	ND	ND	47	16	19	190	18	ND	73	34	90	9	12	2.9
11/13/2018	260	0.1	ND	34	18	88	220	20	6.5	110	49	86	9.4	12	3.2
3/13/2019	21	ND	ND	410	63	15	210	25	ND	100	47	64	12	11	3.3
6/4/2019	40	ND	ND	450	17	26	200	18	ND	79	37	88	8.8	11	3
8/20/2019	68	0.04	ND	390	19	41	220	20	ND	89	42	92	9.8	12	3.2
12/20/2019	180	0.09	ND	380	13	52	17	17	6	96	45	91	7.7	12	2

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 11 Continued: Water chemistry results from MWPC2.

Date	Nitrate + Nitrite (mg/L)	Alkalinity as CaCO3 (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Arsenic (ug/L)	Total Coliform /100mL	Escerichia Coli /100mL	TDS (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	PH	Turbidity (NTU)
2/11/2016	ND	ND	ND	ND	5000	1200	ND	ND	7100	1600	4700	3.49	1600
6/23/2016	ND	ND	ND	ND	2400	260	ND	0	3200	1800	NA	4.07	67
11/14/2016	ND	ND	ND	ND	2100	69	ND	ND	2900	1800	3200	3.64	70
1/31/2017	2.6	ND	ND	ND	5100	100	ND	ND	7100	1900	5100	0.89	19
11/21/2017	ND	ND	ND	ND	2200	78	ND	ND	3100	1900	3200	3.65	110
2/28/2018	0.8	ND	ND	ND	2200	270	ND	ND	3200	2000	3200	3.87	500
5/17/2018	ND	ND	ND	ND	2100	11	ND	ND	3100	1800	3100	3.77	28
8/21/2018	ND	ND	ND	ND	2100	46	ND	ND	3400	920	3200	3.78	34
11/13/2018	ND	ND	ND	ND	2100	550	ND	ND	3000	1000	3200	4.38	1400
3/13/2019	0.6	ND	ND	ND	420	36	ND	ND	4000	1900	3600	3.21	16
6/4/2019	ND	ND	ND	ND	2200	77	ND	ND	3100	2000	3100	3.78	70
8/20/2019	ND	ND	ND	ND	2200	170	ND	ND	3200	1900	3200	4.06	95
12/20/2019	ND	ND	ND	ND	2100	290	ND	ND	3000	1800	3000	3.86	350

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 12: Water chemistry results from MWPC3.

Date	Lead (ug/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Silica (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
2/5/2016	790	0.08	ND	270	ND	23	110	1.9	ND	88	41	84	0.08	18	0.2
2/25/2016	1100	0.22	ND	270	ND	36	100	2	7	170	80	87	0.26	18	ND
6/23/2016	1800	0.27	ND	23	0.23	59	110	1.8	7.6	13	NA	84	0.41	18	NA
11/14/2016	21	ND	ND	21	ND	0.25	81	0.03	ND	60	28	76	ND	19	0.5
1/31/2017	8	0.03	ND	190	ND	0.13	85	0.02	6	64	30	110	ND	34	2.7
11/21/2017	6	ND	ND	170	ND	0.17	79	0.03	ND	62	29	71	ND	23	0.2
2/14/2018	4	24	ND	180	ND	0.1	90	0.02	ND	58	27	72	ND	21	ND
5/17/2018	5	ND	ND	200	ND	0.12	88	0.02	ND	60	28	74	ND	22	0.2
8/21/2018	4	ND	ND	210	0.07	0.16	86	0.09	ND	62	29	78	0.07	20	0.2
11/13/2018	14	ND	0.12	200	0.03	1	93	0.07	ND	71	33	81	ND	20	0.2
2/20/2019	8	ND	0.18	110	ND	0.23	48	0.02	ND	63	29	56	ND	13	ND
6/4/2019	25	ND	0.2	190	ND	0.78	79	0.06	ND	68	32	87	ND	27	0.2
8/20/2019	30	ND	0.5	160	0.1	1.1	75	0.1	25	77	36	75	ND	25	0.2
12/20/2019	13	ND	ND	170	0.07	0.63	76	0.09	ND	68	32	74	ND	24	0.24

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 12 Continued: Water chemistry results from MWPC3.

Date	Nitrate + Nitrite (mg/L)	Alkalinity as CaCO3 (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Arsenic (ug/L)	Total Coliform /100mL	Escerichia Coli /100mL	TDS (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	PH	Turbidity (NTU)
2/5/2016	ND	95	120	ND	1100	100	NA	NA	1700	1100	1900	7.38	55
2/25/2016	ND	94	110	ND	1100	94	NA	NA	1700	1100	1900	7.46	190
6/23/2016	NA	86	86	ND	940	130	1	0	1500	1000	NA	7.12	
11/14/2016	ND	91	110	ND	930	25	NA	NA	1500	860	1700	7.07	4.2
1/31/2017	2.7	170	200	ND	760	60	NA	NA	NA	820	1700	7.64	1.6
11/21/2017	0.6	110	140	ND	810	29	NA	NA	1400	750	1700	7.26	3.8
2/14/2018	ND	89	110	ND	890	24	NA	NA	1500	820	1800	7.01	2.9
5/17/2018	ND	85	100	ND	930	20	NA	NA	1600	860	1800	7.23	2.6
8/21/2018	ND	87	110	ND	880	21	NA	NA	1500	870	1800	7.2	1.8
11/13/2018	ND	85	100	ND	930	31	NA	NA	1500	890	1700	7.04	6
2/20/2019	7.4	130	160	ND	320	53	NA	NA	760	460	1000	7.47	1.6
6/4/2019	1.7	150	190	ND	670	31	NA	NA	1200	800	1500	7.23	3.7
8/20/2019	1.1	130	160	ND	670	32	NA	NA	1200	720	1500	7.21	15
12/20/2019	0.9	120	140	ND	750	24	NA	NA	1300	740	1600	7.38	6

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 13: Water chemistry results from MWPC4.

Date	Lead (ug/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Silica (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
2/11/2016	79	ND	ND	190	0.04	13	87	0.43	6	100	48	74	0.25	18	ND
6/23/2016	ND	ND	ND	180	ND	6.7	90	ND	ND	82	NA	78	0.12	16	ND
11/14/2016	12	0.04	ND	180	ND	1.9	79	ND	ND	60	28	74	ND	16	ND
1/31/2017	2	ND	ND	200	ND	ND	83	ND	ND	58	27	83	ND	17	ND
11/21/2017	2	ND	ND	150	ND	0.2	77	ND	ND	51	24	66	ND	19	ND
2/28/2018	ND	ND	ND	160	ND	ND	83	ND	ND	53	25	70	ND	19	ND
5/17/2018	ND	ND	ND	180	ND	ND	83	ND	ND	53	25	75	ND	19	ND
8/21/2018	ND	ND	ND	180	ND	0.09	78	ND	ND	49	23	72	ND	18	ND
11/13/2018	ND	ND	ND	170	0.03	0.2	86	ND	ND	56	26	72	ND	19	ND
3/13/2019	ND	ND	ND	190	ND	0.41	87	ND	ND	61	29	78	ND	18	ND
6/4/2019	ND	ND	ND	170	0.06	0.2	77	ND	ND	55	26	74	ND	18	ND
8/20/2019	ND	ND	ND	150	0.1	ND	70	ND	ND	51	24	66	ND	18	ND
12/20/2019	ND	ND	ND	160	0.02	0.4	77	ND	ND	57	27	69	ND	19	0.2

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 13 Continued: Water chemistry results from MWPC4.

Date	Nitrate + Nitrite (mg/L)	Alkalinity as CaCO3 (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Arsenic (ug/L)	Total Coliform /100mL	Escerichia Coli /100mL	TDS (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	PH	Turbidity (NTU)
2/11/2016	ND	38	46	ND	970	12	NA	NA	1400	830	1700	7	600
6/23/2016	ND	34	34	ND	810	7.1	1	0	1400	820	NA	6.81	NA
11/14/2016	ND	39	47	ND	880	3	NA	NA	1400	770	1600	6.87	22
1/31/2017	ND	35	42	ND	890	3	NA	NA	1300	820	1600	6.84	0.75
11/21/2017	ND	38	47	ND	820	3	NA	NA	1300	690	1600	6.95	4.4
2/28/2018	ND	39	47	ND	810	3	NA	NA	1300	740	1600	7.01	0.4
5/17/2018	ND	39	47	ND	830	ND	NA	NA	1400	790	1600	7.19	0.6
8/21/2018	ND	37	45	ND	810	3	NA	NA	1300	770	1600	7.21	1.3
11/13/2018	ND	38	46	ND	830	3	NA	NA	1300	780	1600	6.96	3
3/13/2019	ND	38	47	ND	780	3	NA	NA	1300	830	1500	7.01	3.4
6/4/2019	ND	47	57	ND	740	3	NA	NA	1200	740	1400	7.04	2.1
8/20/2019	ND	42	52	ND	750	3	NA	NA	1200	670	1500	7.33	0.75
12/20/2019	0.7	41	50	ND	780	ND	NA	NA	1200	720	1500	7.21	3.4

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 14: Water chemistry results from Jones-Kincaid Adit.

Date	Lead (ug/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Silica (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
2/5/2016	13	ND	ND	270	160	60	86	8.9	7	30	14	73	11	15	0.7
6/23/2016	10	ND	ND	240	140	56	97	7.9	ND	31	12	72	11	13	ND
11/14/2016	13	ND	ND	260	140	80	90	8.9	6	28	13	67	12	14	ND
1/30/2017	10	ND	ND	250	250	48	83	6.9	6	30	14	68	8.7	15	ND
11/13/2018	13	ND	ND	240	79	67	10	10	7	33	16	61	14	16	0.9
2/20/2019	12	ND	ND	210	130	40	82	7.8	ND	32	15	58	11	15	ND
6/4/2019	9.00	ND	ND	250	100	31	84	6.4	6	29	14	67	8.9	17	ND
8/20/2019	11	ND	ND	260	110	32	100	7.7	ND	32	15	69	12	17	ND
12/20/2019	10	ND	ND	270	120	78	99	8.3	6	30	14	62	15	17	0.8

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 14 Continued: Water chemistry results from Jones-Kincaid Adit.

Date	Nitrate + Nitrite (mg/L)	Alkalinity as CaCO3 (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Arsenic (ug/L)	Total Coliform /100mL	Escerichia Coli /100mL	TDS (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	PH	Turbidity (NTU)
2/5/2016	ND	ND	ND	ND	2100	3	NA	NA	2700	1000	30000	2.84	1.9
6/23/2016	ND	ND	ND	ND	2400	3	NA	NA	2500	960	30000	2.83	1.2
11/14/2016	ND	ND	ND	ND	2000	3	NA	NA	2800	1000	3200	2.79	0.55
1/30/2017	ND	ND	ND	ND	1500	3	NA	NA	2100	970	2600	2.95	3.5
11/13/2018	ND	ND	ND	ND	2000	3	NA	NA	2800	1000	3300	2.72	0.65
2/20/2019	ND	ND	ND	ND	1500	3	NA	NA	2200	860	2600	2.85	2.2
6/4/2019	ND	ND	ND	ND	1500	3	NA	NA	2100	960	2500	2.93	4
8/20/2019	ND	ND	ND	ND	1700	3	NA	NA	2400	1100	2900	2.83	0.75
12/20/2019	ND	ND	ND	ND	1900	3	NA	NA	2600	1100	2900	2.89	0.85

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

Table 15: Water chemistry results from Crown-Prince Adit.

Date	Lead (ug/L)	Barium (mg/L)	Boron (mg/L)	Calcium (mg/L)	Copper (mg/L)	Iron (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Potassium (mg/L)	Silica (mg/L)	Silicon (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Chloride (mg/L)	Fluoride (mg/L)
3/13/2019	5	0.04	ND	7.5	0.09	2.3	5	ND	ND	40	18	9.7	ND	5	ND

Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

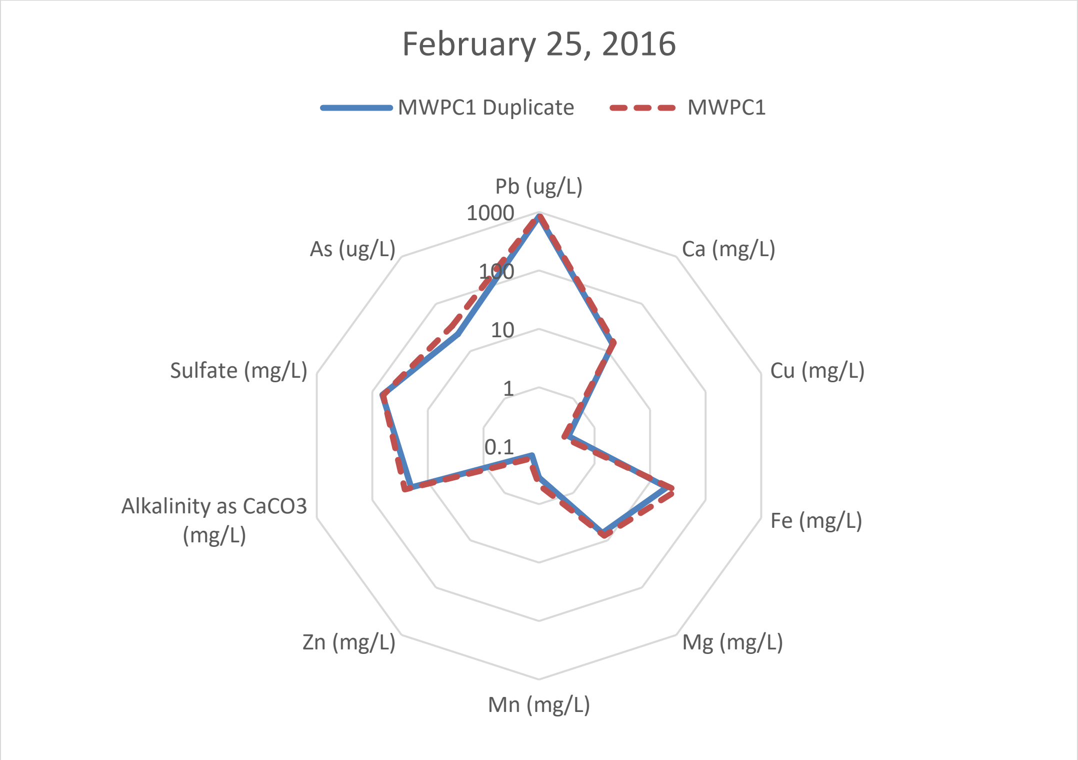
Table 14 Continued: Water chemistry results from Crown-Prince Adit.

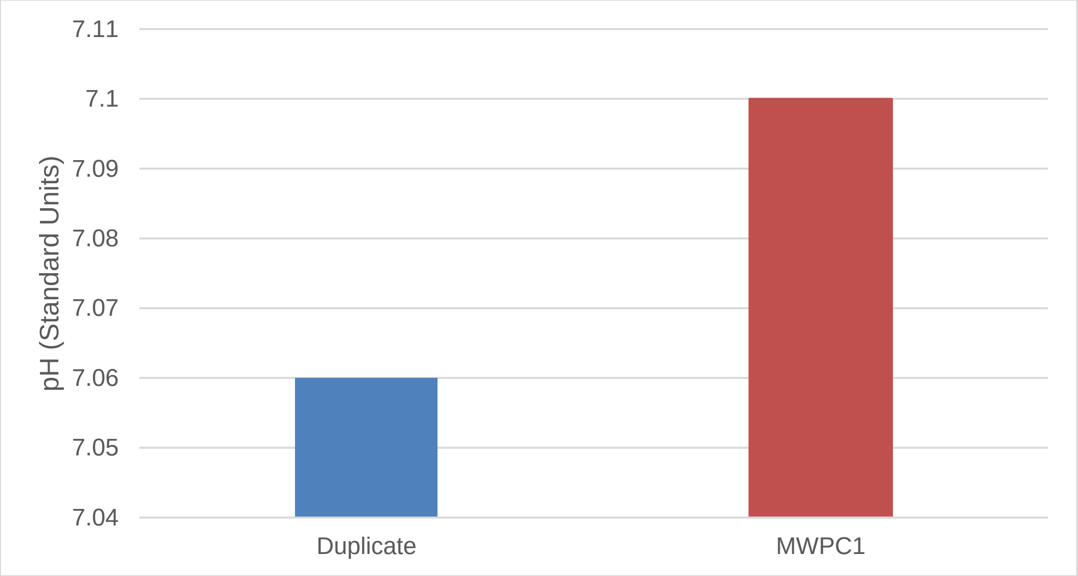
Date	Nitrate + Nitrite (mg/L)	Alkalinity as CaCO3 (mg/L)	Bicarbonate (mg/L)	Carbonate (mg/L)	Sulfate (mg/L)	Arsenic (ug/L)	Total Coliform /100mL	Escerichia Coli /100mL	TDS (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	PH	Turbidity (NTU)
3/13/2019	ND	ND	ND	ND	27	18	NA	NA	150	34	120	7.39	33

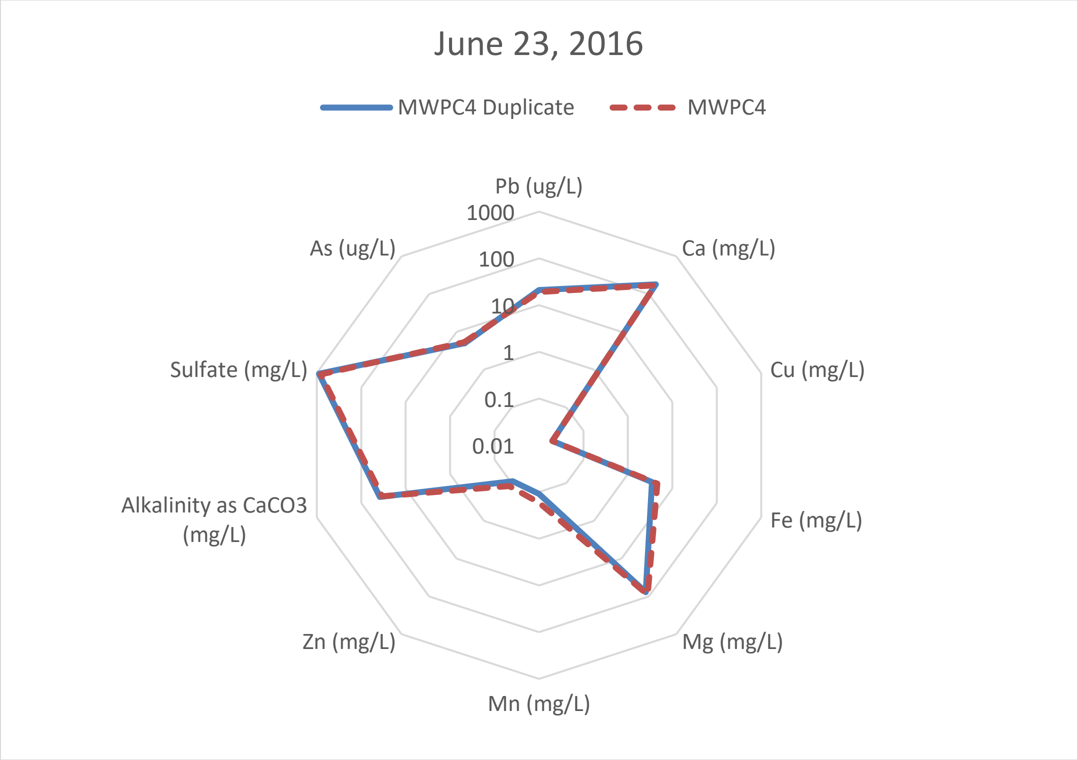
Note: ND means that analyte was not detected in analysis. NA means that analyte was not included in analysis.

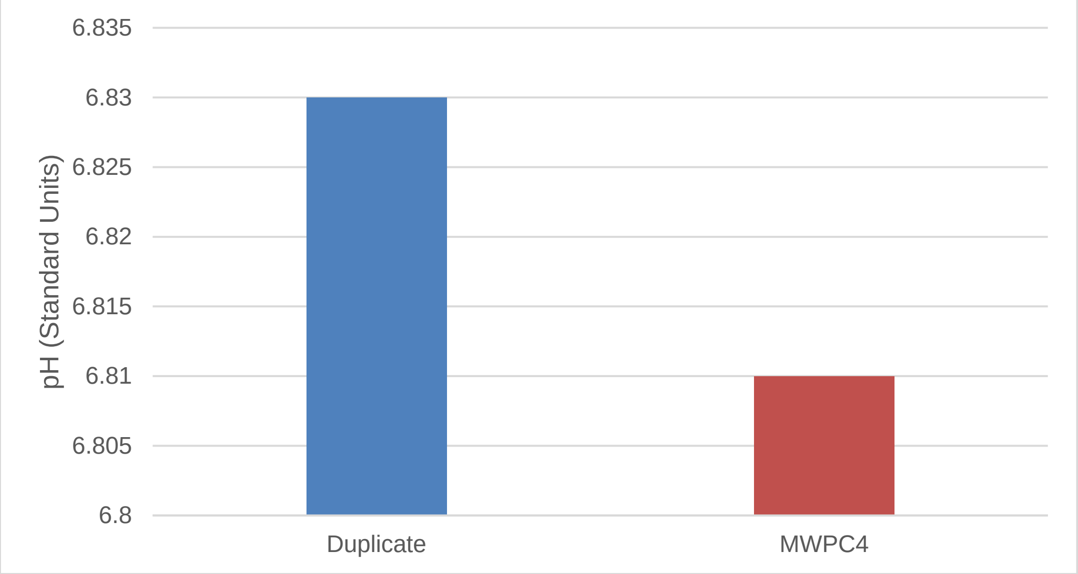
Appendix B: Radial Graphs with Duplicates for each sampling period

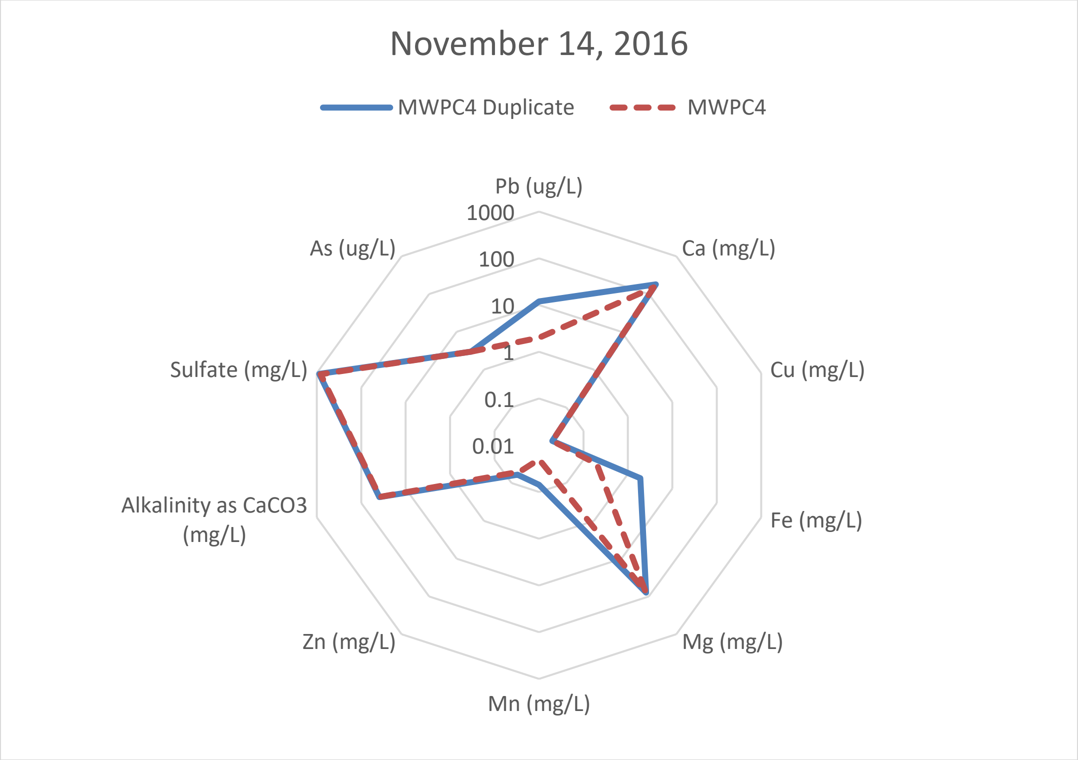
This section contains radial plots for each water quality sampling period that compares sample with the duplicate sample.

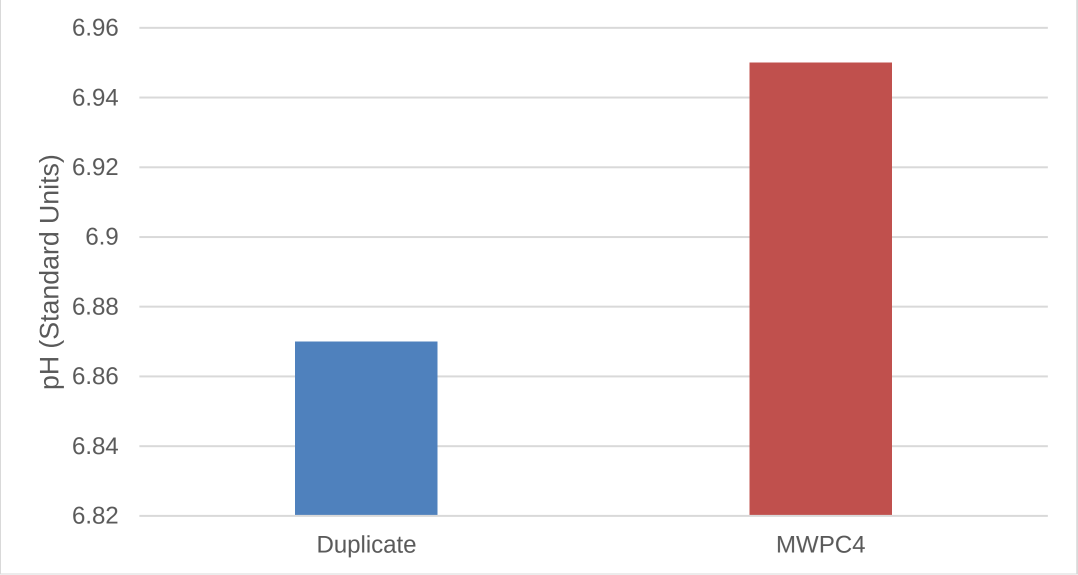


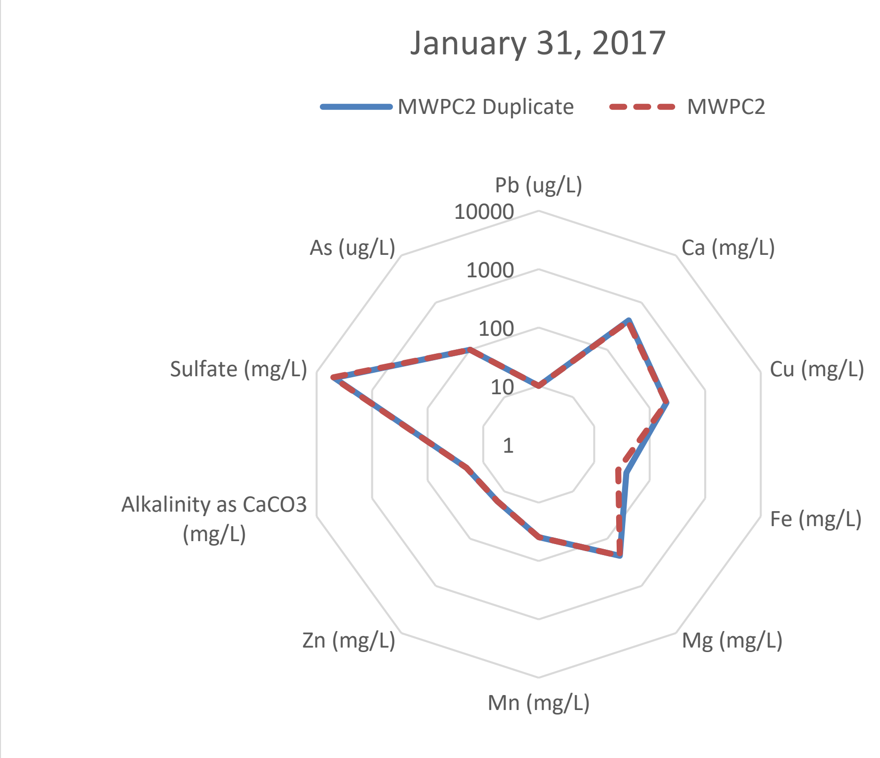


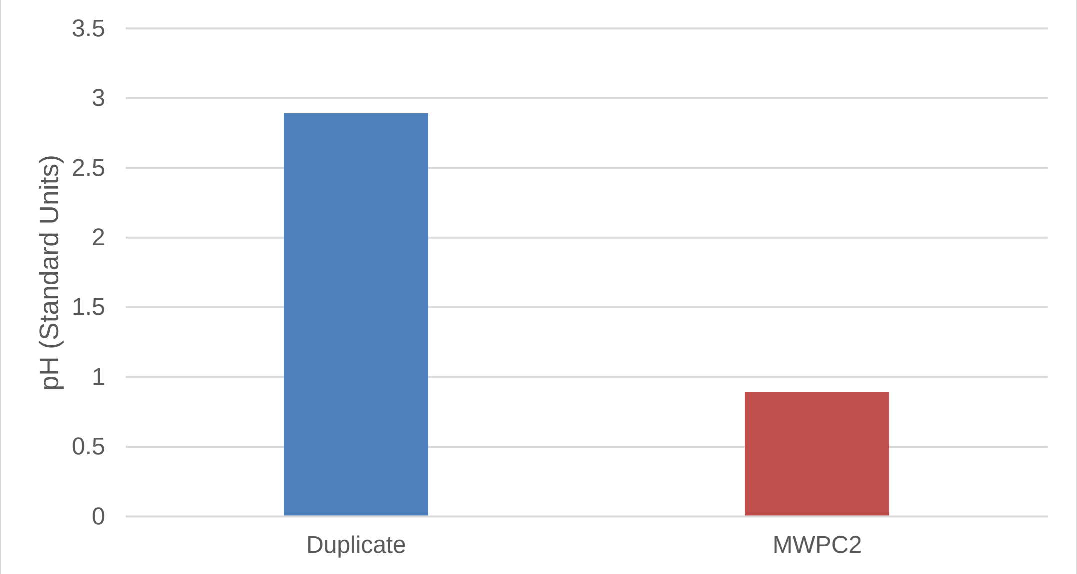

June 23, 2016
MWPC4 Duplicate
MWPC4
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
1000
100
10
1
0.1
0.01

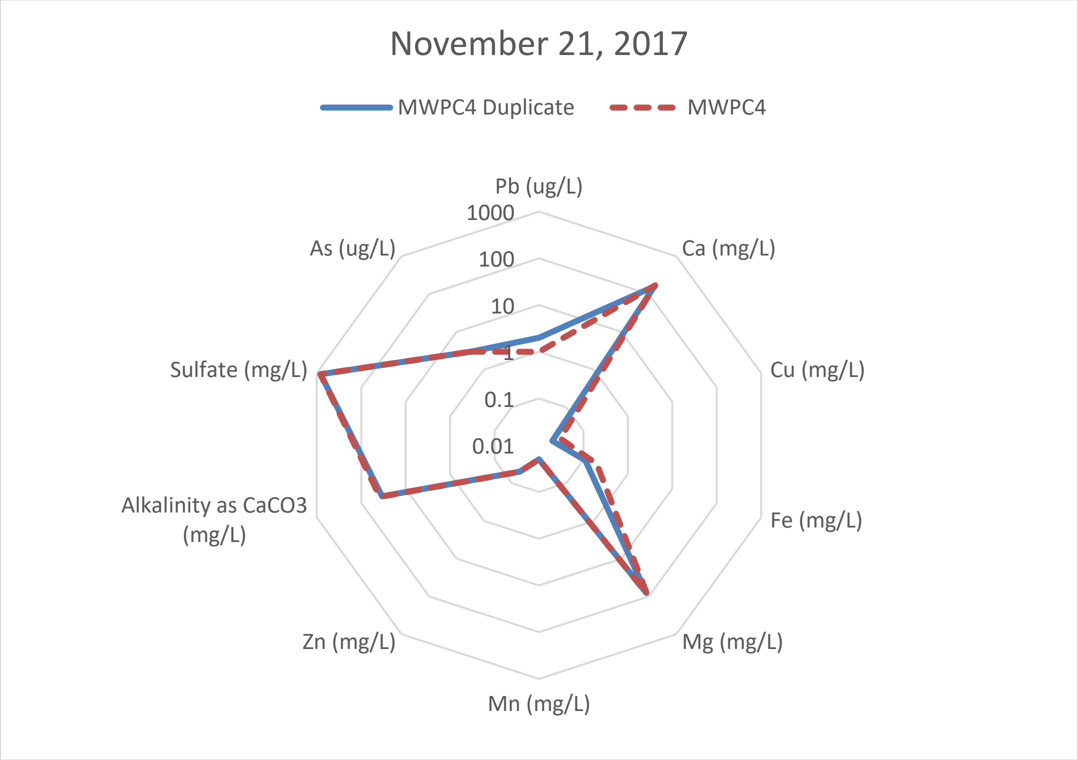

pH (Standard Units)
6.835
6.83
6.825
6.82
6.815
6.81
6.805
6.8
Duplicate
MWPC4

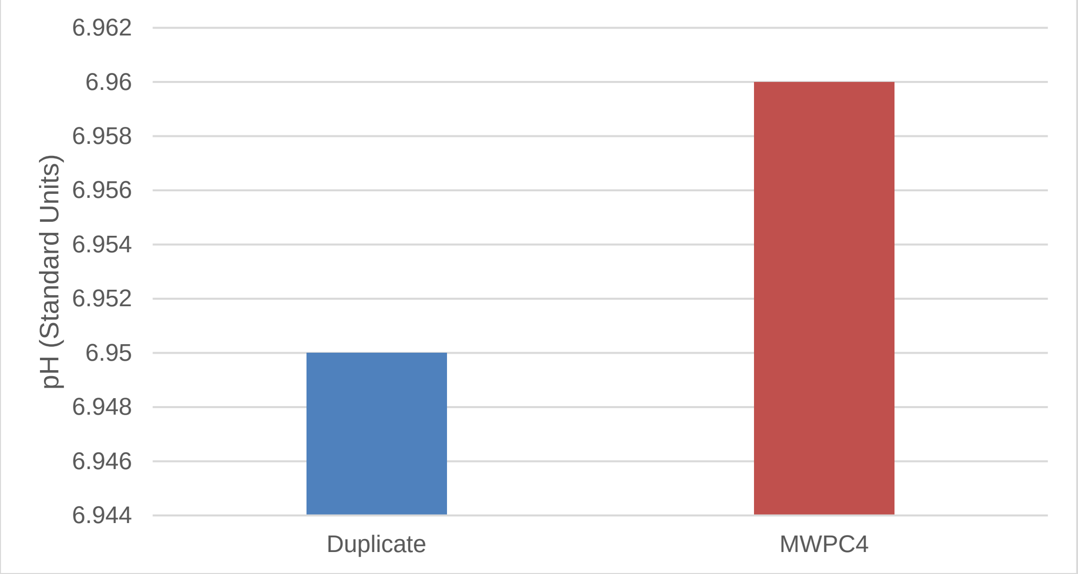

November 14, 2016
MWPC4 Duplicate
MWPC4
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
1000
100
10
1
0.1
0.01

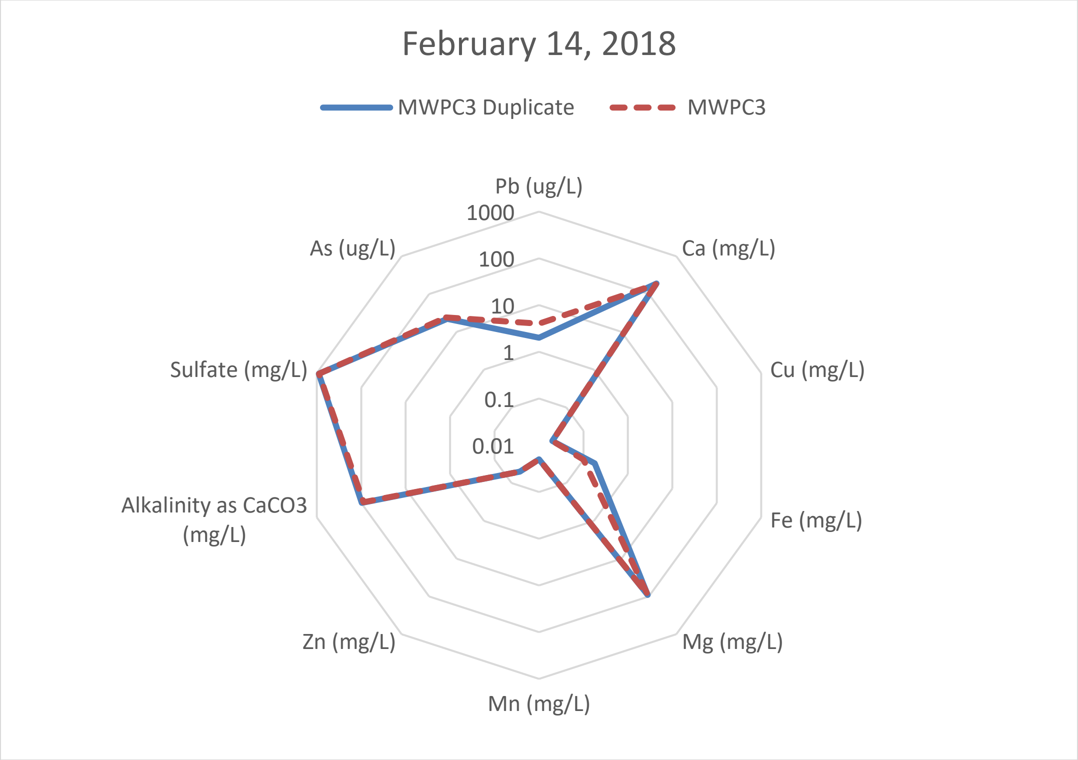

pH (Standard Units)
6.96
6.94
6.92
6.9
6.88
6.86
6.84
6.82
Duplicate
MWPC4

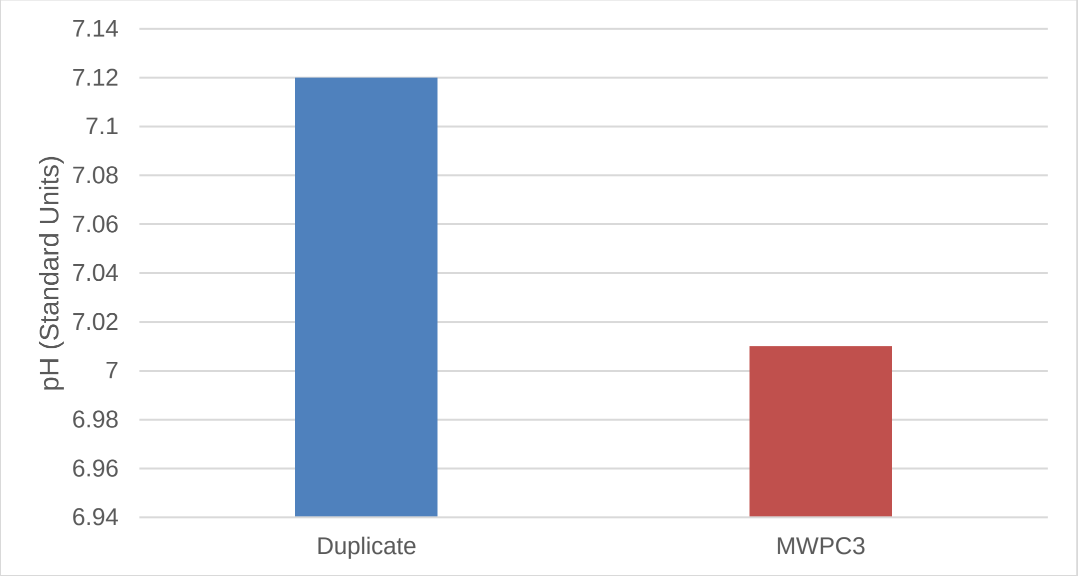

January 31, 2017
MWPC2 Duplicate
MWPC2
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
10000
1000
100
10
1

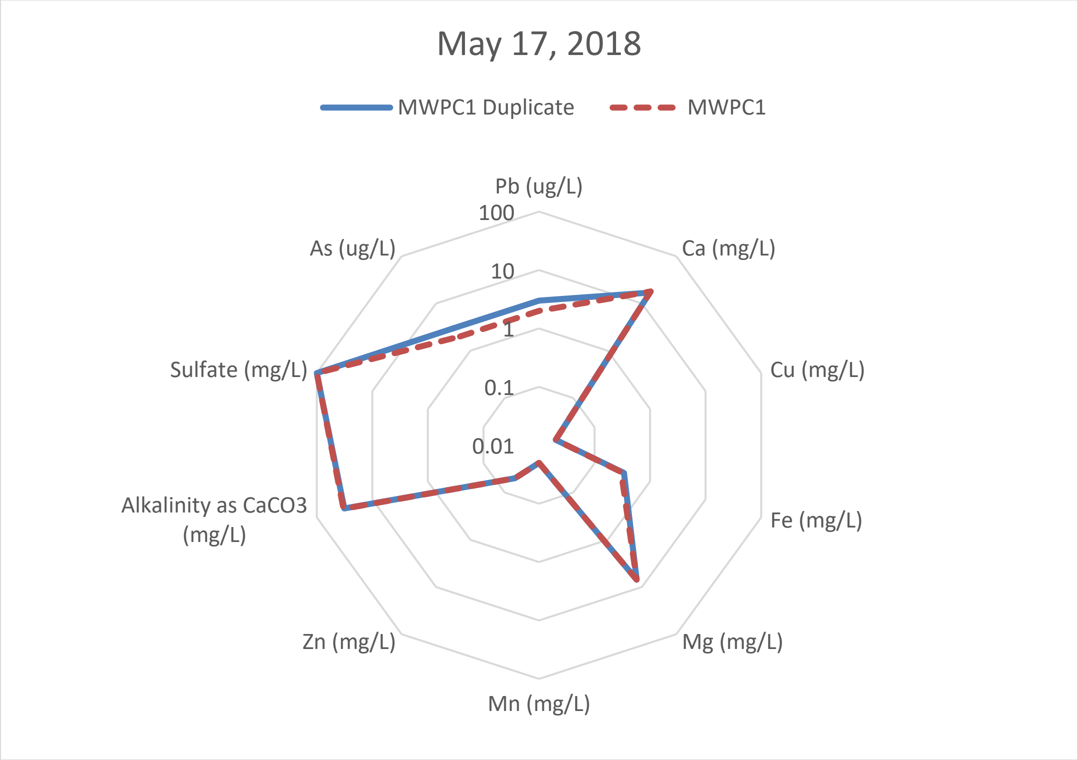

pH (Standard Units)
3.5
3
2.5
2
1.5
1
0.5
0
Duplicate
MWPC2

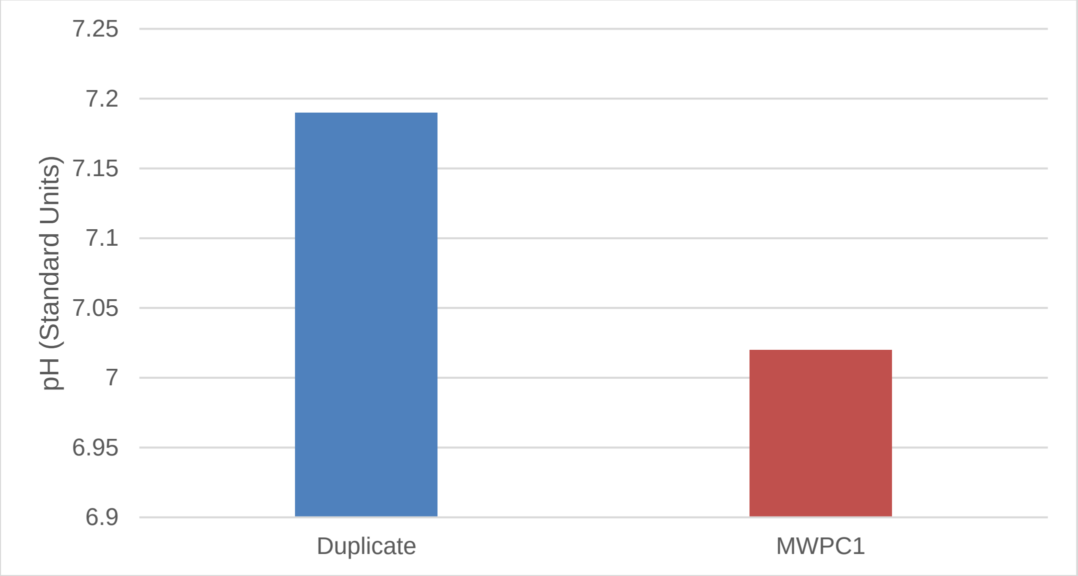

November 21, 2017
MWPC4 Duplicate
MWPC4
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
1000
100
10
1
0.1
0.01

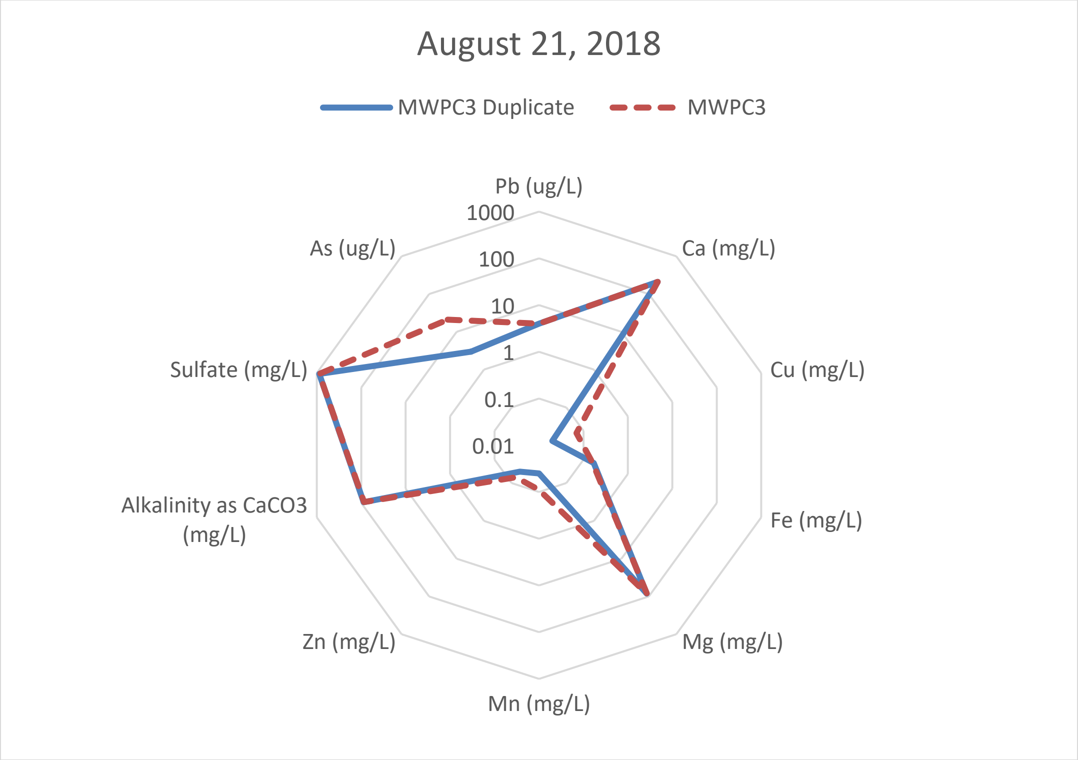

pH (Standard Units)
6.962
6.96
6.958
6.956
6.954
6.952
6.95
6.948
6.946
6.944
Duplicate
MWPC4

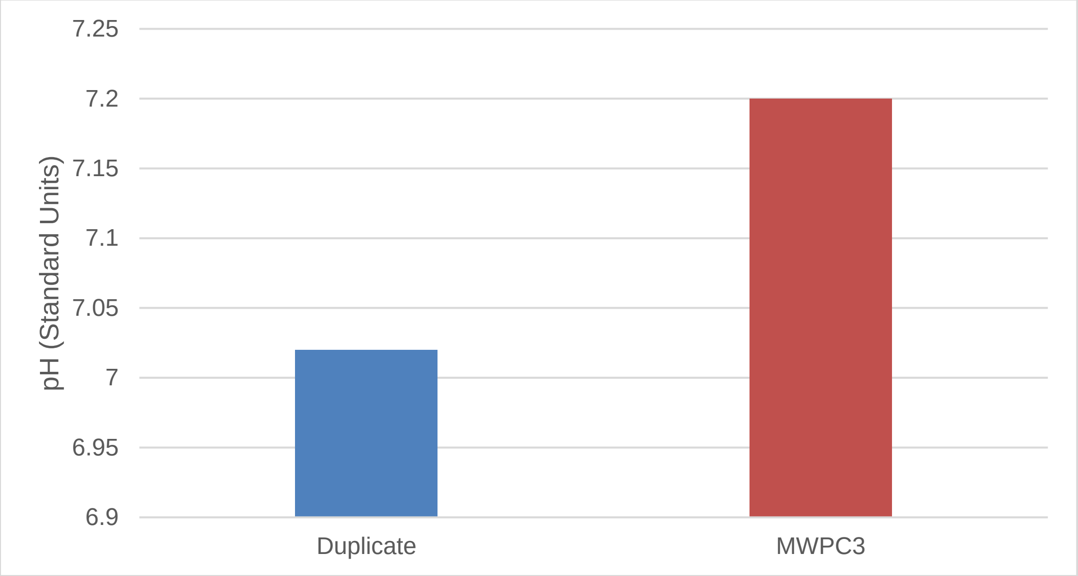

February 14, 2018
MWPC3 Duplicate
MWPC3
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
1000
100
10
1
0.1
0.01

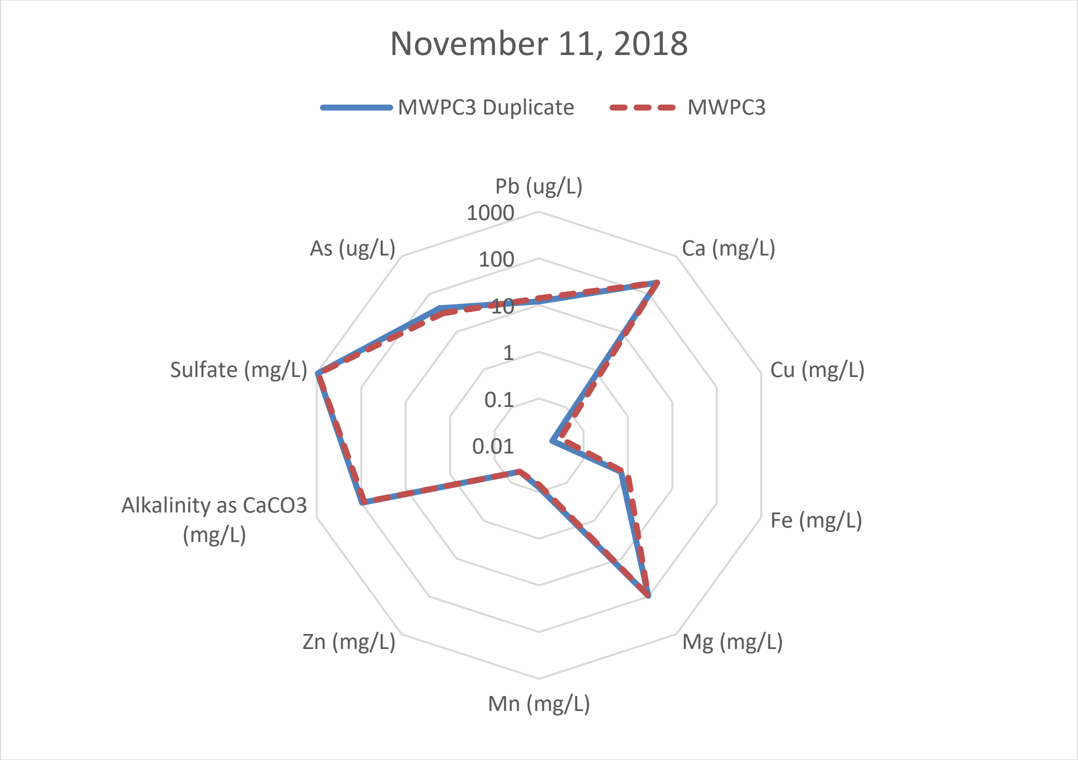

pH (Standard Units)
7.14
7.12
7.1
7.08
7.06
7.04
7.02
7
6.98
6.96
6.94
Duplicate
MWPC3

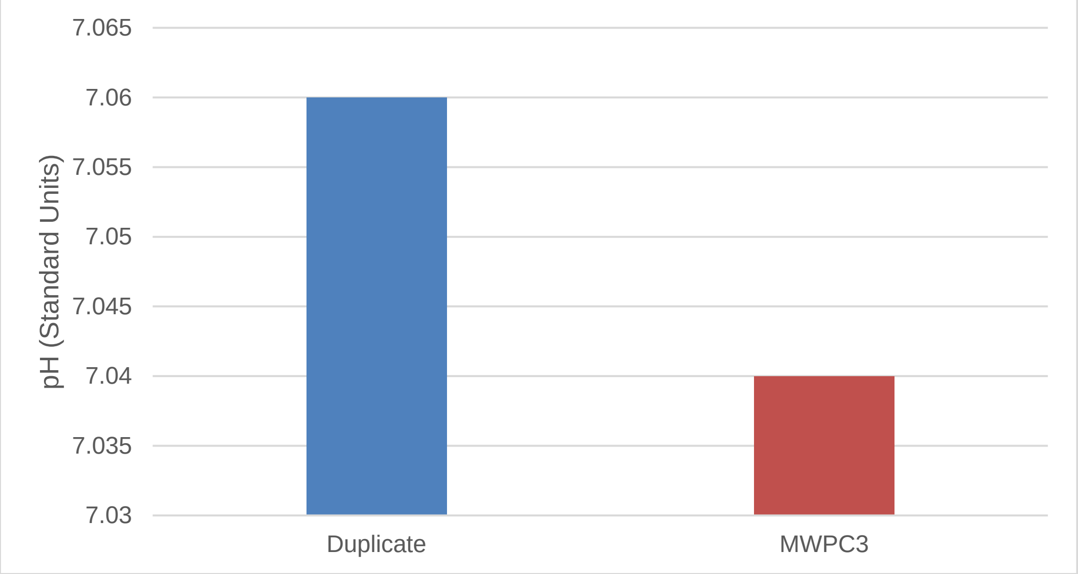

May 17, 2018
MWPC1 Duplicate
MWPC1
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
100
10
1
0.1
0.01

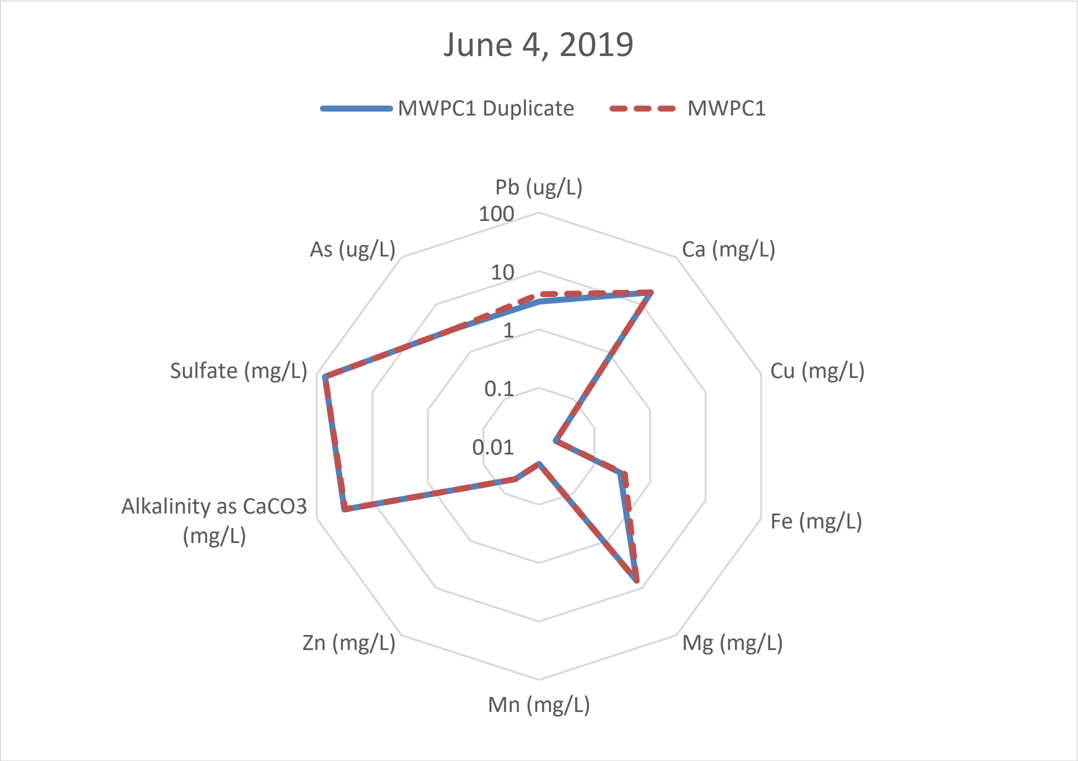

pH (Standard Units)
7.25
7.2
7.15
7.1
7.05
7
6.95
6.9
Duplicate
MWPC1

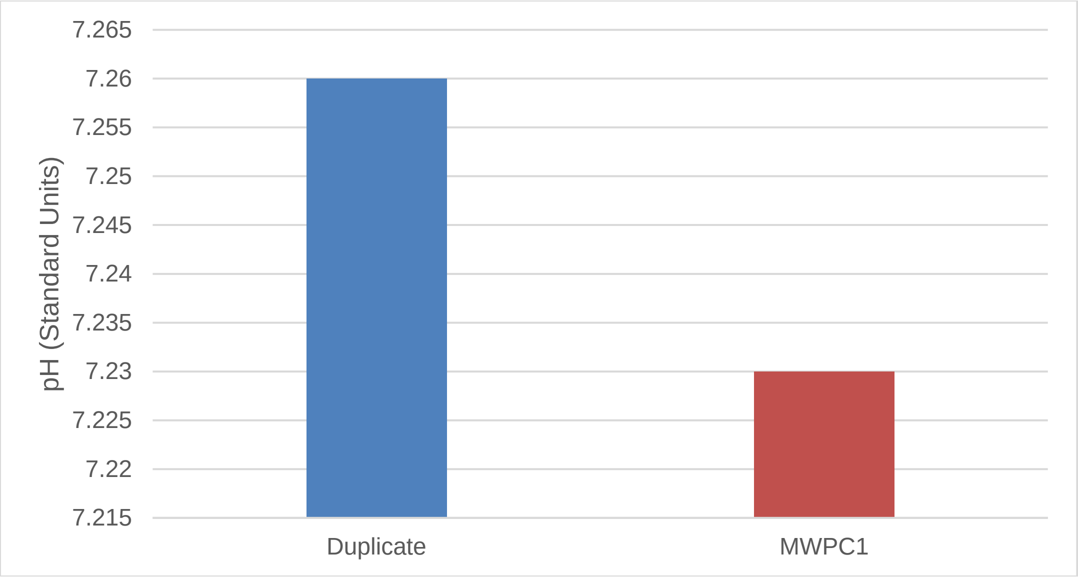

August 21, 2018
MWPC3 Duplicate
MWPC3
Pb (ug/L)
1000
100
10
1
0.1
0.01
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)

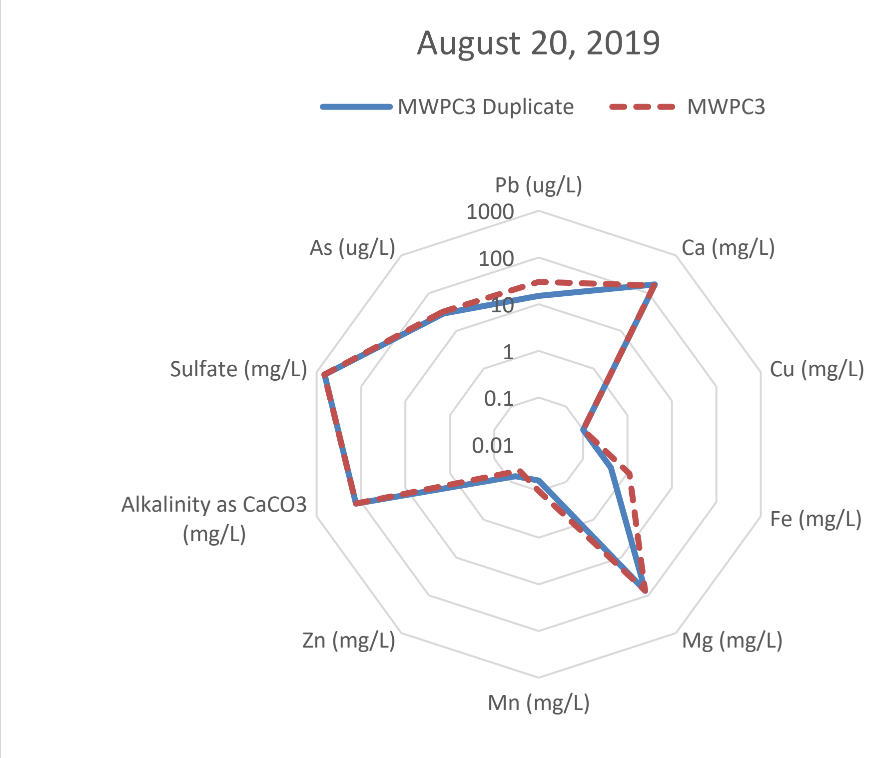

7.25
7.2
7.15
7.1
7.05
7
6.95
6.9
pH (Standard Units)
Duplicate
MWPC3

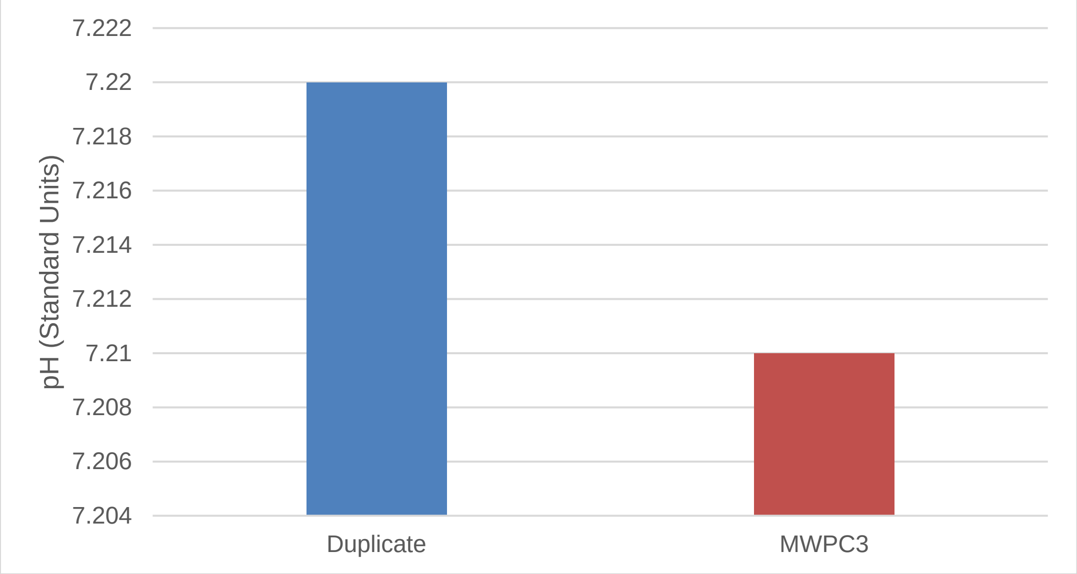

November 11, 2018
MWPC3 Duplicate
MWPC3
Pb (ug/L)
1000
100
10
1
0.1
0.01
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)

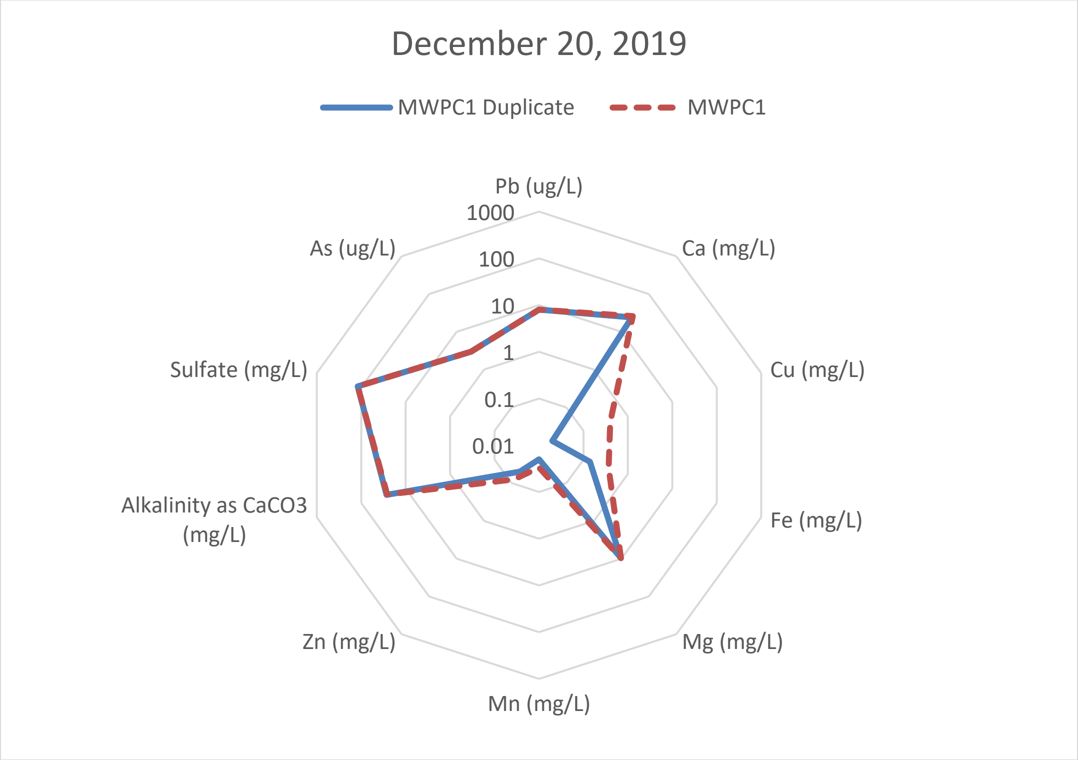

7.065
7.06
7.055
7.05
7.045
7.04
7.035
7.03
pH (Standard Units)
Duplicate
MWPC3

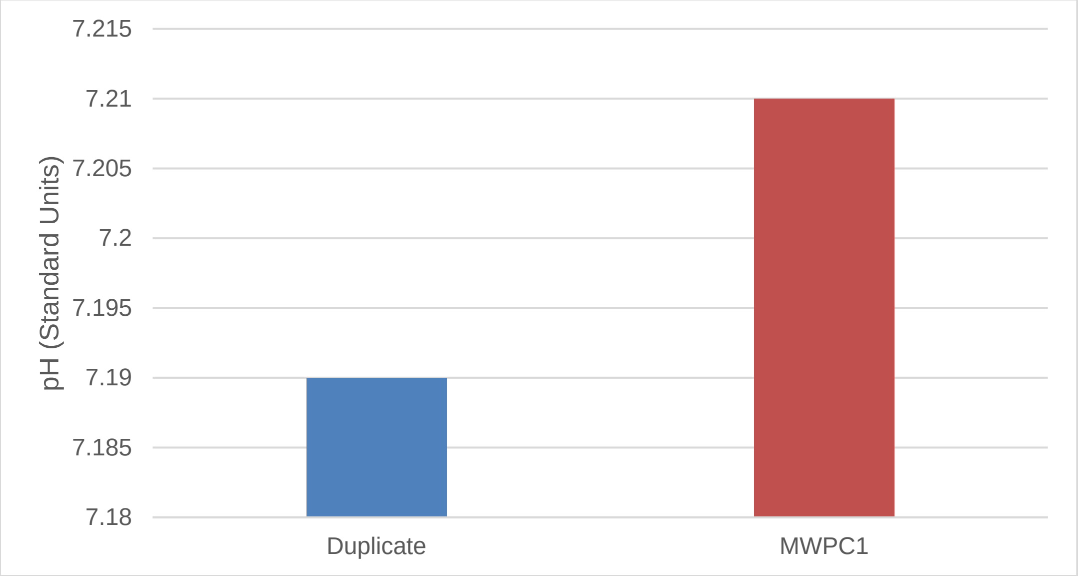

June 4, 2019
MWPC1 Duplicate
MWPC1
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
100
10
1
0.1
0.01


pH (Standard Units)
7.265
7.26
7.255
7.25
7.245
7.24
7.235
7.23
7.225
7.22
7.215
Duplicate
MWPC1


August 20, 2019
MWPC3 Duplicate
MWPC3
Pb (ug/L)
1000
100
10
1
0.1
0.01
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)

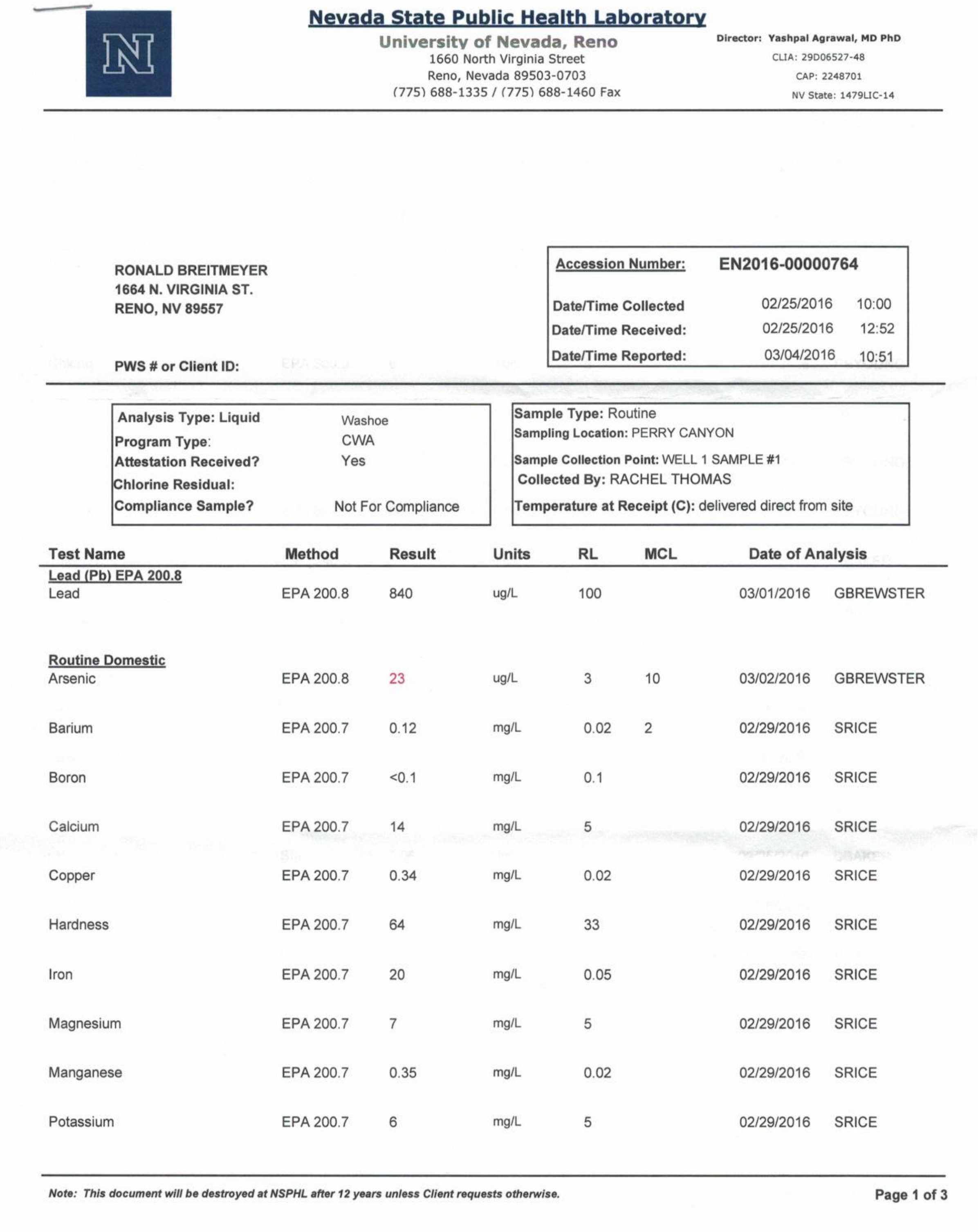

pH (Standard Units)
7.222
7.22
7.218
7.216
7.214
7.212
7.21
7.208
7.206
7.204
Duplicate
MWPC3


December 20, 2019
MWPC1 Duplicate
MWPC1
Pb (ug/L)
Ca (mg/L)
Cu (mg/L)
Fe (mg/L)
Mg (mg/L)
Mn (mg/L)
Zn (mg/L)
Alkalinity as CaCO3 (mg/L)
Sulfate (mg/L)
As (ug/L)
1000
100
10
1
0.1
0.01


pH (Standard Units)
7.215
7.21
7.205
7.2
7.195
7.19
7.185
7.18
Duplicate
MWPC1

Appendix C: Laboratory Results

February 2016 Results



Nevada State Public Health Laboratory
University of Nevada, Reno
1660 North Virginia Street
Reno, Nevada 89503-0703
(775) 688-1335 / (775) 688-1460 Fax

Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

RONALD BREITMEYER
1664 N. VIRGINIA ST.
RENO, NV 89557

PWS # or Client ID:

Accession Number:	EN2016-00000764	
Date/Time Collected	02/25/2016	10:00
Date/Time Received:	02/25/2016	12:52
Date/Time Reported:	03/04/2016	10:51

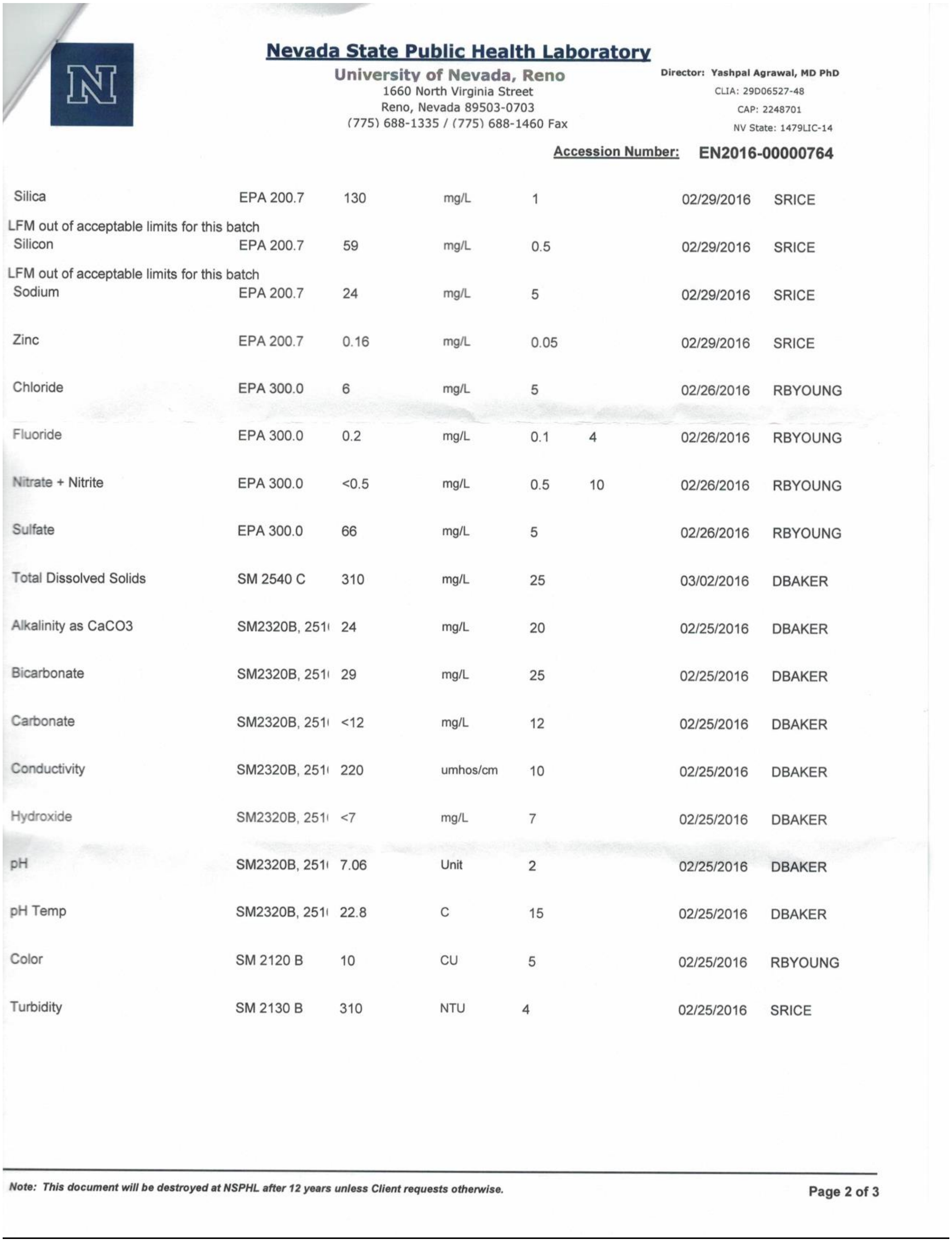
Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: WELL 1 SAMPLE #1
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	840	ug/L	100		03/01/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	23	ug/L	3	10	03/02/2016	GBREWSTER
Barium	EPA 200.7	0.12	mg/L	0.02	2	02/29/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/29/2016	SRICE
Calcium	EPA 200.7	14	mg/L	5		02/29/2016	SRICE
Copper	EPA 200.7	0.34	mg/L	0.02		02/29/2016	SRICE
Hardness	EPA 200.7	64	mg/L	33		02/29/2016	SRICE
Iron	EPA 200.7	20	mg/L	0.05		02/29/2016	SRICE
Magnesium	EPA 200.7	7	mg/L	5		02/29/2016	SRICE
Manganese	EPA 200.7	0.35	mg/L	0.02		02/29/2016	SRICE
Potassium	EPA 200.7	6	mg/L	5		02/29/2016	SRICE

Note: This document will be destroyed at NSPHL after 12 years unless Client requests otherwise.

Page 1 of 3



Nevada State Public Health Laboratory

University of Nevada, Reno
1660 North Virginia Street
Reno, Nevada 89503-0703
(775) 688-1335 / (775) 688-1460 Fax

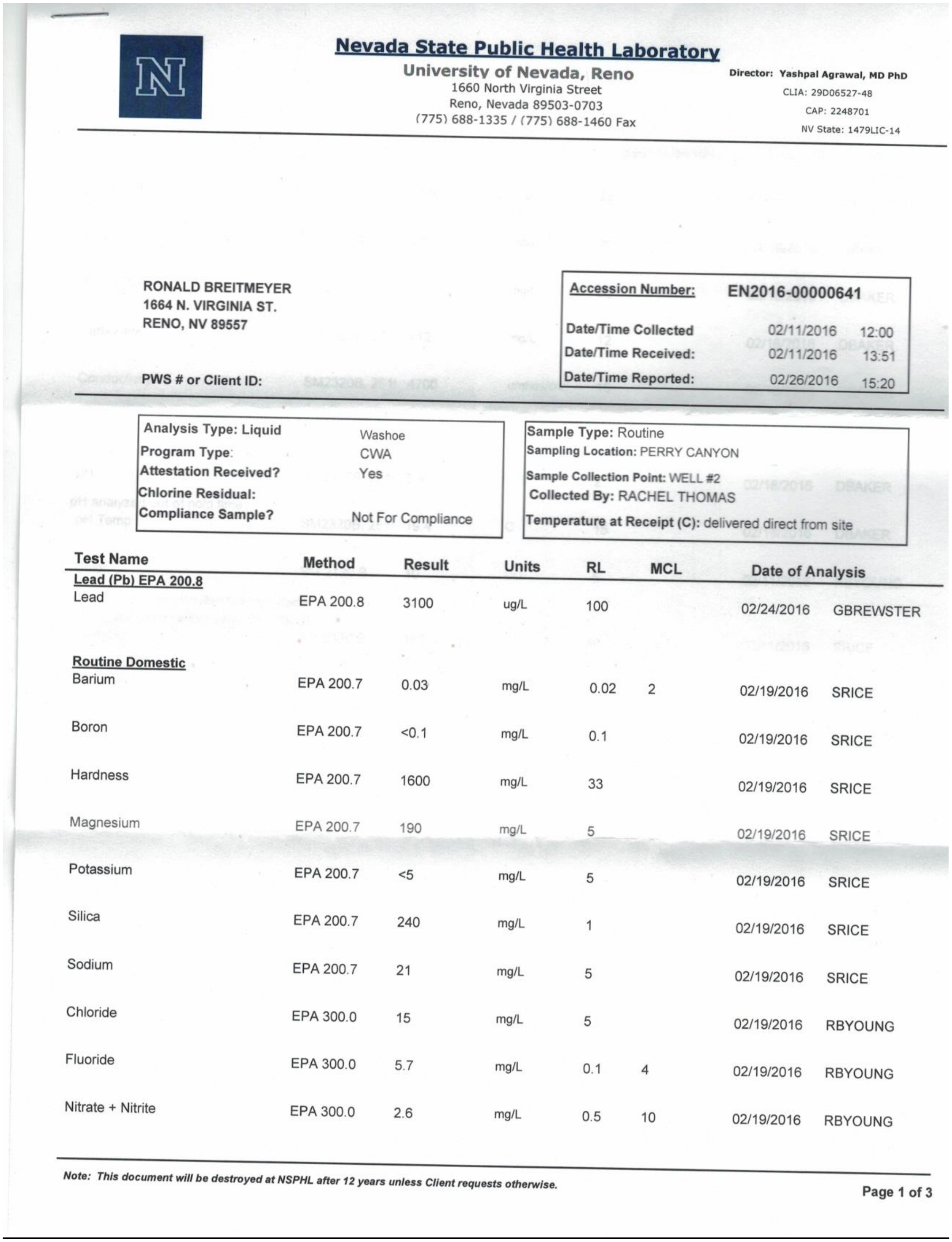
Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

Accession Number: **EN2016-00000764**

Silica	EPA 200.7	130	mg/L	1		02/29/2016	SRICE
LFM out of acceptable limits for this batch							
Silicon	EPA 200.7	59	mg/L	0.5		02/29/2016	SRICE
LFM out of acceptable limits for this batch							
Sodium	EPA 200.7	24	mg/L	5		02/29/2016	SRICE
Zinc	EPA 200.7	0.16	mg/L	0.05		02/29/2016	SRICE
Chloride	EPA 300.0	6	mg/L	5		02/26/2016	RBYOUNG
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	02/26/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/26/2016	RBYOUNG
Sulfate	EPA 300.0	66	mg/L	5		02/26/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	310	mg/L	25		03/02/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	24	mg/L	20		02/25/2016	DBAKER
Bicarbonate	SM2320B, 251	29	mg/L	25		02/25/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/25/2016	DBAKER
Conductivity	SM2320B, 251	220	umhos/cm	10		02/25/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/25/2016	DBAKER
pH	SM2320B, 251	7.06	Unit	2		02/25/2016	DBAKER
pH Temp	SM2320B, 251	22.8	C	15		02/25/2016	DBAKER
Color	SM 2120 B	10	CU	5		02/25/2016	RBYOUNG
Turbidity	SM 2130 B	310	NTU	4		02/25/2016	SRICE

Note: This document will be destroyed at NSPHL after 12 years unless Client requests otherwise.

Page 2 of 3



Nevada State Public Health Laboratory
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1660 North Virginia Street
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(775) 688-1335 / (775) 688-1460 Fax

Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

RONALD BREITMEYER
1664 N. VIRGINIA ST.
RENO, NV 89557

Accession Number: EN2016-00000641

Date/Time Collected 02/11/2016 12:00
Date/Time Received: 02/11/2016 13:51
Date/Time Reported: 02/26/2016 15:20

PWS # or Client ID:

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: WELL #2
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	3100	ug/L	100		02/24/2016	GBREWSTER
Routine Domestic							
Barium	EPA 200.7	0.03	mg/L	0.02	2	02/19/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/19/2016	SRICE
Hardness	EPA 200.7	1600	mg/L	33		02/19/2016	SRICE
Magnesium	EPA 200.7	190	mg/L	5		02/19/2016	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/19/2016	SRICE
Silica	EPA 200.7	240	mg/L	1		02/19/2016	SRICE
Sodium	EPA 200.7	21	mg/L	5		02/19/2016	SRICE
Chloride	EPA 300.0	15	mg/L	5		02/19/2016	RBYOUNG
Fluoride	EPA 300.0	5.7	mg/L	0.1	4	02/19/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	2.6	mg/L	0.5	10	02/19/2016	RBYOUNG

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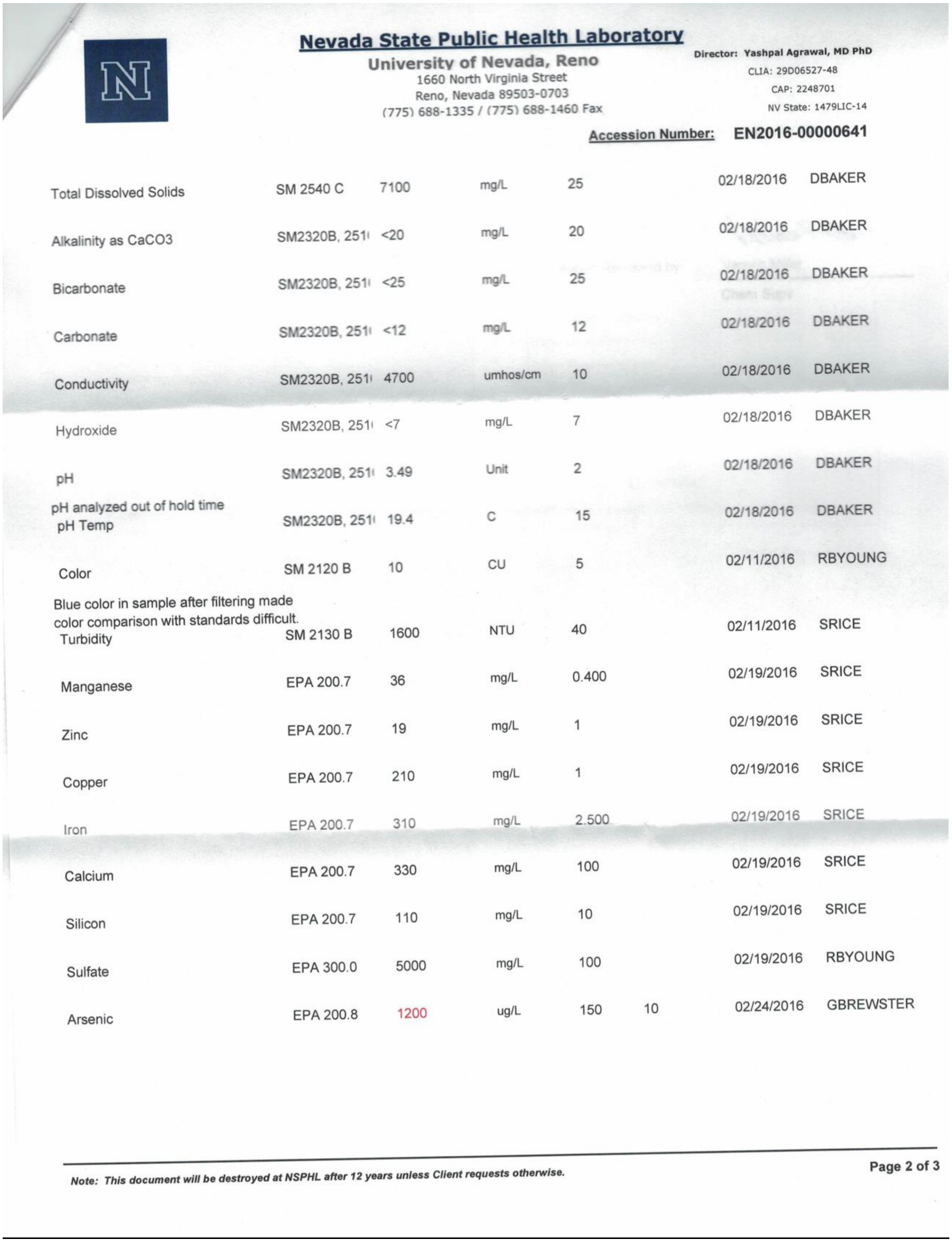

Nevada State Public Health Laboratory

University of Nevada, Reno
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Reno, Nevada 89503-0703
(775) 688-1335 / (775) 688-1460 Fax

Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

Accession Number: **EN2016-00000641**

Total Dissolved Solids	SM 2540 C	7100	mg/L	25		02/18/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		02/18/2016	DBAKER
Bicarbonate	SM2320B, 251	<25	mg/L	25		02/18/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/18/2016	DBAKER
Conductivity	SM2320B, 251	4700	umhos/cm	10		02/18/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/18/2016	DBAKER
pH	SM2320B, 251	3.49	Unit	2		02/18/2016	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	19.4	C	15		02/18/2016	DBAKER
Color	SM 2120 B	10	CU	5		02/11/2016	RBYOUNG
Blue color in sample after filtering made color comparison with standards difficult.							
Turbidity	SM 2130 B	1600	NTU	40		02/11/2016	SRICE
Manganese	EPA 200.7	36	mg/L	0.400		02/19/2016	SRICE
Zinc	EPA 200.7	19	mg/L	1		02/19/2016	SRICE
Copper	EPA 200.7	210	mg/L	1		02/19/2016	SRICE
Iron	EPA 200.7	310	mg/L	2.500		02/19/2016	SRICE
Calcium	EPA 200.7	330	mg/L	100		02/19/2016	SRICE
Silicon	EPA 200.7	110	mg/L	10		02/19/2016	SRICE
Sulfate	EPA 300.0	5000	mg/L	100		02/19/2016	RBYOUNG
Arsenic	EPA 200.8	1200	ug/L	150	10	02/24/2016	GBREWSTER

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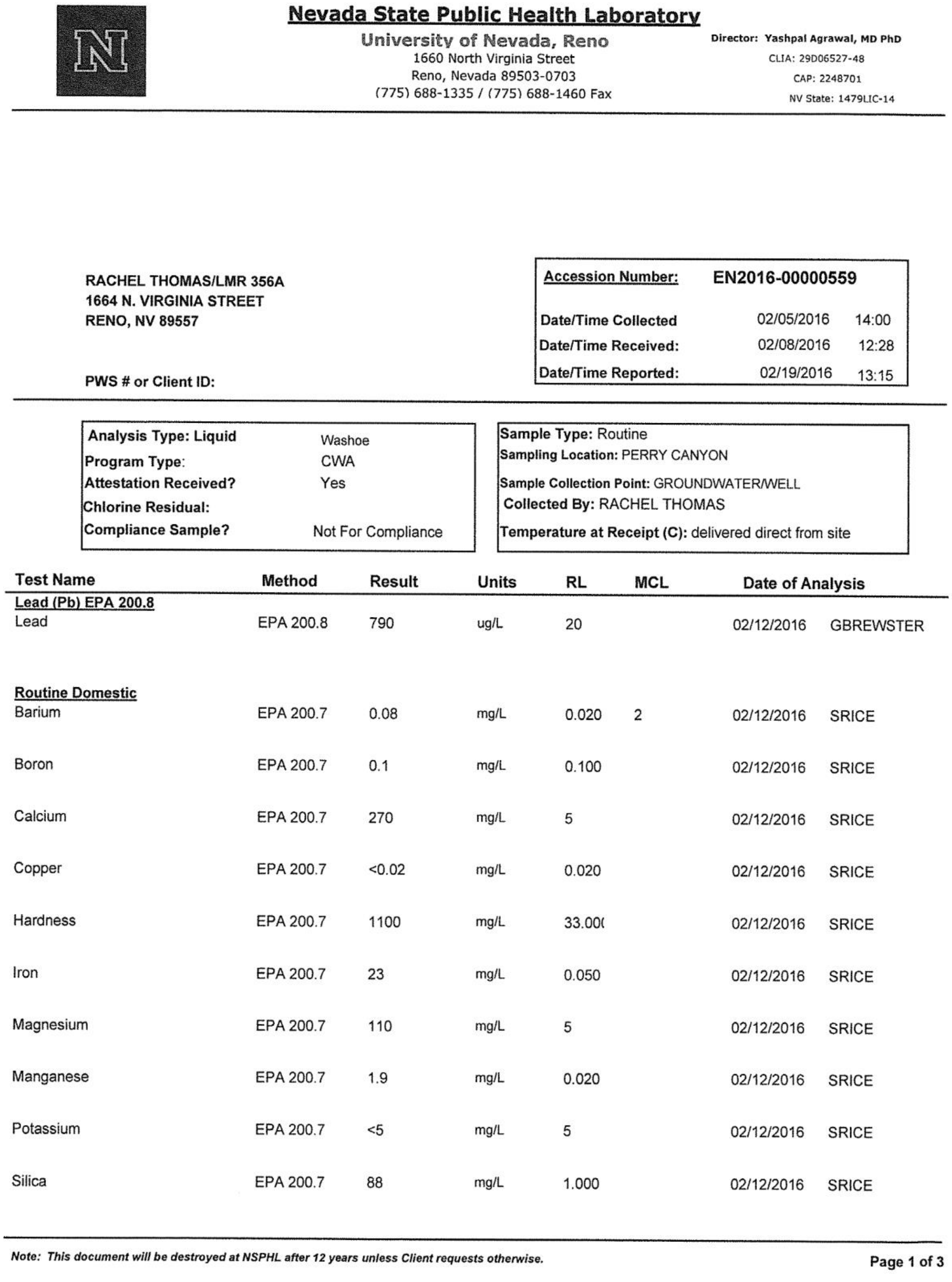

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(775) 688-1335 / (775) 688-1460 Fax

Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00000559**	
Date/Time Collected	02/05/2016	14:00
Date/Time Received:	02/08/2016	12:28
Date/Time Reported:	02/19/2016	13:15

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: GROUNDWATER/WELL
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	790	ug/L	20		02/12/2016	GBREWSTER
Routine Domestic							
Barium	EPA 200.7	0.08	mg/L	0.020	2	02/12/2016	SRICE
Boron	EPA 200.7	0.1	mg/L	0.100		02/12/2016	SRICE
Calcium	EPA 200.7	270	mg/L	5		02/12/2016	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.020		02/12/2016	SRICE
Hardness	EPA 200.7	1100	mg/L	33.00(		02/12/2016	SRICE
Iron	EPA 200.7	23	mg/L	0.050		02/12/2016	SRICE
Magnesium	EPA 200.7	110	mg/L	5		02/12/2016	SRICE
Manganese	EPA 200.7	1.9	mg/L	0.020		02/12/2016	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/12/2016	SRICE
Silica	EPA 200.7	88	mg/L	1.000		02/12/2016	SRICE

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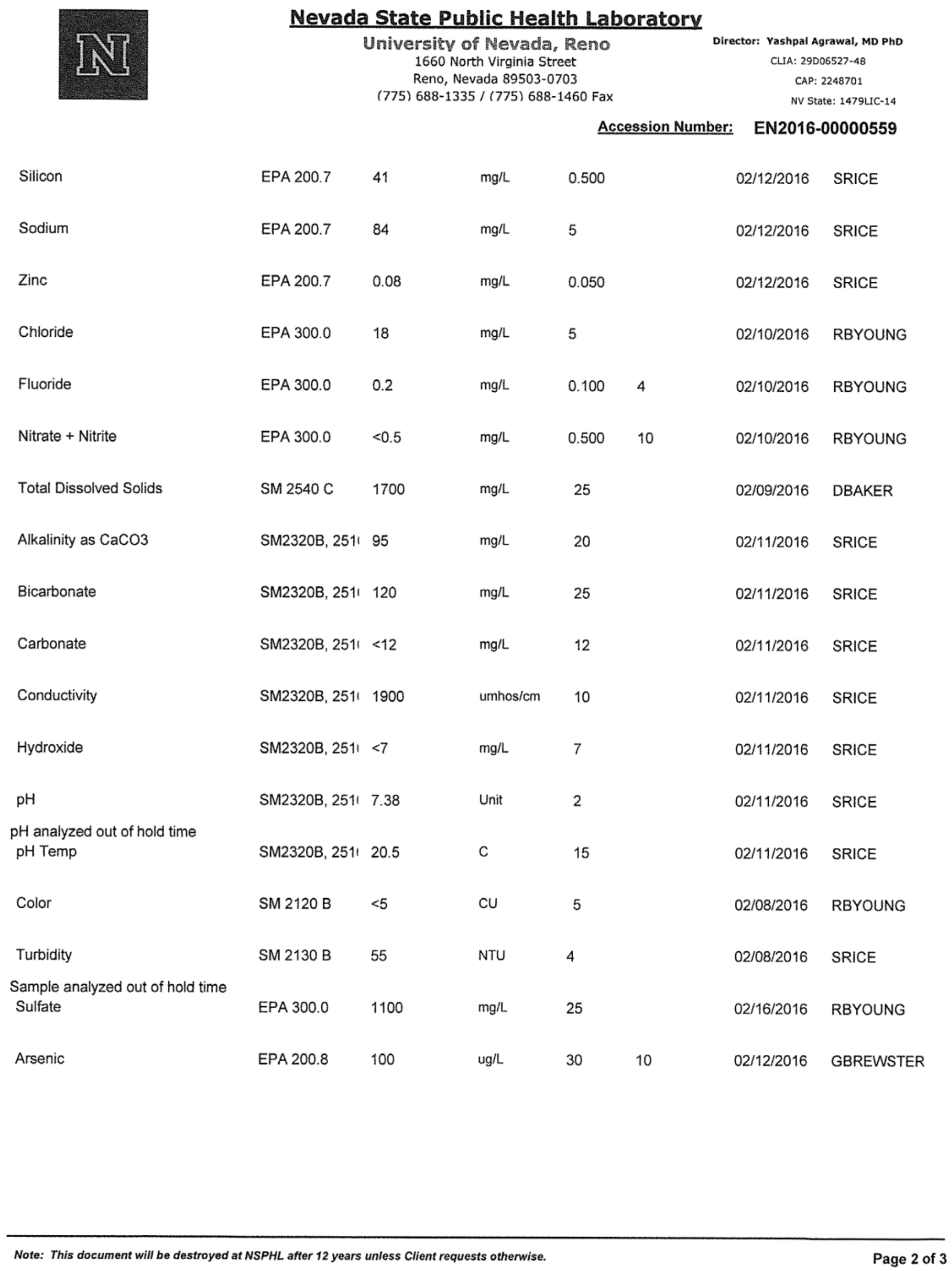

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Director: Yashpal Agrawal, MD PhD
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CAP: 2248701
NV State: 1479LIC-14

Accession Number: **EN2016-00000559**

Silicon	EPA 200.7	41	mg/L	0.500		02/12/2016	SRICE
Sodium	EPA 200.7	84	mg/L	5		02/12/2016	SRICE
Zinc	EPA 200.7	0.08	mg/L	0.050		02/12/2016	SRICE
Chloride	EPA 300.0	18	mg/L	5		02/10/2016	RBYOUNG
Fluoride	EPA 300.0	0.2	mg/L	0.100	4	02/10/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.500	10	02/10/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	1700	mg/L	25		02/09/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	95	mg/L	20		02/11/2016	SRICE
Bicarbonate	SM2320B, 251	120	mg/L	25		02/11/2016	SRICE
Carbonate	SM2320B, 251	<12	mg/L	12		02/11/2016	SRICE
Conductivity	SM2320B, 251	1900	umhos/cm	10		02/11/2016	SRICE
Hydroxide	SM2320B, 251	<7	mg/L	7		02/11/2016	SRICE
pH	SM2320B, 251	7.38	Unit	2		02/11/2016	SRICE
pH analyzed out of hold time							
pH Temp	SM2320B, 251	20.5	C	15		02/11/2016	SRICE
Color	SM 2120 B	<5	CU	5		02/08/2016	RBYOUNG
Turbidity	SM 2130 B	55	NTU	4		02/08/2016	SRICE
Sample analyzed out of hold time							
Sulfate	EPA 300.0	1100	mg/L	25		02/16/2016	RBYOUNG
Arsenic	EPA 200.8	100	ug/L	30	10	02/12/2016	GBREWSTER

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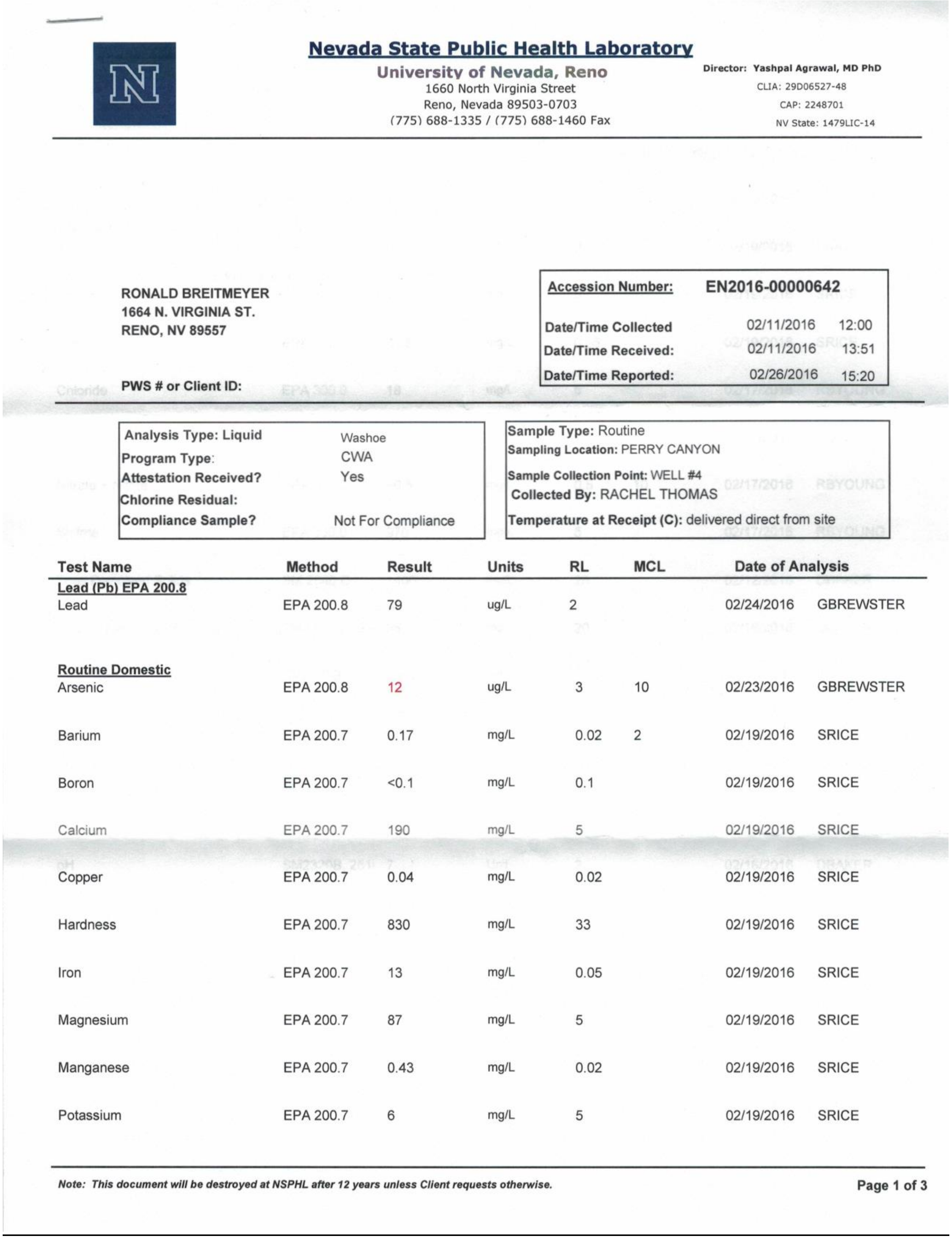

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Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

RONALD BREITMEYER
1664 N. VIRGINIA ST.
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00000642**	
Date/Time Collected	02/11/2016	12:00
Date/Time Received:	02/11/2016	13:51
Date/Time Reported:	02/26/2016	15:20

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: WELL #4
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	79	ug/L	2		02/24/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	12	ug/L	3	10	02/23/2016	GBREWSTER
Barium	EPA 200.7	0.17	mg/L	0.02	2	02/19/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/19/2016	SRICE
Calcium	EPA 200.7	190	mg/L	5		02/19/2016	SRICE
Copper	EPA 200.7	0.04	mg/L	0.02		02/19/2016	SRICE
Hardness	EPA 200.7	830	mg/L	33		02/19/2016	SRICE
Iron	EPA 200.7	13	mg/L	0.05		02/19/2016	SRICE
Magnesium	EPA 200.7	87	mg/L	5		02/19/2016	SRICE
Manganese	EPA 200.7	0.43	mg/L	0.02		02/19/2016	SRICE
Potassium	EPA 200.7	6	mg/L	5		02/19/2016	SRICE

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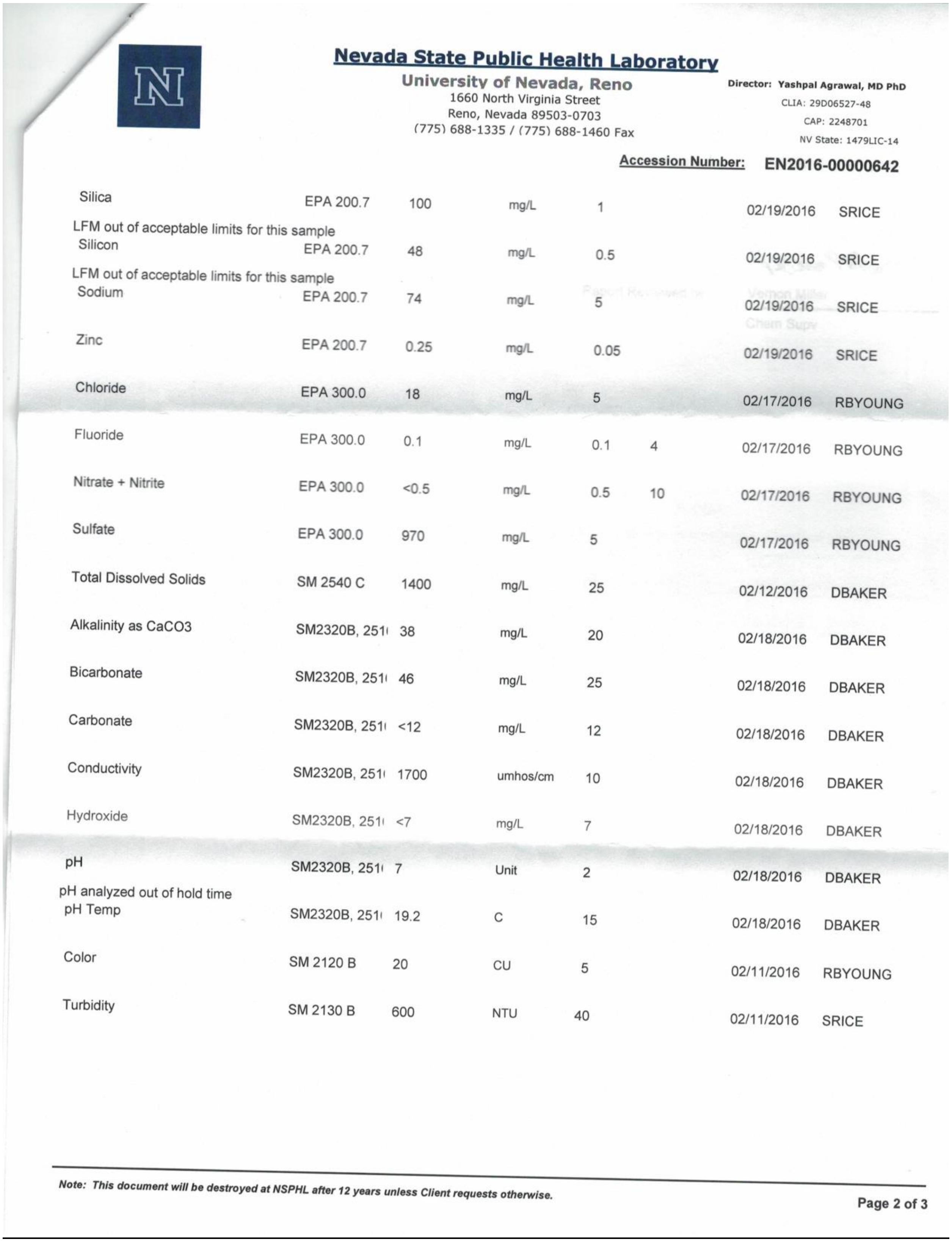

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Reno, Nevada 89503-0703
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Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

Accession Number: **EN2016-00000642**

Silica	EPA 200.7	100	mg/L	1		02/19/2016	SRICE
LFM out of acceptable limits for this sample							
Silicon	EPA 200.7	48	mg/L	0.5		02/19/2016	SRICE
LFM out of acceptable limits for this sample							
Sodium	EPA 200.7	74	mg/L	5		02/19/2016	SRICE
Zinc	EPA 200.7	0.25	mg/L	0.05		02/19/2016	SRICE
Chloride	EPA 300.0	18	mg/L	5		02/17/2016	RBYOUNG
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	02/17/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/17/2016	RBYOUNG
Sulfate	EPA 300.0	970	mg/L	5		02/17/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	1400	mg/L	25		02/12/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	38	mg/L	20		02/18/2016	DBAKER
Bicarbonate	SM2320B, 251	46	mg/L	25		02/18/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/18/2016	DBAKER
Conductivity	SM2320B, 251	1700	umhos/cm	10		02/18/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/18/2016	DBAKER
pH	SM2320B, 251	7	Unit	2		02/18/2016	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	19.2	C	15		02/18/2016	DBAKER
Color	SM 2120 B	20	CU	5		02/11/2016	RBYOUNG
Turbidity	SM 2130 B	600	NTU	40		02/11/2016	SRICE

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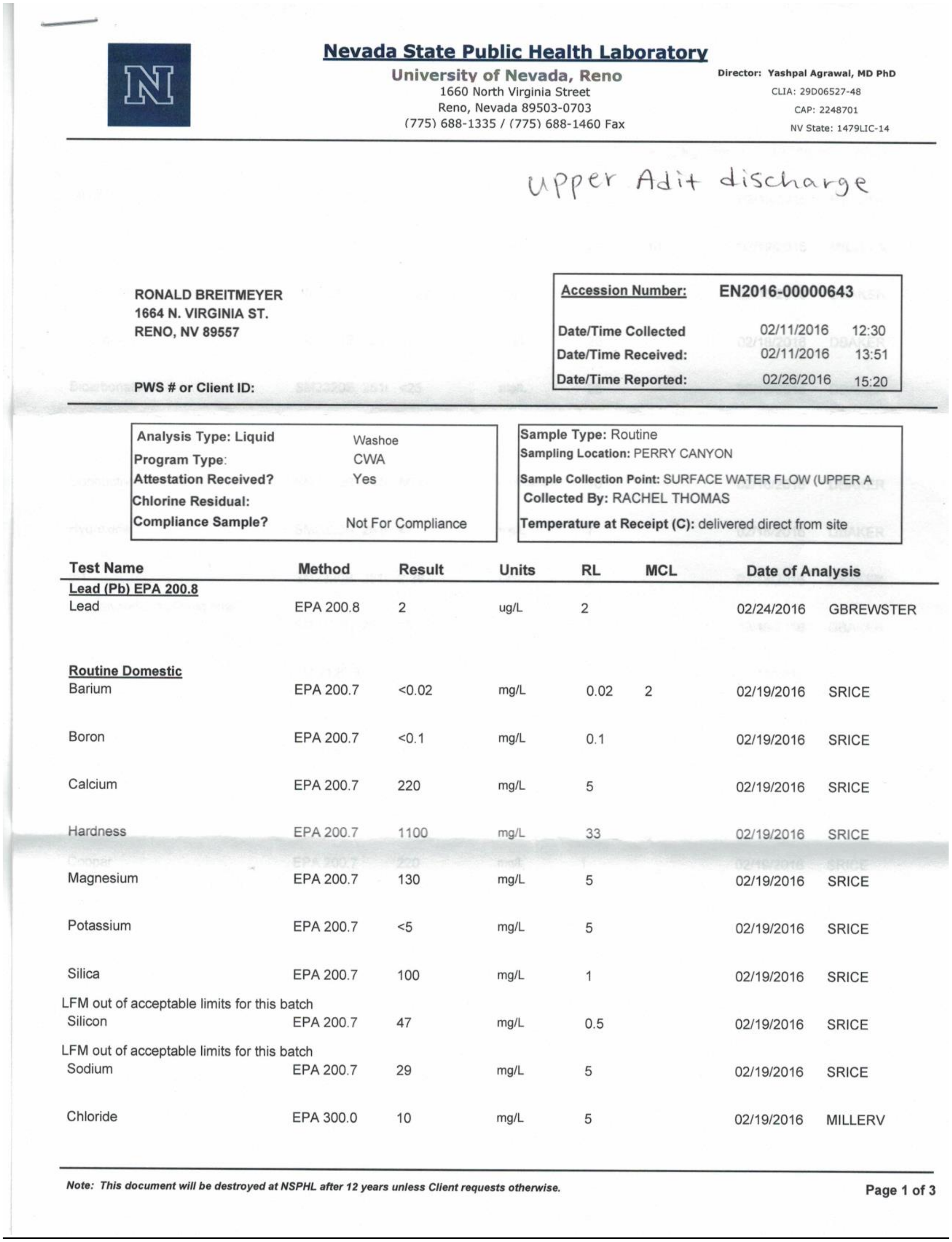

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Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

upper Adit discharge

RONALD BREITMEYER
1664 N. VIRGINIA ST.
RENO, NV 89557

PWS # or Client ID:

Accession Number: EN2016-00000643

Date/Time Collected 02/11/2016 12:30
Date/Time Received: 02/11/2016 13:51
Date/Time Reported: 02/26/2016 15:20

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: SURFACE WATER FLOW (UPPER A
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	2	ug/L	2		02/24/2016	GBREWSTER
Routine Domestic							
Barium	EPA 200.7	<0.02	mg/L	0.02	2	02/19/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/19/2016	SRICE
Calcium	EPA 200.7	220	mg/L	5		02/19/2016	SRICE
Hardness	EPA 200.7	1100	mg/L	33		02/19/2016	SRICE
Magnesium	EPA 200.7	130	mg/L	5		02/19/2016	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/19/2016	SRICE
Silica	EPA 200.7	100	mg/L	1		02/19/2016	SRICE
LFM out of acceptable limits for this batch							
Silicon	EPA 200.7	47	mg/L	0.5		02/19/2016	SRICE
LFM out of acceptable limits for this batch							
Sodium	EPA 200.7	29	mg/L	5		02/19/2016	SRICE
Chloride	EPA 300.0	10	mg/L	5		02/19/2016	MILLERV

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Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

Accession Number: **EN2016-00000643**

Fluoride	EPA 300.0	3	mg/L	0.1	4	02/19/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	0.8	mg/L	0.5	10	02/19/2016	MILLERV
Total Dissolved Solids	SM 2540 C	8200	mg/L	25		02/18/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		02/18/2016	DBAKER
Bicarbonate	SM2320B, 251	<25	mg/L	25		02/18/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/18/2016	DBAKER
Conductivity	SM2320B, 251	5600	umhos/cm	10		02/18/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/18/2016	DBAKER
pH	SM2320B, 251	2.38	Unit	2		02/18/2016	DBAKER
pH analyzed out of hold time pH Temp	SM2320B, 251	19.6	C	15		02/18/2016	DBAKER
Color	SM 2120 B	<5	CU	5		02/11/2016	RBYOUNG
Turbidity	SM 2130 B	18	NTU	0.40		02/11/2016	SRICE
Manganese	EPA 200.7	12	mg/L	0.400		02/19/2016	SRICE
Zinc	EPA 200.7	14	mg/L	1		02/19/2016	SRICE
Copper	EPA 200.7	220	mg/L	1		02/19/2016	SRICE
Iron	EPA 200.7	920	mg/L	2.500		02/19/2016	SRICE
Sulfate	EPA 300.0	5600	mg/L	100		02/19/2016	RBYOUNG
Arsenic	EPA 200.8	21000	ug/L	600	10	02/24/2016	GBREWSTER

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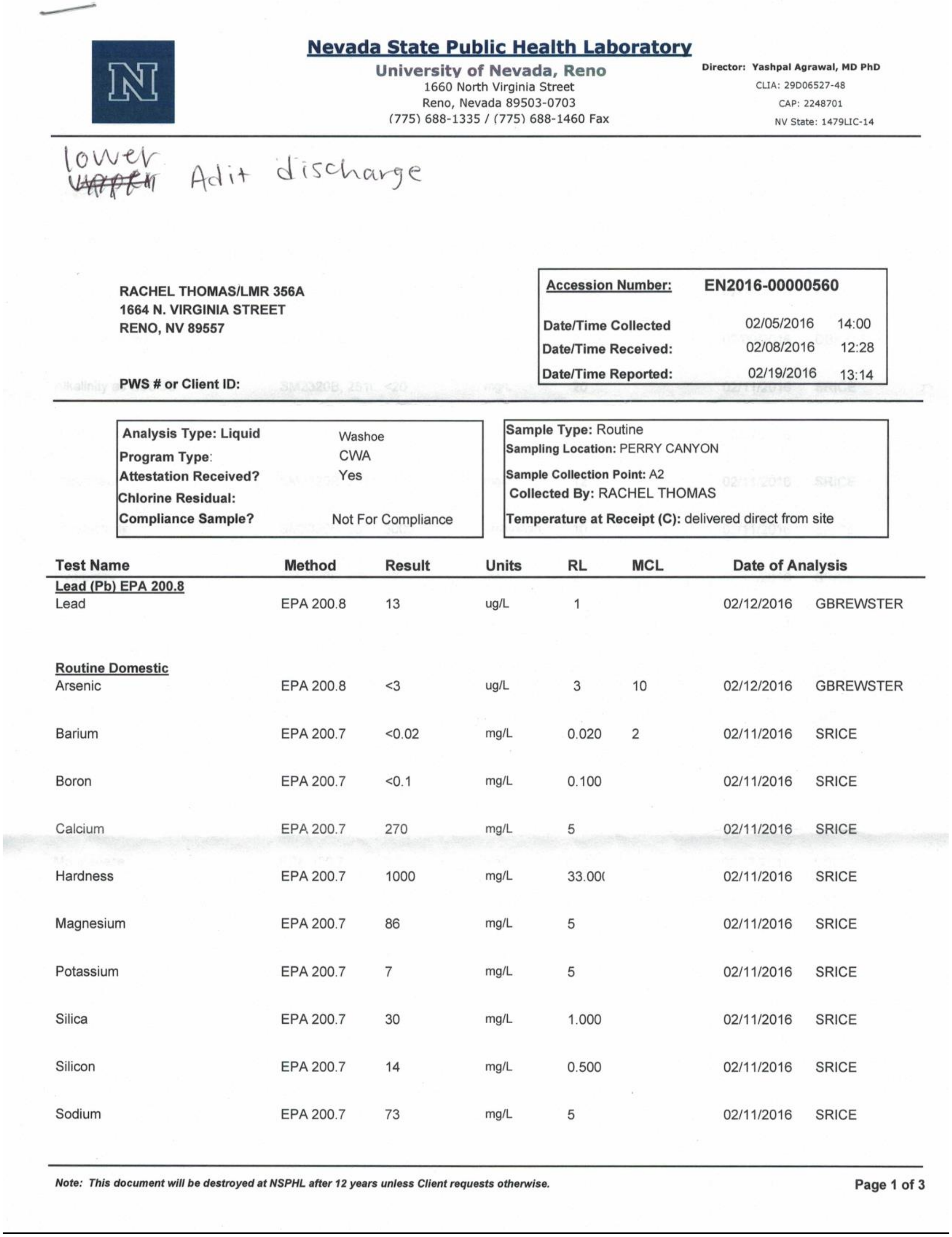

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Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

lower ~~upper~~ Adit discharge

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00000560**	
Date/Time Collected	02/05/2016	14:00
Date/Time Received:	02/08/2016	12:28
Date/Time Reported:	02/19/2016	13:14

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: A2
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	13	ug/L	1		02/12/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	02/12/2016	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.020	2	02/11/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.100		02/11/2016	SRICE
Calcium	EPA 200.7	270	mg/L	5		02/11/2016	SRICE
Hardness	EPA 200.7	1000	mg/L	33.00(		02/11/2016	SRICE
Magnesium	EPA 200.7	86	mg/L	5		02/11/2016	SRICE
Potassium	EPA 200.7	7	mg/L	5		02/11/2016	SRICE
Silica	EPA 200.7	30	mg/L	1.000		02/11/2016	SRICE
Silicon	EPA 200.7	14	mg/L	0.500		02/11/2016	SRICE
Sodium	EPA 200.7	73	mg/L	5		02/11/2016	SRICE

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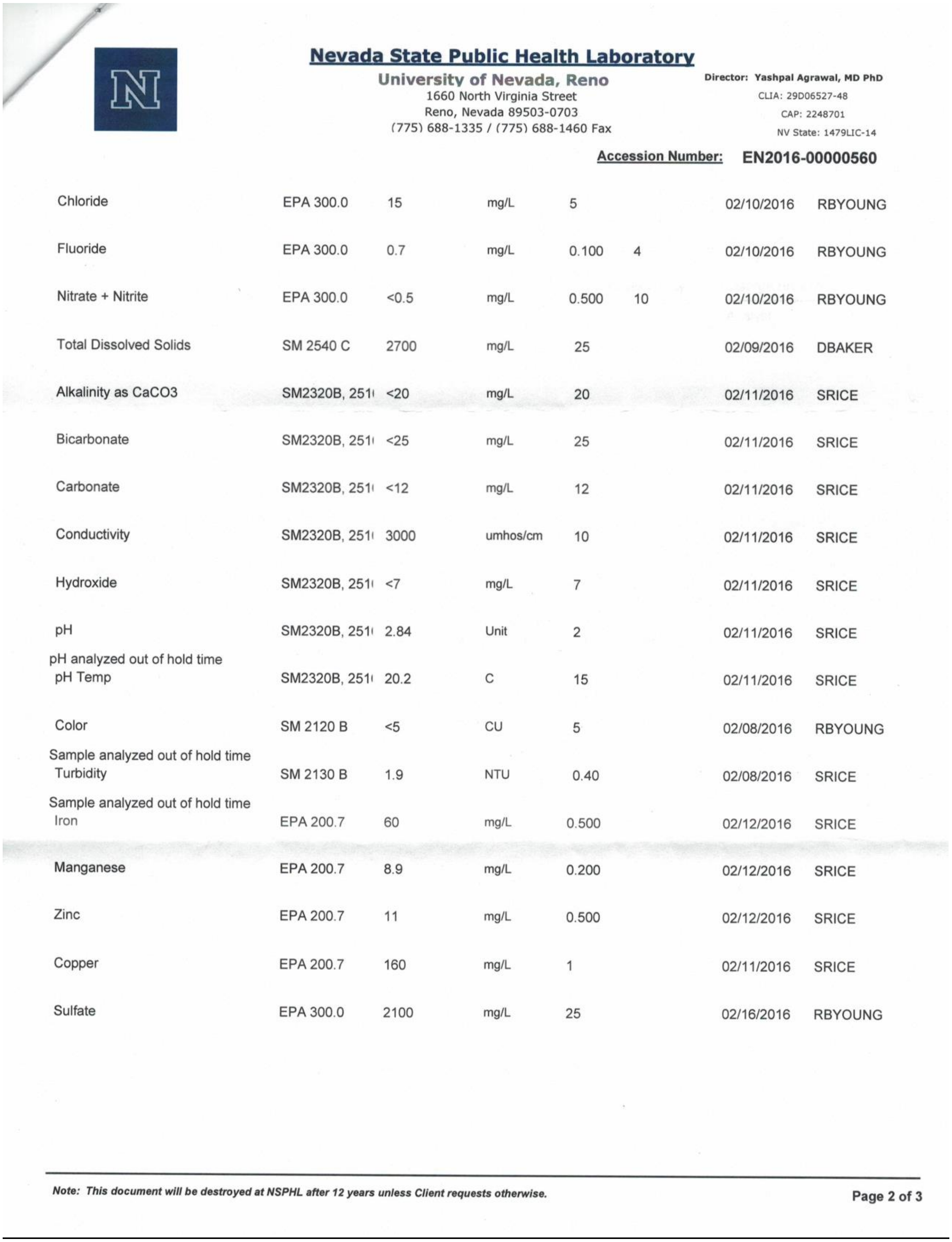

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Director: Yashpal Agrawal, MD PhD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479LIC-14

Accession Number: **EN2016-00000560**

Chloride	EPA 300.0	15	mg/L	5		02/10/2016	RBYOUNG
Fluoride	EPA 300.0	0.7	mg/L	0.100	4	02/10/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.500	10	02/10/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	2700	mg/L	25		02/09/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		02/11/2016	SRICE
Bicarbonate	SM2320B, 251	<25	mg/L	25		02/11/2016	SRICE
Carbonate	SM2320B, 251	<12	mg/L	12		02/11/2016	SRICE
Conductivity	SM2320B, 251	3000	umhos/cm	10		02/11/2016	SRICE
Hydroxide	SM2320B, 251	<7	mg/L	7		02/11/2016	SRICE
pH	SM2320B, 251	2.84	Unit	2		02/11/2016	SRICE
pH analyzed out of hold time							
pH Temp	SM2320B, 251	20.2	C	15		02/11/2016	SRICE
Color	SM 2120 B	<5	CU	5		02/08/2016	RBYOUNG
Sample analyzed out of hold time							
Turbidity	SM 2130 B	1.9	NTU	0.40		02/08/2016	SRICE
Sample analyzed out of hold time							
Iron	EPA 200.7	60	mg/L	0.500		02/12/2016	SRICE
Manganese	EPA 200.7	8.9	mg/L	0.200		02/12/2016	SRICE
Zinc	EPA 200.7	11	mg/L	0.500		02/12/2016	SRICE
Copper	EPA 200.7	160	mg/L	1		02/11/2016	SRICE
Sulfate	EPA 300.0	2100	mg/L	25		02/16/2016	RBYOUNG

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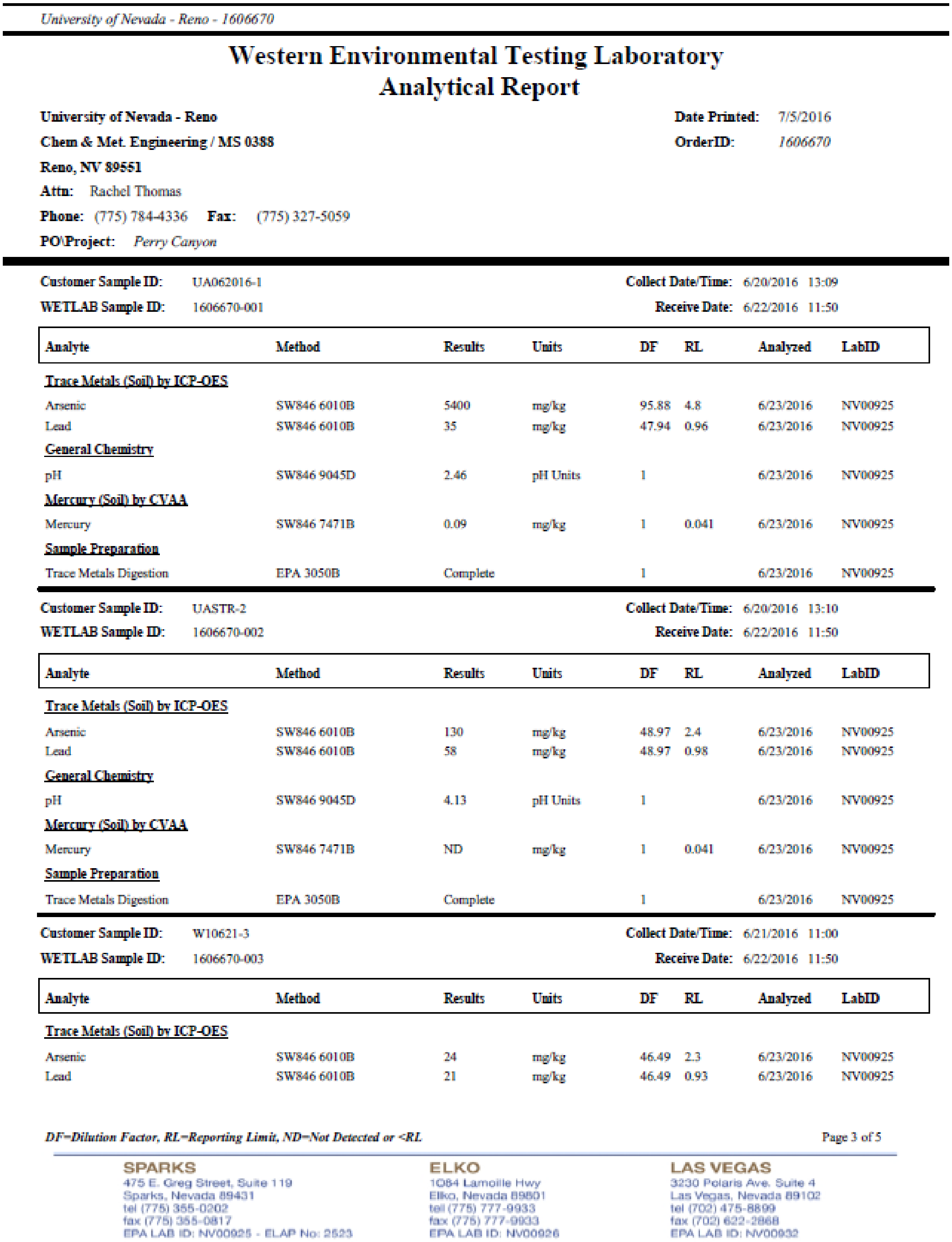
June 2016 Results



University of Nevada - Reno - 1606670

Western Environmental Testing Laboratory
Analytical Report

University of Nevada - Reno
Chem & Met. Engineering / MS 0388
Reno, NV 89551
Attn: Rachel Thomas
Phone: (775) 784-4336 **Fax:** (775) 327-5059
PO\Project: *Perry Canyon*

Date Printed: 7/5/2016
OrderID: *1606670*

Customer Sample ID: UA062016-1
WETLAB Sample ID: 1606670-001
Collect Date/Time: 6/20/2016 13:09
Receive Date: 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	5400	mg/kg	95.88	4.8	6/23/2016	NV00925
Lead	SW846 6010B	35	mg/kg	47.94	0.96	6/23/2016	NV00925
General Chemistry							
pH	SW846 9045D	2.46	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.09	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

Customer Sample ID: UASTR-2
WETLAB Sample ID: 1606670-002
Collect Date/Time: 6/20/2016 13:10
Receive Date: 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	130	mg/kg	48.97	2.4	6/23/2016	NV00925
Lead	SW846 6010B	58	mg/kg	48.97	0.98	6/23/2016	NV00925
General Chemistry							
pH	SW846 9045D	4.13	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

Customer Sample ID: W10621-3
WETLAB Sample ID: 1606670-003
Collect Date/Time: 6/21/2016 11:00
Receive Date: 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	24	mg/kg	46.49	2.3	6/23/2016	NV00925
Lead	SW846 6010B	21	mg/kg	46.49	0.93	6/23/2016	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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EPA LAB ID: NV00926

LAS VEGAS
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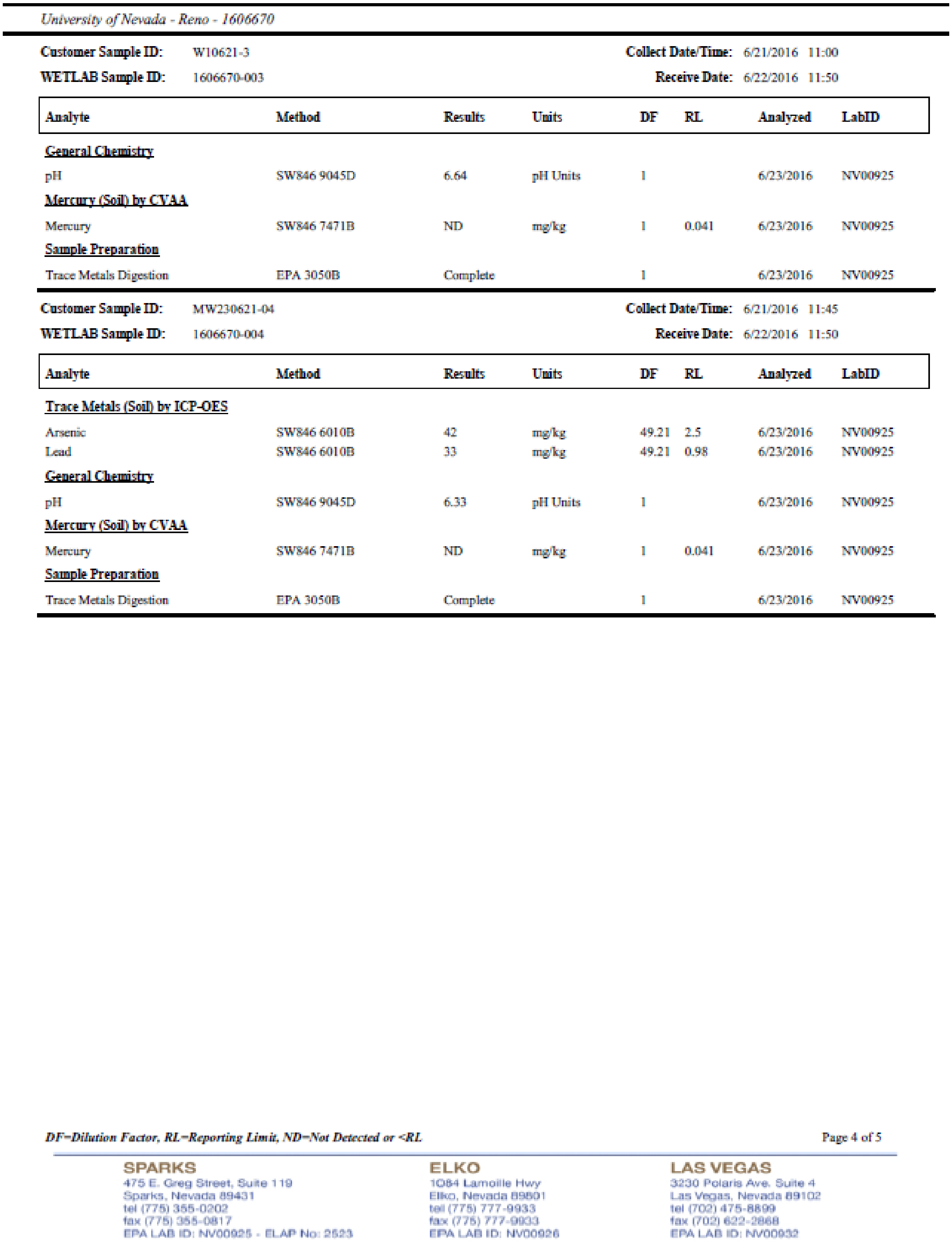
fax (702) 622-2868
EPA LAB ID: NV00932



University of Nevada - Reno - 1606670

Customer Sample ID: W10621-3 **Collect Date/Time:** 6/21/2016 11:00
WETLAB Sample ID: 1606670-003 **Receive Date:** 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
pH	SW846 9045D	6.64	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

Customer Sample ID: MW230621-04 **Collect Date/Time:** 6/21/2016 11:45
WETLAB Sample ID: 1606670-004 **Receive Date:** 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	42	mg/kg	49.21	2.5	6/23/2016	NV00925
Lead	SW846 6010B	33	mg/kg	49.21	0.98	6/23/2016	NV00925
General Chemistry							
pH	SW846 9045D	6.33	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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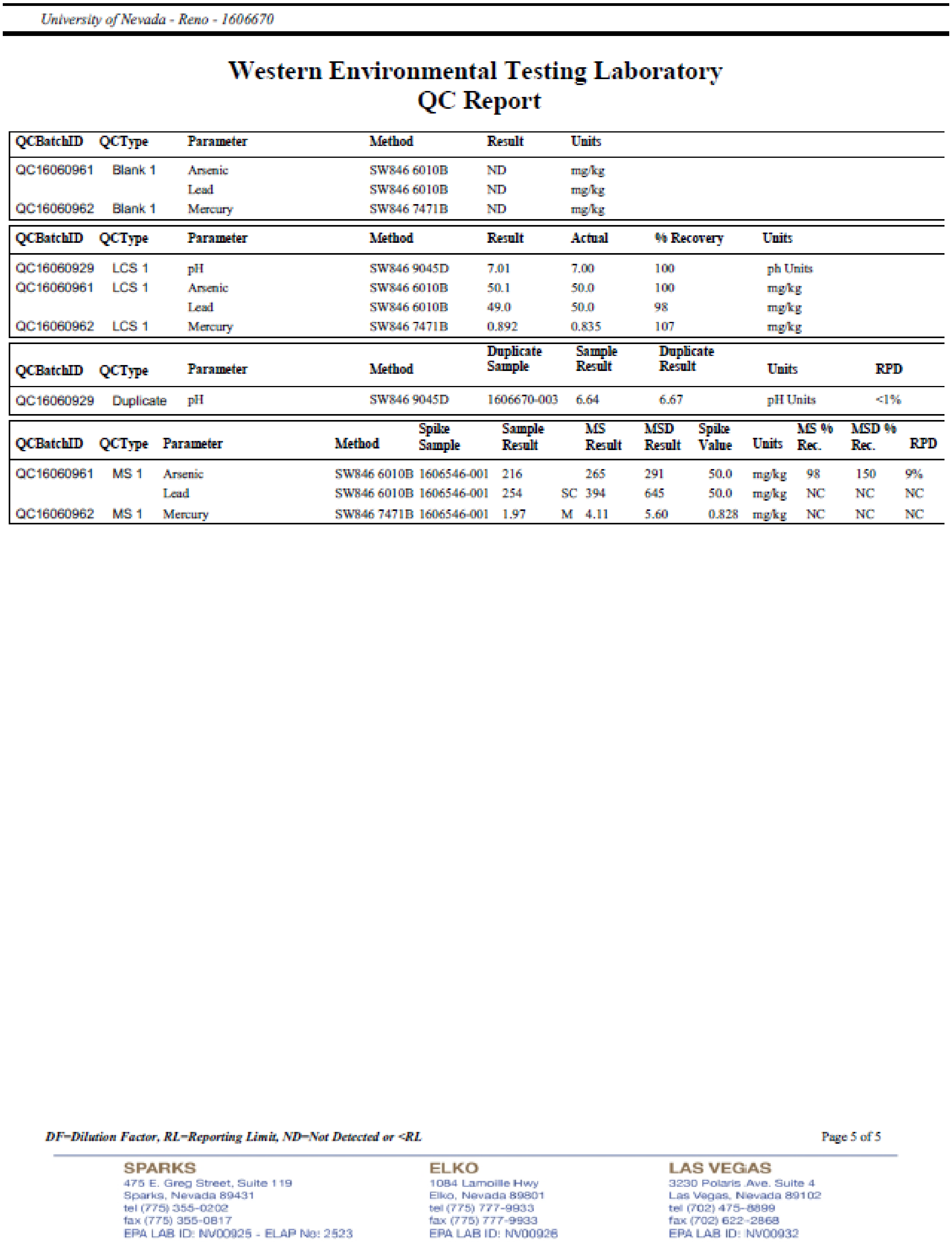

University of Nevada - Reno - 1606670

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC16060961	Blank 1	Arsenic	SW846 6010B	ND	mg/kg
		Lead	SW846 6010B	ND	mg/kg
QC16060962	Blank 1	Mercury	SW846 7471B	ND	mg/kg

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC16060929	LCS 1	pH	SW846 9045D	7.01	7.00	100	ph Units
QC16060961	LCS 1	Arsenic	SW846 6010B	50.1	50.0	100	mg/kg
		Lead	SW846 6010B	49.0	50.0	98	mg/kg
QC16060962	LCS 1	Mercury	SW846 7471B	0.892	0.835	107	mg/kg

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC16060929	Duplicate	pH	SW846 9045D	1606670-003	6.64	6.67	pH Units	<1%

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC16060961	MS 1	Arsenic	SW846 6010B	1606546-001	216		265	291	50.0	mg/kg	98	150	9%
		Lead	SW846 6010B	1606546-001	254	SC	394	645	50.0	mg/kg	NC	NC	NC
QC16060962	MS 1	Mercury	SW846 7471B	1606546-001	1.97	M	4.11	5.60	0.828	mg/kg	NC	NC	NC

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Western Environmental Testing Laboratory
Analytical Report

University of Nevada - Reno
Chem & Met. Engineering / MS 0388
Reno, NV 89551
Attn: Rachel Thomas
Phone: (775) 784-4336 **Fax:** (775) 327-5059
PO\Project: *Perry Canyon*

Date Printed: 7/13/2016
OrderID: *1606727*

Customer Sample ID: MW1062316-1
WETLAB Sample ID: 1606727-001

Collect Date/Time: 6/23/2016 09:00
Receive Date: 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry									
True Color	SM 2120B	10	Color Units	1		6/24/2016	15 CU	Pass	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	82	mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925
pH	SM 4500-H+ B	6.98 HT	pH Units	1		6/29/2016	6.5-8.5 SU	Pass	NV00925
Total Alkalinity	SM 2320B	38	mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Bicarbonate (HCO3)	SM 2320B	38	mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Carbonate (CO3)	SM 2320B	ND	mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Hydroxide (OH)	SM 2320B	ND	mg/L as CaC	1	1.0	6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	240	mg/L	1	10	6/29/2016	1000 mg/L	Pass	NV00925
Microbiological Analyses									
Total Coliform	SM 9223B (IDEX	1	/100 mL	1		6/23/2016	0 /100 mL	Fail	NV00925
Escherichia Coli	SM 9223B (IDEX	0	/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Anions by Ion Chromatography									
Chloride	EPA 300.0	6.0	mg/L	1	1.0	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	0.14	mg/L	1	0.10	6/24/2016	4.0 mg/L	Pass	NV00925
Nitrate Nitrogen	EPA 300.0	0.16	mg/L	1	0.10	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.025	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	87	mg/L	1	1.0	6/24/2016	500 mg/L	Pass	NV00925
Trace Metals by ICP-OES									
Silica	EPA 200.7	52	mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	0.025	mg/L	1	0.010	7/1/2016	NA	NA	NV00925
Boron	EPA 200.7	ND	mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	20	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	ND	mg/L	1	0.050	7/1/2016	1.0 mg/L	Pass	NV00925
Iron	EPA 200.7	1.2	mg/L	1	0.020	7/1/2016	0.6 mg/L	Fail	NV00925
Magnesium	EPA 200.7	7.6	mg/L	1	0.50	7/1/2016	150 mg/L	Pass	NV00925
Manganese	EPA 200.7	0.025	mg/L	1	0.0050	7/1/2016	0.1 mg/L	Pass	NV00925
Potassium	EPA 200.7	3.5	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	31	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	ND	mg/L	1	0.020	7/1/2016	5 mg/L	Pass	NV00925
Trace Metals by ICP-MS									
Arsenic	EPA 200.8	ND	mg/L	1	0.0050	6/30/2016	0.01 mg/L	Pass	NV00925
Lead	EPA 200.8	0.13	mg/L	1	0.0025	6/30/2016	.016 mg/L	Fail	NV00925
Sample Preparation									
Trace Metals Digestion	EPA 200.2	Complete		1		6/30/2016			NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Customer Sample ID: MW1062316-1 **Collect Date/Time:** 6/23/2016 09:00
WETLAB Sample ID: 1606727-001 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID

Customer Sample ID: MW2062316-2 **Collect Date/Time:** 6/23/2016 09:39
WETLAB Sample ID: 1606727-002 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry									
True Color	SM 2120B	0	Color Units	1		6/24/2016	15 CU	Pass	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	1800	mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925
pH	SM 4500-H+ B	4.07 HT	pH Units	1		6/29/2016	6.5-8.5 SU	Fail	NV00925
Acidity (Titrimetric)	SM 2310B	290	mg/L as CaC	1		6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	3200	mg/L	1	10	6/29/2016	1000 mg/L	Fail	NV00925
Microbiological Analyses									
Total Coliform	SM 9223B (IDEX	Invalid	/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Escherichia Coli	SM 9223B (IDEX	Invalid	/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Anions by Ion Chromatography									
Chloride	EPA 300.0	11	mg/L	10	10	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	3.9	mg/L	10	1.0	6/24/2016	4.0 mg/L	Pass	NV00925
Nitrate Nitrogen	EPA 300.0	ND D	mg/L	10	1.0	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND D	mg/L	10	0.25	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	2400	mg/L	100	100	6/27/2016	500 mg/L	Fail	NV00925
Trace Metals by ICP-OES									
Silica	EPA 200.7	93	mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	0.060	mg/L	1	0.010	7/1/2016	NA	NA	NV00925
Boron	EPA 200.7	ND	mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	370	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	22	mg/L	1	0.050	7/1/2016	1.0 mg/L	Fail	NV00925
Iron	EPA 200.7	54	mg/L	1	0.020	7/1/2016	0.6 mg/L	Fail	NV00925
Magnesium	EPA 200.7	200	mg/L	1	0.50	7/1/2016	150 mg/L	Fail	NV00925
Manganese	EPA 200.7	18	mg/L	1	0.0050	7/1/2016	0.1 mg/L	Fail	NV00925
Potassium	EPA 200.7	5.8	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	84	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	8.4	mg/L	1	0.020	7/1/2016	5 mg/L	Fail	NV00925
Trace Metals by ICP-MS									
Arsenic	EPA 200.8	0.26	mg/L	1	0.0050	6/30/2016	0.01 mg/L	Fail	NV00925
Lead	EPA 200.8	0.24	mg/L	1	0.0025	6/30/2016	.016 mg/L	Fail	NV00925
Sample Preparation									
Trace Metals Digestion	EPA 200.2	Complete		1		6/30/2016			NV00925

Customer Sample ID: SWA2062316-3 **Collect Date/Time:** 6/23/2016 11:00
WETLAB Sample ID: 1606727-003 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry									
True Color	SM 2120B	750	Color Units	100		6/24/2016	15 CU	Fail	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	990	mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

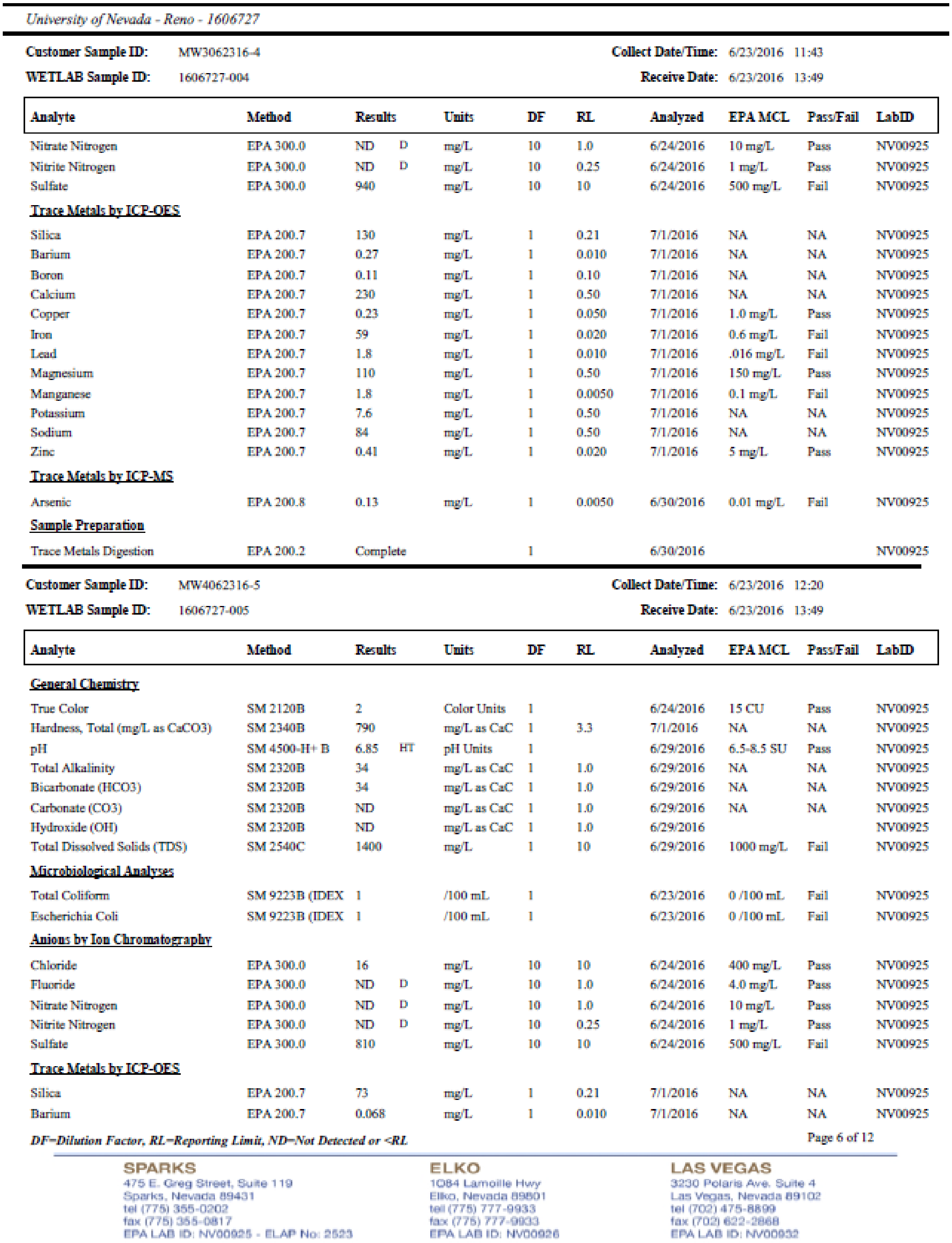
Customer Sample ID: SWA2062316-3 **Collect Date/Time:** 6/23/2016 11:00
WETLAB Sample ID: 1606727-003 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results		Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
pH	SM 4500-H+ B	2.83	HT	pH Units	1		6/29/2016	6.5-8.5 SU	Fail	NV00925
Acidity (Titrimetric)	SM 2310B	760		mg/L as CaC	1		6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	2500		mg/L	1	10	6/29/2016	1000 mg/L	Fail	NV00925
Anions by Ion Chromatography										
Chloride	EPA 300.0	13		mg/L	10	10	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	4.0 mg/L	Pass	NV00925
Nitrate Nitrogen	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	10	0.25	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	2400		mg/L	100	100	6/27/2016	500 mg/L	Fail	NV00925
Trace Metals by ICP-OES										
Silica	EPA 200.7	31		mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	ND		mg/L	1	0.010	7/1/2016	NA	NA	NV00925
Boron	EPA 200.7	ND		mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	240		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	140		mg/L	1	0.050	7/1/2016	1.0 mg/L	Fail	NV00925
Iron	EPA 200.7	56		mg/L	1	0.020	7/1/2016	0.6 mg/L	Fail	NV00925
Magnesium	EPA 200.7	97		mg/L	1	0.50	7/1/2016	150 mg/L	Pass	NV00925
Manganese	EPA 200.7	7.9		mg/L	1	0.0050	7/1/2016	0.1 mg/L	Fail	NV00925
Potassium	EPA 200.7	6.6		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	72		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	11		mg/L	1	0.020	7/1/2016	5 mg/L	Fail	NV00925
Trace Metals by ICP-MS										
Arsenic	EPA 200.8	ND		mg/L	1	0.0050	6/30/2016	0.01 mg/L	Pass	NV00925
Lead	EPA 200.8	0.010		mg/L	1	0.0025	6/30/2016	.016 mg/L	Pass	NV00925
Sample Preparation										
Trace Metals Digestion	EPA 200.2	Complete			1		6/30/2016			NV00925

Customer Sample ID: MW3062316-4 **Collect Date/Time:** 6/23/2016 11:43
WETLAB Sample ID: 1606727-004 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results		Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry										
True Color	SM 2120B	5		Color Units	1		6/24/2016	15 CU	Pass	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	1000		mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925
pH	SM 4500-H+ B	7.12	HT	pH Units	1		6/29/2016	6.5-8.5 SU	Pass	NV00925
Total Alkalinity	SM 2320B	86		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Bicarbonate (HCO3)	SM 2320B	86		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Carbonate (CO3)	SM 2320B	ND		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Hydroxide (OH)	SM 2320B	ND		mg/L as CaC	1	1.0	6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	1500		mg/L	1	10	6/29/2016	1000 mg/L	Fail	NV00925
Microbiological Analyses										
Total Coliform	SM 9223B (IDEX	1		/100 mL	1		6/23/2016	0 /100 mL	Fail	NV00925
Escherichia Coli	SM 9223B (IDEX	0		/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Anions by Ion Chromatography										
Chloride	EPA 300.0	19		mg/L	10	10	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	4.0 mg/L	Pass	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL



University of Nevada - Reno - 1606727

Customer Sample ID: MW3062316-4 **Collect Date/Time:** 6/23/2016 11:43

WETLAB Sample ID: 1606727-004 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results		Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Nitrate Nitrogen	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	10	0.25	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	940		mg/L	10	10	6/24/2016	500 mg/L	Fail	NV00925
Trace Metals by ICP-OES										
Silica	EPA 200.7	130		mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	0.27		mg/L	1	0.010	7/1/2016	NA	NA	NV00925
Boron	EPA 200.7	0.11		mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	230		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	0.23		mg/L	1	0.050	7/1/2016	1.0 mg/L	Pass	NV00925
Iron	EPA 200.7	59		mg/L	1	0.020	7/1/2016	0.6 mg/L	Fail	NV00925
Lead	EPA 200.7	1.8		mg/L	1	0.010	7/1/2016	.016 mg/L	Fail	NV00925
Magnesium	EPA 200.7	110		mg/L	1	0.50	7/1/2016	150 mg/L	Pass	NV00925
Manganese	EPA 200.7	1.8		mg/L	1	0.0050	7/1/2016	0.1 mg/L	Fail	NV00925
Potassium	EPA 200.7	7.6		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	84		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	0.41		mg/L	1	0.020	7/1/2016	5 mg/L	Pass	NV00925
Trace Metals by ICP-MS										
Arsenic	EPA 200.8	0.13		mg/L	1	0.0050	6/30/2016	0.01 mg/L	Fail	NV00925
Sample Preparation										
Trace Metals Digestion	EPA 200.2	Complete			1		6/30/2016			NV00925

Customer Sample ID: MW4062316-5 **Collect Date/Time:** 6/23/2016 12:20

WETLAB Sample ID: 1606727-005 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results		Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry										
True Color	SM 2120B	2		Color Units	1		6/24/2016	15 CU	Pass	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	790		mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925
pH	SM 4500-H+ B	6.85	HT	pH Units	1		6/29/2016	6.5-8.5 SU	Pass	NV00925
Total Alkalinity	SM 2320B	34		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Bicarbonate (HCO3)	SM 2320B	34		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Carbonate (CO3)	SM 2320B	ND		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Hydroxide (OH)	SM 2320B	ND		mg/L as CaC	1	1.0	6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	1400		mg/L	1	10	6/29/2016	1000 mg/L	Fail	NV00925
Microbiological Analyses										
Total Coliform	SM 9223B (IDEX	1		/100 mL	1		6/23/2016	0 /100 mL	Fail	NV00925
Escherichia Coli	SM 9223B (IDEX	1		/100 mL	1		6/23/2016	0 /100 mL	Fail	NV00925
Anions by Ion Chromatography										
Chloride	EPA 300.0	16		mg/L	10	10	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	4.0 mg/L	Pass	NV00925
Nitrate Nitrogen	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	10	0.25	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	810		mg/L	10	10	6/24/2016	500 mg/L	Fail	NV00925
Trace Metals by ICP-OES										
Silica	EPA 200.7	73		mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	0.068		mg/L	1	0.010	7/1/2016	NA	NA	NV00925

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Customer Sample ID: MW4062316-5 **Collect Date/Time:** 6/23/2016 12:20
WETLAB Sample ID: 1606727-005 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results		Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Boron	EPA 200.7	ND		mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	170		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	ND		mg/L	1	0.050	7/1/2016	1.0 mg/L	Pass	NV00925
Iron	EPA 200.7	4.6		mg/L	1	0.020	7/1/2016	0.6 mg/L	Fail	NV00925
Magnesium	EPA 200.7	88		mg/L	1	0.50	7/1/2016	150 mg/L	Pass	NV00925
Manganese	EPA 200.7	0.14		mg/L	1	0.0050	7/1/2016	0.1 mg/L	Fail	NV00925
Potassium	EPA 200.7	5.5		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	77		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	0.096		mg/L	1	0.020	7/1/2016	5 mg/L	Pass	NV00925
Trace Metals by ICP-MS										
Arsenic	EPA 200.8	0.0053		mg/L	1	0.0050	6/30/2016	0.01 mg/L	Pass	NV00925
Lead	EPA 200.8	0.019		mg/L	1	0.0025	6/30/2016	.016 mg/L	Fail	NV00925
Sample Preparation										
Trace Metals Digestion	EPA 200.2	Complete			1		6/30/2016			NV00925

Customer Sample ID: MW5062316-6 **Collect Date/Time:** 6/23/2016 12:30
WETLAB Sample ID: 1606727-006 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results		Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry										
True Color	SM 2120B	2		Color Units	1		6/24/2016	15 CU	Pass	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	820		mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925
pH	SM 4500-H+ B	6.81	HT	pH Units	1		6/29/2016	6.5-8.5 SU	Pass	NV00925
Total Alkalinity	SM 2320B	34		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Bicarbonate (HCO3)	SM 2320B	34		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Carbonate (CO3)	SM 2320B	ND		mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Hydroxide (OH)	SM 2320B	ND		mg/L as CaC	1	1.0	6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	1400		mg/L	1	10	6/29/2016	1000 mg/L	Fail	NV00925
Microbiological Analyses										
Total Coliform	SM 9223B (IDEX	1		/100 mL	1		6/23/2016	0 /100 mL	Fail	NV00925
Escherichia Coli	SM 9223B (IDEX	0		/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Anions by Ion Chromatography										
Chloride	EPA 300.0	16		mg/L	10	10	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	4.0 mg/L	Pass	NV00925
Nitrate Nitrogen	EPA 300.0	ND	D	mg/L	10	1.0	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND	D	mg/L	10	0.25	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	810		mg/L	10	10	6/24/2016	500 mg/L	Fail	NV00925
Trace Metals by ICP-OES										
Silica	EPA 200.7	82		mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	0.086		mg/L	1	0.010	7/1/2016	NA	NA	NV00925
Boron	EPA 200.7	ND		mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	180		mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	ND		mg/L	1	0.050	7/1/2016	1.0 mg/L	Pass	NV00925
Iron	EPA 200.7	6.7		mg/L	1	0.020	7/1/2016	0.6 mg/L	Fail	NV00925
Magnesium	EPA 200.7	90		mg/L	1	0.50	7/1/2016	150 mg/L	Pass	NV00925
Manganese	EPA 200.7	0.17		mg/L	1	0.0050	7/1/2016	0.1 mg/L	Fail	NV00925

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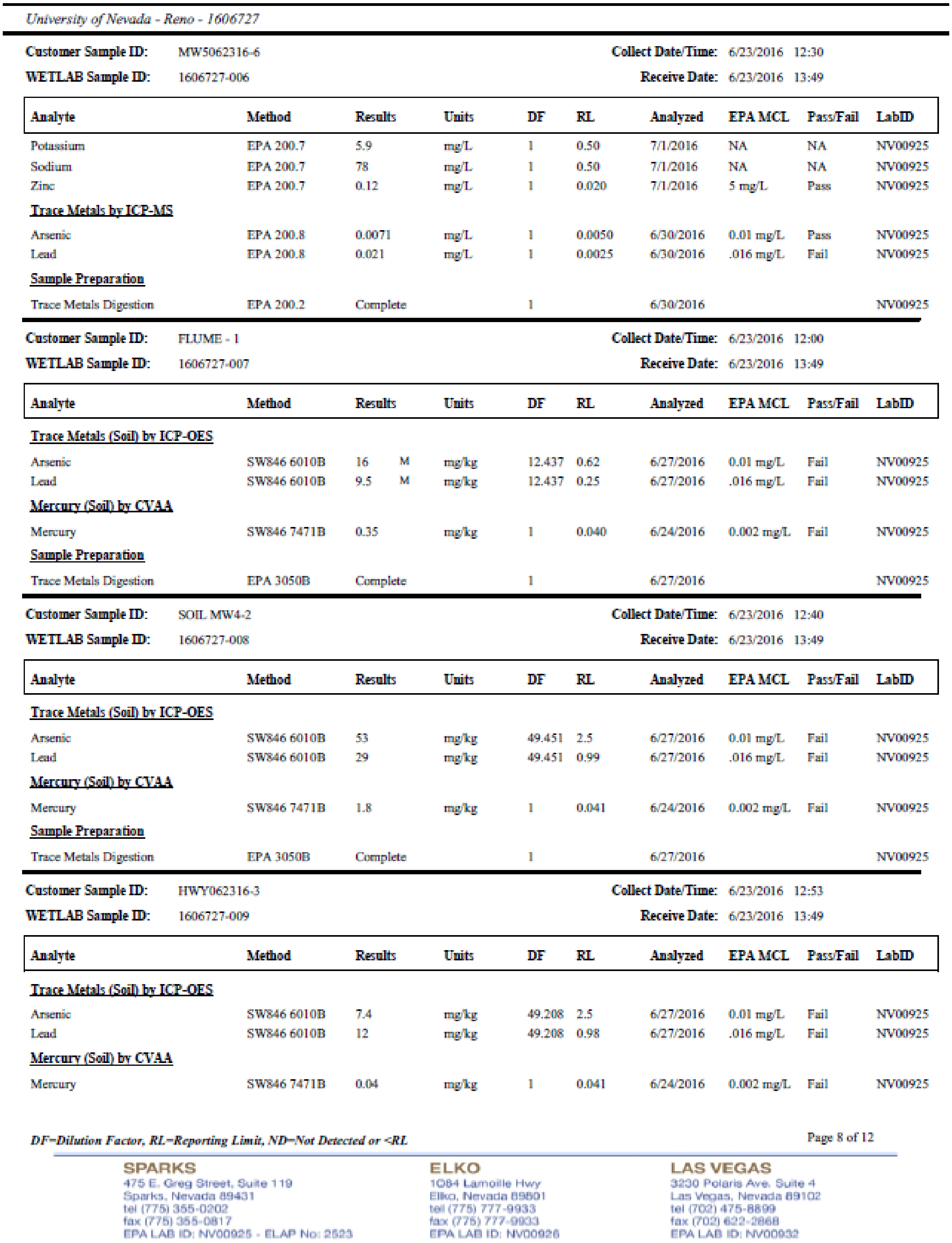

University of Nevada - Reno - 1606727

Customer Sample ID: MW5062316-6 **Collect Date/Time:** 6/23/2016 12:30
WETLAB Sample ID: 1606727-006 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Potassium	EPA 200.7	5.9	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	78	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	0.12	mg/L	1	0.020	7/1/2016	5 mg/L	Pass	NV00925
Trace Metals by ICP-MS									
Arsenic	EPA 200.8	0.0071	mg/L	1	0.0050	6/30/2016	0.01 mg/L	Pass	NV00925
Lead	EPA 200.8	0.021	mg/L	1	0.0025	6/30/2016	.016 mg/L	Fail	NV00925
Sample Preparation									
Trace Metals Digestion	EPA 200.2	Complete		1		6/30/2016			NV00925

Customer Sample ID: FLUME - 1 **Collect Date/Time:** 6/23/2016 12:00
WETLAB Sample ID: 1606727-007 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Trace Metals (Soil) by ICP-OES									
Arsenic	SW846 6010B	16 M	mg/kg	12.437	0.62	6/27/2016	0.01 mg/L	Fail	NV00925
Lead	SW846 6010B	9.5 M	mg/kg	12.437	0.25	6/27/2016	.016 mg/L	Fail	NV00925
Mercury (Soil) by CVAA									
Mercury	SW846 7471B	0.35	mg/kg	1	0.040	6/24/2016	0.002 mg/L	Fail	NV00925
Sample Preparation									
Trace Metals Digestion	EPA 3050B	Complete		1		6/27/2016			NV00925

Customer Sample ID: SOIL MW4-2 **Collect Date/Time:** 6/23/2016 12:40
WETLAB Sample ID: 1606727-008 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Trace Metals (Soil) by ICP-OES									
Arsenic	SW846 6010B	53	mg/kg	49.451	2.5	6/27/2016	0.01 mg/L	Fail	NV00925
Lead	SW846 6010B	29	mg/kg	49.451	0.99	6/27/2016	.016 mg/L	Fail	NV00925
Mercury (Soil) by CVAA									
Mercury	SW846 7471B	1.8	mg/kg	1	0.041	6/24/2016	0.002 mg/L	Fail	NV00925
Sample Preparation									
Trace Metals Digestion	EPA 3050B	Complete		1		6/27/2016			NV00925

Customer Sample ID: HWY062316-3 **Collect Date/Time:** 6/23/2016 12:53
WETLAB Sample ID: 1606727-009 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Trace Metals (Soil) by ICP-OES									
Arsenic	SW846 6010B	7.4	mg/kg	49.208	2.5	6/27/2016	0.01 mg/L	Fail	NV00925
Lead	SW846 6010B	12	mg/kg	49.208	0.98	6/27/2016	.016 mg/L	Fail	NV00925
Mercury (Soil) by CVAA									
Mercury	SW846 7471B	0.04	mg/kg	1	0.041	6/24/2016	0.002 mg/L	Fail	NV00925

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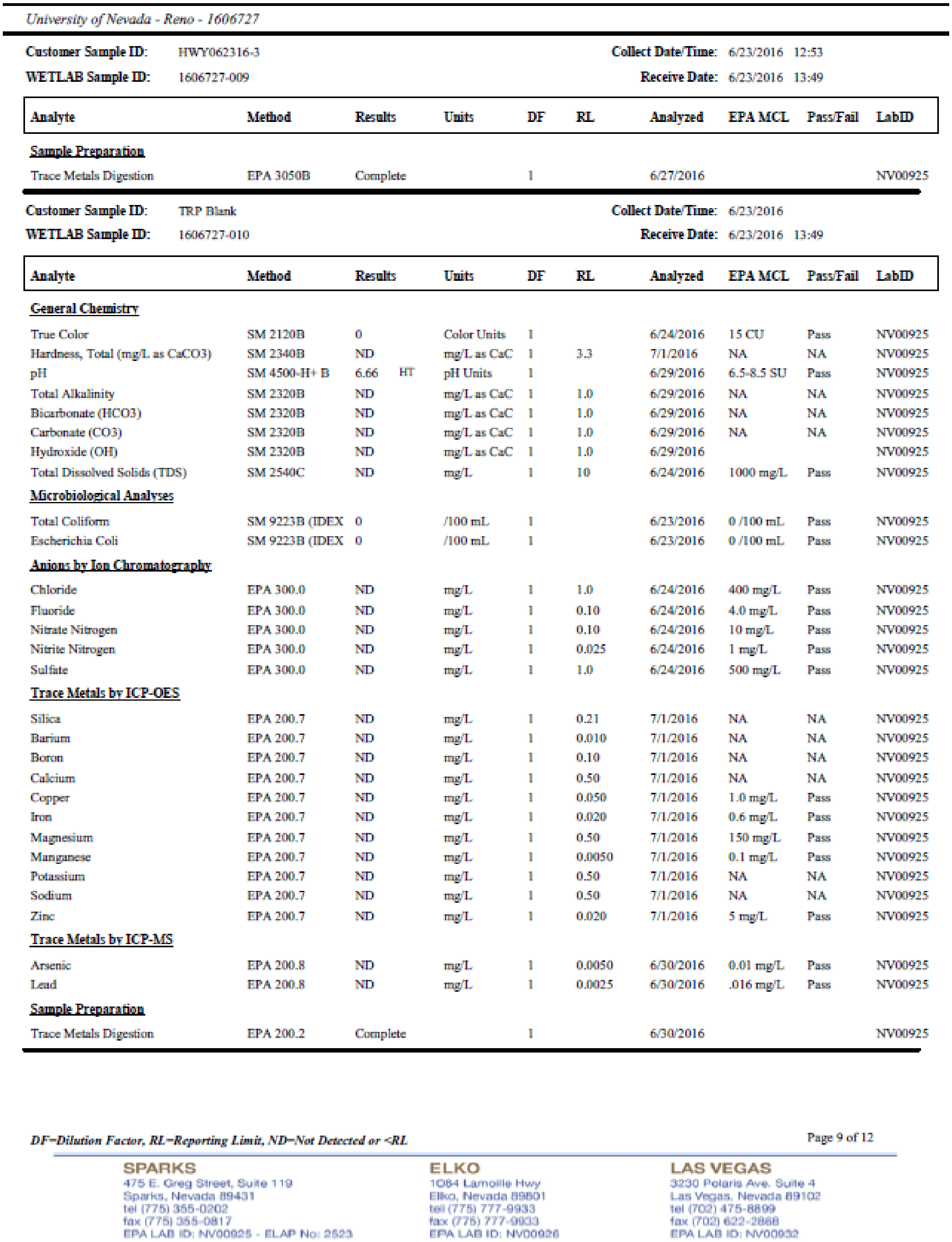

University of Nevada - Reno - 1606727

Customer Sample ID: HWY062316-3 **Collect Date/Time:** 6/23/2016 12:53
WETLAB Sample ID: 1606727-009 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
Sample Preparation									
Trace Metals Digestion	EPA 3050B	Complete		1		6/27/2016			NV00925

Customer Sample ID: TRP Blank **Collect Date/Time:** 6/23/2016
WETLAB Sample ID: 1606727-010 **Receive Date:** 6/23/2016 13:49

Analyte	Method	Results	Units	DF	RL	Analyzed	EPA MCL	Pass/Fail	LabID
General Chemistry									
True Color	SM 2120B	0	Color Units	1		6/24/2016	15 CU	Pass	NV00925
Hardness, Total (mg/L as CaCO3)	SM 2340B	ND	mg/L as CaC	1	3.3	7/1/2016	NA	NA	NV00925
pH	SM 4500-H+ B	6.66 HT	pH Units	1		6/29/2016	6.5-8.5 SU	Pass	NV00925
Total Alkalinity	SM 2320B	ND	mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Bicarbonate (HCO3)	SM 2320B	ND	mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Carbonate (CO3)	SM 2320B	ND	mg/L as CaC	1	1.0	6/29/2016	NA	NA	NV00925
Hydroxide (OH)	SM 2320B	ND	mg/L as CaC	1	1.0	6/29/2016			NV00925
Total Dissolved Solids (TDS)	SM 2540C	ND	mg/L	1	10	6/24/2016	1000 mg/L	Pass	NV00925
Microbiological Analyses									
Total Coliform	SM 9223B (IDEX	0	/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Escherichia Coli	SM 9223B (IDEX	0	/100 mL	1		6/23/2016	0 /100 mL	Pass	NV00925
Anions by Ion Chromatography									
Chloride	EPA 300.0	ND	mg/L	1	1.0	6/24/2016	400 mg/L	Pass	NV00925
Fluoride	EPA 300.0	ND	mg/L	1	0.10	6/24/2016	4.0 mg/L	Pass	NV00925
Nitrate Nitrogen	EPA 300.0	ND	mg/L	1	0.10	6/24/2016	10 mg/L	Pass	NV00925
Nitrite Nitrogen	EPA 300.0	ND	mg/L	1	0.025	6/24/2016	1 mg/L	Pass	NV00925
Sulfate	EPA 300.0	ND	mg/L	1	1.0	6/24/2016	500 mg/L	Pass	NV00925
Trace Metals by ICP-OES									
Silica	EPA 200.7	ND	mg/L	1	0.21	7/1/2016	NA	NA	NV00925
Barium	EPA 200.7	ND	mg/L	1	0.010	7/1/2016	NA	NA	NV00925
Boron	EPA 200.7	ND	mg/L	1	0.10	7/1/2016	NA	NA	NV00925
Calcium	EPA 200.7	ND	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Copper	EPA 200.7	ND	mg/L	1	0.050	7/1/2016	1.0 mg/L	Pass	NV00925
Iron	EPA 200.7	ND	mg/L	1	0.020	7/1/2016	0.6 mg/L	Pass	NV00925
Magnesium	EPA 200.7	ND	mg/L	1	0.50	7/1/2016	150 mg/L	Pass	NV00925
Manganese	EPA 200.7	ND	mg/L	1	0.0050	7/1/2016	0.1 mg/L	Pass	NV00925
Potassium	EPA 200.7	ND	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Sodium	EPA 200.7	ND	mg/L	1	0.50	7/1/2016	NA	NA	NV00925
Zinc	EPA 200.7	ND	mg/L	1	0.020	7/1/2016	5 mg/L	Pass	NV00925
Trace Metals by ICP-MS									
Arsenic	EPA 200.8	ND	mg/L	1	0.0050	6/30/2016	0.01 mg/L	Pass	NV00925
Lead	EPA 200.8	ND	mg/L	1	0.0025	6/30/2016	.016 mg/L	Pass	NV00925
Sample Preparation									
Trace Metals Digestion	EPA 200.2	Complete		1		6/30/2016			NV00925

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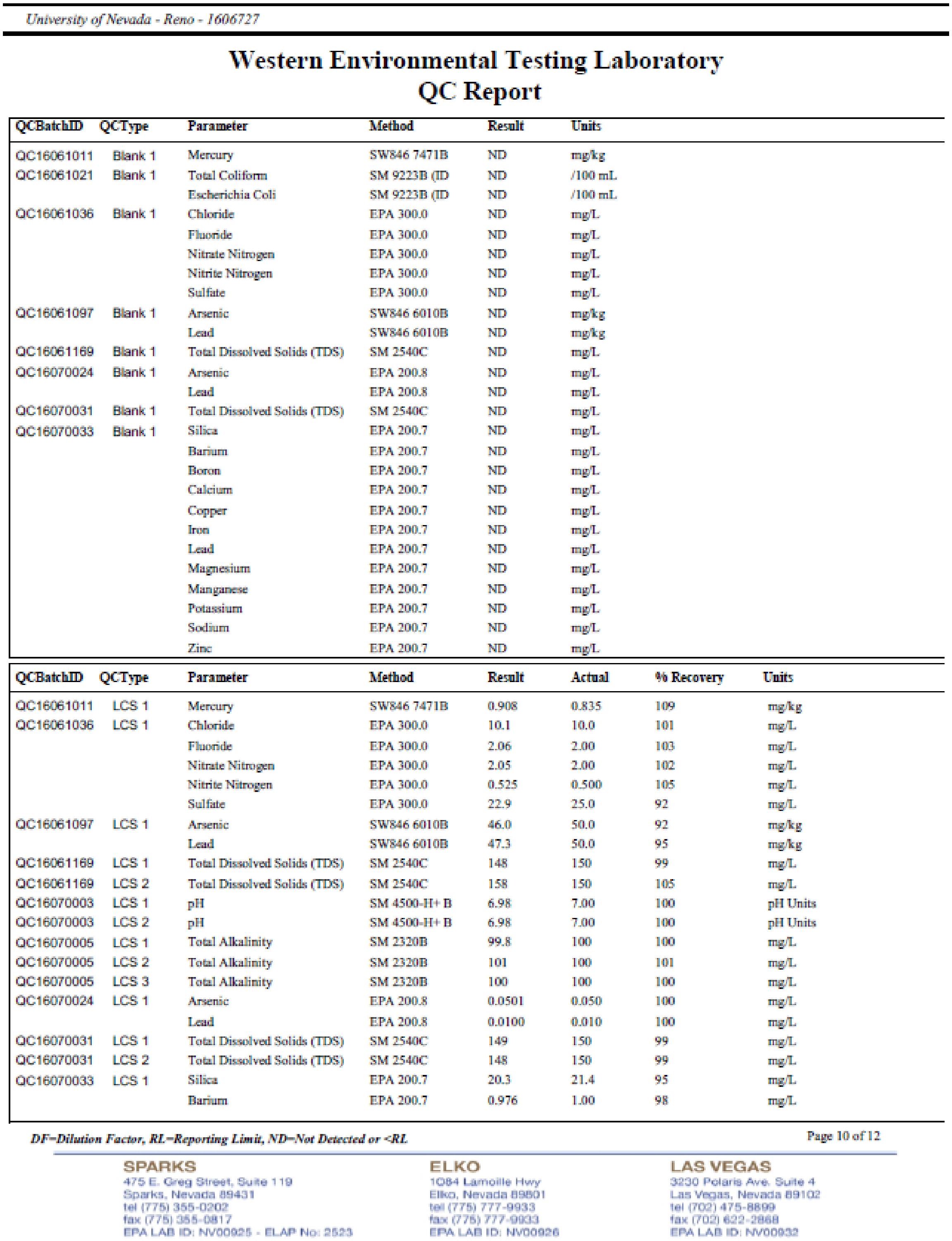

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC16061011	Blank 1	Mercury	SW846 7471B	ND	mg/kg
QC16061021	Blank 1	Total Coliform	SM 9223B (ID	ND	/100 mL
		Escherichia Coli	SM 9223B (ID	ND	/100 mL
QC16061036	Blank 1	Chloride	EPA 300.0	ND	mg/L
		Fluoride	EPA 300.0	ND	mg/L
		Nitrate Nitrogen	EPA 300.0	ND	mg/L
		Nitrite Nitrogen	EPA 300.0	ND	mg/L
		Sulfate	EPA 300.0	ND	mg/L
QC16061097	Blank 1	Arsenic	SW846 6010B	ND	mg/kg
		Lead	SW846 6010B	ND	mg/kg
QC16061169	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND	mg/L
QC16070024	Blank 1	Arsenic	EPA 200.8	ND	mg/L
		Lead	EPA 200.8	ND	mg/L
QC16070031	Blank 1	Total Dissolved Solids (TDS)	SM 2540C	ND	mg/L
QC16070033	Blank 1	Silica	EPA 200.7	ND	mg/L
		Barium	EPA 200.7	ND	mg/L
		Boron	EPA 200.7	ND	mg/L
		Calcium	EPA 200.7	ND	mg/L
		Copper	EPA 200.7	ND	mg/L
		Iron	EPA 200.7	ND	mg/L
		Lead	EPA 200.7	ND	mg/L
		Magnesium	EPA 200.7	ND	mg/L
		Manganese	EPA 200.7	ND	mg/L
		Potassium	EPA 200.7	ND	mg/L
		Sodium	EPA 200.7	ND	mg/L
		Zinc	EPA 200.7	ND	mg/L

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC16061011	LCS 1	Mercury	SW846 7471B	0.908	0.835	109	mg/kg
QC16061036	LCS 1	Chloride	EPA 300.0	10.1	10.0	101	mg/L
		Fluoride	EPA 300.0	2.06	2.00	103	mg/L
		Nitrate Nitrogen	EPA 300.0	2.05	2.00	102	mg/L
		Nitrite Nitrogen	EPA 300.0	0.525	0.500	105	mg/L
		Sulfate	EPA 300.0	22.9	25.0	92	mg/L
QC16061097	LCS 1	Arsenic	SW846 6010B	46.0	50.0	92	mg/kg
		Lead	SW846 6010B	47.3	50.0	95	mg/kg
QC16061169	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	148	150	99	mg/L
QC16061169	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	158	150	105	mg/L
QC16070003	LCS 1	pH	SM 4500-H+ B	6.98	7.00	100	pH Units
QC16070003	LCS 2	pH	SM 4500-H+ B	6.98	7.00	100	pH Units
QC16070005	LCS 1	Total Alkalinity	SM 2320B	99.8	100	100	mg/L
QC16070005	LCS 2	Total Alkalinity	SM 2320B	101	100	101	mg/L
QC16070005	LCS 3	Total Alkalinity	SM 2320B	100	100	100	mg/L
QC16070024	LCS 1	Arsenic	EPA 200.8	0.0501	0.050	100	mg/L
		Lead	EPA 200.8	0.0100	0.010	100	mg/L
QC16070031	LCS 1	Total Dissolved Solids (TDS)	SM 2540C	149	150	99	mg/L
QC16070031	LCS 2	Total Dissolved Solids (TDS)	SM 2540C	148	150	99	mg/L
QC16070033	LCS 1	Silica	EPA 200.7	20.3	21.4	95	mg/L
		Barium	EPA 200.7	0.976	1.00	98	mg/L

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
		Boron	EPA 200.7	0.979	1.00	98	mg/L
		Calcium	EPA 200.7	9.88	10.0	99	mg/L
		Copper	EPA 200.7	4.88	5.00	98	mg/L
		Iron	EPA 200.7	0.980	1.00	98	mg/L
		Lead	EPA 200.7	0.990	1.00	99	mg/L
		Magnesium	EPA 200.7	9.76	10.0	98	mg/L
		Manganese	EPA 200.7	0.980	1.00	98	mg/L
		Potassium	EPA 200.7	9.82	10.0	98	mg/L
		Sodium	EPA 200.7	9.70	10.0	97	mg/L
		Zinc	EPA 200.7	1.01	1.00	101	mg/L

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result		Units	RPD
QC16061169	Duplicate	Total Dissolved Solids (TDS)	SM 2540C	1606705-003	1482	1466		mg/L	1 %
QC16061169	Duplicate	Total Dissolved Solids (TDS)	SM 2540C	1606705-012	1320	1330		mg/L	1 %
QC16070003	Duplicate	pH	SM 4500-H+ B	1606838-001	7.44	7.47	HT	pH Units	<1%
QC16070003	Duplicate	pH	SM 4500-H+ B	1606782-001	7.10	7.11	HT	pH Units	<1%
QC16070003	Duplicate	pH	SM 4500-H+ B	1606794-002	7.76	7.77	HT	pH Units	<1%
QC16070005	Duplicate	Total Alkalinity	SM 2320B	1606838-001	39.7	39.6		mg/L as CaCO3	<1%
		Bicarbonate (HCO3)	SM 2320B	1606838-001	39.7	39.6		mg/L as CaCO3	<1%
		Carbonate (CO3)	SM 2320B	1606838-001	ND	ND		mg/L as CaCO3	<1%
		Hydroxide (OH)	SM 2320B	1606838-001	ND	ND		mg/L as CaCO3	<1%
QC16070005	Duplicate	Total Alkalinity	SM 2320B	1606782-001	101	101		mg/L as CaCO3	<1%
		Bicarbonate (HCO3)	SM 2320B	1606782-001	101	101		mg/L as CaCO3	<1%
		Carbonate (CO3)	SM 2320B	1606782-001	ND	ND		mg/L as CaCO3	<1%
		Hydroxide (OH)	SM 2320B	1606782-001	ND	ND		mg/L as CaCO3	<1%
QC16070005	Duplicate	Total Alkalinity	SM 2320B	1606794-002	77.8	77.9		mg/L as CaCO3	<1%
		Bicarbonate (HCO3)	SM 2320B	1606794-002	77.8	77.9		mg/L as CaCO3	<1%
		Carbonate (CO3)	SM 2320B	1606794-002	ND	ND		mg/L as CaCO3	<1%
		Hydroxide (OH)	SM 2320B	1606794-002	ND	ND		mg/L as CaCO3	<1%
QC16070005	Duplicate	Total Alkalinity	SM 2320B	1606870-001	180	179		mg/L as CaCO3	<1%
		Bicarbonate (HCO3)	SM 2320B	1606870-001	180	179		mg/L as CaCO3	<1%
		Carbonate (CO3)	SM 2320B	1606870-001	ND	ND		mg/L as CaCO3	<1%
		Hydroxide (OH)	SM 2320B	1606870-001	ND	ND		mg/L as CaCO3	<1%
QC16070005	Duplicate	Total Alkalinity	SM 2320B	1606888-009	105	105		mg/L as CaCO3	<1%
		Bicarbonate (HCO3)	SM 2320B	1606888-009	105	105		mg/L as CaCO3	<1%
		Carbonate (CO3)	SM 2320B	1606888-009	ND	ND		mg/L as CaCO3	<1%
		Hydroxide (OH)	SM 2320B	1606888-009	ND	ND		mg/L as CaCO3	<1%
QC16070006	Duplicate	Acidity (Titrimetric)	SM 2310B	1606727-002	293	303		mg/L as CaCO3	3 %
QC16070031	Duplicate	Total Dissolved Solids (TDS)	SM 2540C	1606727-001	239	240		mg/L	<1%
QC16070031	Duplicate	Total Dissolved Solids (TDS)	SM 2540C	1606729-001	327	324		mg/L	1 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC16061011	MS 1	Mercury	SW846 7471B	1606710-001	594	SC	1947	6072	0.822	mg/kg	NC	NC	NC
QC16061036	MS 1	Chloride	EPA 300.0	1606727-001	6.02		11.1	11.1	5.00	mg/L	101	102	<1%
		Fluoride	EPA 300.0	1606727-001	0.141		2.04	2.03	2.00	mg/L	95	95	<1%

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
		Nitrate Nitrogen	EPA 300.0	1606727-001	0.159		2.26	2.29	2.00	mg/L	105	106	1%
		Nitrite Nitrogen	EPA 300.0	1606727-001	ND		0.503	0.516	0.500	mg/L	101	103	3%
		Sulfate	EPA 300.0	1606727-001	87.4		96.4	96.3	10.0	mg/L	90	90	<1%
QC16061036	MS 2	Chloride	EPA 300.0	1606737-003	ND		5.14	5.19	5.00	mg/L	102	103	1%
		Fluoride	EPA 300.0	1606737-003	ND		1.86	1.85	2.00	mg/L	92	91	1%
		Nitrate Nitrogen	EPA 300.0	1606737-003	ND		2.12	2.14	2.00	mg/L	105	106	1%
		Nitrite Nitrogen	EPA 300.0	1606737-003	ND		0.523	0.529	0.500	mg/L	104	105	1%
		Sulfate	EPA 300.0	1606737-003	35.9		44.7	44.8	10.0	mg/L	88	90	<1%
QC16061097	MS 1	Arsenic	SW846 6010B	1606727-007	15.5	M	109	110	50.0	mg/kg	NC	NC	NC
		Lead	SW846 6010B	1606727-007	9.48	M	77.7	73.7	50.0	mg/kg	NC	NC	NC
QC16070024	MS 1	Arsenic	EPA 200.8	1606727-010	ND		0.0507	0.0518	0.050	mg/L	101	103	2%
		Lead	EPA 200.8	1606727-010	ND		0.0101	0.0100	0.010	mg/L	101	100	1%
QC16070033	MS 1	Silica	EPA 200.7	1606727-010	ND		20.6	20.4	21.4	mg/L	96	95	1%
		Barium	EPA 200.7	1606727-010	ND		0.986	0.974	1.00	mg/L	99	97	1%
		Boron	EPA 200.7	1606727-010	ND		0.992	0.981	1.00	mg/L	99	98	1%
		Calcium	EPA 200.7	1606727-010	ND		9.81	9.82	10.0	mg/L	98	98	<1%
		Copper	EPA 200.7	1606727-010	ND		4.90	4.90	5.00	mg/L	98	98	<1%
		Iron	EPA 200.7	1606727-010	ND		0.973	0.978	1.00	mg/L	97	98	1%
		Lead	EPA 200.7	1606727-010	ND		0.987	0.987	1.00	mg/L	99	99	<1%
		Magnesium	EPA 200.7	1606727-010	ND		9.70	9.70	10.0	mg/L	97	97	<1%
		Manganese	EPA 200.7	1606727-010	ND		0.988	0.977	1.00	mg/L	99	98	1%
		Potassium	EPA 200.7	1606727-010	ND		9.81	9.90	10.0	mg/L	98	99	1%
		Sodium	EPA 200.7	1606727-010	ND		9.81	10.2	10.0	mg/L	98	102	4%
		Zinc	EPA 200.7	1606727-010	ND		1.00	0.991	1.00	mg/L	100	99	1%

WETLAB
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tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 1606727
Sparks Control #
Elko Control #
LV Control #
Report Due Date 7/8/16
Page 1 of 1

Client Rachel Thomas-UNR
Address 1664 N. Virginia St LMR 356A
City, State & Zip Reno, NV 89557
Contact Rachel Thomas
Phone (803) 743-3345
Collector's Name Rachel Thomas
Fax
PWS/Project Name Perry Canyon
P.O. Number
PWS/Project Number
Email rachelthomas@nevada.unr.edu

Turnaround Time Requirements
Standard ✓
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State?
NV ✓ CA ____ Other ____

Report Results Via
[✓ PDF] EDD
Other ____

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Standard QC Required?
[✓ Yes] No

Billing Address (if different than Client Address)
Company Ronald Breitmeyer, UNR
Address 1664 N Virginia St. Mail Stop 0124
City, State & Zip Reno, NV 89557
Contact Rachel Thomas
Phone (303) 743-3345 Fax
Email rachelthomas@nevada.unr.edu

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	Routine Dom	Pb	Hg	As	pH						Spl. No.
MW2062316-2	6/23	939	1,6	MW	3	X	X									2
SWA2062316-3	6/23	1100			3	X	X									3
MW1062316-1	6/23	900			3	X	X									1
TRPBlank	6/23				3	X	X									10
MW3062316-4	6/23	1143			3	X	X									4
MW4062316-5	6/23	1220			3	X	X									5
MW5062316-6	6/23	1230	↓		3	X	X									6
HWY062316-3	6/23	1253	1	SO	2		X	X	X	X						9
SOIL MW4-2	6/23	1240		SO	2		X	X	X	X						8
FLUME-1	6/23	1200		SO	2		X	X	X	X						7

1606-9
727 10

Instructions/Comments/Special Requirements:

Sample Matrix Key** DW = Drinking Water WW = Wastewater SW = Surface Water MW = Monitoring Well SD = Solid/Sludge SO = Soil HW = Hazardous Waste OTHER:

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
20.1°C	Y N [✓ None]	~~33~~ 27	6/23/16	1349	Rachel Thomas	Ni
°C	Y N None					
°C	Y N None					
°C	Y N None					

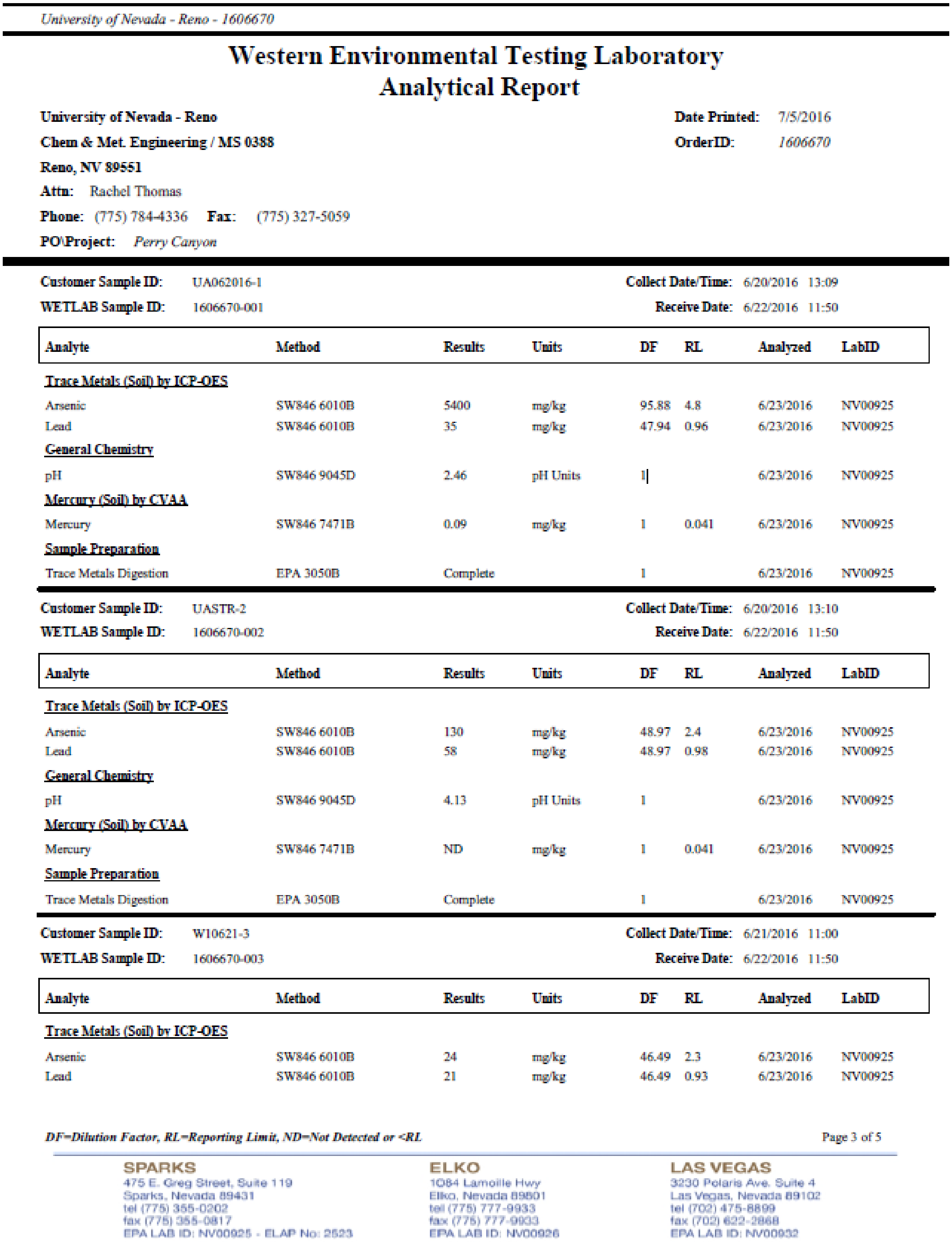
WETLAB'S Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). RT initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. RT initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. RT initial

301.2E



University of Nevada - Reno - 1606670

Western Environmental Testing Laboratory
Analytical Report

University of Nevada - Reno
Chem & Met. Engineering / MS 0388
Reno, NV 89551
Attn: Rachel Thomas
Phone: (775) 784-4336 **Fax:** (775) 327-5059
PO\Project: *Perry Canyon*

Date Printed: 7/5/2016
OrderID: *1606670*

Customer Sample ID: UA062016-1
WETLAB Sample ID: 1606670-001
Collect Date/Time: 6/20/2016 13:09
Receive Date: 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	5400	mg/kg	95.88	4.8	6/23/2016	NV00925
Lead	SW846 6010B	35	mg/kg	47.94	0.96	6/23/2016	NV00925
General Chemistry							
pH	SW846 9045D	2.46	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.09	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

Customer Sample ID: UASTR-2
WETLAB Sample ID: 1606670-002
Collect Date/Time: 6/20/2016 13:10
Receive Date: 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	130	mg/kg	48.97	2.4	6/23/2016	NV00925
Lead	SW846 6010B	58	mg/kg	48.97	0.98	6/23/2016	NV00925
General Chemistry							
pH	SW846 9045D	4.13	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

Customer Sample ID: W10621-3
WETLAB Sample ID: 1606670-003
Collect Date/Time: 6/21/2016 11:00
Receive Date: 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	24	mg/kg	46.49	2.3	6/23/2016	NV00925
Lead	SW846 6010B	21	mg/kg	46.49	0.93	6/23/2016	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 3 of 5

SPARKS
475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

ELKO
1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS
3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

University of Nevada - Reno - 1606670

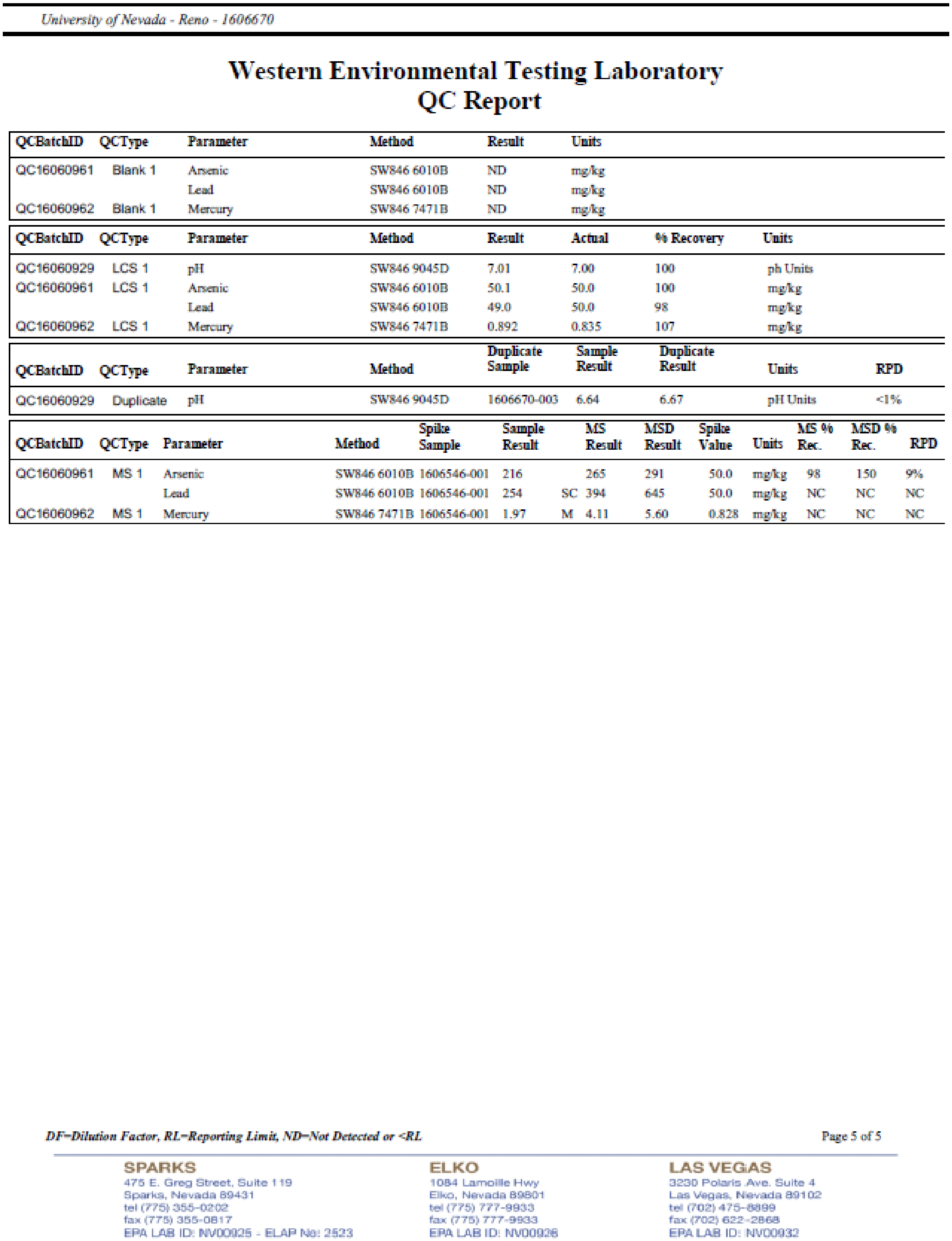
Customer Sample ID: W10621-3 **Collect Date/Time:** 6/21/2016 11:00
WETLAB Sample ID: 1606670-003 **Receive Date:** 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
General Chemistry							
pH	SW846 9045D	6.64	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

Customer Sample ID: MW230621-04 **Collect Date/Time:** 6/21/2016 11:45
WETLAB Sample ID: 1606670-004 **Receive Date:** 6/22/2016 11:50

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil) by ICP-OES							
Arsenic	SW846 6010B	42	mg/kg	49.21	2.5	6/23/2016	NV00925
Lead	SW846 6010B	33	mg/kg	49.21	0.98	6/23/2016	NV00925
General Chemistry							
pH	SW846 9045D	6.33	pH Units	1		6/23/2016	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.041	6/23/2016	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/23/2016	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL



University of Nevada - Reno - 1606670

Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Units
QC16060961	Blank 1	Arsenic	SW846 6010B	ND	mg/kg
		Lead	SW846 6010B	ND	mg/kg
QC16060962	Blank 1	Mercury	SW846 7471B	ND	mg/kg

QCBatchID	QCType	Parameter	Method	Result	Actual	% Recovery	Units
QC16060929	LCS 1	pH	SW846 9045D	7.01	7.00	100	ph Units
QC16060961	LCS 1	Arsenic	SW846 6010B	50.1	50.0	100	mg/kg
		Lead	SW846 6010B	49.0	50.0	98	mg/kg
QC16060962	LCS 1	Mercury	SW846 7471B	0.892	0.835	107	mg/kg

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC16060929	Duplicate	pH	SW846 9045D	1606670-003	6.64	6.67	pH Units	<1%

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS % Rec.	MSD % Rec.	RPD
QC16060961	MS 1	Arsenic	SW846 6010B	1606546-001	216		265	291	50.0	mg/kg	98	150	9%
		Lead	SW846 6010B	1606546-001	254	SC	394	645	50.0	mg/kg	NC	NC	NC
QC16060962	MS 1	Mercury	SW846 7471B	1606546-001	1.97	M	4.11	5.60	0.828	mg/kg	NC	NC	NC

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 5 of 5

SPARKS
475 E. Greg Street, Suite 119
Sparks, Nevada 89431
tel (775) 355-0202
fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

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1084 Lamoille Hwy
Elko, Nevada 89801
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tel (702) 475-8899
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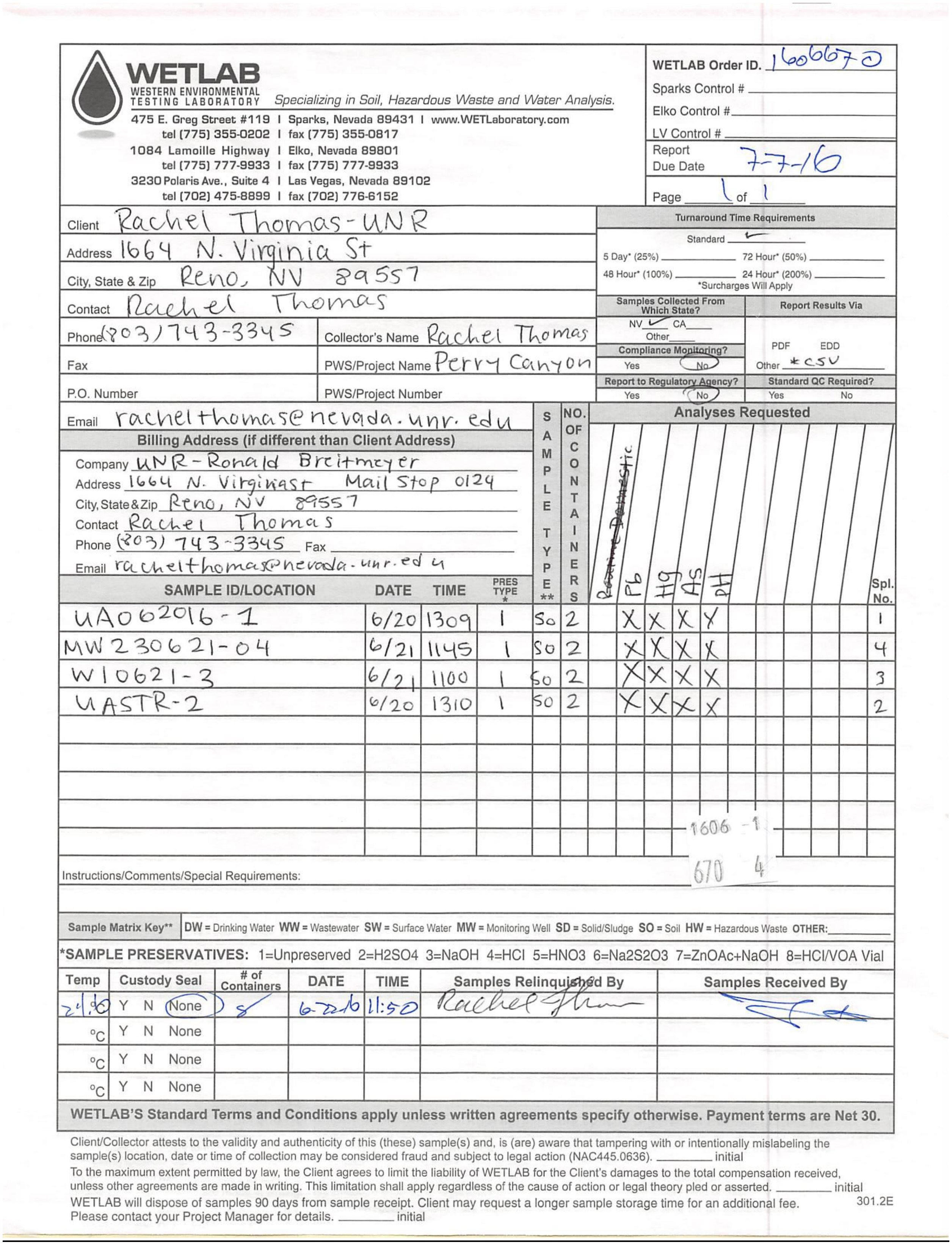
EPA LAB ID: NV00932



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tel (775) 777-9933 | fax (775) 777-9933
3230 Polaris Ave., Suite 4 | Las Vegas, Nevada 89102
tel (702) 475-8899 | fax (702) 776-6152

WETLAB Order ID. 1606670
Sparks Control # ____
Elko Control # ____
LV Control # ____
Report Due Date 7-7-16
Page 1 of 1

Client Rachel Thomas-UNR
Address 1664 N. Virginia St
City, State & Zip Reno, NV 89557
Contact Rachel Thomas
Phone (803) 743-3345
Collector's Name Rachel Thomas
Fax ____
PWS/Project Name Perry Canyon
P.O. Number ____
PWS/Project Number ____
Email rachelthomas@nevada.unr.edu

Turnaround Time Requirements
Standard ✓
5 Day* (25%) ____ 72 Hour* (50%) ____
48 Hour* (100%) ____ 24 Hour* (200%) ____
*Surcharges Will Apply

Samples Collected From Which State?
NV ✓ CA ____
Other ____

Compliance Monitoring?
Yes [✓ No]

Report to Regulatory Agency?
Yes [✓ No]

Report Results Via
PDF EDD
Other *CSV

Standard QC Required?
Yes No

Billing Address (if different than Client Address)
Company UNR-Ronald Breitmeyer
Address 1664 N. Virginia St Mail Stop 0124
City, State & Zip Reno, NV 89557
Contact Rachel Thomas
Phone (803) 743-3345 Fax ____
Email rachelthomas@nevada.unr.edu

Analyses Requested

SAMPLE ID/LOCATION	DATE	TIME	PRES TYPE *	SAMPLE TYPE **	NO. OF CONTAINERS	~~Routine Domestic~~	Pb	Hg	As	pH						Spl. No.
UA062016-1	6/20	1309	1	SO	2		X	X	X	X						1
MW230621-04	6/21	1145	1	SO	2		X	X	X	X						4
W10621-3	6/21	1100	1	SO	2		X	X	X	X						3
UASTR-2	6/20	1310	1	SO	2		X	X	X	X						2

1606-1
670 4

Instructions/Comments/Special Requirements:

Sample Matrix Key** **DW** = Drinking Water **WW** = Wastewater **SW** = Surface Water **MW** = Monitoring Well **SD** = Solid/Sludge **SO** = Soil **HW** = Hazardous Waste **OTHER:** ____

***SAMPLE PRESERVATIVES:** 1=Unpreserved 2=H2SO4 3=NaOH 4=HCl 5=HNO3 6=Na2S2O3 7=ZnOAc+NaOH 8=HCl/VOA Vial

Temp	Custody Seal	# of Containers	DATE	TIME	Samples Relinquished By	Samples Received By
2.1°C	Y N [✓ None]	8	6-22-16	11:50	Rachel	
°C	Y N None					
°C	Y N None					
°C	Y N None					

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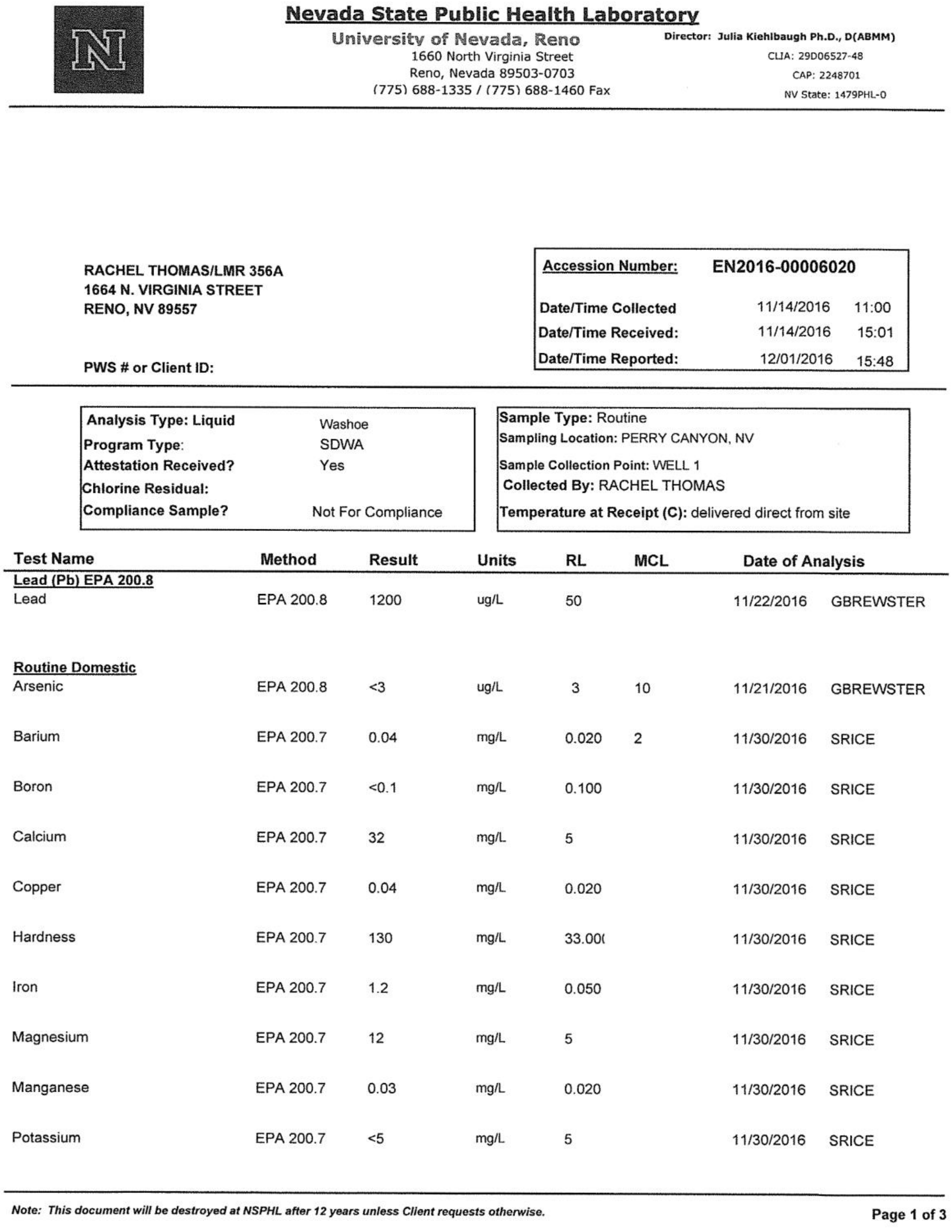
Client/Collector attests to the validity and authenticity of this (these) sample(s) and, is (are) aware that tampering with or intentionally mislabeling the sample(s) location, date or time of collection may be considered fraud and subject to legal action (NAC445.0636). ________ initial

To the maximum extent permitted by law, the Client agrees to limit the liability of WETLAB for the Client's damages to the total compensation received, unless other agreements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted. ________ initial

WETLAB will dispose of samples 90 days from sample receipt. Client may request a longer sample storage time for an additional fee. Please contact your Project Manager for details. ________ initial

301.2E

November 2016 Results



Nevada State Public Health Laboratory

University of Nevada, Reno
1660 North Virginia Street
Reno, Nevada 89503-0703
(775) 688-1335 / (775) 688-1460 Fax

Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00006020**	
Date/Time Collected	11/14/2016	11:00
Date/Time Received:	11/14/2016	15:01
Date/Time Reported:	12/01/2016	15:48

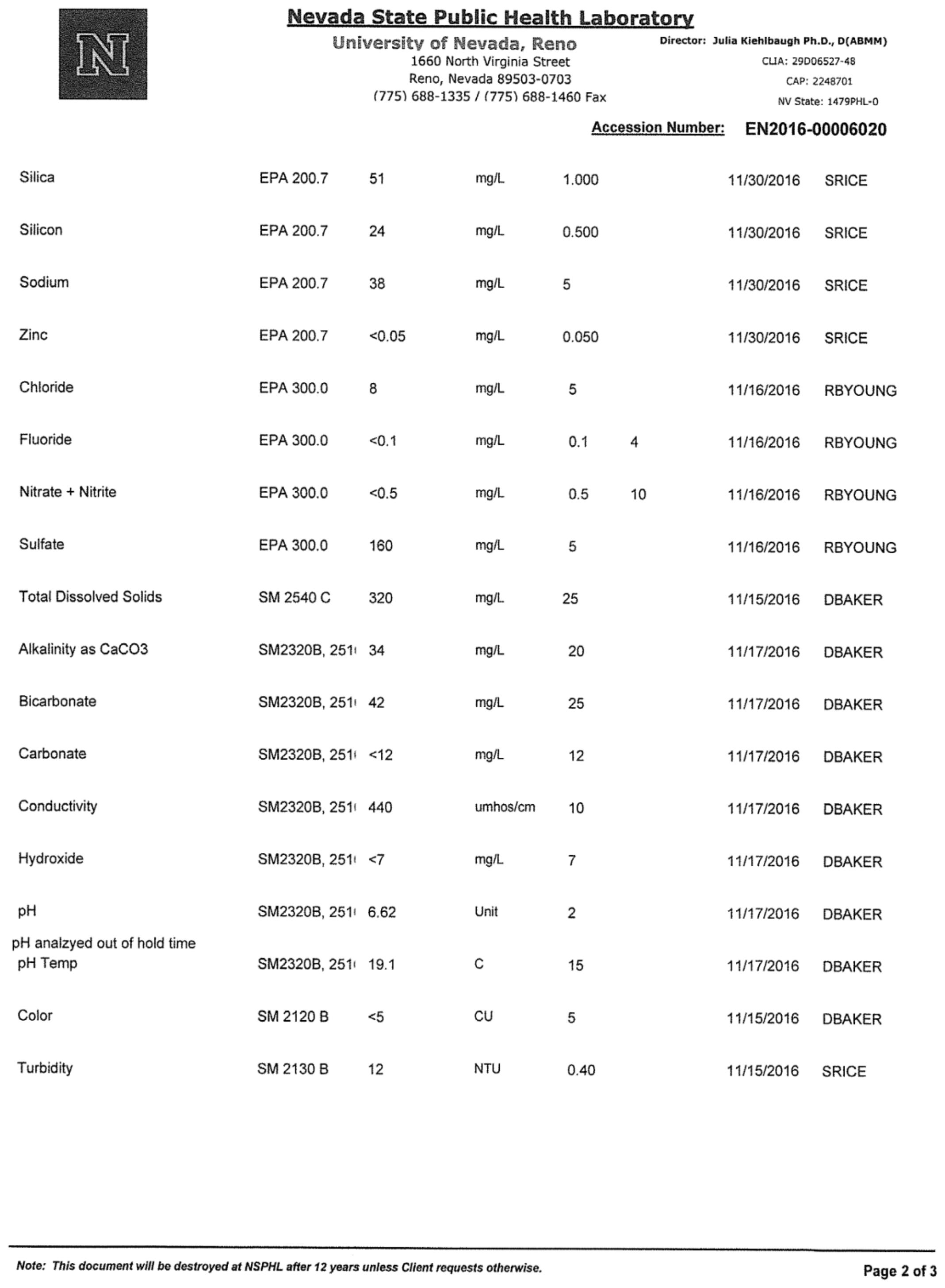
Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON, NV
Sample Collection Point: WELL 1
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	1200	ug/L	50		11/22/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/21/2016	GBREWSTER
Barium	EPA 200.7	0.04	mg/L	0.020	2	11/30/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.100		11/30/2016	SRICE
Calcium	EPA 200.7	32	mg/L	5		11/30/2016	SRICE
Copper	EPA 200.7	0.04	mg/L	0.020		11/30/2016	SRICE
Hardness	EPA 200.7	130	mg/L	33.00(		11/30/2016	SRICE
Iron	EPA 200.7	1.2	mg/L	0.050		11/30/2016	SRICE
Magnesium	EPA 200.7	12	mg/L	5		11/30/2016	SRICE
Manganese	EPA 200.7	0.03	mg/L	0.020		11/30/2016	SRICE
Potassium	EPA 200.7	<5	mg/L	5		11/30/2016	SRICE

Note: This document will be destroyed at NSPHL after 12 years unless Client requests otherwise.

Page 1 of 3



Nevada State Public Health Laboratory

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1660 North Virginia Street
Reno, Nevada 89503-0703
(775) 688-1335 / (775) 688-1460 Fax

Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2016-00006020**

Silica	EPA 200.7	51	mg/L	1.000		11/30/2016	SRICE
Silicon	EPA 200.7	24	mg/L	0.500		11/30/2016	SRICE
Sodium	EPA 200.7	38	mg/L	5		11/30/2016	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.050		11/30/2016	SRICE
Chloride	EPA 300.0	8	mg/L	5		11/16/2016	RBYOUNG
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	11/16/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/16/2016	RBYOUNG
Sulfate	EPA 300.0	160	mg/L	5		11/16/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	320	mg/L	25		11/15/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	34	mg/L	20		11/17/2016	DBAKER
Bicarbonate	SM2320B, 251	42	mg/L	25		11/17/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		11/17/2016	DBAKER
Conductivity	SM2320B, 251	440	umhos/cm	10		11/17/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		11/17/2016	DBAKER
pH	SM2320B, 251	6.62	Unit	2		11/17/2016	DBAKER
pH analzyed out of hold time							
pH Temp	SM2320B, 251	19.1	C	15		11/17/2016	DBAKER
Color	SM 2120 B	<5	CU	5		11/15/2016	DBAKER
Turbidity	SM 2130 B	12	NTU	0.40		11/15/2016	SRICE

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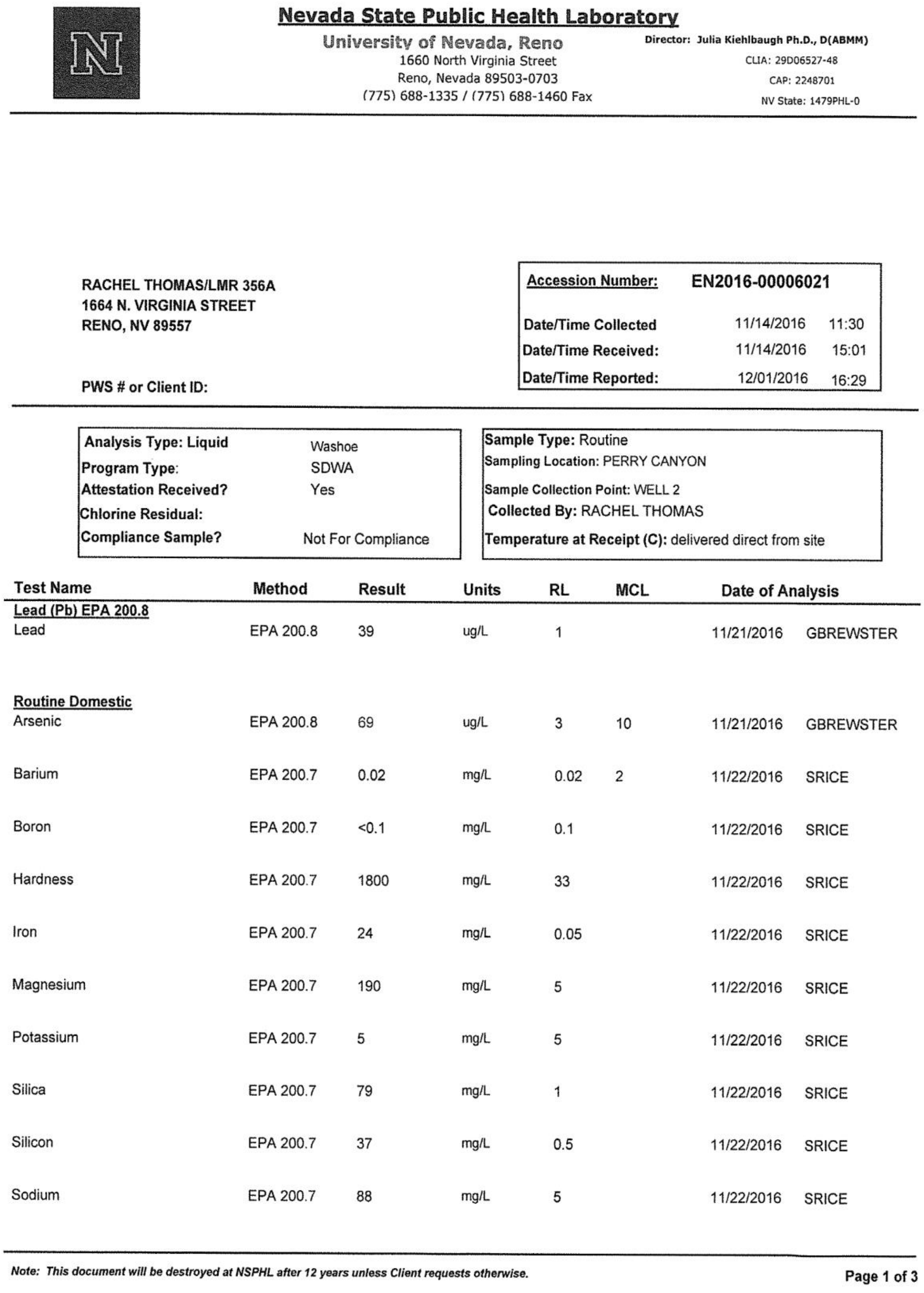

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(775) 688-1335 / (775) 688-1460 Fax

Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00006021**	
Date/Time Collected	11/14/2016	11:30
Date/Time Received:	11/14/2016	15:01
Date/Time Reported:	12/01/2016	16:29

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: WELL 2
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	39	ug/L	1		11/21/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	69	ug/L	3	10	11/21/2016	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	11/22/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		11/22/2016	SRICE
Hardness	EPA 200.7	1800	mg/L	33		11/22/2016	SRICE
Iron	EPA 200.7	24	mg/L	0.05		11/22/2016	SRICE
Magnesium	EPA 200.7	190	mg/L	5		11/22/2016	SRICE
Potassium	EPA 200.7	5	mg/L	5		11/22/2016	SRICE
Silica	EPA 200.7	79	mg/L	1		11/22/2016	SRICE
Silicon	EPA 200.7	37	mg/L	0.5		11/22/2016	SRICE
Sodium	EPA 200.7	88	mg/L	5		11/22/2016	SRICE

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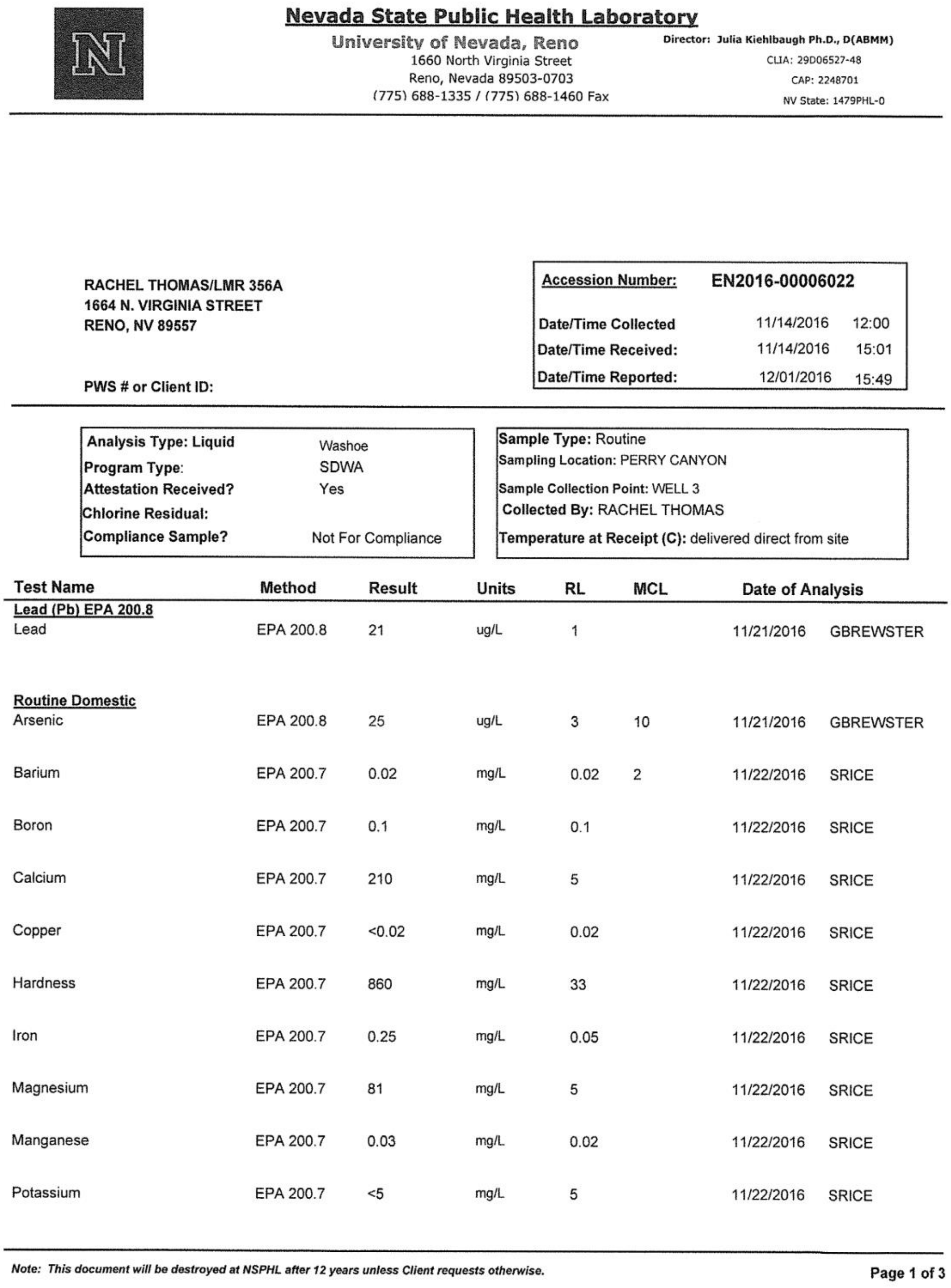
Accession Number: **EN2016-00006021**

Chloride	EPA 300.0	11	mg/L	5		11/16/2016	RBYOUNG
Fluoride	EPA 300.0	2.9	mg/L	0.100	4	11/16/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.500	10	11/16/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	2900	mg/L	25		11/22/2016	ABOBADILLA
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		11/17/2016	DBAKER
Bicarbonate	SM2320B, 251	<25	mg/L	25		11/17/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		11/17/2016	DBAKER
Conductivity	SM2320B, 251	3200	umhos/cm	10		11/17/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		11/17/2016	DBAKER
pH	SM2320B, 251	3.64	Unit	2		11/17/2016	DBAKER
pH analzyed out of hold time							
pH Temp	SM2320B, 251	19	C	15		11/17/2016	DBAKER
Color	SM 2120 B	<5	CU	5		11/15/2016	DBAKER
Turbidity	SM 2130 B	70	NTU	4		11/15/2016	SRICE
Calcium	EPA 200.7	420	mg/L	25		11/22/2016	SRICE
Copper	EPA 200.7	15	mg/L	0.100		11/22/2016	SRICE
Manganese	EPA 200.7	17	mg/L	0.100		11/22/2016	SRICE
Zinc	EPA 200.7	8.1	mg/L	0.250		11/22/2016	SRICE
Sulfate	EPA 300.0	2100	mg/L	25		11/18/2016	RBYOUNG



Nevada State Public Health Laboratory

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CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00006022**	
Date/Time Collected	11/14/2016	12:00
Date/Time Received:	11/14/2016	15:01
Date/Time Reported:	12/01/2016	15:49

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: WELL 3
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	21	ug/L	1		11/21/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	25	ug/L	3	10	11/21/2016	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	11/22/2016	SRICE
Boron	EPA 200.7	0.1	mg/L	0.1		11/22/2016	SRICE
Calcium	EPA 200.7	210	mg/L	5		11/22/2016	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		11/22/2016	SRICE
Hardness	EPA 200.7	860	mg/L	33		11/22/2016	SRICE
Iron	EPA 200.7	0.25	mg/L	0.05		11/22/2016	SRICE
Magnesium	EPA 200.7	81	mg/L	5		11/22/2016	SRICE
Manganese	EPA 200.7	0.03	mg/L	0.02		11/22/2016	SRICE
Potassium	EPA 200.7	<5	mg/L	5		11/22/2016	SRICE

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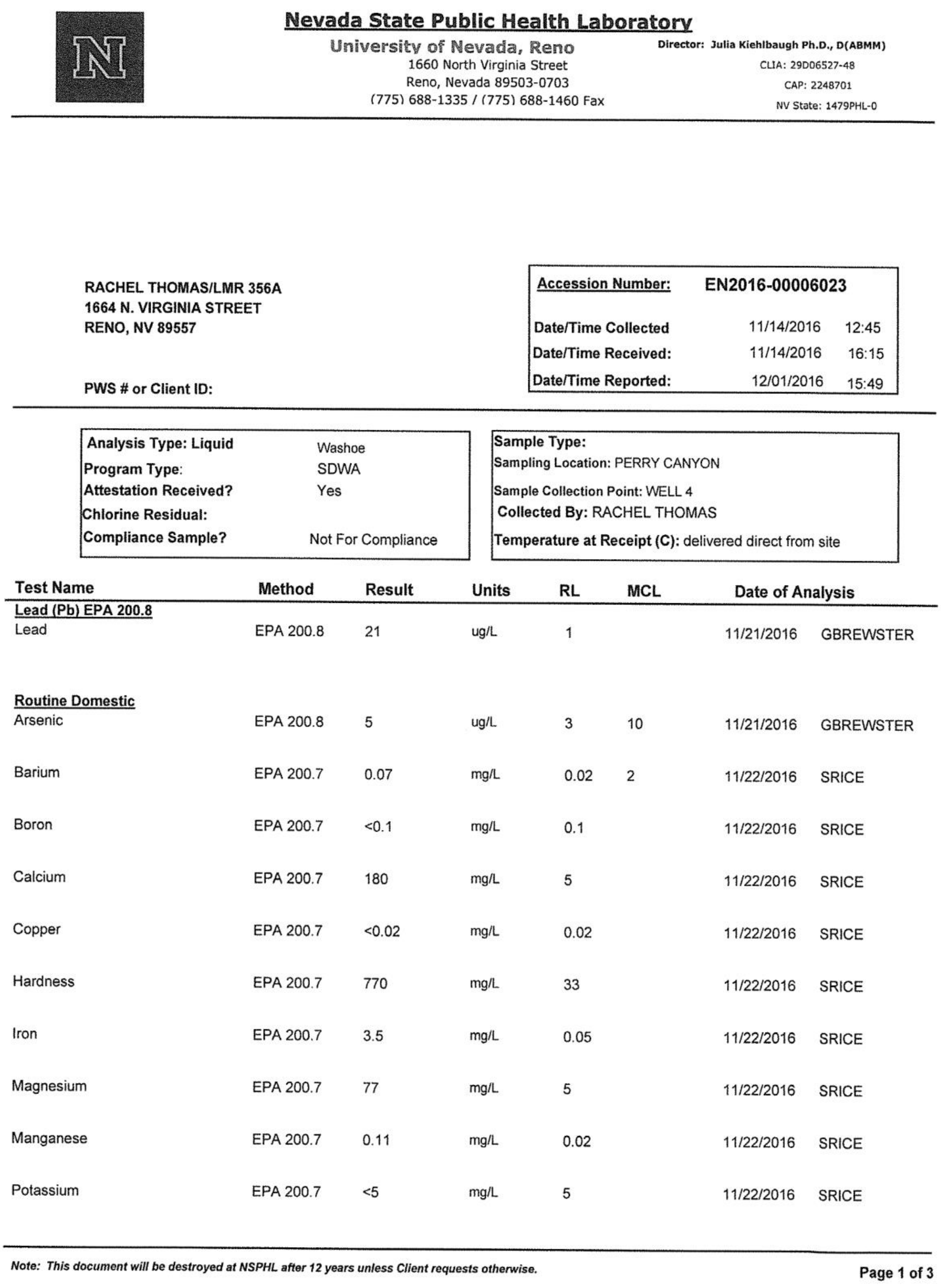
Accession Number: **EN2016-00006022**

Silica	EPA 200.7	60	mg/L	1		11/22/2016	SRICE
Silicon	EPA 200.7	28	mg/L	0.5		11/22/2016	SRICE
Sodium	EPA 200.7	76	mg/L	5		11/22/2016	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/22/2016	SRICE
Chloride	EPA 300.0	19	mg/L	5		11/16/2016	RBYOUNG
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	11/16/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/16/2016	RBYOUNG
Sulfate	EPA 300.0	930	mg/L	5		11/16/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	1500	mg/L	25		11/15/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	91	mg/L	20		11/17/2016	DBAKER
Bicarbonate	SM2320B, 251	110	mg/L	25		11/17/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		11/17/2016	DBAKER
Conductivity	SM2320B, 251	1700	umhos/cm	10		11/17/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		11/17/2016	DBAKER
pH	SM2320B, 251	7.07	Unit	2		11/17/2016	DBAKER
pH analzyed out of hold time							
pH Temp	SM2320B, 251	18.7	C	15		11/17/2016	DBAKER
Color	SM 2120 B	<5	CU	5		11/15/2016	DBAKER
Turbidity	SM 2130 B	4.2	NTU	0.40		11/15/2016	SRICE



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CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00006023**	
Date/Time Collected	11/14/2016	12:45
Date/Time Received:	11/14/2016	16:15
Date/Time Reported:	12/01/2016	15:49

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type:
Sampling Location: PERRY CANYON
Sample Collection Point: WELL 4
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	21	ug/L	1		11/21/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	5	ug/L	3	10	11/21/2016	GBREWSTER
Barium	EPA 200.7	0.07	mg/L	0.02	2	11/22/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		11/22/2016	SRICE
Calcium	EPA 200.7	180	mg/L	5		11/22/2016	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		11/22/2016	SRICE
Hardness	EPA 200.7	770	mg/L	33		11/22/2016	SRICE
Iron	EPA 200.7	3.5	mg/L	0.05		11/22/2016	SRICE
Magnesium	EPA 200.7	77	mg/L	5		11/22/2016	SRICE
Manganese	EPA 200.7	0.11	mg/L	0.02		11/22/2016	SRICE
Potassium	EPA 200.7	<5	mg/L	5		11/22/2016	SRICE

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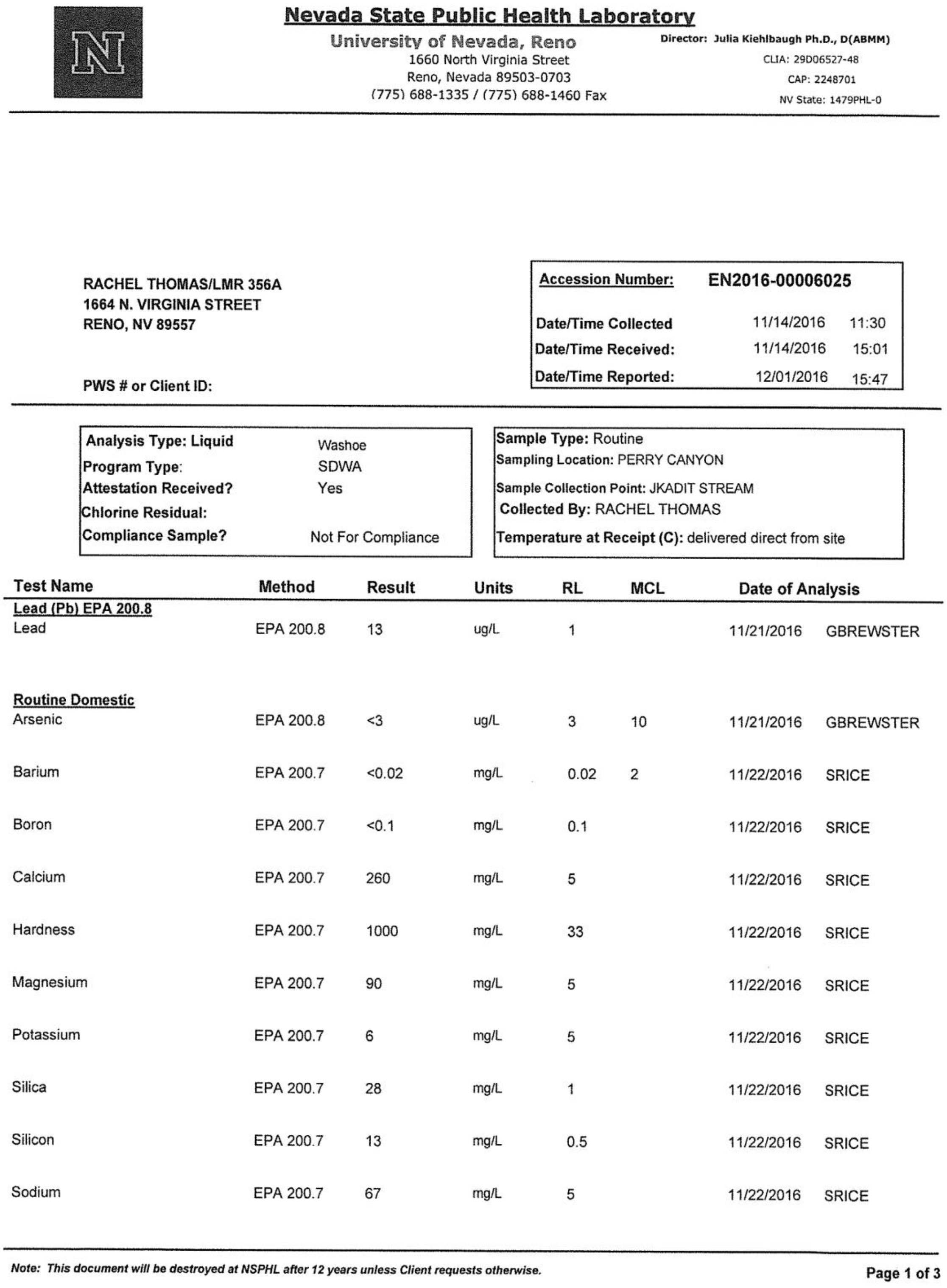
Silica	EPA 200.7	64	mg/L	1		11/22/2016	SRICE
Silicon	EPA 200.7	30	mg/L	0.5		11/22/2016	SRICE
Sodium	EPA 200.7	70	mg/L	5		11/22/2016	SRICE
Zinc	EPA 200.7	0.09	mg/L	0.05		11/22/2016	SRICE
Chloride	EPA 300.0	16	mg/L	5		11/16/2016	RBYOUNG
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	11/16/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/16/2016	GBREWSTER
Sulfate	EPA 300.0	890	mg/L	5		11/16/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	1400	mg/L	25		11/15/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	38	mg/L	20		11/17/2016	DBAKER
Bicarbonate	SM2320B, 251	46	mg/L	25		11/17/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		11/17/2016	DBAKER
Conductivity	SM2320B, 251	1600	umhos/cm	10		11/17/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		11/17/2016	DBAKER
pH	SM2320B, 251	6.83	Unit	2		11/17/2016	DBAKER
pH analzyed out of hold time							
pH Temp	SM2320B, 251	18.9	C	15		11/17/2016	DBAKER
Color	SM 2120 B	5	CU	5		11/15/2016	DBAKER
Turbidity	SM 2130 B	34	NTU	0.40		11/15/2016	SRICE



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NV State: 1479PHL-0

RACHEL THOMAS/LMR 356A
1664 N. VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2016-00006025**	
Date/Time Collected	11/14/2016	11:30
Date/Time Received:	11/14/2016	15:01
Date/Time Reported:	12/01/2016	15:47

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: PERRY CANYON
Sample Collection Point: JKADIT STREAM
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	13	ug/L	1		11/21/2016	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/21/2016	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	11/22/2016	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		11/22/2016	SRICE
Calcium	EPA 200.7	260	mg/L	5		11/22/2016	SRICE
Hardness	EPA 200.7	1000	mg/L	33		11/22/2016	SRICE
Magnesium	EPA 200.7	90	mg/L	5		11/22/2016	SRICE
Potassium	EPA 200.7	6	mg/L	5		11/22/2016	SRICE
Silica	EPA 200.7	28	mg/L	1		11/22/2016	SRICE
Silicon	EPA 200.7	13	mg/L	0.5		11/22/2016	SRICE
Sodium	EPA 200.7	67	mg/L	5		11/22/2016	SRICE

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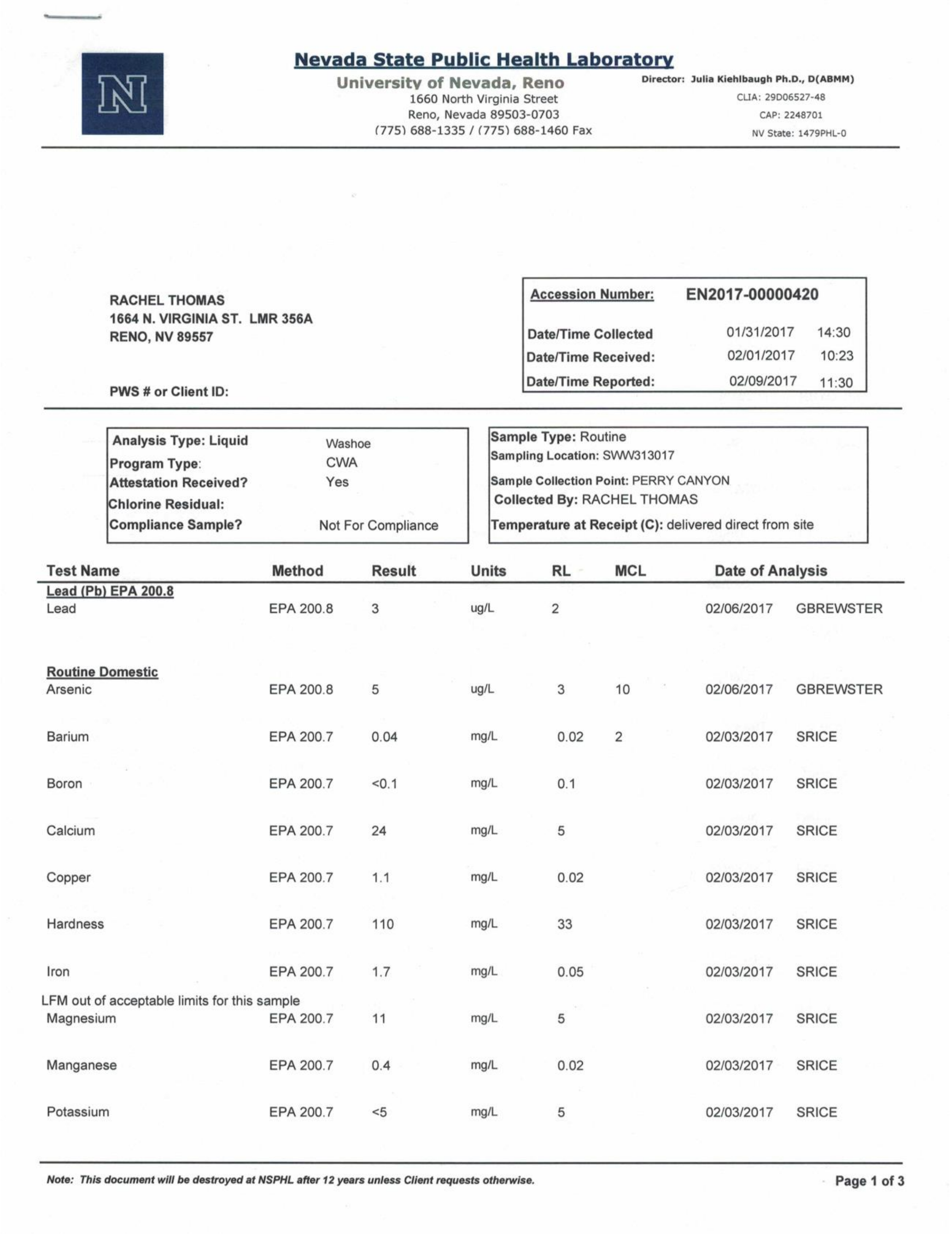
Accession Number: **EN2016-00006025**

Chloride	EPA 300.0	14	mg/L	5		11/16/2016	RBYOUNG
Fluoride	EPA 300.0	0.5	mg/L	0.100	4	11/16/2016	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.500	10	11/16/2016	RBYOUNG
Total Dissolved Solids	SM 2540 C	2800	mg/L	25		11/15/2016	DBAKER
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		11/17/2016	DBAKER
Bicarbonate	SM2320B, 251	<25	mg/L	25		11/17/2016	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		11/17/2016	DBAKER
Conductivity	SM2320B, 251	3200	umhos/cm	10		11/17/2016	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		11/17/2016	DBAKER
pH	SM2320B, 251	2.79	Unit	2		11/17/2016	DBAKER
pH analzyed out of hold time							
pH Temp	SM2320B, 251	19.7	C	15		11/17/2016	DBAKER
Color	SM 2120 B	5	CU	5		11/15/2016	DBAKER
Turbidity	SM 2130 B	0.55	NTU	0.40		11/15/2016	SRICE
Copper	EPA 200.7	140	mg/L	1		11/22/2016	SRICE
Iron	EPA 200.7	80	mg/L	0.250		11/22/2016	SRICE
Manganese	EPA 200.7	8.9	mg/L	0.100		11/22/2016	SRICE
Zinc	EPA 200.7	12	mg/L	0.250		11/22/2016	SRICE
Sulfate	EPA 300.0	2000	mg/L	25		11/18/2016	RBYOUNG

January 2017 Results



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CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000420**	
Date/Time Collected	01/31/2017	14:30
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/09/2017	11:30

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: SWW313017
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	3	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	5	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	0.04	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/03/2017	SRICE
Calcium	EPA 200.7	24	mg/L	5		02/03/2017	SRICE
Copper	EPA 200.7	1.1	mg/L	0.02		02/03/2017	SRICE
Hardness	EPA 200.7	110	mg/L	33		02/03/2017	SRICE
Iron	EPA 200.7	1.7	mg/L	0.05		02/03/2017	SRICE
LFM out of acceptable limits for this sample							
Magnesium	EPA 200.7	11	mg/L	5		02/03/2017	SRICE
Manganese	EPA 200.7	0.4	mg/L	0.02		02/03/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/03/2017	SRICE

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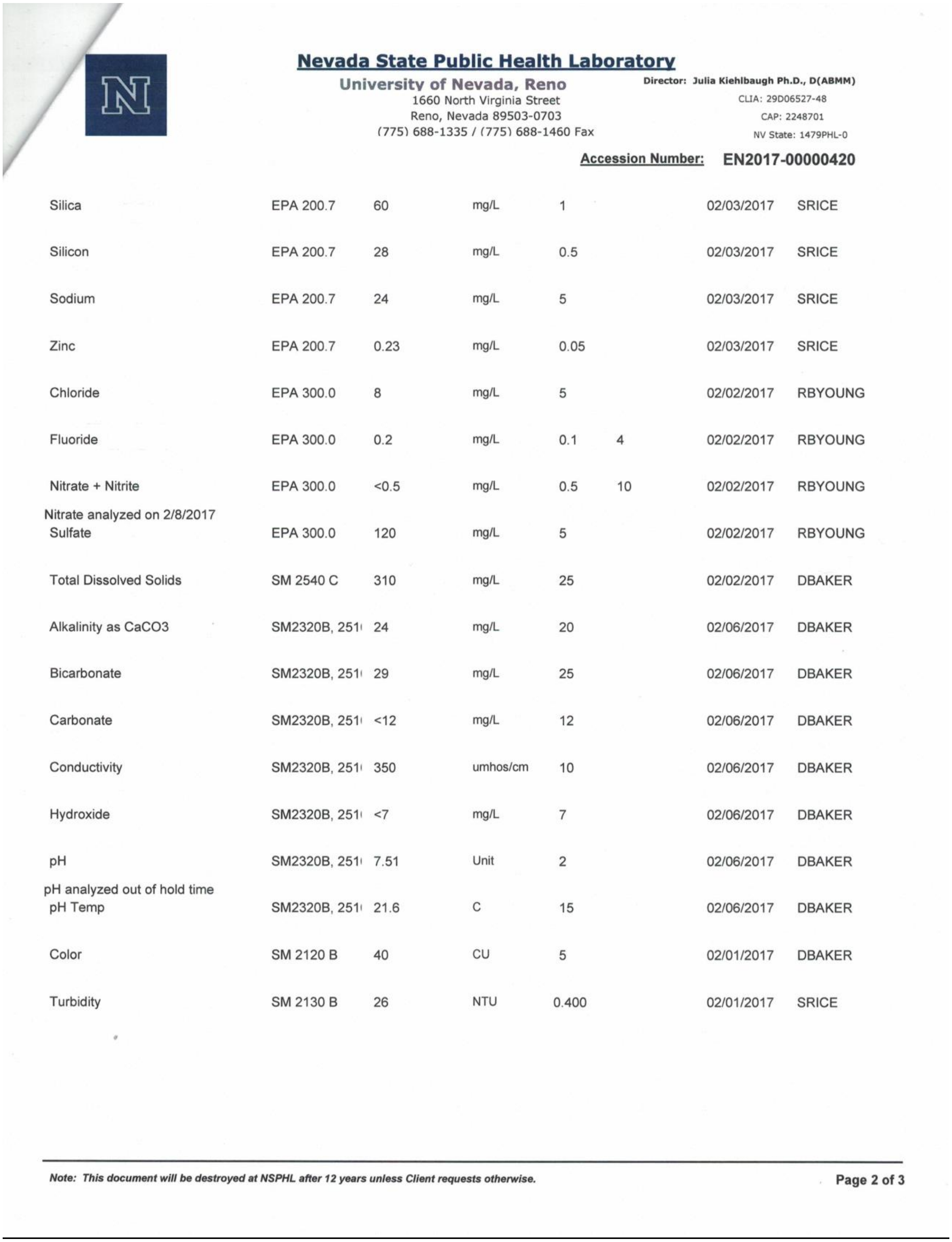

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Accession Number: **EN2017-00000420**

Silica	EPA 200.7	60	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	28	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	24	mg/L	5		02/03/2017	SRICE
Zinc	EPA 200.7	0.23	mg/L	0.05		02/03/2017	SRICE
Chloride	EPA 300.0	8	mg/L	5		02/02/2017	RBYOUNG
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	02/02/2017	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/02/2017	RBYOUNG
Nitrate analyzed on 2/8/2017							
Sulfate	EPA 300.0	120	mg/L	5		02/02/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	310	mg/L	25		02/02/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	24	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	29	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	350	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	7.51	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	21.6	C	15		02/06/2017	DBAKER
Color	SM 2120 B	40	CU	5		02/01/2017	DBAKER
Turbidity	SM 2130 B	26	NTU	0.400		02/01/2017	SRICE

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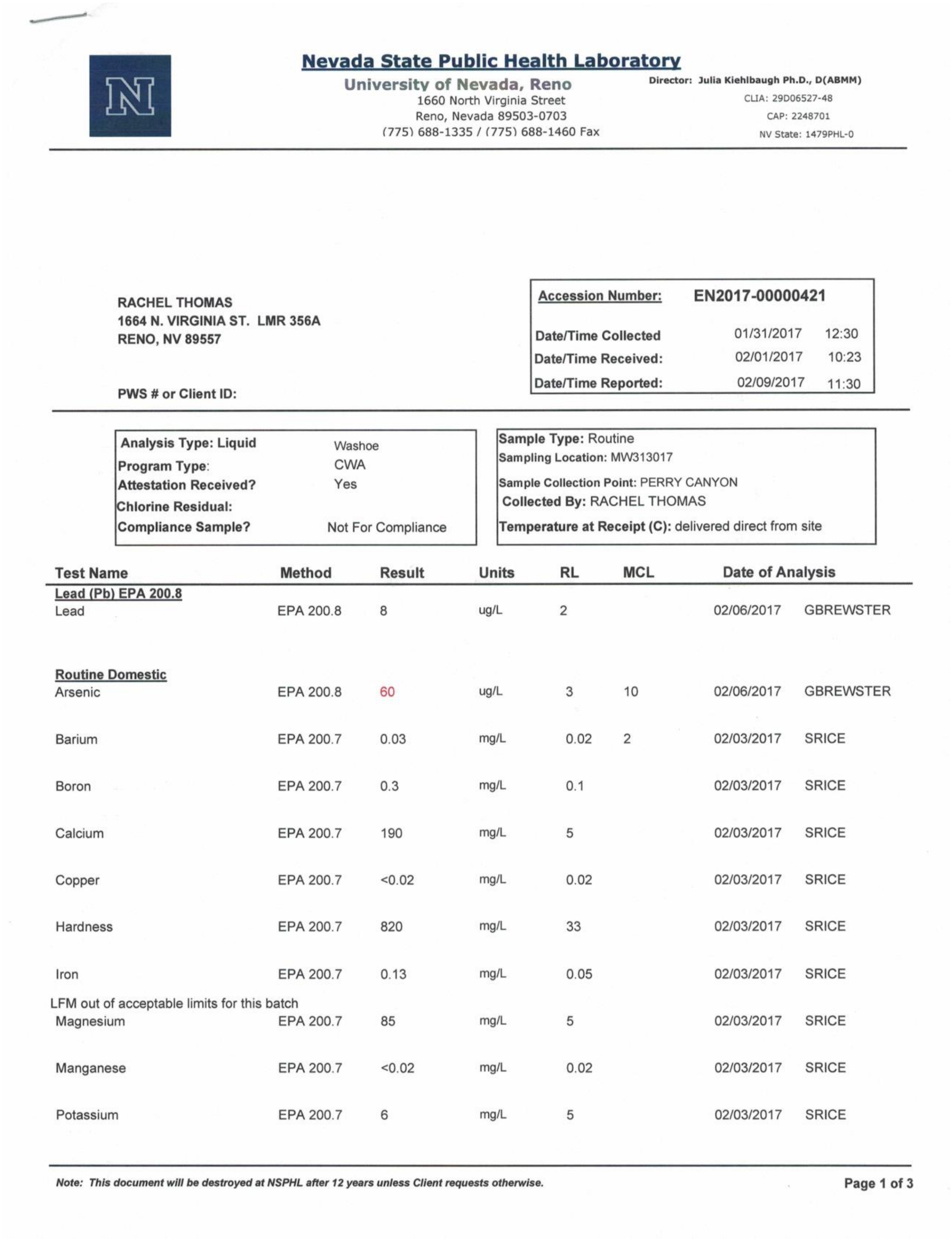

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NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000421**	
Date/Time Collected	01/31/2017	12:30
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/09/2017	11:30

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MW313017
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	8	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	60	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	0.3	mg/L	0.1		02/03/2017	SRICE
Calcium	EPA 200.7	190	mg/L	5		02/03/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/03/2017	SRICE
Hardness	EPA 200.7	820	mg/L	33		02/03/2017	SRICE
Iron	EPA 200.7	0.13	mg/L	0.05		02/03/2017	SRICE
LFM out of acceptable limits for this batch							
Magnesium	EPA 200.7	85	mg/L	5		02/03/2017	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		02/03/2017	SRICE
Potassium	EPA 200.7	6	mg/L	5		02/03/2017	SRICE

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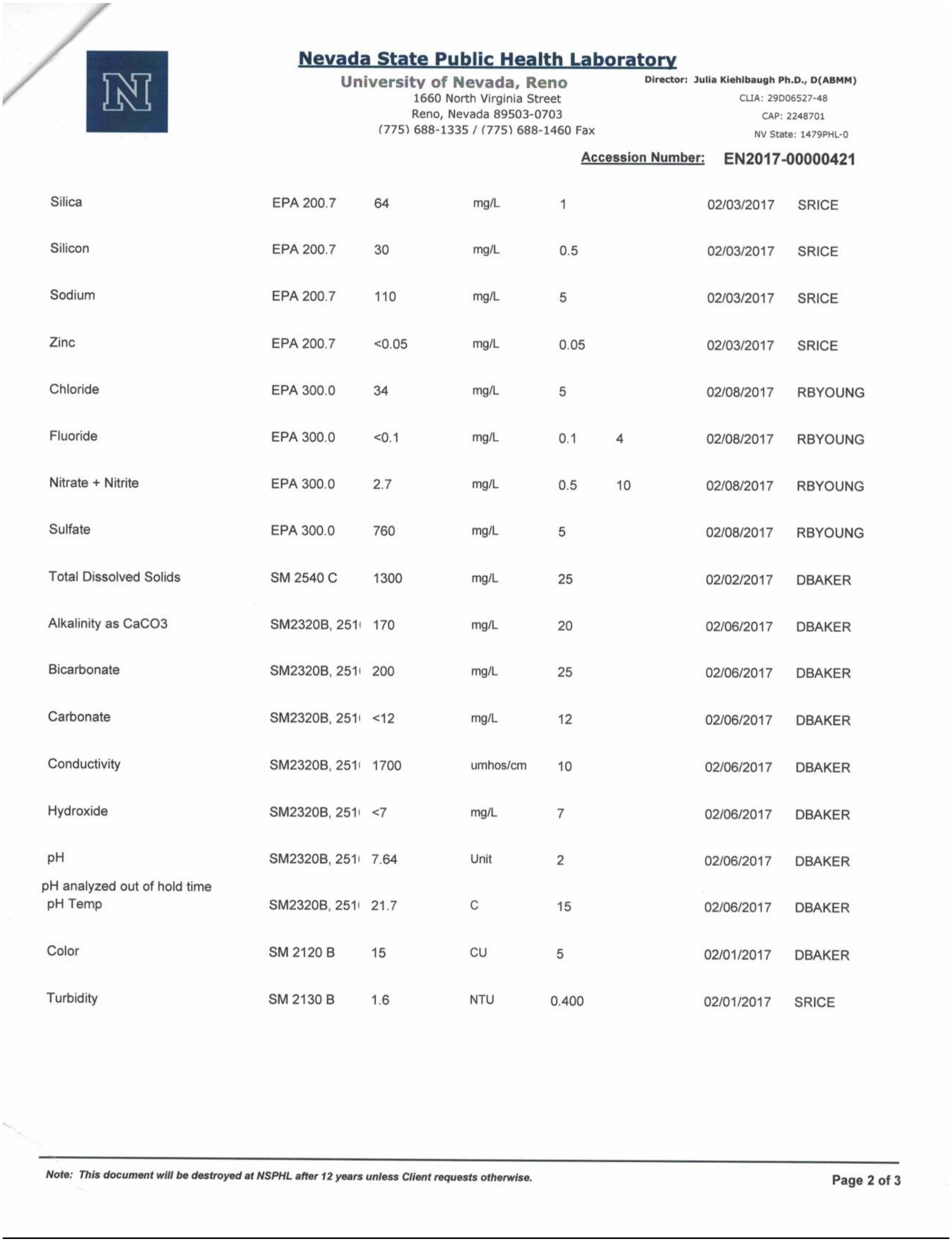

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00000421**

Silica	EPA 200.7	64	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	30	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	110	mg/L	5		02/03/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/03/2017	SRICE
Chloride	EPA 300.0	34	mg/L	5		02/08/2017	RBYOUNG
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	02/08/2017	RBYOUNG
Nitrate + Nitrite	EPA 300.0	2.7	mg/L	0.5	10	02/08/2017	RBYOUNG
Sulfate	EPA 300.0	760	mg/L	5		02/08/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		02/02/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	170	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	200	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	1700	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	7.64	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	21.7	C	15		02/06/2017	DBAKER
Color	SM 2120 B	15	CU	5		02/01/2017	DBAKER
Turbidity	SM 2130 B	1.6	NTU	0.400		02/01/2017	SRICE

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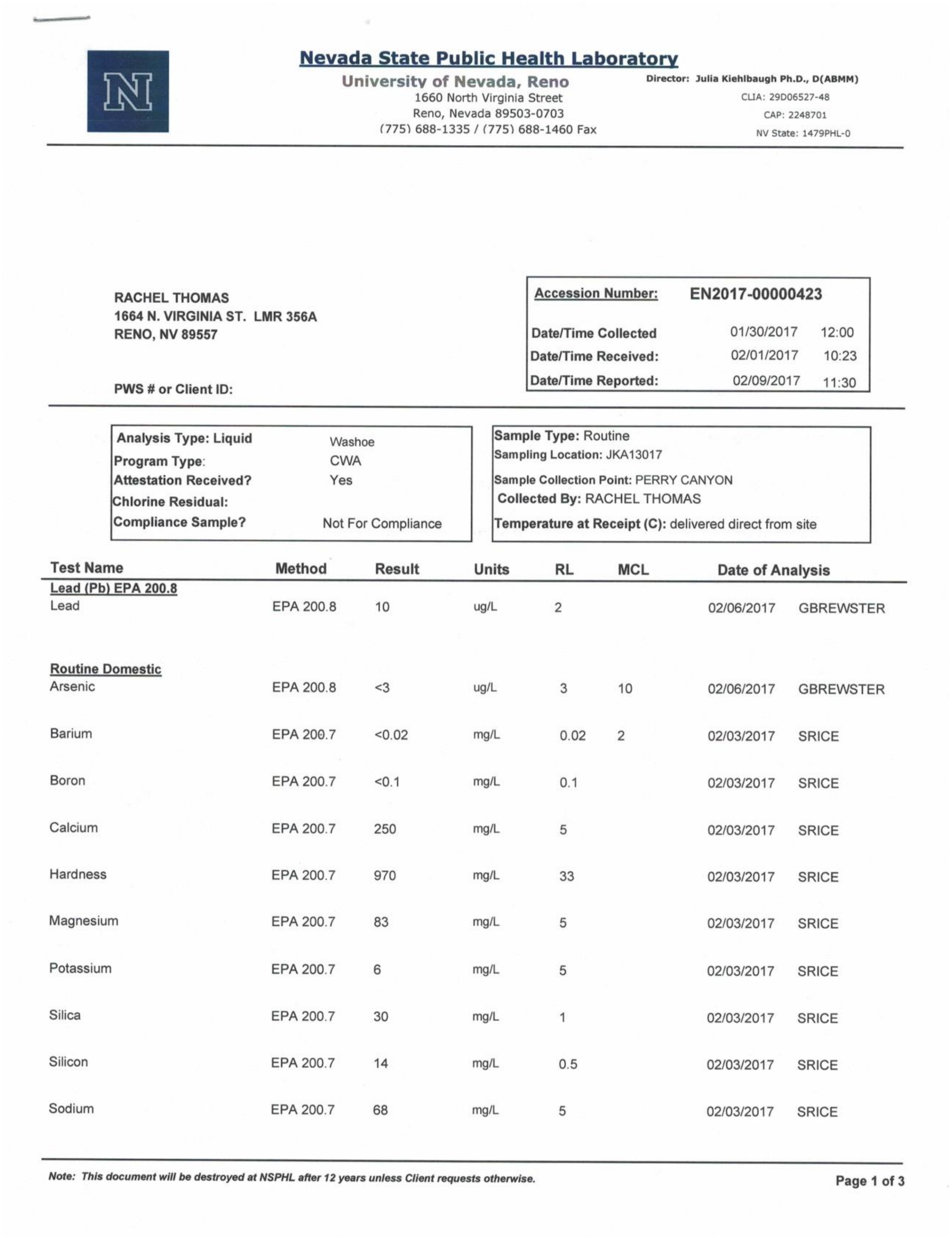

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000423**	
Date/Time Collected	01/30/2017	12:00
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/09/2017	11:30

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: JKA13017
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	10	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/03/2017	SRICE
Calcium	EPA 200.7	250	mg/L	5		02/03/2017	SRICE
Hardness	EPA 200.7	970	mg/L	33		02/03/2017	SRICE
Magnesium	EPA 200.7	83	mg/L	5		02/03/2017	SRICE
Potassium	EPA 200.7	6	mg/L	5		02/03/2017	SRICE
Silica	EPA 200.7	30	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	14	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	68	mg/L	5		02/03/2017	SRICE

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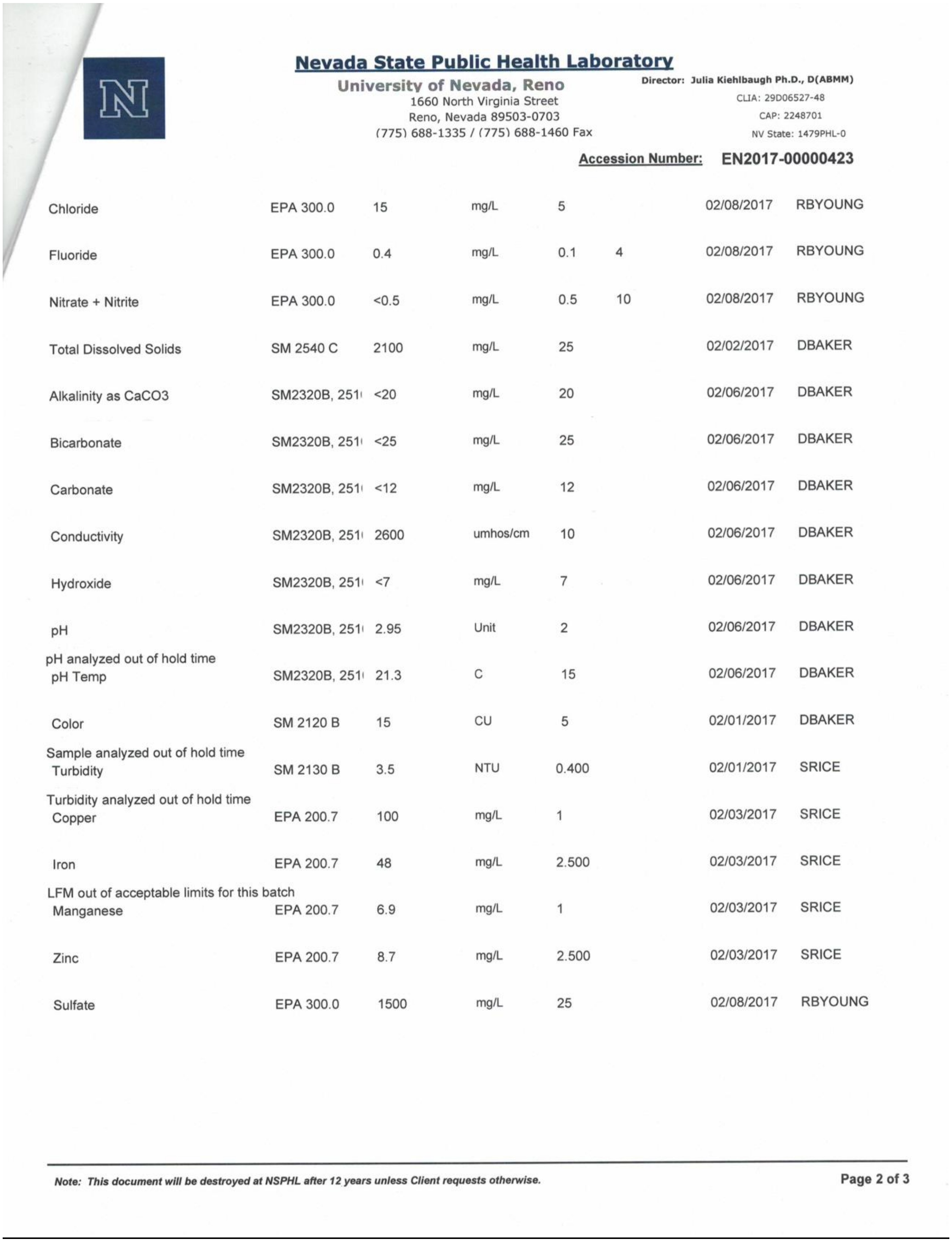

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00000423**

Chloride	EPA 300.0	15	mg/L	5		02/08/2017	RBYOUNG
Fluoride	EPA 300.0	0.4	mg/L	0.1	4	02/08/2017	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/08/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	2100	mg/L	25		02/02/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	<25	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	2600	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	2.95	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	21.3	C	15		02/06/2017	DBAKER
Color	SM 2120 B	15	CU	5		02/01/2017	DBAKER
Sample analyzed out of hold time							
Turbidity	SM 2130 B	3.5	NTU	0.400		02/01/2017	SRICE
Turbidity analyzed out of hold time							
Copper	EPA 200.7	100	mg/L	1		02/03/2017	SRICE
Iron	EPA 200.7	48	mg/L	2.500		02/03/2017	SRICE
LFM out of acceptable limits for this batch							
Manganese	EPA 200.7	6.9	mg/L	1		02/03/2017	SRICE
Zinc	EPA 200.7	8.7	mg/L	2.500		02/03/2017	SRICE
Sulfate	EPA 300.0	1500	mg/L	25		02/08/2017	RBYOUNG

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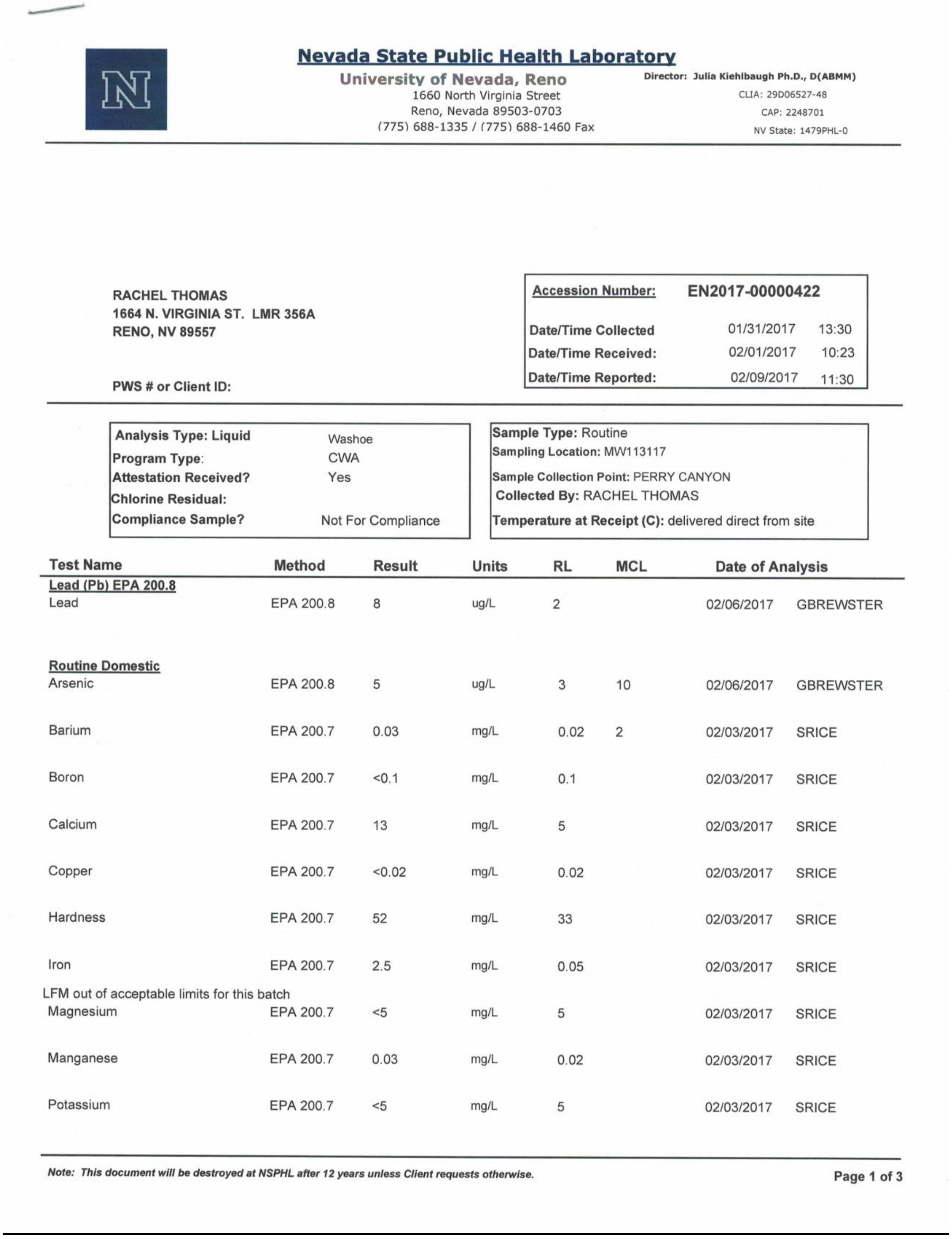

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000422**	
Date/Time Collected	01/31/2017	13:30
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/09/2017	11:30

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MW113117
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	8	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	5	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/03/2017	SRICE
Calcium	EPA 200.7	13	mg/L	5		02/03/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/03/2017	SRICE
Hardness	EPA 200.7	52	mg/L	33		02/03/2017	SRICE
Iron	EPA 200.7	2.5	mg/L	0.05		02/03/2017	SRICE
LFM out of acceptable limits for this batch							
Magnesium	EPA 200.7	<5	mg/L	5		02/03/2017	SRICE
Manganese	EPA 200.7	0.03	mg/L	0.02		02/03/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/03/2017	SRICE

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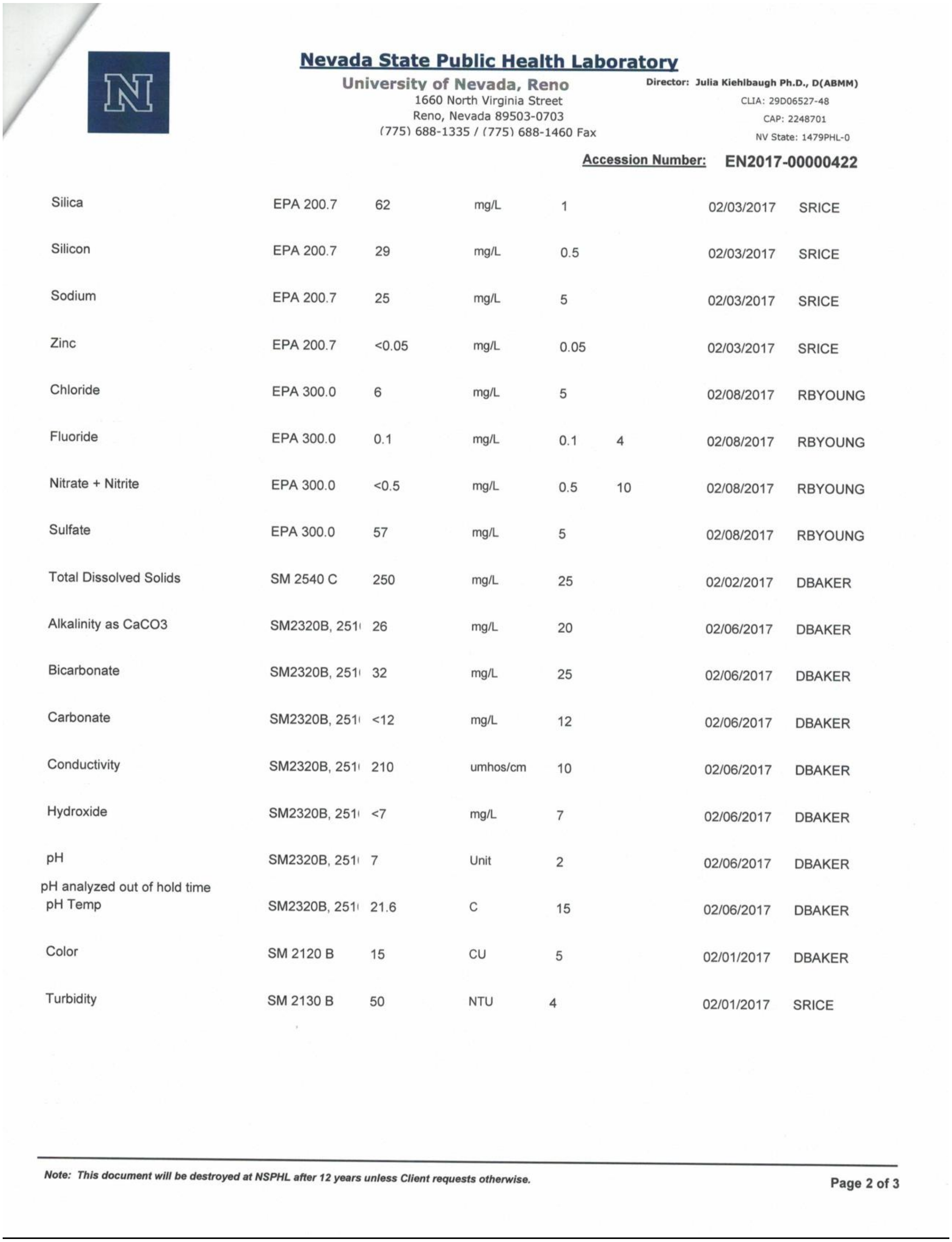

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CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00000422**

Silica	EPA 200.7	62	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	29	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	25	mg/L	5		02/03/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/03/2017	SRICE
Chloride	EPA 300.0	6	mg/L	5		02/08/2017	RBYOUNG
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	02/08/2017	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/08/2017	RBYOUNG
Sulfate	EPA 300.0	57	mg/L	5		02/08/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	250	mg/L	25		02/02/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	26	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	32	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	210	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	7	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	21.6	C	15		02/06/2017	DBAKER
Color	SM 2120 B	15	CU	5		02/01/2017	DBAKER
Turbidity	SM 2130 B	50	NTU	4		02/01/2017	SRICE

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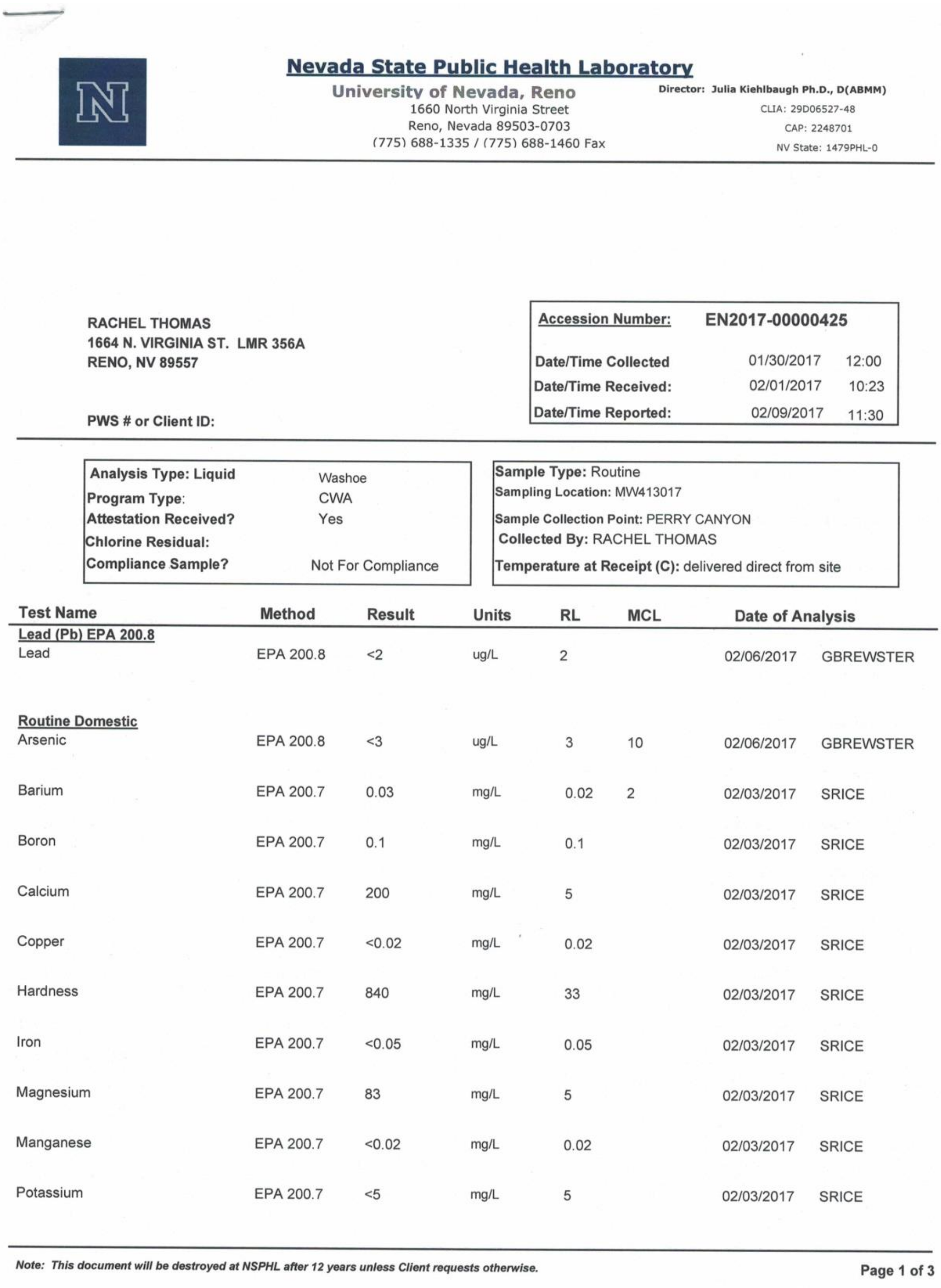

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000425**	
Date/Time Collected	01/30/2017	12:00
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/09/2017	11:30

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MW413017
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<2	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	0.1	mg/L	0.1		02/03/2017	SRICE
Calcium	EPA 200.7	200	mg/L	5		02/03/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/03/2017	SRICE
Hardness	EPA 200.7	840	mg/L	33		02/03/2017	SRICE
Iron	EPA 200.7	<0.05	mg/L	0.05		02/03/2017	SRICE
Magnesium	EPA 200.7	83	mg/L	5		02/03/2017	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		02/03/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/03/2017	SRICE

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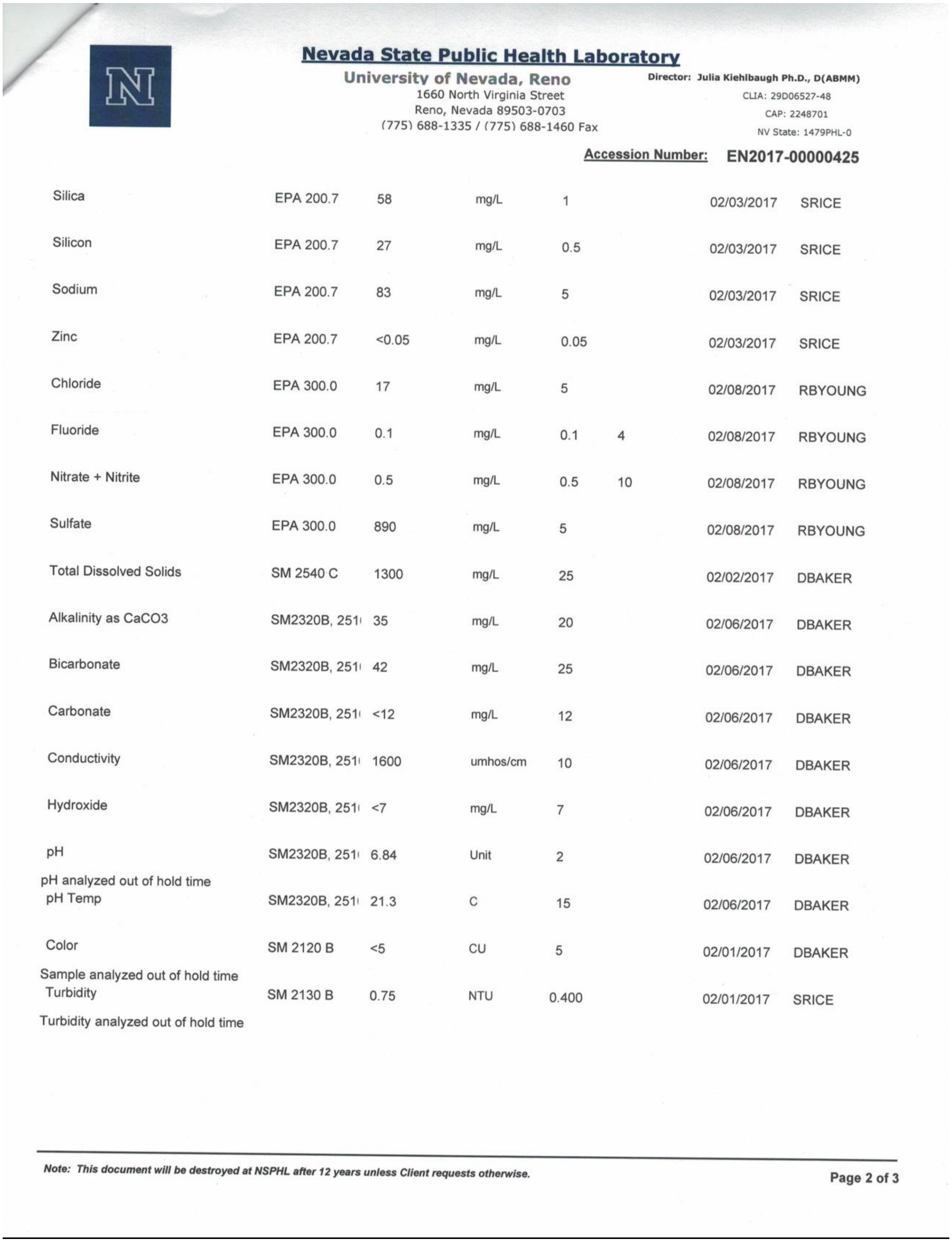

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CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00000425**

Silica	EPA 200.7	58	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	27	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	83	mg/L	5		02/03/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/03/2017	SRICE
Chloride	EPA 300.0	17	mg/L	5		02/08/2017	RBYOUNG
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	02/08/2017	RBYOUNG
Nitrate + Nitrite	EPA 300.0	0.5	mg/L	0.5	10	02/08/2017	RBYOUNG
Sulfate	EPA 300.0	890	mg/L	5		02/08/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		02/02/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	35	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	42	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	1600	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	6.84	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	21.3	C	15		02/06/2017	DBAKER
Color	SM 2120 B	<5	CU	5		02/01/2017	DBAKER
Sample analyzed out of hold time							
Turbidity	SM 2130 B	0.75	NTU	0.400		02/01/2017	SRICE
Turbidity analyzed out of hold time							

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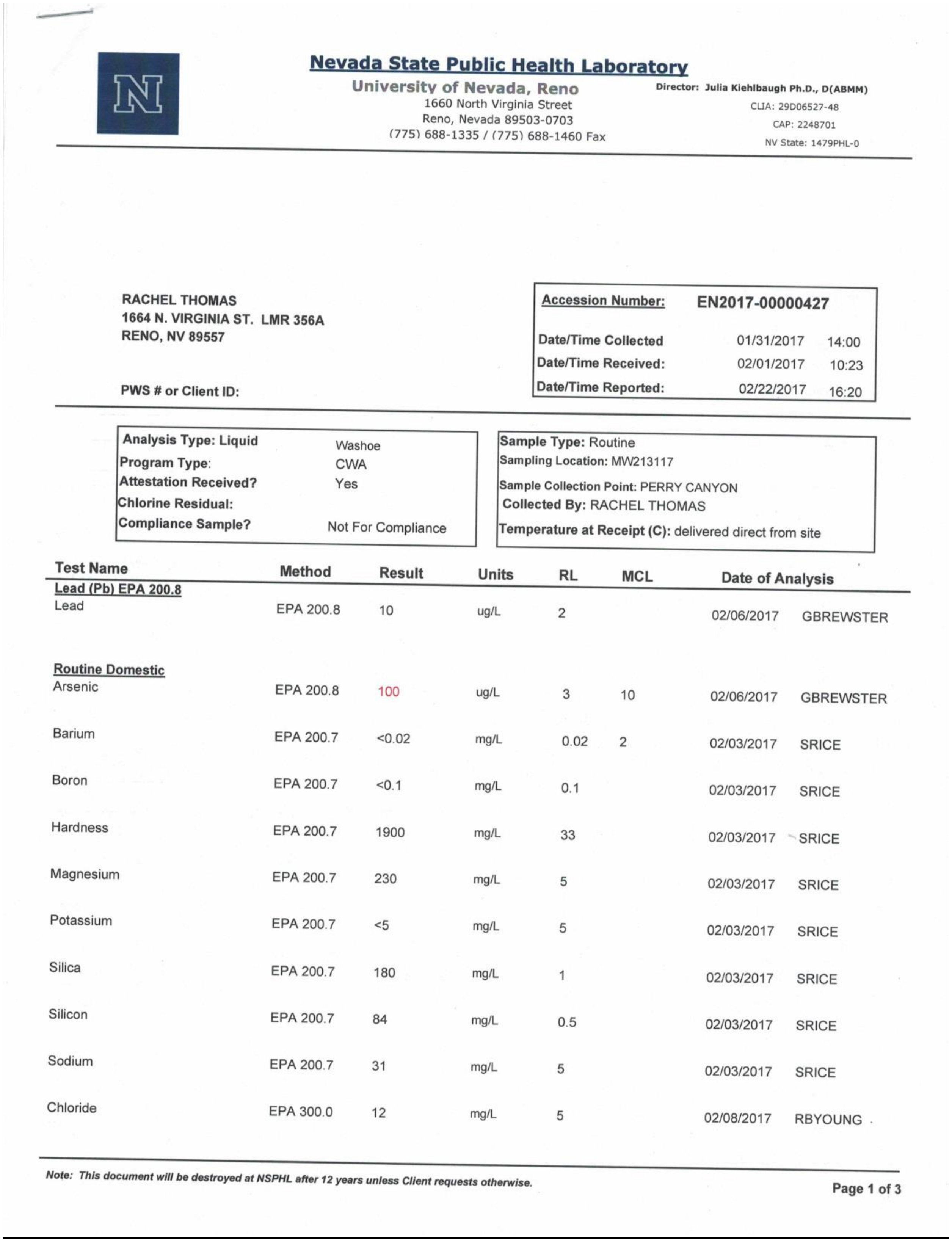

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000427**	
Date/Time Collected	01/31/2017	14:00
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/22/2017	16:20

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MW213117
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	10	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	100	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/03/2017	SRICE
Hardness	EPA 200.7	1900	mg/L	33		02/03/2017	SRICE
Magnesium	EPA 200.7	230	mg/L	5		02/03/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/03/2017	SRICE
Silica	EPA 200.7	180	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	84	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	31	mg/L	5		02/03/2017	SRICE
Chloride	EPA 300.0	12	mg/L	5		02/08/2017	RBYOUNG

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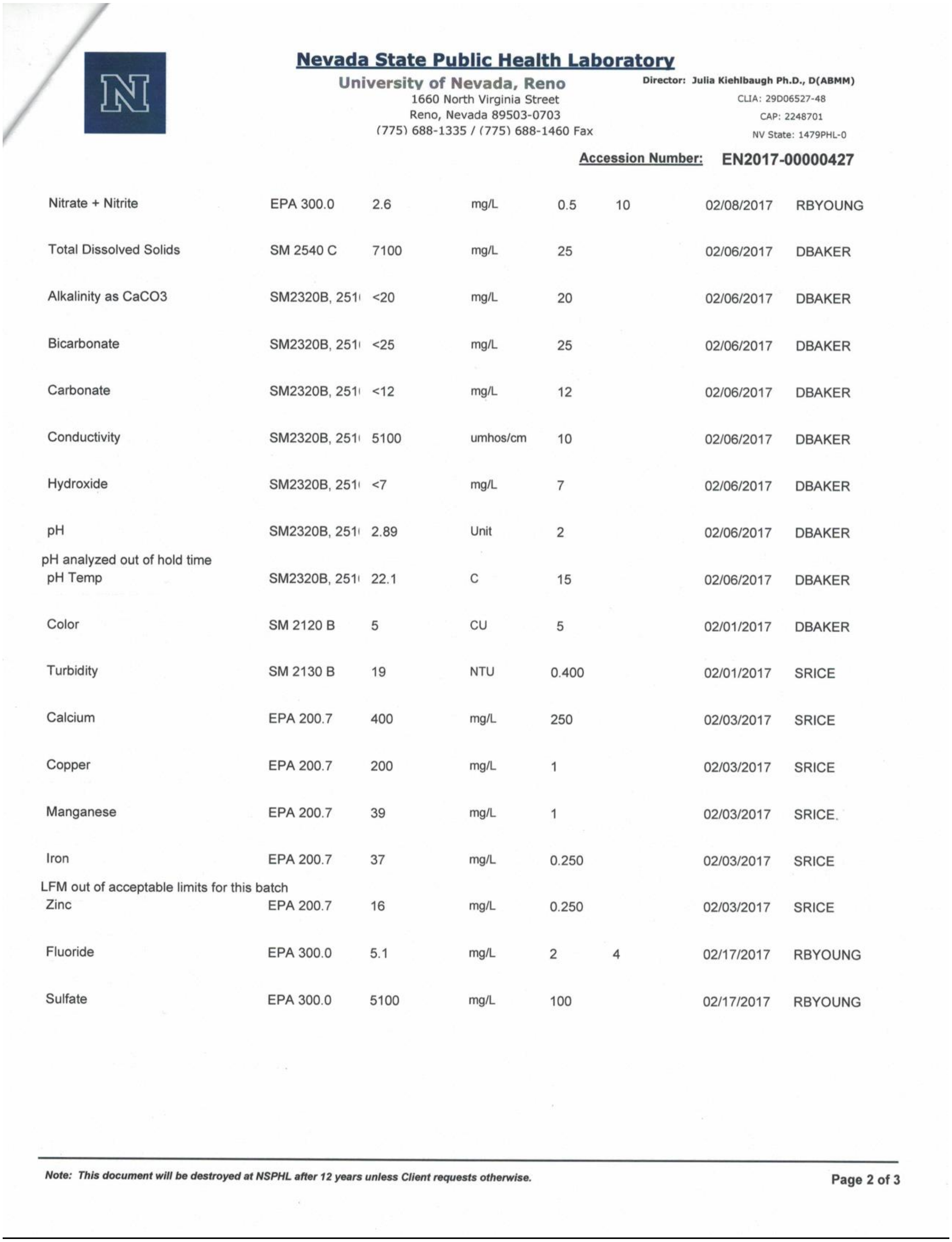

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00000427**

Nitrate + Nitrite	EPA 300.0	2.6	mg/L	0.5	10	02/08/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	7100	mg/L	25		02/06/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	<20	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	<25	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	5100	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	2.89	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B, 251	22.1	C	15		02/06/2017	DBAKER
Color	SM 2120 B	5	CU	5		02/01/2017	DBAKER
Turbidity	SM 2130 B	19	NTU	0.400		02/01/2017	SRICE
Calcium	EPA 200.7	400	mg/L	250		02/03/2017	SRICE
Copper	EPA 200.7	200	mg/L	1		02/03/2017	SRICE
Manganese	EPA 200.7	39	mg/L	1		02/03/2017	SRICE
Iron	EPA 200.7	37	mg/L	0.250		02/03/2017	SRICE
LFM out of acceptable limits for this batch							
Zinc	EPA 200.7	16	mg/L	0.250		02/03/2017	SRICE
Fluoride	EPA 300.0	5.1	mg/L	2	4	02/17/2017	RBYOUNG
Sulfate	EPA 300.0	5100	mg/L	100		02/17/2017	RBYOUNG

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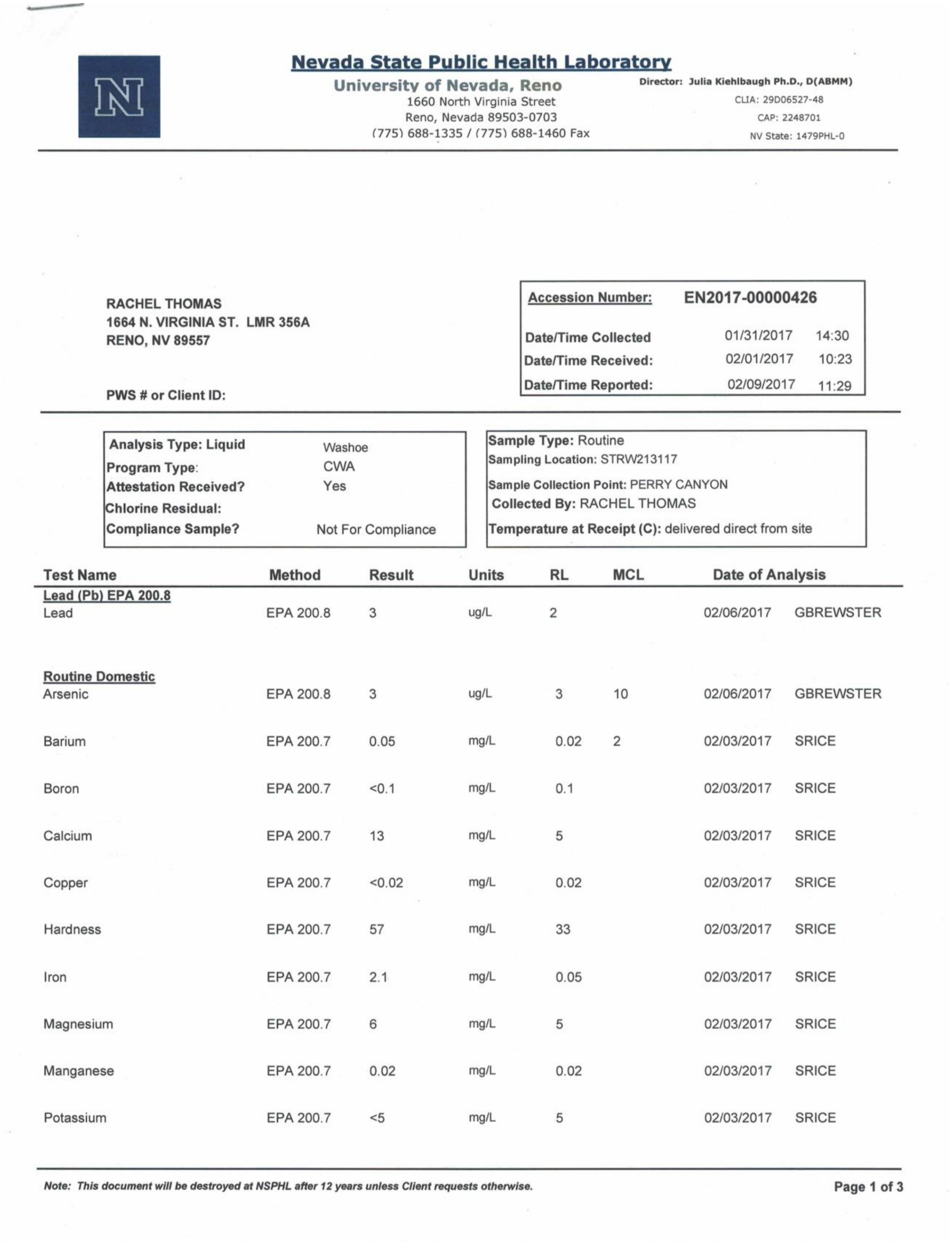

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Director: Julia Kiehlbaugh Ph.D., D(ABMM)
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RACHEL THOMAS
1664 N. VIRGINIA ST. LMR 356A
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00000426**	
Date/Time Collected	01/31/2017	14:30
Date/Time Received:	02/01/2017	10:23
Date/Time Reported:	02/09/2017	11:29

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: STRW213117
Sample Collection Point: PERRY CANYON
Collected By: RACHEL THOMAS
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	3	ug/L	2		02/06/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	3	ug/L	3	10	02/06/2017	GBREWSTER
Barium	EPA 200.7	0.05	mg/L	0.02	2	02/03/2017	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/03/2017	SRICE
Calcium	EPA 200.7	13	mg/L	5		02/03/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/03/2017	SRICE
Hardness	EPA 200.7	57	mg/L	33		02/03/2017	SRICE
Iron	EPA 200.7	2.1	mg/L	0.05		02/03/2017	SRICE
Magnesium	EPA 200.7	6	mg/L	5		02/03/2017	SRICE
Manganese	EPA 200.7	0.02	mg/L	0.02		02/03/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/03/2017	SRICE

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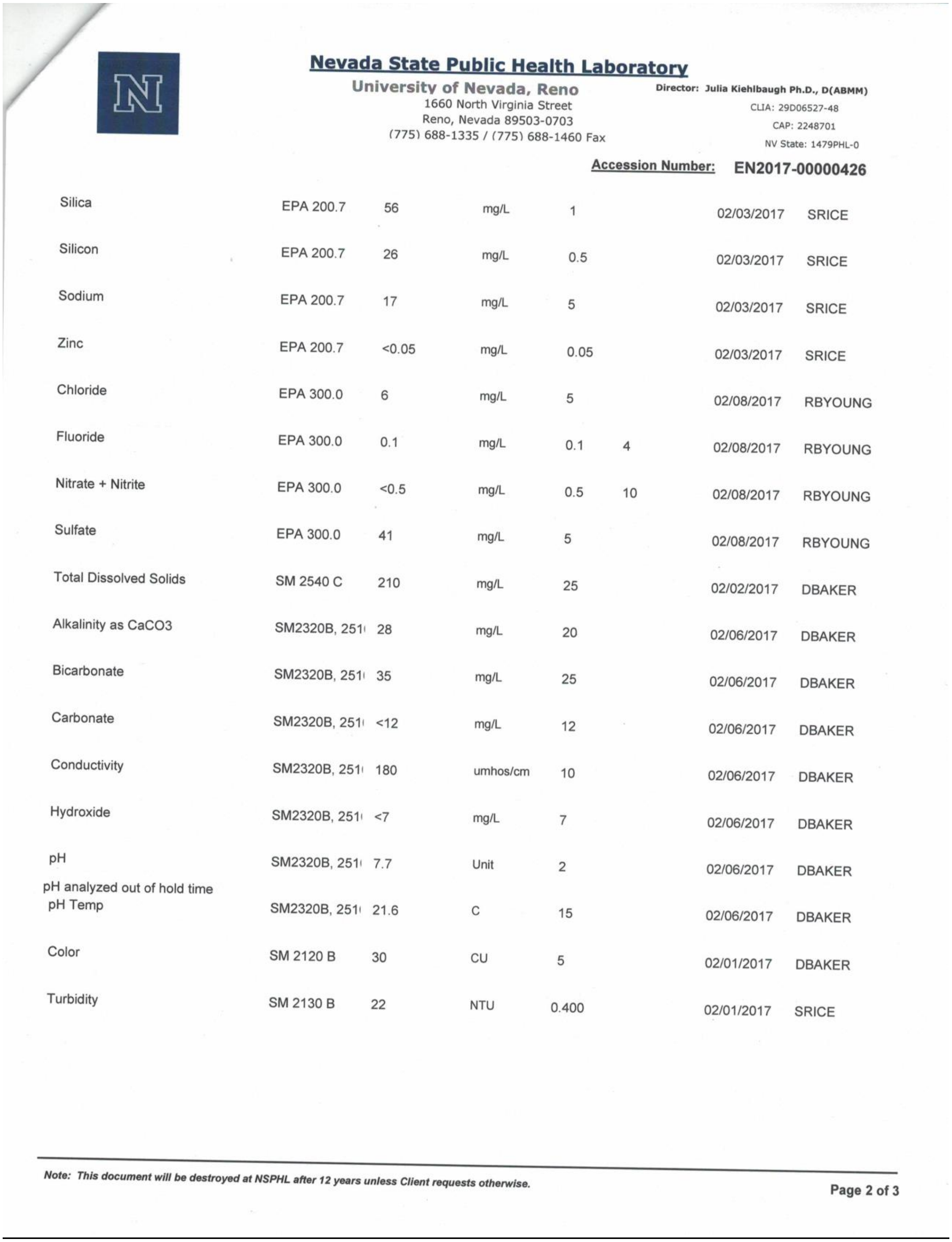

Nevada State Public Health Laboratory

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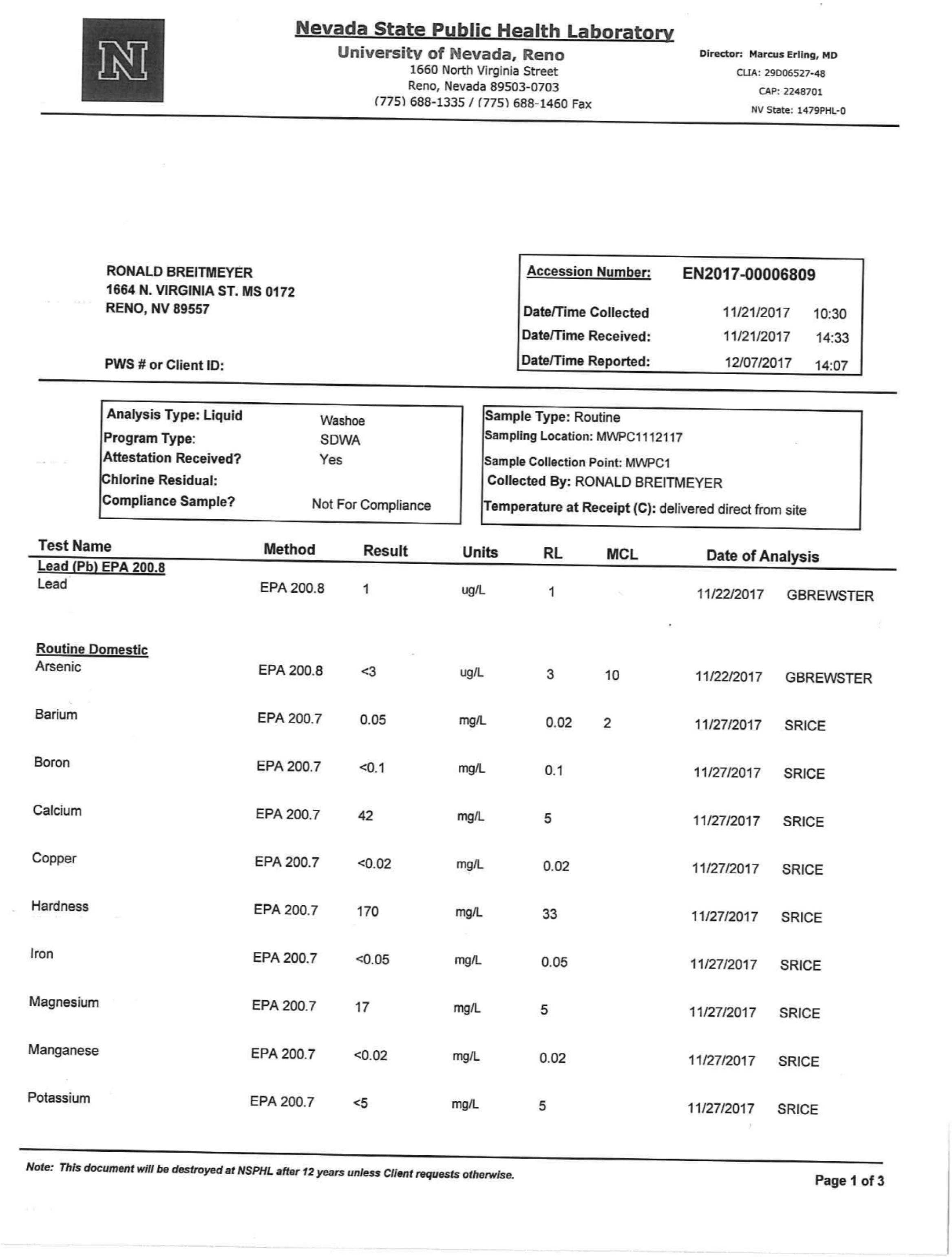
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00000426**

Silica	EPA 200.7	56	mg/L	1		02/03/2017	SRICE
Silicon	EPA 200.7	26	mg/L	0.5		02/03/2017	SRICE
Sodium	EPA 200.7	17	mg/L	5		02/03/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/03/2017	SRICE
Chloride	EPA 300.0	6	mg/L	5		02/08/2017	RBYOUNG
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	02/08/2017	RBYOUNG
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/08/2017	RBYOUNG
Sulfate	EPA 300.0	41	mg/L	5		02/08/2017	RBYOUNG
Total Dissolved Solids	SM 2540 C	210	mg/L	25		02/02/2017	DBAKER
Alkalinity as CaCO3	SM2320B, 251	28	mg/L	20		02/06/2017	DBAKER
Bicarbonate	SM2320B, 251	35	mg/L	25		02/06/2017	DBAKER
Carbonate	SM2320B, 251	<12	mg/L	12		02/06/2017	DBAKER
Conductivity	SM2320B, 251	180	umhos/cm	10		02/06/2017	DBAKER
Hydroxide	SM2320B, 251	<7	mg/L	7		02/06/2017	DBAKER
pH	SM2320B, 251	7.7	Unit	2		02/06/2017	DBAKER
pH analyzed out of hold time pH Temp	SM2320B, 251	21.6	C	15		02/06/2017	DBAKER
Color	SM 2120 B	30	CU	5		02/01/2017	DBAKER
Turbidity	SM 2130 B	22	NTU	0.400		02/01/2017	SRICE

***Note:* This document will be destroyed at NSPHL after 12 years unless Client requests otherwise.**

November 2017 Results



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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00006809**	
Date/Time Collected	11/21/2017	10:30
Date/Time Received:	11/21/2017	14:33
Date/Time Reported:	12/07/2017	14:07

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1112117
Sample Collection Point: MWPC1
Collected By: RONALD BREITMEYER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	1	ug/L	1		11/22/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/22/2017	GBREWSTER
Barium	EPA 200.7	0.05	mg/L	0.02	2	11/27/2017	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		11/27/2017	SRICE
Calcium	EPA 200.7	42	mg/L	5		11/27/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		11/27/2017	SRICE
Hardness	EPA 200.7	170	mg/L	33		11/27/2017	SRICE
Iron	EPA 200.7	<0.05	mg/L	0.05		11/27/2017	SRICE
Magnesium	EPA 200.7	17	mg/L	5		11/27/2017	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		11/27/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		11/27/2017	SRICE

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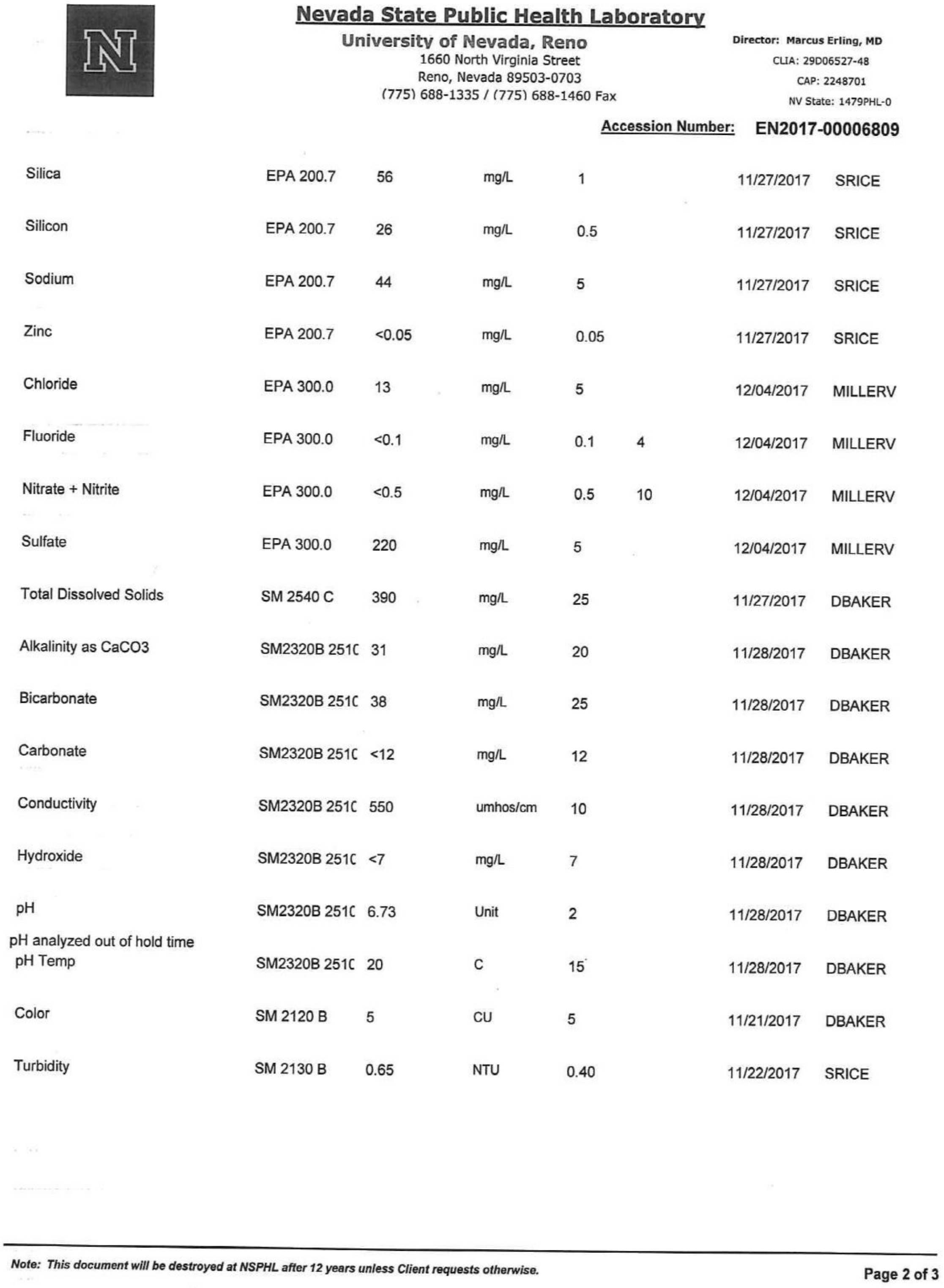

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CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2017-00006809**

Silica	EPA 200.7	56	mg/L	1		11/27/2017	SRICE
Silicon	EPA 200.7	26	mg/L	0.5		11/27/2017	SRICE
Sodium	EPA 200.7	44	mg/L	5		11/27/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/27/2017	SRICE
Chloride	EPA 300.0	13	mg/L	5		12/04/2017	MILLERV
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	12/04/2017	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	12/04/2017	MILLERV
Sulfate	EPA 300.0	220	mg/L	5		12/04/2017	MILLERV
Total Dissolved Solids	SM 2540 C	390	mg/L	25		11/27/2017	DBAKER
Alkalinity as CaCO3	SM2320B 251C	31	mg/L	20		11/28/2017	DBAKER
Bicarbonate	SM2320B 251C	38	mg/L	25		11/28/2017	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		11/28/2017	DBAKER
Conductivity	SM2320B 251C	550	umhos/cm	10		11/28/2017	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		11/28/2017	DBAKER
pH	SM2320B 251C	6.73	Unit	2		11/28/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	20	C	15		11/28/2017	DBAKER
Color	SM 2120 B	5	CU	5		11/21/2017	DBAKER
Turbidity	SM 2130 B	0.65	NTU	0.40		11/22/2017	SRICE

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CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00006810**	
Date/Time Collected	11/21/2017	12:00
Date/Time Received:	11/21/2017	14:33
Date/Time Reported:	12/13/2017	11:19

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2112117
Sample Collection Point: MWPC2
Collected By: RONALD BREITMEYER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	100	ug/L	2		11/29/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	78	ug/L	3	10	11/29/2017	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	11/29/2017	SRICE
LFM out of acceptable limits for this sample							
Boron	EPA 200.7	<0.1	mg/L	0.1		11/29/2017	SRICE
Hardness	EPA 200.7	1900	mg/L	33		11/29/2017	SRICE
Iron	EPA 200.7	29	mg/L	0.05		11/29/2017	SRICE
Magnesium	EPA 200.7	220	mg/L	5		11/29/2017	SRICE
Potassium	EPA 200.7	5	mg/L	5		11/29/2017	SRICE
Silica	EPA 200.7	83	mg/L	1		11/29/2017	SRICE
Silicon	EPA 200.7	39	mg/L	0.5		11/29/2017	SRICE
Sodium	EPA 200.7	86	mg/L	5		11/29/2017	SRICE

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Chloride	EPA 300.0	12	mg/L	5		12/04/2017	MILLERV
Fluoride	EPA 300.0	3	mg/L	0.1	4	12/04/2017	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	12/04/2017	MILLERV
Total Dissolved Solids	SM 2540 C	3100	mg/L	25		11/29/2017	DBAKER
TDS analyzed out of hold time Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		11/28/2017	DBAKER
Bicarbonate	SM2320B 251C	<25	mg/L	25		11/28/2017	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		11/28/2017	DBAKER
Conductivity	SM2320B 251C	3200	umhos/cm	10		11/28/2017	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		11/28/2017	DBAKER
pH	SM2320B 251C	3.65	Unit	2		11/28/2017	DBAKER
pH analyzed out of hold time pH Temp	SM2320B 251C	19.9	C	15		11/28/2017	DBAKER
Color	SM 2120 B	5	CU	5		11/21/2017	DBAKER
Turbidity	SM 2130 B	110	NTU	4		11/22/2017	SRICE
Calcium	EPA 200.7	380	mg/L	50		11/29/2017	SRICE
Copper	EPA 200.7	16	mg/L	0.200		11/29/2017	SRICE
Manganese	EPA 200.7	18	mg/L	0.200		11/29/2017	SRICE
Zinc	EPA 200.7	8.4	mg/L	0.500		11/29/2017	SRICE
Sulfate	EPA 300.0	2200	mg/L	50		12/07/2017	MILLERV

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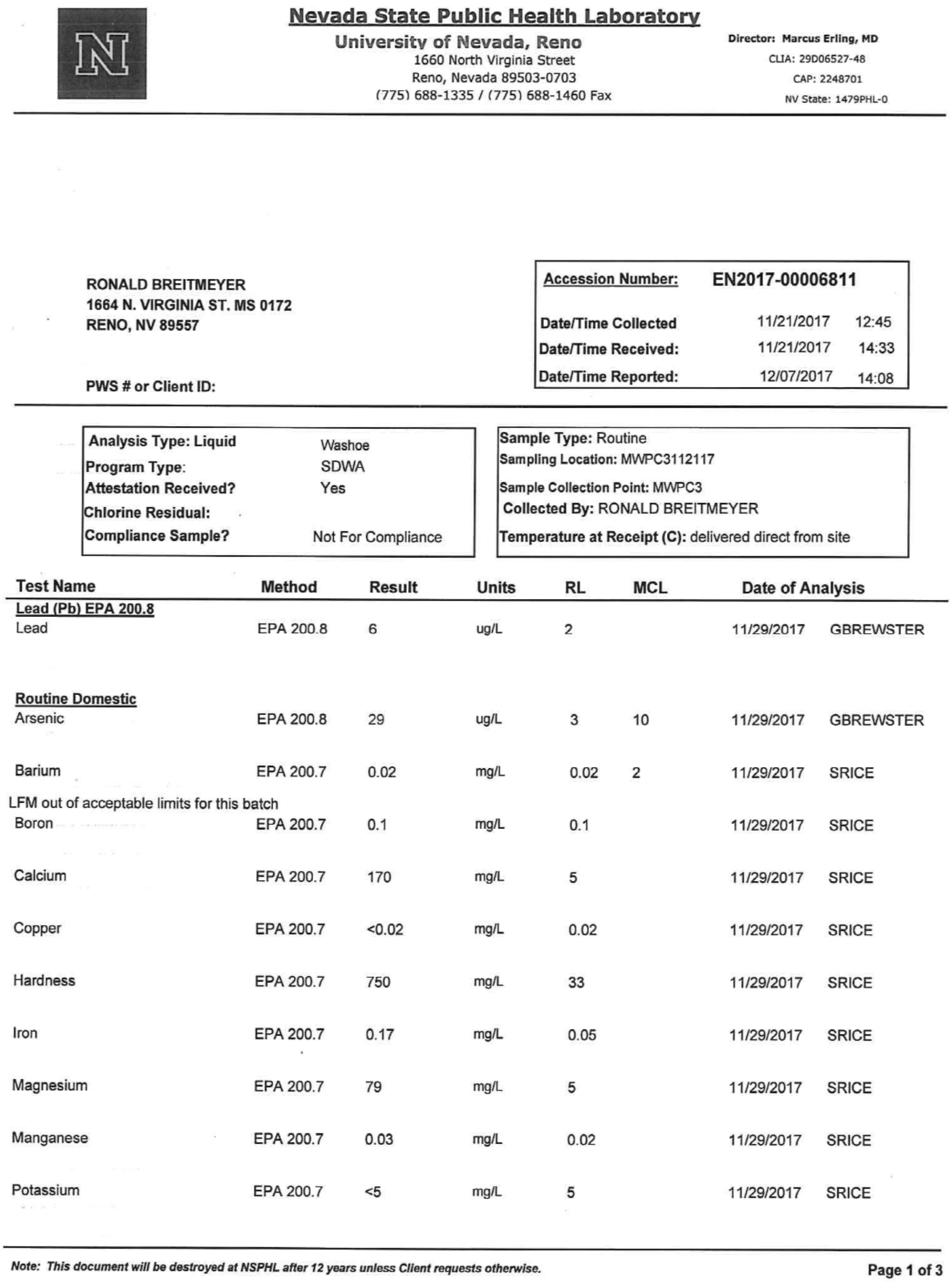

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CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00006811**	
Date/Time Collected	11/21/2017	12:45
Date/Time Received:	11/21/2017	14:33
Date/Time Reported:	12/07/2017	14:08

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3112117
Sample Collection Point: MWPC3
Collected By: RONALD BREITMEYER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	6	ug/L	2		11/29/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	29	ug/L	3	10	11/29/2017	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	11/29/2017	SRICE
LFM out of acceptable limits for this batch							
Boron	EPA 200.7	0.1	mg/L	0.1		11/29/2017	SRICE
Calcium	EPA 200.7	170	mg/L	5		11/29/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		11/29/2017	SRICE
Hardness	EPA 200.7	750	mg/L	33		11/29/2017	SRICE
Iron	EPA 200.7	0.17	mg/L	0.05		11/29/2017	SRICE
Magnesium	EPA 200.7	79	mg/L	5		11/29/2017	SRICE
Manganese	EPA 200.7	0.03	mg/L	0.02		11/29/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		11/29/2017	SRICE

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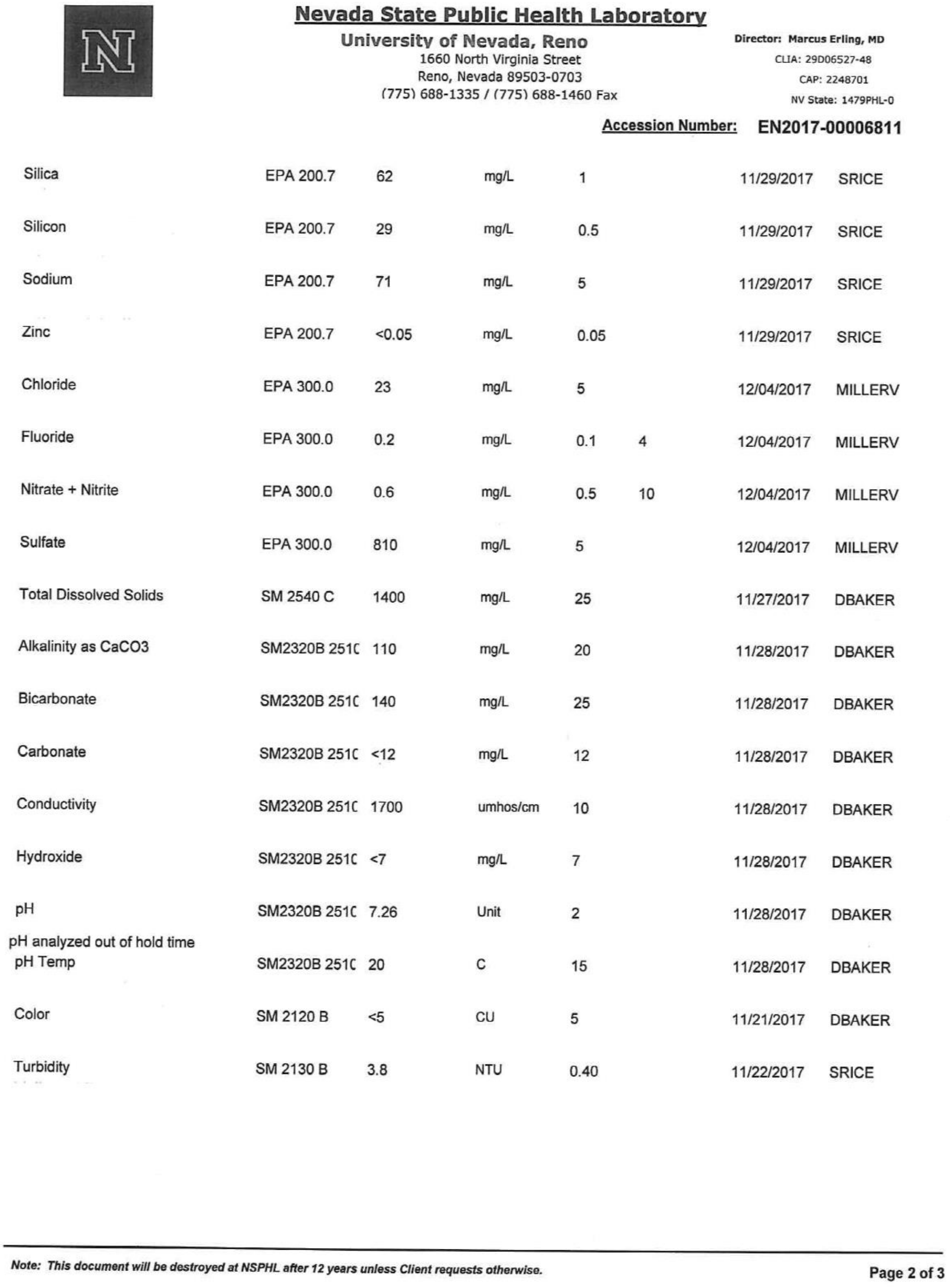

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NV State: 1479PHL-0

Accession Number: **EN2017-00006811**

Silica	EPA 200.7	62	mg/L	1		11/29/2017	SRICE
Silicon	EPA 200.7	29	mg/L	0.5		11/29/2017	SRICE
Sodium	EPA 200.7	71	mg/L	5		11/29/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/29/2017	SRICE
Chloride	EPA 300.0	23	mg/L	5		12/04/2017	MILLERV
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	12/04/2017	MILLERV
Nitrate + Nitrite	EPA 300.0	0.6	mg/L	0.5	10	12/04/2017	MILLERV
Sulfate	EPA 300.0	810	mg/L	5		12/04/2017	MILLERV
Total Dissolved Solids	SM 2540 C	1400	mg/L	25		11/27/2017	DBAKER
Alkalinity as CaCO3	SM2320B 251C	110	mg/L	20		11/28/2017	DBAKER
Bicarbonate	SM2320B 251C	140	mg/L	25		11/28/2017	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		11/28/2017	DBAKER
Conductivity	SM2320B 251C	1700	umhos/cm	10		11/28/2017	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		11/28/2017	DBAKER
pH	SM2320B 251C	7.26	Unit	2		11/28/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	20	C	15		11/28/2017	DBAKER
Color	SM 2120 B	<5	CU	5		11/21/2017	DBAKER
Turbidity	SM 2130 B	3.8	NTU	0.40		11/22/2017	SRICE

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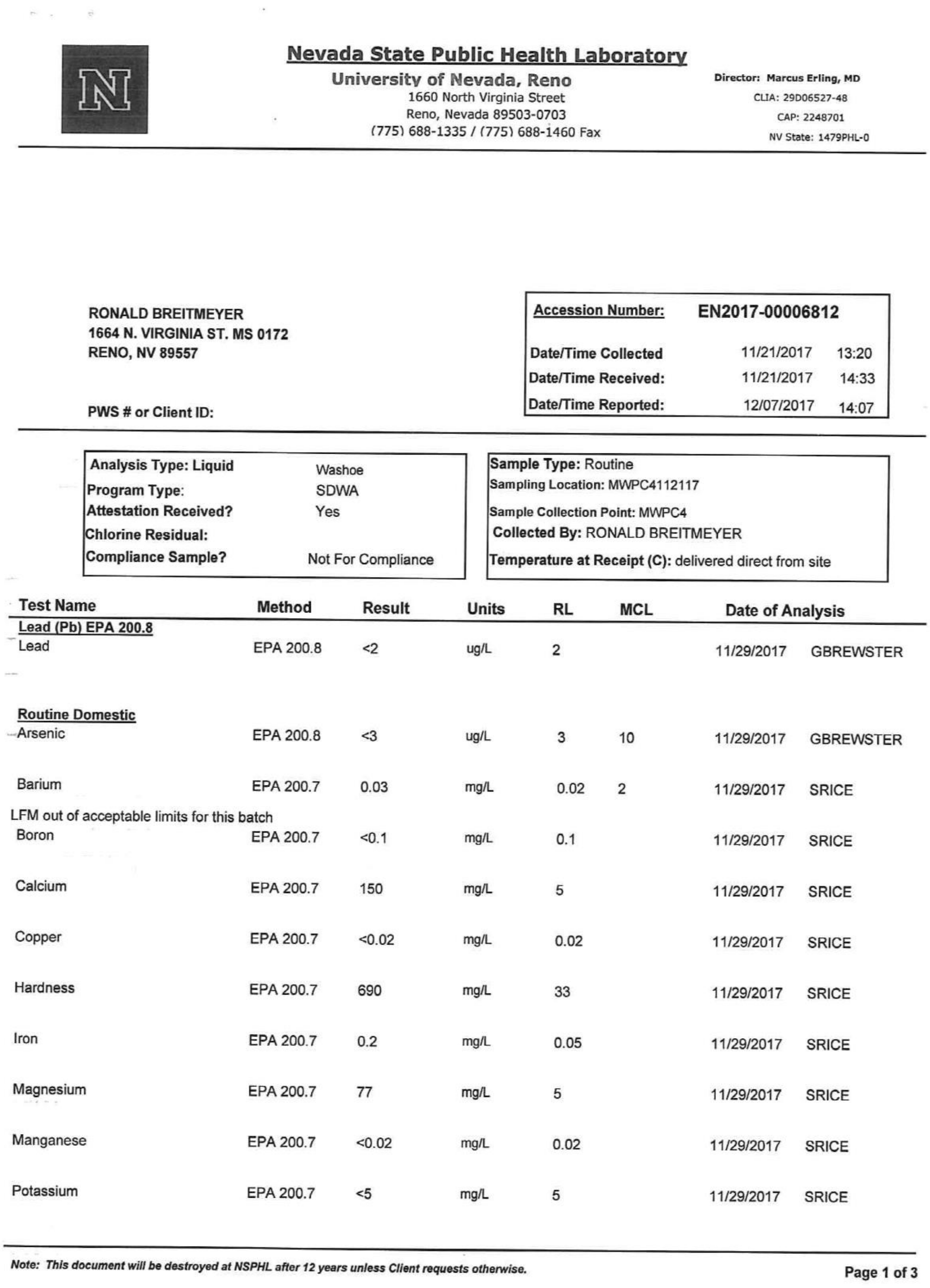

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RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2017-00006812**	
Date/Time Collected	11/21/2017	13:20
Date/Time Received:	11/21/2017	14:33
Date/Time Reported:	12/07/2017	14:07

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4112117
Sample Collection Point: MWPC4
Collected By: RONALD BREITMEYER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<2	ug/L	2		11/29/2017	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/29/2017	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	11/29/2017	SRICE
LFM out of acceptable limits for this batch							
Boron	EPA 200.7	<0.1	mg/L	0.1		11/29/2017	SRICE
Calcium	EPA 200.7	150	mg/L	5		11/29/2017	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		11/29/2017	SRICE
Hardness	EPA 200.7	690	mg/L	33		11/29/2017	SRICE
Iron	EPA 200.7	0.2	mg/L	0.05		11/29/2017	SRICE
Magnesium	EPA 200.7	77	mg/L	5		11/29/2017	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		11/29/2017	SRICE
Potassium	EPA 200.7	<5	mg/L	5		11/29/2017	SRICE

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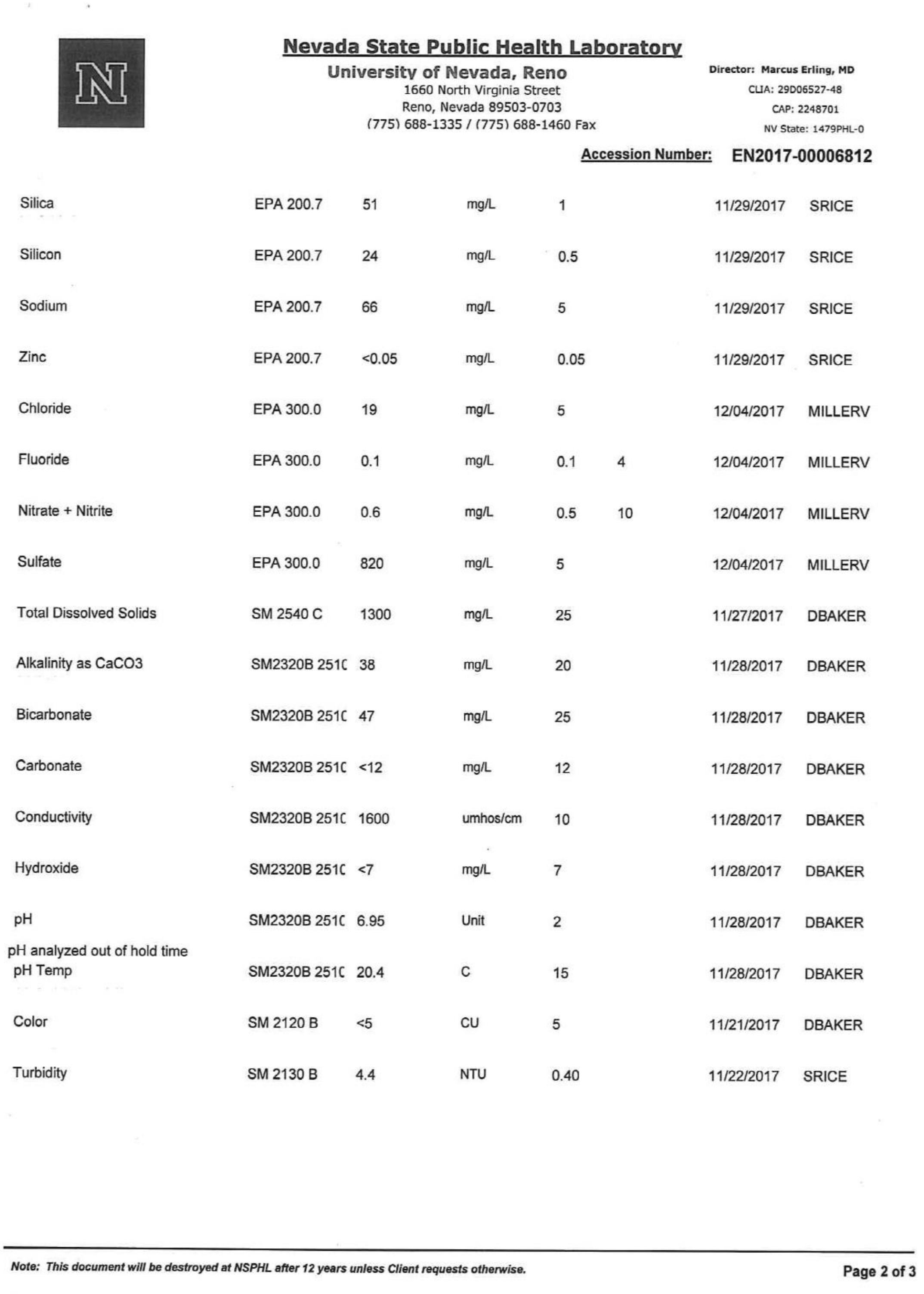

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NV State: 1479PHL-0

Accession Number: **EN2017-00006812**

Silica	EPA 200.7	51	mg/L	1		11/29/2017	SRICE
Silicon	EPA 200.7	24	mg/L	0.5		11/29/2017	SRICE
Sodium	EPA 200.7	66	mg/L	5		11/29/2017	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/29/2017	SRICE
Chloride	EPA 300.0	19	mg/L	5		12/04/2017	MILLERV
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	12/04/2017	MILLERV
Nitrate + Nitrite	EPA 300.0	0.6	mg/L	0.5	10	12/04/2017	MILLERV
Sulfate	EPA 300.0	820	mg/L	5		12/04/2017	MILLERV
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		11/27/2017	DBAKER
Alkalinity as CaCO3	SM2320B 251C	38	mg/L	20		11/28/2017	DBAKER
Bicarbonate	SM2320B 251C	47	mg/L	25		11/28/2017	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		11/28/2017	DBAKER
Conductivity	SM2320B 251C	1600	umhos/cm	10		11/28/2017	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		11/28/2017	DBAKER
pH	SM2320B 251C	6.95	Unit	2		11/28/2017	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	20.4	C	15		11/28/2017	DBAKER
Color	SM 2120 B	<5	CU	5		11/21/2017	DBAKER
Turbidity	SM 2130 B	4.4	NTU	0.40		11/22/2017	SRICE

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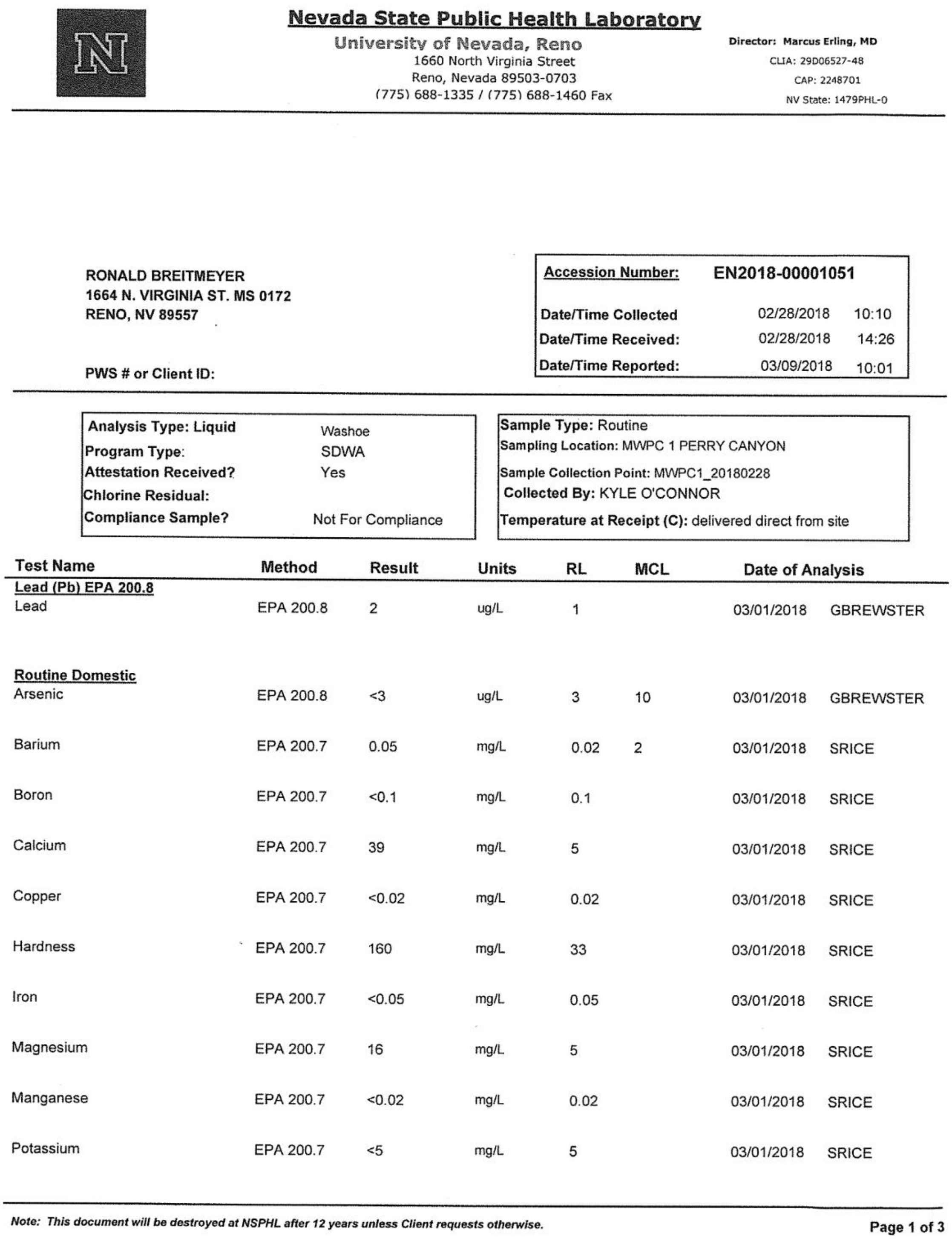
February 2018 Results



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CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00001051**	
Date/Time Collected	02/28/2018	10:10
Date/Time Received:	02/28/2018	14:26
Date/Time Reported:	03/09/2018	10:01

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC 1 PERRY CANYON
Sample Collection Point: MWPC1_20180228
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	2	ug/L	1		03/01/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	03/01/2018	GBREWSTER
Barium	EPA 200.7	0.05	mg/L	0.02	2	03/01/2018	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		03/01/2018	SRICE
Calcium	EPA 200.7	39	mg/L	5		03/01/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		03/01/2018	SRICE
Hardness	EPA 200.7	160	mg/L	33		03/01/2018	SRICE
Iron	EPA 200.7	<0.05	mg/L	0.05		03/01/2018	SRICE
Magnesium	EPA 200.7	16	mg/L	5		03/01/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		03/01/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		03/01/2018	SRICE

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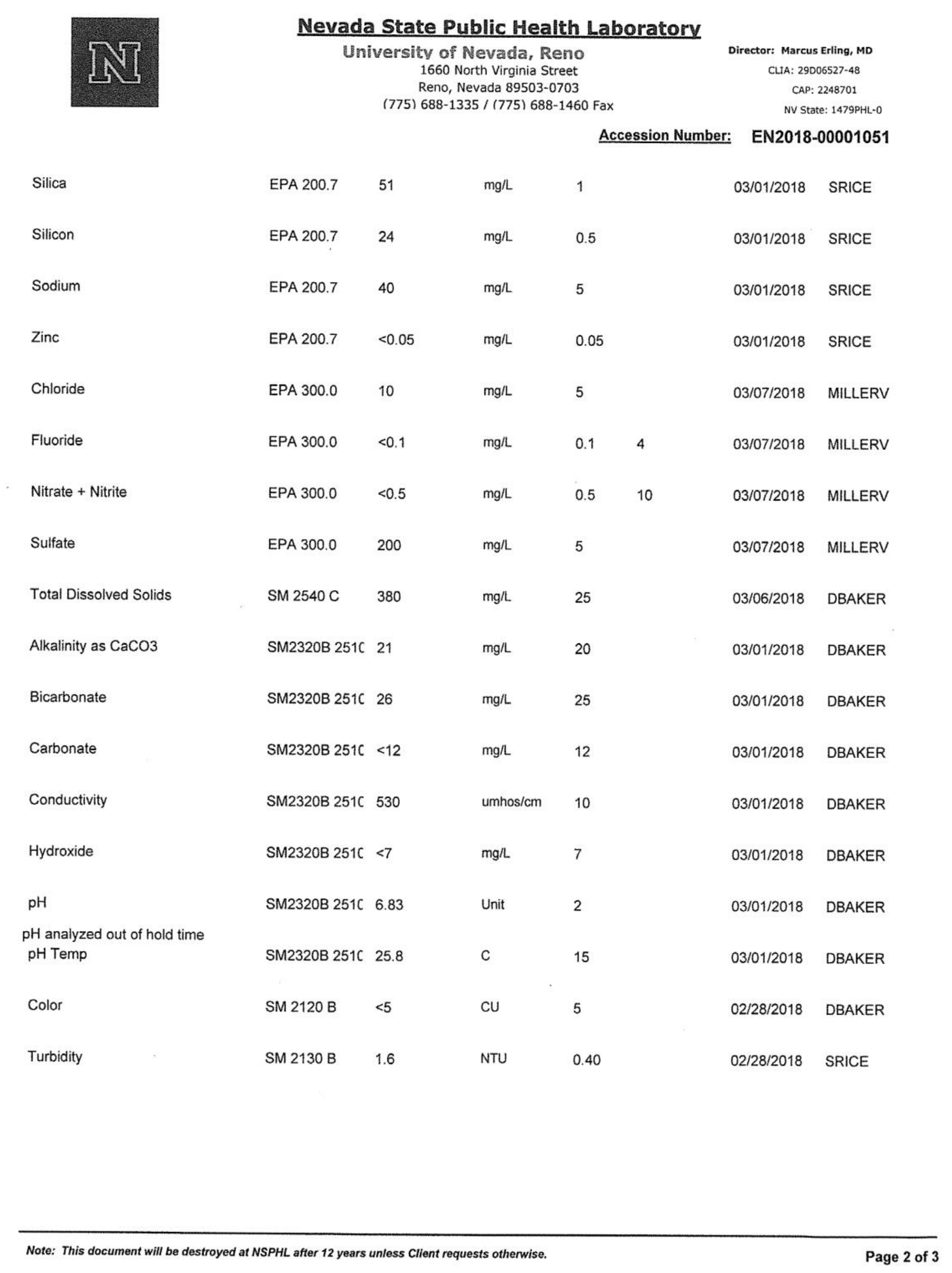

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2018-00001051**

Silica	EPA 200.7	51	mg/L	1		03/01/2018	SRICE
Silicon	EPA 200.7	24	mg/L	0.5		03/01/2018	SRICE
Sodium	EPA 200.7	40	mg/L	5		03/01/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		03/01/2018	SRICE
Chloride	EPA 300.0	10	mg/L	5		03/07/2018	MILLERV
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	03/07/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	03/07/2018	MILLERV
Sulfate	EPA 300.0	200	mg/L	5		03/07/2018	MILLERV
Total Dissolved Solids	SM 2540 C	380	mg/L	25		03/06/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	21	mg/L	20		03/01/2018	DBAKER
Bicarbonate	SM2320B 251C	26	mg/L	25		03/01/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		03/01/2018	DBAKER
Conductivity	SM2320B 251C	530	umhos/cm	10		03/01/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		03/01/2018	DBAKER
pH	SM2320B 251C	6.83	Unit	2		03/01/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	25.8	C	15		03/01/2018	DBAKER
Color	SM 2120 B	<5	CU	5		02/28/2018	DBAKER
Turbidity	SM 2130 B	1.6	NTU	0.40		02/28/2018	SRICE

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00001052**	
Date/Time Collected	02/28/2018	11:40
Date/Time Received:	02/28/2018	14:26
Date/Time Reported:	03/13/2018	16:52

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2_
Sample Collection Point: MWPC2_20180228
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	47	ug/L	2		03/02/2018	GBREWSTER
Routine Domestic							
Barium	EPA 200.7	0.04	mg/L	0.02	2	03/05/2018	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		03/05/2018	SRICE
Hardness	EPA 200.7	2000	mg/L	33		03/05/2018	SRICE
Magnesium	EPA 200.7	250	mg/L	5		03/05/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		03/05/2018	SRICE
Silica	EPA 200.7	120	mg/L	1		03/05/2018	SRICE
Silicon	EPA 200.7	58	mg/L	0.5		03/05/2018	SRICE
Sodium	EPA 200.7	55	mg/L	5		03/05/2018	SRICE
Chloride	EPA 300.0	12	mg/L	5		03/07/2018	MILLERV
Fluoride	EPA 300.0	3	mg/L	0.1	4	03/07/2018	MILLERV

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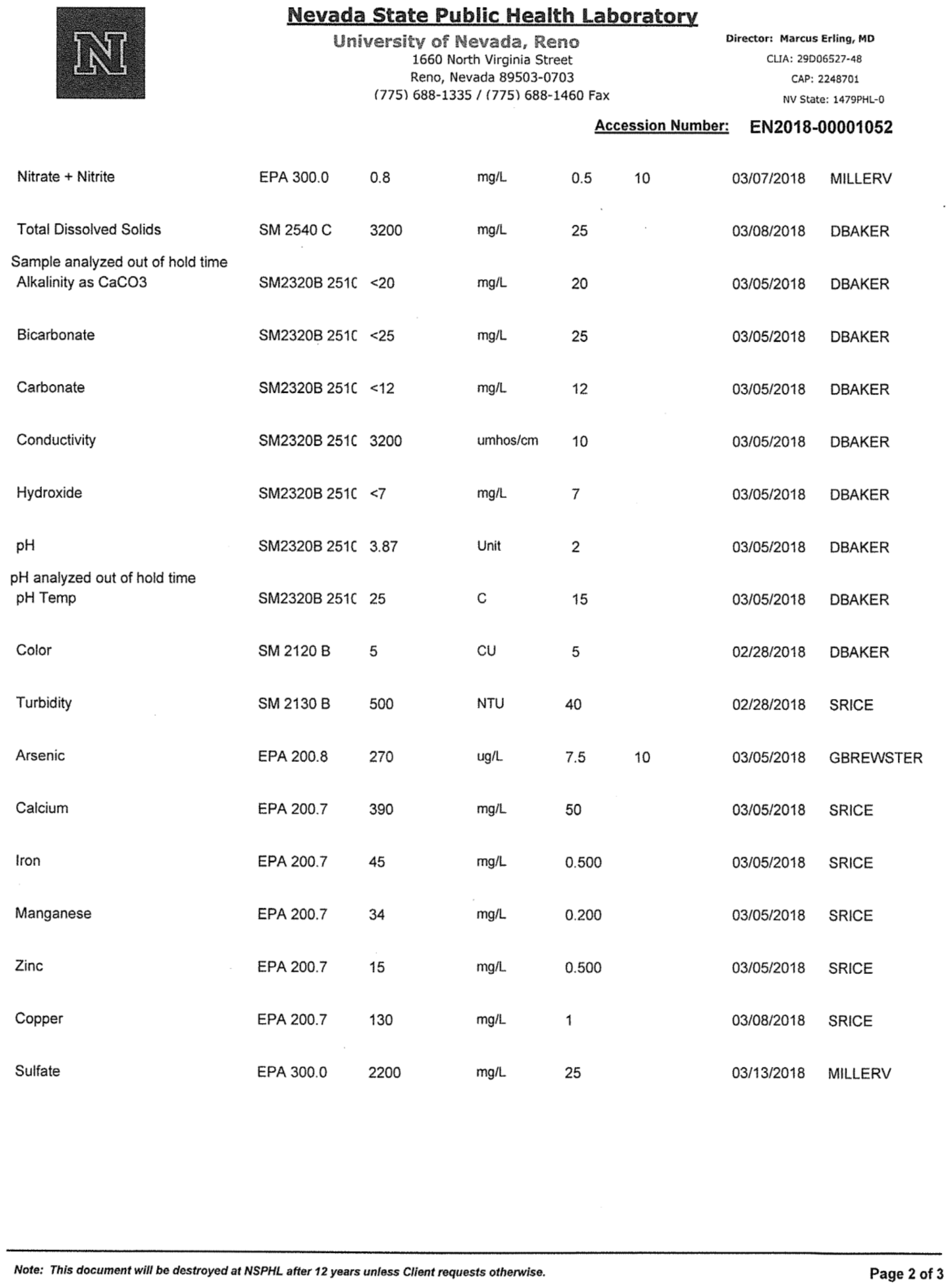
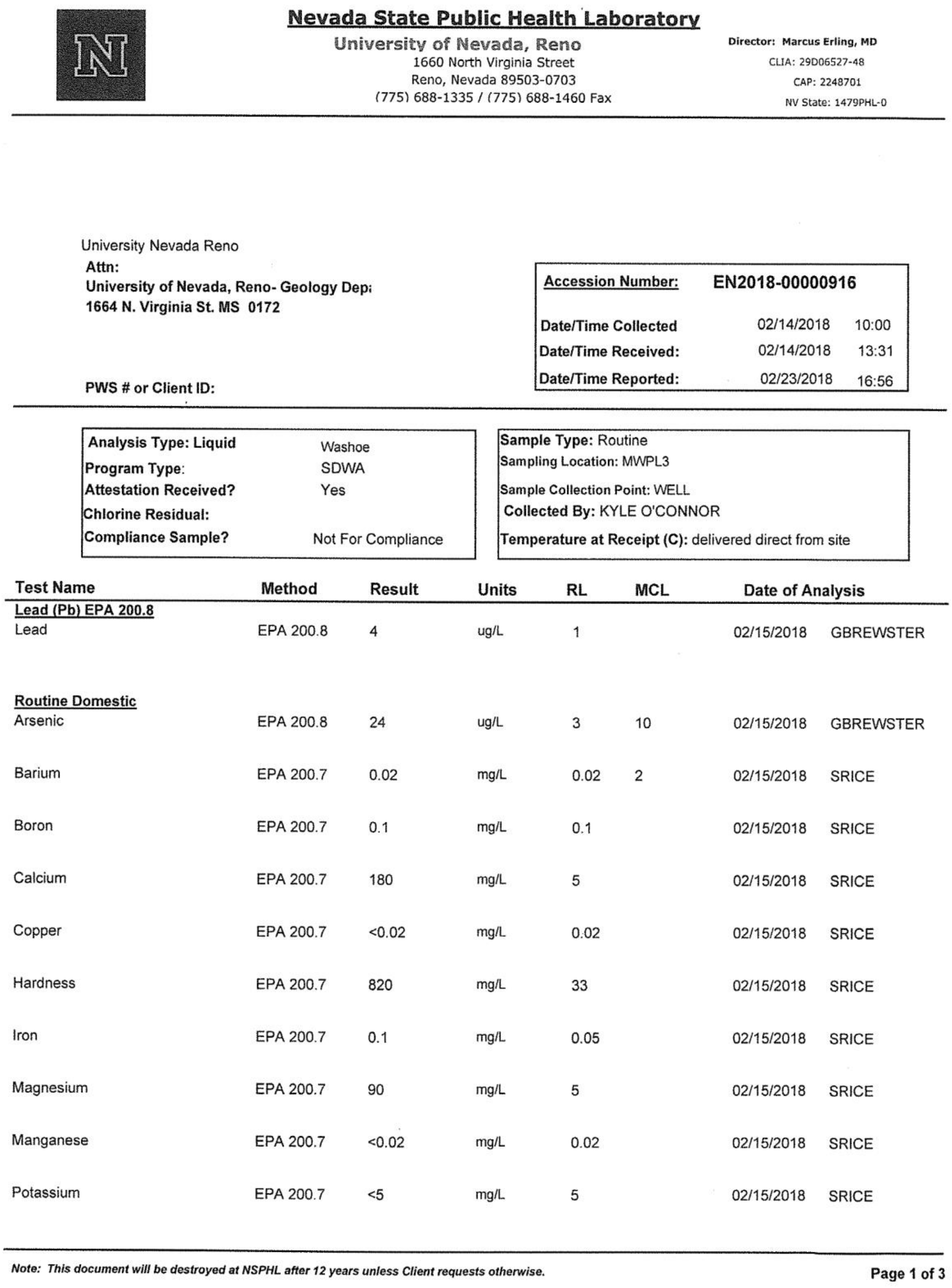


Accession Number: **EN2018-00001052**

Nitrate + Nitrite	EPA 300.0	0.8	mg/L	0.5	10	03/07/2018	MILLERV
Total Dissolved Solids	SM 2540 C	3200	mg/L	25		03/08/2018	DBAKER
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		03/05/2018	DBAKER
Bicarbonate	SM2320B 251C	<25	mg/L	25		03/05/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		03/05/2018	DBAKER
Conductivity	SM2320B 251C	3200	umhos/cm	10		03/05/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		03/05/2018	DBAKER
pH	SM2320B 251C	3.87	Unit	2		03/05/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	25	C	15		03/05/2018	DBAKER
Color	SM 2120 B	5	CU	5		02/28/2018	DBAKER
Turbidity	SM 2130 B	500	NTU	40		02/28/2018	SRICE
Arsenic	EPA 200.8	270	ug/L	7.5	10	03/05/2018	GBREWSTER
Calcium	EPA 200.7	390	mg/L	50		03/05/2018	SRICE
Iron	EPA 200.7	45	mg/L	0.500		03/05/2018	SRICE
Manganese	EPA 200.7	34	mg/L	0.200		03/05/2018	SRICE
Zinc	EPA 200.7	15	mg/L	0.500		03/05/2018	SRICE
Copper	EPA 200.7	130	mg/L	1		03/08/2018	SRICE
Sulfate	EPA 300.0	2200	mg/L	25		03/13/2018	MILLERV



Nevada State Public Health Laboratory

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
Attn:
University of Nevada, Reno- Geology Dep;
1664 N. Virginia St. MS 0172

PWS # or Client ID:

Accession Number:	**EN2018-00000916**	
Date/Time Collected	02/14/2018	10:00
Date/Time Received:	02/14/2018	13:31
Date/Time Reported:	02/23/2018	16:56

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPL3
Sample Collection Point: WELL
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	4	ug/L	1		02/15/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	24	ug/L	3	10	02/15/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	02/15/2018	SRICE
Boron	EPA 200.7	0.1	mg/L	0.1		02/15/2018	SRICE
Calcium	EPA 200.7	180	mg/L	5		02/15/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/15/2018	SRICE
Hardness	EPA 200.7	820	mg/L	33		02/15/2018	SRICE
Iron	EPA 200.7	0.1	mg/L	0.05		02/15/2018	SRICE
Magnesium	EPA 200.7	90	mg/L	5		02/15/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		02/15/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/15/2018	SRICE

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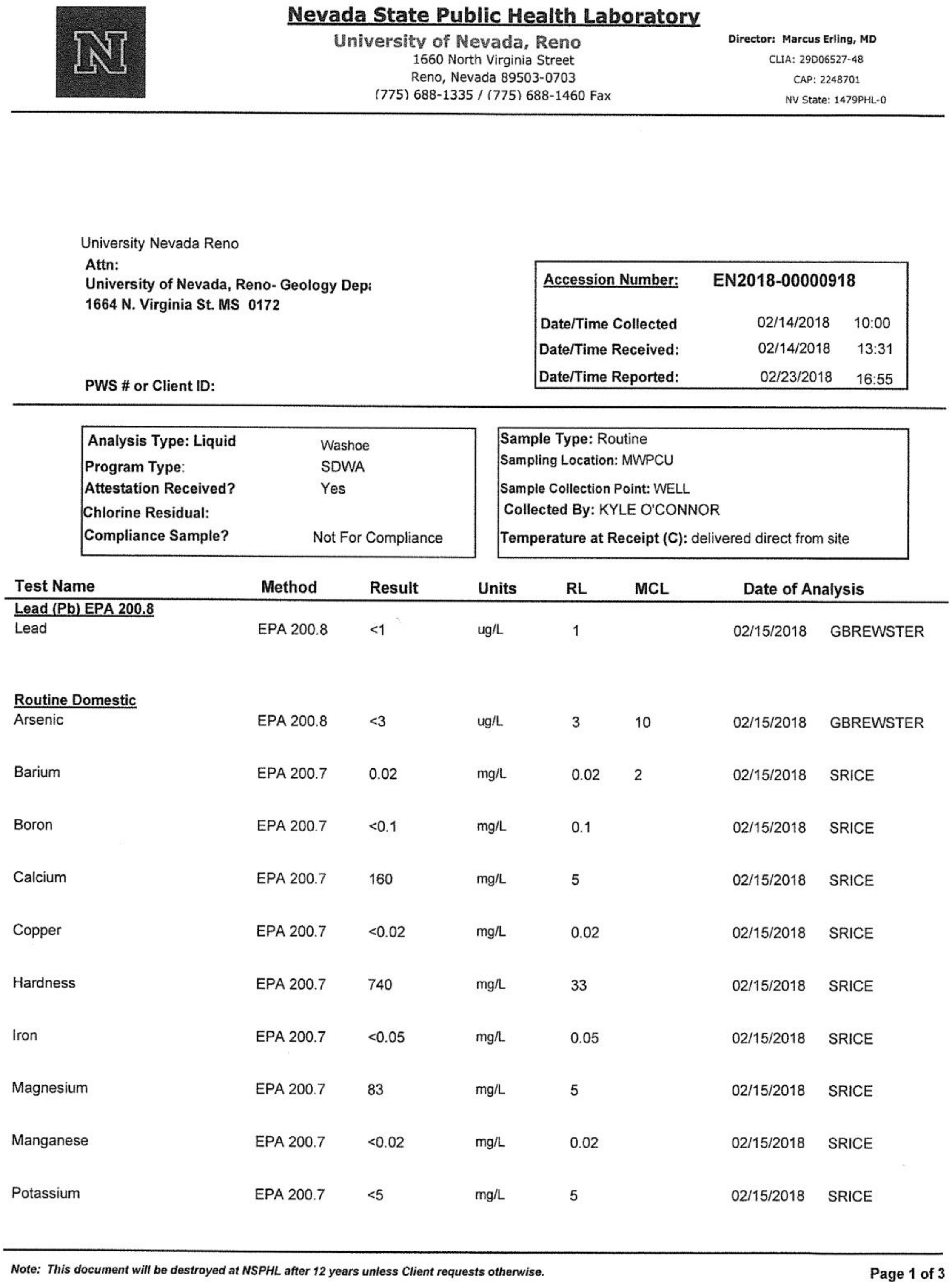
Accession Number: **EN2018-00000916**

Silica	EPA 200.7	58	mg/L	1		02/15/2018	SRICE
Silicon	EPA 200.7	27	mg/L	0.5		02/15/2018	SRICE
Sodium	EPA 200.7	72	mg/L	5		02/15/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/15/2018	SRICE
Chloride	EPA 300.0	21	mg/L	5		02/16/2018	MILLERV
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	02/16/2018	MILLERV
Nitrate + Nitrite Analyzed 02/23/18	EPA 300.0	<0.5	mg/L	0.5	10	02/16/2018	MILLERV
Sulfate	EPA 300.0	890	mg/L	5		02/16/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1500	mg/L	25		02/15/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	89	mg/L	20		02/15/2018	DBAKER
Bicarbonate	SM2320B 251C	110	mg/L	25		02/15/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		02/15/2018	DBAKER
Conductivity	SM2320B 251C	1800	umhos/cm	10		02/15/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		02/15/2018	DBAKER
pH pH analyzed out of hold time	SM2320B 251C	7.01	Unit	2		02/15/2018	DBAKER
pH Temp	SM2320B 251C	24.3	C	15		02/15/2018	DBAKER
Color	SM 2120 B	<5	CU	5		02/14/2018	DBAKER
Turbidity	SM 2130 B	2.9	NTU	0.40		02/15/2018	SRICE



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CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
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PWS # or Client ID:

Accession Number: **EN2018-00000918**

Date/Time Collected 02/14/2018 10:00
Date/Time Received: 02/14/2018 13:31
Date/Time Reported: 02/23/2018 16:55

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPCU
Sample Collection Point: WELL
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<1	ug/L	1		02/15/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	02/15/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	02/15/2018	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		02/15/2018	SRICE
Calcium	EPA 200.7	160	mg/L	5		02/15/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/15/2018	SRICE
Hardness	EPA 200.7	740	mg/L	33		02/15/2018	SRICE
Iron	EPA 200.7	<0.05	mg/L	0.05		02/15/2018	SRICE
Magnesium	EPA 200.7	83	mg/L	5		02/15/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		02/15/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/15/2018	SRICE

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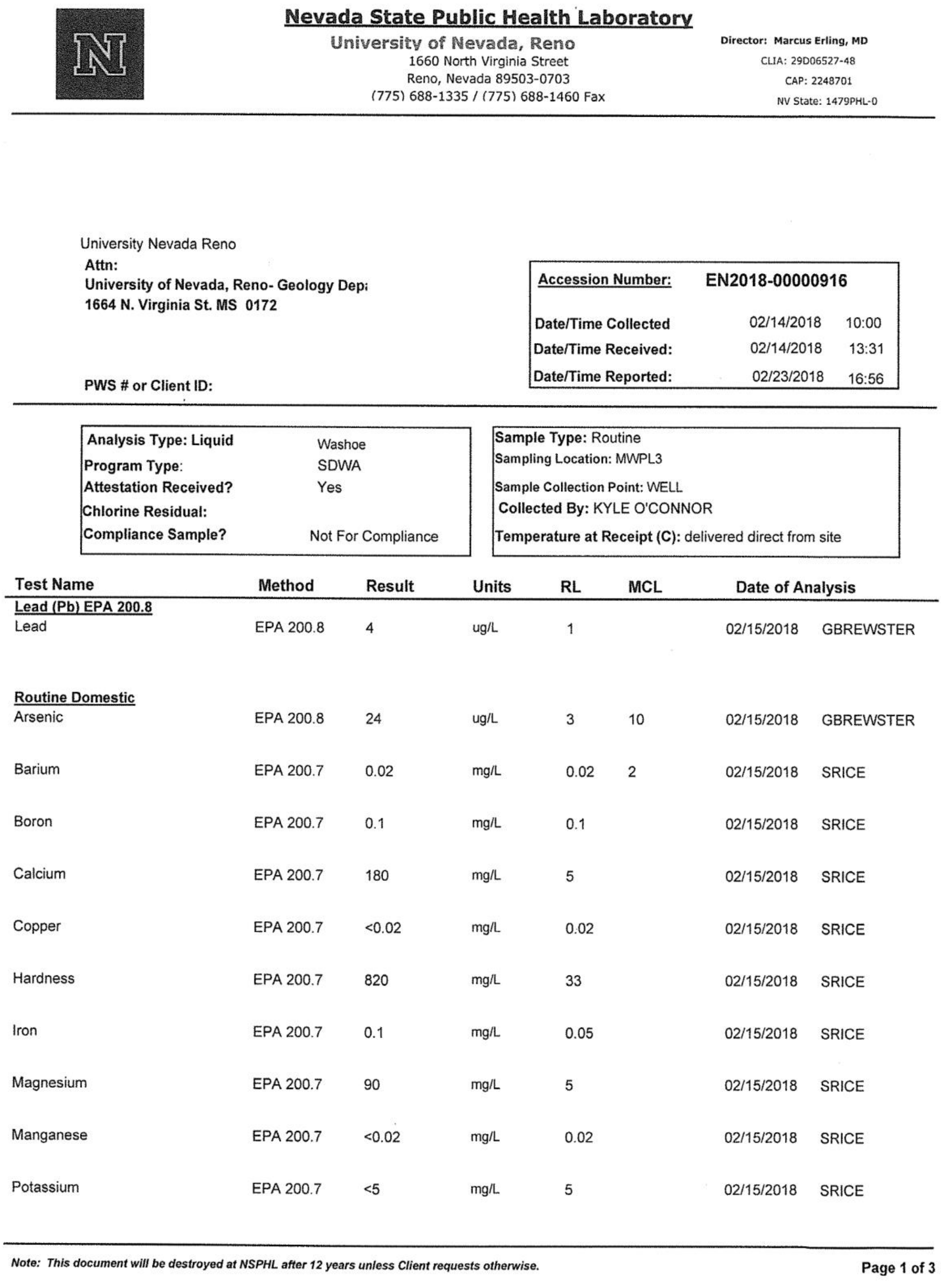
Silica	EPA 200.7	53	mg/L	1		02/15/2018	SRICE
Silicon	EPA 200.7	25	mg/L	0.5		02/15/2018	SRICE
Sodium	EPA 200.7	70	mg/L	5		02/15/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/15/2018	SRICE
Chloride	EPA 300.0	19	mg/L	5		02/16/2018	MILLERV
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	02/16/2018	MILLERV
Nitrate + Nitrite Analyzed 02/23/18	EPA 300.0	0.6	mg/L	0.5	10	02/16/2018	MILLERV
Sulfate	EPA 300.0	810	mg/L	5		02/16/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		02/15/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	39	mg/L	20		02/15/2018	DBAKER
Bicarbonate	SM2320B 251C	47	mg/L	25		02/15/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		02/15/2018	DBAKER
Conductivity	SM2320B 251C	1600	umhos/cm	10		02/15/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		02/15/2018	DBAKER
pH pH analyzed out of hold time	SM2320B 251C	7.01	Unit	2		02/15/2018	DBAKER
pH Temp	SM2320B 251C	24.2	C	15		02/15/2018	DBAKER
Color	SM 2120 B	<5	CU	5		02/14/2018	DBAKER
Turbidity	SM 2130 B	0.4	NTU	0.40		02/15/2018	SRICE



Nevada State Public Health Laboratory

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CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
Attn:
University of Nevada, Reno- Geology Dep
1664 N. Virginia St. MS 0172

PWS # or Client ID:

Accession Number:	**EN2018-00000916**	
Date/Time Collected	02/14/2018	10:00
Date/Time Received:	02/14/2018	13:31
Date/Time Reported:	02/23/2018	16:56

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPL3
Sample Collection Point: WELL
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	4	ug/L	1		02/15/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	24	ug/L	3	10	02/15/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	02/15/2018	SRICE
Boron	EPA 200.7	0.1	mg/L	0.1		02/15/2018	SRICE
Calcium	EPA 200.7	180	mg/L	5		02/15/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		02/15/2018	SRICE
Hardness	EPA 200.7	820	mg/L	33		02/15/2018	SRICE
Iron	EPA 200.7	0.1	mg/L	0.05		02/15/2018	SRICE
Magnesium	EPA 200.7	90	mg/L	5		02/15/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		02/15/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		02/15/2018	SRICE

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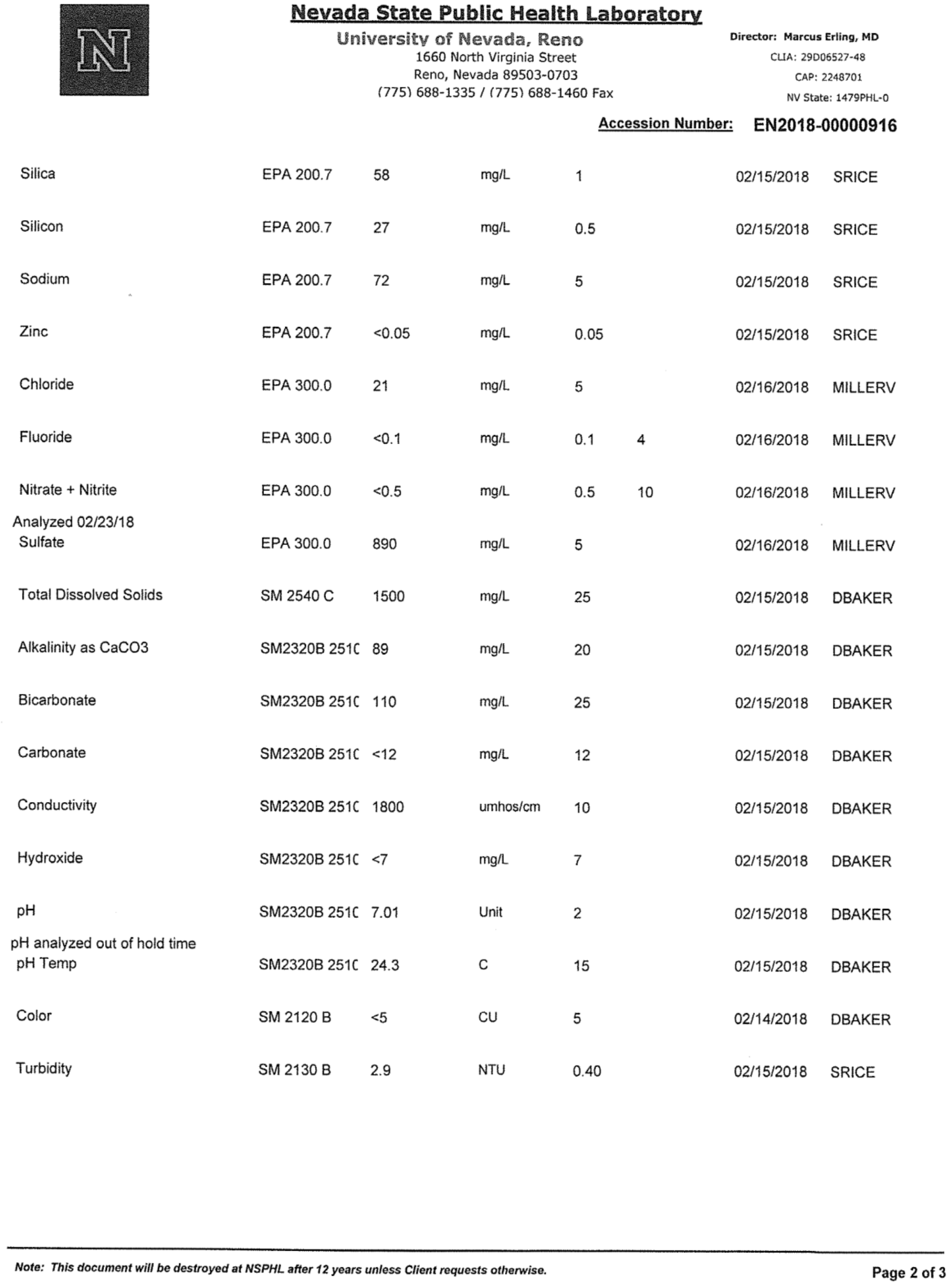

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2018-00000916**

Silica	EPA 200.7	58	mg/L	1		02/15/2018	SRICE
Silicon	EPA 200.7	27	mg/L	0.5		02/15/2018	SRICE
Sodium	EPA 200.7	72	mg/L	5		02/15/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		02/15/2018	SRICE
Chloride	EPA 300.0	21	mg/L	5		02/16/2018	MILLERV
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	02/16/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	02/16/2018	MILLERV
Analyzed 02/23/18							
Sulfate	EPA 300.0	890	mg/L	5		02/16/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1500	mg/L	25		02/15/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251(	89	mg/L	20		02/15/2018	DBAKER
Bicarbonate	SM2320B 251(	110	mg/L	25		02/15/2018	DBAKER
Carbonate	SM2320B 251(	<12	mg/L	12		02/15/2018	DBAKER
Conductivity	SM2320B 251(	1800	umhos/cm	10		02/15/2018	DBAKER
Hydroxide	SM2320B 251(	<7	mg/L	7		02/15/2018	DBAKER
pH	SM2320B 251(	7.01	Unit	2		02/15/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251(	24.3	C	15		02/15/2018	DBAKER
Color	SM 2120 B	<5	CU	5		02/14/2018	DBAKER
Turbidity	SM 2130 B	2.9	NTU	0.40		02/15/2018	SRICE

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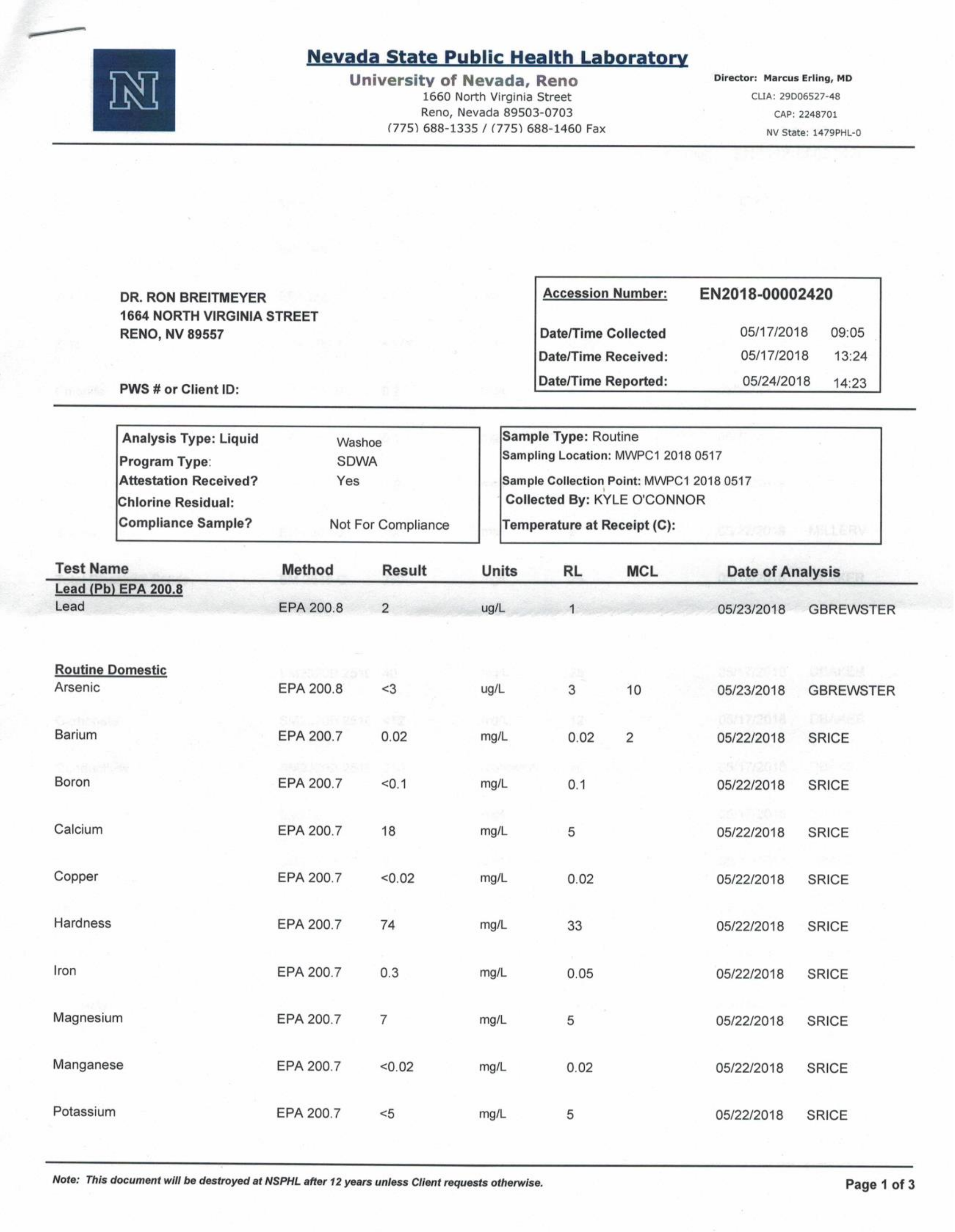
May 2018 Results



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CAP: 2248701
NV State: 1479PHL-0

DR. RON BREITMEYER
1664 NORTH VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00002420**	
Date/Time Collected	05/17/2018	09:05
Date/Time Received:	05/17/2018	13:24
Date/Time Reported:	05/24/2018	14:23

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1 2018 0517
Sample Collection Point: MWPC1 2018 0517
Collected By: KYLE O'CONNOR
Temperature at Receipt (C):

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	2	ug/L	1		05/23/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	05/23/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	05/22/2018	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		05/22/2018	SRICE
Calcium	EPA 200.7	18	mg/L	5		05/22/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		05/22/2018	SRICE
Hardness	EPA 200.7	74	mg/L	33		05/22/2018	SRICE
Iron	EPA 200.7	0.3	mg/L	0.05		05/22/2018	SRICE
Magnesium	EPA 200.7	7	mg/L	5		05/22/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		05/22/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		05/22/2018	SRICE

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2018-00002420**

Silica	EPA 200.7	49	mg/L	1		05/22/2018	SRICE
Silicon	EPA 200.7	23	mg/L	0.5		05/22/2018	SRICE
Sodium	EPA 200.7	27	mg/L	5		05/22/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		05/22/2018	SRICE
Chloride	EPA 300.0	8.2	mg/L	5		05/22/2018	MILLERV
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	05/22/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	0.8	mg/L	0.5	10	05/22/2018	MILLERV
Sulfate	EPA 300.0	100	mg/L	5		05/22/2018	MILLERV
Total Dissolved Solids	SM 2540 C	250	mg/L	25		05/18/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	33	mg/L	20		05/17/2018	DBAKER
Bicarbonate	SM2320B 251C	40	mg/L	25		05/17/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		05/17/2018	DBAKER
Conductivity	SM2320B 251C	310	umhos/cm	10		05/17/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		05/17/2018	DBAKER
pH	SM2320B 251C	7.15	Unit	2		05/17/2018	DBAKER
pH Temp	SM2320B 251C	24.3	C	15		05/17/2018	DBAKER
Color	SM 2120 B	10	CU	5		05/18/2018	DBAKER
Turbidity	SM 2130 B	6.1	NTU	0.40		05/18/2018	SRICE

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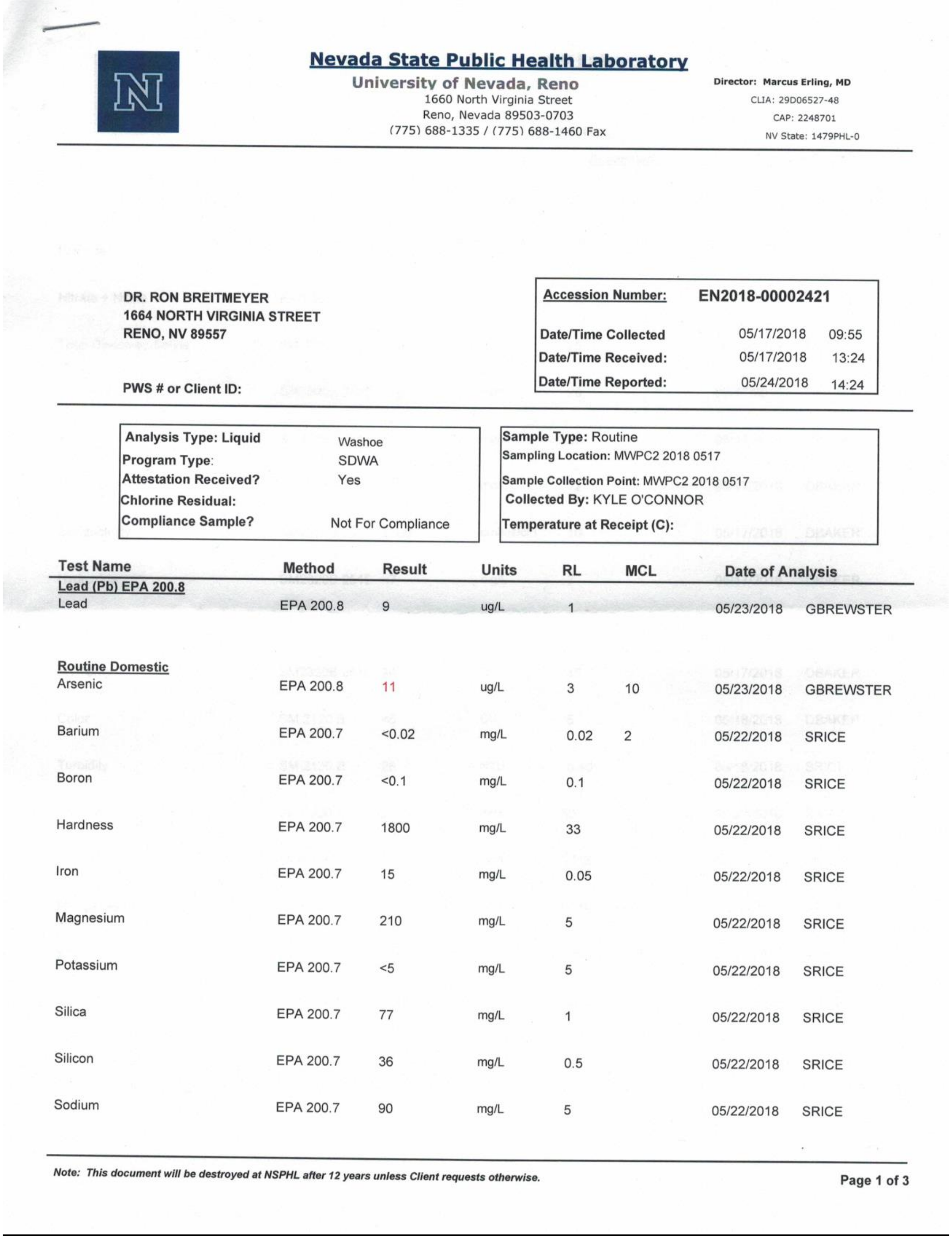

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(775) 688-1335 / (775) 688-1460 Fax

Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

DR. RON BREITMEYER
1664 NORTH VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00002421**	
Date/Time Collected	05/17/2018	09:55
Date/Time Received:	05/17/2018	13:24
Date/Time Reported:	05/24/2018	14:24

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2 2018 0517
Sample Collection Point: MWPC2 2018 0517
Collected By: KYLE O'CONNOR
Temperature at Receipt (C):

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	9	ug/L	1		05/23/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	11	ug/L	3	10	05/23/2018	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	05/22/2018	SRICE
Boron	EPA 200.7	<0.1	mg/L	0.1		05/22/2018	SRICE
Hardness	EPA 200.7	1800	mg/L	33		05/22/2018	SRICE
Iron	EPA 200.7	15	mg/L	0.05		05/22/2018	SRICE
Magnesium	EPA 200.7	210	mg/L	5		05/22/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		05/22/2018	SRICE
Silica	EPA 200.7	77	mg/L	1		05/22/2018	SRICE
Silicon	EPA 200.7	36	mg/L	0.5		05/22/2018	SRICE
Sodium	EPA 200.7	90	mg/L	5		05/22/2018	SRICE

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Nevada State Public Health Laboratory

University of Nevada, Reno
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Director: Marcus Erling, MD
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Accession Number: **EN2018-00002421**

Chloride	EPA 300.0	12	mg/L	5		05/22/2018	MILLERV
Fluoride	EPA 300.0	3	mg/L	0.1	4	05/22/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	05/22/2018	MILLERV
Total Dissolved Solids	SM 2540 C	3100	mg/L	25		05/18/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		05/17/2018	DBAKER
Bicarbonate	SM2320B 251C	<25	mg/L	25		05/17/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		05/17/2018	DBAKER
Conductivity	SM2320B 251C	3100	umhos/cm	10		05/17/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		05/17/2018	DBAKER
pH	SM2320B 251C	3.77	Unit	2		05/17/2018	DBAKER
pH Temp	SM2320B 251C	24	C	15		05/17/2018	DBAKER
Color	SM 2120 B	<5	CU	5		05/18/2018	DBAKER
Turbidity	SM 2130 B	28	NTU	0.40		05/18/2018	SRICE
Calcium	EPA 200.7	390	mg/L	50		05/22/2018	SRICE
Copper	EPA 200.7	16	mg/L	0.200		05/22/2018	SRICE
Manganese	EPA 200.7	18	mg/L	0.200		05/22/2018	SRICE
Zinc	EPA 200.7	8.6	mg/L	0.500		05/22/2018	SRICE
Sulfate	EPA 300.0	2100	mg/L	25		05/23/2018	MILLERV

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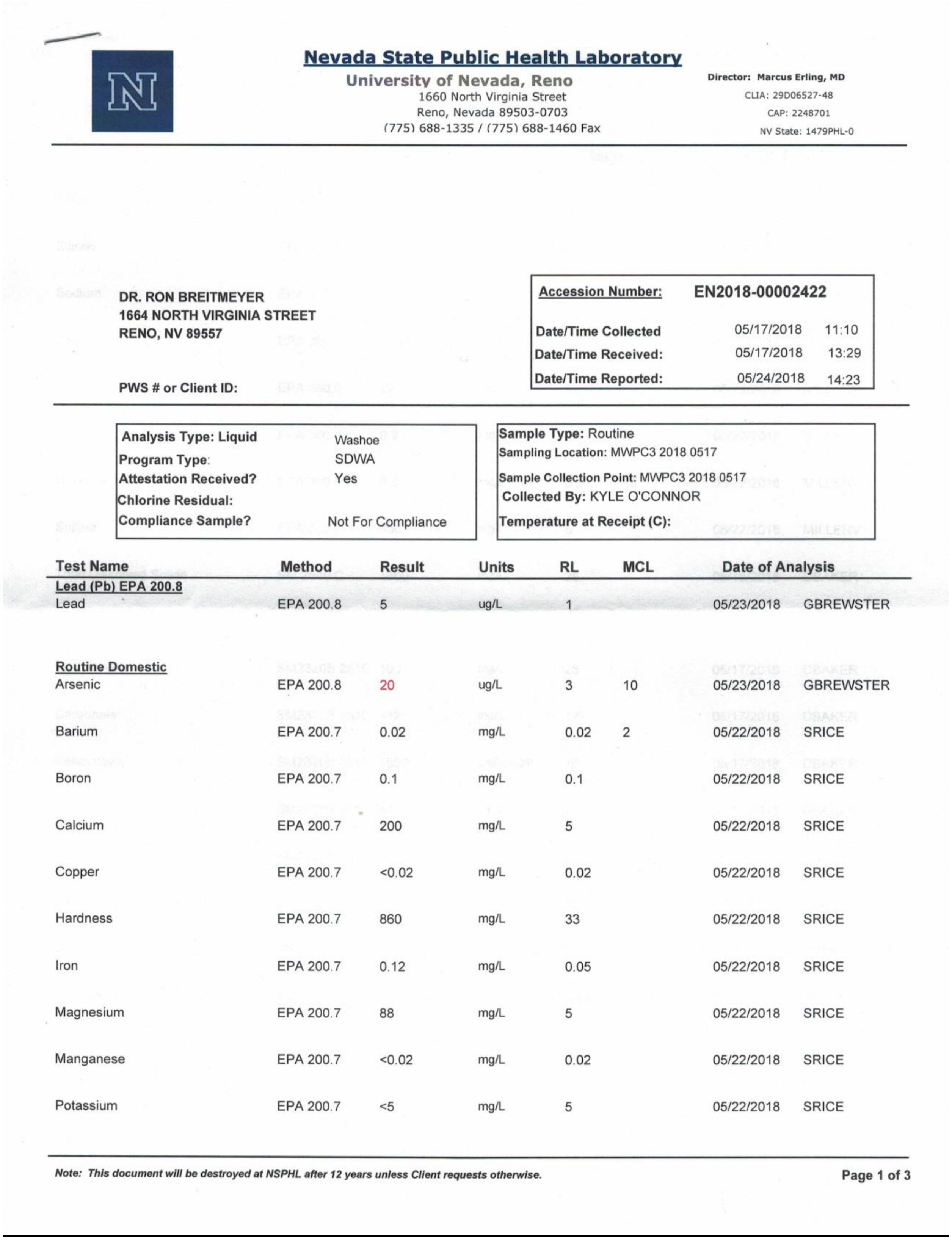

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NV State: 1479PHL-0

DR. RON BREITMEYER
1664 NORTH VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00002422**	
Date/Time Collected	05/17/2018	11:10
Date/Time Received:	05/17/2018	13:29
Date/Time Reported:	05/24/2018	14:23

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3 2018 0517
Sample Collection Point: MWPC3 2018 0517
Collected By: KYLE O'CONNOR
Temperature at Receipt (C):

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	5	ug/L	1		05/23/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	20	ug/L	3	10	05/23/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	05/22/2018	SRICE
Boron	EPA 200.7	0.1	mg/L	0.1		05/22/2018	SRICE
Calcium	EPA 200.7	200	mg/L	5		05/22/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		05/22/2018	SRICE
Hardness	EPA 200.7	860	mg/L	33		05/22/2018	SRICE
Iron	EPA 200.7	0.12	mg/L	0.05		05/22/2018	SRICE
Magnesium	EPA 200.7	88	mg/L	5		05/22/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		05/22/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		05/22/2018	SRICE

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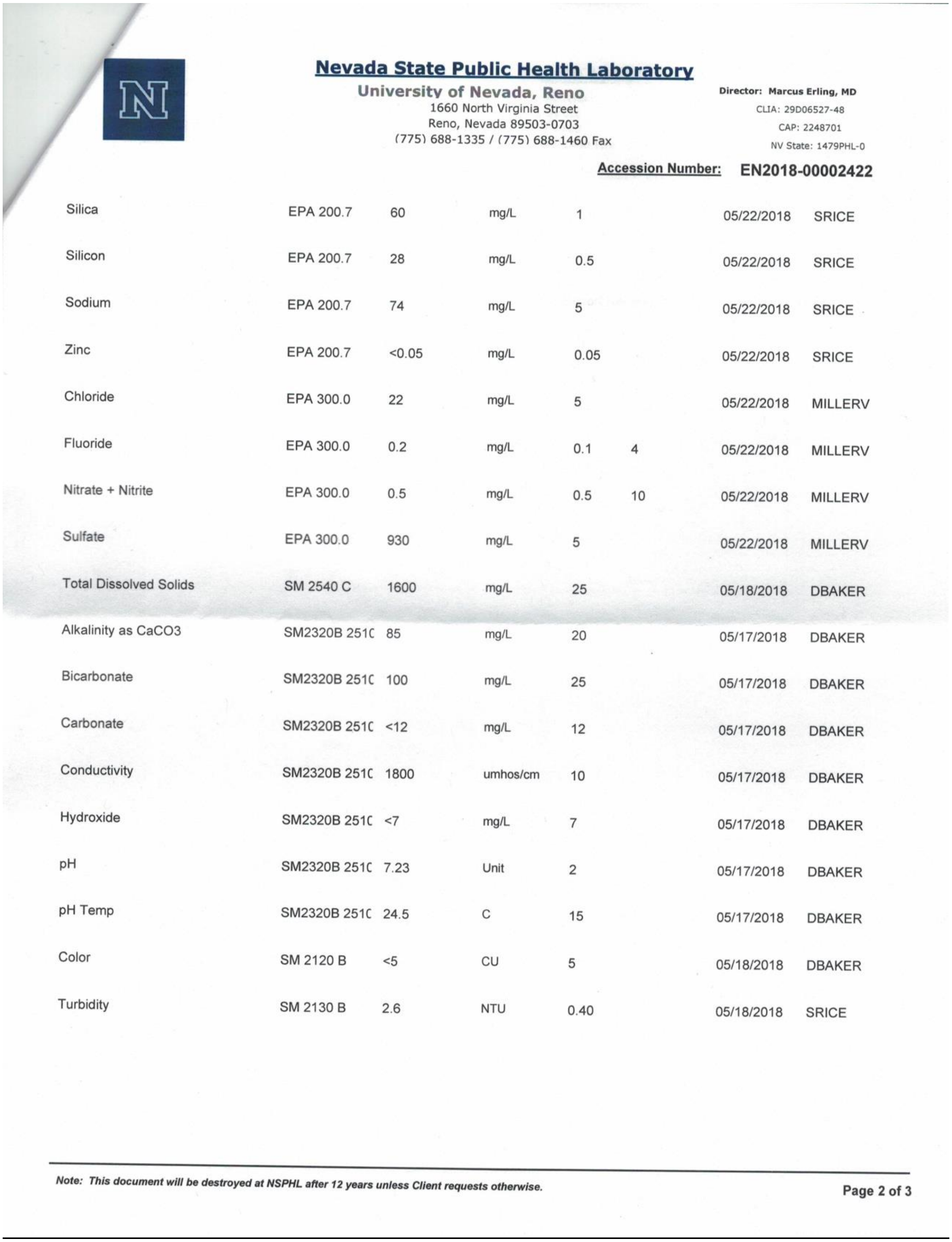

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CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2018-00002422**

Silica	EPA 200.7	60	mg/L	1		05/22/2018	SRICE
Silicon	EPA 200.7	28	mg/L	0.5		05/22/2018	SRICE
Sodium	EPA 200.7	74	mg/L	5		05/22/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		05/22/2018	SRICE
Chloride	EPA 300.0	22	mg/L	5		05/22/2018	MILLERV
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	05/22/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	0.5	mg/L	0.5	10	05/22/2018	MILLERV
Sulfate	EPA 300.0	930	mg/L	5		05/22/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1600	mg/L	25		05/18/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	85	mg/L	20		05/17/2018	DBAKER
Bicarbonate	SM2320B 251C	100	mg/L	25		05/17/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		05/17/2018	DBAKER
Conductivity	SM2320B 251C	1800	umhos/cm	10		05/17/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		05/17/2018	DBAKER
pH	SM2320B 251C	7.23	Unit	2		05/17/2018	DBAKER
pH Temp	SM2320B 251C	24.5	C	15		05/17/2018	DBAKER
Color	SM 2120 B	<5	CU	5		05/18/2018	DBAKER
Turbidity	SM 2130 B	2.6	NTU	0.40		05/18/2018	SRICE

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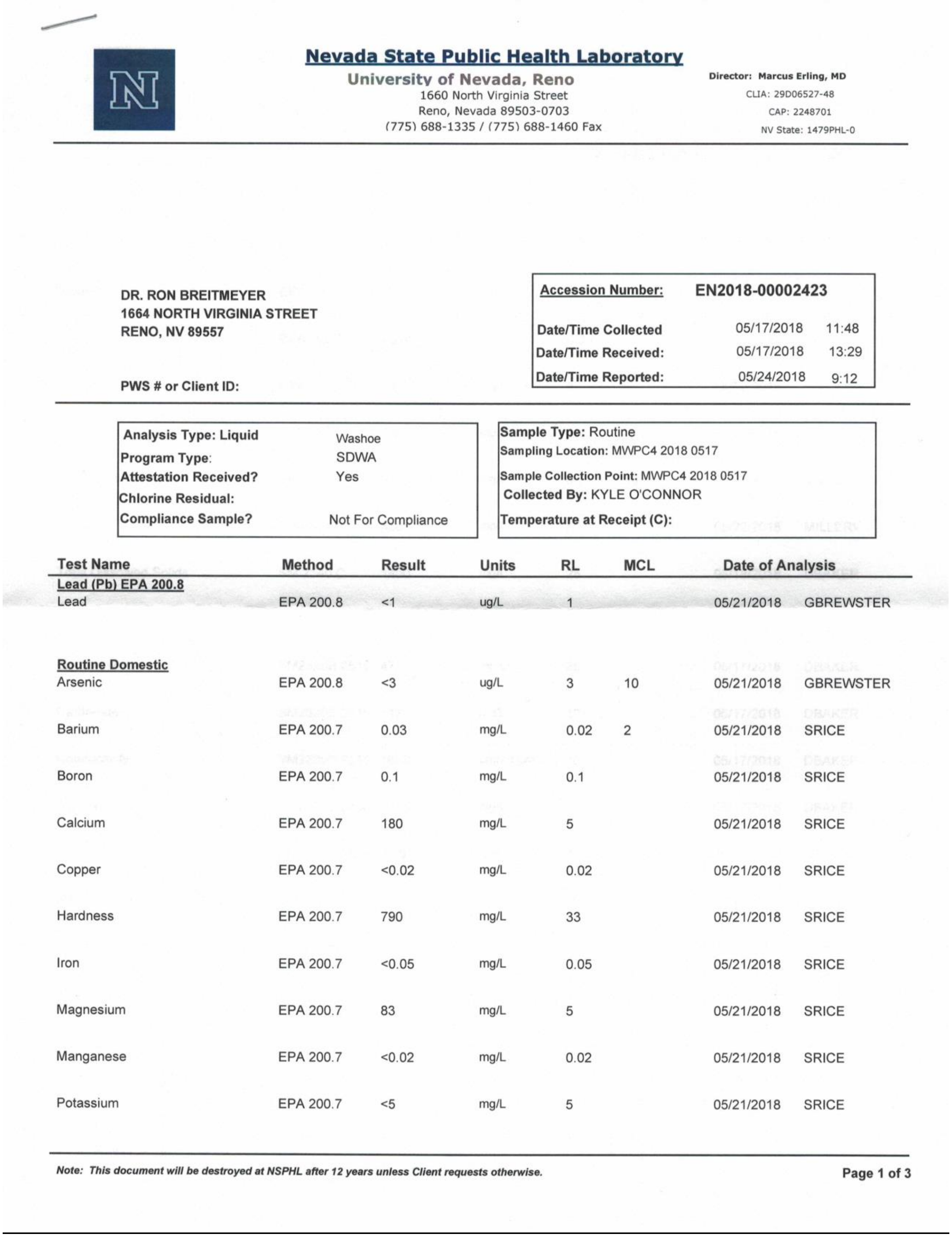

Nevada State Public Health Laboratory
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Director: Marcus Erling, MD
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CAP: 2248701
NV State: 1479PHL-0

DR. RON BREITMEYER
1664 NORTH VIRGINIA STREET
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00002423**	
Date/Time Collected	05/17/2018	11:48
Date/Time Received:	05/17/2018	13:29
Date/Time Reported:	05/24/2018	9:12

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4 2018 0517
Sample Collection Point: MWPC4 2018 0517
Collected By: KYLE O'CONNOR
Temperature at Receipt (C):

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<1	ug/L	1		05/21/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	05/21/2018	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	05/21/2018	SRICE
Boron	EPA 200.7	0.1	mg/L	0.1		05/21/2018	SRICE
Calcium	EPA 200.7	180	mg/L	5		05/21/2018	SRICE
Copper	EPA 200.7	<0.02	mg/L	0.02		05/21/2018	SRICE
Hardness	EPA 200.7	790	mg/L	33		05/21/2018	SRICE
Iron	EPA 200.7	<0.05	mg/L	0.05		05/21/2018	SRICE
Magnesium	EPA 200.7	83	mg/L	5		05/21/2018	SRICE
Manganese	EPA 200.7	<0.02	mg/L	0.02		05/21/2018	SRICE
Potassium	EPA 200.7	<5	mg/L	5		05/21/2018	SRICE

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2018-00002423**

Silica	EPA 200.7	53	mg/L	1		05/21/2018	SRICE
Silicon	EPA 200.7	25	mg/L	0.5		05/21/2018	SRICE
Sodium	EPA 200.7	75	mg/L	5		05/21/2018	SRICE
Zinc	EPA 200.7	<0.05	mg/L	0.05		05/21/2018	SRICE
Chloride	EPA 300.0	19	mg/L	5		05/22/2018	MILLERV
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	05/22/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	0.7	mg/L	0.5	10	05/22/2018	MILLERV
Sulfate	EPA 300.0	830	mg/L	5		05/22/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1400	mg/L	25		05/18/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	39	mg/L	20		05/17/2018	DBAKER
Bicarbonate	SM2320B 251C	47	mg/L	25		05/17/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		05/17/2018	DBAKER
Conductivity	SM2320B 251C	1600	umhos/cm	10		05/17/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		05/17/2018	DBAKER
pH	SM2320B 251C	7.19	Unit	2		05/17/2018	DBAKER
pH Temp	SM2320B 251C	24.9	C	15		05/17/2018	DBAKER
Color	SM 2120 B	<5	CU	5		05/18/2018	DBAKER
Turbidity	SM 2130 B	0.6	NTU	0.40		05/18/2018	SRICE

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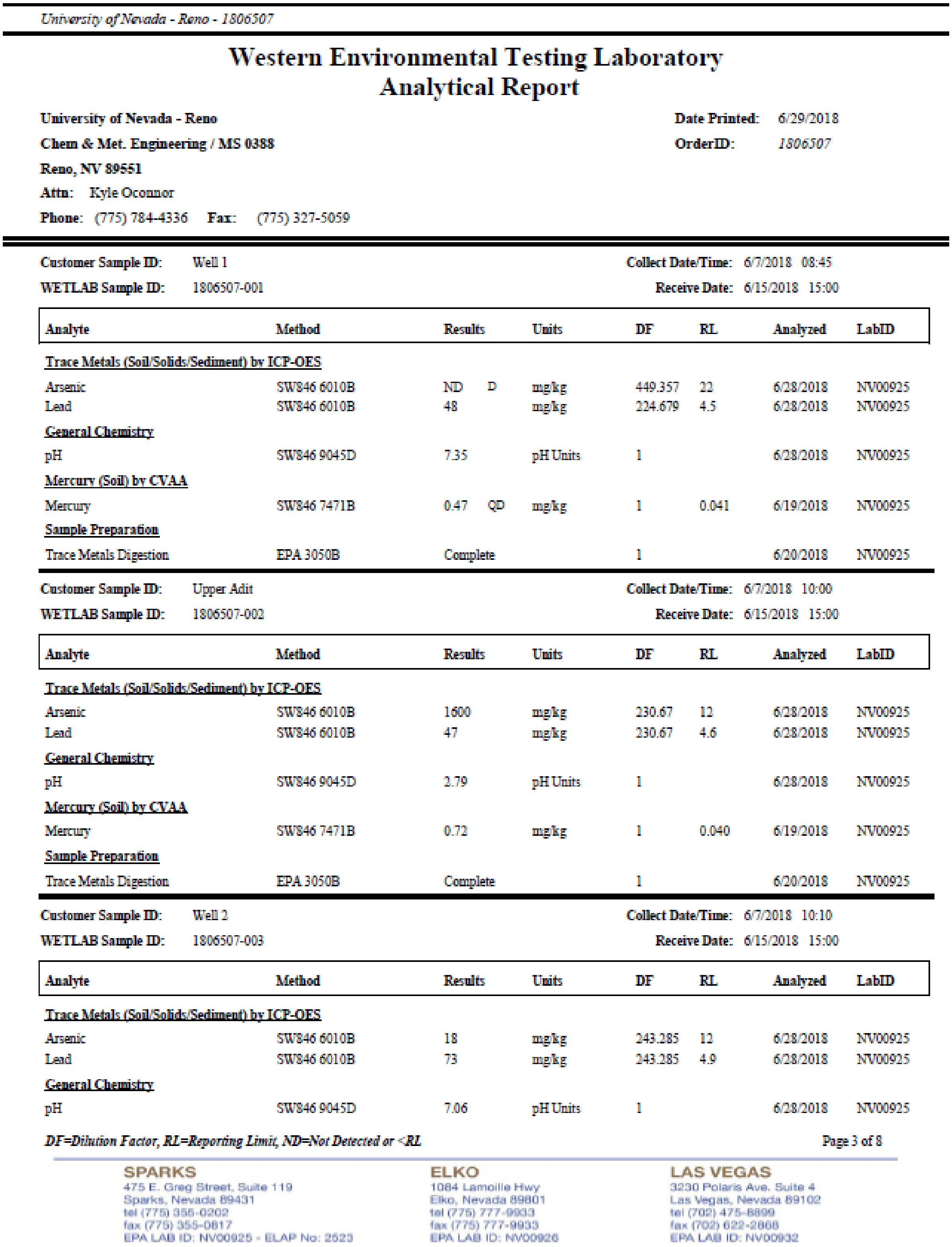
June 2018 Results



University of Nevada - Reno - 1806507

Western Environmental Testing Laboratory
Analytical Report

University of Nevada - Reno
Chem & Met. Engineering / MS 0388
Reno, NV 89551
Attn: Kyle Oconnor
Phone: (775) 784-4336 **Fax:** (775) 327-5059

Date Printed: 6/29/2018
OrderID: *1806507*

Customer Sample ID: Well 1 **Collect Date/Time:** 6/7/2018 08:45
WETLAB Sample ID: 1806507-001 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	ND D	mg/kg	449.357	22	6/28/2018	NV00925
Lead	SW846 6010B	48	mg/kg	224.679	4.5	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	7.35	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.47 QD	mg/kg	1	0.041	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: Upper Adit **Collect Date/Time:** 6/7/2018 10:00
WETLAB Sample ID: 1806507-002 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	1600	mg/kg	230.67	12	6/28/2018	NV00925
Lead	SW846 6010B	47	mg/kg	230.67	4.6	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	2.79	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.72	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: Well 2 **Collect Date/Time:** 6/7/2018 10:10
WETLAB Sample ID: 1806507-003 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	18	mg/kg	243.285	12	6/28/2018	NV00925
Lead	SW846 6010B	73	mg/kg	243.285	4.9	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	7.06	pH Units	1		6/28/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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SPARKS
475 E. Greg Street, Suite 119
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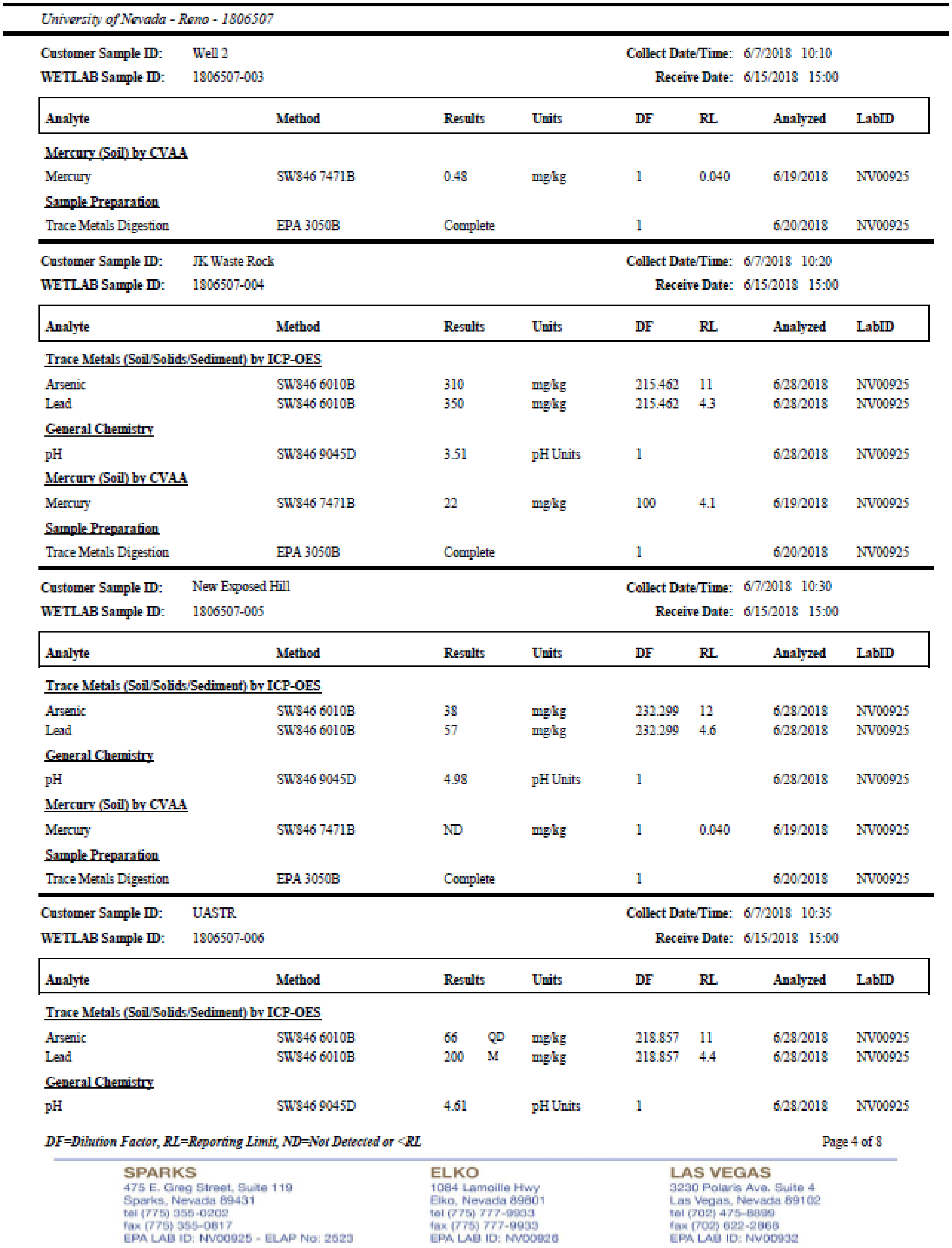
1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS
3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932



University of Nevada - Reno - 1806507

Customer Sample ID: Well 2 **Collect Date/Time:** 6/7/2018 10:10
WETLAB Sample ID: 1806507-003 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.48	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: JK Waste Rock **Collect Date/Time:** 6/7/2018 10:20
WETLAB Sample ID: 1806507-004 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	310	mg/kg	215.462	11	6/28/2018	NV00925
Lead	SW846 6010B	350	mg/kg	215.462	4.3	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	3.51	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	22	mg/kg	100	4.1	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: New Exposed Hill **Collect Date/Time:** 6/7/2018 10:30
WETLAB Sample ID: 1806507-005 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	38	mg/kg	232.299	12	6/28/2018	NV00925
Lead	SW846 6010B	57	mg/kg	232.299	4.6	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	4.98	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	ND	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: UASTR **Collect Date/Time:** 6/7/2018 10:35
WETLAB Sample ID: 1806507-006 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	66 QD	mg/kg	218.857	11	6/28/2018	NV00925
Lead	SW846 6010B	200 M	mg/kg	218.857	4.4	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	4.61	pH Units	1		6/28/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

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EPA LAB ID: NV00926

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3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Customer Sample ID: UASTR **Collect Date/Time:** 6/7/2018 10:35
WETLAB Sample ID: 1806507-006 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.14	mg/kg	1	0.041	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: DS-JK-1 **Collect Date/Time:** 6/7/2018 14:10
WETLAB Sample ID: 1806507-007 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	21	mg/kg	211.846	11	6/28/2018	NV00925
Lead	SW846 6010B	26	mg/kg	211.846	4.2	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	6.05	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.85	mg/kg	1	0.041	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

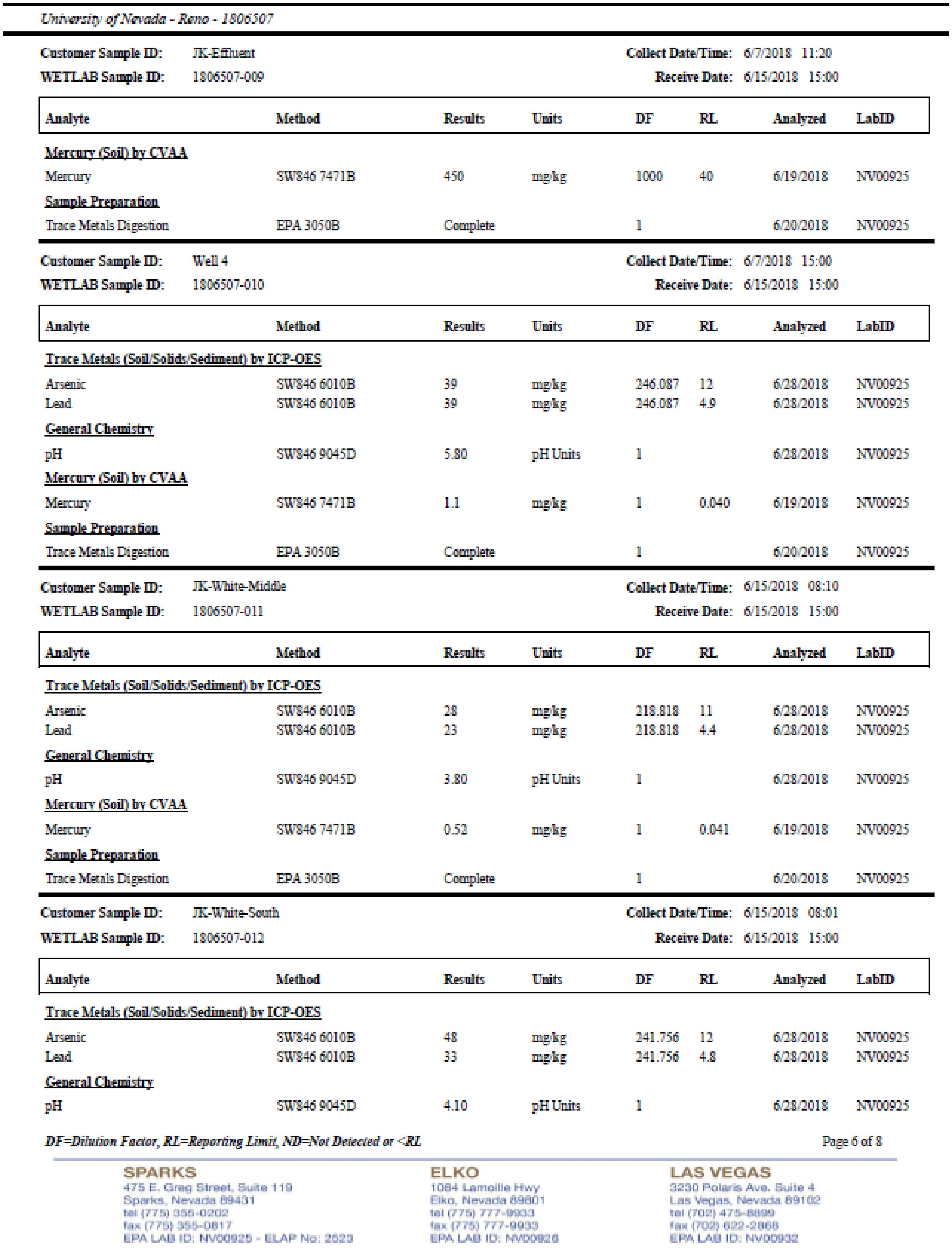
Customer Sample ID: Flume 1 **Collect Date/Time:** 6/7/2018 13:05
WETLAB Sample ID: 1806507-008 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	22	mg/kg	201.304	10	6/28/2018	NV00925
Lead	SW846 6010B	27	mg/kg	201.304	4.0	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	4.62	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.45	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: JK-Effluent **Collect Date/Time:** 6/7/2018 11:20
WETLAB Sample ID: 1806507-009 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	200	mg/kg	232.234	12	6/28/2018	NV00925
Lead	SW846 6010B	78	mg/kg	232.234	4.6	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	3.05	pH Units	1		6/28/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL



University of Nevada - Reno - 1806507

Customer Sample ID: JK-Effluent **Collect Date/Time:** 6/7/2018 11:20
WETLAB Sample ID: 1806507-009 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	450	mg/kg	1000	40	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: Well 4 **Collect Date/Time:** 6/7/2018 15:00
WETLAB Sample ID: 1806507-010 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	39	mg/kg	246.087	12	6/28/2018	NV00925
Lead	SW846 6010B	39	mg/kg	246.087	4.9	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	5.80	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	1.1	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: JK-White-Middle **Collect Date/Time:** 6/15/2018 08:10
WETLAB Sample ID: 1806507-011 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	28	mg/kg	218.818	11	6/28/2018	NV00925
Lead	SW846 6010B	23	mg/kg	218.818	4.4	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	3.80	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.52	mg/kg	1	0.041	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: JK-White-South **Collect Date/Time:** 6/15/2018 08:01
WETLAB Sample ID: 1806507-012 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	48	mg/kg	241.756	12	6/28/2018	NV00925
Lead	SW846 6010B	33	mg/kg	241.756	4.8	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	4.10	pH Units	1		6/28/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

Page 6 of 8

SPARKS
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fax (775) 355-0817
EPA LAB ID: NV00925 - ELAP No: 2523

ELKO
1084 Lamoille Hwy
Elko, Nevada 89801
tel (775) 777-9933
fax (775) 777-9933
EPA LAB ID: NV00926

LAS VEGAS
3230 Polaris Ave. Suite 4
Las Vegas, Nevada 89102
tel (702) 475-8899
fax (702) 622-2868
EPA LAB ID: NV00932

Customer Sample ID: JK-White-South **Collect Date/Time:** 6/15/2018 08:01
WETLAB Sample ID: 1806507-012 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.96	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

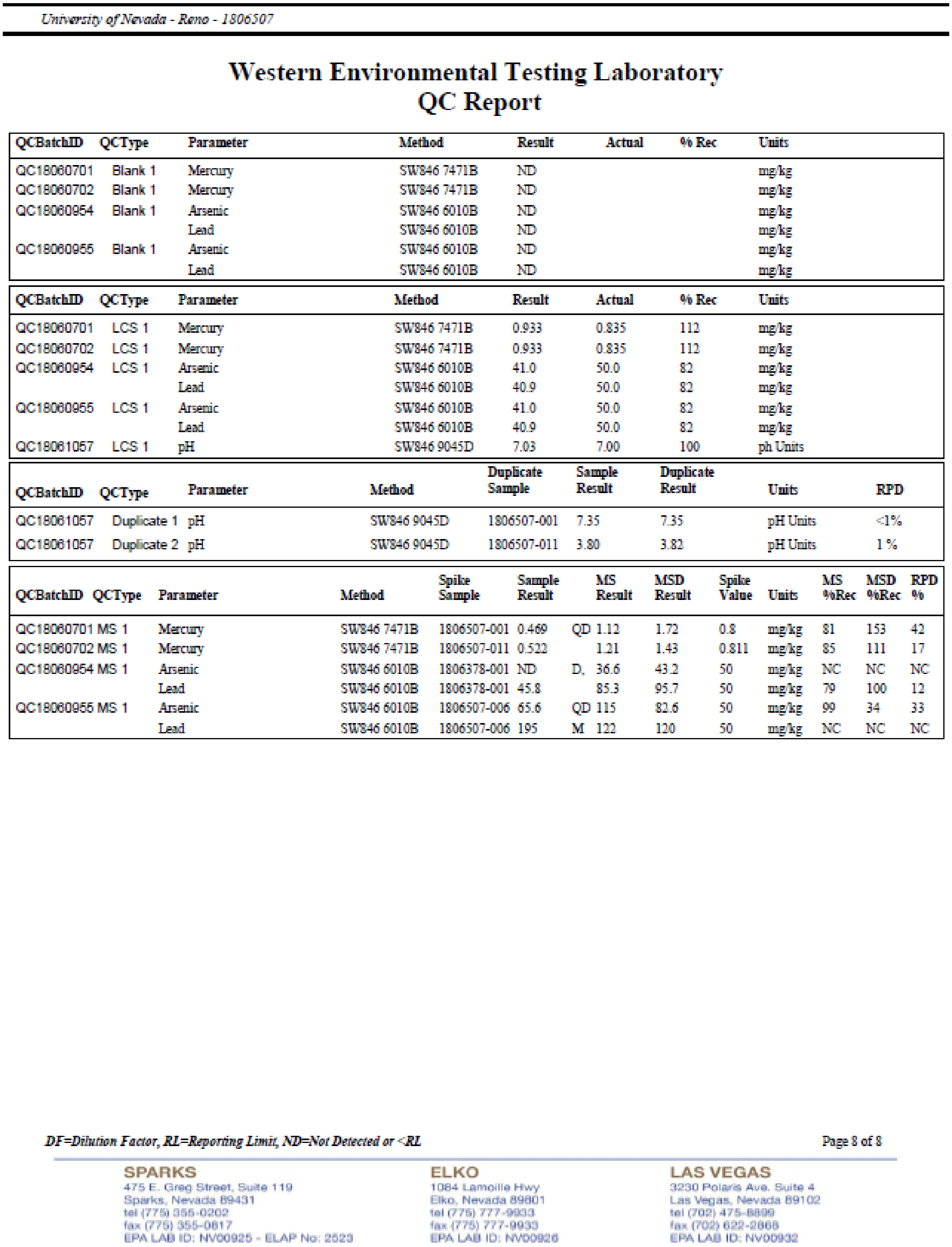
Customer Sample ID: JK-White-West **Collect Date/Time:** 6/15/2018 08:18
WETLAB Sample ID: 1806507-013 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	51	mg/kg	226.922	11	6/28/2018	NV00925
Lead	SW846 6010B	40	mg/kg	226.922	4.5	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	3.35	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.59	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

Customer Sample ID: JK-White-North **Collect Date/Time:** 6/15/2018 08:24
WETLAB Sample ID: 1806507-014 **Receive Date:** 6/15/2018 15:00

Analyte	Method	Results	Units	DF	RL	Analyzed	LabID
Trace Metals (Soil/Solids/Sediment) by ICP-OES							
Arsenic	SW846 6010B	47	mg/kg	232.385	12	6/28/2018	NV00925
Lead	SW846 6010B	28	mg/kg	232.385	4.6	6/28/2018	NV00925
General Chemistry							
pH	SW846 9045D	3.40	pH Units	1		6/28/2018	NV00925
Mercury (Soil) by CVAA							
Mercury	SW846 7471B	0.67	mg/kg	1	0.040	6/19/2018	NV00925
Sample Preparation							
Trace Metals Digestion	EPA 3050B	Complete		1		6/20/2018	NV00925

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL



Western Environmental Testing Laboratory
QC Report

QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18060701	Blank 1	Mercury	SW846 7471B	ND			mg/kg
QC18060702	Blank 1	Mercury	SW846 7471B	ND			mg/kg
QC18060954	Blank 1	Arsenic	SW846 6010B	ND			mg/kg
		Lead	SW846 6010B	ND			mg/kg
QC18060955	Blank 1	Arsenic	SW846 6010B	ND			mg/kg
		Lead	SW846 6010B	ND			mg/kg

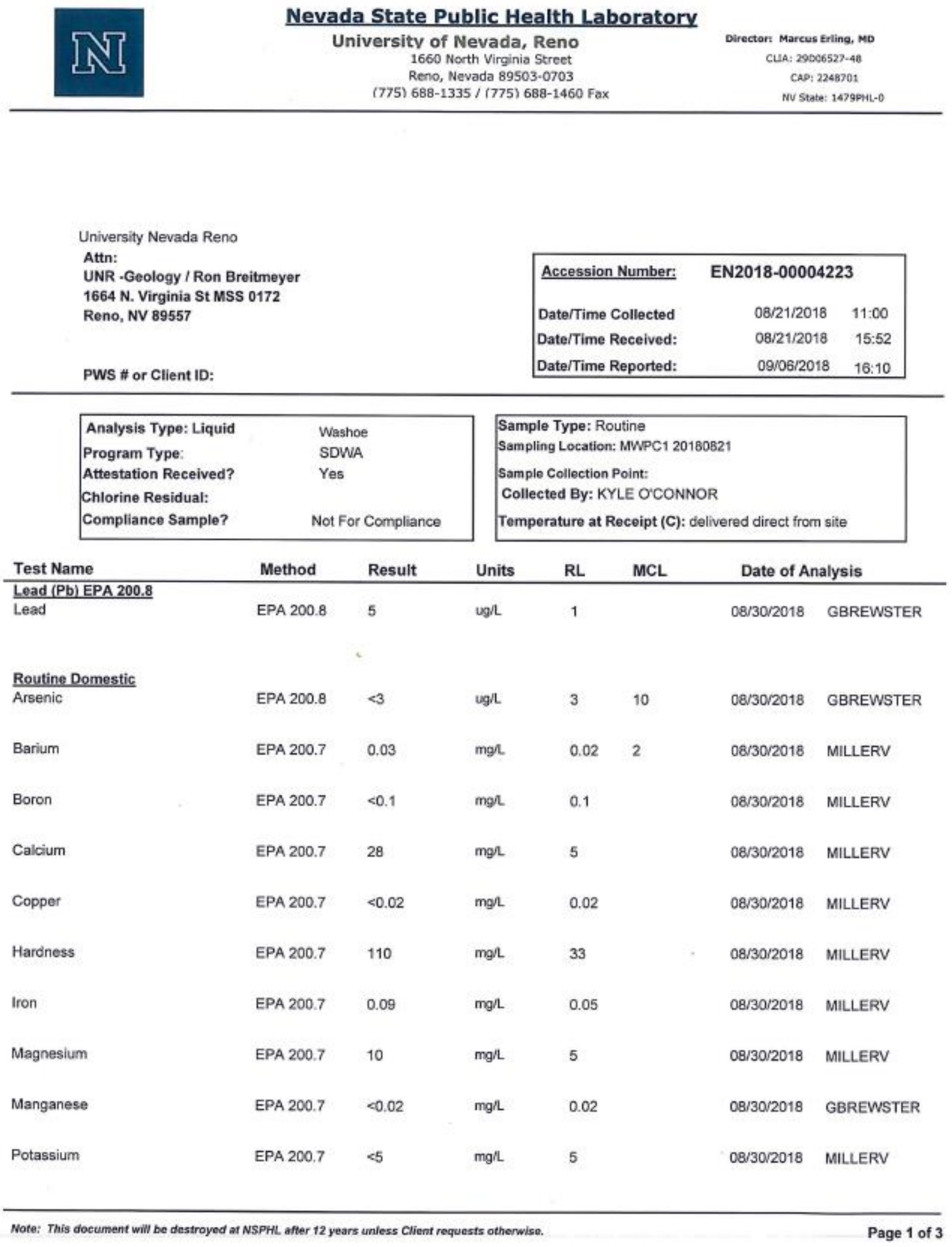
QCBatchID	QCType	Parameter	Method	Result	Actual	% Rec	Units
QC18060701	LCS 1	Mercury	SW846 7471B	0.933	0.835	112	mg/kg
QC18060702	LCS 1	Mercury	SW846 7471B	0.933	0.835	112	mg/kg
QC18060954	LCS 1	Arsenic	SW846 6010B	41.0	50.0	82	mg/kg
		Lead	SW846 6010B	40.9	50.0	82	mg/kg
QC18060955	LCS 1	Arsenic	SW846 6010B	41.0	50.0	82	mg/kg
		Lead	SW846 6010B	40.9	50.0	82	mg/kg
QC18061057	LCS 1	pH	SW846 9045D	7.03	7.00	100	ph Units

QCBatchID	QCType	Parameter	Method	Duplicate Sample	Sample Result	Duplicate Result	Units	RPD
QC18061057	Duplicate 1	pH	SW846 9045D	1806507-001	7.35	7.35	pH Units	<1%
QC18061057	Duplicate 2	pH	SW846 9045D	1806507-011	3.80	3.82	pH Units	1 %

QCBatchID	QCType	Parameter	Method	Spike Sample	Sample Result		MS Result	MSD Result	Spike Value	Units	MS %Rec	MSD %Rec	RPD %
QC18060701	MS 1	Mercury	SW846 7471B	1806507-001	0.469	QD	1.12	1.72	0.8	mg/kg	81	153	42
QC18060702	MS 1	Mercury	SW846 7471B	1806507-011	0.522		1.21	1.43	0.811	mg/kg	85	111	17
QC18060954	MS 1	Arsenic	SW846 6010B	1806378-001	ND	D,	36.6	43.2	50	mg/kg	NC	NC	NC
		Lead	SW846 6010B	1806378-001	45.8		85.3	95.7	50	mg/kg	79	100	12
QC18060955	MS 1	Arsenic	SW846 6010B	1806507-006	65.6	QD	115	82.6	50	mg/kg	99	34	33
		Lead	SW846 6010B	1806507-006	195	M	122	120	50	mg/kg	NC	NC	NC

DF=Dilution Factor, RL=Reporting Limit, ND=Not Detected or <RL

August 2018 Results



Nevada State Public Health Laboratory

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CAP: 2248701
NV State: 1479PHL-0

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PWS # or Client ID:

Accession Number:	**EN2018-00004223**	
Date/Time Collected	08/21/2018	11:00
Date/Time Received:	08/21/2018	15:52
Date/Time Reported:	09/06/2018	16:10

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1 20180821
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	5	ug/L	1		08/30/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	08/30/2018	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	08/30/2018	MILLERV
Boron	EPA 200.7	<0.1	mg/L	0.1		08/30/2018	MILLERV
Calcium	EPA 200.7	28	mg/L	5		08/30/2018	MILLERV
Copper	EPA 200.7	<0.02	mg/L	0.02		08/30/2018	MILLERV
Hardness	EPA 200.7	110	mg/L	33		08/30/2018	MILLERV
Iron	EPA 200.7	0.09	mg/L	0.05		08/30/2018	MILLERV
Magnesium	EPA 200.7	10	mg/L	5		08/30/2018	MILLERV
Manganese	EPA 200.7	<0.02	mg/L	0.02		08/30/2018	GBREWSTER
Potassium	EPA 200.7	<5	mg/L	5		08/30/2018	MILLERV

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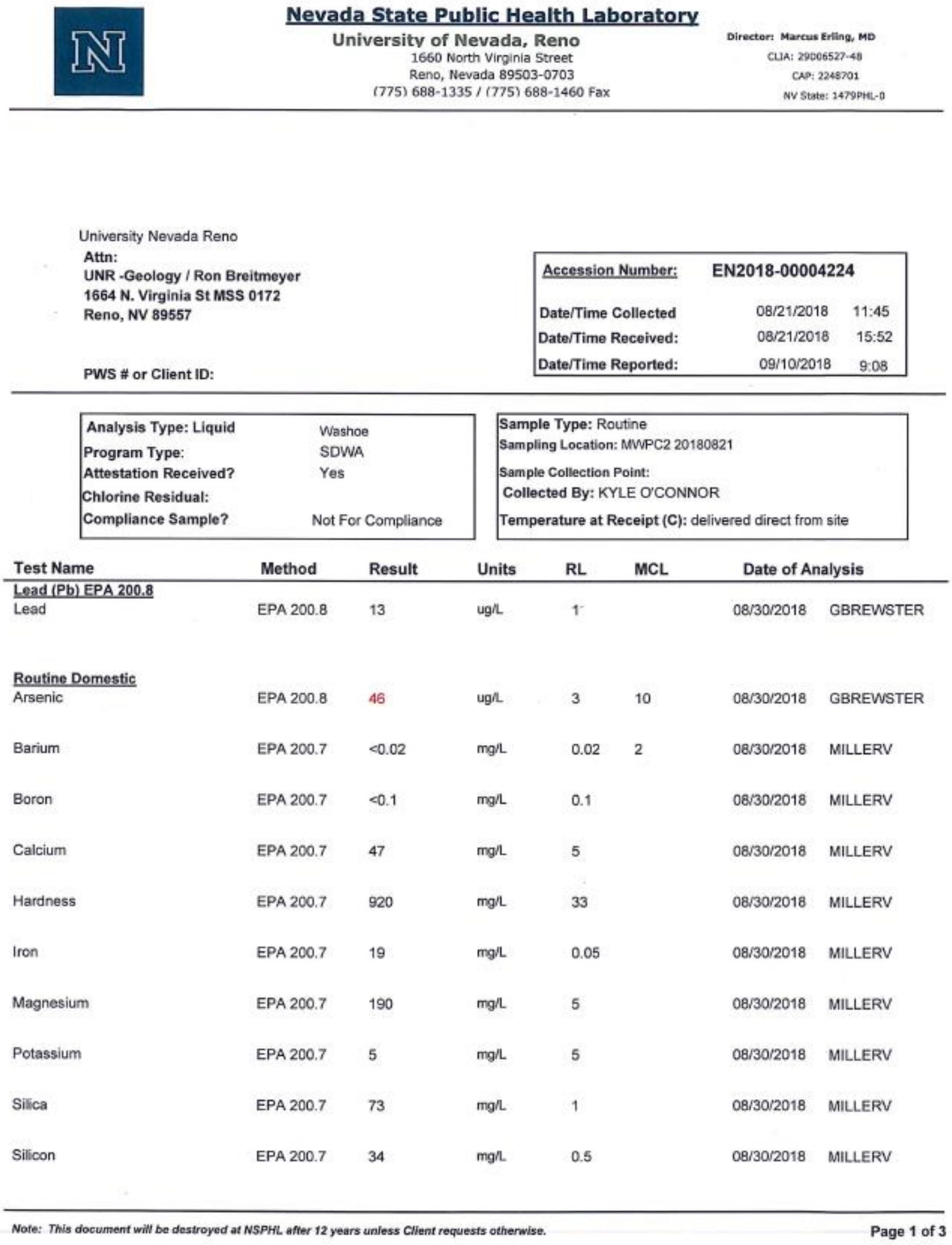
Silica	EPA 200.7	45	mg/L	1		08/30/2018	MILLERV
Silicon	EPA 200.7	21	mg/L	0.5		08/30/2018	MILLERV
Sodium	EPA 200.7	36	mg/L	5		08/30/2018	GBREWSTER
Zinc	EPA 200.7	<0.05	mg/L	0.05		08/30/2018	GBREWSTER
Chloride	EPA 300.0	9	mg/L	5		08/23/2018	MILLERV
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	08/23/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/23/2018	MILLERV
Sulfate	EPA 300.0	140	mg/L	5		08/23/2018	MILLERV
Total Dissolved Solids	SM 2540 C	290	mg/L	25		08/22/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	34	mg/L	20		08/22/2018	DBAKER
Bicarbonate	SM2320B 251C	42	mg/L	25		08/22/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2018	DBAKER
Conductivity	SM2320B 251C	420	umhos/cm	10		08/22/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2018	DBAKER
pH	SM2320B 251C	7.02	Unit	2		08/22/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.1	C	15		08/22/2018	DBAKER
Color	SM 2120 B	<5	CU	5		08/22/2018	DBAKER
Turbidity	SM 2130 B	2.4	NTU	0.40		08/22/2018	SRICE



Nevada State Public Health Laboratory

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CAP: 2248701
NV State: 1479PHL-0

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PWS # or Client ID:

Accession Number:	**EN2018-00004224**	
Date/Time Collected	08/21/2018	11:45
Date/Time Received:	08/21/2018	15:52
Date/Time Reported:	09/10/2018	9:08

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2 20180821
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	13	ug/L	1		08/30/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	46	ug/L	3	10	08/30/2018	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	08/30/2018	MILLERV
Boron	EPA 200.7	<0.1	mg/L	0.1		08/30/2018	MILLERV
Calcium	EPA 200.7	47	mg/L	5		08/30/2018	MILLERV
Hardness	EPA 200.7	920	mg/L	33		08/30/2018	MILLERV
Iron	EPA 200.7	19	mg/L	0.05		08/30/2018	MILLERV
Magnesium	EPA 200.7	190	mg/L	5		08/30/2018	MILLERV
Potassium	EPA 200.7	5	mg/L	5		08/30/2018	MILLERV
Silica	EPA 200.7	73	mg/L	1		08/30/2018	MILLERV
Silicon	EPA 200.7	34	mg/L	0.5		08/30/2018	MILLERV

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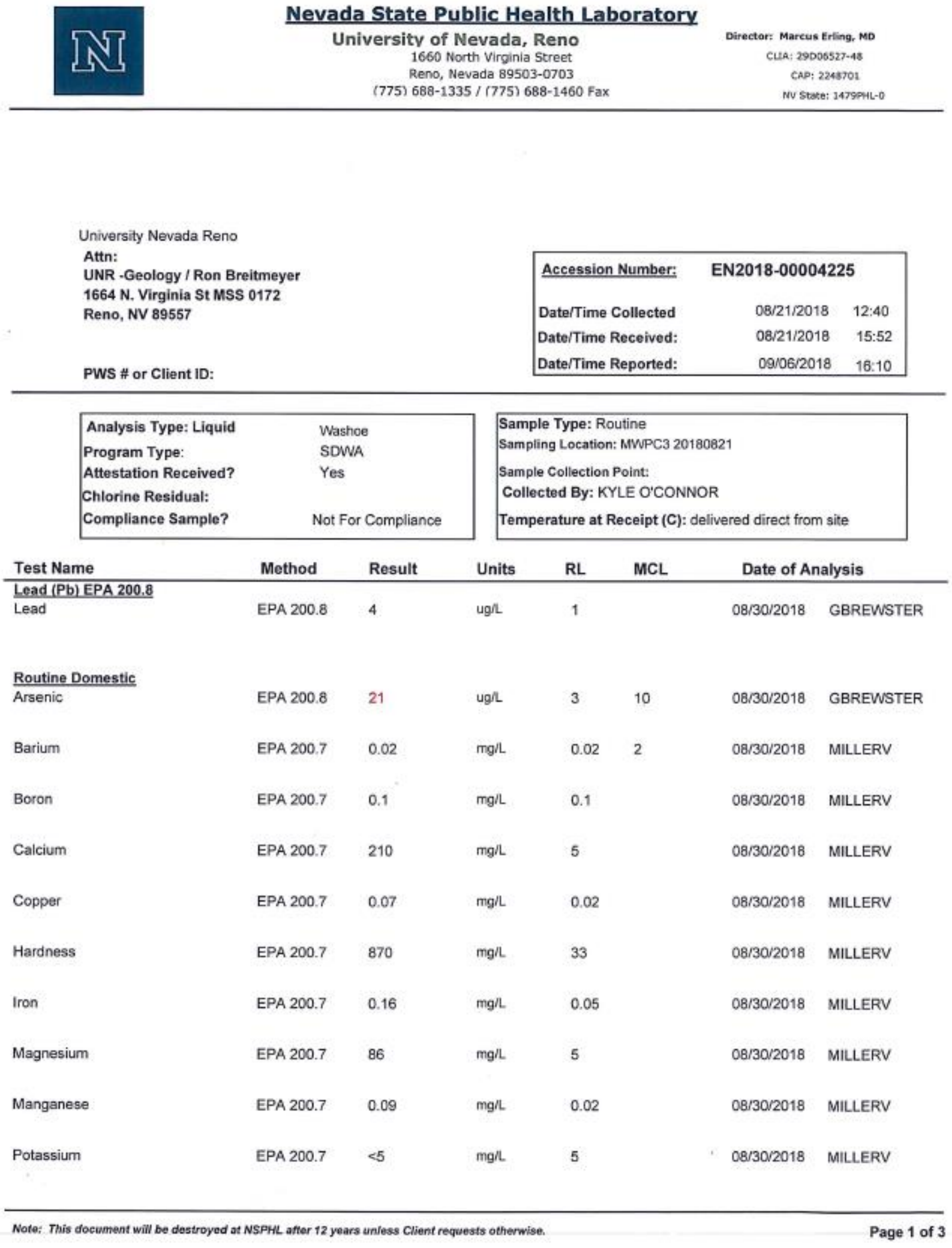
Accession Number: **EN2018-00004224**

Sodium	EPA 200.7	90	mg/L	5		08/30/2018	MILLERV
Chloride	EPA 300.0	12	mg/L	5		08/28/2018	MILLERV
Fluoride	EPA 300.0	2.9	mg/L	0.1	4	08/28/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/28/2018	MILLERV
Total Dissolved Solids	SM 2540 C	3400	mg/L	25		08/22/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		08/22/2018	DBAKER
Bicarbonate	SM2320B 251C	<25	mg/L	25		08/22/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2018	DBAKER
Conductivity	SM2320B 251C	3200	umhos/cm	10		08/22/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2018	DBAKER
pH	SM2320B 251C	3.78	Unit	2		08/22/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.1	C	15		08/22/2018	DBAKER
Color	SM 2120 B	<5	CU	5		08/22/2018	DBAKER
Turbidity	SM 2130 B	34	NTU	0.40		08/22/2018	SRICE
Sulfate	EPA 300.0	2100	mg/L	25		08/30/2018	MILLERV
Copper	EPA 200.7	16	mg/L	0.100		09/06/2018	MILLERV
Manganese	EPA 200.7	18	mg/L	0.100		09/06/2018	MILLERV
Zinc	EPA 200.7	9	mg/L	0.250		09/06/2018	MILLERV



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NV State: 1479PHL-0

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PWS # or Client ID:

Accession Number: EN2018-00004225

Date/Time Collected 08/21/2018 12:40
Date/Time Received: 08/21/2018 15:52
Date/Time Reported: 09/06/2018 16:10

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3 20180821
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	4	ug/L	1		08/30/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	21	ug/L	3	10	08/30/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	08/30/2018	MILLERV
Boron	EPA 200.7	0.1	mg/L	0.1		08/30/2018	MILLERV
Calcium	EPA 200.7	210	mg/L	5		08/30/2018	MILLERV
Copper	EPA 200.7	0.07	mg/L	0.02		08/30/2018	MILLERV
Hardness	EPA 200.7	870	mg/L	33		08/30/2018	MILLERV
Iron	EPA 200.7	0.16	mg/L	0.05		08/30/2018	MILLERV
Magnesium	EPA 200.7	86	mg/L	5		08/30/2018	MILLERV
Manganese	EPA 200.7	0.09	mg/L	0.02		08/30/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		08/30/2018	MILLERV

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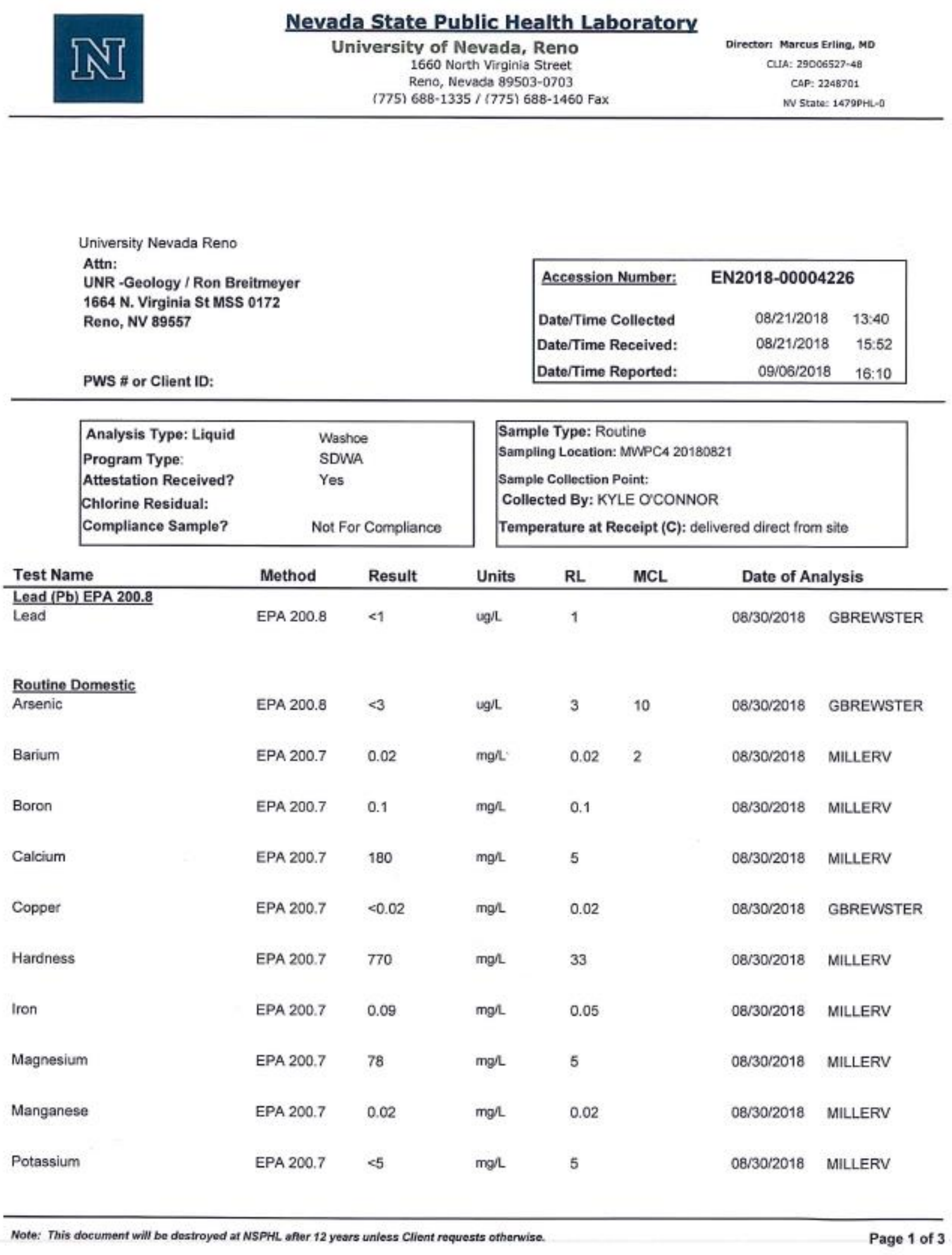
Silica	EPA 200.7	62	mg/L	1		08/30/2018	MILLERV
Silicon	EPA 200.7	29	mg/L	0.5		08/30/2018	MILLERV
Sodium	EPA 200.7	78	mg/L	5		08/30/2018	MILLERV
Zinc	EPA 200.7	0.07	mg/L	0.05		08/30/2018	MILLERV
Chloride	EPA 300.0	20	mg/L	5		08/23/2018	MILLERV
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	08/23/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/23/2018	MILLERV
Sulfate	EPA 300.0	880	mg/L	5		08/23/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1500	mg/L	25		08/22/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	87	mg/L	20		08/22/2018	DBAKER
Bicarbonate	SM2320B 251C	110	mg/L	25		08/22/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2018	DBAKER
Conductivity	SM2320B 251C	1800	umhos/cm	10		08/22/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2018	DBAKER
pH	SM2320B 251C	7.2	Unit	2		08/22/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.4	C	15		08/22/2018	DBAKER
Color	SM 2120 B	<5	CU	5		08/22/2018	DBAKER
Turbidity	SM 2130 B	1.8	NTU	0.40		08/22/2018	SRICE



Nevada State Public Health Laboratory

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NV State: 1479PHL-0

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Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00004226**	
Date/Time Collected	08/21/2018	13:40
Date/Time Received:	08/21/2018	15:52
Date/Time Reported:	09/06/2018	16:10

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4 20180821
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<1	ug/L	1		08/30/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	08/30/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	08/30/2018	MILLERV
Boron	EPA 200.7	0.1	mg/L	0.1		08/30/2018	MILLERV
Calcium	EPA 200.7	180	mg/L	5		08/30/2018	MILLERV
Copper	EPA 200.7	<0.02	mg/L	0.02		08/30/2018	GBREWSTER
Hardness	EPA 200.7	770	mg/L	33		08/30/2018	MILLERV
Iron	EPA 200.7	0.09	mg/L	0.05		08/30/2018	MILLERV
Magnesium	EPA 200.7	78	mg/L	5		08/30/2018	MILLERV
Manganese	EPA 200.7	0.02	mg/L	0.02		08/30/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		08/30/2018	MILLERV

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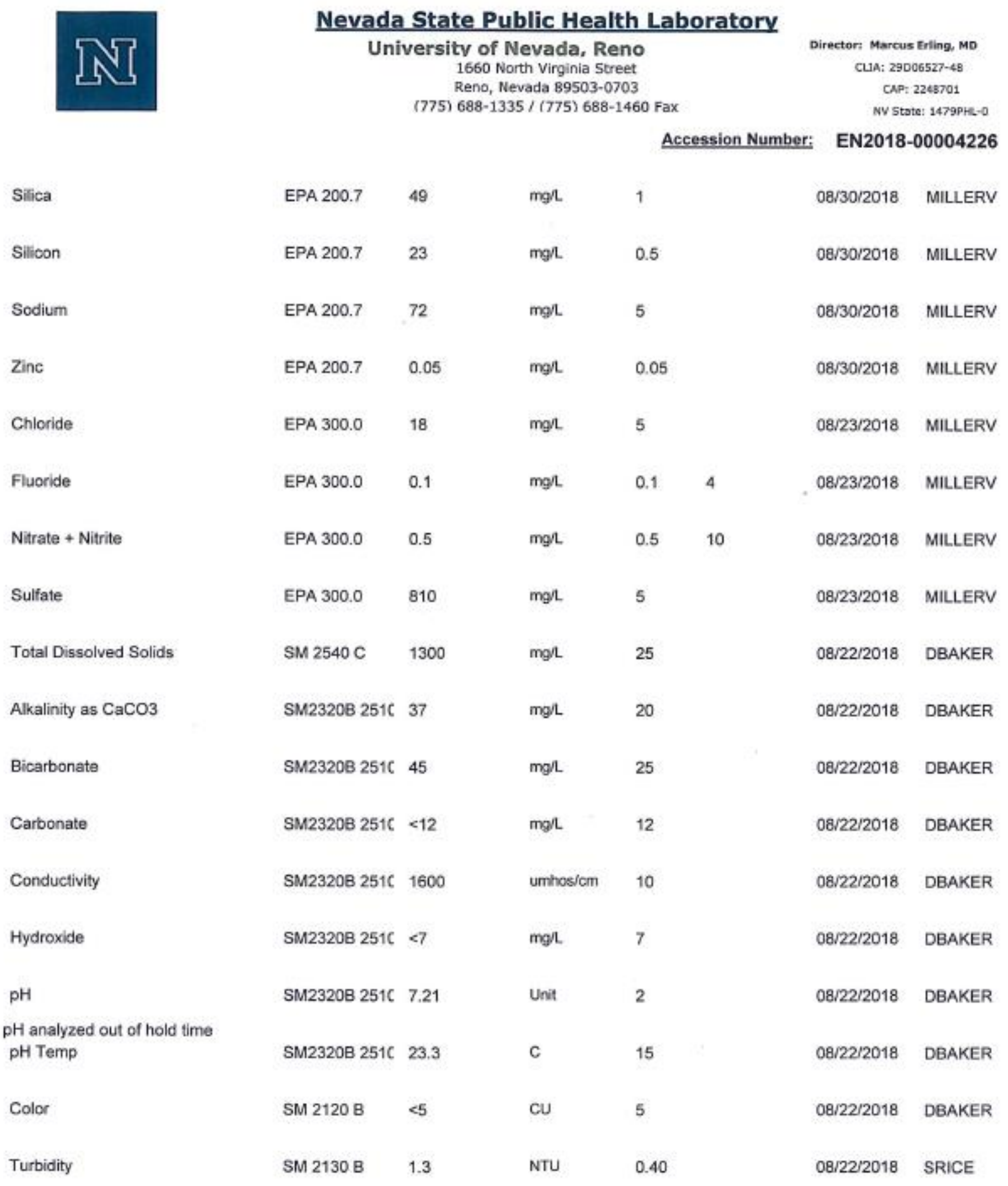

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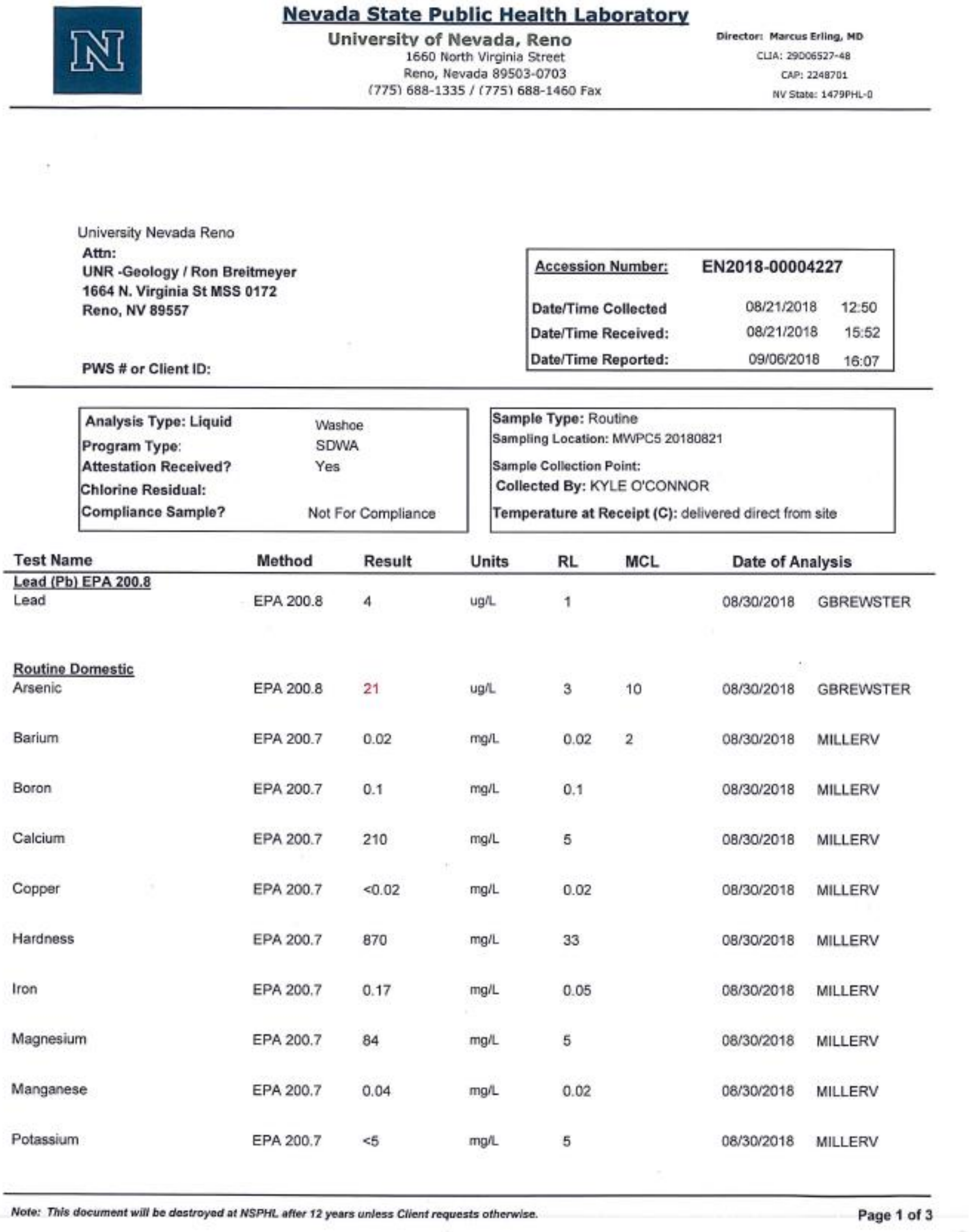
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2018-00004226**

Silica	EPA 200.7	49	mg/L	1		08/30/2018	MILLERV
Silicon	EPA 200.7	23	mg/L	0.5		08/30/2018	MILLERV
Sodium	EPA 200.7	72	mg/L	5		08/30/2018	MILLERV
Zinc	EPA 200.7	0.05	mg/L	0.05		08/30/2018	MILLERV
Chloride	EPA 300.0	18	mg/L	5		08/23/2018	MILLERV
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	08/23/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	0.5	mg/L	0.5	10	08/23/2018	MILLERV
Sulfate	EPA 300.0	810	mg/L	5		08/23/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		08/22/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	37	mg/L	20		08/22/2018	DBAKER
Bicarbonate	SM2320B 251C	45	mg/L	25		08/22/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2018	DBAKER
Conductivity	SM2320B 251C	1600	umhos/cm	10		08/22/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2018	DBAKER
pH	SM2320B 251C	7.21	Unit	2		08/22/2018	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.3	C	15		08/22/2018	DBAKER
Color	SM 2120 B	<5	CU	5		08/22/2018	DBAKER
Turbidity	SM 2130 B	1.3	NTU	0.40		08/22/2018	SRICE



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NV State: 1479PHL-0

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PWS # or Client ID:

Accession Number:	**EN2018-00004227**	
Date/Time Collected	08/21/2018	12:50
Date/Time Received:	08/21/2018	15:52
Date/Time Reported:	09/06/2018	16:07

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5 20180821
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	4	ug/L	1		08/30/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	21	ug/L	3	10	08/30/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	08/30/2018	MILLERV
Boron	EPA 200.7	0.1	mg/L	0.1		08/30/2018	MILLERV
Calcium	EPA 200.7	210	mg/L	5		08/30/2018	MILLERV
Copper	EPA 200.7	<0.02	mg/L	0.02		08/30/2018	MILLERV
Hardness	EPA 200.7	870	mg/L	33		08/30/2018	MILLERV
Iron	EPA 200.7	0.17	mg/L	0.05		08/30/2018	MILLERV
Magnesium	EPA 200.7	84	mg/L	5		08/30/2018	MILLERV
Manganese	EPA 200.7	0.04	mg/L	0.02		08/30/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		08/30/2018	MILLERV

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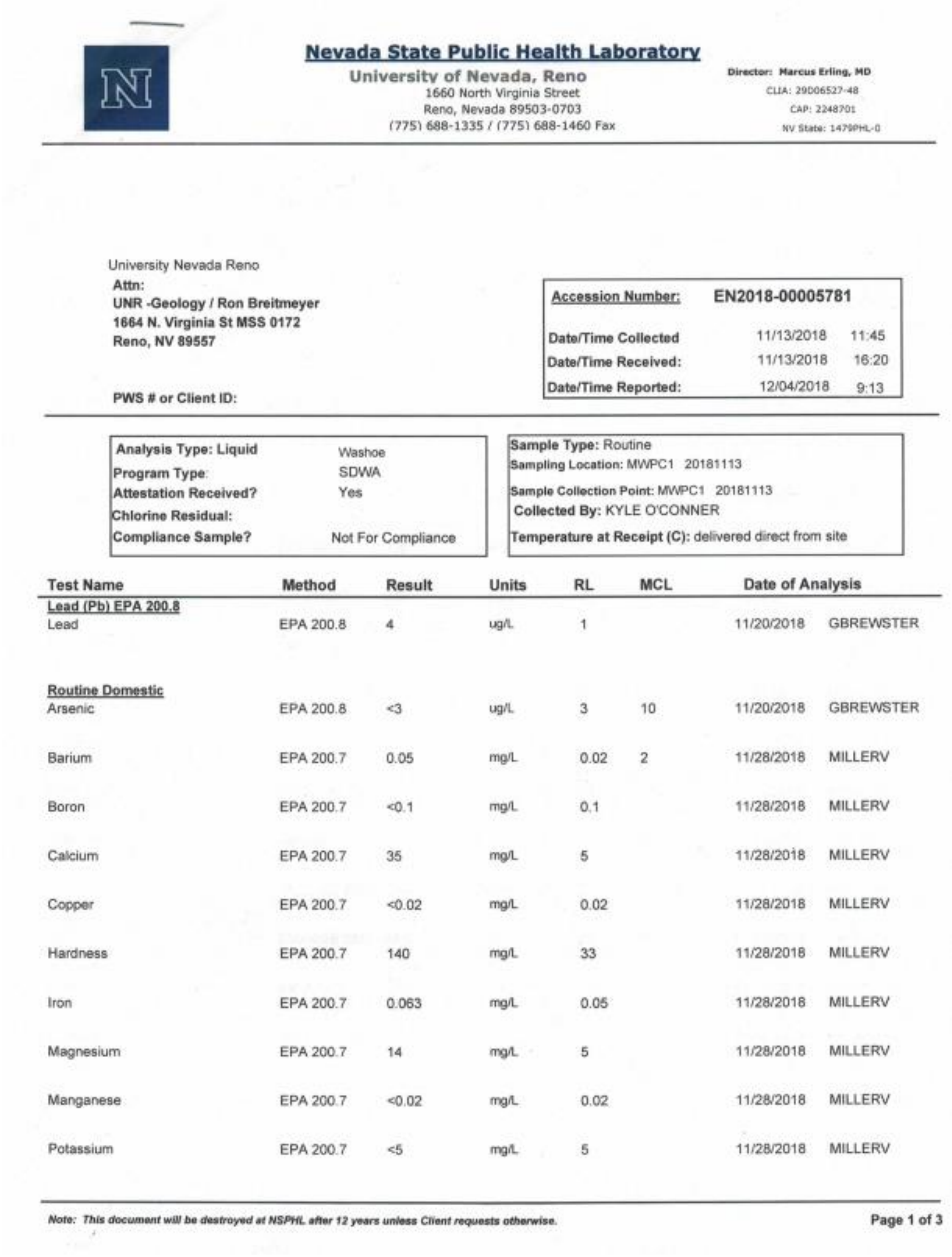
Accession Number: **EN2018-00004227**

Silica	EPA 200.7	62	mg/L	1		08/30/2018	MILLERV
Silicon	EPA 200.7	29	mg/L	0.5		08/30/2018	MILLERV
Sodium	EPA 200.7	76	mg/L	5		08/30/2018	MILLERV
Zinc	EPA 200.7	<0.05	mg/L	0.05		08/30/2018	MILLERV
Chloride	EPA 300.0	20	mg/L	5		08/23/2018	GBREWSTER
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	08/23/2018	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/23/2018	MILLERV
Sulfate	EPA 300.0	880	mg/L	5		08/23/2018	MILLERV
Total Dissolved Solids	SM 2540 C	1400	mg/L	25		08/22/2018	DBAKER
Alkalinity as CaCO3	SM2320B 251C	88	mg/L	20		08/22/2018	DBAKER
Bicarbonate	SM2320B 251C	110	mg/L	25		08/22/2018	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2018	DBAKER
Conductivity	SM2320B 251C	1800	umhos/cm	10		08/22/2018	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2018	DBAKER
pH	SM2320B 251C	7.11	Unit	2		08/22/2018	DBAKER
pH analyzed out of hold time pH Temp	SM2320B 251C	23.3	C	15		08/22/2018	DBAKER
Color	SM 2120 B	<5	CU	5		08/22/2018	DBAKER
Turbidity	SM 2130 B	2.6	NTU	0.40		08/22/2018	SRICE

November 2018 Results



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NV State: 1479PHL-0

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PWS # or Client ID:

Accession Number:	**EN2018-00005781**	
Date/Time Collected	11/13/2018	11:45
Date/Time Received:	11/13/2018	16:20
Date/Time Reported:	12/04/2018	9:13

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1 20181113
Sample Collection Point: MWPC1 20181113
Collected By: KYLE O'CONNER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	4	ug/L	1		11/20/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/20/2018	GBREWSTER
Barium	EPA 200.7	0.05	mg/L	0.02	2	11/28/2018	MILLERV
Boron	EPA 200.7	<0.1	mg/L	0.1		11/28/2018	MILLERV
Calcium	EPA 200.7	35	mg/L	5		11/28/2018	MILLERV
Copper	EPA 200.7	<0.02	mg/L	0.02		11/28/2018	MILLERV
Hardness	EPA 200.7	140	mg/L	33		11/28/2018	MILLERV
Iron	EPA 200.7	0.063	mg/L	0.05		11/28/2018	MILLERV
Magnesium	EPA 200.7	14	mg/L	5		11/28/2018	MILLERV
Manganese	EPA 200.7	<0.02	mg/L	0.02		11/28/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		11/28/2018	MILLERV

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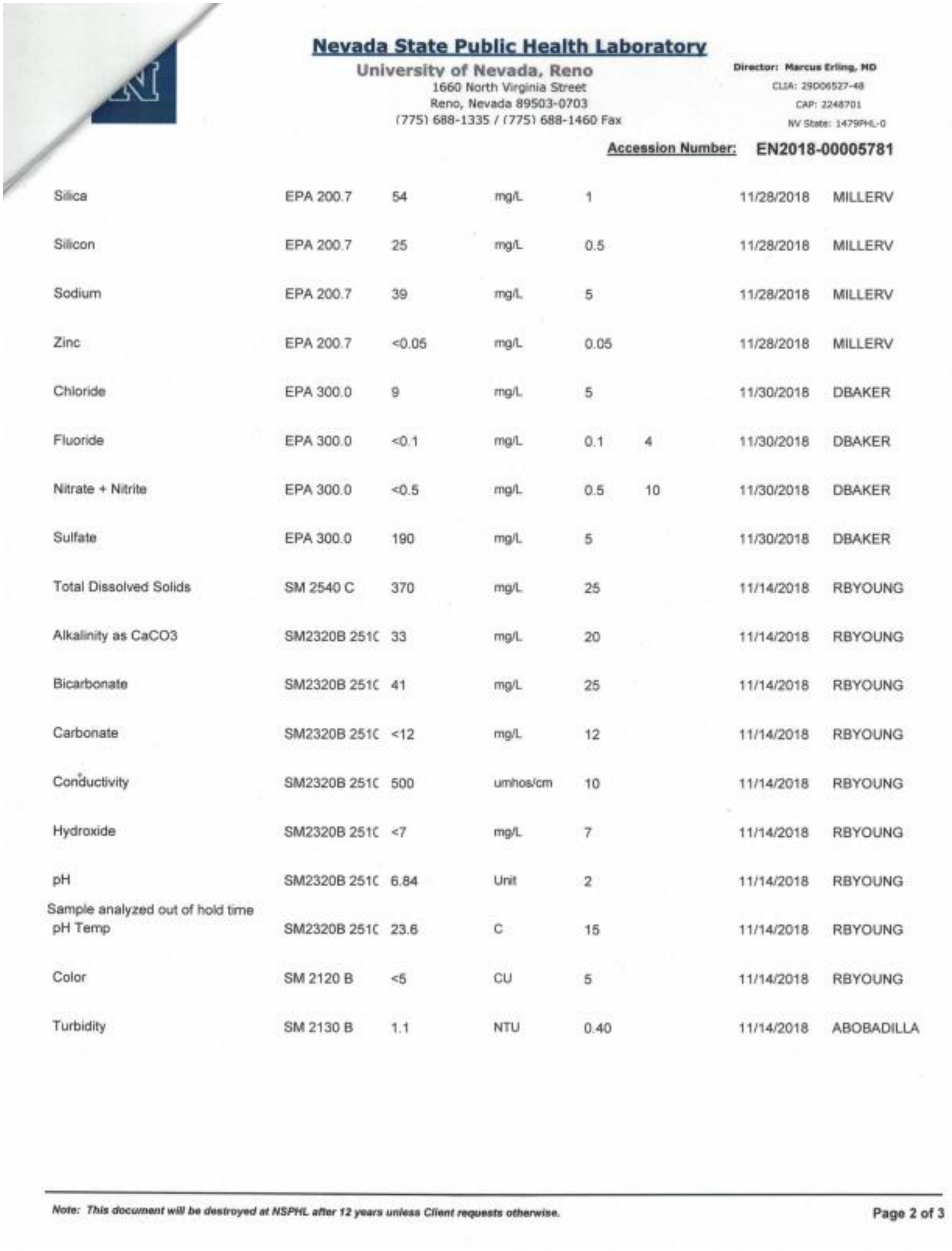

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Accession Number: **EN2018-00005781**

Silica	EPA 200.7	54	mg/L	1		11/28/2018	MILLERV
Silicon	EPA 200.7	25	mg/L	0.5		11/28/2018	MILLERV
Sodium	EPA 200.7	39	mg/L	5		11/28/2018	MILLERV
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/28/2018	MILLERV
Chloride	EPA 300.0	9	mg/L	5		11/30/2018	DBAKER
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	11/30/2018	DBAKER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/30/2018	DBAKER
Sulfate	EPA 300.0	190	mg/L	5		11/30/2018	DBAKER
Total Dissolved Solids	SM 2540 C	370	mg/L	25		11/14/2018	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	33	mg/L	20		11/14/2018	RBYOUNG
Bicarbonate	SM2320B 251C	41	mg/L	25		11/14/2018	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		11/14/2018	RBYOUNG
Conductivity	SM2320B 251C	500	umhos/cm	10		11/14/2018	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		11/14/2018	RBYOUNG
pH	SM2320B 251C	6.84	Unit	2		11/14/2018	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	23.6	C	15		11/14/2018	RBYOUNG
Color	SM 2120 B	<5	CU	5		11/14/2018	RBYOUNG
Turbidity	SM 2130 B	1.1	NTU	0.40		11/14/2018	ABOBADILLA

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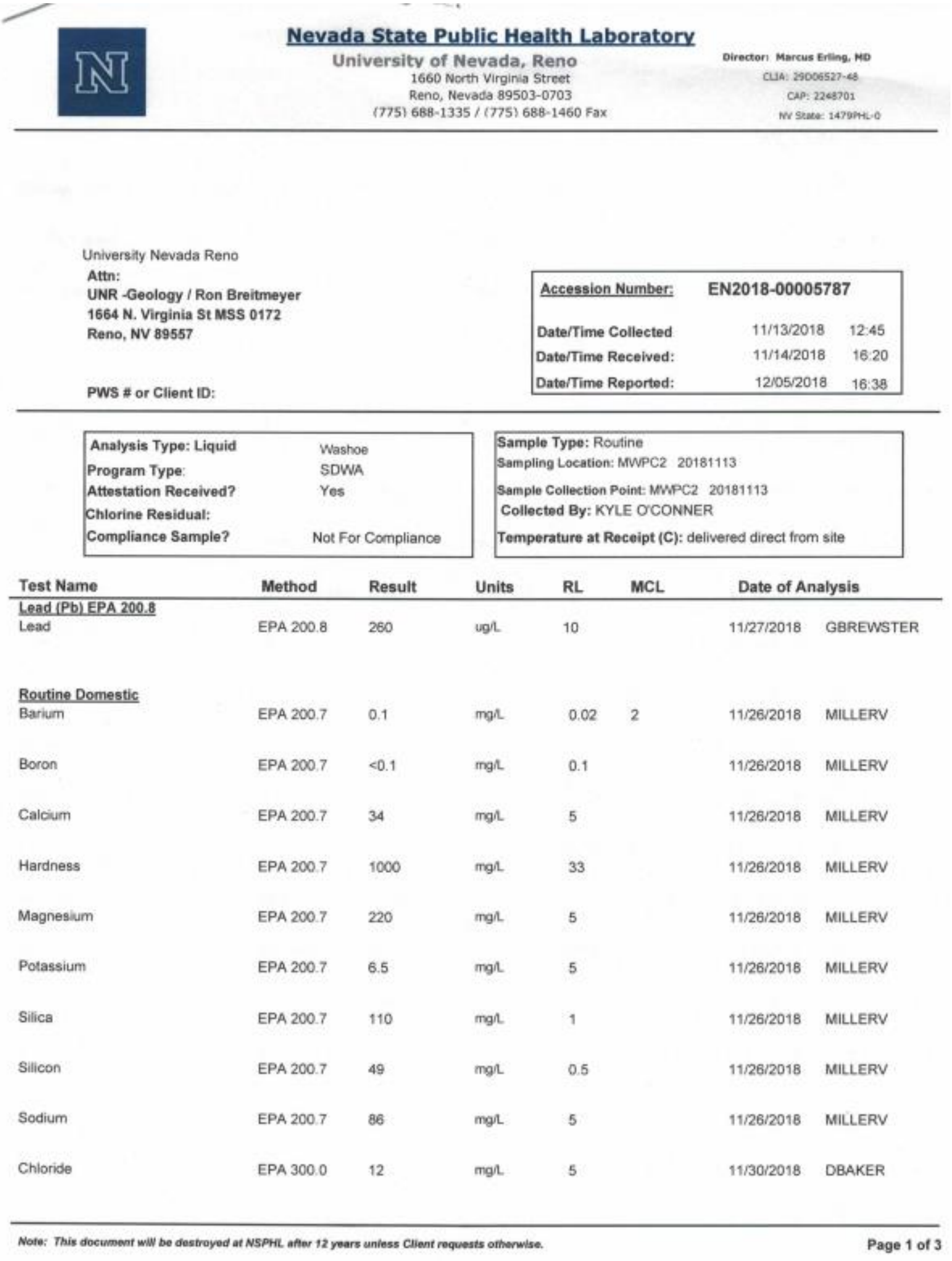

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PWS # or Client ID:

Accession Number:	**EN2018-00005787**	
Date/Time Collected	11/13/2018	12:45
Date/Time Received:	11/14/2018	16:20
Date/Time Reported:	12/05/2018	16:38

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2 20181113
Sample Collection Point: MWPC2 20181113
Collected By: KYLE O'CONNER
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	260	ug/L	10		11/27/2018	GBREWSTER
Routine Domestic							
Barium	EPA 200.7	0.1	mg/L	0.02	2	11/26/2018	MILLERV
Boron	EPA 200.7	<0.1	mg/L	0.1		11/26/2018	MILLERV
Calcium	EPA 200.7	34	mg/L	5		11/26/2018	MILLERV
Hardness	EPA 200.7	1000	mg/L	33		11/26/2018	MILLERV
Magnesium	EPA 200.7	220	mg/L	5		11/26/2018	MILLERV
Potassium	EPA 200.7	6.5	mg/L	5		11/26/2018	MILLERV
Silica	EPA 200.7	110	mg/L	1		11/26/2018	MILLERV
Silicon	EPA 200.7	49	mg/L	0.5		11/26/2018	MILLERV
Sodium	EPA 200.7	86	mg/L	5		11/26/2018	MILLERV
Chloride	EPA 300.0	12	mg/L	5		11/30/2018	DBAKER

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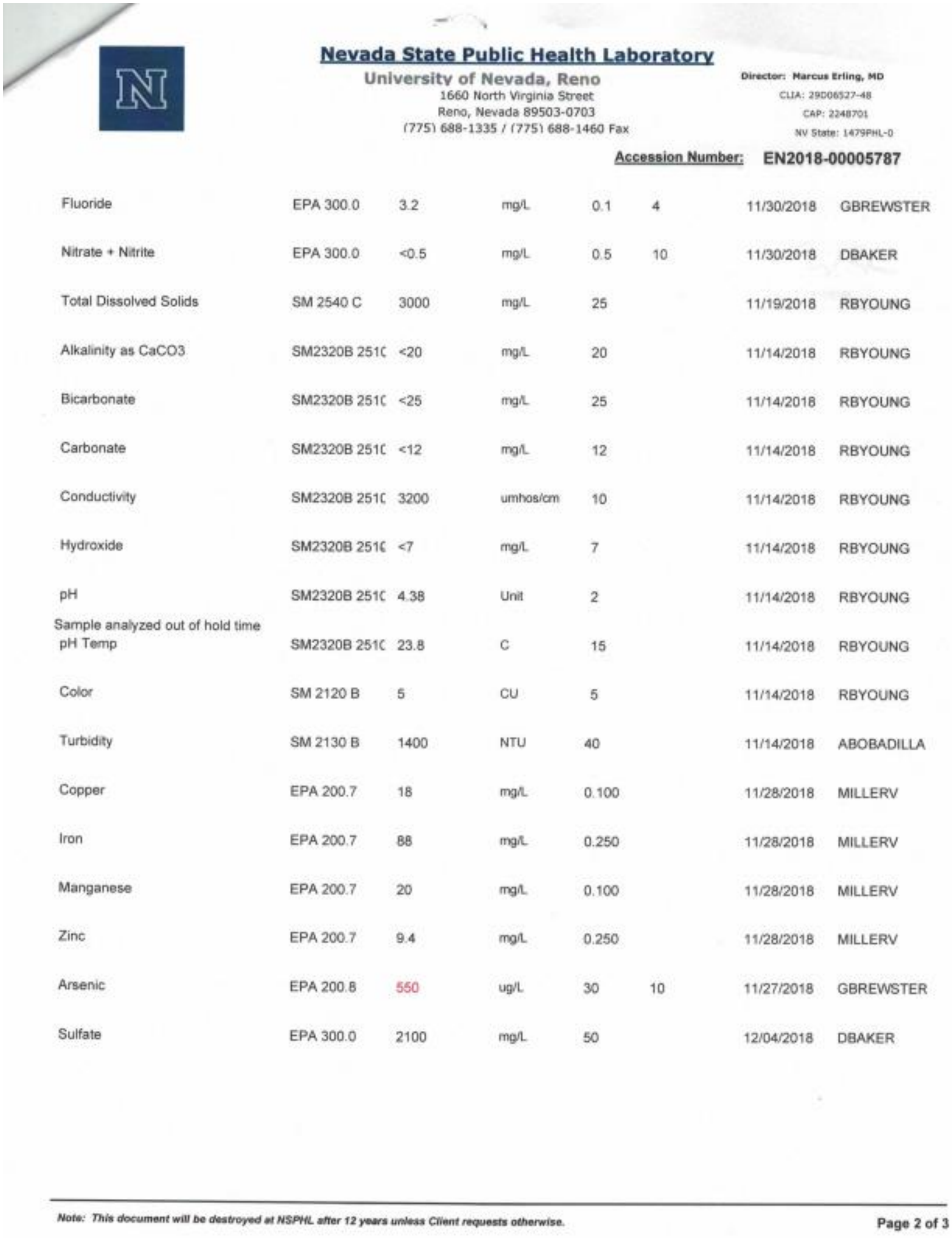

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Accession Number: **EN2018-00005787**

Fluoride	EPA 300.0	3.2	mg/L	0.1	4	11/30/2018	GBREWSTER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/30/2018	DBAKER
Total Dissolved Solids	SM 2540 C	3000	mg/L	25		11/19/2018	RBYOUNG
Alkalinity as CaCO3	SM2320B 251(	<20	mg/L	20		11/14/2018	RBYOUNG
Bicarbonate	SM2320B 251(	<25	mg/L	25		11/14/2018	RBYOUNG
Carbonate	SM2320B 251(	<12	mg/L	12		11/14/2018	RBYOUNG
Conductivity	SM2320B 251(	3200	umhos/cm	10		11/14/2018	RBYOUNG
Hydroxide	SM2320B 251(	<7	mg/L	7		11/14/2018	RBYOUNG
pH	SM2320B 251(	4.38	Unit	2		11/14/2018	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251(	23.8	C	15		11/14/2018	RBYOUNG
Color	SM 2120 B	5	CU	5		11/14/2018	RBYOUNG
Turbidity	SM 2130 B	1400	NTU	40		11/14/2018	ABOBADILLA
Copper	EPA 200.7	18	mg/L	0.100		11/28/2018	MILLERV
Iron	EPA 200.7	88	mg/L	0.250		11/28/2018	MILLERV
Manganese	EPA 200.7	20	mg/L	0.100		11/28/2018	MILLERV
Zinc	EPA 200.7	9.4	mg/L	0.250		11/28/2018	MILLERV
Arsenic	EPA 200.8	550	ug/L	30	10	11/27/2018	GBREWSTER
Sulfate	EPA 300.0	2100	mg/L	50		12/04/2018	DBAKER

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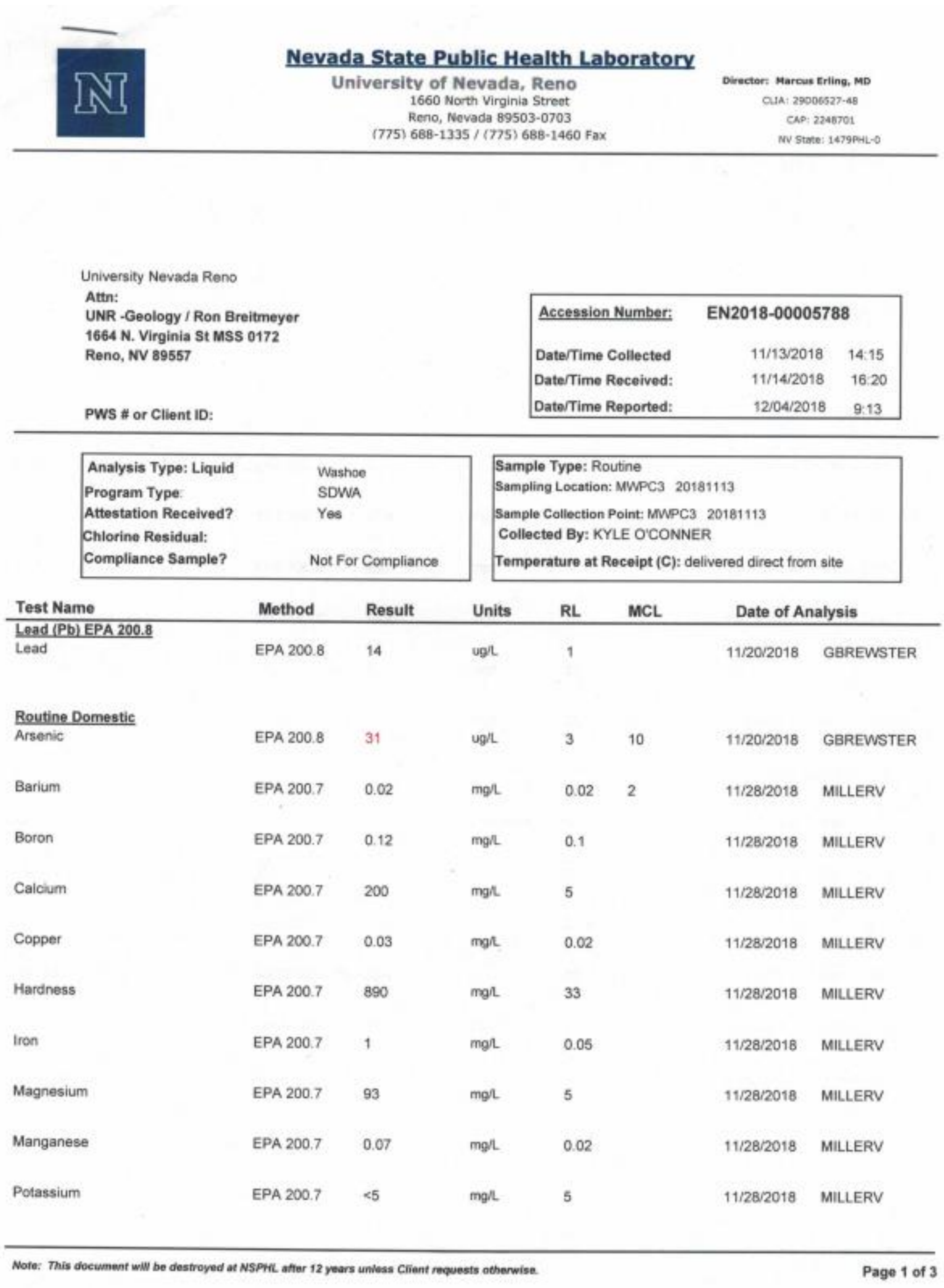

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PWS # or Client ID:

Accession Number:	**EN2018-00005788**	
Date/Time Collected	11/13/2018	14:15
Date/Time Received:	11/14/2018	16:20
Date/Time Reported:	12/04/2018	9:13

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3 20181113
Sample Collection Point: MWPC3 20181113
Collected By: KYLE O'CONNER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	14	ug/L	1		11/20/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	31	ug/L	3	10	11/20/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	11/28/2018	MILLERV
Boron	EPA 200.7	0.12	mg/L	0.1		11/28/2018	MILLERV
Calcium	EPA 200.7	200	mg/L	5		11/28/2018	MILLERV
Copper	EPA 200.7	0.03	mg/L	0.02		11/28/2018	MILLERV
Hardness	EPA 200.7	890	mg/L	33		11/28/2018	MILLERV
Iron	EPA 200.7	1	mg/L	0.05		11/28/2018	MILLERV
Magnesium	EPA 200.7	93	mg/L	5		11/28/2018	MILLERV
Manganese	EPA 200.7	0.07	mg/L	0.02		11/28/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		11/28/2018	MILLERV

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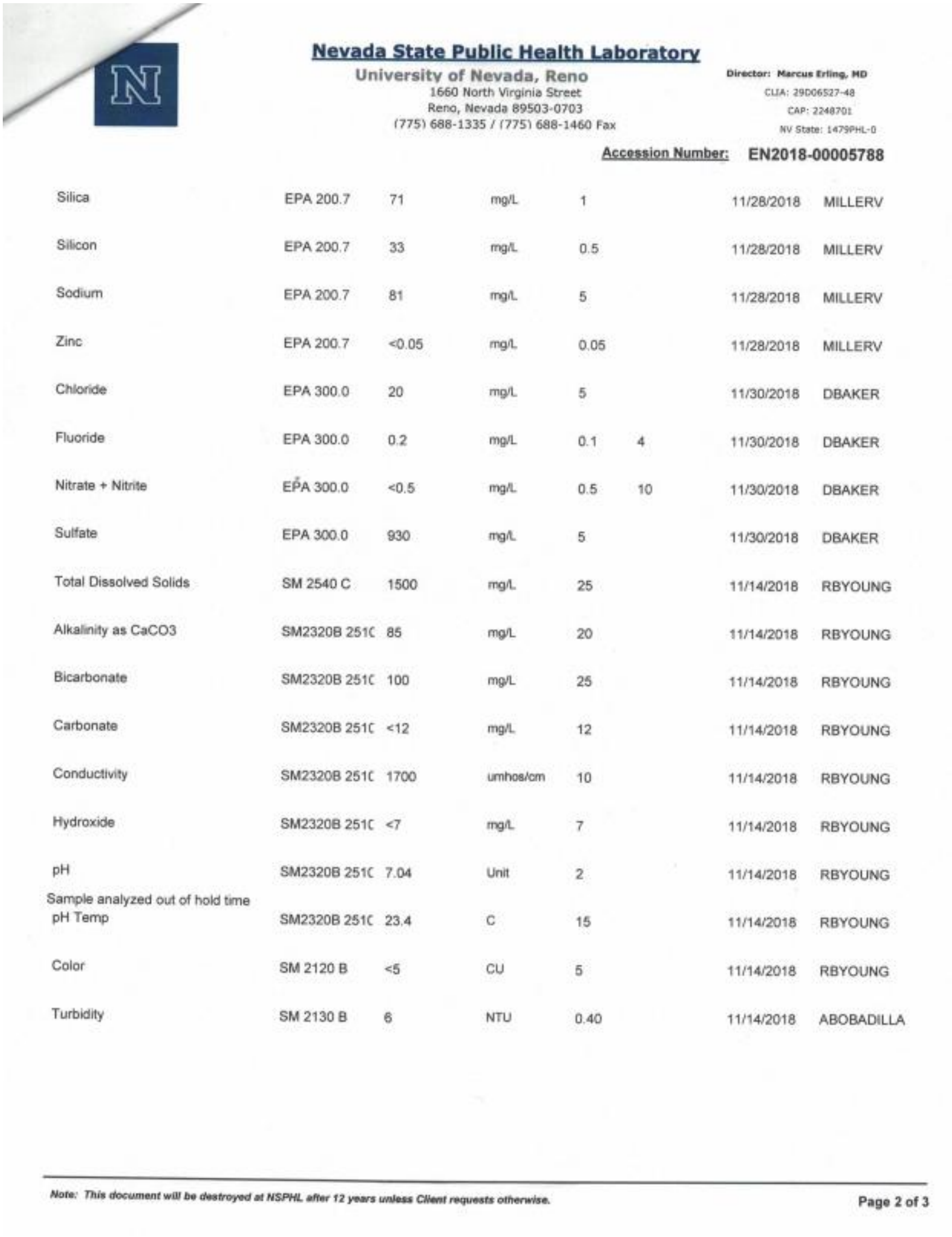

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Accession Number: **EN2018-00005788**

Silica	EPA 200.7	71	mg/L	1		11/28/2018	MILLERV
Silicon	EPA 200.7	33	mg/L	0.5		11/28/2018	MILLERV
Sodium	EPA 200.7	81	mg/L	5		11/28/2018	MILLERV
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/28/2018	MILLERV
Chloride	EPA 300.0	20	mg/L	5		11/30/2018	DBAKER
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	11/30/2018	DBAKER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/30/2018	DBAKER
Sulfate	EPA 300.0	930	mg/L	5		11/30/2018	DBAKER
Total Dissolved Solids	SM 2540 C	1500	mg/L	25		11/14/2018	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	85	mg/L	20		11/14/2018	RBYOUNG
Bicarbonate	SM2320B 251C	100	mg/L	25		11/14/2018	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		11/14/2018	RBYOUNG
Conductivity	SM2320B 251C	1700	umhos/cm	10		11/14/2018	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		11/14/2018	RBYOUNG
pH	SM2320B 251C	7.04	Unit	2		11/14/2018	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	23.4	C	15		11/14/2018	RBYOUNG
Color	SM 2120 B	<5	CU	5		11/14/2018	RBYOUNG
Turbidity	SM 2130 B	6	NTU	0.40		11/14/2018	ABOBADILLA

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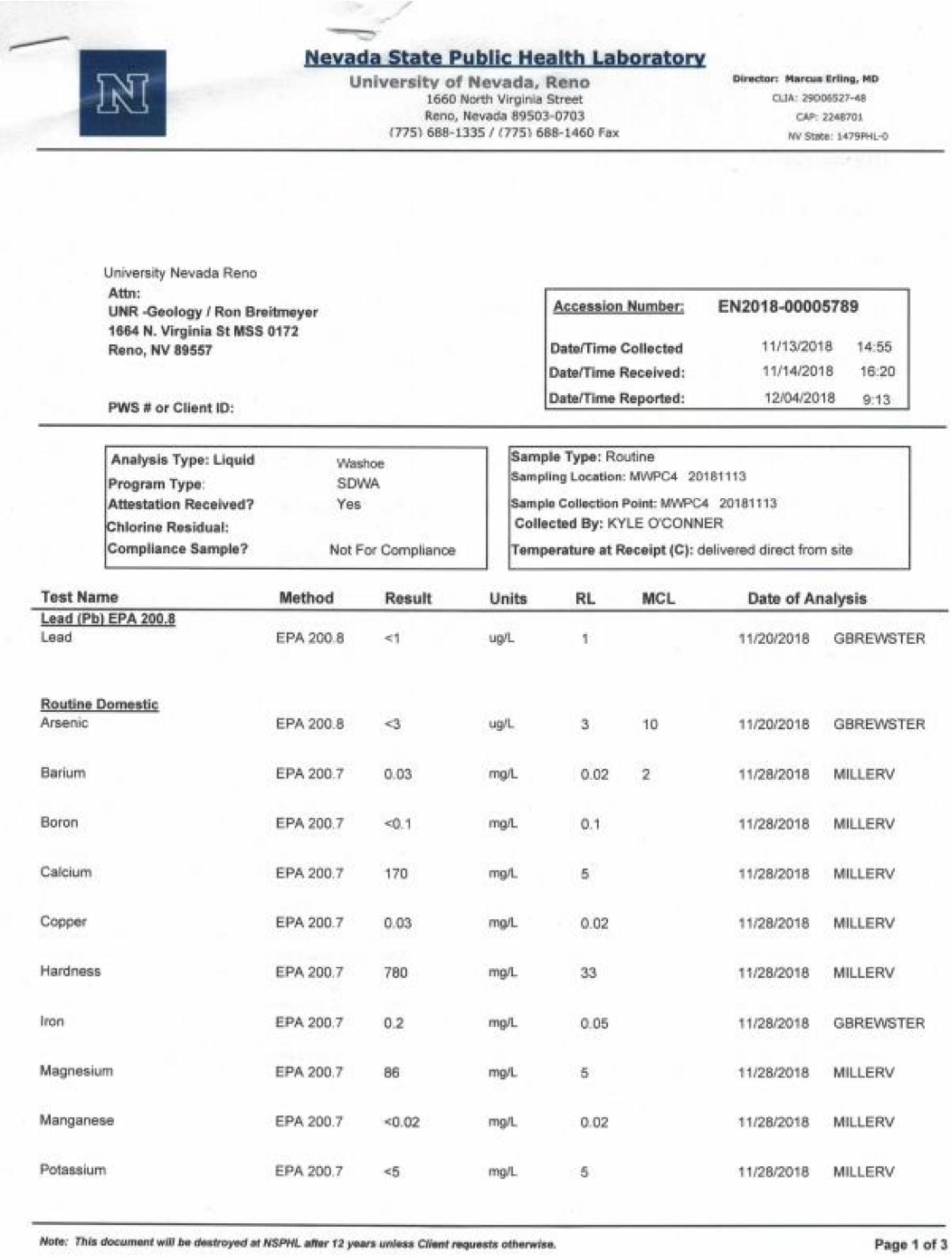

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PWS # or Client ID:

Accession Number:	**EN2018-00005789**	
Date/Time Collected	11/13/2018	14:55
Date/Time Received:	11/14/2018	16:20
Date/Time Reported:	12/04/2018	9:13

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4 20181113
Sample Collection Point: MWPC4 20181113
Collected By: KYLE O'CONNER
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<1	ug/L	1		11/20/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/20/2018	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	11/28/2018	MILLERV
Boron	EPA 200.7	<0.1	mg/L	0.1		11/28/2018	MILLERV
Calcium	EPA 200.7	170	mg/L	5		11/28/2018	MILLERV
Copper	EPA 200.7	0.03	mg/L	0.02		11/28/2018	MILLERV
Hardness	EPA 200.7	780	mg/L	33		11/28/2018	MILLERV
Iron	EPA 200.7	0.2	mg/L	0.05		11/28/2018	GBREWSTER
Magnesium	EPA 200.7	86	mg/L	5		11/28/2018	MILLERV
Manganese	EPA 200.7	<0.02	mg/L	0.02		11/28/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		11/28/2018	MILLERV

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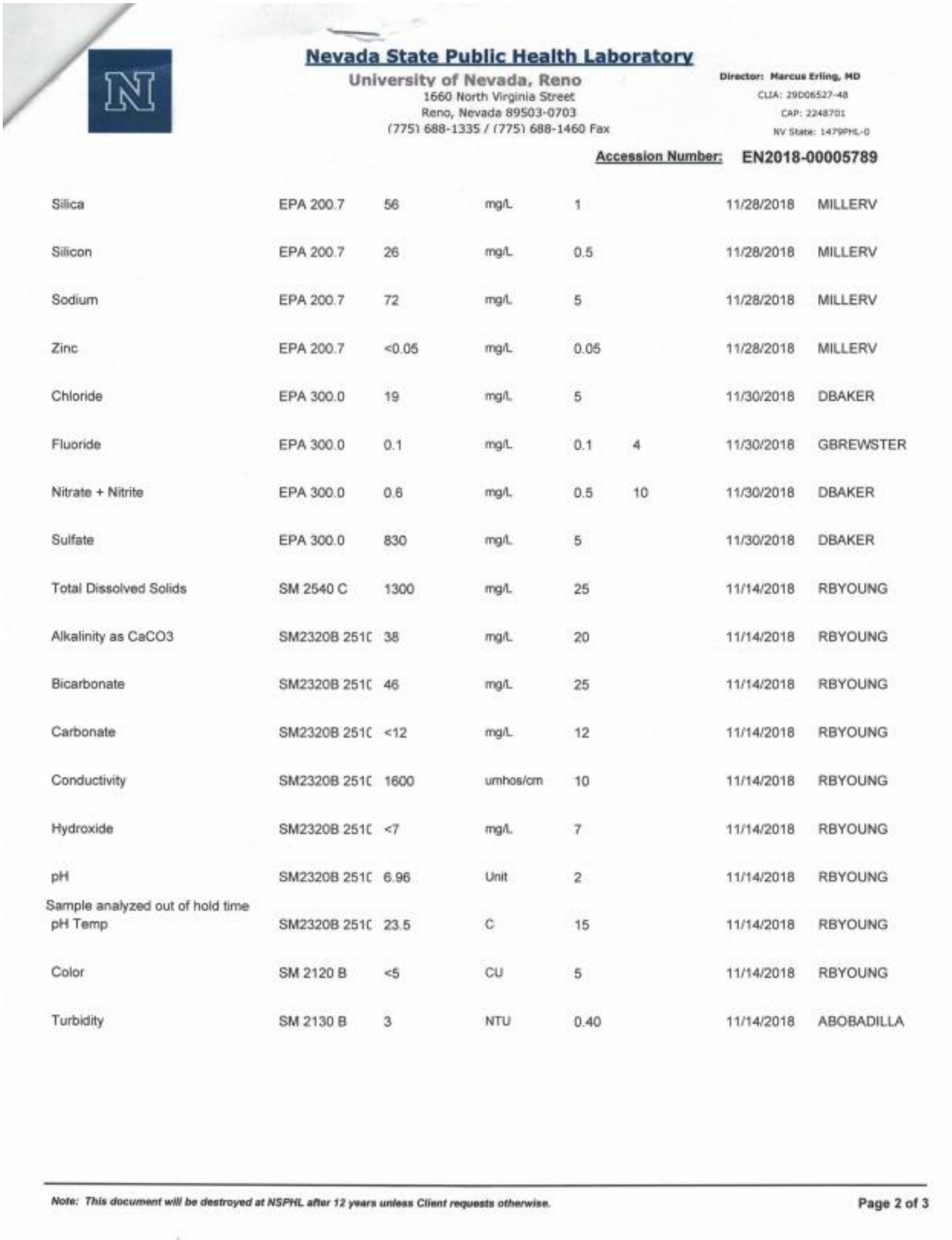

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Accession Number: **EN2018-00005789**

Silica	EPA 200.7	56	mg/L	1		11/28/2018	MILLERV
Silicon	EPA 200.7	26	mg/L	0.5		11/28/2018	MILLERV
Sodium	EPA 200.7	72	mg/L	5		11/28/2018	MILLERV
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/28/2018	MILLERV
Chloride	EPA 300.0	19	mg/L	5		11/30/2018	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	11/30/2018	GBREWSTER
Nitrate + Nitrite	EPA 300.0	0.6	mg/L	0.5	10	11/30/2018	DBAKER
Sulfate	EPA 300.0	830	mg/L	5		11/30/2018	DBAKER
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		11/14/2018	RBYOUNG
Alkalinity as CaCO3	SM2320B 251(	38	mg/L	20		11/14/2018	RBYOUNG
Bicarbonate	SM2320B 251(	46	mg/L	25		11/14/2018	RBYOUNG
Carbonate	SM2320B 251(	<12	mg/L	12		11/14/2018	RBYOUNG
Conductivity	SM2320B 251(	1600	umhos/cm	10		11/14/2018	RBYOUNG
Hydroxide	SM2320B 251(	<7	mg/L	7		11/14/2018	RBYOUNG
pH	SM2320B 251(	6.96	Unit	2		11/14/2018	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251(	23.5	C	15		11/14/2018	RBYOUNG
Color	SM 2120 B	<5	CU	5		11/14/2018	RBYOUNG
Turbidity	SM 2130 B	3	NTU	0.40		11/14/2018	ABOBADILLA

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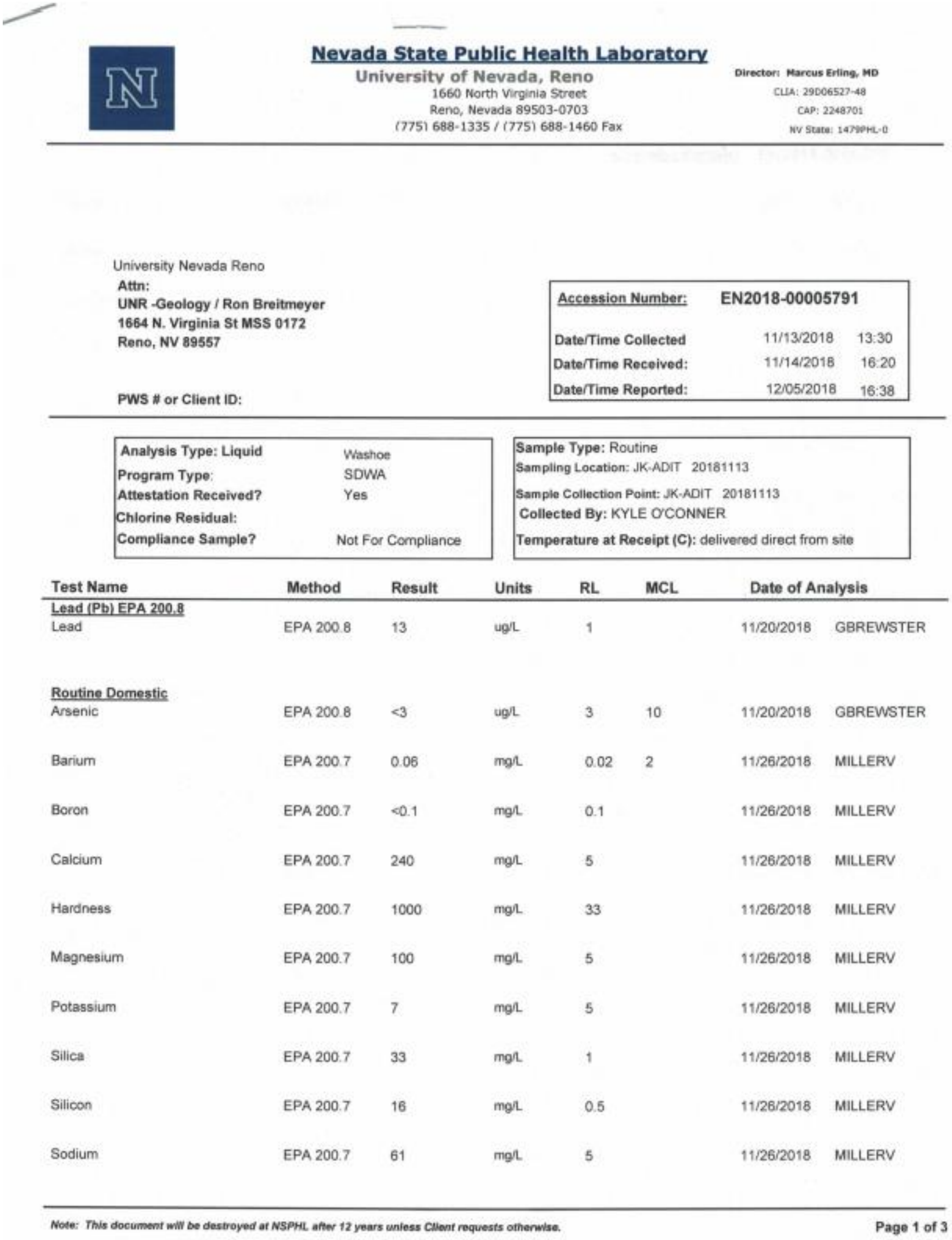

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Reno, Nevada 89503-0703
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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
Attn:
UNR -Geology / Ron Breitmeyer
1664 N. Virginia St MSS 0172
Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2018-00005791**	
Date/Time Collected	11/13/2018	13:30
Date/Time Received:	11/14/2018	16:20
Date/Time Reported:	12/05/2018	16:38

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: JK-ADIT 20181113
Sample Collection Point: JK-ADIT 20181113
Collected By: KYLE O'CONNER
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	13	ug/L	1		11/20/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	11/20/2018	GBREWSTER
Barium	EPA 200.7	0.06	mg/L	0.02	2	11/26/2018	MILLERV
Boron	EPA 200.7	<0.1	mg/L	0.1		11/26/2018	MILLERV
Calcium	EPA 200.7	240	mg/L	5		11/26/2018	MILLERV
Hardness	EPA 200.7	1000	mg/L	33		11/26/2018	MILLERV
Magnesium	EPA 200.7	100	mg/L	5		11/26/2018	MILLERV
Potassium	EPA 200.7	7	mg/L	5		11/26/2018	MILLERV
Silica	EPA 200.7	33	mg/L	1		11/26/2018	MILLERV
Silicon	EPA 200.7	16	mg/L	0.5		11/26/2018	MILLERV
Sodium	EPA 200.7	61	mg/L	5		11/26/2018	MILLERV

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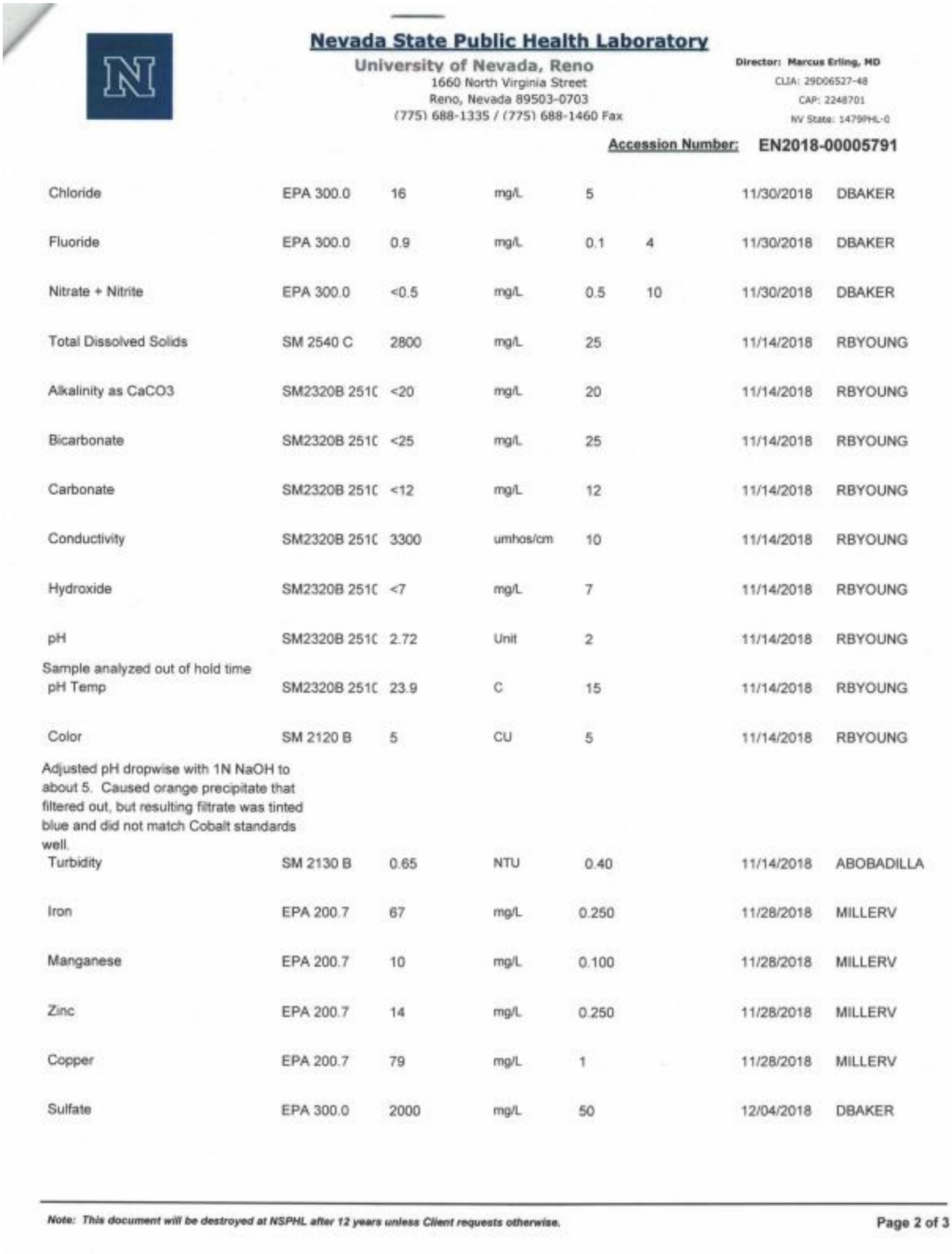

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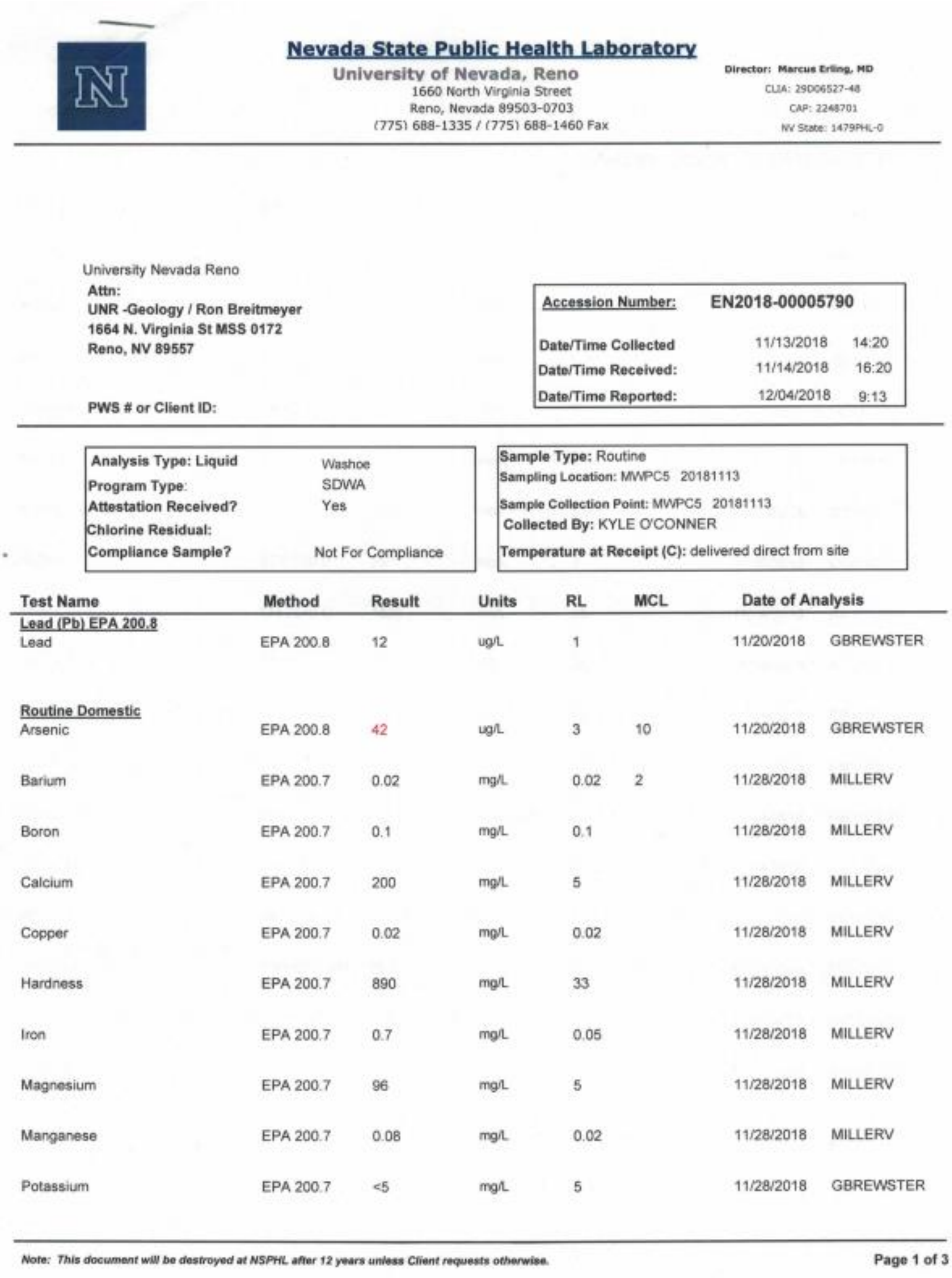
NV State: 1479PHL-0

Accession Number: **EN2018-00005791**

Chloride	EPA 300.0	16	mg/L	5		11/30/2018	DBAKER
Fluoride	EPA 300.0	0.9	mg/L	0.1	4	11/30/2018	DBAKER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/30/2018	DBAKER
Total Dissolved Solids	SM 2540 C	2800	mg/L	25		11/14/2018	RBYOUNG
Alkalinity as CaCO3	SM2320B 251(	<20	mg/L	20		11/14/2018	RBYOUNG
Bicarbonate	SM2320B 251(	<25	mg/L	25		11/14/2018	RBYOUNG
Carbonate	SM2320B 251(	<12	mg/L	12		11/14/2018	RBYOUNG
Conductivity	SM2320B 251(	3300	umhos/cm	10		11/14/2018	RBYOUNG
Hydroxide	SM2320B 251(	<7	mg/L	7		11/14/2018	RBYOUNG
pH	SM2320B 251(	2.72	Unit	2		11/14/2018	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251(	23.9	C	15		11/14/2018	RBYOUNG
Color	SM 2120 B	5	CU	5		11/14/2018	RBYOUNG
Adjusted pH dropwise with 1N NaOH to about 5. Caused orange precipitate that filtered out, but resulting filtrate was tinted blue and did not match Cobalt standards well.							
Turbidity	SM 2130 B	0.65	NTU	0.40		11/14/2018	ABOBADILLA
Iron	EPA 200.7	67	mg/L	0.250		11/28/2018	MILLERV
Manganese	EPA 200.7	10	mg/L	0.100		11/28/2018	MILLERV
Zinc	EPA 200.7	14	mg/L	0.250		11/28/2018	MILLERV
Copper	EPA 200.7	79	mg/L	1		11/28/2018	MILLERV
Sulfate	EPA 300.0	2000	mg/L	50		12/04/2018	DBAKER



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NV State: 1479PHL-0

University Nevada Reno
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1664 N. Virginia St MSS 0172
Reno, NV 89557

PWS # or Client ID:

Accession Number: **EN2018-00005790**

Date/Time Collected 11/13/2018 14:20
Date/Time Received: 11/14/2018 16:20
Date/Time Reported: 12/04/2018 9:13

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5 20181113
Sample Collection Point: MWPC5 20181113
Collected By: KYLE O'CONNER
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	12	ug/L	1		11/20/2018	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	42	ug/L	3	10	11/20/2018	GBREWSTER
Barium	EPA 200.7	0.02	mg/L	0.02	2	11/28/2018	MILLERV
Boron	EPA 200.7	0.1	mg/L	0.1		11/28/2018	MILLERV
Calcium	EPA 200.7	200	mg/L	5		11/28/2018	MILLERV
Copper	EPA 200.7	0.02	mg/L	0.02		11/28/2018	MILLERV
Hardness	EPA 200.7	890	mg/L	33		11/28/2018	MILLERV
Iron	EPA 200.7	0.7	mg/L	0.05		11/28/2018	MILLERV
Magnesium	EPA 200.7	96	mg/L	5		11/28/2018	MILLERV
Manganese	EPA 200.7	0.08	mg/L	0.02		11/28/2018	MILLERV
Potassium	EPA 200.7	<5	mg/L	5		11/28/2018	GBREWSTER

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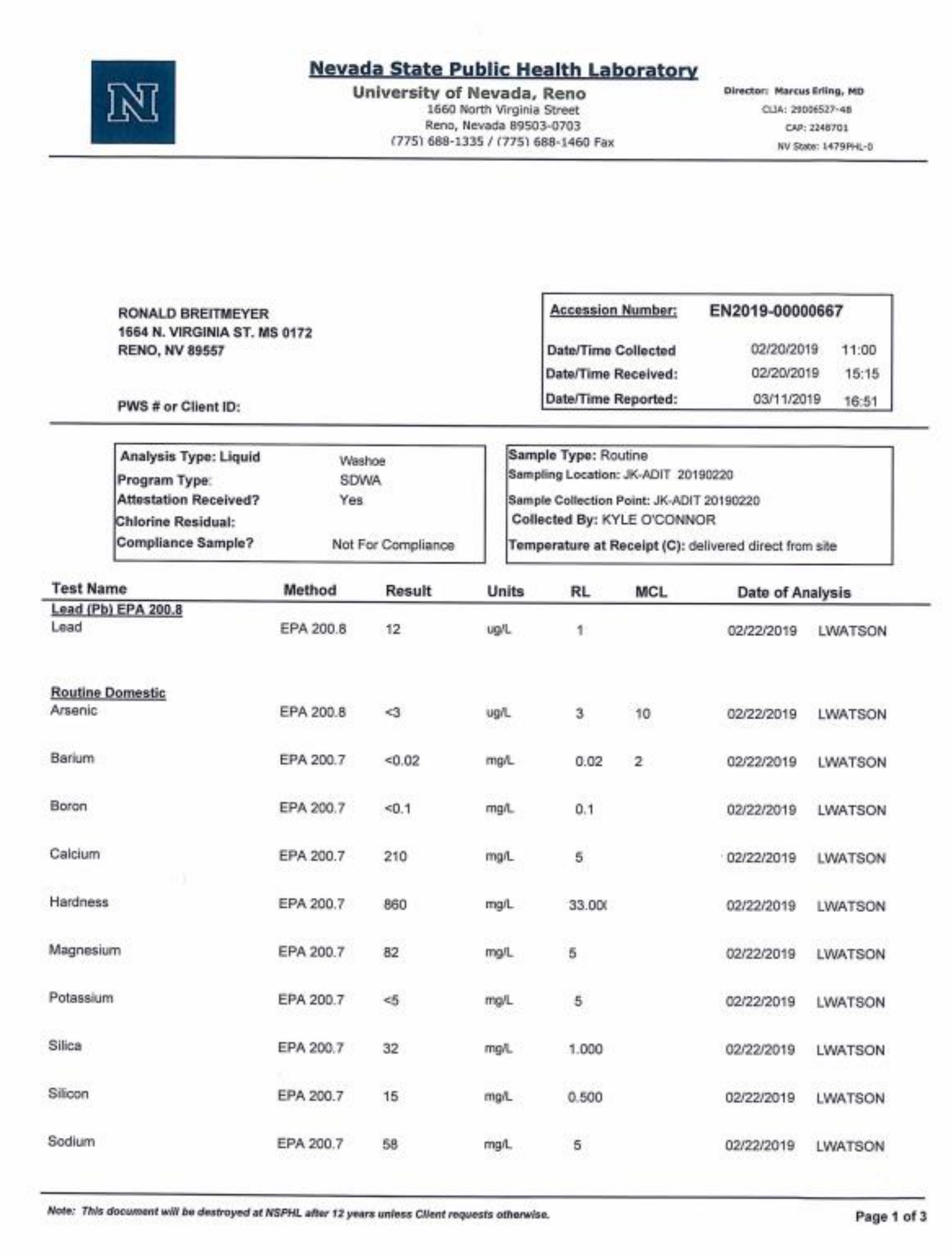
Silica	EPA 200.7	71	mg/L	1		11/28/2018	MILLERV
Silicon	EPA 200.7	33	mg/L	0.5		11/28/2018	MILLERV
Sodium	EPA 200.7	82	mg/L	5		11/28/2018	MILLERV
Zinc	EPA 200.7	<0.05	mg/L	0.05		11/28/2018	MILLERV
Chloride	EPA 300.0	21	mg/L	5		11/30/2018	DBAKER
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	11/30/2018	DBAKER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	11/30/2018	DBAKER
Sulfate	EPA 300.0	950	mg/L	5		11/30/2018	DBAKER
Total Dissolved Solids	SM 2540 C	1500	mg/L	25		11/14/2018	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	96	mg/L	20		11/14/2018	RBYOUNG
Bicarbonate	SM2320B 251C	120	mg/L	25		11/14/2018	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		11/14/2018	RBYOUNG
Conductivity	SM2320B 251C	1800	umhos/cm	10		11/14/2018	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		11/14/2018	RBYOUNG
pH	SM2320B 251C	7.06	Unit	2		11/14/2018	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	23.7	C	15		11/14/2018	RBYOUNG
Color	SM 2120 B	<5	CU	5		11/14/2018	RBYOUNG
Turbidity	SM 2130 B	11	NTU	0.40		11/14/2018	ABOBADILLA

February 2019 Results



Nevada State Public Health Laboratory
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CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000667**	
Date/Time Collected	02/20/2019	11:00
Date/Time Received:	02/20/2019	15:15
Date/Time Reported:	03/11/2019	16:51

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: JK-ADIT 20190220
Sample Collection Point: JK-ADIT 20190220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	12	ug/L	1		02/22/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	02/22/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.02	2	02/22/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.1		02/22/2019	LWATSON
Calcium	EPA 200.7	210	mg/L	5		02/22/2019	LWATSON
Hardness	EPA 200.7	860	mg/L	33.00(		02/22/2019	LWATSON
Magnesium	EPA 200.7	82	mg/L	5		02/22/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		02/22/2019	LWATSON
Silica	EPA 200.7	32	mg/L	1.000		02/22/2019	LWATSON
Silicon	EPA 200.7	15	mg/L	0.500		02/22/2019	LWATSON
Sodium	EPA 200.7	58	mg/L	5		02/22/2019	LWATSON

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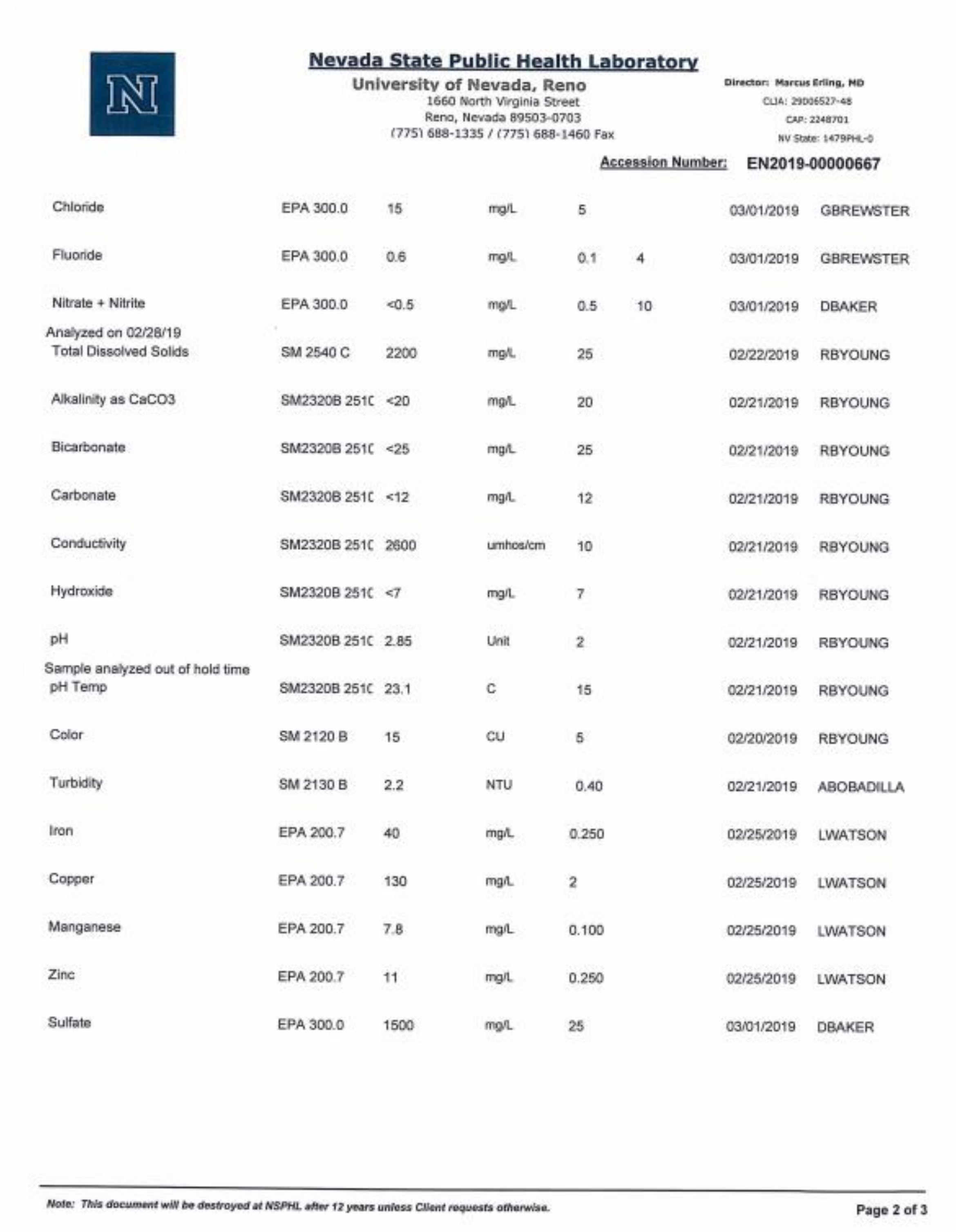

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NV State: 1479PHL-0

Accession Number: EN2019-00000667

Chloride	EPA 300.0	15	mg/L	5		03/01/2019	GBREWSTER
Fluoride	EPA 300.0	0.6	mg/L	0.1	4	03/01/2019	GBREWSTER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	03/01/2019	DBAKER
Analyzed on 02/28/19							
Total Dissolved Solids	SM 2540 C	2200	mg/L	25		02/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251	<20	mg/L	20		02/21/2019	RBYOUNG
Bicarbonate	SM2320B 251	<25	mg/L	25		02/21/2019	RBYOUNG
Carbonate	SM2320B 251	<12	mg/L	12		02/21/2019	RBYOUNG
Conductivity	SM2320B 251	2600	umhos/cm	10		02/21/2019	RBYOUNG
Hydroxide	SM2320B 251	<7	mg/L	7		02/21/2019	RBYOUNG
pH	SM2320B 251	2.85	Unit	2		02/21/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251	23.1	C	15		02/21/2019	RBYOUNG
Color	SM 2120 B	15	CU	5		02/20/2019	RBYOUNG
Turbidity	SM 2130 B	2.2	NTU	0.40		02/21/2019	ABOBADILLA
Iron	EPA 200.7	40	mg/L	0.250		02/25/2019	LWATSON
Copper	EPA 200.7	130	mg/L	2		02/25/2019	LWATSON
Manganese	EPA 200.7	7.8	mg/L	0.100		02/25/2019	LWATSON
Zinc	EPA 200.7	11	mg/L	0.250		02/25/2019	LWATSON
Sulfate	EPA 300.0	1500	mg/L	25		03/01/2019	DBAKER

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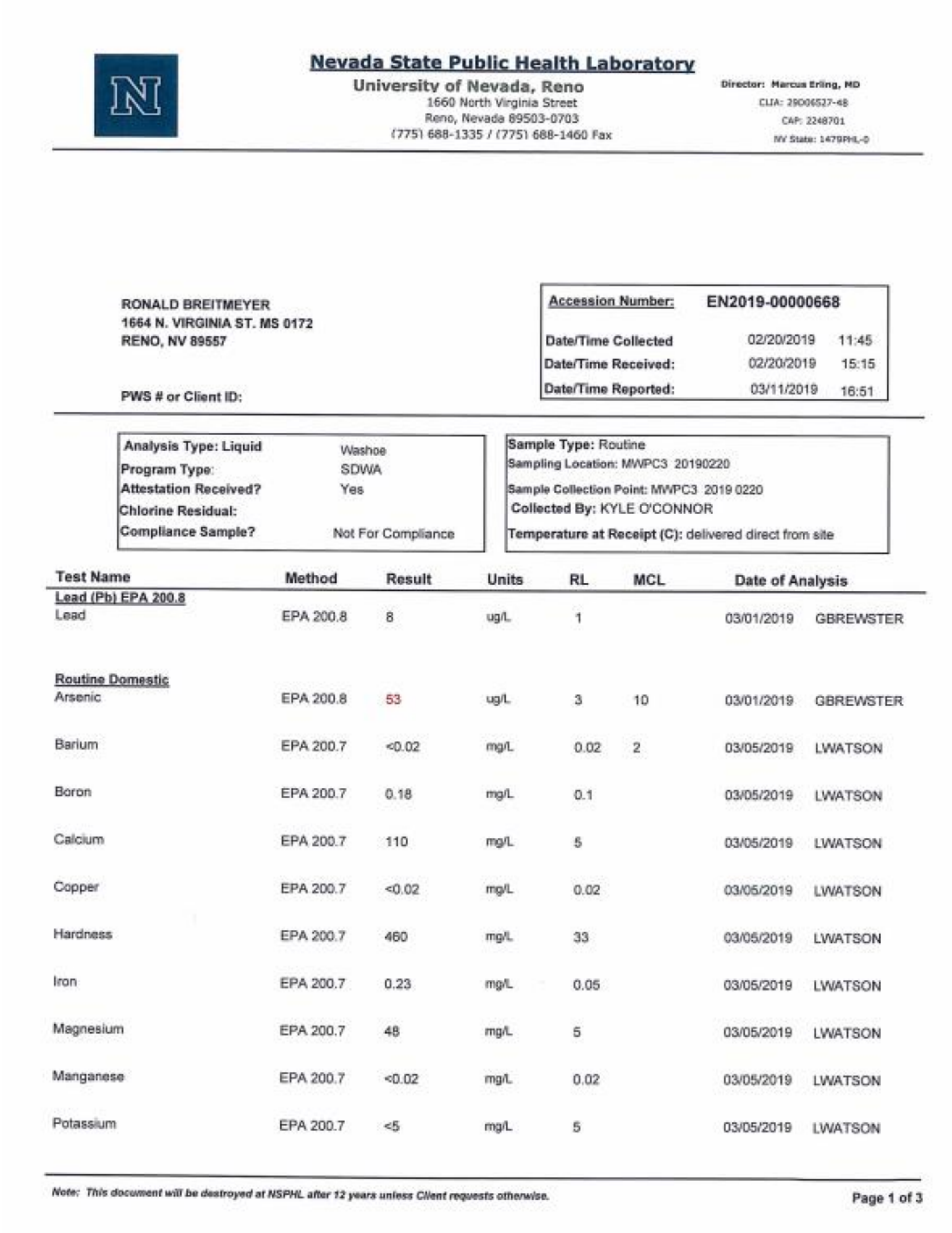

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CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000668**	
Date/Time Collected	02/20/2019	11:45
Date/Time Received:	02/20/2019	15:15
Date/Time Reported:	03/11/2019	16:51

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3 20190220
Sample Collection Point: MWPC3 2019 0220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	8	ug/L	1		03/01/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	53	ug/L	3	10	03/01/2019	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	03/05/2019	LWATSON
Boron	EPA 200.7	0.18	mg/L	0.1		03/05/2019	LWATSON
Calcium	EPA 200.7	110	mg/L	5		03/05/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.02		03/05/2019	LWATSON
Hardness	EPA 200.7	460	mg/L	33		03/05/2019	LWATSON
Iron	EPA 200.7	0.23	mg/L	0.05		03/05/2019	LWATSON
Magnesium	EPA 200.7	48	mg/L	5		03/05/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.02		03/05/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/05/2019	LWATSON

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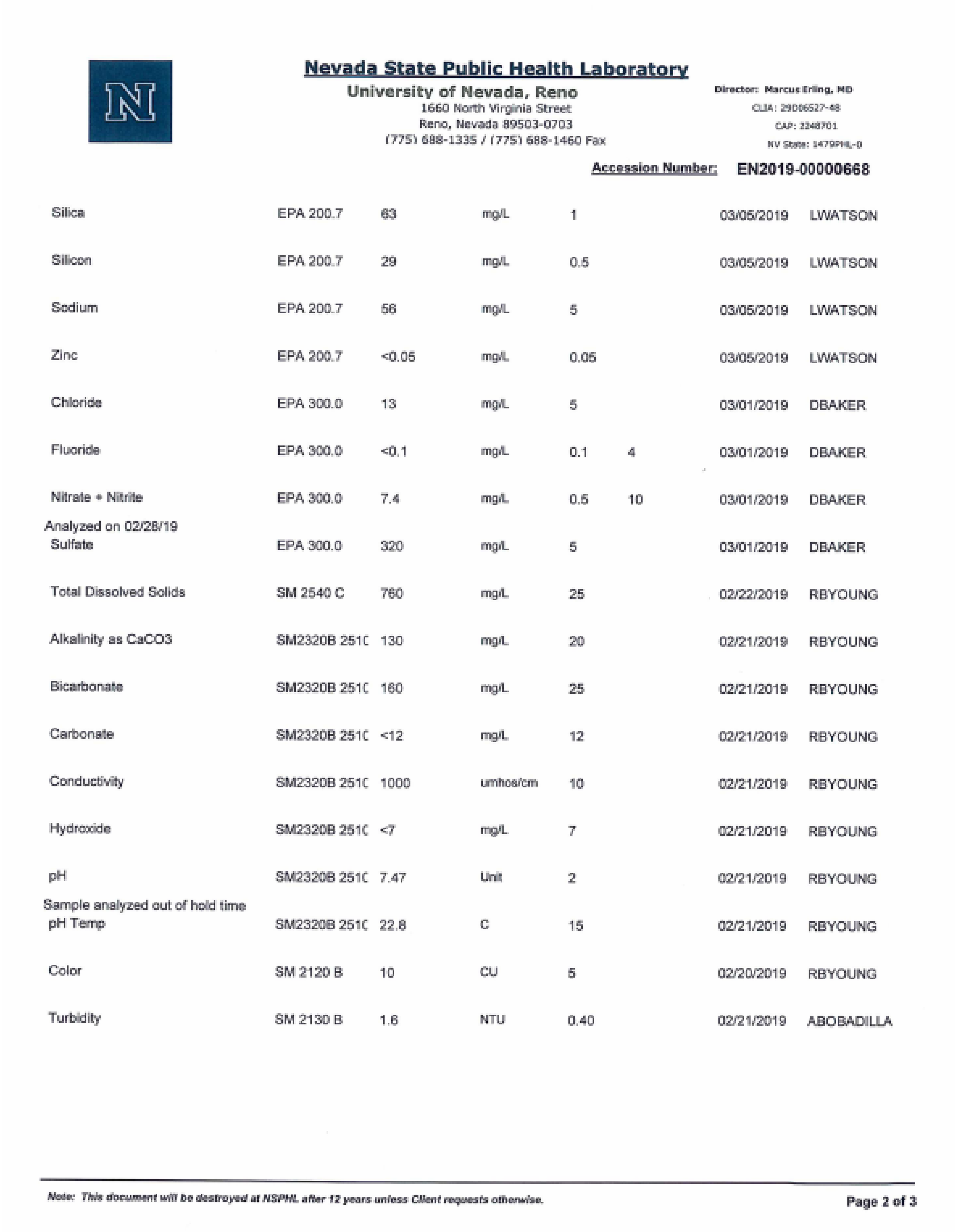

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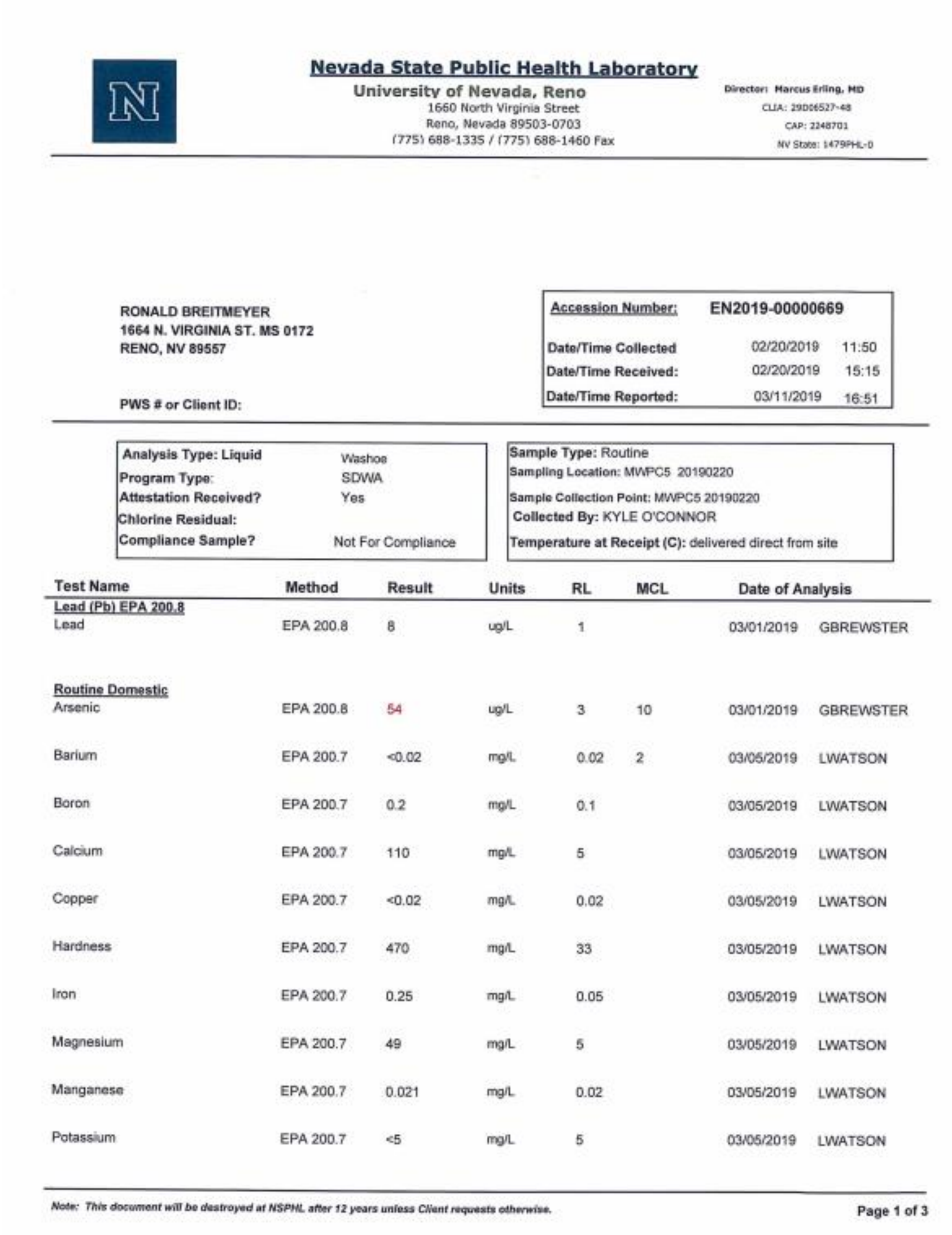
NV State: 1479PHL-0

Accession Number: **EN2019-00000668**

Silica	EPA 200.7	63	mg/L	1		03/05/2019	LWATSON
Silicon	EPA 200.7	29	mg/L	0.5		03/05/2019	LWATSON
Sodium	EPA 200.7	56	mg/L	5		03/05/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		03/05/2019	LWATSON
Chloride	EPA 300.0	13	mg/L	5		03/01/2019	DBAKER
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	03/01/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	7.4	mg/L	0.5	10	03/01/2019	DBAKER
Analyzed on 02/28/19							
Sulfate	EPA 300.0	320	mg/L	5		03/01/2019	DBAKER
Total Dissolved Solids	SM 2540 C	760	mg/L	25		02/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	130	mg/L	20		02/21/2019	RBYOUNG
Bicarbonate	SM2320B 251C	160	mg/L	25		02/21/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		02/21/2019	RBYOUNG
Conductivity	SM2320B 251C	1000	umhos/cm	10		02/21/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		02/21/2019	RBYOUNG
pH	SM2320B 251C	7.47	Unit	2		02/21/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	22.8	C	15		02/21/2019	RBYOUNG
Color	SM 2120 B	10	CU	5		02/20/2019	RBYOUNG
Turbidity	SM 2130 B	1.6	NTU	0.40		02/21/2019	ABOBADILLA



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NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000669**	
Date/Time Collected	02/20/2019	11:50
Date/Time Received:	02/20/2019	15:15
Date/Time Reported:	03/11/2019	16:51

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5 20190220
Sample Collection Point: MWPC5 20190220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	8	ug/L	1		03/01/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	54	ug/L	3	10	03/01/2019	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	03/05/2019	LWATSON
Boron	EPA 200.7	0.2	mg/L	0.1		03/05/2019	LWATSON
Calcium	EPA 200.7	110	mg/L	5		03/05/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.02		03/05/2019	LWATSON
Hardness	EPA 200.7	470	mg/L	33		03/05/2019	LWATSON
Iron	EPA 200.7	0.25	mg/L	0.05		03/05/2019	LWATSON
Magnesium	EPA 200.7	49	mg/L	5		03/05/2019	LWATSON
Manganese	EPA 200.7	0.021	mg/L	0.02		03/05/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/05/2019	LWATSON

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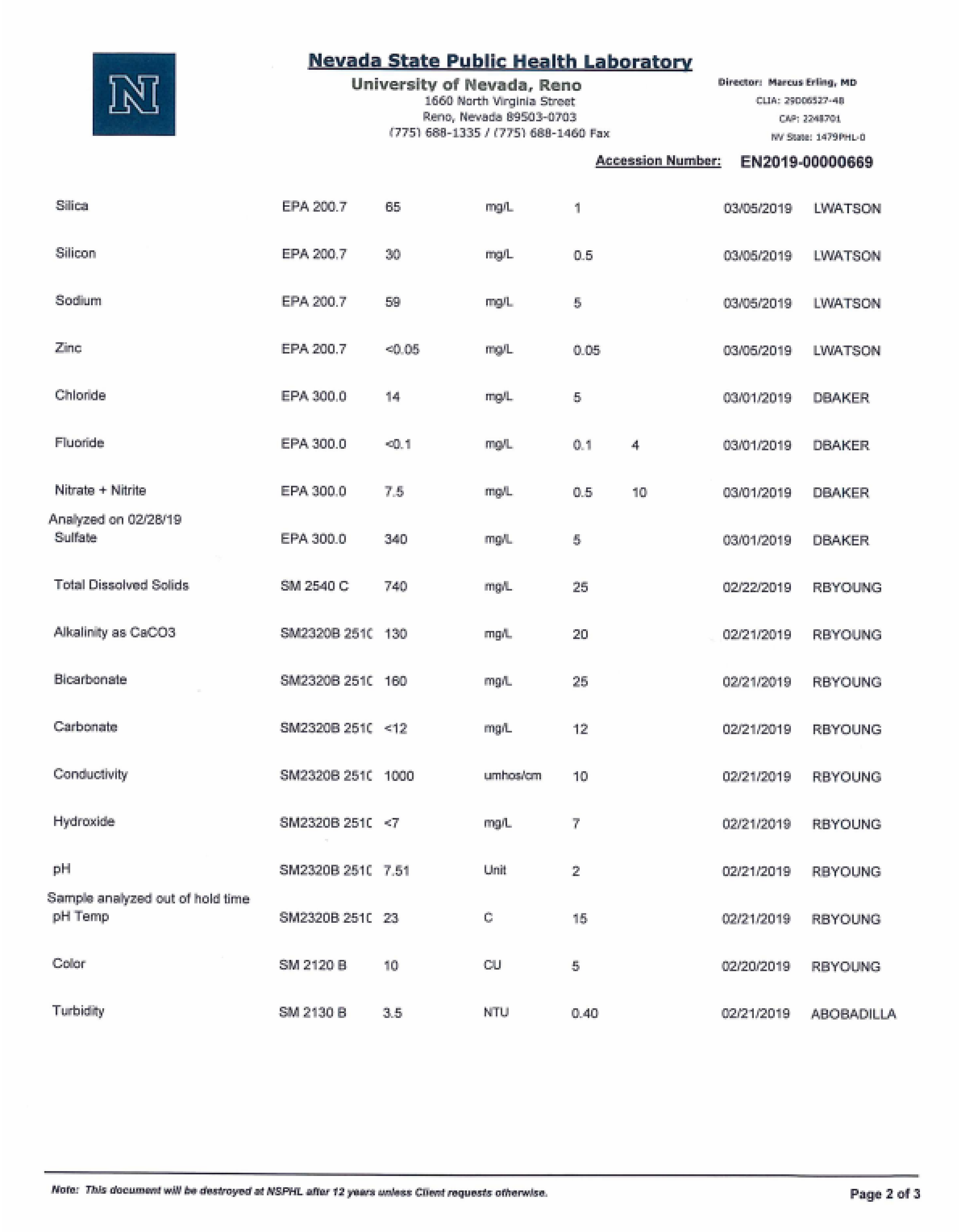

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Accession Number: **EN2019-00000669**

Silica	EPA 200.7	65	mg/L	1		03/05/2019	LWATSON
Silicon	EPA 200.7	30	mg/L	0.5		03/05/2019	LWATSON
Sodium	EPA 200.7	59	mg/L	5		03/05/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		03/05/2019	LWATSON
Chloride	EPA 300.0	14	mg/L	5		03/01/2019	DBAKER
Fluoride	EPA 300.0	<0.1	mg/L	0.1	4	03/01/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	7.5	mg/L	0.5	10	03/01/2019	DBAKER
Analyzed on 02/28/19							
Sulfate	EPA 300.0	340	mg/L	5		03/01/2019	DBAKER
Total Dissolved Solids	SM 2540 C	740	mg/L	25		02/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	130	mg/L	20		02/21/2019	RBYOUNG
Bicarbonate	SM2320B 251C	160	mg/L	25		02/21/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		02/21/2019	RBYOUNG
Conductivity	SM2320B 251C	1000	umhos/cm	10		02/21/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		02/21/2019	RBYOUNG
pH	SM2320B 251C	7.51	Unit	2		02/21/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	23	C	15		02/21/2019	RBYOUNG
Color	SM 2120 B	10	CU	5		02/20/2019	RBYOUNG
Turbidity	SM 2130 B	3.5	NTU	0.40		02/21/2019	ABOBADILLA

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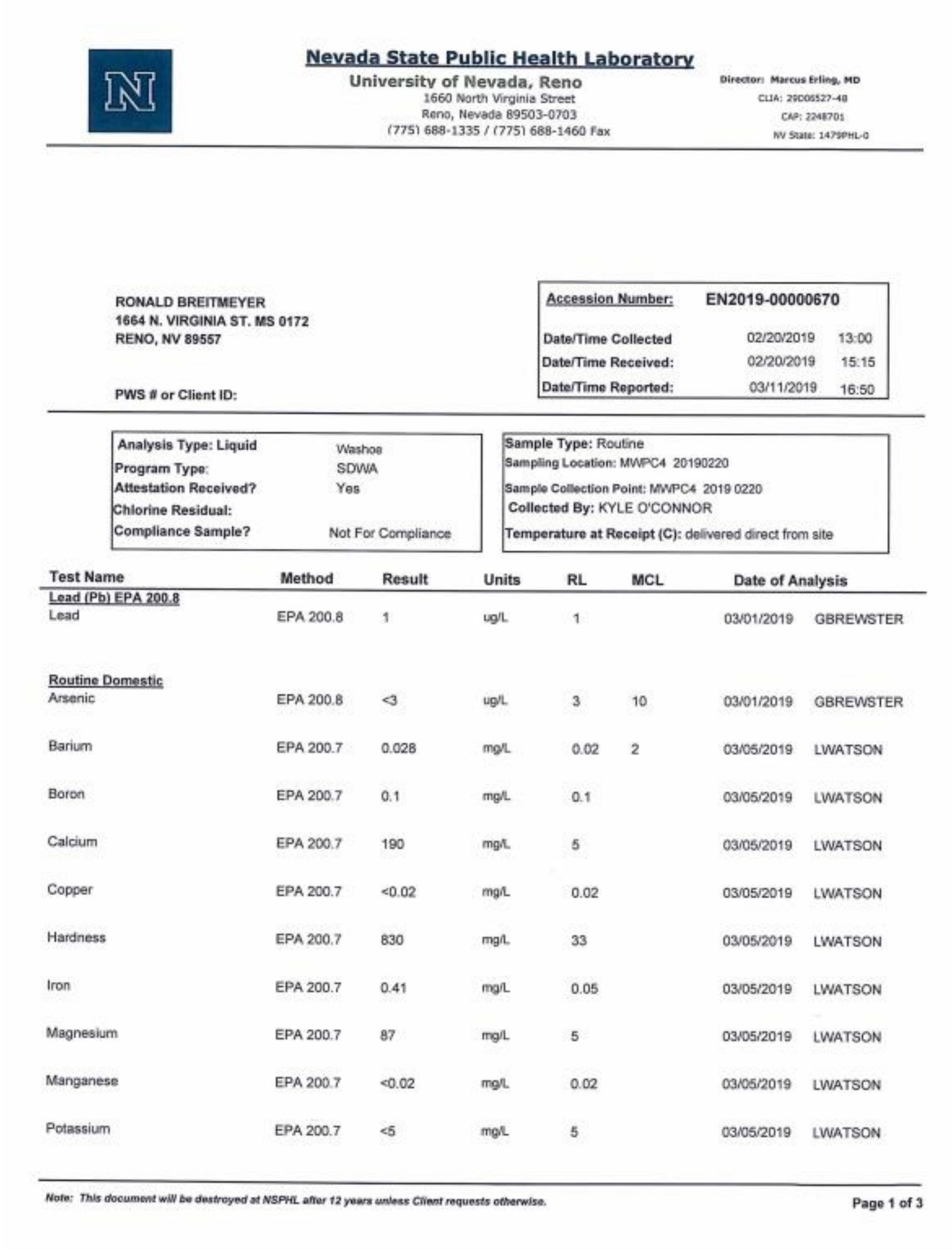

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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

RONALD BREITMEYER
1664 N. VIRGINIA ST. MS 0172
RENO, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000670**	
Date/Time Collected	02/20/2019	13:00
Date/Time Received:	02/20/2019	15:15
Date/Time Reported:	03/11/2019	16:50

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4 20190220
Sample Collection Point: MWPC4 2019 0220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	1	ug/L	1		03/01/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	03/01/2019	GBREWSTER
Barium	EPA 200.7	0.028	mg/L	0.02	2	03/05/2019	LWATSON
Boron	EPA 200.7	0.1	mg/L	0.1		03/05/2019	LWATSON
Calcium	EPA 200.7	190	mg/L	5		03/05/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.02		03/05/2019	LWATSON
Hardness	EPA 200.7	830	mg/L	33		03/05/2019	LWATSON
Iron	EPA 200.7	0.41	mg/L	0.05		03/05/2019	LWATSON
Magnesium	EPA 200.7	87	mg/L	5		03/05/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.02		03/05/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/05/2019	LWATSON

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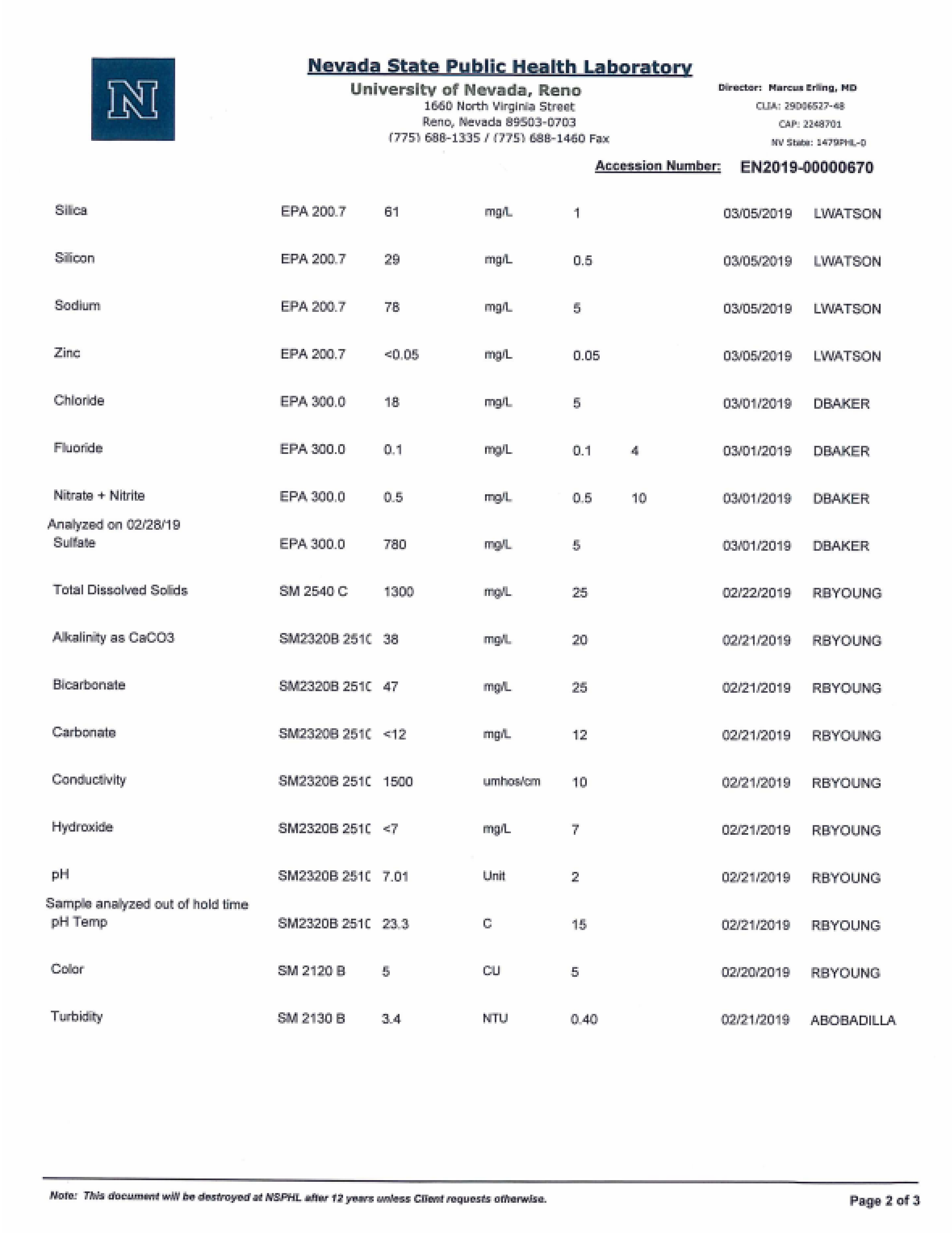

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CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2019-00000670**

Silica	EPA 200.7	61	mg/L	1		03/05/2019	LWATSON
Silicon	EPA 200.7	29	mg/L	0.5		03/05/2019	LWATSON
Sodium	EPA 200.7	78	mg/L	5		03/05/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		03/05/2019	LWATSON
Chloride	EPA 300.0	18	mg/L	5		03/01/2019	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	03/01/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	0.5	mg/L	0.5	10	03/01/2019	DBAKER
Analyzed on 02/28/19							
Sulfate	EPA 300.0	780	mg/L	5		03/01/2019	DBAKER
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		02/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251(	38	mg/L	20		02/21/2019	RBYOUNG
Bicarbonate	SM2320B 251(	47	mg/L	25		02/21/2019	RBYOUNG
Carbonate	SM2320B 251(	<12	mg/L	12		02/21/2019	RBYOUNG
Conductivity	SM2320B 251(	1500	umhos/cm	10		02/21/2019	RBYOUNG
Hydroxide	SM2320B 251(	<7	mg/L	7		02/21/2019	RBYOUNG
pH	SM2320B 251(	7.01	Unit	2		02/21/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251(	23.3	C	15		02/21/2019	RBYOUNG
Color	SM 2120 B	5	CU	5		02/20/2019	RBYOUNG
Turbidity	SM 2130 B	3.4	NTU	0.40		02/21/2019	ABOBADILLA

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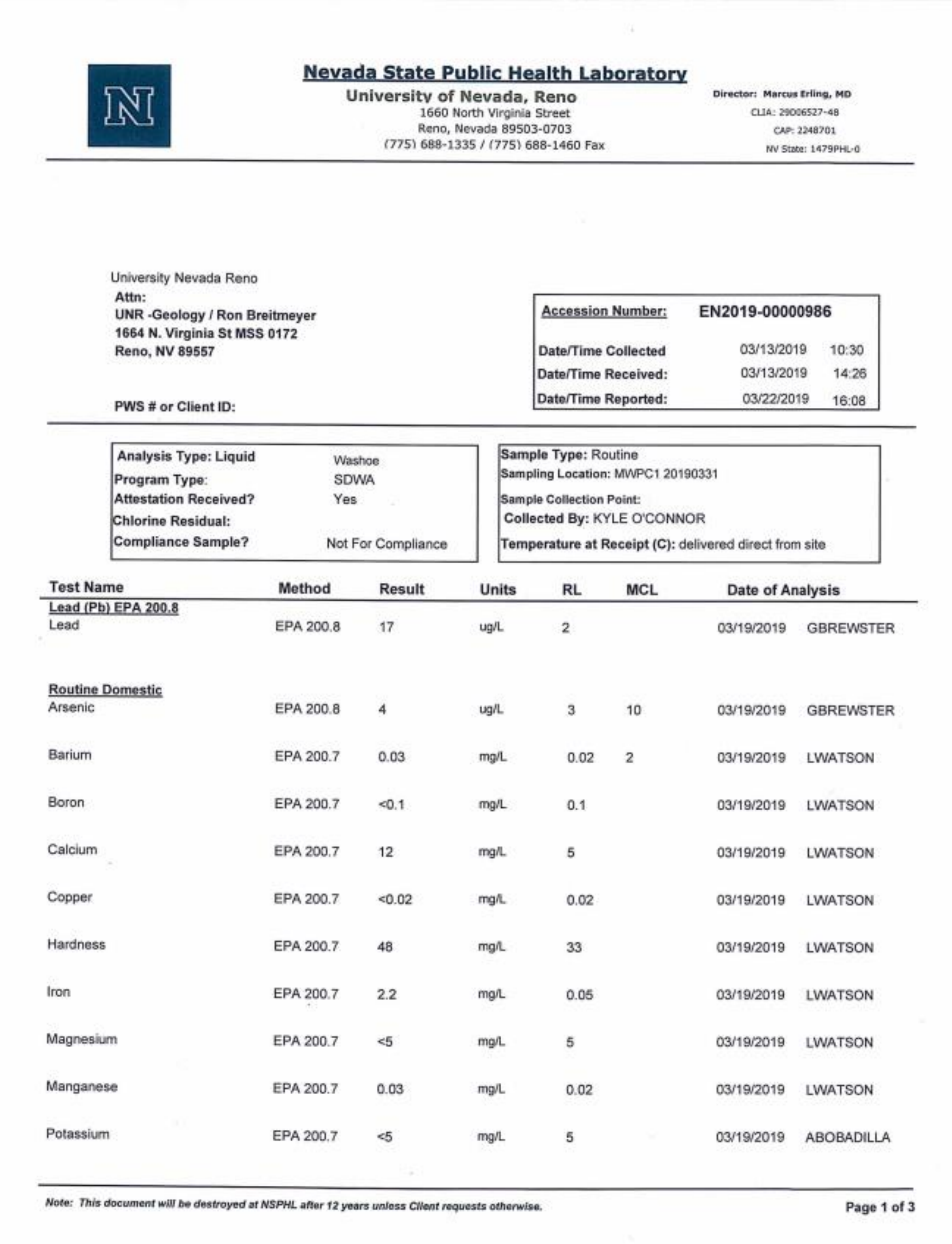
March 2019 Results



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NV State: 1479PHL-0

University Nevada Reno
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UNR -Geology / Ron Breitmeyer
1664 N. Virginia St MSS 0172
Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000986**	
Date/Time Collected	03/13/2019	10:30
Date/Time Received:	03/13/2019	14:26
Date/Time Reported:	03/22/2019	16:08

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1 20190331
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	17	ug/L	2		03/19/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	4	ug/L	3	10	03/19/2019	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	03/19/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.1		03/19/2019	LWATSON
Calcium	EPA 200.7	12	mg/L	5		03/19/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.02		03/19/2019	LWATSON
Hardness	EPA 200.7	48	mg/L	33		03/19/2019	LWATSON
Iron	EPA 200.7	2.2	mg/L	0.05		03/19/2019	LWATSON
Magnesium	EPA 200.7	<5	mg/L	5		03/19/2019	LWATSON
Manganese	EPA 200.7	0.03	mg/L	0.02		03/19/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/19/2019	ABOBADILLA

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CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2019-00000986**

Silica	EPA 200.7	57	mg/L	1		03/19/2019	LWATSON
Silicon	EPA 200.7	27	mg/L	0.5		03/19/2019	LWATSON
Sodium	EPA 200.7	21	mg/L	5		03/19/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		03/19/2019	LWATSON
Chloride	EPA 300.0	6	mg/L	5		03/20/2019	GBREWSTER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	03/20/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	1.6	mg/L	0.5	10	03/20/2019	DBAKER
anaylzed on 03/19/19							
Sulfate	EPA 300.0	47	mg/L	5		03/20/2019	DBAKER
Total Dissolved Solids	SM 2540 C	230	mg/L	25		03/14/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	30	mg/L	20		03/15/2019	RBYOUNG
Bicarbonate	SM2320B 251C	36	mg/L	25		03/15/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		03/15/2019	RBYOUNG
Conductivity	SM2320B 251C	200	umhos/cm	10		03/15/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		03/15/2019	RBYOUNG
pH	SM2320B 251C	7.41	Unit	2		03/15/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	23.3	C	15		03/15/2019	RBYOUNG
Color	SM 2120 B	30	CU	5		03/14/2019	RBYOUNG
Turbidity	SM 2130 B	34	NTU	0.40		03/14/2019	ABOBADILLA

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NV State: 1479PHL-0

University Nevada Reno
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1664 N. Virginia St MSS 0172
Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000987**	
Date/Time Collected	03/13/2019	12:30
Date/Time Received:	03/13/2019	14:26
Date/Time Reported:	03/22/2019	16:08

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2 20190313
Sample Collection Point:
Collected By: KYLE O;CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	21	ug/L	2		03/19/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	36	ug/L	3	10	03/19/2019	GBREWSTER
Barium	EPA 200.7	<0.02	mg/L	0.02	2	03/19/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.1		03/19/2019	LWATSON
Hardness	EPA 200.7	1900	mg/L	33		03/19/2019	LWATSON
Iron	EPA 200.7	15	mg/L	0.05		03/19/2019	LWATSON
Magnesium	EPA 200.7	210	mg/L	5		03/19/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/19/2019	LWATSON
Silica	EPA 200.7	100	mg/L	1		03/19/2019	LWATSON
Silicon	EPA 200.7	47	mg/L	0.5		03/19/2019	LWATSON
Sodium	EPA 200.7	64	mg/L	5		03/19/2019	LWATSON

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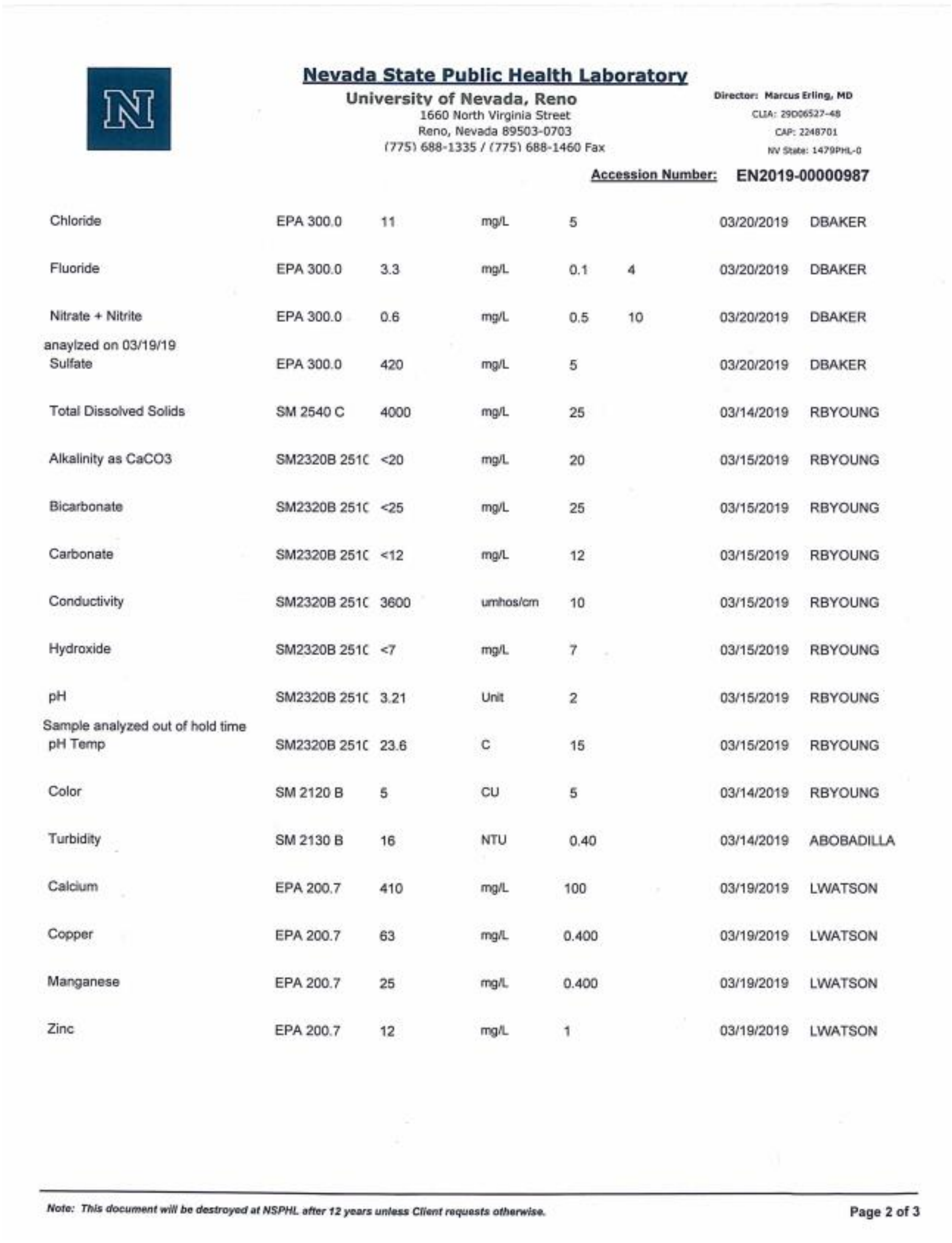

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Accession Number: **EN2019-00000987**

Chloride	EPA 300.0	11	mg/L	5		03/20/2019	DBAKER
Fluoride	EPA 300.0	3.3	mg/L	0.1	4	03/20/2019	DBAKER
Nitrate + Nitrite anaylzed on 03/19/19	EPA 300.0	0.6	mg/L	0.5	10	03/20/2019	DBAKER
Sulfate	EPA 300.0	420	mg/L	5		03/20/2019	DBAKER
Total Dissolved Solids	SM 2540 C	4000	mg/L	25		03/14/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		03/15/2019	RBYOUNG
Bicarbonate	SM2320B 251C	<25	mg/L	25		03/15/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		03/15/2019	RBYOUNG
Conductivity	SM2320B 251C	3600	umhos/cm	10		03/15/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		03/15/2019	RBYOUNG
pH Sample analyzed out of hold time	SM2320B 251C	3.21	Unit	2		03/15/2019	RBYOUNG
pH Temp	SM2320B 251C	23.6	C	15		03/15/2019	RBYOUNG
Color	SM 2120 B	5	CU	5		03/14/2019	RBYOUNG
Turbidity	SM 2130 B	16	NTU	0.40		03/14/2019	ABOBADILLA
Calcium	EPA 200.7	410	mg/L	100		03/19/2019	LWATSON
Copper	EPA 200.7	63	mg/L	0.400		03/19/2019	LWATSON
Manganese	EPA 200.7	25	mg/L	0.400		03/19/2019	LWATSON
Zinc	EPA 200.7	12	mg/L	1		03/19/2019	LWATSON

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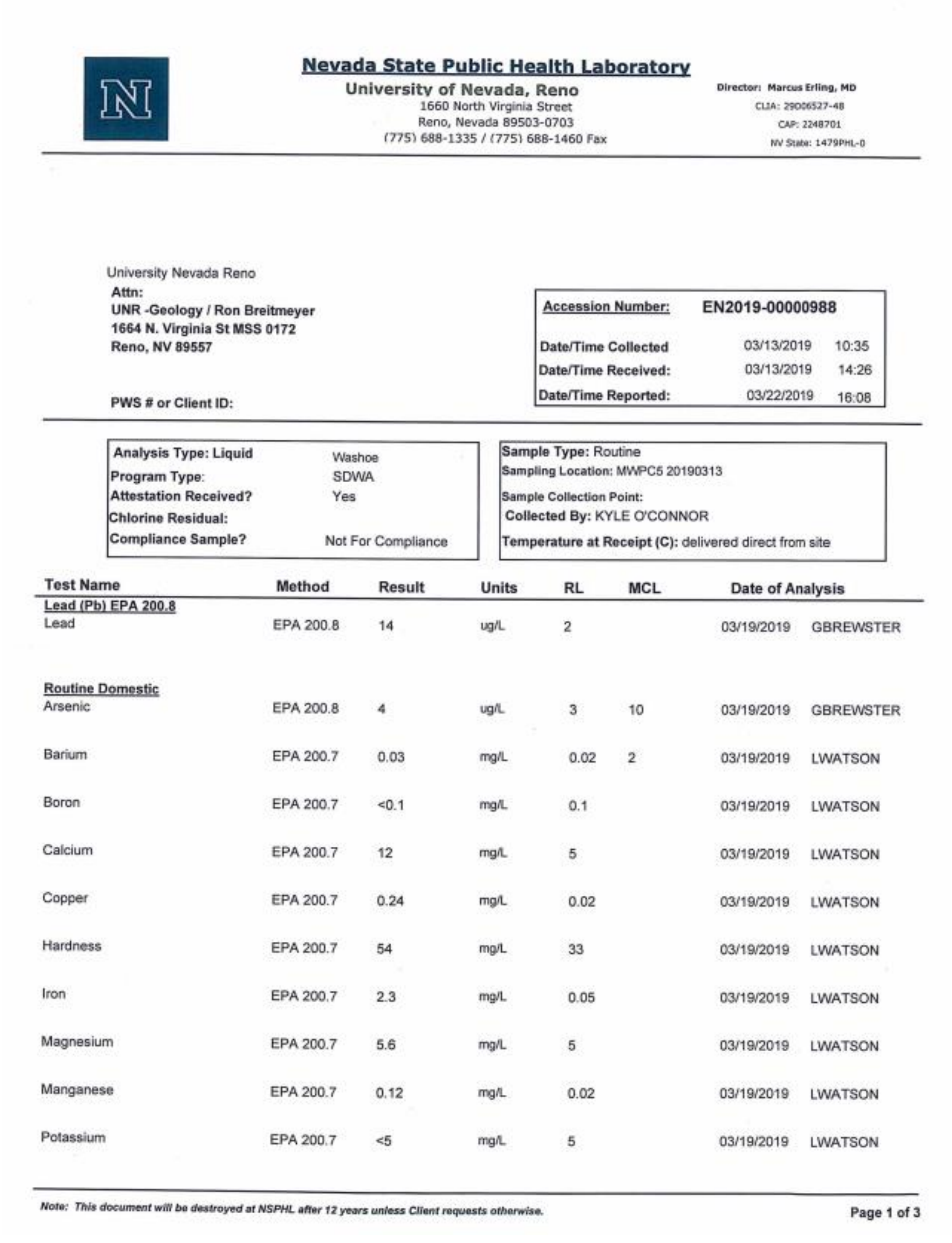

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PWS # or Client ID:

Accession Number:	**EN2019-0000988**	
Date/Time Collected	03/13/2019	10:35
Date/Time Received:	03/13/2019	14:26
Date/Time Reported:	03/22/2019	16:08

Analysis Type: Liquid Washoe
Program Type: SDWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5 20190313
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	14	ug/L	2		03/19/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	4	ug/L	3	10	03/19/2019	GBREWSTER
Barium	EPA 200.7	0.03	mg/L	0.02	2	03/19/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.1		03/19/2019	LWATSON
Calcium	EPA 200.7	12	mg/L	5		03/19/2019	LWATSON
Copper	EPA 200.7	0.24	mg/L	0.02		03/19/2019	LWATSON
Hardness	EPA 200.7	54	mg/L	33		03/19/2019	LWATSON
Iron	EPA 200.7	2.3	mg/L	0.05		03/19/2019	LWATSON
Magnesium	EPA 200.7	5.6	mg/L	5		03/19/2019	LWATSON
Manganese	EPA 200.7	0.12	mg/L	0.02		03/19/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/19/2019	LWATSON

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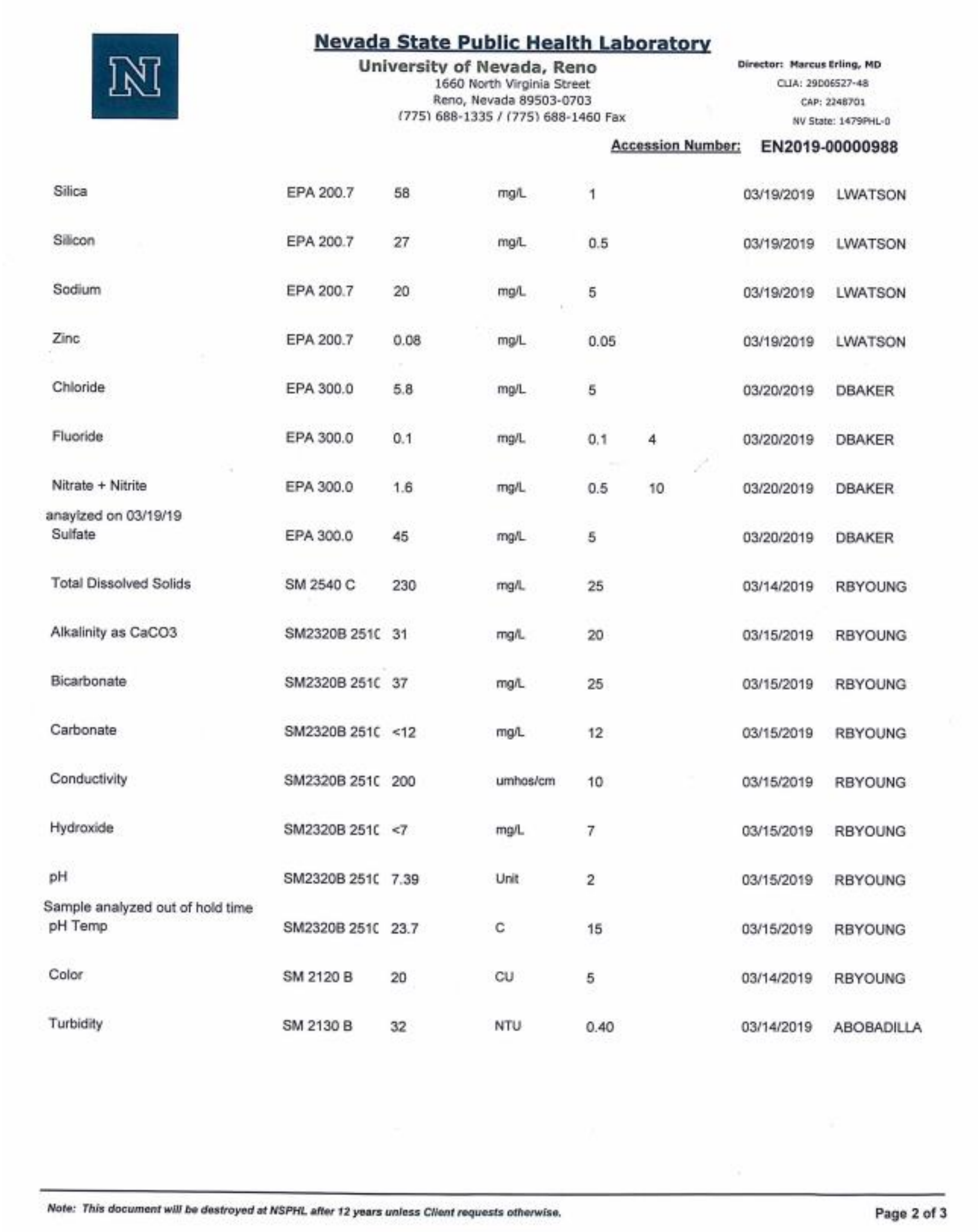

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Accession Number: **EN2019-00000988**

Silica	EPA 200.7	58	mg/L	1		03/19/2019	LWATSON
Silicon	EPA 200.7	27	mg/L	0.5		03/19/2019	LWATSON
Sodium	EPA 200.7	20	mg/L	5		03/19/2019	LWATSON
Zinc	EPA 200.7	0.08	mg/L	0.05		03/19/2019	LWATSON
Chloride	EPA 300.0	5.8	mg/L	5		03/20/2019	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	03/20/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	1.6	mg/L	0.5	10	03/20/2019	DBAKER
anayized on 03/19/19							
Sulfate	EPA 300.0	45	mg/L	5		03/20/2019	DBAKER
Total Dissolved Solids	SM 2540 C	230	mg/L	25		03/14/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	31	mg/L	20		03/15/2019	RBYOUNG
Bicarbonate	SM2320B 251C	37	mg/L	25		03/15/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		03/15/2019	RBYOUNG
Conductivity	SM2320B 251C	200	umhos/cm	10		03/15/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		03/15/2019	RBYOUNG
pH	SM2320B 251C	7.39	Unit	2		03/15/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	23.7	C	15		03/15/2019	RBYOUNG
Color	SM 2120 B	20	CU	5		03/14/2019	RBYOUNG
Turbidity	SM 2130 B	32	NTU	0.40		03/14/2019	ABOBADILLA

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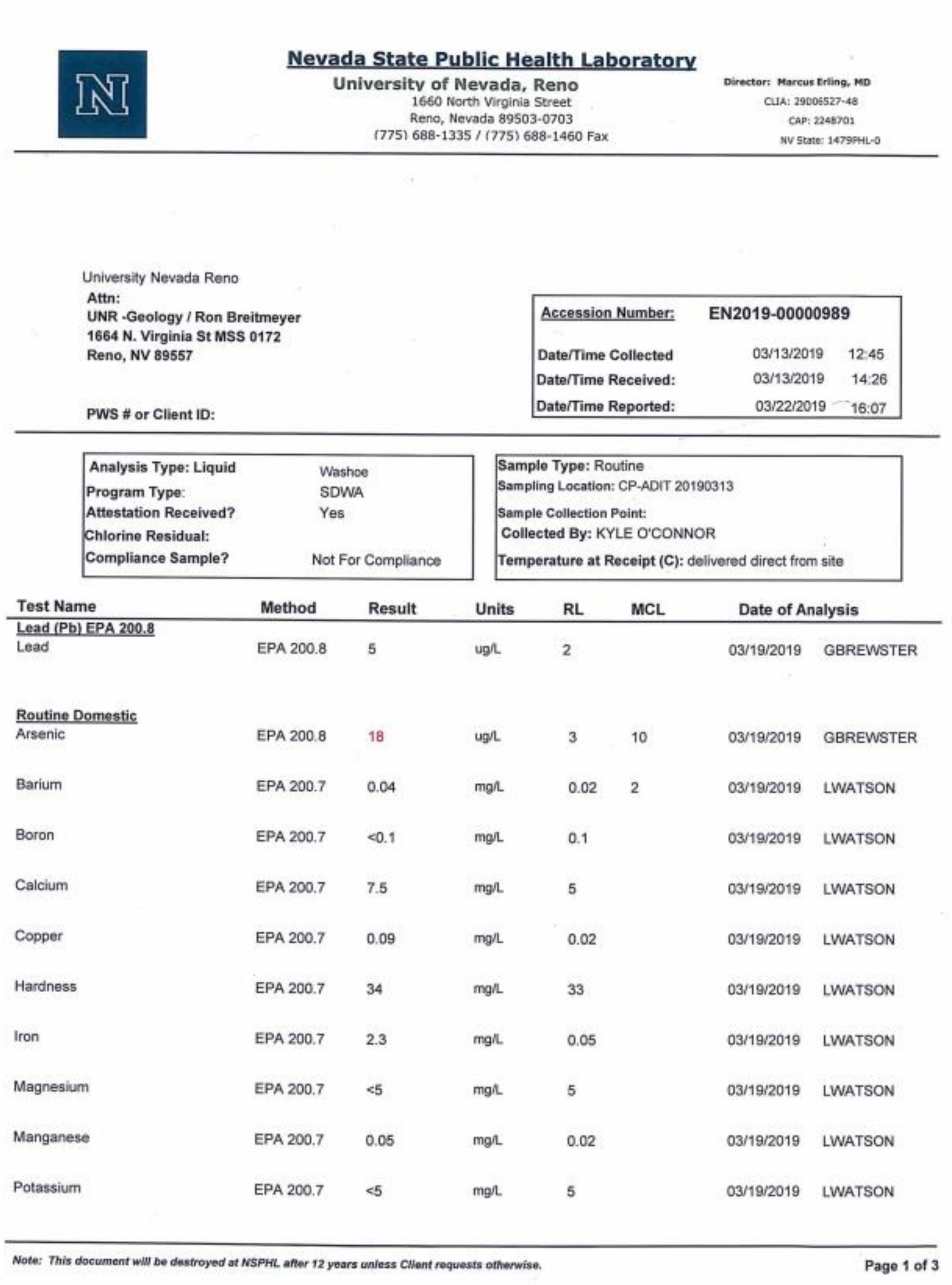

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PWS # or Client ID:

Accession Number:	**EN2019-00000989**	
Date/Time Collected	03/13/2019	12:45
Date/Time Received:	03/13/2019	14:26
Date/Time Reported:	03/22/2019	16:07

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: CP-ADIT 20190313
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	5	ug/L	2		03/19/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	18	ug/L	3	10	03/19/2019	GBREWSTER
Barium	EPA 200.7	0.04	mg/L	0.02	2	03/19/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.1		03/19/2019	LWATSON
Calcium	EPA 200.7	7.5	mg/L	5		03/19/2019	LWATSON
Copper	EPA 200.7	0.09	mg/L	0.02		03/19/2019	LWATSON
Hardness	EPA 200.7	34	mg/L	33		03/19/2019	LWATSON
Iron	EPA 200.7	2.3	mg/L	0.05		03/19/2019	LWATSON
Magnesium	EPA 200.7	<5	mg/L	5		03/19/2019	LWATSON
Manganese	EPA 200.7	0.05	mg/L	0.02		03/19/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/19/2019	LWATSON

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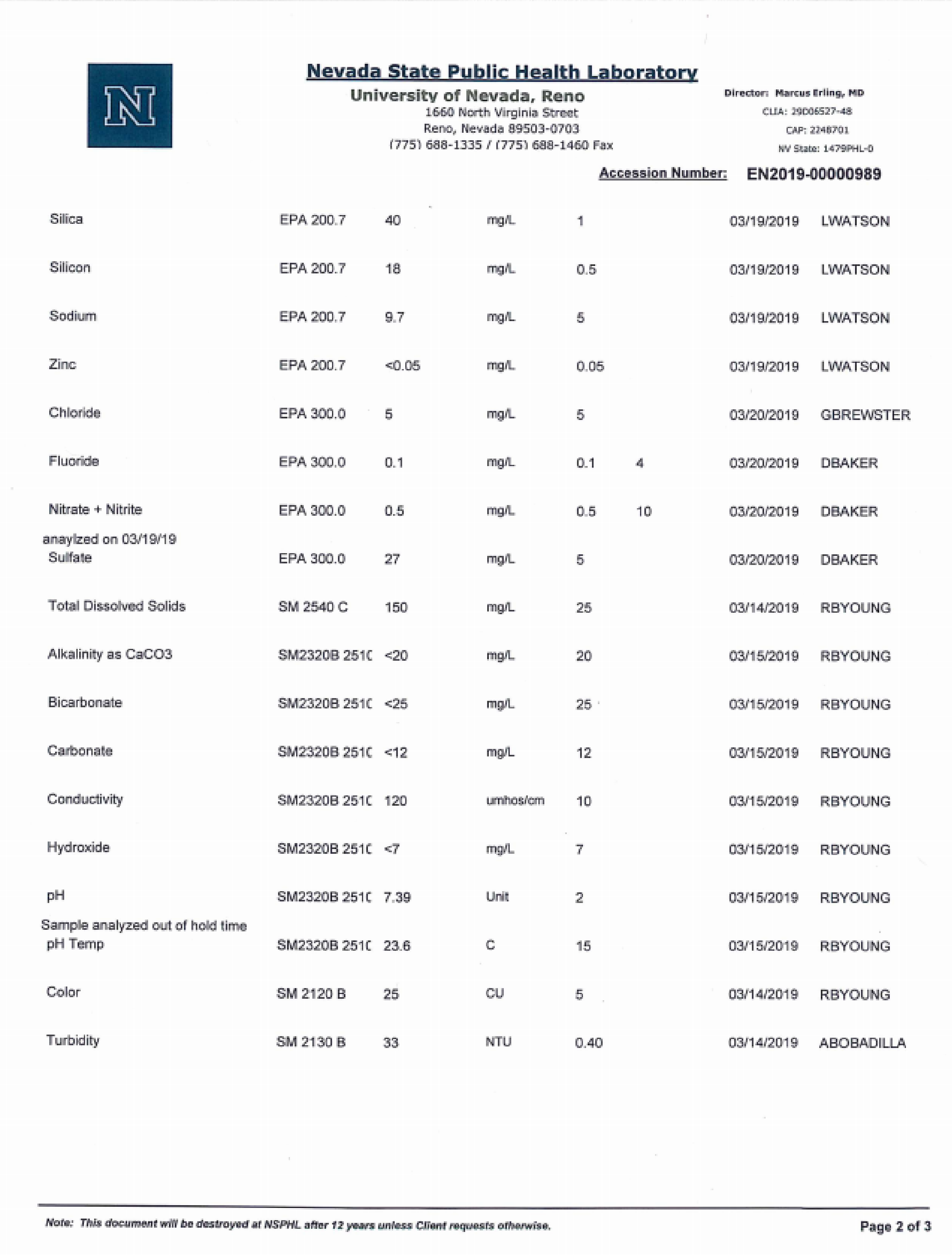

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NV State: 1479PHL-0

Accession Number: **EN2019-00000989**

Silica	EPA 200.7	40	mg/L	1		03/19/2019	LWATSON
Silicon	EPA 200.7	18	mg/L	0.5		03/19/2019	LWATSON
Sodium	EPA 200.7	9.7	mg/L	5		03/19/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		03/19/2019	LWATSON
Chloride	EPA 300.0	5	mg/L	5		03/20/2019	GBREWSTER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	03/20/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	0.5	mg/L	0.5	10	03/20/2019	DBAKER
anaylzed on 03/19/19							
Sulfate	EPA 300.0	27	mg/L	5		03/20/2019	DBAKER
Total Dissolved Solids	SM 2540 C	150	mg/L	25		03/14/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251(	<20	mg/L	20		03/15/2019	RBYOUNG
Bicarbonate	SM2320B 251(	<25	mg/L	25		03/15/2019	RBYOUNG
Carbonate	SM2320B 251(	<12	mg/L	12		03/15/2019	RBYOUNG
Conductivity	SM2320B 251(	120	umhos/cm	10		03/15/2019	RBYOUNG
Hydroxide	SM2320B 251(	<7	mg/L	7		03/15/2019	RBYOUNG
pH	SM2320B 251(	7.39	Unit	2		03/15/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251(	23.6	C	15		03/15/2019	RBYOUNG
Color	SM 2120 B	25	CU	5		03/14/2019	RBYOUNG
Turbidity	SM 2130 B	33	NTU	0.40		03/14/2019	ABOBADILLA

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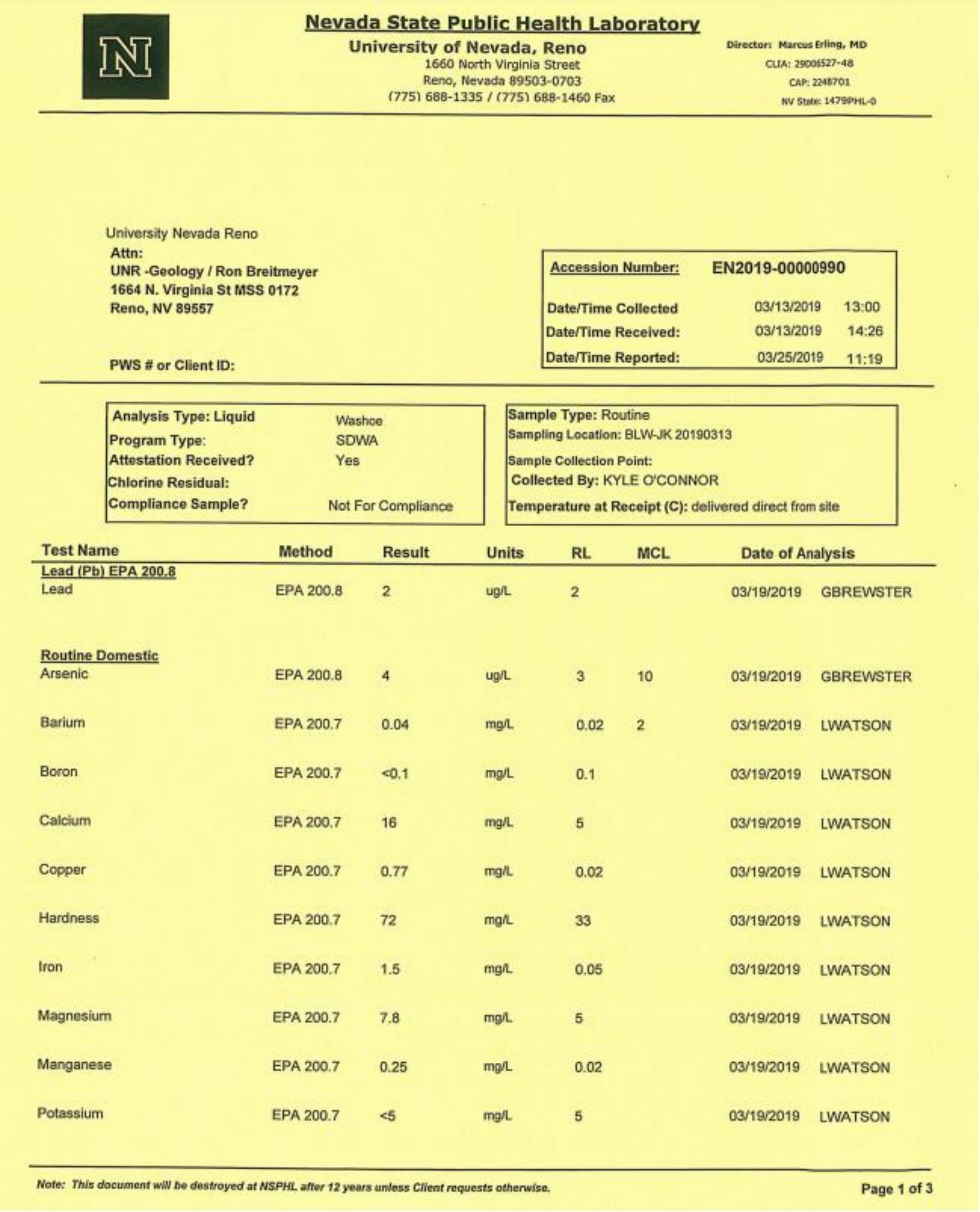

Nevada State Public Health Laboratory
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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
Attn:
UNR -Geology / Ron Breitmeyer
1664 N. Virginia St MSS 0172
Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00000990**	
Date/Time Collected	03/13/2019	13:00
Date/Time Received:	03/13/2019	14:26
Date/Time Reported:	03/25/2019	11:19

Analysis Type: Liquid	Washoe
Program Type:	SDWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: BLW-JK 20190313
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	2	ug/L	2		03/19/2019	GBREWSTER
Routine Domestic							
Arsenic	EPA 200.8	4	ug/L	3	10	03/19/2019	GBREWSTER
Barium	EPA 200.7	0.04	mg/L	0.02	2	03/19/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.1		03/19/2019	LWATSON
Calcium	EPA 200.7	16	mg/L	5		03/19/2019	LWATSON
Copper	EPA 200.7	0.77	mg/L	0.02		03/19/2019	LWATSON
Hardness	EPA 200.7	72	mg/L	33		03/19/2019	LWATSON
Iron	EPA 200.7	1.5	mg/L	0.05		03/19/2019	LWATSON
Magnesium	EPA 200.7	7.8	mg/L	5		03/19/2019	LWATSON
Manganese	EPA 200.7	0.25	mg/L	0.02		03/19/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		03/19/2019	LWATSON

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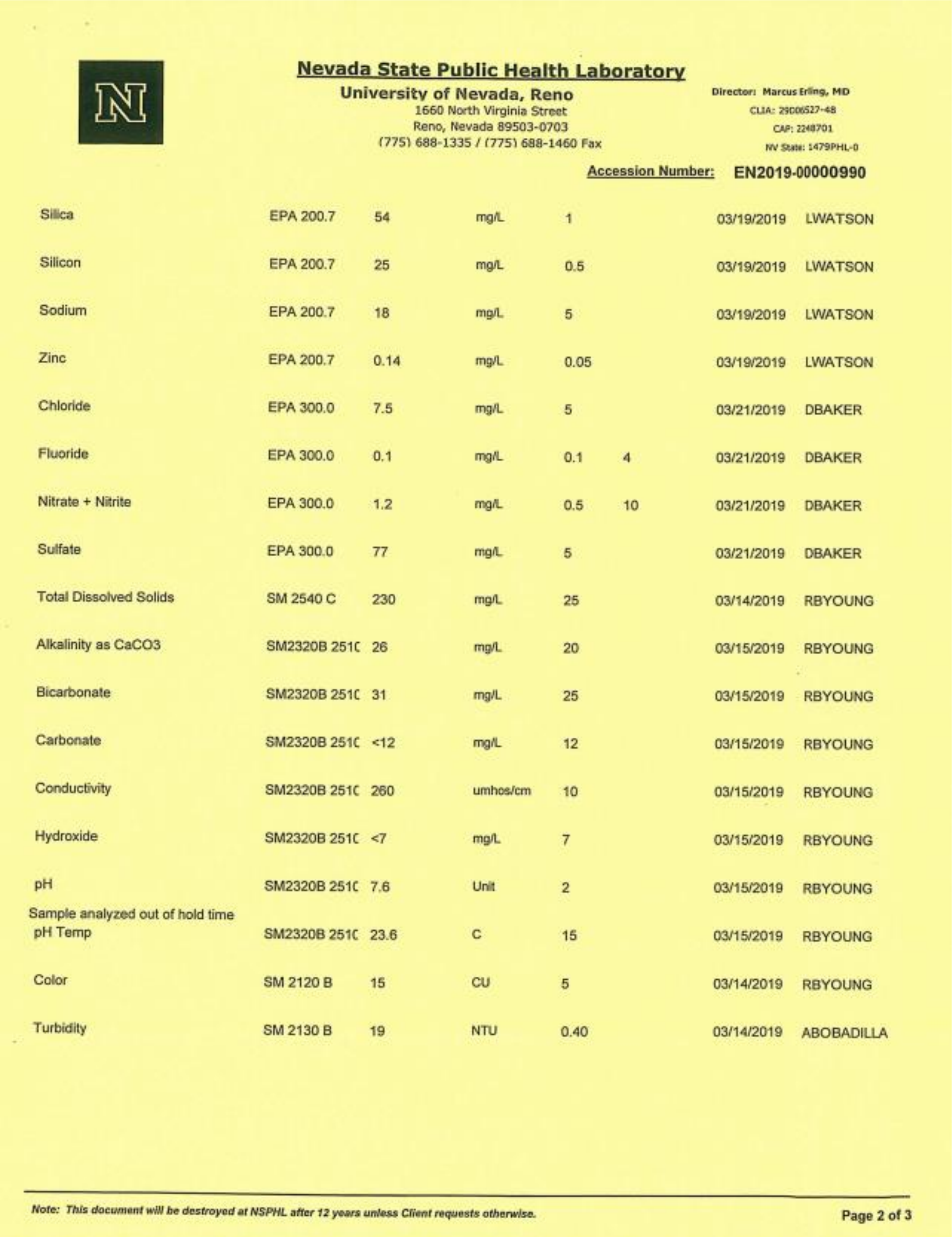

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Accession Number: **EN2019-00000990**

Silica	EPA 200.7	54	mg/L	1		03/19/2019	LWATSON
Silicon	EPA 200.7	25	mg/L	0.5		03/19/2019	LWATSON
Sodium	EPA 200.7	18	mg/L	5		03/19/2019	LWATSON
Zinc	EPA 200.7	0.14	mg/L	0.05		03/19/2019	LWATSON
Chloride	EPA 300.0	7.5	mg/L	5		03/21/2019	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	03/21/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	1.2	mg/L	0.5	10	03/21/2019	DBAKER
Sulfate	EPA 300.0	77	mg/L	5		03/21/2019	DBAKER
Total Dissolved Solids	SM 2540 C	230	mg/L	25		03/14/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	26	mg/L	20		03/15/2019	RBYOUNG
Bicarbonate	SM2320B 251C	31	mg/L	25		03/15/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		03/15/2019	RBYOUNG
Conductivity	SM2320B 251C	260	umhos/cm	10		03/15/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		03/15/2019	RBYOUNG
pH	SM2320B 251C	7.6	Unit	2		03/15/2019	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251C	23.6	C	15		03/15/2019	RBYOUNG
Color	SM 2120 B	15	CU	5		03/14/2019	RBYOUNG
Turbidity	SM 2130 B	19	NTU	0.40		03/14/2019	ABOBADILLA

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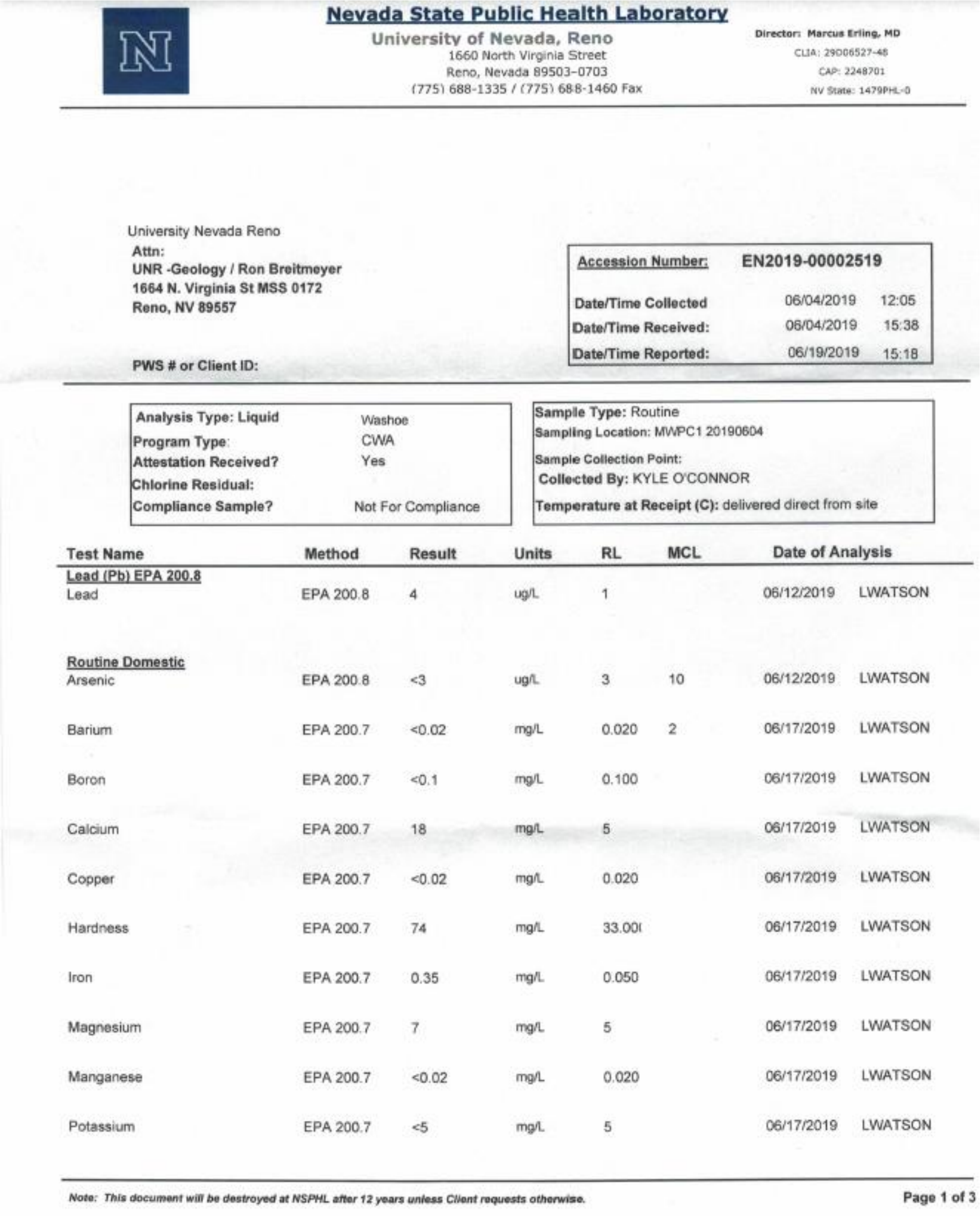
June 2019 Results



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Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00002519**	
Date/Time Collected	06/04/2019	12:05
Date/Time Received:	06/04/2019	15:38
Date/Time Reported:	06/19/2019	15:18

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1 20190604
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	4	ug/L	1		06/12/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	06/12/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.020	2	06/17/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		06/17/2019	LWATSON
Calcium	EPA 200.7	18	mg/L	5		06/17/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.020		06/17/2019	LWATSON
Hardness	EPA 200.7	74	mg/L	33.00		06/17/2019	LWATSON
Iron	EPA 200.7	0.35	mg/L	0.050		06/17/2019	LWATSON
Magnesium	EPA 200.7	7	mg/L	5		06/17/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.020		06/17/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		06/17/2019	LWATSON

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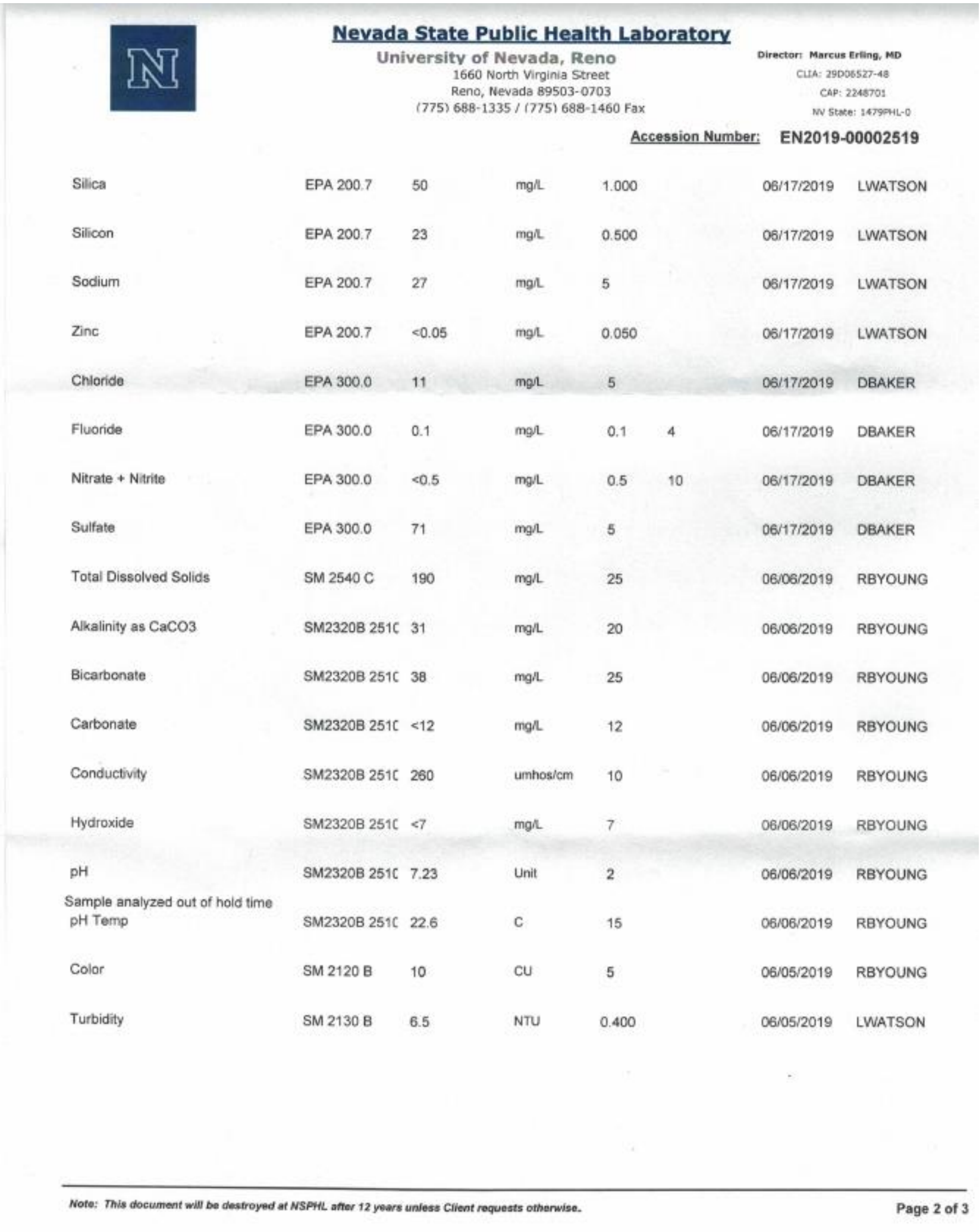

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CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2019-00002519**

Silica	EPA 200.7	50	mg/L	1.000		06/17/2019	LWATSON
Silicon	EPA 200.7	23	mg/L	0.500		06/17/2019	LWATSON
Sodium	EPA 200.7	27	mg/L	5		06/17/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.050		06/17/2019	LWATSON
Chloride	EPA 300.0	11	mg/L	5		06/17/2019	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	06/17/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	06/17/2019	DBAKER
Sulfate	EPA 300.0	71	mg/L	5		06/17/2019	DBAKER
Total Dissolved Solids	SM 2540 C	190	mg/L	25		06/06/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	31	mg/L	20		06/06/2019	RBYOUNG
Bicarbonate	SM2320B 251C	38	mg/L	25		06/06/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		06/06/2019	RBYOUNG
Conductivity	SM2320B 251C	260	umhos/cm	10		06/06/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		06/06/2019	RBYOUNG
pH	SM2320B 251C	7.23	Unit	2		06/06/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	22.6	C	15		06/06/2019	RBYOUNG
Color	SM 2120 B	10	CU	5		06/05/2019	RBYOUNG
Turbidity	SM 2130 B	6.5	NTU	0.400		06/05/2019	LWATSON

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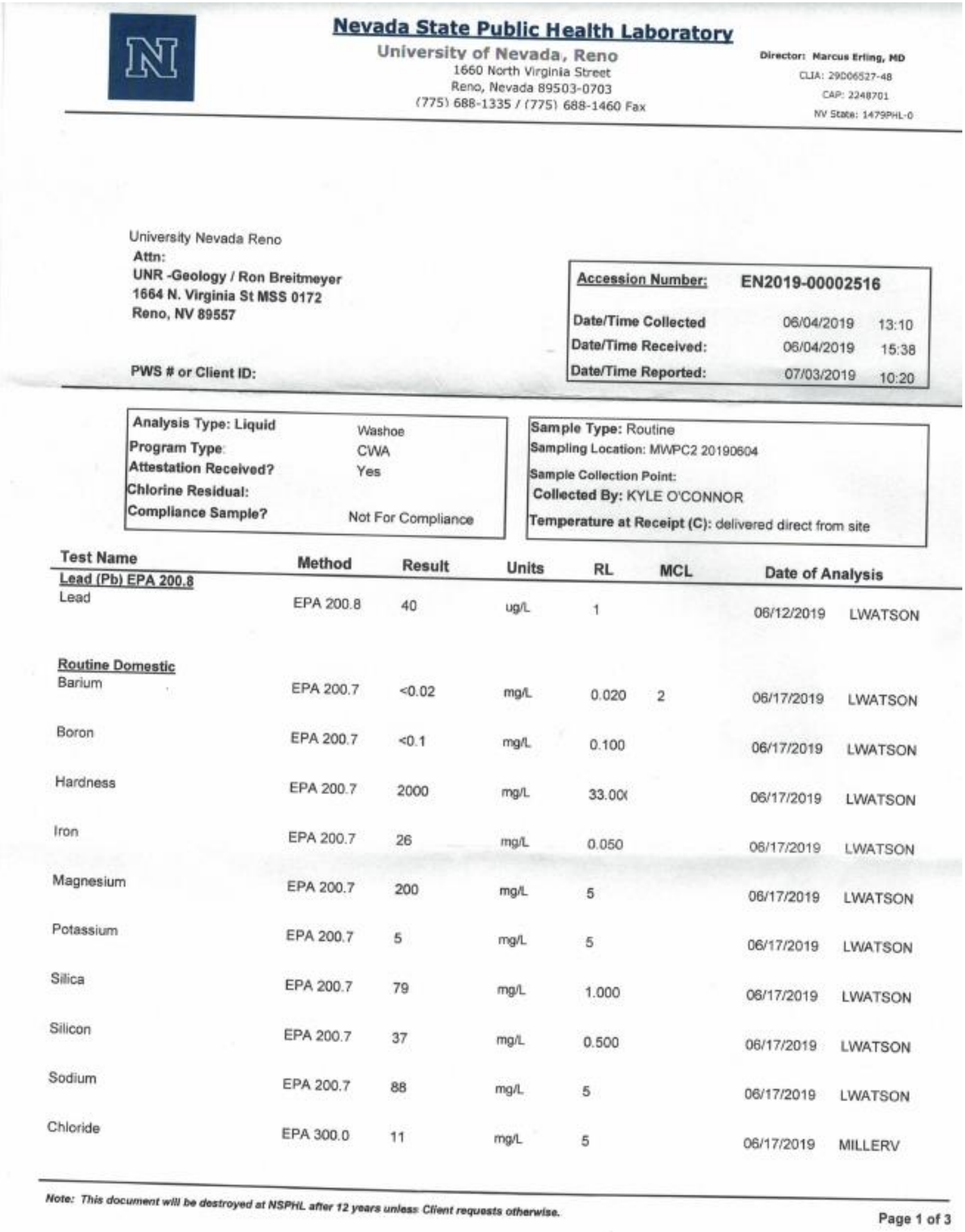

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PWS # or Client ID:

Accession Number: **EN2019-00002516**

Date/Time Collected 06/04/2019 13:10
Date/Time Received: 06/04/2019 15:38
Date/Time Reported: 07/03/2019 10:20

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2 20190604
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis
Lead (Pb) EPA 200.8						
Lead	EPA 200.8	40	ug/L	1		06/12/2019 LWATSON
Routine Domestic						
Barium	EPA 200.7	<0.02	mg/L	0.020	2	06/17/2019 LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		06/17/2019 LWATSON
Hardness	EPA 200.7	2000	mg/L	33.00		06/17/2019 LWATSON
Iron	EPA 200.7	26	mg/L	0.050		06/17/2019 LWATSON
Magnesium	EPA 200.7	200	mg/L	5		06/17/2019 LWATSON
Potassium	EPA 200.7	5	mg/L	5		06/17/2019 LWATSON
Silica	EPA 200.7	79	mg/L	1.000		06/17/2019 LWATSON
Silicon	EPA 200.7	37	mg/L	0.500		06/17/2019 LWATSON
Sodium	EPA 200.7	88	mg/L	5		06/17/2019 LWATSON
Chloride	EPA 300.0	11	mg/L	5		06/17/2019 MILLERV

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NV State: 1479PHL-0

Accession Number: **EN2019-00002516**

Fluoride	EPA 300.0	3	mg/L	0.100	4	06/17/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.500	10	06/17/2019	MILLERV
Total Dissolved Solids	SM 2540 C	3100	mg/L	25		06/06/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		06/06/2019	RBYOUNG
Bicarbonate	SM2320B 251C	<25	mg/L	25		06/06/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		06/06/2019	RBYOUNG
Conductivity	SM2320B 251C	3100	umhos/cm	10		06/06/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		06/06/2019	RBYOUNG
pH	SM2320B 251C	3.78	Unit	2		06/06/2019	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251C	22	C	15		06/06/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		06/05/2019	RBYOUNG
Turbidity	SM 2130 B	70	NTU	4		06/05/2019	LWATSON
Arsenic	EPA 200.8	77	ug/L	3	10	06/12/2019	LWATSON
Calcium	EPA 200.7	450	mg/L	50		06/14/2019	LWATSON
Copper	EPA 200.7	17	mg/L	0.200		06/17/2019	LWATSON
Manganese	EPA 200.7	18	mg/L	0.200		06/17/2019	LWATSON
Zinc	EPA 200.7	8.8	mg/L	0.500		06/17/2019	LWATSON
Sulfate	EPA 300.0	2200	mg/L	25		07/02/2019	MILLERV

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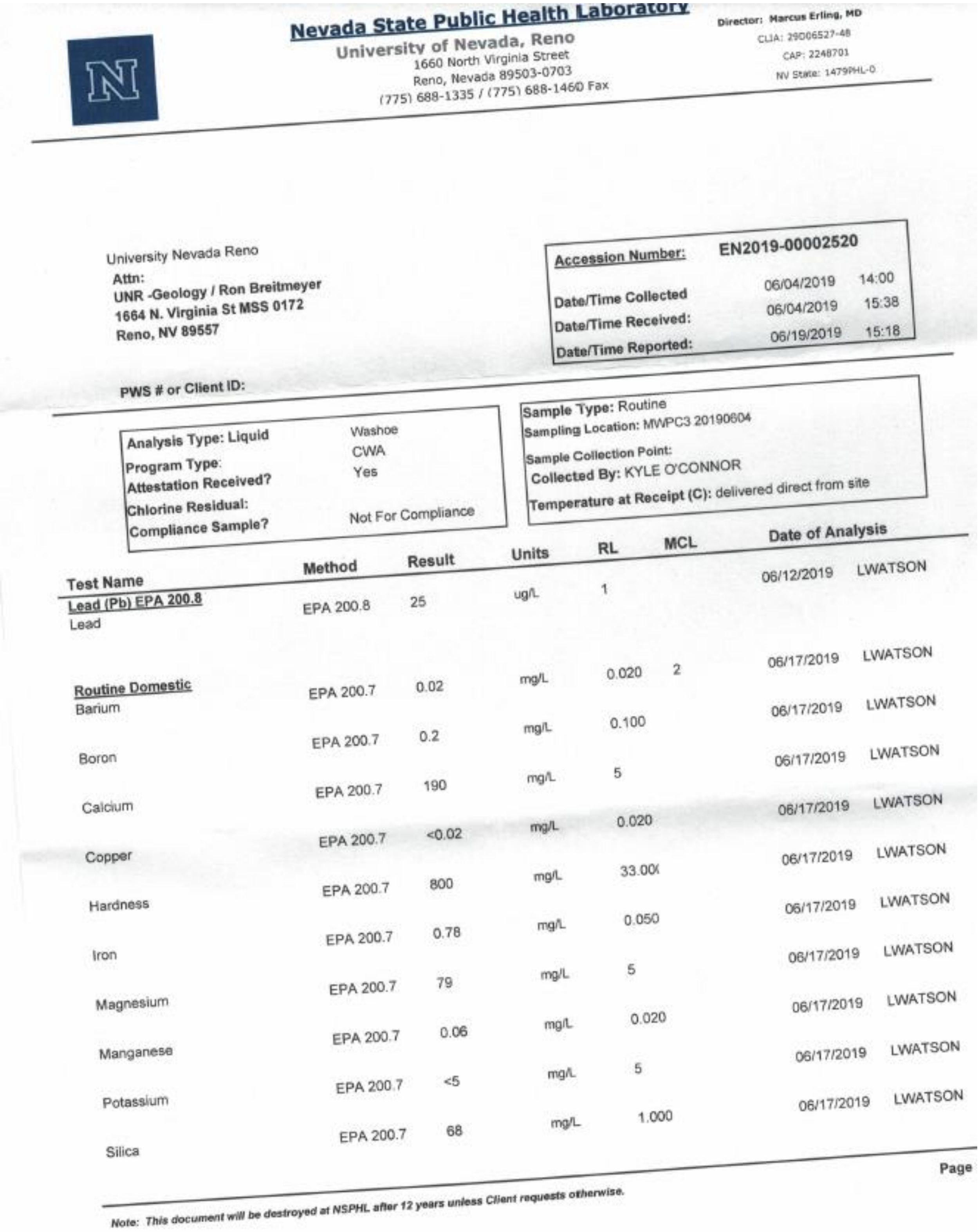

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University Nevada Reno
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Reno, NV 89557

Accession Number: **EN2019-00002520**

Date/Time Collected	06/04/2019	14:00
Date/Time Received:	06/04/2019	15:38
Date/Time Reported:	06/19/2019	15:18

PWS # or Client ID:

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3 20190604
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	25	ug/L	1		06/12/2019	LWATSON
Routine Domestic							
Barium	EPA 200.7	0.02	mg/L	0.020	2	06/17/2019	LWATSON
Boron	EPA 200.7	0.2	mg/L	0.100		06/17/2019	LWATSON
Calcium	EPA 200.7	190	mg/L	5		06/17/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.020		06/17/2019	LWATSON
Hardness	EPA 200.7	800	mg/L	33.00		06/17/2019	LWATSON
Iron	EPA 200.7	0.78	mg/L	0.050		06/17/2019	LWATSON
Magnesium	EPA 200.7	79	mg/L	5		06/17/2019	LWATSON
Manganese	EPA 200.7	0.06	mg/L	0.020		06/17/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		06/17/2019	LWATSON
Silica	EPA 200.7	68	mg/L	1.000		06/17/2019	LWATSON

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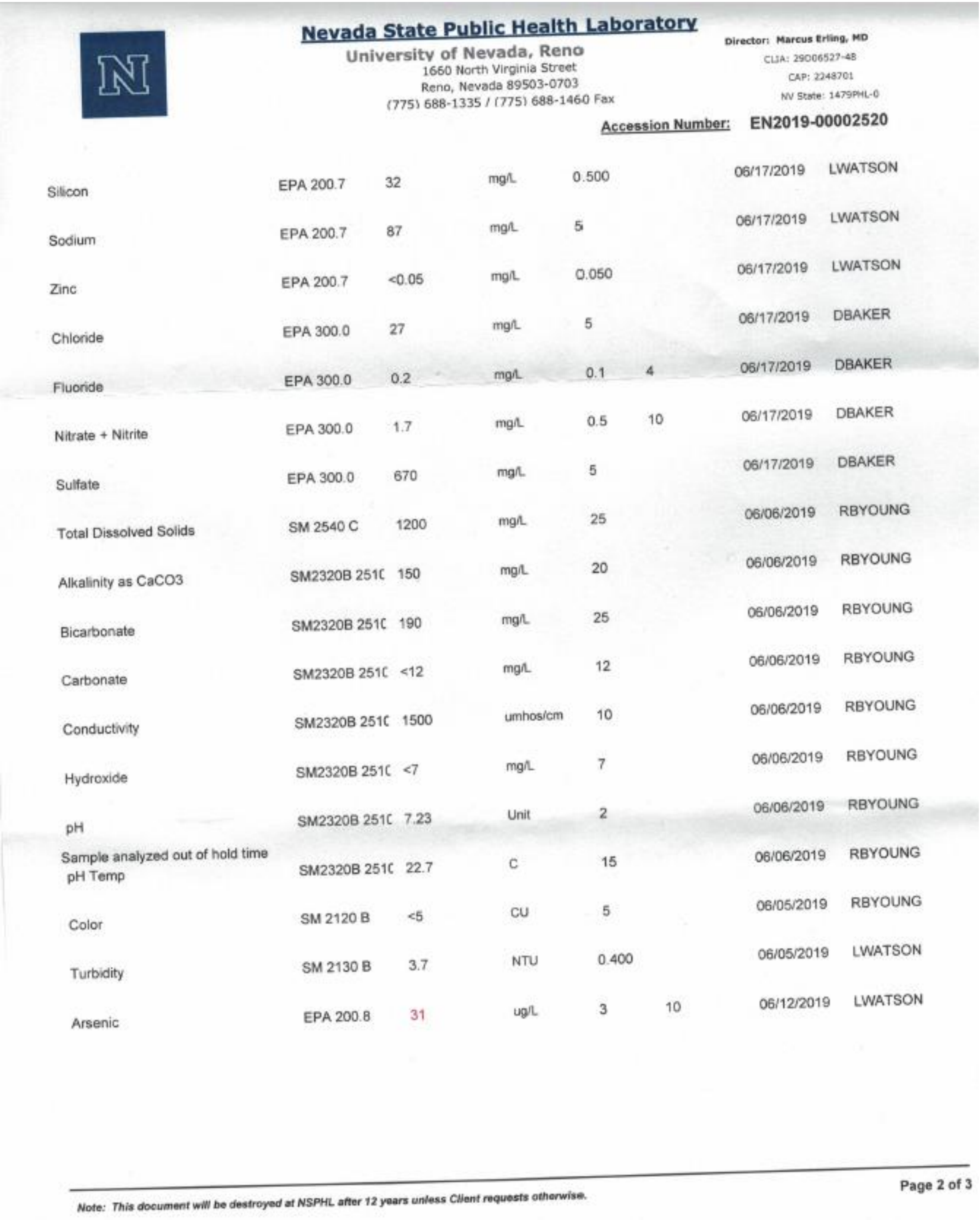

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Silicon	EPA 200.7	32	mg/L	0.500		06/17/2019	LWATSON
Sodium	EPA 200.7	87	mg/L	5		06/17/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.050		06/17/2019	LWATSON
Chloride	EPA 300.0	27	mg/L	5		06/17/2019	DBAKER
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	06/17/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	1.7	mg/L	0.5	10	06/17/2019	DBAKER
Sulfate	EPA 300.0	670	mg/L	5		06/17/2019	DBAKER
Total Dissolved Solids	SM 2540 C	1200	mg/L	25		06/06/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	150	mg/L	20		06/06/2019	RBYOUNG
Bicarbonate	SM2320B 251C	190	mg/L	25		06/06/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		06/06/2019	RBYOUNG
Conductivity	SM2320B 251C	1500	umhos/cm	10		06/06/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		06/06/2019	RBYOUNG
pH	SM2320B 251C	7.23	Unit	2		06/06/2019	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251C	22.7	C	15		06/06/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		06/05/2019	RBYOUNG
Turbidity	SM 2130 B	3.7	NTU	0.400		06/05/2019	LWATSON
Arsenic	EPA 200.8	31	ug/L	3	10	06/12/2019	LWATSON

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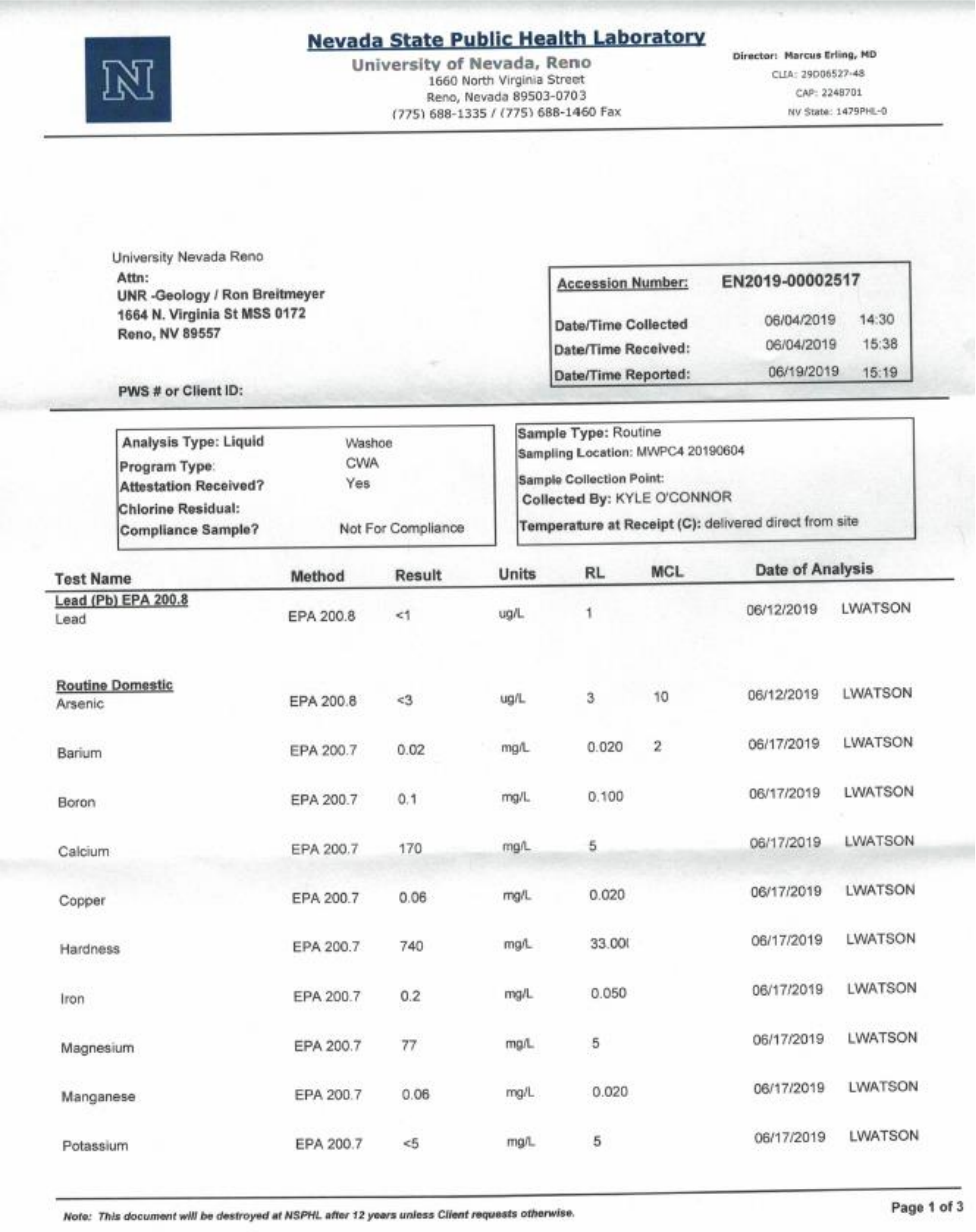

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PWS # or Client ID:

Accession Number:	**EN2019-00002517**	
Date/Time Collected	06/04/2019	14:30
Date/Time Received:	06/04/2019	15:38
Date/Time Reported:	06/19/2019	15:19

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4 20190604
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<1	ug/L	1		06/12/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	06/12/2019	LWATSON
Barium	EPA 200.7	0.02	mg/L	0.020	2	06/17/2019	LWATSON
Boron	EPA 200.7	0.1	mg/L	0.100		06/17/2019	LWATSON
Calcium	EPA 200.7	170	mg/L	5		06/17/2019	LWATSON
Copper	EPA 200.7	0.06	mg/L	0.020		06/17/2019	LWATSON
Hardness	EPA 200.7	740	mg/L	33.00		06/17/2019	LWATSON
Iron	EPA 200.7	0.2	mg/L	0.050		06/17/2019	LWATSON
Magnesium	EPA 200.7	77	mg/L	5		06/17/2019	LWATSON
Manganese	EPA 200.7	0.06	mg/L	0.020		06/17/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		06/17/2019	LWATSON

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NV State: 1479PHL-0

Accession Number: **EN2019-00002517**

Silica	EPA 200.7	55	mg/L	1.000		06/17/2019	LWATSON
Silicon	EPA 200.7	26	mg/L	0.500		06/17/2019	LWATSON
Sodium	EPA 200.7	74	mg/L	5		06/17/2019	LWATSON
Zinc	EPA 200.7	0.06	mg/L	0.050		06/17/2019	LWATSON
Chloride	EPA 300.0	18	mg/L	5		06/17/2019	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	06/17/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	0.5	mg/L	0.5	10	06/17/2019	DBAKER
Sulfate	EPA 300.0	740	mg/L	5		06/17/2019	DBAKER
Total Dissolved Solids	SM 2540 C	1200	mg/L	25		06/06/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	47	mg/L	20		06/06/2019	RBYOUNG
Bicarbonate	SM2320B 251C	57	mg/L	25		06/06/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		06/06/2019	RBYOUNG
Conductivity	SM2320B 251C	1400	umhos/cm	10		06/06/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		06/06/2019	RBYOUNG
pH	SM2320B 251C	7.04	Unit	2		06/06/2019	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251C	22.2	C	15		06/06/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		06/05/2019	RBYOUNG
Turbidity	SM 2130 B	2.1	NTU	0.400		06/05/2019	LWATSON

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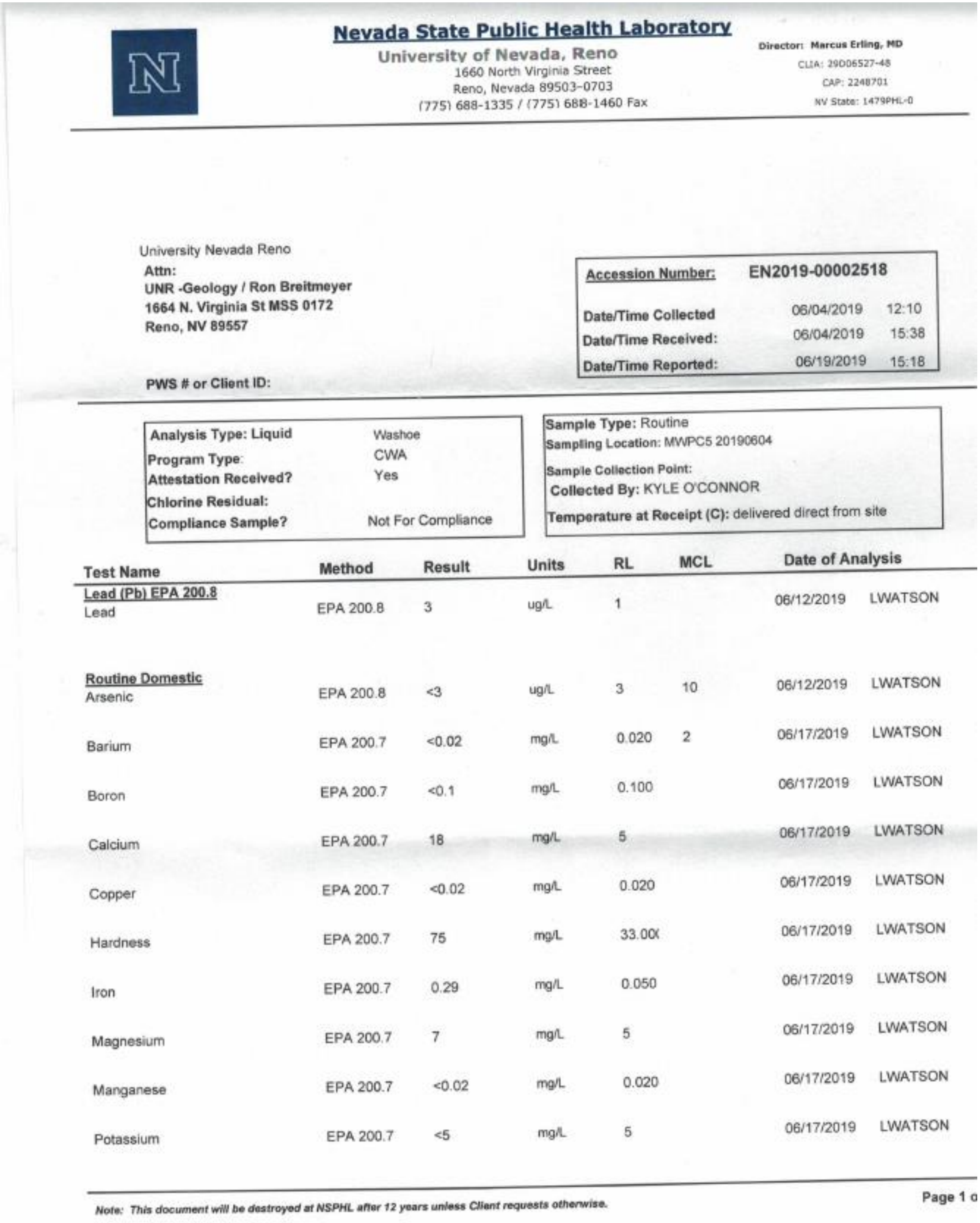

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CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
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1664 N. Virginia St MSS 0172
Reno, NV 89557

Accession Number:	**EN2019-00002518**	
Date/Time Collected	06/04/2019	12:10
Date/Time Received:	06/04/2019	15:38
Date/Time Reported:	06/19/2019	15:18

PWS # or Client ID:

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5 20190604
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	3	ug/L	1		06/12/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	06/12/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.020	2	06/17/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		06/17/2019	LWATSON
Calcium	EPA 200.7	18	mg/L	5		06/17/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.020		06/17/2019	LWATSON
Hardness	EPA 200.7	75	mg/L	33.00		06/17/2019	LWATSON
Iron	EPA 200.7	0.29	mg/L	0.050		06/17/2019	LWATSON
Magnesium	EPA 200.7	7	mg/L	5		06/17/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.020		06/17/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		06/17/2019	LWATSON

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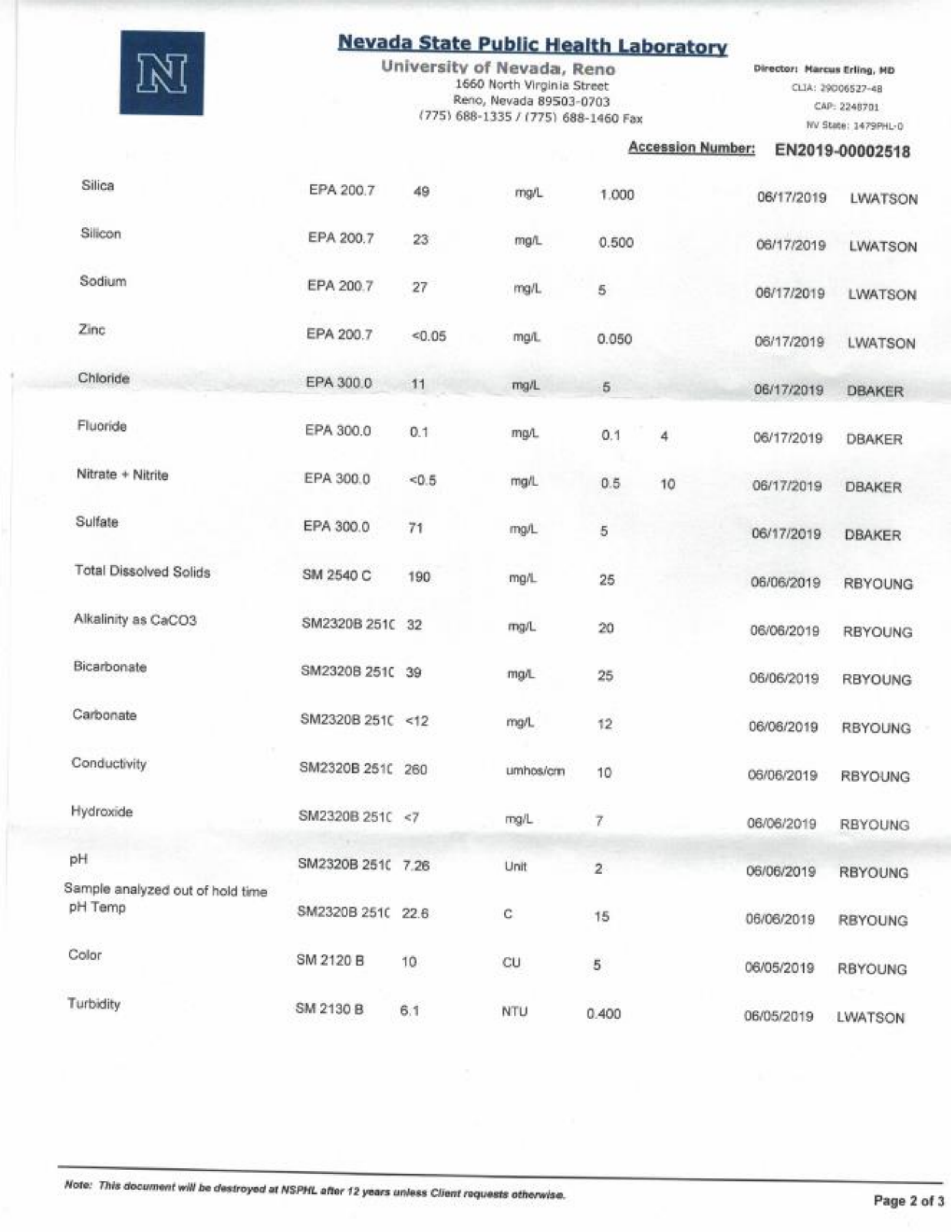

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Accession Number: **EN2019-00002518**

Silica	EPA 200.7	49	mg/L	1.000		06/17/2019	LWATSON
Silicon	EPA 200.7	23	mg/L	0.500		06/17/2019	LWATSON
Sodium	EPA 200.7	27	mg/L	5		06/17/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.050		06/17/2019	LWATSON
Chloride	EPA 300.0	11	mg/L	5		06/17/2019	DBAKER
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	06/17/2019	DBAKER
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	06/17/2019	DBAKER
Sulfate	EPA 300.0	71	mg/L	5		06/17/2019	DBAKER
Total Dissolved Solids	SM 2540 C	190	mg/L	25		06/06/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	32	mg/L	20		06/06/2019	RBYOUNG
Bicarbonate	SM2320B 251C	39	mg/L	25		06/06/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		06/06/2019	RBYOUNG
Conductivity	SM2320B 251C	260	umhos/cm	10		06/06/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		06/06/2019	RBYOUNG
pH Sample analyzed out of hold time	SM2320B 251C	7.26	Unit	2		06/06/2019	RBYOUNG
pH Temp	SM2320B 251C	22.6	C	15		06/06/2019	RBYOUNG
Color	SM 2120 B	10	CU	5		06/05/2019	RBYOUNG
Turbidity	SM 2130 B	6.1	NTU	0.400		06/05/2019	LWATSON

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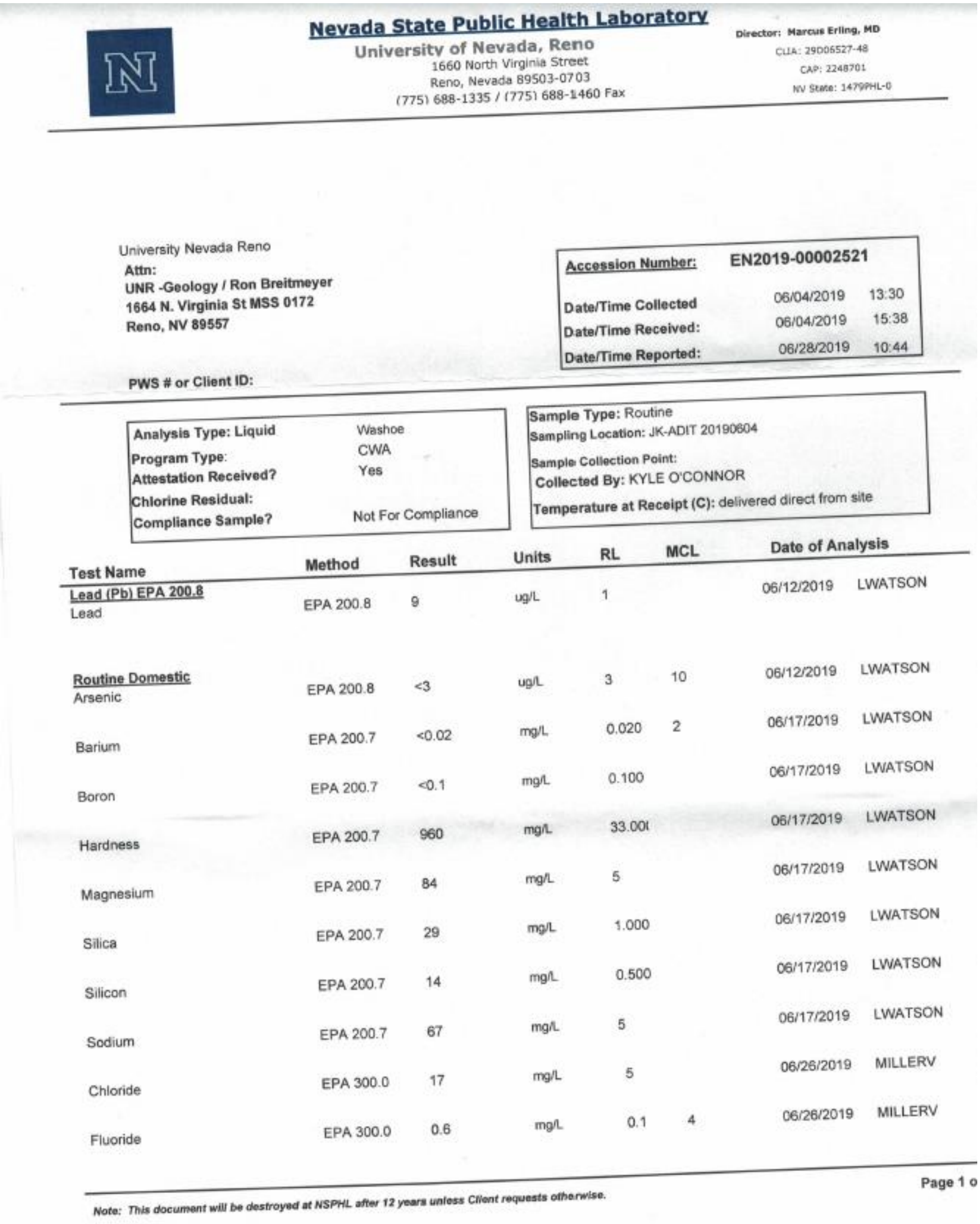

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Accession Number:	**EN2019-00002521**	
Date/Time Collected	06/04/2019	13:30
Date/Time Received:	06/04/2019	15:38
Date/Time Reported:	06/28/2019	10:44

PWS # or Client ID:

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: JK-ADIT 20190604
Sample Collection Point:
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	9	ug/L	1		06/12/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	06/12/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.020	2	06/17/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		06/17/2019	LWATSON
Hardness	EPA 200.7	960	mg/L	33.00		06/17/2019	LWATSON
Magnesium	EPA 200.7	84	mg/L	5		06/17/2019	LWATSON
Silica	EPA 200.7	29	mg/L	1.000		06/17/2019	LWATSON
Silicon	EPA 200.7	14	mg/L	0.500		06/17/2019	LWATSON
Sodium	EPA 200.7	67	mg/L	5		06/17/2019	LWATSON
Chloride	EPA 300.0	17	mg/L	5		06/26/2019	MILLERV
Fluoride	EPA 300.0	0.6	mg/L	0.1	4	06/26/2019	MILLERV

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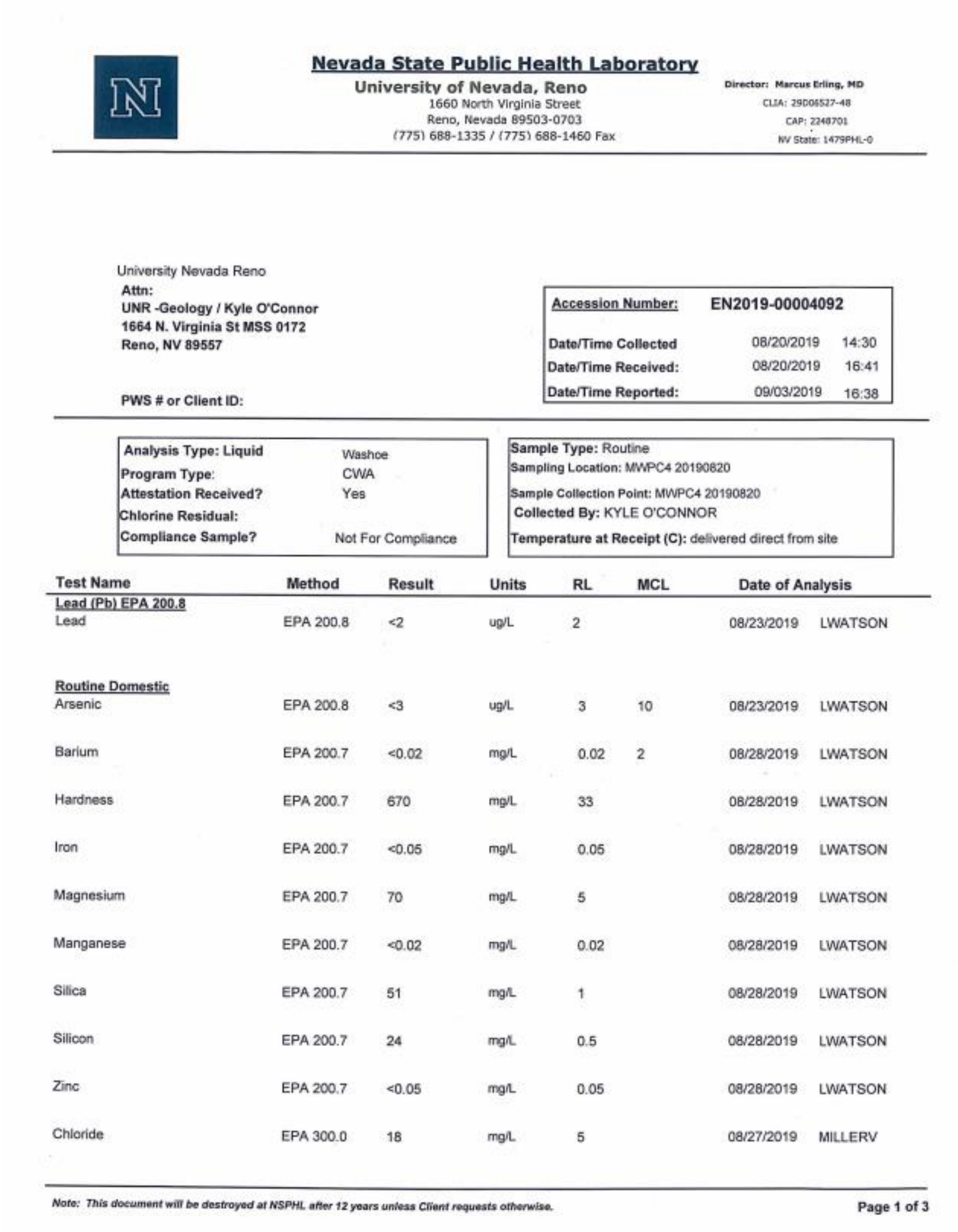
Accession Number: EN2019-00002521

Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	06/26/2019	MILLERV
Total Dissolved Solids	SM 2540 C	2100	mg/L	25		06/06/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		06/06/2019	RBYOUNG
Bicarbonate	SM2320B 251C	<25	mg/L	25		06/06/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		06/06/2019	RBYOUNG
Conductivity	SM2320B 251C	2500	umhos/cm	10		06/06/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		06/06/2019	RBYOUNG
pH	SM2320B 251C	2.93	Unit	2		06/06/2019	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251C	23.3	C	15		06/06/2019	RBYOUNG
Color	SM 2120 B	10	CU	5		06/05/2019	RBYOUNG
Turbidity	SM 2130 B	4	NTU	0.400		06/05/2019	LWATSON
Calcium	EPA 200.7	250	mg/L	5		06/14/2019	LWATSON
Potassium	EPA 200.7	6	mg/L	5		06/14/2019	LWATSON
Copper	EPA 200.7	100	mg/L	2		06/17/2019	LWATSON
Zinc	EPA 200.7	8.9	mg/L	0.500		06/17/2019	LWATSON
Iron	EPA 200.7	31	mg/L	0.500		06/17/2019	LWATSON
Manganese	EPA 200.7	6.4	mg/L	0.200		06/17/2019	LWATSON
Sulfate	EPA 300.0	1500	mg/L	25		06/26/2019	MILLERV

August 2019 Results



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NV State: 1479PHL-0

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PWS # or Client ID:

Accession Number:	**EN2019-00004092**	
Date/Time Collected	08/20/2019	14:30
Date/Time Received:	08/20/2019	16:41
Date/Time Reported:	09/03/2019	16:38

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4 20190820
Sample Collection Point: MWPC4 20190820
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<2	ug/L	2		08/23/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	08/23/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.02	2	08/28/2019	LWATSON
Hardness	EPA 200.7	670	mg/L	33		08/28/2019	LWATSON
Iron	EPA 200.7	<0.05	mg/L	0.05		08/28/2019	LWATSON
Magnesium	EPA 200.7	70	mg/L	5		08/28/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.02		08/28/2019	LWATSON
Silica	EPA 200.7	51	mg/L	1		08/28/2019	LWATSON
Silicon	EPA 200.7	24	mg/L	0.5		08/28/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		08/28/2019	LWATSON
Chloride	EPA 300.0	18	mg/L	5		08/27/2019	MILLERV

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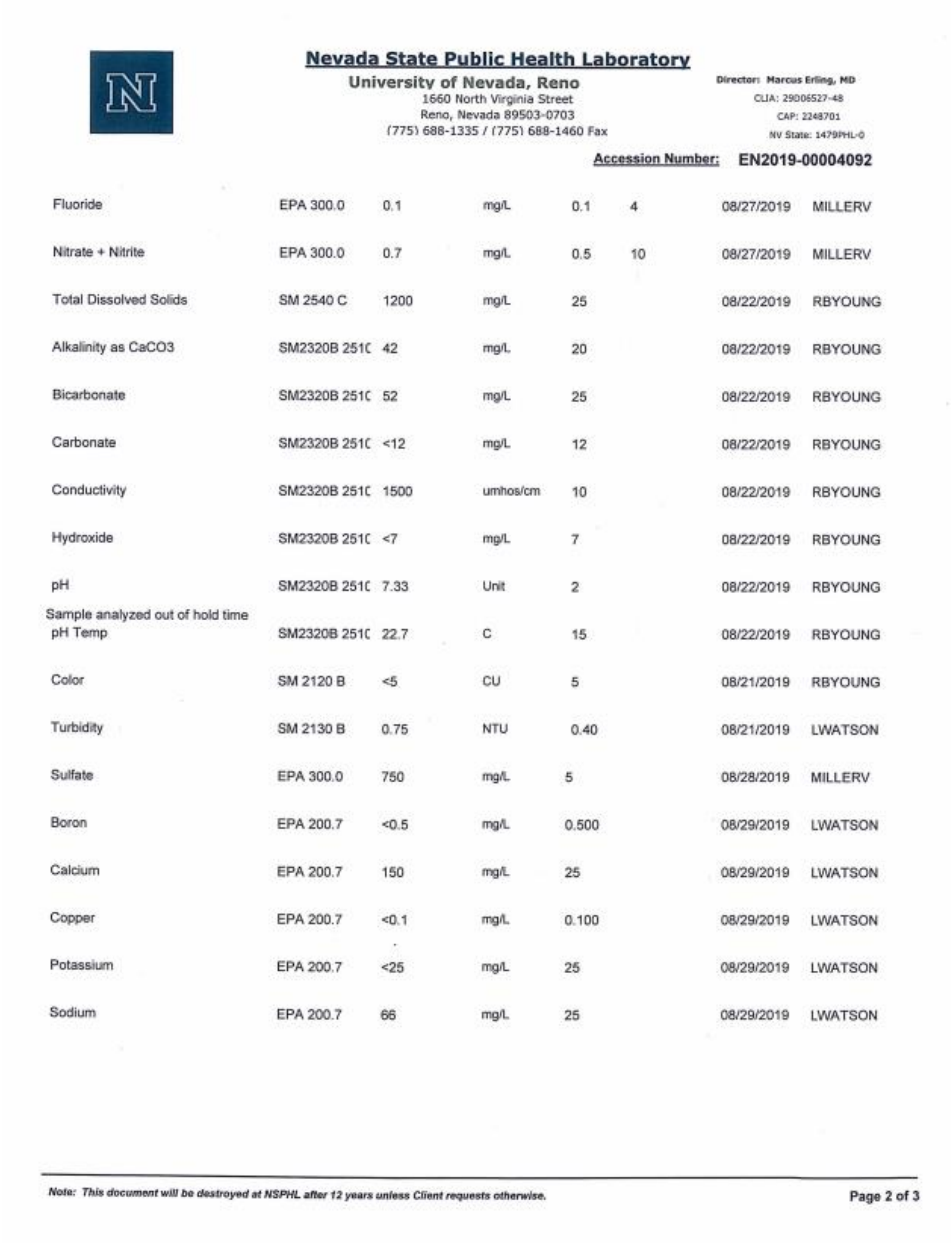

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Accession Number: **EN2019-00004092**

Fluoride	EPA 300.0	0.1	mg/L	0.1	4	08/27/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	0.7	mg/L	0.5	10	08/27/2019	MILLERV
Total Dissolved Solids	SM 2540 C	1200	mg/L	25		08/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	42	mg/L	20		08/22/2019	RBYOUNG
Bicarbonate	SM2320B 251C	52	mg/L	25		08/22/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2019	RBYOUNG
Conductivity	SM2320B 251C	1500	umhos/cm	10		08/22/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2019	RBYOUNG
pH	SM2320B 251C	7.33	Unit	2		08/22/2019	RBYOUNG
Sample analyzed out of hold time pH Temp	SM2320B 251C	22.7	C	15		08/22/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		08/21/2019	RBYOUNG
Turbidity	SM 2130 B	0.75	NTU	0.40		08/21/2019	LWATSON
Sulfate	EPA 300.0	750	mg/L	5		08/28/2019	MILLERV
Boron	EPA 200.7	<0.5	mg/L	0.500		08/29/2019	LWATSON
Calcium	EPA 200.7	150	mg/L	25		08/29/2019	LWATSON
Copper	EPA 200.7	<0.1	mg/L	0.100		08/29/2019	LWATSON
Potassium	EPA 200.7	<25	mg/L	25		08/29/2019	LWATSON
Sodium	EPA 200.7	66	mg/L	25		08/29/2019	LWATSON

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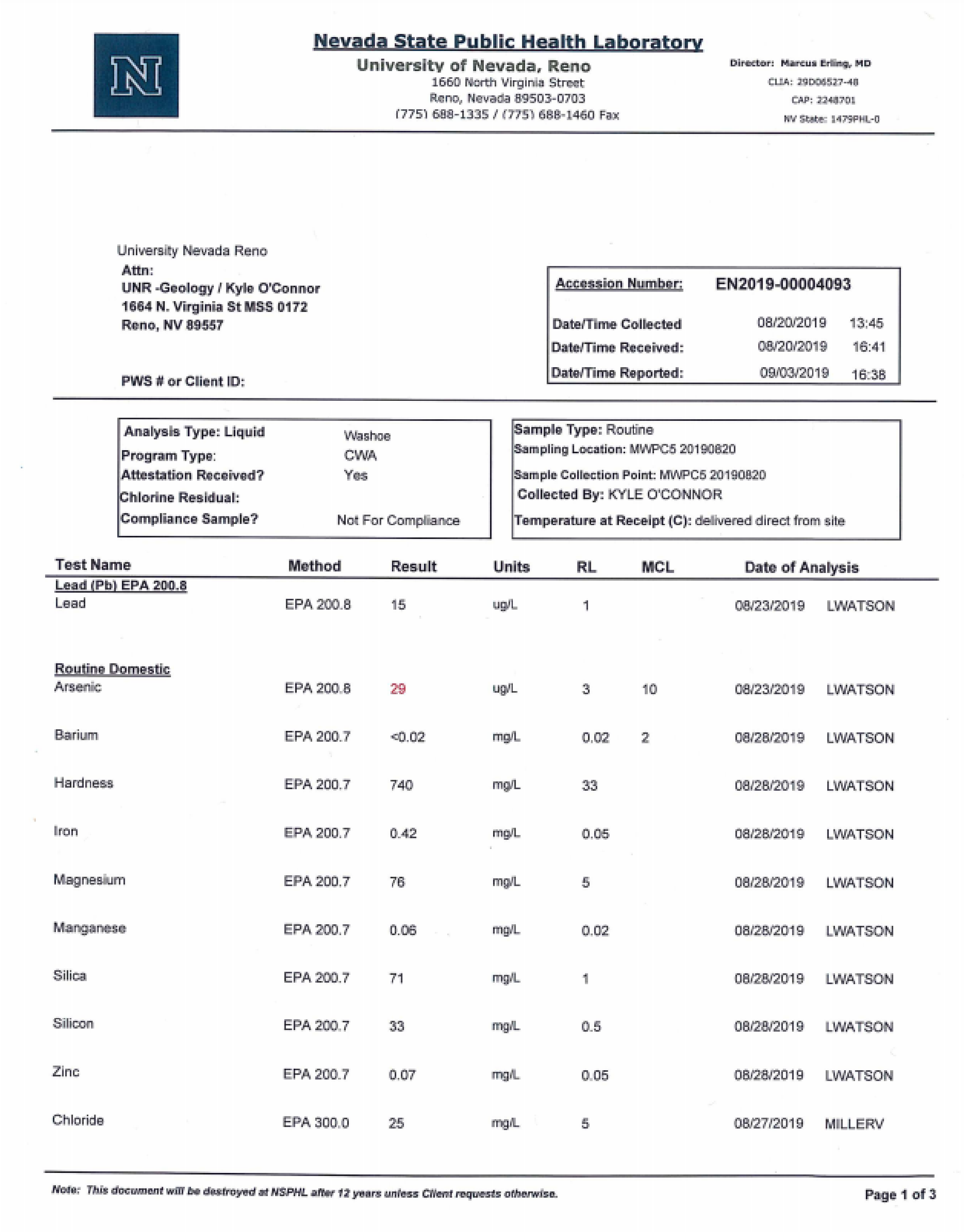

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Reno, NV 89557

PWS # or Client ID:

Accession Number: **EN2019-00004093**

Date/Time Collected 08/20/2019 13:45
Date/Time Received: 08/20/2019 16:41
Date/Time Reported: 09/03/2019 16:38

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5 20190820
Sample Collection Point: MWPC5 20190820
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	15	ug/L	1		08/23/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	29	ug/L	3	10	08/23/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.02	2	08/28/2019	LWATSON
Hardness	EPA 200.7	740	mg/L	33		08/28/2019	LWATSON
Iron	EPA 200.7	0.42	mg/L	0.05		08/28/2019	LWATSON
Magnesium	EPA 200.7	76	mg/L	5		08/28/2019	LWATSON
Manganese	EPA 200.7	0.06	mg/L	0.02		08/28/2019	LWATSON
Silica	EPA 200.7	71	mg/L	1		08/28/2019	LWATSON
Silicon	EPA 200.7	33	mg/L	0.5		08/28/2019	LWATSON
Zinc	EPA 200.7	0.07	mg/L	0.05		08/28/2019	LWATSON
Chloride	EPA 300.0	25	mg/L	5		08/27/2019	MILLERV

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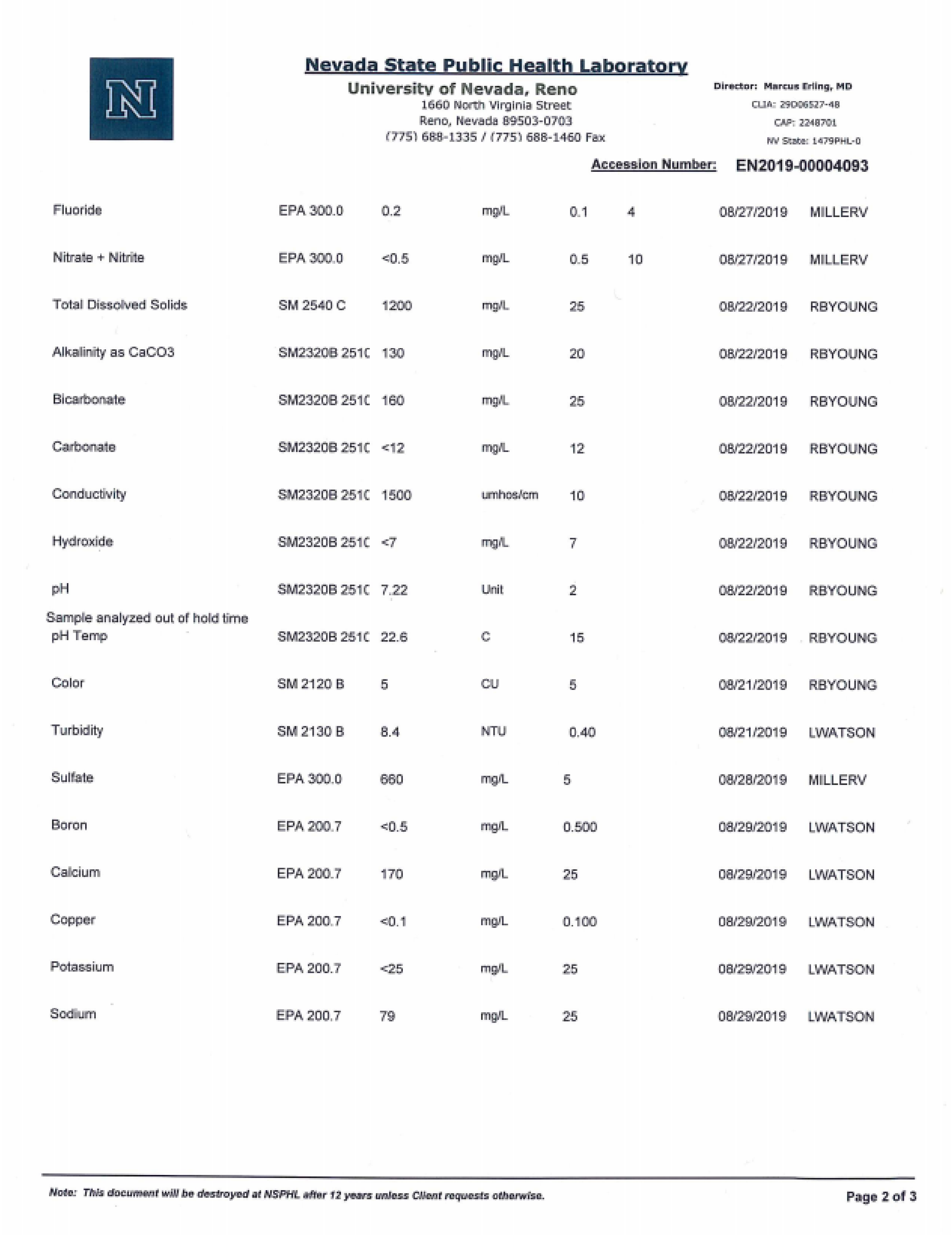

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Fluoride	EPA 300.0	0.2	mg/L	0.1	4	08/27/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/27/2019	MILLERV
Total Dissolved Solids	SM 2540 C	1200	mg/L	25		08/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251(	130	mg/L	20		08/22/2019	RBYOUNG
Bicarbonate	SM2320B 251(	160	mg/L	25		08/22/2019	RBYOUNG
Carbonate	SM2320B 251(	<12	mg/L	12		08/22/2019	RBYOUNG
Conductivity	SM2320B 251(	1500	umhos/cm	10		08/22/2019	RBYOUNG
Hydroxide	SM2320B 251(	<7	mg/L	7		08/22/2019	RBYOUNG
pH	SM2320B 251(	7.22	Unit	2		08/22/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251(	22.6	C	15		08/22/2019	RBYOUNG
Color	SM 2120 B	5	CU	5		08/21/2019	RBYOUNG
Turbidity	SM 2130 B	8.4	NTU	0.40		08/21/2019	LWATSON
Sulfate	EPA 300.0	660	mg/L	5		08/28/2019	MILLERV
Boron	EPA 200.7	<0.5	mg/L	0.500		08/29/2019	LWATSON
Calcium	EPA 200.7	170	mg/L	25		08/29/2019	LWATSON
Copper	EPA 200.7	<0.1	mg/L	0.100		08/29/2019	LWATSON
Potassium	EPA 200.7	<25	mg/L	25		08/29/2019	LWATSON
Sodium	EPA 200.7	79	mg/L	25		08/29/2019	LWATSON

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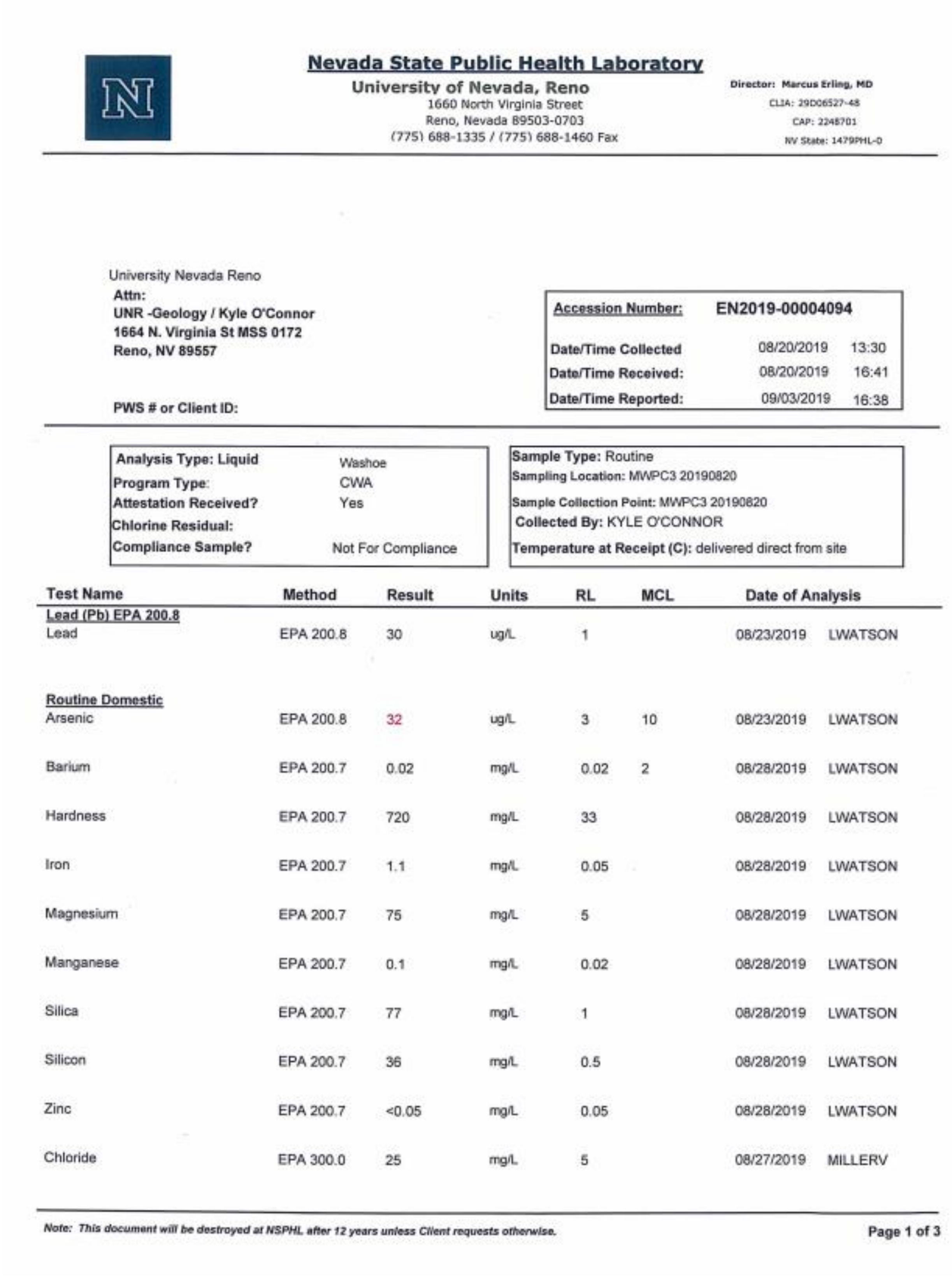

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PWS # or Client ID:

Accession Number:	**EN2019-00004094**	
Date/Time Collected	08/20/2019	13:30
Date/Time Received:	08/20/2019	16:41
Date/Time Reported:	09/03/2019	16:38

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3 20190820
Sample Collection Point: MWPC3 20190820
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	30	ug/L	1		08/23/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	32	ug/L	3	10	08/23/2019	LWATSON
Barium	EPA 200.7	0.02	mg/L	0.02	2	08/28/2019	LWATSON
Hardness	EPA 200.7	720	mg/L	33		08/28/2019	LWATSON
Iron	EPA 200.7	1.1	mg/L	0.05		08/28/2019	LWATSON
Magnesium	EPA 200.7	75	mg/L	5		08/28/2019	LWATSON
Manganese	EPA 200.7	0.1	mg/L	0.02		08/28/2019	LWATSON
Silica	EPA 200.7	77	mg/L	1		08/28/2019	LWATSON
Silicon	EPA 200.7	36	mg/L	0.5		08/28/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		08/28/2019	LWATSON
Chloride	EPA 300.0	25	mg/L	5		08/27/2019	MILLERV

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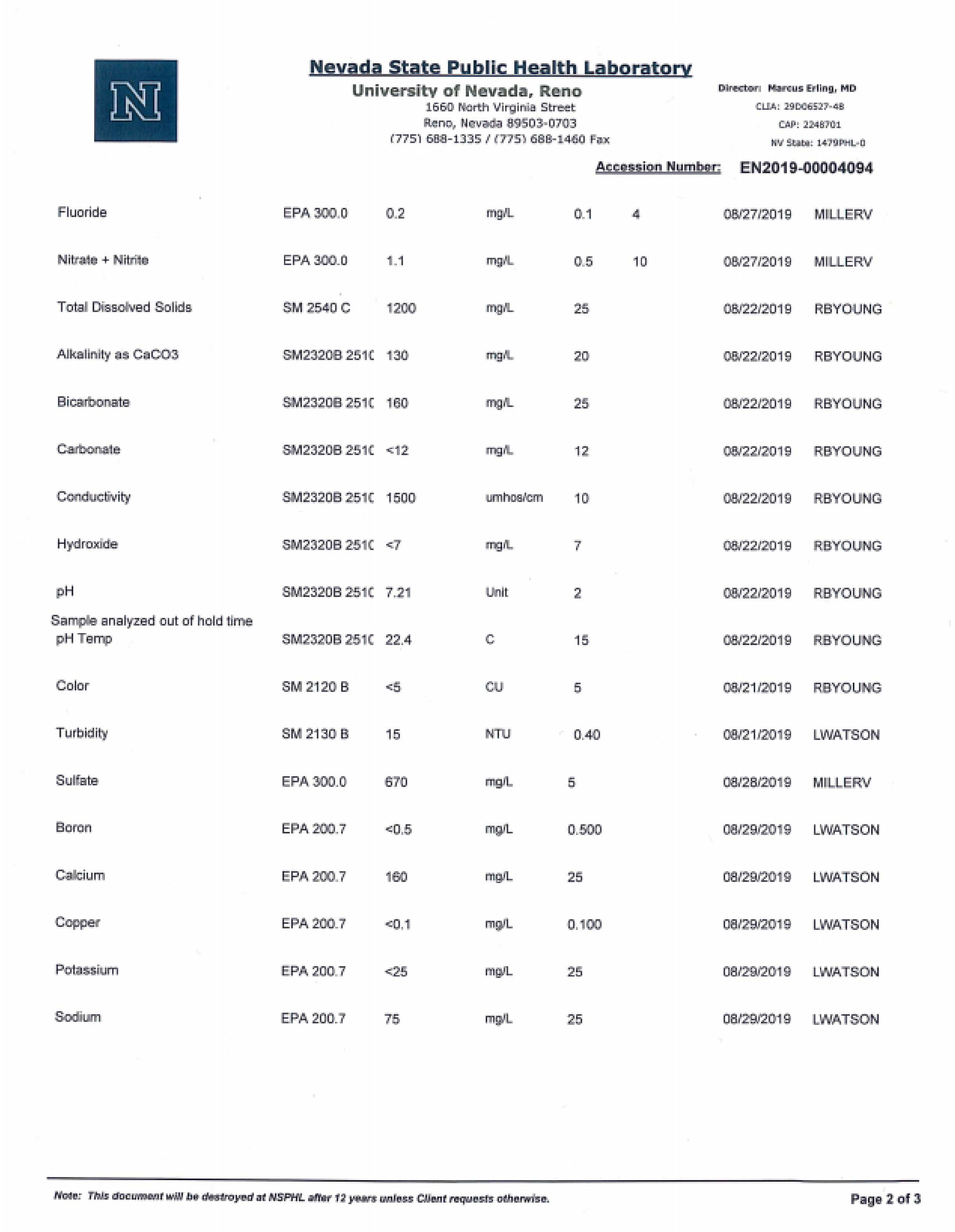
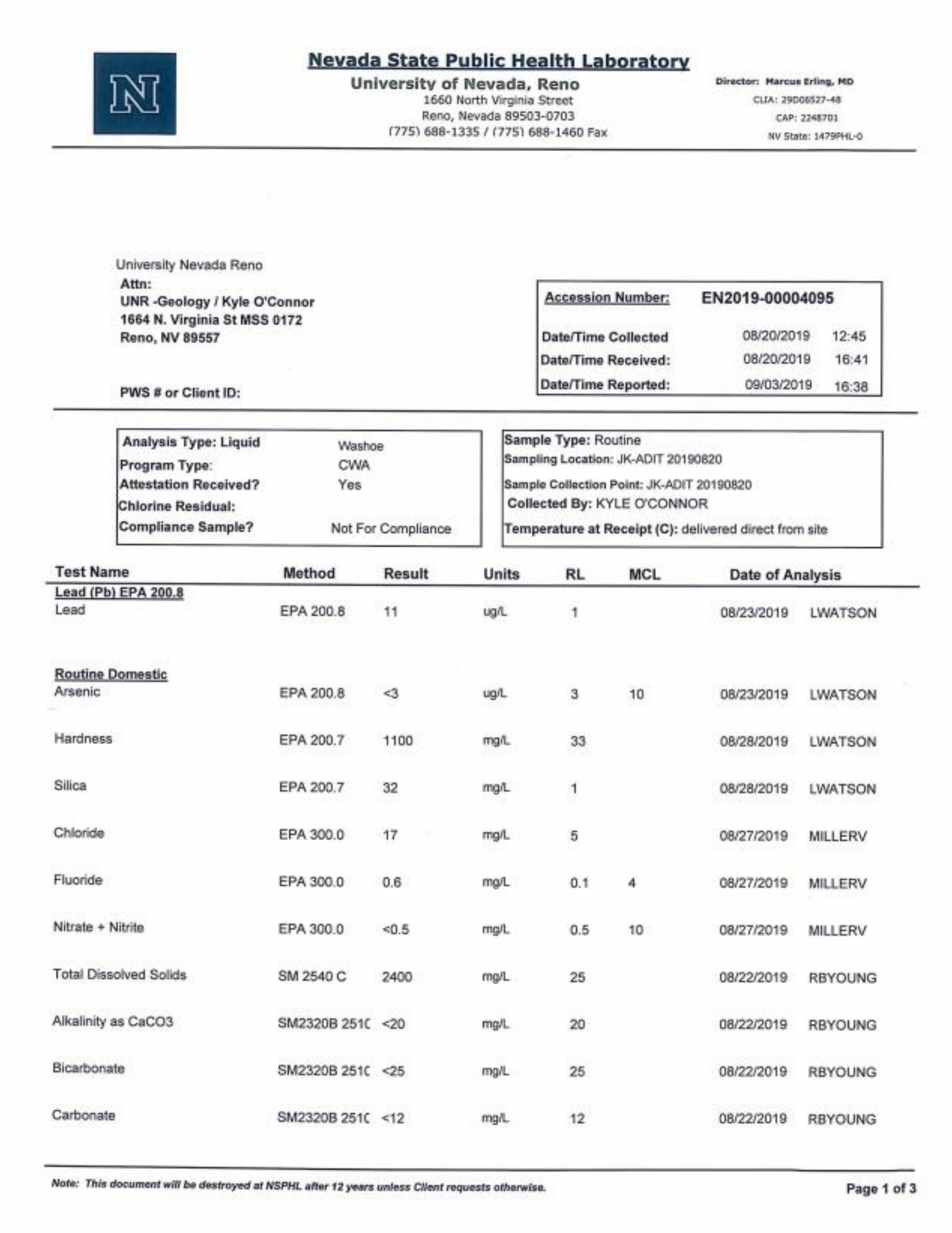


Fluoride	EPA 300.0	0.2	mg/L	0.1	4	08/27/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	1.1	mg/L	0.5	10	08/27/2019	MILLERV
Total Dissolved Solids	SM 2540 C	1200	mg/L	25		08/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 2510	130	mg/L	20		08/22/2019	RBYOUNG
Bicarbonate	SM2320B 2510	160	mg/L	25		08/22/2019	RBYOUNG
Carbonate	SM2320B 2510	<12	mg/L	12		08/22/2019	RBYOUNG
Conductivity	SM2320B 2510	1500	umhos/cm	10		08/22/2019	RBYOUNG
Hydroxide	SM2320B 2510	<7	mg/L	7		08/22/2019	RBYOUNG
pH	SM2320B 2510	7.21	Unit	2		08/22/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 2510	22.4	C	15		08/22/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		08/21/2019	RBYOUNG
Turbidity	SM 2130 B	15	NTU	0.40		08/21/2019	LWATSON
Sulfate	EPA 300.0	670	mg/L	5		08/28/2019	MILLERV
Boron	EPA 200.7	<0.5	mg/L	0.500		08/29/2019	LWATSON
Calcium	EPA 200.7	160	mg/L	25		08/29/2019	LWATSON
Copper	EPA 200.7	<0.1	mg/L	0.100		08/29/2019	LWATSON
Potassium	EPA 200.7	<25	mg/L	25		08/29/2019	LWATSON
Sodium	EPA 200.7	75	mg/L	25		08/29/2019	LWATSON



Nevada State Public Health Laboratory
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Director: Marcus Erling, MD
CLIA: 29D06527-48
CAP: 2248701
NV State: 1479PHL-0

University Nevada Reno
Attn:
UNR -Geology / Kyle O'Connor
1664 N. Virginia St MSS 0172
Reno, NV 89557

PWS # or Client ID:

Accession Number:	**EN2019-00004095**	
Date/Time Collected	08/20/2019	12:45
Date/Time Received:	08/20/2019	16:41
Date/Time Reported:	09/03/2019	16:38

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: JK-ADIT 20190820
Sample Collection Point: JK-ADIT 20190820
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	11	ug/L	1		08/23/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	08/23/2019	LWATSON
Hardness	EPA 200.7	1100	mg/L	33		08/28/2019	LWATSON
Silica	EPA 200.7	32	mg/L	1		08/28/2019	LWATSON
Chloride	EPA 300.0	17	mg/L	5		08/27/2019	MILLERV
Fluoride	EPA 300.0	0.6	mg/L	0.1	4	08/27/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/27/2019	MILLERV
Total Dissolved Solids	SM 2540 C	2400	mg/L	25		08/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		08/22/2019	RBYOUNG
Bicarbonate	SM2320B 251C	<25	mg/L	25		08/22/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2019	RBYOUNG

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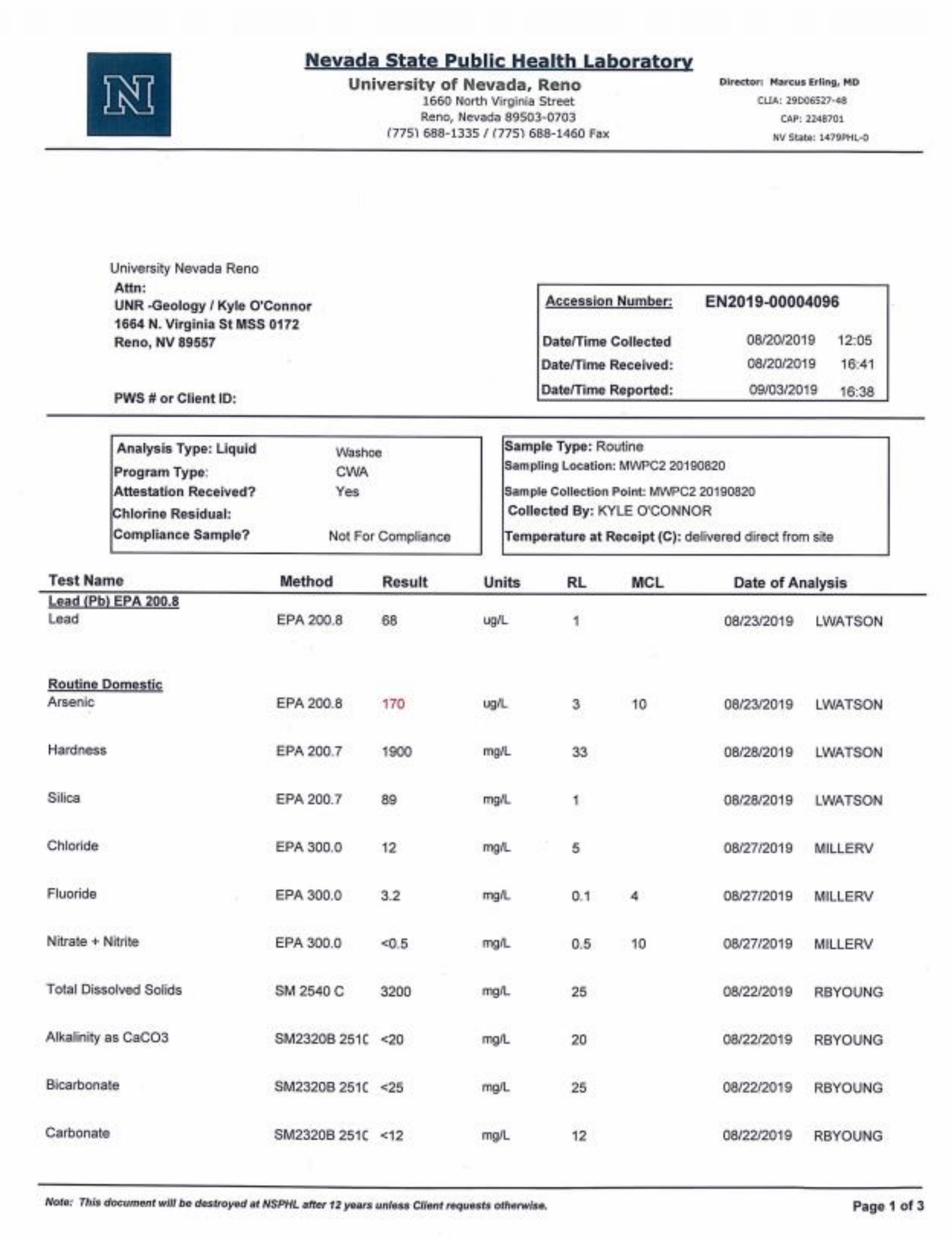
CAP: 2248701
NV State: 1479PHL-0

Accession Number: **EN2019-00004095**

Conductivity	SM2320B 251C	2900	umhos/cm	10		08/22/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2019	RBYOUNG
pH	SM2320B 251C	2.83	Unit	2		08/22/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	22.4	C	15		08/22/2019	RBYOUNG
Color	SM 2120 B	25	CU	5		08/21/2019	RBYOUNG
Turbidity	SM 2130 B	0.75	NTU	0.40		08/21/2019	LWATSON
Sulfate	EPA 300.0	1700	mg/L	25		08/28/2019	MILLERV
Barium	EPA 200.7	<0.1	mg/L	0.100	2	08/28/2019	LWATSON
Iron	EPA 200.7	32	mg/L	0.250		08/28/2019	LWATSON
Magnesium	EPA 200.7	100	mg/L	25		08/28/2019	LWATSON
Manganese	EPA 200.7	7.7	mg/L	0.100		08/28/2019	LWATSON
Silicon	EPA 200.7	15	mg/L	2.500		08/28/2019	LWATSON
Zinc	EPA 200.7	12	mg/L	0.250		08/28/2019	LWATSON
Boron	EPA 200.7	<0.5	mg/L	0.500		08/29/2019	LWATSON
Calcium	EPA 200.7	260	mg/L	25		08/29/2019	LWATSON
Copper	EPA 200.7	110	mg/L	1		08/29/2019	LWATSON
Potassium	EPA 200.7	<50	mg/L	50		08/29/2019	LWATSON
Sodium	EPA 200.7	69	mg/L	50		08/29/2019	LWATSON



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PWS # or Client ID:

Accession Number: **EN2019-00004096**
Date/Time Collected 08/20/2019 12:05
Date/Time Received: 08/20/2019 16:41
Date/Time Reported: 09/03/2019 16:38

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2 20190820
Sample Collection Point: MWPC2 20190820
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	68	ug/L	1		08/23/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	170	ug/L	3	10	08/23/2019	LWATSON
Hardness	EPA 200.7	1900	mg/L	33		08/28/2019	LWATSON
Silica	EPA 200.7	89	mg/L	1		08/28/2019	LWATSON
Chloride	EPA 300.0	12	mg/L	5		08/27/2019	MILLERV
Fluoride	EPA 300.0	3.2	mg/L	0.1	4	08/27/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/27/2019	MILLERV
Total Dissolved Solids	SM 2540 C	3200	mg/L	25		08/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		08/22/2019	RBYOUNG
Bicarbonate	SM2320B 251C	<25	mg/L	25		08/22/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2019	RBYOUNG

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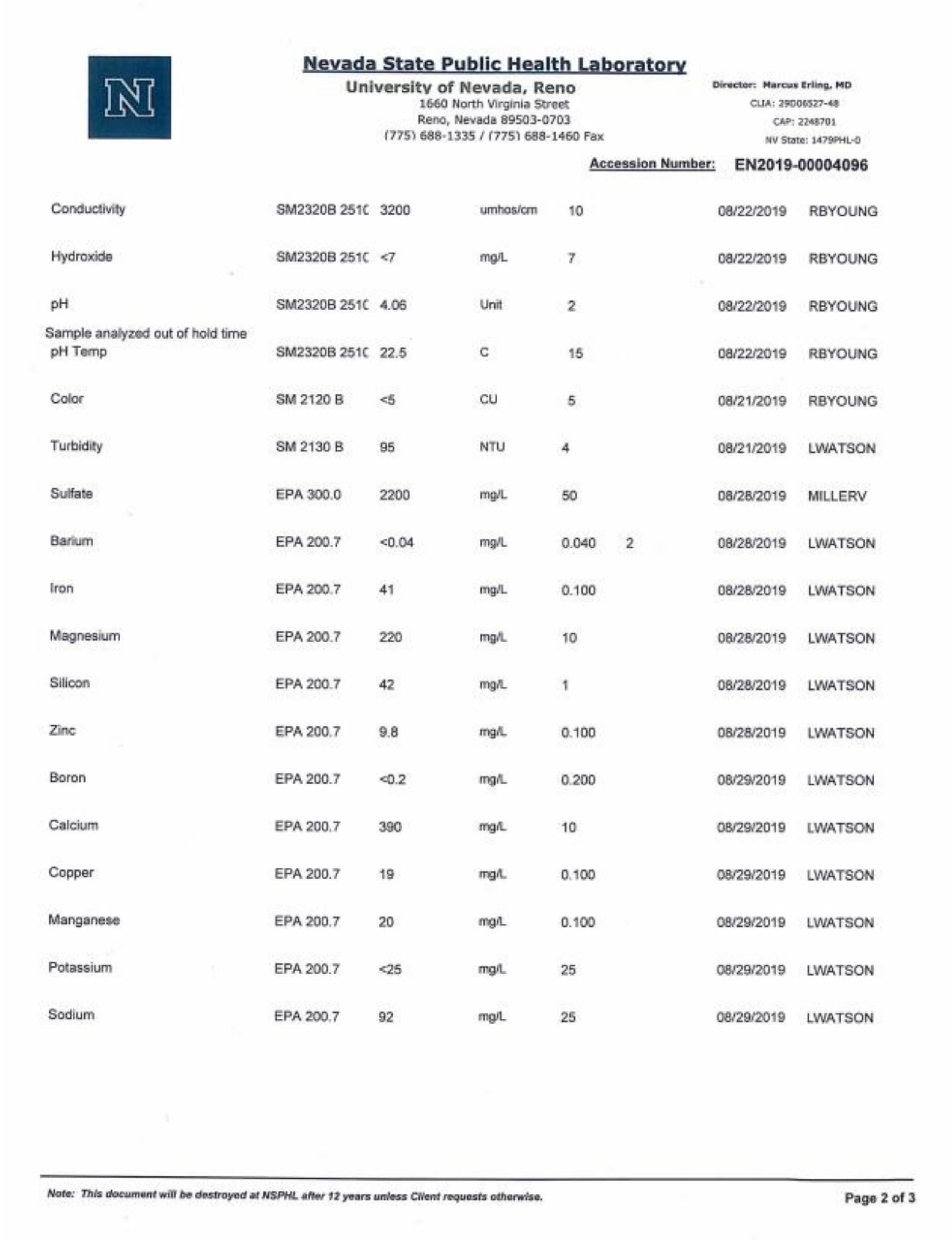

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NV State: 1479PHL-0

Accession Number: **EN2019-00004096**

Conductivity	SM2320B 251C	3200	umhos/cm	10		08/22/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2019	RBYOUNG
pH	SM2320B 251C	4.06	Unit	2		08/22/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	22.5	C	15		08/22/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		08/21/2019	RBYOUNG
Turbidity	SM 2130 B	95	NTU	4		08/21/2019	LWATSON
Sulfate	EPA 300.0	2200	mg/L	50		08/28/2019	MILLERV
Barium	EPA 200.7	<0.04	mg/L	0.040	2	08/28/2019	LWATSON
Iron	EPA 200.7	41	mg/L	0.100		08/28/2019	LWATSON
Magnesium	EPA 200.7	220	mg/L	10		08/28/2019	LWATSON
Silicon	EPA 200.7	42	mg/L	1		08/28/2019	LWATSON
Zinc	EPA 200.7	9.8	mg/L	0.100		08/28/2019	LWATSON
Boron	EPA 200.7	<0.2	mg/L	0.200		08/29/2019	LWATSON
Calcium	EPA 200.7	390	mg/L	10		08/29/2019	LWATSON
Copper	EPA 200.7	19	mg/L	0.100		08/29/2019	LWATSON
Manganese	EPA 200.7	20	mg/L	0.100		08/29/2019	LWATSON
Potassium	EPA 200.7	<25	mg/L	25		08/29/2019	LWATSON
Sodium	EPA 200.7	92	mg/L	25		08/29/2019	LWATSON

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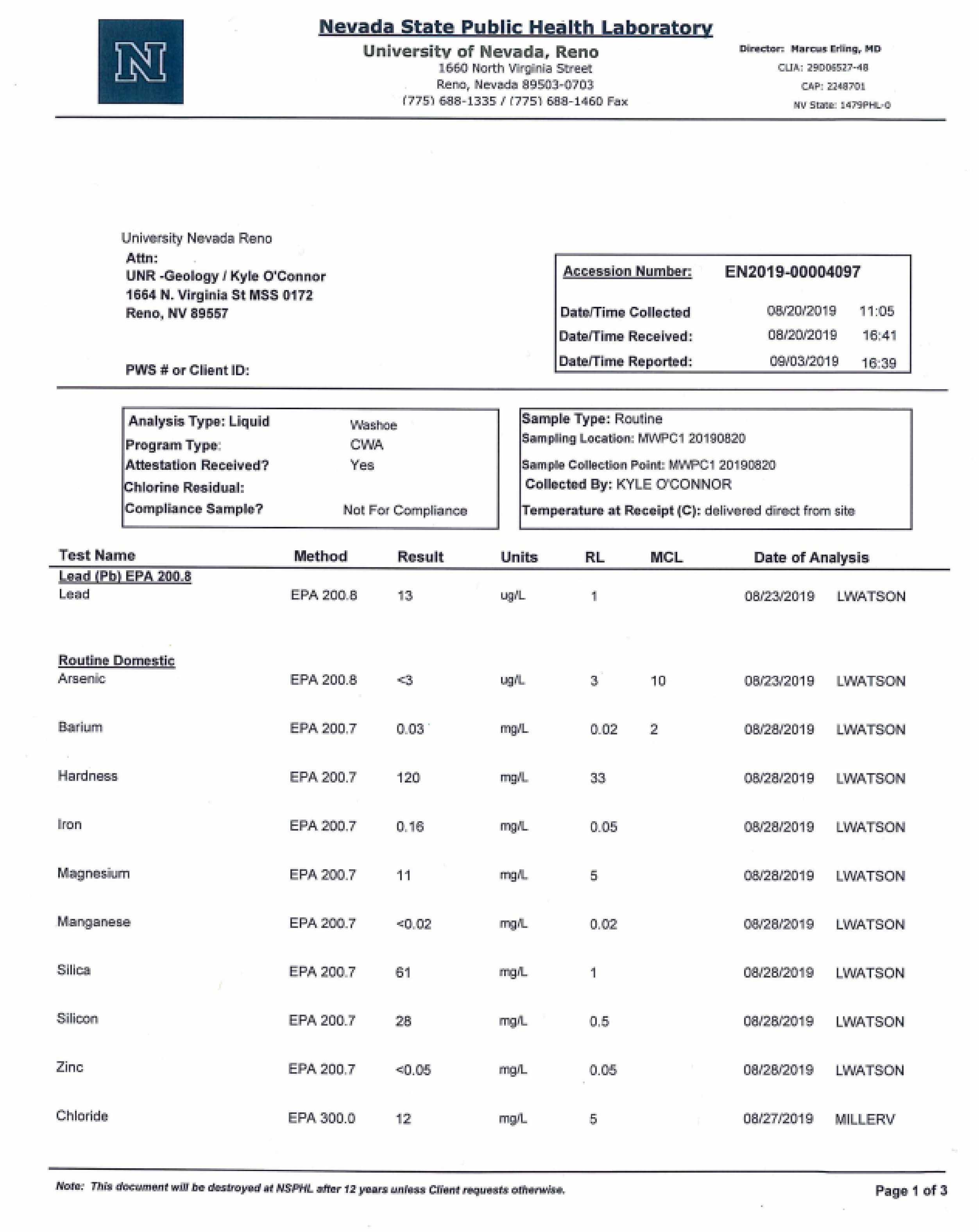

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PWS # or Client ID:

Accession Number:	**EN2019-00004097**		
Date/Time Collected	08/20/2019	11:05	
Date/Time Received:	08/20/2019	16:41	
Date/Time Reported:	09/03/2019	16:39	

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1 20190820
Sample Collection Point: MWPC1 20190820
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	13	ug/L	1		08/23/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	08/23/2019	LWATSON
Barium	EPA 200.7	0.03	mg/L	0.02	2	08/28/2019	LWATSON
Hardness	EPA 200.7	120	mg/L	33		08/28/2019	LWATSON
Iron	EPA 200.7	0.16	mg/L	0.05		08/28/2019	LWATSON
Magnesium	EPA 200.7	11	mg/L	5		08/28/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.02		08/28/2019	LWATSON
Silica	EPA 200.7	61	mg/L	1		08/28/2019	LWATSON
Silicon	EPA 200.7	28	mg/L	0.5		08/28/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.05		08/28/2019	LWATSON
Chloride	EPA 300.0	12	mg/L	5		08/27/2019	MILLERV

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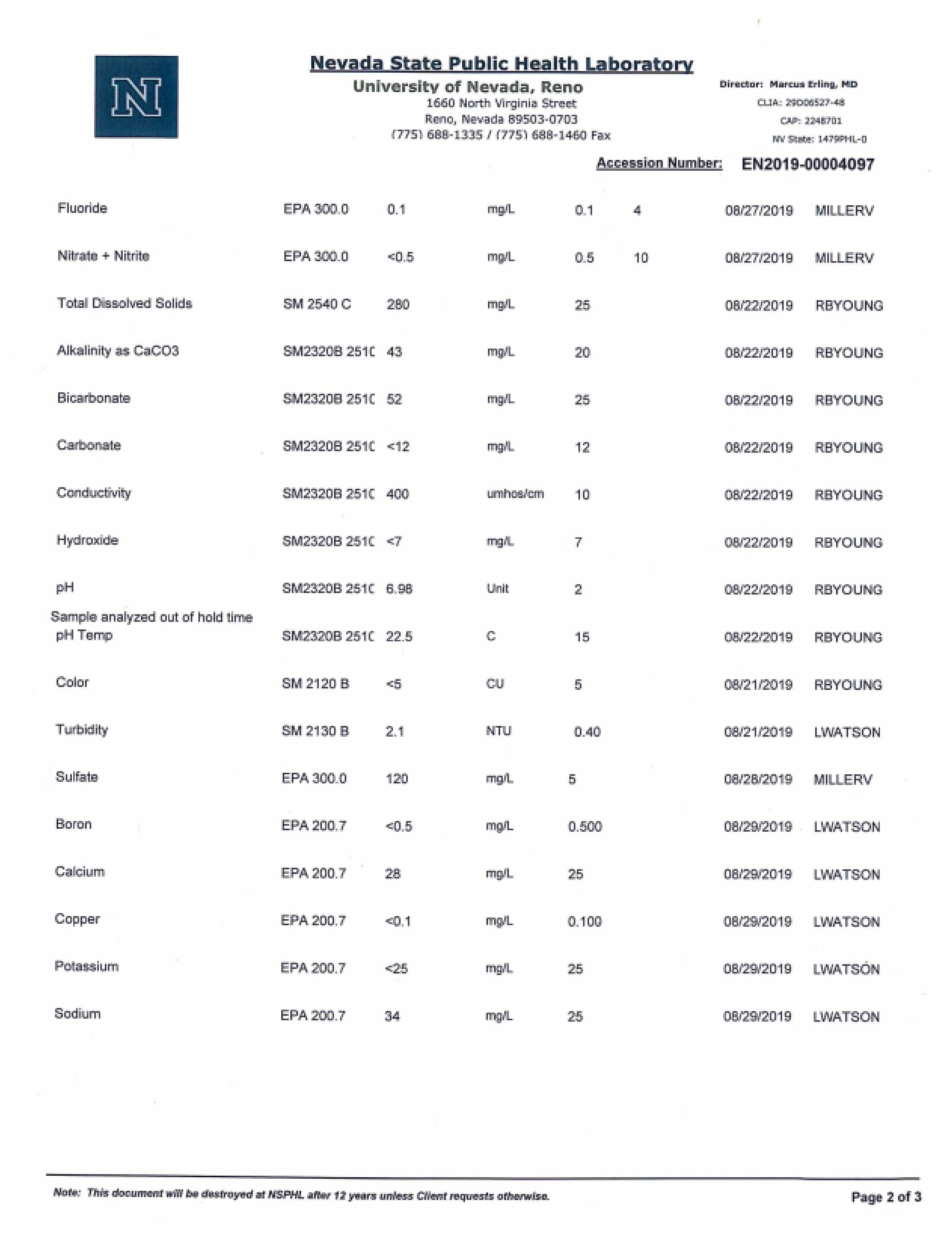

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Accession Number: EN2019-00004097

Fluoride	EPA 300.0	0.1	mg/L	0.1	4	08/27/2019	MILLERV
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	08/27/2019	MILLERV
Total Dissolved Solids	SM 2540 C	280	mg/L	25		08/22/2019	RBYOUNG
Alkalinity as CaCO3	SM2320B 251C	43	mg/L	20		08/22/2019	RBYOUNG
Bicarbonate	SM2320B 251C	52	mg/L	25		08/22/2019	RBYOUNG
Carbonate	SM2320B 251C	<12	mg/L	12		08/22/2019	RBYOUNG
Conductivity	SM2320B 251C	400	umhos/cm	10		08/22/2019	RBYOUNG
Hydroxide	SM2320B 251C	<7	mg/L	7		08/22/2019	RBYOUNG
pH	SM2320B 251C	6.98	Unit	2		08/22/2019	RBYOUNG
Sample analyzed out of hold time							
pH Temp	SM2320B 251C	22.5	C	15		08/22/2019	RBYOUNG
Color	SM 2120 B	<5	CU	5		08/21/2019	RBYOUNG
Turbidity	SM 2130 B	2.1	NTU	0.40		08/21/2019	LWATSON
Sulfate	EPA 300.0	120	mg/L	5		08/28/2019	MILLERV
Boron	EPA 200.7	<0.5	mg/L	0.500		08/29/2019	LWATSON
Calcium	EPA 200.7	28	mg/L	25		08/29/2019	LWATSON
Copper	EPA 200.7	<0.1	mg/L	0.100		08/29/2019	LWATSON
Potassium	EPA 200.7	<25	mg/L	25		08/29/2019	LWATSON
Sodium	EPA 200.7	34	mg/L	25		08/29/2019	LWATSON

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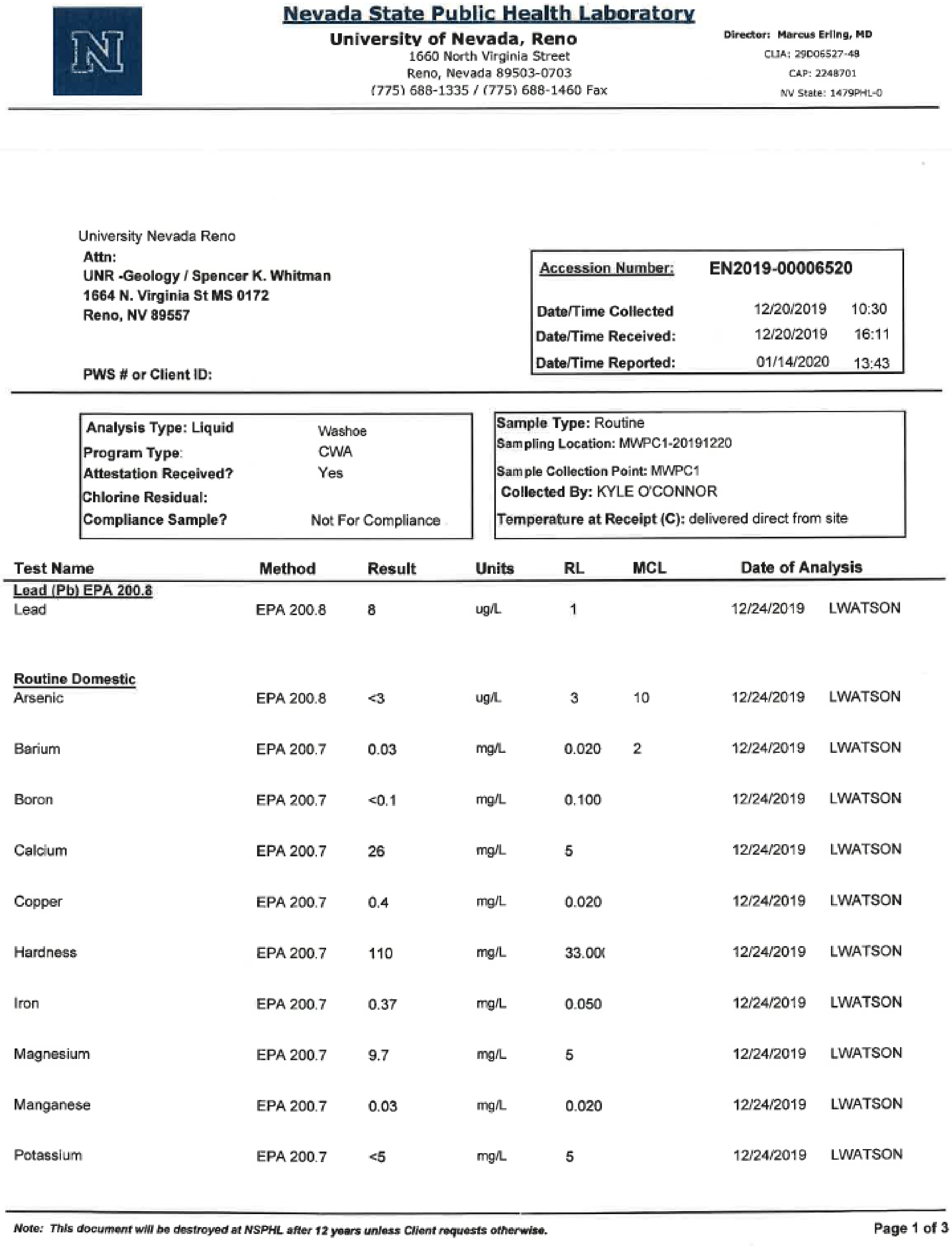
December 2019 Results



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PWS # or Client ID:

Accession Number:	**EN2019-00006520**	
Date/Time Collected	12/20/2019	10:30
Date/Time Received:	12/20/2019	16:11
Date/Time Reported:	01/14/2020	13:43

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC1-20191220
Sample Collection Point: MWPC1
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	8	ug/L	1		12/24/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	12/24/2019	LWATSON
Barium	EPA 200.7	0.03	mg/L	0.020	2	12/24/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		12/24/2019	LWATSON
Calcium	EPA 200.7	26	mg/L	5		12/24/2019	LWATSON
Copper	EPA 200.7	0.4	mg/L	0.020		12/24/2019	LWATSON
Hardness	EPA 200.7	110	mg/L	33.00		12/24/2019	LWATSON
Iron	EPA 200.7	0.37	mg/L	0.050		12/24/2019	LWATSON
Magnesium	EPA 200.7	9.7	mg/L	5		12/24/2019	LWATSON
Manganese	EPA 200.7	0.03	mg/L	0.020		12/24/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		12/24/2019	LWATSON

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Silica	EPA 200.7	46	mg/L	1.000		12/24/2019	LWATSON
Silicon	EPA 200.7	21	mg/L	0.500		12/24/2019	LWATSON
Sodium	EPA 200.7	30	mg/L	5		12/24/2019	LWATSON
Zinc	EPA 200.7	0.08	mg/L	0.050		12/24/2019	LWATSON
Chloride	EPA 300.0	13	mg/L	5		01/07/2020	LWATSON
Fluoride	EPA 300.0	0.1	mg/L	0.1	4	01/07/2020	LWATSON
Nitrate + Nitrite	EPA 300.0	0.8	mg/L	0.5	10	01/07/2020	LWATSON
Sulfate	EPA 300.0	120	mg/L	5		01/07/2020	LWATSON
Total Dissolved Solids	SM 2540 C	270	mg/L	25		12/30/2019	DBAKER
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B 251(	26	mg/L	20		12/30/2019	GBREWSTER
Bicarbonate	SM2320B 251(	32	mg/L	25		12/30/2019	DBAKER
Carbonate	SM2320B 251(	<12	mg/L	12		12/30/2019	DBAKER
Conductivity	SM2320B 251(	380	umhos/cm	10		12/30/2019	DBAKER
Hydroxide	SM2320B 251(	<7	mg/L	7		12/30/2019	DBAKER
pH	SM2320B 251(	7.21	Unit	2		12/30/2019	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251(	23.1	C	15		12/30/2019	DBAKER
Color	SM 2120 B	25	CU	5		12/20/2019	DBAKER
Turbidity	SM 2130 B	2.8	NTU	0.40		12/20/2019	LWATSON

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PWS # or Client ID:

Accession Number:	**EN2019-00006521**	
Date/Time Collected	12/20/2019	12:30
Date/Time Received:	12/20/2019	16:11
Date/Time Reported:	01/14/2020	13:43

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC2-20191220
Sample Collection Point: MWPC2-20191220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	180	ug/L	2		12/24/2019	LWATSON
Routine Domestic							
Barium	EPA 200.7	0.09	mg/L	0.020	2	12/24/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		12/24/2019	LWATSON
Hardness	EPA 200.7	1800	mg/L	33.00(		12/24/2019	LWATSON
Magnesium	EPA 200.7	200	mg/L	5		12/24/2019	LWATSON
Potassium	EPA 200.7	6	mg/L	5		12/24/2019	LWATSON
Silica	EPA 200.7	96	mg/L	1		12/24/2019	LWATSON
Silicon	EPA 200.7	45	mg/L	0.5		12/24/2019	LWATSON
Sodium	EPA 200.7	91	mg/L	5		12/24/2019	LWATSON
Chloride	EPA 300.0	12	mg/L	5		01/07/2020	LWATSON
Fluoride	EPA 300.0	2	mg/L	0.1	4	01/07/2020	LWATSON

Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.5	10	01/07/2020	LWATSON
Total Dissolved Solids	SM 2540 C	3000	mg/L	25		12/30/2019	DBAKER
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		12/30/2019	DBAKER
Bicarbonate	SM2320B 251C	<25	mg/L	25		12/30/2019	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		12/30/2019	DBAKER
Conductivity	SM2320B 251C	3000	umhos/cm	10		12/30/2019	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		12/30/2019	DBAKER
pH	SM2320B 251C	3.86	Unit	2		12/30/2019	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.4	C	15		12/30/2019	DBAKER
Color	SM 2120 B	20	CU	5		12/20/2019	DBAKER
Turbidity	SM 2130 B	350	NTU	4		12/20/2019	LWATSON
Calcium	EPA 200.7	380	mg/L	50			LWATSON
Copper	EPA 200.7	13	mg/L	0.200			LWATSON
Iron	EPA 200.7	52	mg/L	0.500			LWATSON
Manganese	EPA 200.7	17	mg/L	0.200			LWATSON
Zinc	EPA 200.7	7.7	mg/L	0.500			LWATSON
Arsenic	EPA 200.8	290	ug/L	6	10	12/24/2019	LWATSON
Sulfate	EPA 300.0	2100	mg/L	25		01/10/2020	LWATSON

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PWS # or Client ID:

Accession Number:	**EN2019-00006534**	
Date/Time Collected	12/20/2019	14:00
Date/Time Received:	12/20/2019	16:11
Date/Time Reported:	01/14/2020	13:43

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC3-20191220
Sample Collection Point: MWPC3-20191220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered on ice

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	13	ug/L	1		12/24/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	24	ug/L	3	10	12/24/2019	LWATSON
Barium	EPA 200.7	0.02	mg/L	0.020	2	12/24/2019	LWATSON
Boron	EPA 200.7	0.1	mg/L	0.100		12/24/2019	LWATSON
Calcium	EPA 200.7	170	mg/L	5		12/24/2019	LWATSON
Copper	EPA 200.7	0.07	mg/L	0.020		12/24/2019	LWATSON
Hardness	EPA 200.7	740	mg/L	33.00(		12/24/2019	LWATSON
Iron	EPA 200.7	0.63	mg/L	0.050		12/24/2019	LWATSON
Magnesium	EPA 200.7	76	mg/L	5		12/24/2019	LWATSON
Manganese	EPA 200.7	0.09	mg/L	0.020		12/24/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		12/24/2019	LWATSON

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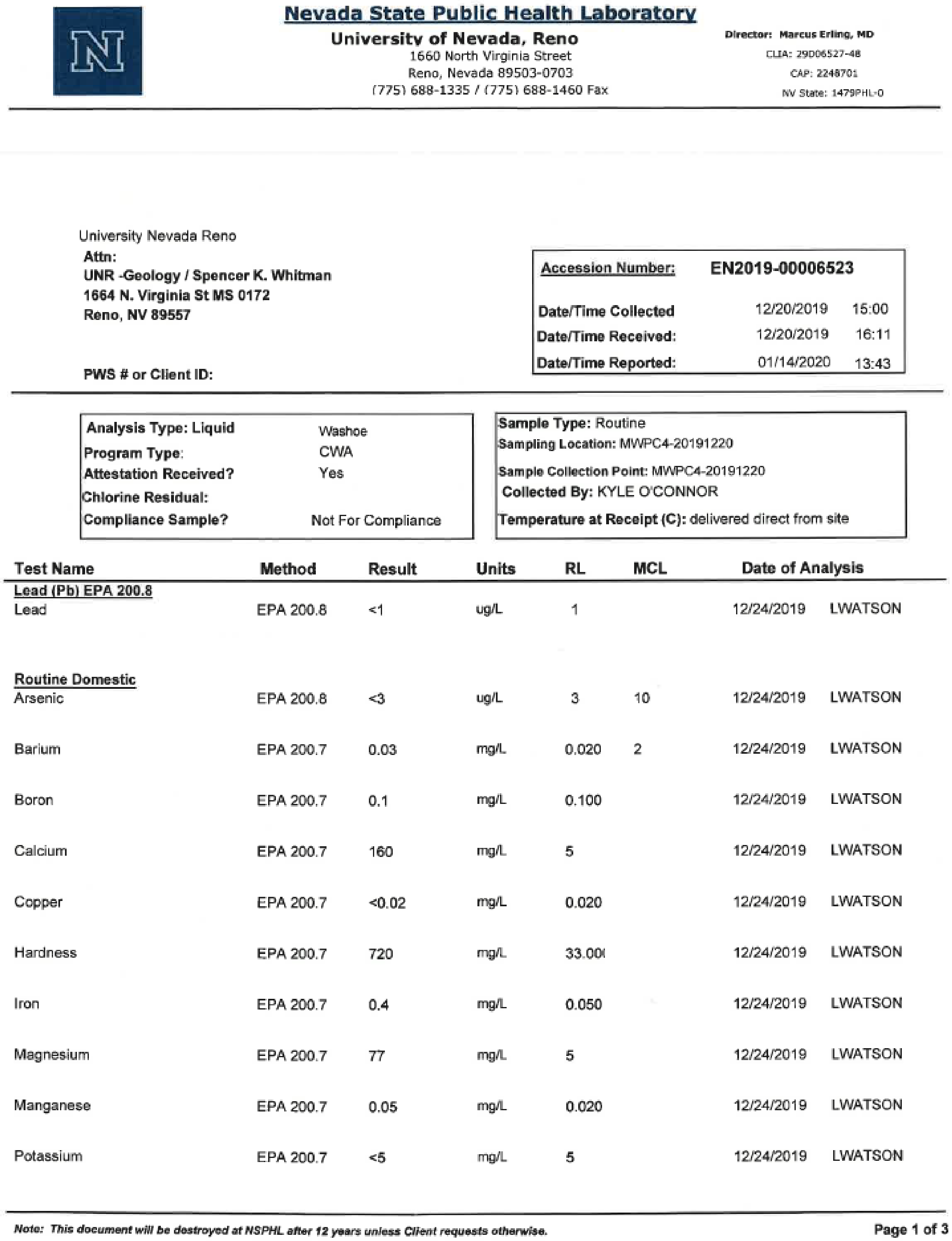
Silica	EPA 200.7	68	mg/L	1.000		12/24/2019	LWATSON
Silicon	EPA 200.7	32	mg/L	0.500		12/24/2019	LWATSON
Sodium	EPA 200.7	74	mg/L	5		12/24/2019	LWATSON
Zinc	EPA 200.7	0.06	mg/L	0.050		12/24/2019	LWATSON
Chloride	EPA 300.0	24	mg/L	5		01/07/2020	LWATSON
Fluoride	EPA 300.0	0.24	mg/L	0.1	4	01/07/2020	LWATSON
Nitrate + Nitrite	EPA 300.0	0.9	mg/L	0.5	10	01/07/2020	LWATSON
Sulfate	EPA 300.0	750	mg/L	5		01/07/2020	LWATSON
Total Dissolved Solids	SM 2540 C	1300	mg/L	25		12/30/2019	DBAKER
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B 251(	120	mg/L	20		12/30/2019	DBAKER
Bicarbonate	SM2320B 251(	140	mg/L	25		12/30/2019	DBAKER
Carbonate	SM2320B 251(	<12	mg/L	12		12/30/2019	DBAKER
Conductivity	SM2320B 251(	1600	umhos/cm	10		12/30/2019	DBAKER
Hydroxide	SM2320B 251(	<7	mg/L	7		12/30/2019	DBAKER
pH	SM2320B 251(	7.38	Unit	2		12/30/2019	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251(	24	C	15		12/30/2019	DBAKER
Color	SM 2120 B	<5	CU	5		12/20/2019	DBAKER
Turbidity	SM 2130 B	6	NTU	0.40		12/20/2019	LWATSON



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PWS # or Client ID:

Accession Number:	**EN2019-00006523**	
Date/Time Collected	12/20/2019	15:00
Date/Time Received:	12/20/2019	16:11
Date/Time Reported:	01/14/2020	13:43

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: MWPC4-20191220
Sample Collection Point: MWPC4-20191220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	<1	ug/L	1		12/24/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	12/24/2019	LWATSON
Barium	EPA 200.7	0.03	mg/L	0.020	2	12/24/2019	LWATSON
Boron	EPA 200.7	0.1	mg/L	0.100		12/24/2019	LWATSON
Calcium	EPA 200.7	160	mg/L	5		12/24/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.020		12/24/2019	LWATSON
Hardness	EPA 200.7	720	mg/L	33.00		12/24/2019	LWATSON
Iron	EPA 200.7	0.4	mg/L	0.050		12/24/2019	LWATSON
Magnesium	EPA 200.7	77	mg/L	5		12/24/2019	LWATSON
Manganese	EPA 200.7	0.05	mg/L	0.020		12/24/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		12/24/2019	LWATSON

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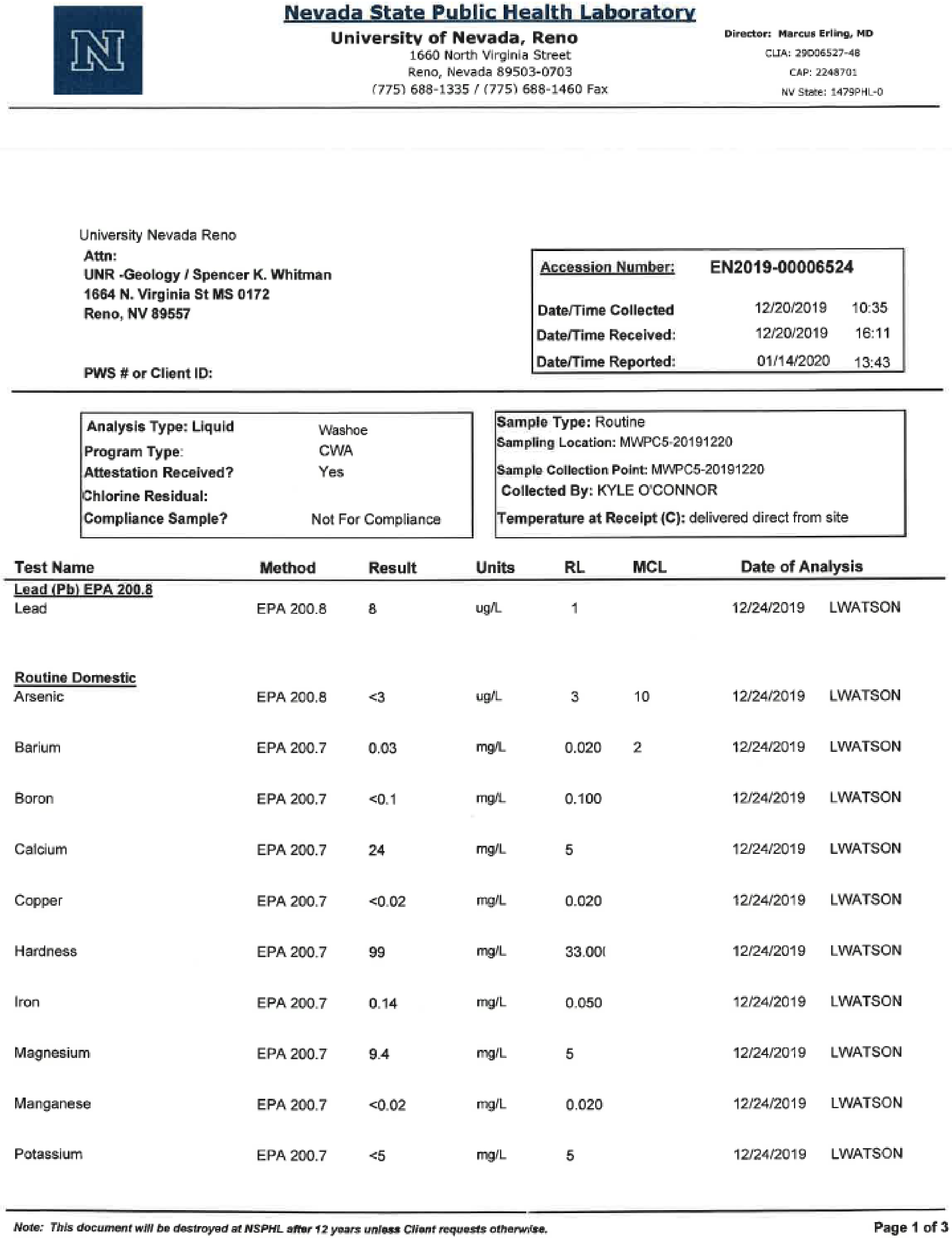
Silica	EPA 200.7	57	mg/L	1.000		12/24/2019	LWATSON
Silicon	EPA 200.7	27	mg/L	0.500		12/24/2019	LWATSON
Sodium	EPA 200.7	69	mg/L	5		12/24/2019	LWATSON
Zinc	EPA 200.7	0.06	mg/L	0.050		12/24/2019	LWATSON
Chloride	EPA 300.0	19	mg/L	5		01/07/2020	LWATSON
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	01/07/2020	LWATSON
Nitrate + Nitrite	EPA 300.0	0.7	mg/L	0.5	10	01/07/2020	LWATSON
Sulfate	EPA 300.0	780	mg/L	5		01/07/2020	LWATSON
Total Dissolved Solids	SM 2540 C	1200	mg/L	25		12/30/2019	DBAKER
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B 251C	41	mg/L	20		12/30/2019	DBAKER
Bicarbonate	SM2320B 251C	50	mg/L	25		12/30/2019	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		12/30/2019	DBAKER
Conductivity	SM2320B 251C	1500	umhos/cm	10		12/30/2019	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		12/30/2019	DBAKER
pH	SM2320B 251C	7.21	Unit	2		12/30/2019	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.7	C	15		12/30/2019	DBAKER
Color	SM 2120 B	5	CU	5		12/20/2019	DBAKER
Turbidity	SM 2130 B	3.4	NTU	0.40		12/20/2019	LWATSON



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PWS # or Client ID:

Accession Number:	**EN2019-00006524**	
Date/Time Collected	12/20/2019	10:35
Date/Time Received:	12/20/2019	16:11
Date/Time Reported:	01/14/2020	13:43

Analysis Type: Liquid	Washoe
Program Type:	CWA
Attestation Received?	Yes
Chlorine Residual:	
Compliance Sample?	Not For Compliance

Sample Type: Routine
Sampling Location: MWPC5-20191220
Sample Collection Point: MWPC5-20191220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	**Method**	**Result**	**Units**	**RL**	**MCL**	**Date of Analysis**	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	8	ug/L	1		12/24/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	12/24/2019	LWATSON
Barium	EPA 200.7	0.03	mg/L	0.020	2	12/24/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		12/24/2019	LWATSON
Calcium	EPA 200.7	24	mg/L	5		12/24/2019	LWATSON
Copper	EPA 200.7	<0.02	mg/L	0.020		12/24/2019	LWATSON
Hardness	EPA 200.7	99	mg/L	33.00(		12/24/2019	LWATSON
Iron	EPA 200.7	0.14	mg/L	0.050		12/24/2019	LWATSON
Magnesium	EPA 200.7	9.4	mg/L	5		12/24/2019	LWATSON
Manganese	EPA 200.7	<0.02	mg/L	0.020		12/24/2019	LWATSON
Potassium	EPA 200.7	<5	mg/L	5		12/24/2019	LWATSON

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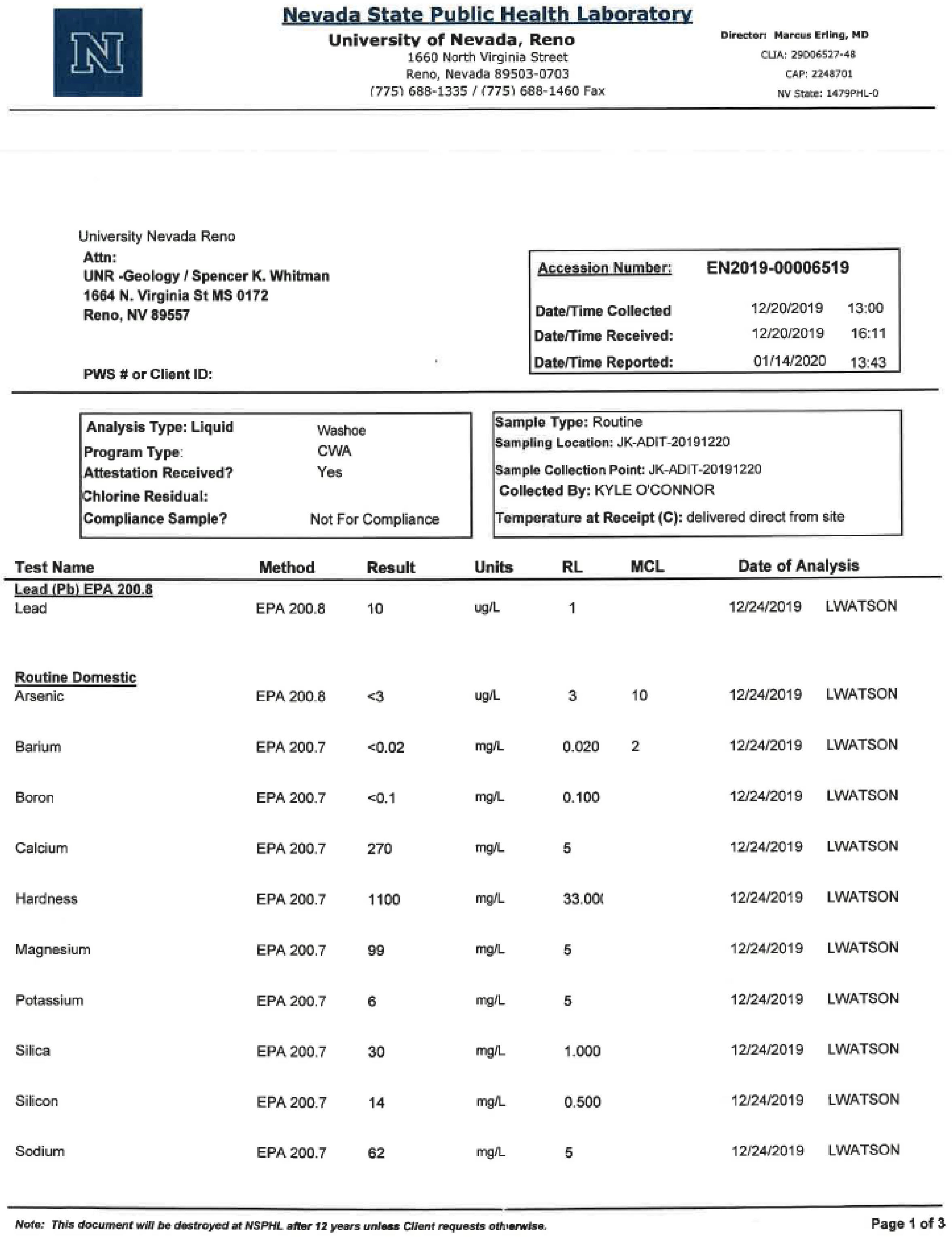
Silica	EPA 200.7	44	mg/L	1.000		12/24/2019	LWATSON
Silicon	EPA 200.7	21	mg/L	0.500		12/24/2019	LWATSON
Sodium	EPA 200.7	28	mg/L	5		12/24/2019	LWATSON
Zinc	EPA 200.7	<0.05	mg/L	0.050		12/24/2019	LWATSON
Chloride	EPA 300.0	13	mg/L	5		01/07/2020	LWATSON
Fluoride	EPA 300.0	0.2	mg/L	0.1	4	01/07/2020	LWATSON
Nitrate + Nitrite	EPA 300.0	0.7	mg/L	0.5	10	01/07/2020	LWATSON
Sulfate	EPA 300.0	120	mg/L	5		01/07/2020	LWATSON
Total Dissolved Solids	SM 2540 C	270	mg/L	25		12/30/2019	DBAKER
Sample analyzed out of hold time							
Alkalinity as CaCO3	SM2320B 251C	27	mg/L	20		12/30/2019	DBAKER
Bicarbonate	SM2320B 251C	33	mg/L	25		12/30/2019	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		12/30/2019	DBAKER
Conductivity	SM2320B 251C	380	umhos/cm	10		12/30/2019	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		12/30/2019	DBAKER
pH	SM2320B 251C	7.19	Unit	2		12/30/2019	DBAKER
pH analyzed out of hold time							
pH Temp	SM2320B 251C	23.8	C	15		12/30/2019	DBAKER
Color	SM 2120 B	5	CU	5		12/20/2019	DBAKER
Turbidity	SM 2130 B	2.8	NTU	0.40		12/20/2019	LWATSON



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PWS # or Client ID:

Accession Number:	**EN2019-00006519**		
Date/Time Collected	12/20/2019	13:00	
Date/Time Received:	12/20/2019	16:11	
Date/Time Reported:	01/14/2020	13:43	

Analysis Type: Liquid Washoe
Program Type: CWA
Attestation Received? Yes
Chlorine Residual:
Compliance Sample? Not For Compliance

Sample Type: Routine
Sampling Location: JK-ADIT-20191220
Sample Collection Point: JK-ADIT-20191220
Collected By: KYLE O'CONNOR
Temperature at Receipt (C): delivered direct from site

Test Name	Method	Result	Units	RL	MCL	Date of Analysis	
Lead (Pb) EPA 200.8							
Lead	EPA 200.8	10	ug/L	1		12/24/2019	LWATSON
Routine Domestic							
Arsenic	EPA 200.8	<3	ug/L	3	10	12/24/2019	LWATSON
Barium	EPA 200.7	<0.02	mg/L	0.020	2	12/24/2019	LWATSON
Boron	EPA 200.7	<0.1	mg/L	0.100		12/24/2019	LWATSON
Calcium	EPA 200.7	270	mg/L	5		12/24/2019	LWATSON
Hardness	EPA 200.7	1100	mg/L	33.00		12/24/2019	LWATSON
Magnesium	EPA 200.7	99	mg/L	5		12/24/2019	LWATSON
Potassium	EPA 200.7	6	mg/L	5		12/24/2019	LWATSON
Silica	EPA 200.7	30	mg/L	1.000		12/24/2019	LWATSON
Silicon	EPA 200.7	14	mg/L	0.500		12/24/2019	LWATSON
Sodium	EPA 200.7	62	mg/L	5		12/24/2019	LWATSON

Chloride	EPA 300.0	17	mg/L	5		01/07/2020	LWATSON
Fluoride	EPA 300.0	0.8	mg/L	0.100	4	01/07/2020	LWATSON
Nitrate + Nitrite	EPA 300.0	<0.5	mg/L	0.500	10	01/07/2020	LWATSON
Total Dissolved Solids	SM 2540 C	2600	mg/L	25		12/30/2019	DBAKER
Sample analyzed out of hold time Alkalinity as CaCO3	SM2320B 251C	<20	mg/L	20		12/30/2019	DBAKER
Bicarbonate	SM2320B 251C	<25	mg/L	25		12/30/2019	DBAKER
Carbonate	SM2320B 251C	<12	mg/L	12		12/30/2019	DBAKER
Conductivity	SM2320B 251C	2900	umhos/cm	10		12/30/2019	DBAKER
Hydroxide	SM2320B 251C	<7	mg/L	7		12/30/2019	DBAKER
pH	SM2320B 251C	2.89	Unit	2		12/30/2019	DBAKER
pH analyzed out of hold time pH Temp	SM2320B 251C	22.8	C	15		12/30/2019	DBAKER
Color	SM 2120 B	30	CU	5		12/20/2019	DBAKER
Turbidity	SM 2130 B	0.85	NTU	0.40		12/20/2019	LWATSON
Iron	EPA 200.7	78	mg/L	0.500			LWATSON
Manganese	EPA 200.7	8.3	mg/L	0.200			LWATSON
Zinc	EPA 200.7	15	mg/L	0.500			LWATSON
Copper	EPA 200.7	120	mg/L	1			LWATSON
Sulfate	EPA 300.0	1900	mg/L	25		01/09/2020	LWATSON

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