

**CITY OF CLEARWATER
GROUNDWATER REPLENISHMENT
RECHARGE TEST, GEOCHEMISTRY, AND GROUNDWATER MODELING
REPORT**

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OCTOBER 2014



**Southwest Florida
Water Management District**

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1 INTRODUCTION

1.1 Purpose

Leggette, Brashears & Graham, Inc. (LBG) prepared this report to provide a description of the recharge test, geochemical evaluation, and groundwater modeling update for the City of Clearwater Groundwater Replenishment Project. The City of Clearwater (City) in cooperation with the Southwest Florida Water Management District (SWFWMD) is implementing a multi-phased groundwater replenishment (GWR) project using purified reclaimed water from the City's Northeast Water Reclamation Facility (NEWRF). The purpose of the project is to use direct recharge of purified reclaimed water to the Upper Floridan aquifer to fully utilize the City's reclaimed water supply, enhance groundwater resources, offset current and future withdrawals from the City's well fields, and reduce the discharge of reclaimed water to surface water. The test recharge well and three associated monitoring wells were constructed at the NEWRF located on State Road 580, approximately 1,000 feet east of McMullen Booth Road in Clearwater, Florida. (**Figure 1**).

This report includes a description of the hydrogeologic evaluation tasks in the testing phase of the project. These tasks include: 1) performance of a six-month recharge test; 2) column testing of rock cores for metals leaching analysis; 3) geochemical modeling for the mixing of the purified water with the native aquifer water; and 4) updating of the groundwater flow and particle tracking models that were developed in the feasibility study performed in 2011.

1.2 Background

A test recharge well and three associated monitoring wells were constructed at the NEWRF located on State Road 580, approximately 1,000 feet east of McMullen Booth Road in Clearwater, Florida. The wells were constructed by Hausinger & Associates, Inc. (HAI) during the period of October 8, 2012 through February 1, 2013. Construction of the wells was

performed in compliance with Florida Department of Environmental Protection (FDEP) Permit No. 0310013-001-UC/5R, dated September 25, 2012. A copy of the permit is included in **Appendix A**. The well drilling and testing plan was developed to: 1) identify the depth, thickness, and transmissivity of the recharge zone; 2) evaluate the degree of confinement between the recharge zone (lower Zone A) and the overlying upper Zone A; 3) define the water-quality profile through Zone A; 4) assess the potential for mobilization of arsenic in the recharge zone; and 5) evaluate the ability of the recharge zone to accept the proposed recharge quantity. Details of the well construction and related testing were provided in the report, *City of Clearwater Groundwater Replenishment Test Recharge and Monitoring Well Construction and Testing Report* (LBG March, 2014).

2 RECHARGE TEST ACTIVITES

2.1 Test Setup

The test recharge well (RW-1) was constructed on the east side of the NEWRF, approximately 200 feet northwest of the existing test ASR well as shown on **Figure 2**. The test ASR Well installed a number of years ago as part of a separate investigation was used as a lower Zone A monitoring well (designated LZAMW-1) for the six month recharge (injection) test. An upper Zone A monitoring well (UZAMW-1) was constructed adjacent to the test ASR well, and a pair of upper and lower Zone A monitoring wells (UZAMW-2 and LZAMW-2) were constructed approximately 800 feet south of the test recharge well, along the southern site boundary as shown on **Figure 2**.

Potable water was planned to be injected at a rate of approximately 300 gallons per minute (gpm) for the recharge test. The source of the water for the recharge test was originally to be two 8-inch diameter supply wells drilled into upper Zone A in the northeast corner of the NEWRF site as shown on **Figure 2**. The supply wells were approximately 1,400 feet north-northeast of RW-1. Initial water-quality data from the supply wells indicated that arsenic was present at a concentration of 35 micro-grams per liter ($\mu\text{g/l}$), which exceeds the primary drinking water standard. An arsenic filtration system was investigated but found to be cost-prohibitive. An alternative plan was implemented to construct a supply well into lower Zone A, which was expected to contain arsenic less than 10 $\mu\text{g/l}$.

The lower Zone A supply well was constructed during the period of February 20 to 27, 2014. The well was constructed with 12-inch diameter surface casing to a depth of 20 feet below land surface (bls), 8-inch diameter PVC casing to a depth of 210 feet bls (top of lower Zone A), and nominal six-inch diameter open borehole to a depth of 320 feet bls. Initial water-quality analysis indicated that arsenic was present at a concentration of 14 $\mu\text{g/l}$. Since the lower Zone A supply well is the only viable supply source for the six month recharge test, and water-quality data from RW-1 and the upper and lower Zone A monitoring wells showed that arsenic exists naturally at concentrations form 2 to 36 $\mu\text{g/l}$ in upper and lower Zone A across the Northeast

Water Reclamation Facility, a request was made to the FDEP to allow use of the well for the recharge test. They concurred that since the water was being injected into the same zone as it was being withdrawn from on the same contiguous site, that the well could be used for the recharge test.

Water from the supply well was pumped through 6-inch diameter PVC pipe laid on land surface to the recharge well. The recharge well head consists of a flange with a drop pipe, which extended approximately 30 feet below the static water level in the well in order to minimize exposure of the injected water to the atmosphere. The upper portion of the drop pipe was 6 inches in diameter, and the bottom 30 feet of drop pipe was reduced to 2 inches in diameter to create enough back pressure so that water would not free-fall and entrain air in the injection stream. Air relief valves were installed on the well head on top of the recharge pipe and on the well head flange in order to allow air to escape from the recharge pipe, and the well casing. Since the water quality of the injected water was similar to the water in the recharge zone, a tracer was used to identify arrival of the injected water at the monitoring wells. Fluoride (hydrofluorosilicic acid) was injected into the recharge water pipe at a rate to create a fluoride concentration of at least 0.8 milligrams per liter (mg/l) in the recharge water.

The recharge test was started on April 3, 2014, and was run for 180 days or 6 months. The average recharge rate was 277 gpm. A total of 330 gallons of hydrofluorosilicic acid were injected into the recharge stream during the test. The supply well ran continuously, with the exception of a 27 hour period on April 29 to 30, when the power to the supply well pump was interrupted.

2.2 Data Collection

2.2.1 Water Levels and Recharge Rate

A calibrated totalizing flow meter was installed in the recharge line near the supply well. The totalizer reading was collected each week during the sampling events. Pressure transducer dataloggers were installed in RW-1 and the four monitoring wells (LZAMW-1, LZAMW-2,

UZAMW-1 and UZAMW-2) to monitor water levels during the recharge test. Collection of background data began on January 4, 2014, and continued until the start of recharge to RW-1 on April 3, 2014. Water-level measurements were recorded at 30-minute intervals during the background and recharge test periods. Water levels were converted to elevations relative to mean sea level based on surveyed top of casing elevations. The dataloggers were downloaded during weekly sampling events throughout the recharge test.

2.2.2 Water Quality

Water samples were collected from RW-1 and the four monitoring wells on a weekly basis throughout the test. An initial background sample was collected from each of the monitoring wells on April 1, 2014. The monitoring wells were equipped with dedicated Grundfos submersible pumps that produce 30 gpm. The pump discharge pipes were equipped with sample taps to divert a controlled volume of water for sample collection. The wells were purged of three well volumes prior to sampling. PVC tubing was connected to the sample tap and a flow-through cell for measurement of temperature, specific conductance, pH, dissolved oxygen (DO) and oxidation-reduction potential (ORP) with a YSI multi-meter. Samples were collected, packed in ice, and delivered to the laboratory for analysis of the following list of parameters:

- Total alkalinity
- Total Organic Carbon
- Nitrate
- TDS
- Calcium
- Potassium
- Sodium
- Bicarbonate alkalinity
- Chloride
- Sulfate
- Arsenic
- Iron
- Magnesium
- Fluoride

Samples collected between April 1 and June 4, 2014 were analyzed by Southern Analytical Laboratories. Samples collected after June 4 were analyzed by Test America Laboratories.

2.3 Data Analysis

2.3.1 Water Levels and Recharge Rate

Average recharge rate values were calculated using the weekly flow meter totalizer values as shown in **Table 1**. The recharge rate decreased slowly from 282 gpm (406,000 gallons per day (gpd)) at the start of the test to 274 gpm (395,000 gpd) by the beginning of July, where it stabilized for the duration of the test. The slight decrease is due to a reduction in specific capacity over time for the supply well.

Hydrographs for RW-1 and the four monitoring wells using the 30-minute interval data are shown on **Figure 3**. The hydrographs indicate that during the background period the potentiometric surface elevations in all of the wells are within 0.1 feet, with the elevations in the lower Zone A wells consistently higher than those in the upper Zone A wells. The hydrographs show daily fluctuations of up to 0.4 feet due to tidal fluctuations. Other periodic fluctuations with a period of several days, such as those most notably observed between early-March and mid-April, are due to barometric pressure changes. These fluctuations are as much as 0.5 feet. Comparison of the baro-logger pressures with the hydrographs shows that the high pressure peaks correlate with the lower potentiometric surface readings, and conversely low pressure peaks correlate to high potentiometric surface readings.

The start of the test on April 3 is marked by instantaneous water-level increase of 4.8 feet in RW-1. In order to more easily identify overall changes in water levels between the monitoring wells, the hydrographs were converted to average daily water levels to remove the tidal fluctuations as seen on **Figure 4**. During April the water levels in the four monitoring wells remained within 0.1 feet, and with the exception of barometric fluctuations, showed a relatively flat trend. However, the water levels in RW-1 showed a steadily increasing trend. As previously noted, the supply well pump had a 27-hour power interruption on April 29 to 30, which, as shown on **Figure 3**, resulted in water levels decreasing to the same levels as the monitoring wells. When the pump was turned back on and recharge started again, the water level in RW-1 rose one foot less than the level reached when the pump had turned off. The water level in RW-1

was back on the relatively flat trend that the monitoring wells had tracked since the start of recharge. This drop in recharge water level and return to a flat trend caused by the short cessation of recharge suggests that the increasing trend during the first month of recharge resulted from a decrease in injectivity possibly due to air entrainment at the start-up of recharge, or other physical clogging of pore spaces.

Water levels in the four monitoring wells remained within 0.1 feet of each other throughout the duration of the recharge test. The average daily water levels in the lower Zone A wells were slightly higher (approximately 0.05 feet) than in the adjacent upper Zone A wells. Comparison of the water-level elevations between the monitoring well pair closest to RW-1 (UZAMW-1 and LZAMW-1) and the monitoring well pair further away (UZAMW-2 and LZAMW-2) indicated that there was no consistent apparent gradient or defined flow direction between the monitoring well pairs.

The anomalous increasing trend that was identified in RW-1 in April began again in late May and continued until mid-August. Recharge was stopped for 26 hours on August 20 to 21 to assess the effect on the water level in RW-1, and to attempt to identify any resulting effect on the water levels in the monitoring wells. The hydrographs shown on **Figure 3** indicate that the water level in RW-1 dropped nearly 7 feet in the first few minutes after recharge was stopped. During this same time the water levels dropped 0.09 and 0.1 feet in UZAMW-1 and LZAMW-1, respectively, and 0.06 feet in UZAMW-2 and LZAMW-2. The water levels continued to drop an additional 0.5 feet in all five wells over the next 16 hours, before slowly increasing about 0.3 feet in the nine hours before recharge was re-started, due to the normal tidal fluctuation. Upon the re-start of recharge, the water level in RW-1 rose 6.7 feet within a few minutes. Increases of 0.06 feet and 0.07 feet were observed in UZAMW-1 and LZAMW-1, respectively, and 0.03 feet in UZAMW-2 and LZAMW-2 during the first 30 minutes of recharge. Levels then slowly declined in all of the wells due to the normal tidal fluctuation. The changes in water level in the monitoring wells immediately after stopping and then re-starting recharge appear to be the best indication of the amount of water-level change due to recharge. The rise of approximately 0.1 feet at UZAMW-1 and LZAMW-1 is consistent with the rise predicted in the analytical model (WinFlow) that was used to initially estimate the head change and travel time for the recharge

test setup. The analytical model was run using aquifer parameters from the calibrated MODFLOW groundwater flow model discussed in Section 5 of this report. WinFlow was used to perform predictive recharge modeling because the scale of the MODFLOW model was not appropriate for the size of the recharge test setup.

2.3.2 Water Quality

A summary of the weekly water-quality for each well during the recharge test is provided in **Tables 2 through 6**. Graphs of the primary water-quality parameters of interest are provided in **Appendix B**. Water-quality laboratory reports are provided in **Appendix C**. The graphs of chloride, total dissolved solids (TDS), and sodium all show the basic differentiation in salinity between upper and lower Zone A. Chloride concentrations ranged from 140 to 190 mg/l in UZAMW-1, 80 to 110 mg/l in UZAMW-2, 260 to 360 mg/l in LZAMW-1, 270 to 360 in LZAMW-2, and 450 to 610 mg/l in the lower Zone A supply well used as recharge source water in RW-1. TDS concentrations ranged from 480 to 570 mg/l in UZAMW-1, 330 to 420 mg/l in UZAMW-2, 710 to 820 mg/l in LZAMW-1, 660 to 900 mg/l in LZAMW-2, and 1,100 to 1,400 mg/l in RW-1. Sodium concentrations ranged from 68 to 97 mg/l in UZAMW-1, 38 to 56 mg/l in UZAMW-2, 130 to 190 mg/l in LZAMW-1, 140 to 220 mg/l in LZAMW-2, and 240 to 340 mg/l in RW-1. The differences in salinity between wells in the same zone is most likely due to differences in the depths of the primary producing zones in each well, with salinity increasing with depth. There were no trends or changes observed in the salinity parameters in the monitoring wells related to the effects of recharge. Chloride and TDS concentrations in the recharge test source water do show a slight increasing trend which is likely from upconing of more brackish water due to pumping.

Sulfate concentration graphs show a similar separation between upper and lower Zone A as the graphs of salinity parameters. Concentrations range from 3.1 to 10 mg/l in the upper Zone A monitoring wells, 11 to 30 mg/l in the lower Zone A monitoring wells, and 29 to 54 mg/l in the source water supply well for recharging RW-1. The sharp increase in sulfide concentrations between samples collected up to June 4, and those collected after June 4 is most likely due to the change in laboratories performing the analyses that started with the June 12 samples. Sulfide

concentration graphs show a somewhat similar grouping as sulfate, but since sulfide is an oxidation-reduction (redox)-dependent parameter, there are some differences. Sulfide occurs from the reduction of sulfate by sulfate-reducing bacteria in the aquifer. The degree to which sulfate is converted to sulfide is dependent on the amount of sulfate available, and the amount of DO in the aquifer. Since sulfate concentrations are higher and DO concentrations lower in lower Zone A, sulfide concentrations are higher in lower Zone A. Additionally, DO concentrations are higher in UZAMW-2 than in UZAMW-1, resulting in low to below detection sulfide concentrations in UZAMW-2, and sulfide concentrations of 2.0 to 4.1 mg/l in UZAMW-1. The role of DO and sulfide concentrations is discussed in detail in Section 4 and **Appendix E**.

Calcium concentrations range from 73 to 110 mg/l in both of the lower Zone A monitoring wells and in UZAMW-1. The concentration in UZAMW-2 ranges from 53 to 74 mg/l, and the concentration in the source water for RW-1 ranges from 95 to 140 mg/l. Comparison of total and bicarbonate alkalinity indicates that all of the alkalinity is bicarbonate. Alkalinity ranges from 160 to 190 mg/l in all of the monitoring wells, and from 160 to 210 mg/l in the source water well for recharging RW-1.

Naturally occurring arsenic is found in the Upper Floridan aquifer at many locations across the City, including the NEWRF site. Arsenic concentrations range from 1.0 to 2.4 µg/l in the lower Zone A monitoring wells, 5.1 to 8.2 µg/l in UZAMW-1, 25 to 32 µg/l in UZAMW-2, and 13 to 17 µg/l in the source water well for recharging RW-1. The concentrations of arsenic in the monitoring wells are directly related to the DO concentration in each well. DO concentrations in the lower Zone A monitoring wells ranged from 0.04 to 0.5 parts per million (ppm), resulting in arsenic concentrations of less than 2.5 µg/l. DO concentration in UZAMW-1 ranged from 0.05 to 0.72 ppm, resulting in arsenic concentrations of 5.1 to 8.2 µg/l, while DO concentrations in UZAMW-2 ranged from 0.05 to 3.9 ppm, resulting in arsenic concentrations from 25 to 31 µg/l. The role of DO and arsenic concentrations is discussed in detail in Section 4 and **Appendix E**.

The graphs of total organic carbon concentrations (TOC) indicate that all of the wells except UZAMW-2 had similar concentrations ranging from 1.5 to 4.5 mg/l. The concentration

in UZAMW-2 was consistently slightly lower, ranging from 1.2 to 3.5 mg/l. The sharp decrease in TOC concentrations between samples collected up to June 4, and those collected after June 4 is most likely due to the change in laboratories performing the analyses that started with the June 12 samples.

Fluoride concentrations ranged from 0.16 to 0.31 mg/l in UZAMW-1, 0.09 to 0.24 mg/l in LZAMW-1, 0.28 to 0.44 mg/l in UZAMW-2, and 0.08 to 0.31 mg/l in LZAMW-2. The fluoride concentration in the recharge water ranged from 1.6 to 2.5 mg/l. The increase in concentration in RW-1 was due to the gradual decrease in pumping rate from the supply well, resulting in a slightly higher concentration until the feed rate of the fluoride pump was reduced after the July 2 sampling event. The fluoride feed pump malfunctioned on two occasions (April 23 and May 21) resulting in the background fluoride concentrations being detected for RW-1 on these dates. Comparison of the fluoride concentration graphs indicates that similar fluctuations occurred in all of the monitoring wells indicative of natural background fluctuations. There was no indication of the fluoride tracer in water from RW-1 reaching any of the monitoring wells. A particle-tracking model was run as part of the WinFlow analytical model used to estimate the effect of recharge at the monitoring wells indicated that travel time from RW-1 to LZAMW-1 was between five and six months.

3 CORE ANALYSIS

The objective of the core analysis was to assess the effect of oxidation on the leachability of trace metals (primarily arsenic) from rock cores using water at various levels of dissolved oxygen concentration produced from the pilot treatment system. The analysis also included a mineralogical analysis of the cores to identify the occurrence of arsenic-bearing minerals in the rock. The core analysis was performed by IndeWater with assistance from the University of Florida and the Florida Geological Survey. A detailed description of the methodologies and results of the analyses is provided in the report, *Preliminary Evaluation of the Trace Metal Leaching Potential of Source Water from the Clearwater Groundwater Replenishment Project* provided in **Appendix D, Section 2**.

3.1 Core Collection

A continuous rock core was collected through the recharge zone (lower Zone A) for mineralogical and metals leachability analyses at a location adjacent to the recharge test well as shown on **Figure 2**. The cores were analyzed to identify potential sources of arsenic in the rock matrix, and the mechanisms and conditions that could cause mobilization of arsenic. Coring activities were performed by Huss Drilling during the period of April 16 through 23, 2013. A four-inch diameter steel temporary casing was installed to a depth of 85 feet bls on April 16 and 17. The interval from 90 to 230 feet was cored for the purpose of creating a stable borehole to guide the drill string and core barrel throughout the coring process. Cores were collected with a HQ (2.5-inch diameter) 10-foot long wire-line core barrel. The rock cores collected from 90 to 230 feet bls were placed in core boxes, photographed and described. The interval from 230 to 340 feet bls was cored on April 22 and 23. IndeWater was on site at this time to put the cores in preservation tubes for storage in an anoxic state. Details of this are provided in **Appendix D, Section 2**. A total of 95 feet of core was recovered from the interval between 230 and 340 feet bls.

3.2 Column Test Procedures

Following is a summary of the column testing procedures. Details are provided in **Appendix D, Section 2**. The core sections that were used for column test analysis were from the interval between 260 and 290 feet bls, which appeared from geophysical logs to be a primary transmissive zone in lower Zone A. Prior to column testing, sections of unpreserved core from similar depths as the preserved sections were analyzed for hydraulic parameters such as permeability and porosity. The preserved cores were transported to the pilot treatment system for column testing using source waters with varying levels of DO removal produced from the pilot treatment system. Seven water sources were tested including the following:

- 1) Native groundwater from lower Zone A;
- 2) High-DO water prior to DO removal;
- 3) 2.2-log DO removal using membrane contactors without sodium hydrosulfide (NaHS) addition;
- 4) 3-log DO removal using membrane contactors without sodium hydrosulfide (NaHS) addition;
- 5) 2.3-log DO removal using membrane contactors and NaHS addition
- 6) 3.5-log DO removal using membrane contactors and NAHS addition, and;
- 7) 1.2-log DO removal membrane contactors and NAHS addition.

3.3 Column Test Results

Hydraulic testing of the cores indicated that porosity of the limestone ranged between 11 and 22 percent. Vertical hydraulic conductivity ranged from 40 to 43 feet/day (ft/d).

Arsenic peaks due to leaching from arsenic-bearing minerals were identified in all of the column tests. The peak arsenic concentration was less than 10 µg/l in the samples with high DO (no DO removal), 3.5-log DO removal, and 1.2 log removal. The remaining tests had arsenic concentration peaks above 10 ug/l. At DO concentrations between 3 parts per billion (ppb) (3.5-log DO removal) and 60 ppb (2.2 log DO removal) there appears to be a correlation between DO

concentration and peak arsenic concentration, with peak arsenic concentration increasing with increasing DO concentration. The column tests with DO concentrations of 600 ppb (1.2-log removal) and seven ppm (no DO removal) did not follow this correlation, as the peak arsenic concentrations were less than 10 µg/l. (**Appendix D, Figures 2-6 and 2-7**). It was hypothesized that the lower arsenic concentrations at these elevated DO concentrations may be due to sorption of the leached arsenic on iron hydroxides that precipitate at higher DO concentrations. Analysis of molybdenum and cadmium concentration, which are also oxidation-sensitive metals indicated that the mass of molybdenum and cadmium leached, followed the same trend as arsenic. Therefore, the leachability of arsenic is an indicator for the leaching of these two trace metals.

It bears noting that the column test using native groundwater resulted in leaching of arsenic above 10 µg/l, in spite of the fact that arsenic concentrations in lower Zone A, the source of the core and the native groundwater used in the column test contains arsenic at less than two µg/l. The DO concentration of 18 ppb measured during the column test is less than that measured during sampling of the lower Zone A monitoring wells (<500 ppb). The low concentration of arsenic in lower Zone A with DO concentrations of up to 500 ppb is not consistent with the results of the column test where a DO concentration of 18 ppb and peak arsenic concentration of 18 µg/l were observed. The relationship of DO concentration, oxidation-reduction potential (ORP), and arsenic concentration is discussed in more detail in Section 4.2 and **Appendix E, *Geochemical Modeling Evaluation for the Clearwater Groundwater Replenishment Project***, (Geosyntec Consultants, 2014).

3.4 Core Lithologic Analysis

Trace mineralogical analyses were performed on core samples to identify minerals and their concentrations that could leach trace metals under oxidizing conditions. Details of the analyses performed and the results are provided in **Appendix D**. Several analyses were performed including scanning electron microscopy, back-scattered electron imaging, and electron probe microanalysis including energy-dispersive x-ray spectroscopy and wavelength dispersive spectroscopy.

The results of these analyses include:

- 1) The samples contained sparse amount of pyrite, ilmenite, rutile, iron oxide, chalcopyrite, and possible pentlandite;
- 2) Arsenic concentrations in the bulk rock samples were relatively low, ranging from below detection level to two (2) ppm;
- 3) Arsenic concentrations in the pyrite grains were in the low end of the range for the Suwannee limestone as found in previous studies;
- 4) Arsenic was not associated with the other trace minerals identified.

4 GEOCHEMICAL MODELING

Geochemical modeling was performed using water-quality data derived from the four monitoring well samples (UZAMW-1, LZAMW-1, UZAMW-2 and LZAMW-2) and the pilot treatment system to evaluate the potential for dissolution of the carbonate aquifer matrix, and mobilization of arsenic (and other metals) within the injection zone. The objectives of the investigation were (1) to describe the major ion chemistry and hydrochemical facies of the groundwater system at the Project site, (2) ascertain whether arsenic is a naturally occurring solute in groundwater, (3) identify probable mineralogical associations and geochemical controls on the occurrence of arsenic, and (4) model the effects of mixing purified reclaimed water with native groundwater on mineral saturation states and oxidation-reduction (redox) conditions within the aquifer. The geochemical modeling investigation was performed by Geosyntec Consultants. Details of the geochemical modeling investigation is provided in the report, *Geochemical Modeling Evaluation for the Clearwater Groundwater Replenishment Project*, (Geosyntec Consultants, 2014) (**Appendix E**).

The initial step in the geochemical modeling analysis was to plot the major-ion chemistry of all samples on a Durov diagram. The primary cations and anions are plotted in separate trilinear diagrams by percentage based on units of millequivalents per liter (meq/l). Lines from each pair of points in the cation and anion triangles are projected into the central rectangle to form a common point, which represents the composition of the samples with respect to cations and anions. The points from the central rectangle are also projected into the TDS and pH fields. Laboratory analysis of groundwater samples from the four monitor wells and source water for the injection test form distinct clusters on a Durov diagram that define hydrochemical compositions ranging from calcium-sodium-chloride (UZA-1 and UZA-2) to sodium-chloride (RW-1, LZA-1 and LZA-2) (**Figure 5 in Appendix E**).

The next step in the geochemical investigation was an evaluation of the occurrence of arsenic in the groundwater samples for the four monitoring wells. As discussed in Section 2.3.2, arsenic was detected at concentrations ranging from 1.3 to 31 µg/l in the groundwater samples collected from the recharge test wells. Since the source of arsenic in the Upper Floridan aquifer is pyrite (FeS_2) grains in the limestone matrix, the stability of which is related to DO, iron, and

sulfide concentrations in the groundwater, a graphical analysis of these constituents was performed to assess the factors controlling the occurrence of arsenic at the site. Plots of dissolved arsenic and iron concentrations, iron and ORP, sulfide (HS-) and ORP, DO and iron, DO and sulfide, sulfide and arsenic, and DO and arsenic indicate that reductive processes are the principal reactions controlling the stability of iron minerals and the occurrence of arsenic within the groundwater system (**Appendix E, Figures 9 through 15**). Data from the monitoring wells indicate that reducing conditions predominate within the lower zone and within the area of the upper zone in the vicinity of UZAMW-1. However, around UZAMW-2, the ORP measurements indicate that conditions are more oxidizing and are thus, more likely to lead to the dissolution of pyrite and to the release of arsenic. Slight differences in ORP might account for much of the difference in arsenic concentrations among these wells, although the higher chloride concentrations of RW-1 might indicate the potential for a combination of reductive dissolution and competitive desorption as factors controlling the occurrence of arsenic in higher-TDS groundwater of the area (**Appendix E**).

The final step in the geochemical modeling investigation was to evaluate the effects of the mixing of the purified reclaimed water from the pilot treatment system with native groundwater of lower Zone A. This involved: 1) calculation of the saturation states of key mineral species for the treated waters and native groundwater; and 2) modeling the effects on overall hydrochemical composition and the effects on mineral saturation indices of different mixtures of treated waters and native groundwater as a basis for assessing the likelihood of dissolution of the aquifer matrix and dissolution/precipitation of pyrite. The details of this analysis are provided in **Appendix E, Section 6**.

The geochemical mixing modeling was performed using the Geochemist Workbench software. Each mixing model was developed with two end members: 1) a purified reclaimed water; and 2) a mixture of water representative of LZAMW-1 and LZAMW-2. Tetra Tech estimated three expected treated water compositions, based on total dissolved solids and overall composition. The treated waters were classified as (1) Low, (2) Typical, and (3) High (**Appendix E, Section 6**). The mixing models were based on a range of mixing percentages to evaluate changes with time as the recharged water continues to mix with the native aquifer water. The percentages used for the models included:

- 25 percent LZA, 75 percent treated water (Low, Typical and High) [25:75],
- 50 percent LZA, 50 percent treated water (Low, Typical and High) [50:50], and
- 75 percent LZA, 25 percent treated water (Low, Typical and High) [75:25].

The mixing model results were used to evaluate the effect of each mixture on the saturation states of calcite and pyrite to conditions that would exist for the dissolution or precipitation of these minerals. For all mixtures, the calcite saturation indices (Si-Cal) indicate equilibrium or a low state of saturation. Hence, there is no apparent significant potential for dissolution of the carbonate matrix. All of the pyrite indices (Si-Pyr) indicate a high degree of oversaturation for any mixture and end member. Under such conditions, pyrite (or other metastable iron sulfide minerals) might be expected to precipitate (**Appendix E, Section 6**).

Because lower-zone groundwater and the purified reclaimed water are both anoxic, redox conditions should not lead toward the development of an oxidizing state within lower Zone A. Therefore, if the DO of the purified reclaimed water is within the range of the native lower Zone A water, pyrite would not be expected to oxidize and result in the leaching of arsenic.

5 GROUNDWATER FLOW AND TRAVEL-TIME MODELING UPDATE

A key hydrogeological aspect of the feasibility study performed by Tetra-Tech and LBG in 2011 was the use of groundwater modeling as a tool to assist in evaluating recharge potential with purified reclaimed water. The purpose of the groundwater modeling analysis was to: 1) evaluate the hydraulic benefit to recharging the aquifer relative to the drawdown from the City's water supply well field; and 2) evaluate the travel-time zones for recharge water from the recharge wells. The evaluation of the hydraulic benefit was performed using a calibrated MODFLOW groundwater flow model. The travel-time evaluation was required by the Florida Department of Environmental Protection (FDEP), and was performed using a MODPATH particle-tracking model. In this phase of the project, the model developed for the feasibility study performed in 2011 was updated and recalibrated. Data collected during the test/monitoring well drilling and testing and recharge testing, and updated production records for the City's wells, along with revised projected City withdrawals were also used in updating the model.

5.1 Original Groundwater Flow Model Set-Up

The groundwater flow model developed for the feasibility study in 2011 was based on a conceptual model that represented the hydrogeology of the Clearwater area. All but two of the City's existing public supply wells obtain water from upper Zone A. Two wells are open to both upper and lower Zone A. The recharge wells for this project are proposed to utilize lower Zone A. No wells in the area are open to Zones B or C due to the occurrence of highly brackish or salty water. Therefore, the conceptual model shown on **Figure 5** for this project was to develop a quasi-3D model with individual model layers for the surficial aquifer, upper Zone A, lower Zone A, and a layer for underlying Zones B and C.

Existing Southwest Florida Water Management District (SWFWMD) regional groundwater flow models were reviewed to assess whether focused telescopic mesh refinement (FTMR) models could be used as a base model for this analysis. The benefit of using the SWFWMD models is that they are calibrated and they include all permitted withdrawals. Three

models were reviewed: the District-Wide Regulatory Model (DWRM2), the Northern Tampa Bay Model (NTBM), and the Southern District Model (SDM). Each of these models can be utilized with the FTMR process to create a sub-model out of the calibrated regional model. The DWRM2 was deemed unsuitable for this use because the entire Upper Floridan aquifer (UFA) is represented with one model layer, and the aquifer properties and layer elevations needed to fit the conceptual model for the area were not suitable for the necessary re-layering of the model grid. The NTBM was not suitable because the southern boundary of the model is immediately south of the City's well field. Review of the SDM indicated that the UFA is divided into two layers. Layer 4 represents Zones A and B, and layer 5 represents Zone C. Layers 2 and 3 represent the Intermediate Aquifer System where it exists to the south of Pinellas County, but in Pinellas County are relatively thin units that represent the zone at the interface between the surficial aquifer and the Upper Floridan aquifer. Layer 1 represents the surficial aquifer. Review of the layer elevations and aquifer characteristics of the SDM indicated that the model grid could be revised to re-layer the grid while maintaining the overall aquifer properties, boundary conditions, and permitted well withdrawal rates of the model. Therefore, a FTMR model was created from the SDM for use as a base model and modified in order to fit the conceptual model described above on **Figure 5**. The model grid and boundary conditions for the feasibility report model of 2011 are shown on **Figure 6**.

The first step in modifying the FTMR model was to modify the grid layers to fit the conceptual hydrogeologic model as shown on **Figure 5**. Layers 1 and 2 were unchanged and represent the surficial aquifer and the interface between the intermediate confining unit and the UFA, respectively. Layer 3 was converted to represent upper Zone A. Layer 4 was converted to represent lower Zone A, and Layer 5 was converted to represent Zones B and C.

Layer top and bottom elevations, and aquifer characteristics from the original FTMR model were used as the basis for the revised elevations and aquifer characteristics in the new model to maintain the original calibrated values. A summary of the new layer elevations and aquifer characteristics is shown below.

Model Set Up

Layer	Top Elevation	Bottom Elevation	Transmissivity	Leakance
1	Original SDM	Original SDM	Original SDM	Original SDM adjusted during calibration
2	Layer 1 bottom	Original SDM Layer 3 bottom	Original SDM	Original SDM
3	Original SDM Layer 3 bottom	New Layer 4 top + 35 feet	60% original SDM Layer 4 transmissivity	0.01 d-1
4	New Layer 4 bottom + 80 feet	New Layer 5 top + 60 feet	40% original SDM Layer 4 transmissivity	0.001 d-1
5	Original SDM Layer 4 bottom + 200 feet	Original SDM Layer 5 bottom	Original SDM	N.A.

Top elevations were not set or used for layers 2 – 5 in the original FTMR model, but since the model was being converted to quasi-3D for the future MODPATH simulations, top elevations were set for these layers. New top and bottom elevations were based on existing layer elevations to maintain the overall contoured surface configuration of the layers in the original model. The semi-confining layers separating the producing zones in a quasi-3D model are represented using leakance values of the overlying layer, with the semi-confining layer thickness defined as the difference between the bottom elevation of the overlying layer and top elevation of the underlying layer.

The division of transmissivity values from layer 4 of the original FTMR model to layers 3 and 4 of the new model shown above was based on aquifer test results described in section 4.1 of this report. Leakance between layers 3 and 4 was set at 0.01 d^{-1} to represent the high degree of connection between upper and lower Zone A. Leakance between layers 4 and 5 was set at the same value (0.001 d^{-1}) as the original FTMR model.

Permitted wells in the original FTMR model were set in layer 4, with some wells in the northern portion of the model in layers 4 and 5. With the re-layering of the model, the wells also had to be reassigned to the appropriate model layers. Wells with a total depth of less than 200 feet were set in layer 3. Wells with casing depths less than 200 feet and total depths greater than 200 feet were set in both layers 3 and 4. Wells with casing depths greater than 200 feet were set in layer 4. Where total well depths were greater than 350 feet, wells were also open to layer 5.

A FTMR model is comprised of three stress periods. Stress period 1 is steady-state with no pumping to simulate pre-development conditions. Stress period 2 is steady-state with permitted wells set at 2006 reported pumping rates. Stress period 3 is transient with the duration and pumping rates set by the user. The new groundwater flow model will be used for particle tracking with MODPATH, which does not function with a combination steady-state/transient stress period configuration. Therefore, the steady-state stress periods were converted to 10-year transient stress periods for use in MODPATH. Storativity was set at 1×10^{-4} in layers 3, 4, and 5.

5.2 Original Model Calibration

The final modified grid model with three transient stress periods was used as the original base model for calibration to known heads (water level elevations) in seven wells located around the Clearwater area. The calibration well locations are shown in **Figure 7**. Average potentiometric surface levels for 2009 were set for the calibration targets. Pumping rates for the City wells were set at 2009 reported rates in both stress periods 2 and 3.

Sensitivity runs indicated that leakance of layer 1 had the most significant impact on overall head levels in layers 3 and 4. Changes in transmissivity values in layers 3 and 4 within a reasonable range in values expected for the area had relatively little effect on head elevations. Model calibration consisted of manual changes to layer 1 leakance values and layer 3 and 4 transmissivity values. Excessively high heads in the northern part of the county were reduced to observed levels by setting the maximum layer 1 leakance value to $1 \times 10^{-4} \text{ d}^{-1}$. Heads in the eastern portion of the City's well field were raised by increasing leakance by one order of

magnitude, to a range of $1.6 \times 10^{-5} \text{ d}^{-1}$ to $1 \times 10^{-4} \text{ d}^{-1}$ in the eastern portion of the City. The final calibration adjustment consisted of setting the maximum transmissivity value in layers 3 and 4 to 39,800 ft²/day over the entire model domain. The final calibrated potentiometric surface is shown on **Figure 7**, and the final calibration statistics are shown below.

Original Model Final Calibration Statistics

Name	Time	Layer	Observed	Computed	Residual
Romp_13-2	7665	3	6.5	7.16	-0.66
Romp_13-1	7665	3	7	7.06	-0.06
Romp_14-1	7665	3	8.5	7.84	0.66
Romp_14-2	7665	3	5.5	6.51	-1.01
Romp_14-3	7665	3	7.8	8.50	-0.70
Pinellas_665	7665	3	9.5	7.87	1.63
Garden_Street	7665	3	5.7	5.69	0.01
Residual Mean	-0.01694				
Abs. Res. Mean	0.675				
Res. Std. Dev.	0.847				
Sum of Squares	5.028				
RMS Error	0.847				
Min. Residual	-1.006				
Max. Residual	1.630				
Number of Observations	7				
Range in Observations	4.0				
Scaled Std. Dev.	0.212				
Scaled Abs. Mean	0.169				
Scaled RMS	0.212				

5.3 Model Updates and Recalibration

The first use of the new model was to update the withdrawal rates for the City's well field. Stress period 2 withdrawals were set to average annual rates for 2011 of 5.25 million gallons per day (mgd). Other WUP withdrawals in the model remained at 2006 rates. In stress period 3, the rates for the City's existing wells remained at 5.25 mgd with an additional 9.05 mgd from the new RO2 well field for a total withdrawal of 14.3 mgd. This is the same pumping scenario as used in the impact analysis model for the most recent modification of the City's WUP (SDI, 2012). Potentiometric surface elevations in the calibration target wells were updated to 2011 average elevations, along with four additional calibration target wells that were added to the model.

The short-term aquifer test performed in RW-1 upon completion of the well construction resulted in a transmissivity value of approximately 15,000 ft²/day for lower Zone A. Review of the model grid indicates that transmissivity of lower Zone A ranges from 16,000 to 32,000 ft²/day in the area around the NEWRF. As was observed in sensitivity runs on the feasibility study model done in 2011, changes in transmissivity values in layers 3 and 4 within a reasonable range in values had relatively little effect on head elevations. Therefore, the model transmissivity values in the area around the NEWRF are representative of aquifer transmissivity in this area.

Recalibration of the model based on 2011 pumping and average 2011 potentiometric surface elevations in the 10 calibration target wells was accomplished by adjusting layer 1 leakance values, which control the amount of recharge to the Upper Floridan aquifer from the surficial aquifer. Eight adjustments were made to leakance values in various areas of the model to improve the match of observed to modeled potentiometric heads in the calibration target wells. None of the adjustments were greater than a factor of five, higher or lower than the existing model values. The final calibrated potentiometric surface maps for upper and lower Zone A are shown on **Figures 8 and 9**, respectively, and the final calibration statistics are shown below. The residual mean residual is 3.8 percent of the total range in heads at the calibration points, which is within the five percent criteria generally accepted for model calibration.

Updated Model Final Calibration Statistics

Name	Time	Layer	Observed	Computed	Residual
Romp_13-2	7300	3	5.8	6.96	-1.16
Romp_13-1	7300	3	6.2	6.36	-0.16
Romp_14-2	7300	3	5.3	5.57	-0.27
Romp_14-3	7300	3	5.7	7.33	-1.66
Pinellas_665	7300	3	8.7	8.20	0.50
Garden_Street	7300	3	5.4	5.16	0.24
CCC	7300	3	5.5	5.20	0.30
19/60	7300	3	7.3	6.91	0.39
81M	7300	3	9.2	9.12	0.08
MW68M	7300	3	8	7.81	0.19
Residual Mean	-0.152				
Absolute Residual Mean	0.491				
Residual Std. Deviation	0.668				
Sum of Squares	4.692				
RMS Error	0.685				
Min. Residual	-1.627				
Max. Residual	0.496				
Number of Observations	10				
Range in Observations	3.9				
Scaled Residual Std. Deviation	0.171				
Scaled Absolute Residual Mean	0.126				
Scaled RMS Error	0.176				
Scaled Residual Mean	-0.039				

5.4 Predictive Model Runs

One of the City's objectives for implementing a groundwater recharge project is to offset as much as possible new drawdown from future increases in withdrawals from their well fields through groundwater replenishment. In order to evaluate the benefit of groundwater replenishment on water levels while increasing the withdrawal quantity from the well fields, the calibrated model was run in the same manner as an impact analysis model. The model was run with 2011 pumping rates (5.25 mgd) assigned to the City's supply wells in stress period 2 to

simulate current conditions. The well field withdrawals were increased to 14.3 mgd in stress period 3 with the addition of 9.05 mgd from the new RO2 brackish groundwater well field in the southern portion of the City's service area. **Figures 8 and 9** show the modeled potentiometric surfaces in upper and lower Zone A at the 2011 average annual withdrawal rate of 5.25 mgd. The potentiometric surfaces are nearly the same in both zones, which is consistent with that observed in the water-level data from the recharge test monitoring wells. The potentiometric surface ranges from a high of approximately nine feet NGVD in the area of monitoring well 81M, to five feet along the west coast of the City. **Figures 10 and 11** show the modeled potentiometric surfaces in upper and lower Zone A at the currently permitted withdrawal of 14.3 mgd. While the potentiometric surface elevations in the two zones are similar over much of the modeled area, the elevations in lower Zone A are slightly lower in the southern portion of the City's service area due to the new withdrawal from lower Zone A for the new RO2 Well Field and Treatment Facility. To better illustrate the effect of the pumping increase, the change in drawdown in upper and lower Zone A is shown on **Figures 12 and 13**. Most of the City's service area is encompassed by the two-foot drawdown contour as seen in the figures. The greatest drawdown in upper Zone A is in the southeast portion of the services area. The greatest drawdown in lower Zone A is in the RO2 brackish groundwater well field located across the southern portion of the City's service area. Maximum drawdown in this area is four to five feet around the production wells as seen in **Figures 12 and 13**.

The effect of groundwater replenishment on the drawdown in upper and lower Zone A is shown on **Figures 14 and 15**. The effect of recharge is to increase the potentiometric surface around the NEWRF by one foot in upper Zone A and three feet in lower Zone A. The most noticeable effect of the recharge on drawdown is the movement of the one foot drawdown contour to the south with only the southern portion of the City of Dunedin's well field still within the one foot of drawdown. Overall, drawdown in the City of Clearwater's service area is reduced by one foot in the northern portion of the service area, and a few tenths of a foot in the southern portion of the service area, including the RO2 supply wells.

The recharge well layout proposed in the feasibility study consisted of five recharge wells located on the NEWRF and the ChiChi Rodriguez Golf Club portions of the City-owned

property. This layout would have required construction of a pipeline under McMullen Booth Road and two wells on the golf course. Based on the results of the recharge test and updated groundwater flow modeling, the three mgd of recharge can be accomplished using three to four recharge wells all located on the portion city-owned property east of McMullen Booth Road as shown on **Figure 16**. Two additional potential well sites are shown on the golf course west of McMullen Booth Road in the event that unexpected hydrogeologic conditions result in the need for additional well capacity.

5.5 Travel-Time Modeling

The particle-tracking model MODPATH was used to evaluate the flow paths and travel-times of particles of water from the recharge wells. MODPATH utilizes the grid structure, aquifer characteristics, and cell to cell flow terms from the MODFLOW model to move particles through the three-dimensional flow system. In addition to the input parameters used in the MODFLOW model, aquifer porosity, the number and initial location of particles, and the particle tracking time are required for the MODPATH simulation.

Porosity values were derived in the lab from the limestone core samples collected for the core analysis portion of the study. Porosity values from these cores ranged from 0.11 to 0.22. The average value of 0.16 was used in this MODPATH model. Particle circles consisting of 10 particles each were emplaced around each recharge well. The particle circles had release points at the top, center, and bottom of layer 4. Multiple release points were used to evaluate flow paths across the entire thickness of the lower Zone A recharge zone.

The MODFLOW model used to evaluate the net effect of groundwater replenishment on reducing drawdown from the City's well field (as described in Section 5.4) was used as the initial base for the MODPATH model. However, the City of Oldsmar well field, which began production after 2011, was not included in stress period 2 of the MODFLOW model. Accordingly, the MODFLOW model to be used for the MODPATH simulation was revised to include the 2.7 mgd permitted withdrawal for the City of Oldsmar in stress periods 2 and 3. Stress period 3 still reflects the increase in drawdown due to increasing the City of Clearwater withdrawal to 14.3 mgd but includes the existing effect of the City of Oldsmar withdrawal along

with the other existing permitted withdrawals across the model domain. Stress period 3 was run for a period of 10 years. The particles were released at the beginning of stress period 3, coinciding with the increase in withdrawal from the City's well field and the start of the recharge wells. The particle tracking evaluation criteria for this project was adopted from previous work at the Orange County California groundwater recharge project, which stipulated a minimum six month travel time from the recharge wells to any potable supply wells. The results shown on **Figure 17** indicate that the green particle tracks released in the middle of layer 4 (lower Zone A) migrate radially from the area of the recharge wells to a maximum distance of approximately 700 feet from the wells in the first six months. All but three of the tracks from the northeast recharge well remain within the boundaries of the site. The yellow particle tracks represent the period from six months to 10 years of travel time, with each arrow head representing one year of travel time. The distance traveled each year decreases as the hydraulic gradient decreases with distance from the recharge wells. The maximum travel distance in 10 years lower Zone A is approximately 4,300 feet. Yellow particle tracks that change to purple tracks indicate that the particle has migrated upward to layer 3 (upper Zone A).

The particles released at the top of layer 4 migrate upward through the semi-confining layer to layer 3 (upper Zone A), and then horizontally within upper Zone A. The purple tracks indicate that the shortest travel time beyond the site boundary in upper Zone A is approximately five years. The maximum travel distance in 10 years lower Zone A is approximately 1,900 feet.

6 CONCLUSIONS AND RECOMMENDATIONS

The hydrogeologic testing and evaluation phase of the Groundwater Replenishment study has included: 1) performance of a six-month recharge test; 2) column testing of rock cores for metals leaching analysis; 3) geochemical modeling for the mixing of the purified water with the native aquifer water; and 4) updating of the groundwater flow and particle tracking models that were developed in the feasibility study.

The six month recharge test was performed from April 3, to October 3, 2014. The average recharge rate for the test was 396,000 gpd. Fluoride was used as a tracer to evaluate travel time of the recharge water to the nearest monitoring well. The monitoring wells and recharge water were sampled weekly during the test and analyzed for a list of 21 parameters of interest. The following conclusions were derived from the results of the test:

- The water level initially rose approximately five feet above the background water level in RW-1 as a result of recharge. The level subsequently rose an additional four to five feet apparently as a result of a slight decrease in specific injectivity during the test. Since the static water level is 50 feet below land surface, a slight loss in specific injectivity will not adversely affect the ability of the wells to accept the planned 750,000 to 1,000,000 gpd recharge rate for each operating recharge well.
- The water level rose approximately 0.1 feet in UZAMW-1 and LZAMW-1 at a distance of 200 feet from RW-1. This rise is consistent with the rise predicted using the analytical model (WinFlow) with aquifer parameters from the calibrated MODFLOW groundwater flow model used for the predictive modeling.
- Total dissolved solids (TDS) data from the monitoring wells indicated that the TDS concentration in the recharge zone (lower Zone A) ranges from 710 to 900 mg/l. TDS concentration in upper Zone A ranges from 330 to 570 mg/l.
- Naturally occurring arsenic was detected in all of the wells at the NEWRF site. Arsenic concentrations range from 1.0 to 2.4 µg/l in the lower Zone A monitoring wells, 5.1 to 8.2 µg/l in UZAMW-1, and 25 to 32 µg/l in UZAMW-2. The concentrations of arsenic in the monitoring wells are related to the DO concentration

in the water in each well. DO concentrations in the lower Zone A monitoring wells ranged from 0.1 to 0.5 ppm, resulting in arsenic concentrations of less than 2.5 µg/l. DO concentration in UZAMW-1 ranged from 0.05 to 0.72 ppm, resulting in arsenic concentrations of 5.1 to 8.2 µg/l, while DO concentrations in UZAMW-2 ranged from 0.05 to 3.9 ppm, resulting in arsenic concentrations from 25 to 32 µg/l.

- Fluoride injected into the recharge stream as a groundwater tracer was not detected at the monitoring wells. The WinFlow particle tracking model used to estimate travel-time at the test-site scale indicated that arrival at LZAMW-1 would occur between five and six months. The fact that the tracer was not detected within six months suggests that the porosity value of 0.16 used in the particle tracking model is conservative (overestimates the distance traveled in a specified time).

Analysis of rock cores from the recharge zone (lower Zone A) was performed to assess the effect of oxidation on the leachability of trace metals (primarily arsenic) from the rock cores using water at various levels of dissolved oxygen from the pilot treatment system. The analysis also included a mineralogical analysis of the cores to identify the occurrence of arsenic-bearing minerals in the rock. The core analysis was performed by IndeWater with assistance from the University of Florida and the Florida Geological Survey. The following conclusions were derived from the results of this work:

- Arsenic peaks due to leaching from arsenic-bearing minerals were identified in all of the column tests. The peak arsenic concentration was less than 10 µg/l in the samples with high DO (no DO removal), 3.5-log DO removal, and 1.2 log removal. The remaining tests had arsenic concentration peaks above 10 µg/l.
- At DO concentrations between 3 ppb (3.5-log DO removal) and 60 ppb (2.2 log DO removal) there appears to be a correlation between DO concentration and peak arsenic concentration, with peak arsenic concentration increasing with increasing DO concentration. The column tests with DO concentrations of 600 ppb (1.2-log removal) and seven ppm (no DO removal) did not follow this correlation, as the peak arsenic concentrations were less than 10 µg/l. It was hypothesized that the lower

arsenic concentrations at these elevated DO concentrations may be due to sorption of the leached arsenic on iron hydroxides that precipitate at higher DO concentrations.

- The column test using native groundwater resulted in leaching of arsenic above 10 µg/l, in spite of the fact that arsenic concentrations in lower Zone A, the source of the core and the native groundwater used in the column test, contains arsenic at less than two µg/l. The DO concentration of 18 ppb measured during the column test is less than that measured during sampling of the lower Zone A monitoring wells (<500 ppb). The low concentration of arsenic in lower Zone A with DO concentrations of up to 500 ppb is not consistent with the results of the column test where a DO concentration of 18 ppb and peak arsenic concentration of 18 µg/l were observed.

Geochemical modeling was performed using water-quality data derived from the monitoring well samples and the pilot treatment system to evaluate the potential for dissolution of the carbonate aquifer matrix, and mobilization of arsenic (and other metals) within the injection zone. The objectives were: 1) to describe the major ion chemistry and hydrochemical facies of the groundwater system at the site; 2) ascertain whether arsenic is a naturally occurring solute in groundwater; 3) identify probable mineralogical associations and geochemical controls on the occurrence of arsenic; and 4) model the effects of mixing treated wastewater with native groundwater on mineral saturation states and redox conditions within the aquifer. The following conclusions were derived from the results of this work:

- Lower Zone A of the Upper Floridan Florida aquifer is anoxic. This is clearly indicated by negative ORP measurements and DO concentrations less than 0.5 ppm, sulfide concentrations ranging from 2 to 7 mg/l, and dissolved iron concentrations less than 0.04 mg/l.
- Sulfide concentrations greater than 2 mg/l in samples of lower zone groundwater indicate that lower Zone A is anoxic and that DO has probably been exhausted within that part of the groundwater system.
- Upper Zone A is anoxic in the vicinity of UZAMW-1, but positive ORP measurements and DO concentrations ranging from 1.5 to 4 mg/l in samples from UZAMW-2 indicate oxidizing conditions in the vicinity of that well.

- Arsenic occurs naturally in groundwaters of upper and lower Zone A. The lowest concentrations are associated with LZAMW-1 and LZAMW-2, wells with consistently negative ORP measurements, elevated sulfide concentrations, and low concentrations of dissolved iron. The highest arsenic concentrations are found in samples from UZAMW-2.
- The low dissolved iron concentrations of LZAMW-1 and LZAMW-2 indicate that pyrite, the iron sulfide mineral with which arsenic is most commonly associated in the Suwannee Limestone, is not unstable in the anoxic environment of lower Zone A.
- The low arsenic concentrations associated with LZAMW-1 and LZAMW-2 are probably related to the sequestration of arsenic by pyrite, and arsenic concentrations greater than 25 µg/l in groundwater samples from UZAMW-2 are probably related to the release of arsenic through the dissolution of pyrite in that part of upper Zone A.
- With regard to RW-1, a lower Zone A well, arsenic concentrations of approximately 14 µg/l could be related to a combination of reductive dissolution and competitive desorption in higher TDS groundwater produced by the source well for water used in injection tests.
- Purified reclaimed waters are expected to be calcium-bicarbonate in composition and to be anoxic. Modeled mixtures of various treated water and lower zone groundwater are dominated by the composition of the higher TDS native groundwater, even at ratios as low as 25:75 (25 percent lower zone A groundwater and 75 percent purified reclaimed water). All mixtures should remain anoxic, and there should be little potential for the release of arsenic through the dissolution of pyrite.

Groundwater modeling was used in the feasibility study as a tool to assist in evaluating recharge potential with highly treated reclaimed water. The purpose of the groundwater modeling analysis was to: 1) evaluate the hydraulic benefit to recharging the aquifer relative to the drawdown from the City's water supply well field; and 2) evaluate the travel-time zones for recharge water from the recharge wells. In this phase of the project the model developed for the feasibility in 2011 was updated and recalibrated using data collected in the field testing

investigation, updated production records for the City's wells, and revised projected City withdrawals. The following conclusions were derived from the results of this work:

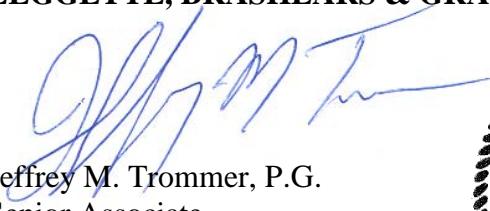
- The model was successfully updated and calibrated to 2011 pumping rates and potentiometric surface elevations for the starting point of predictive modeling.
- The model was updated to include the RO2 well field and the current total 14.3 mgd of permitted withdrawals from the City's well fields for predictive modeling.
- Recharge of 3mgd can be accomplished using three wells with a fourth as a backup well, with all the wells located on the portion of the City-controlled property to the east of McMullen Booth Road. Two additional well sites are located on the golf course west of McMullen Booth Road in the event that unexpected hydrogeologic conditions result in the need for additional well capacity.
- Recharge of 3 mgd will reduce drawdown in the City of Clearwater's well field by one foot in the northern portion of the well field, and a few tenths of a foot in the southern portion of the well field, including the use of the RO2 supply wells. Two additional well sites are located on the golf course west of McMullen Booth Road in the event that unexpected hydrogeologic conditions result in the need for additional well capacity.
- The particle-tracking model results indicate that recharge water will remain within the City-controlled property boundary for six months after injection into lower Zone A. The maximum distance traveled in 10 years in lower Zone A is 4,300 feet. The maximum distance traveled in upper Zone A in 10 years is 1,900 feet. Only one permitted well, a backup irrigation well at Countryside High School is within the 10-year travel-time.

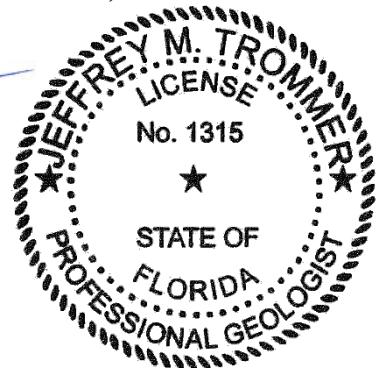
The results of the hydrogeologic testing program indicate that lower Zone A has the appropriate water-quality and hydraulic parameters for direct aquifer recharge of the proposed 3 mgd of purified reclaimed water. The results of geochemical and rock core metals leaching analyses indicate that the post-treatment processes used in the pilot treatment system are appropriate to remove DO to the level needed to maintain arsenic concentrations below the drinking water standard of 10 µg/l, and to make the purified water compatible with the native

groundwater and aquifer matrix in lower Zone A. The results of the groundwater modeling analysis indicate that the groundwater replenishment project will provide a net benefit by reduction of drawdown in the City's service area of up to one foot. As a result we recommend the following:

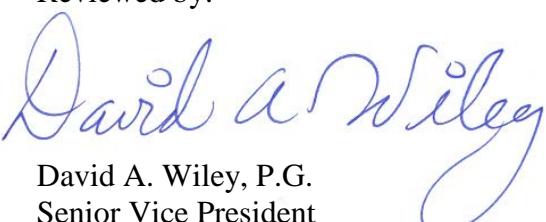
- 1) Proceed with design and permitting of the groundwater replenishment facility;
- 2) Utilize the revised recharge well layout with four wells located on the property east of McMullen Booth Road;
- 3) In addition to the site perimeter monitoring wells used for long-term water-quality monitoring, install up to four monitoring wells in close proximity of one of the recharge wells for monitoring of arsenic during the test operation period. The wells can provide monitoring of in-situ testing of the effect of varying levels of DO removal on arsenic leaching for the purpose of determining the long-term DO removal requirement.

LEGGETTE, BRASHEARS & GRAHAM, INC.


Jeffrey M. Trommer, P.G.
Senior Associate



Reviewed by:

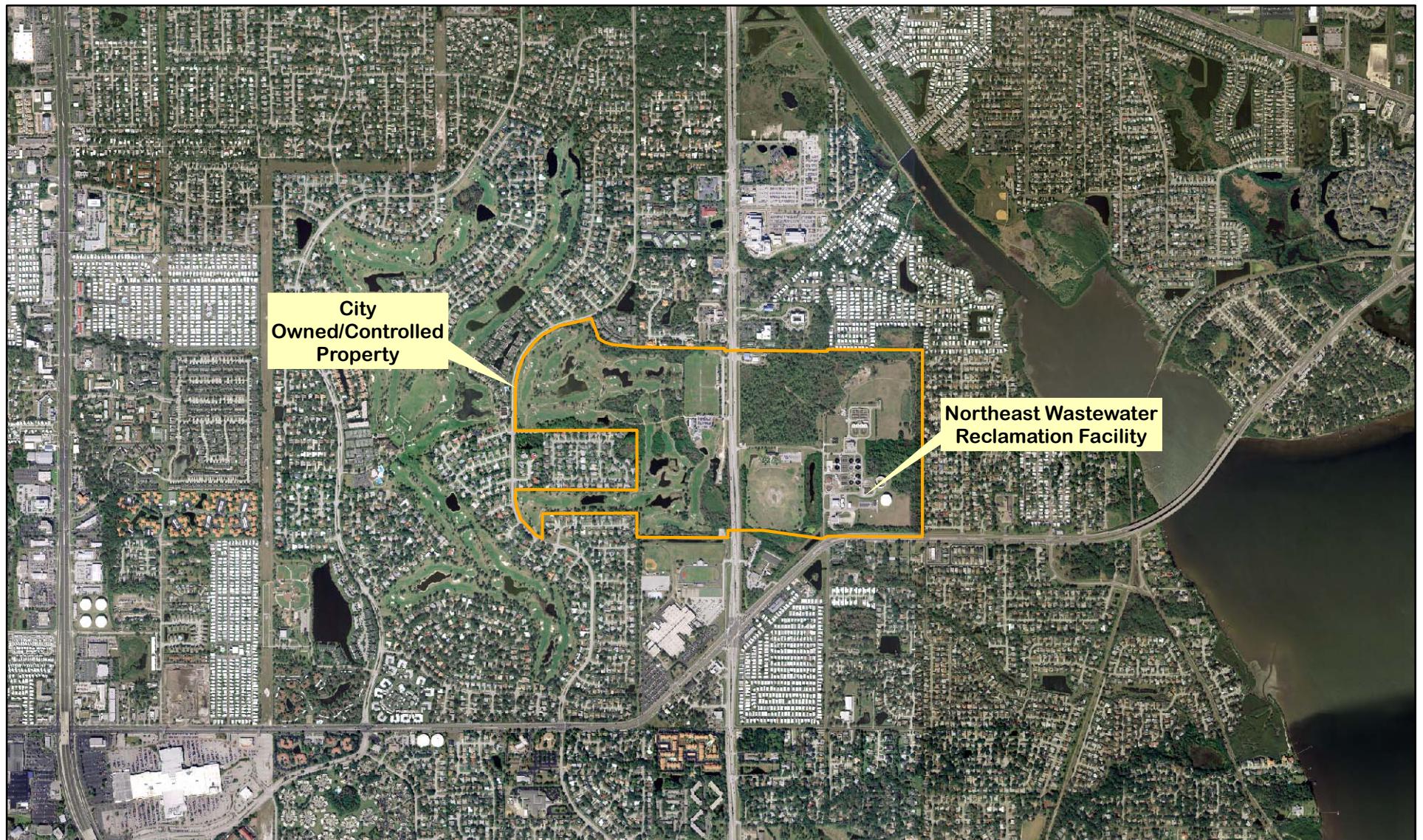

David A. Wiley, P.G.
Senior Vice President

7 REFERENCES

Broska, J.C., and Barnette, H.L., 1999, Hydrogeology and Analysis of Aquifer Characteristics in West-Central Florida, U.S. Geological Survey Open-File Report 99-185.

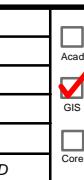
Hickey, J.J., 1982, Hydrogeology and Results of Injections Tests at Waste-Injections Test Sites in Pinellas County, Florida, U.S. Geological Survey Water Supply Paper 2183.

FIGURES



0
1,000
2,000
Feet

DATE	REVISED



CITY OF CLEARWATER
GROUNDWATER REPLENISHMENT TEST PROGRAM STUDY

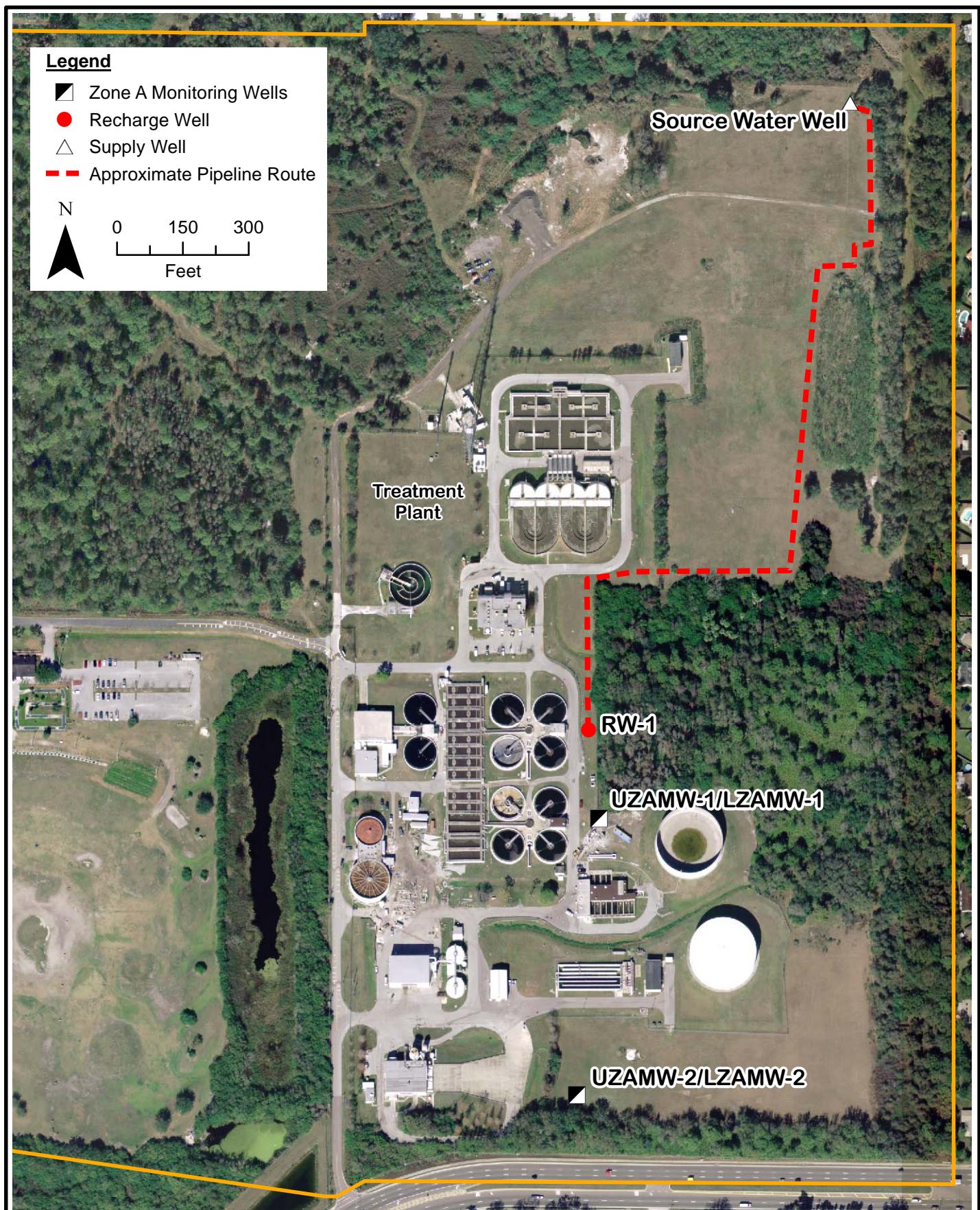
PROJECT AREA



PREPARED BY:

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DATE:	Sept. 2014
FIGURE NO.:	1



**CITY OF CLEARWATER
GROUNDWATER REPLENISHMENT
TEST PROGRAM STUDY**

RECHARGE TEST WELL LOCATION

PREPARED BY:



**LEGGETTE, BRASHEARS
& GRAHAM, INC.**

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Acad
 GIS
 Corel

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DATE: Sept. 2014
FILE NAME: FIGURE02.MXD
FIGURE NO.: 2

Figure 3
Recharge Test Hydrographs
City of Clearwater Groundwater Replenishment

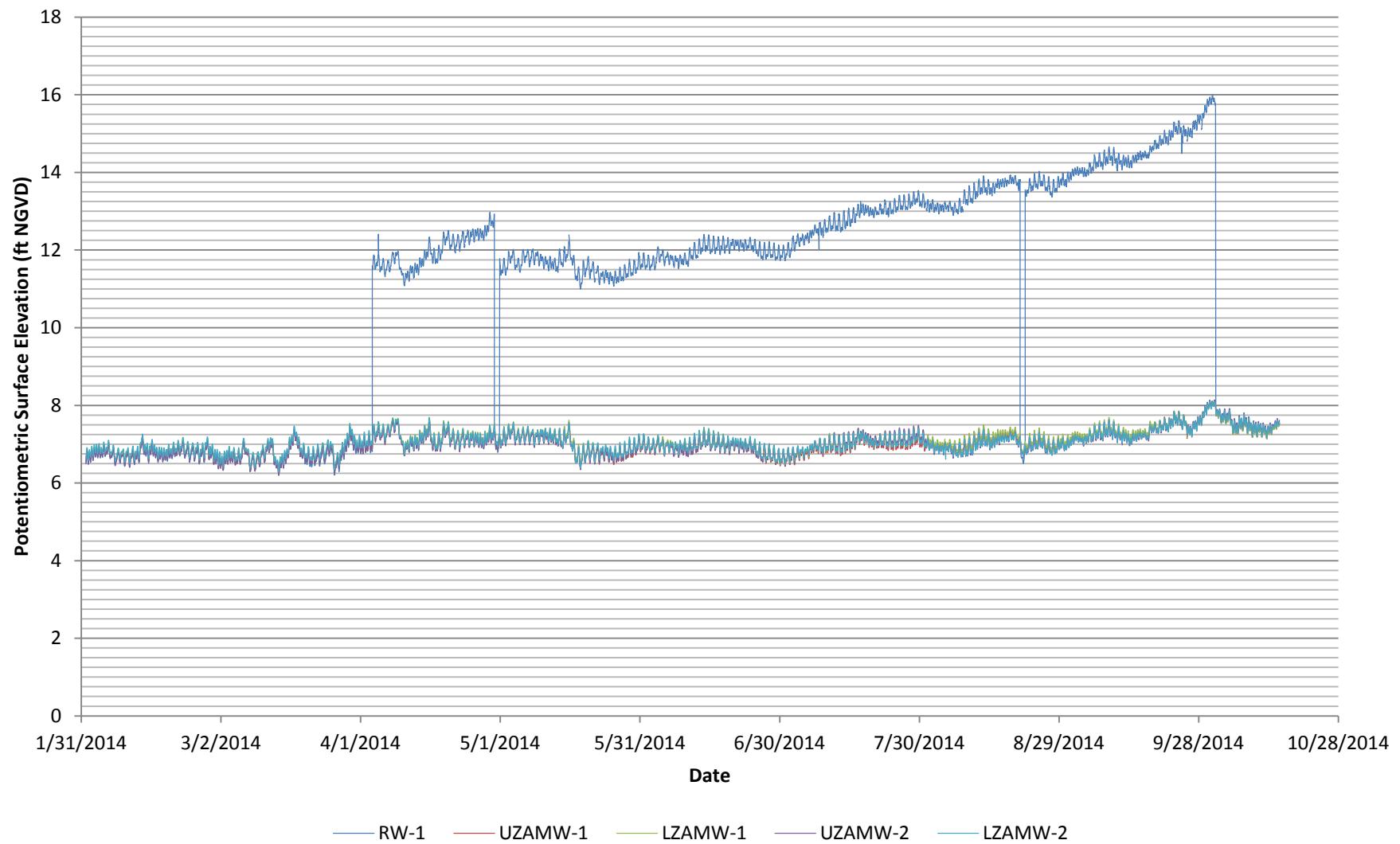
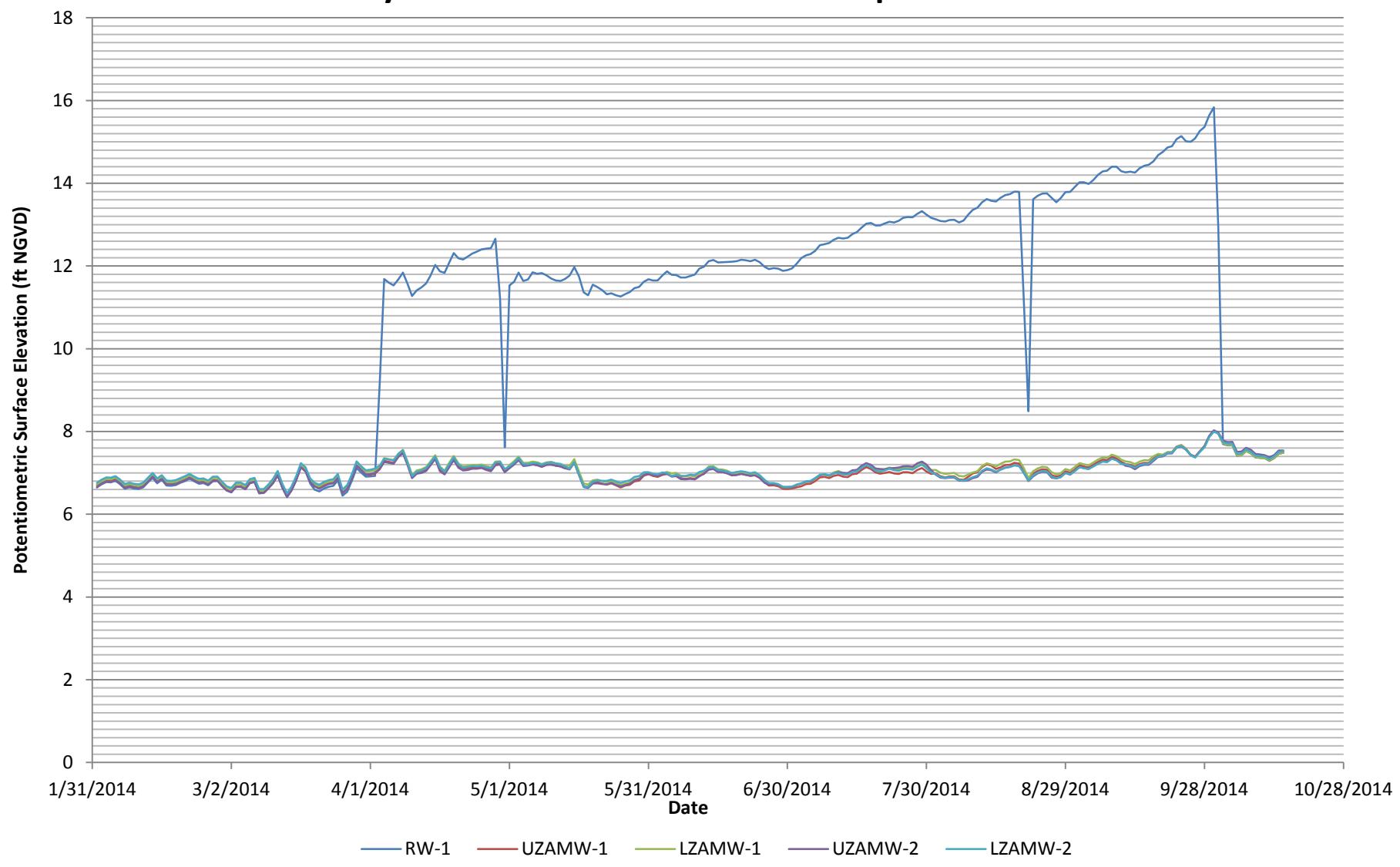
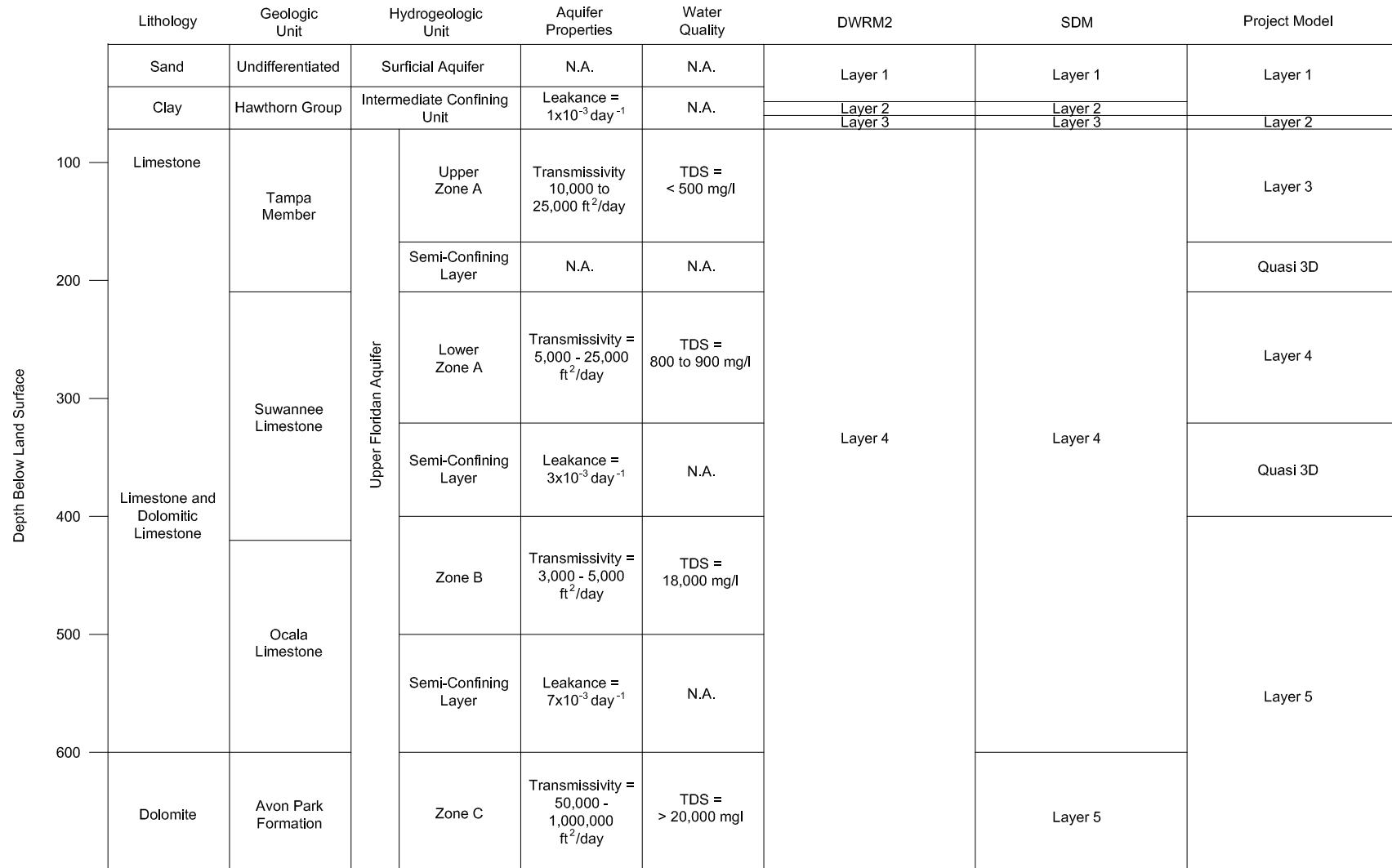


Figure 4
Recharge Test Daily Average Hydrographs
City of Clearwater Groundwater Replenishment





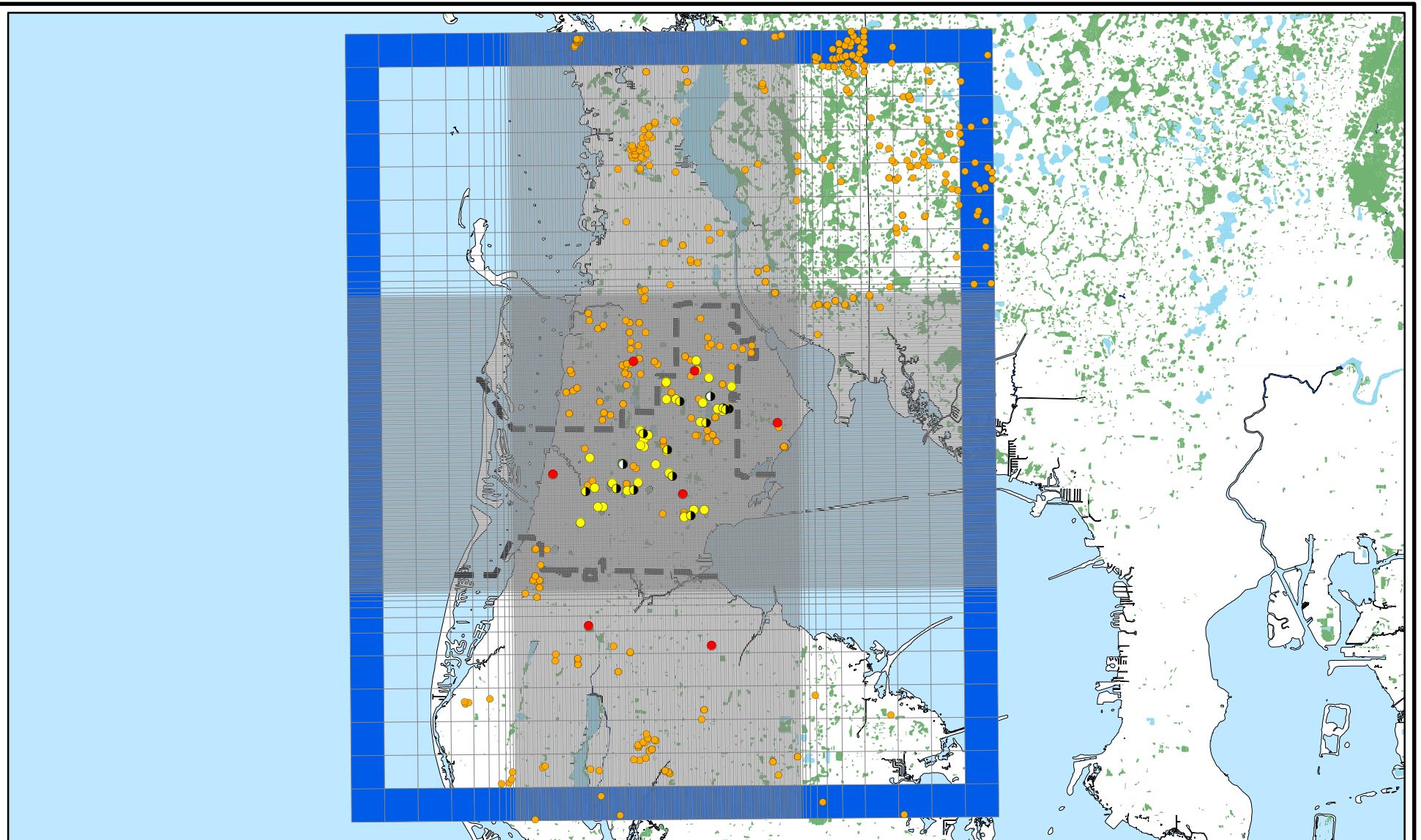
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		<input type="checkbox"/> Corel
FILE NAME: Figure05.dwg		

CITY OF CLEARWATER
GROUNDWATER REPLENISHMENT TEST PROGRAM STUDY
CONCEPTUAL HYDROGEOLOGIC MODEL

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 DATE: Sept. 2014
 FIGURE: 5



0 2 4
Miles

Legend

- | | | | | | |
|----------------|----------------------------|---------------------|------------------------|--------------|--------|
| Model Grid | Model Wells | Monitoring Well | UFAS Monitoring Well | Service Area | Lakes |
| Model Boundary | Calibration Well Locations | SAS Monitoring Well | Active Production Well | Wetlands | Rivers |

DATE	REVISED
[] Acad	
[] GIS	
[] Corel	
FILE NAME: FIGURE06.MXD	

CITY OF CLEARWATER GROUNDWATER REPLENISHMENT TEST PROGRAM STUDY

FTMR MODEL GRID



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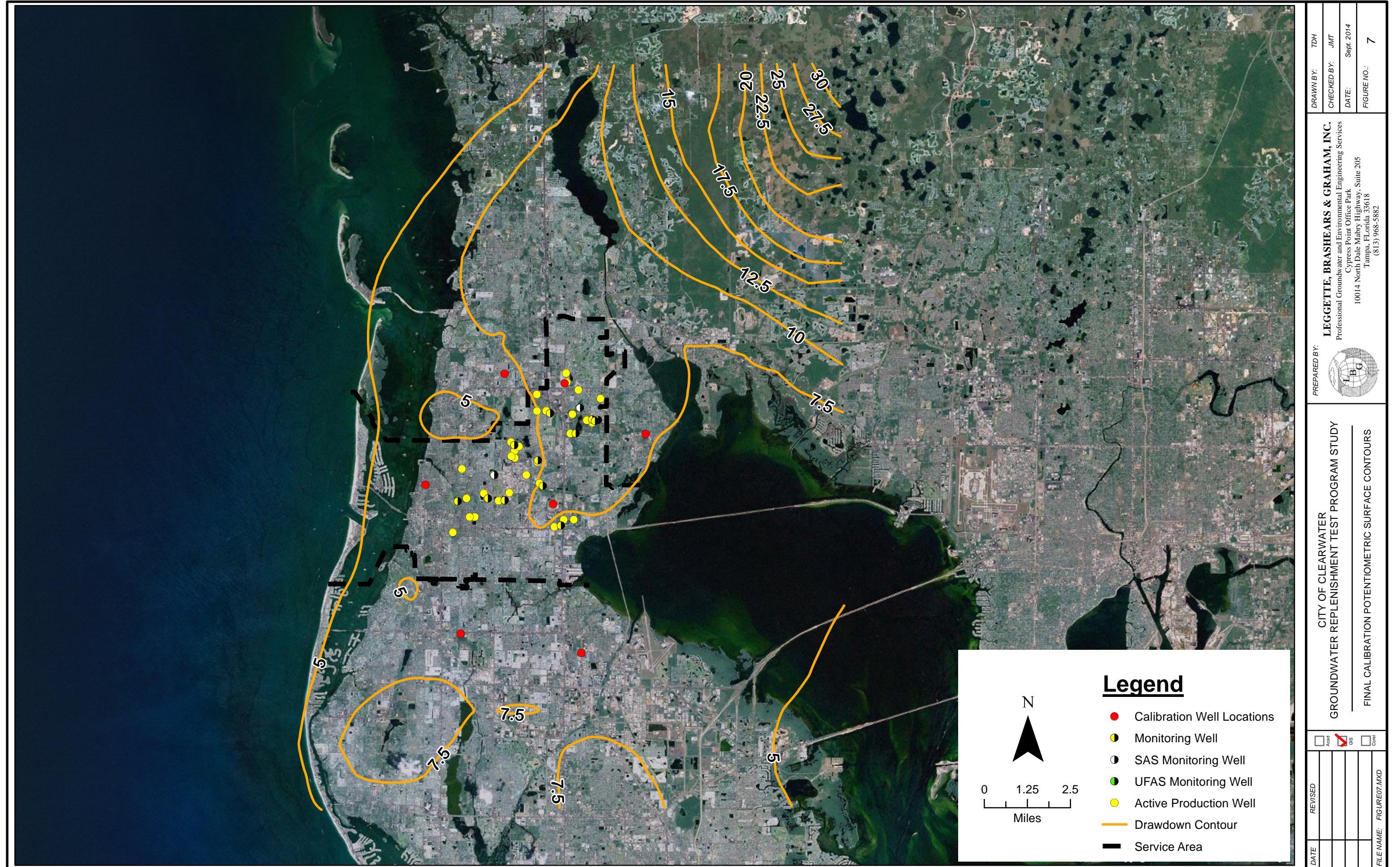
LEGGETTE, BRASHEARS & GRAHAM, INC.
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10014 North Dale Mabry Highway, Suite 205
Tampa, Florida 33618
(813) 968-5882

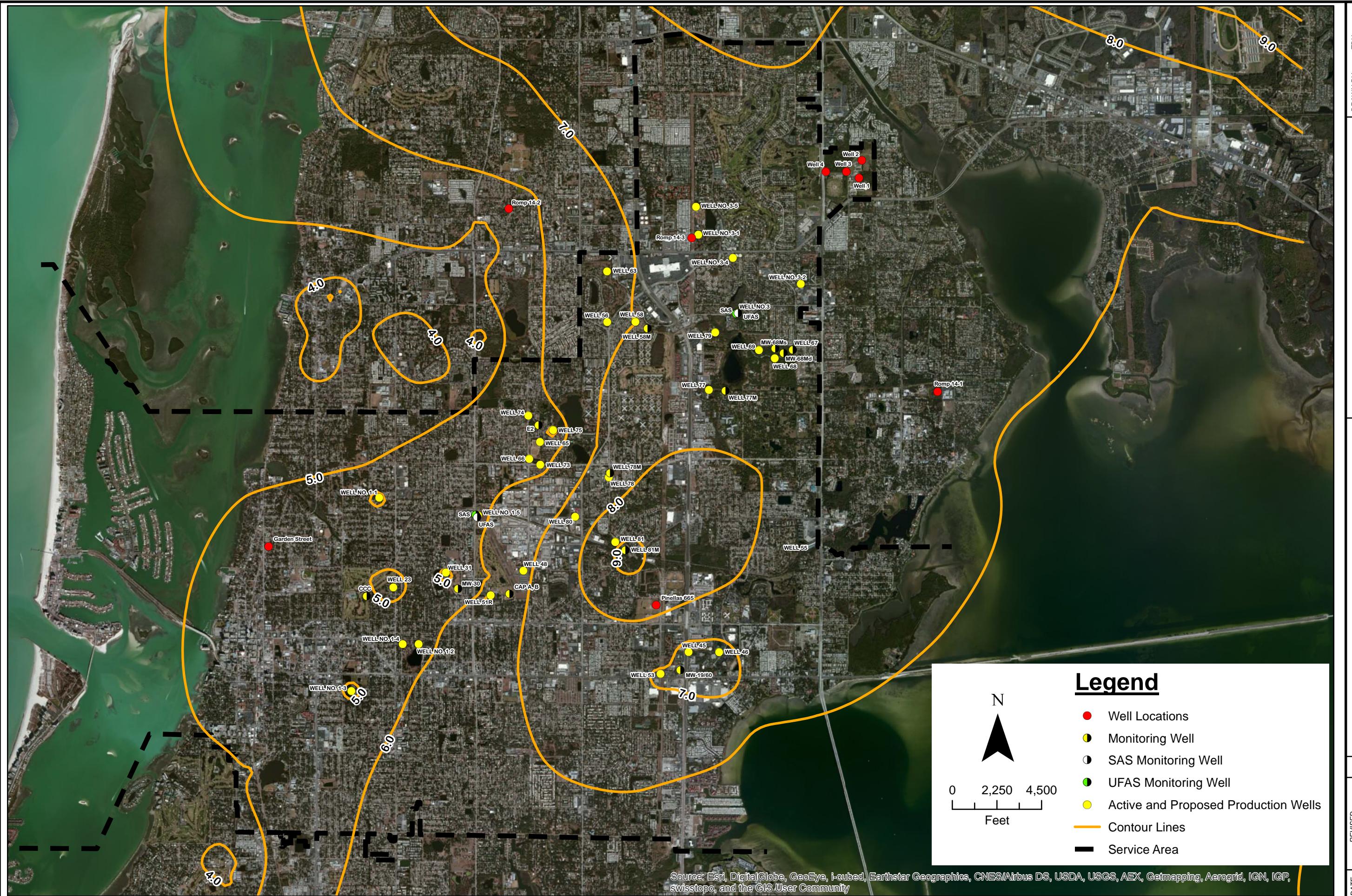
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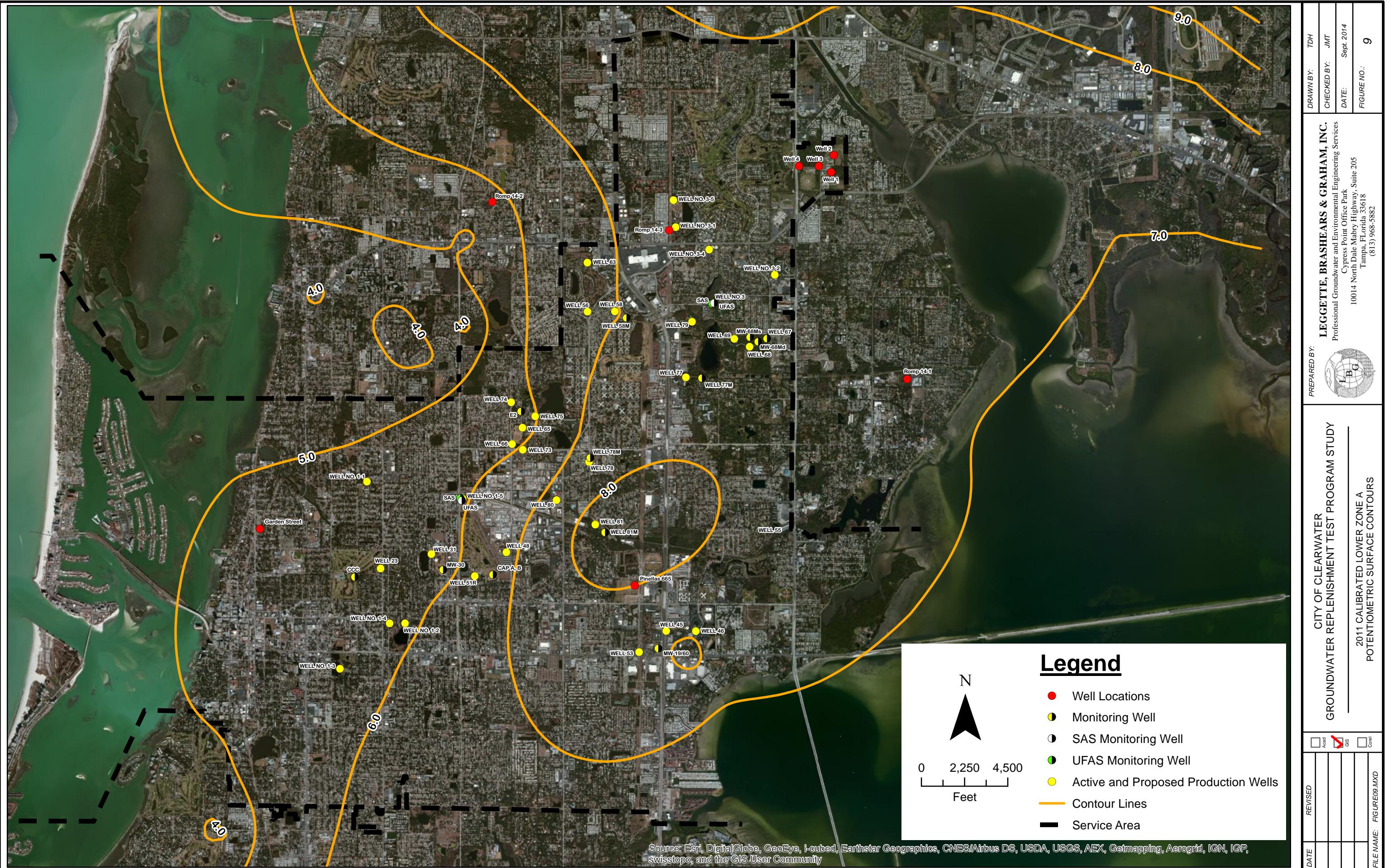
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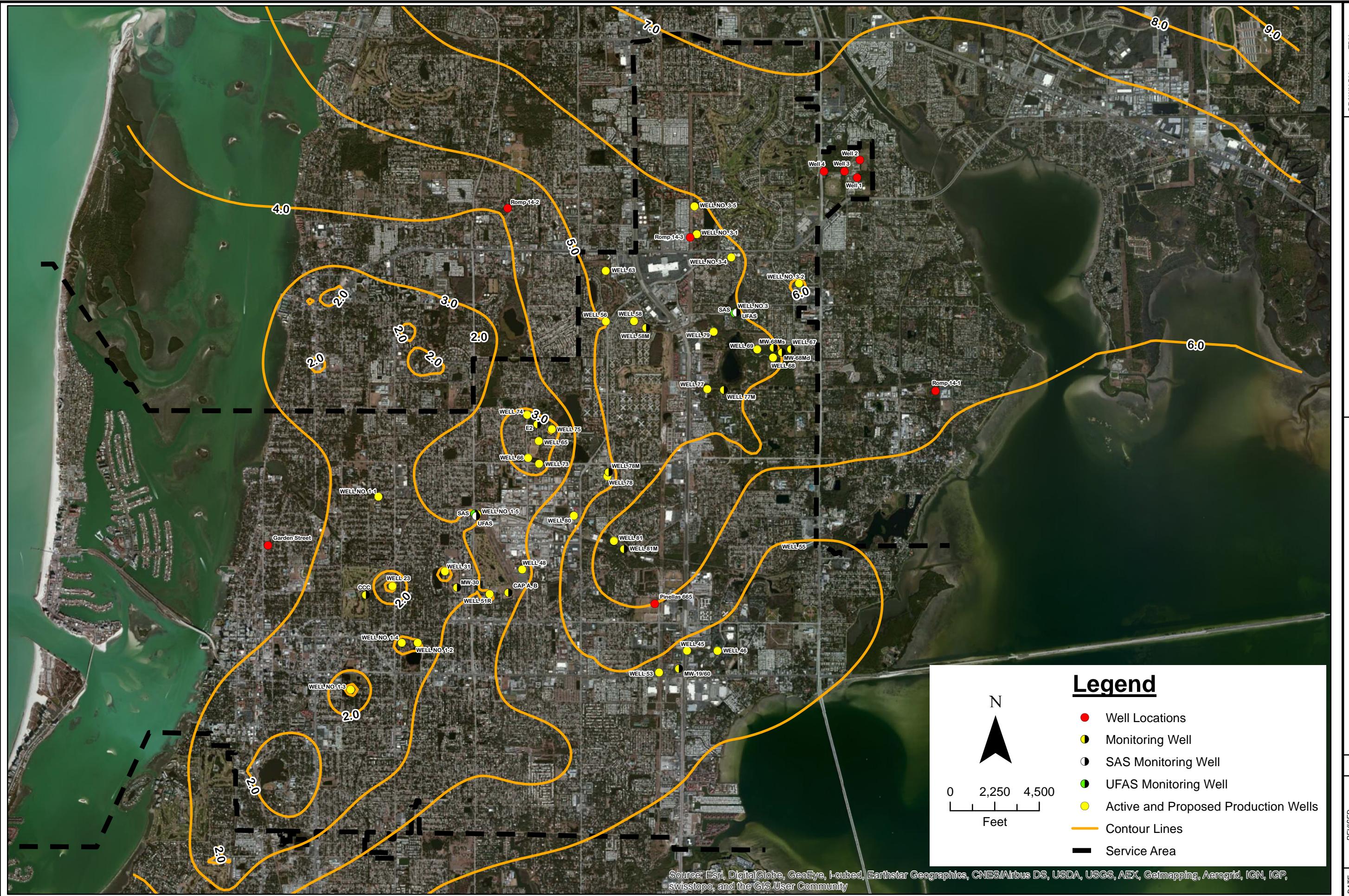
DATE: Sept. 2014

FIGURE NO.: 6

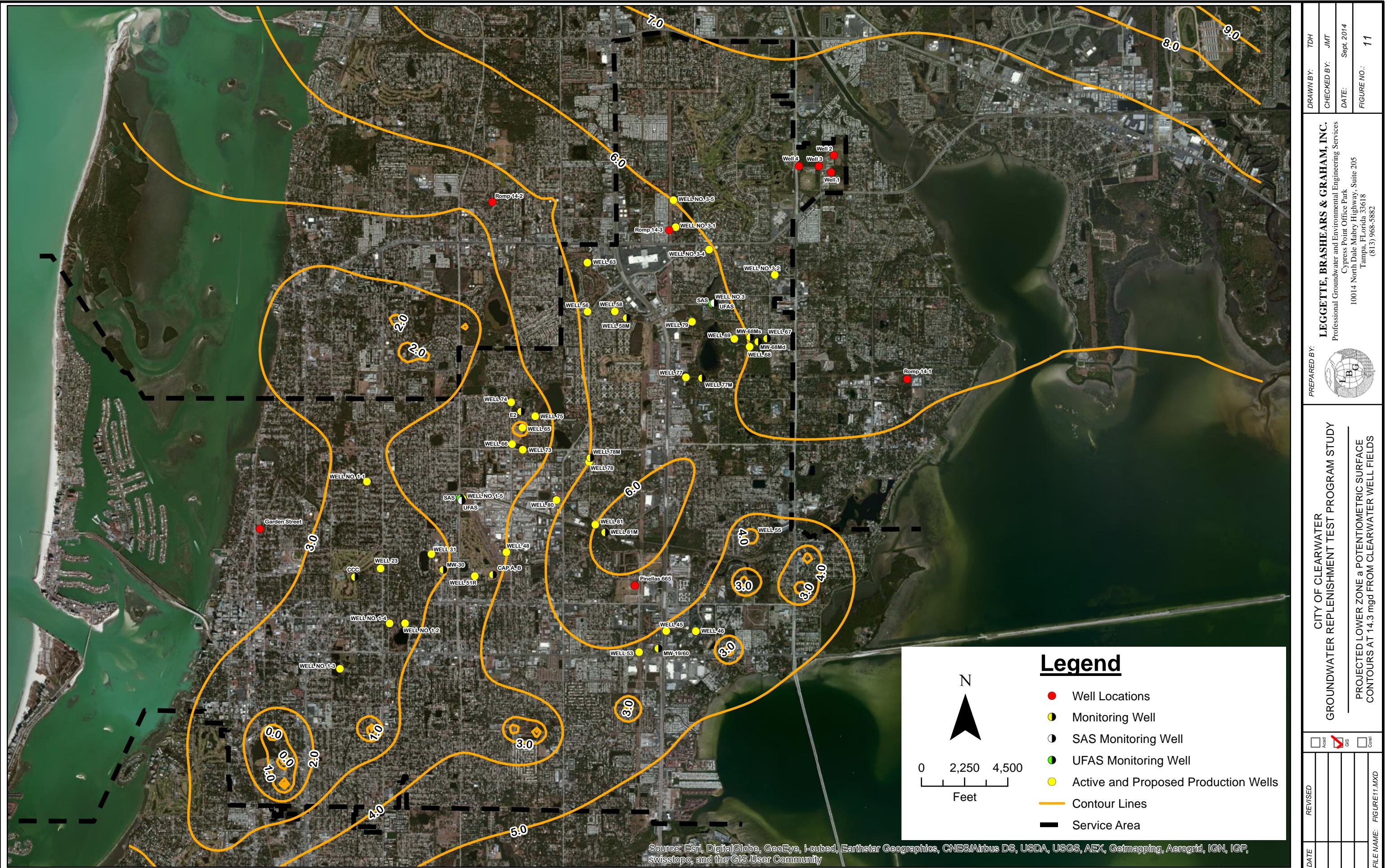


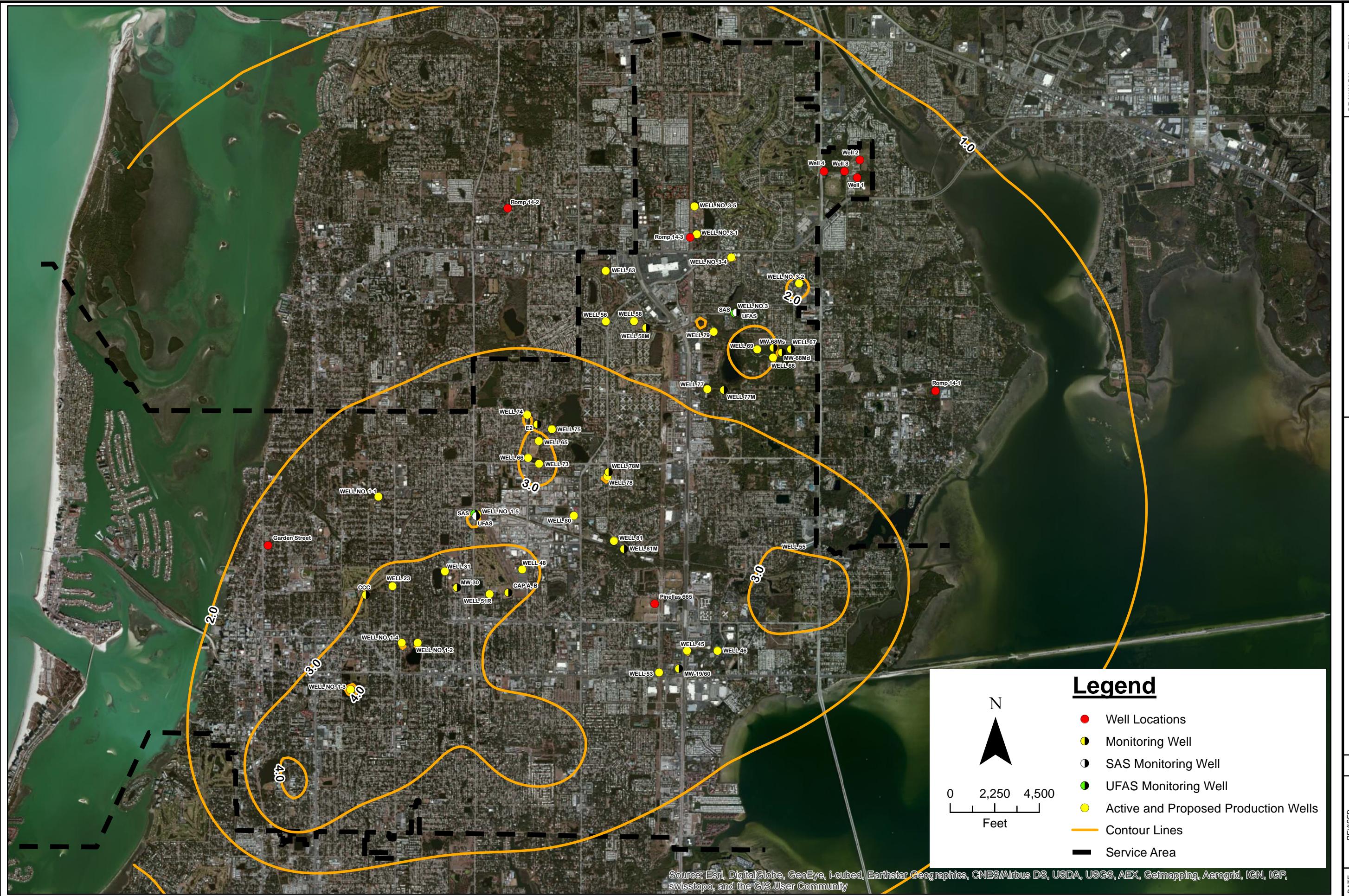




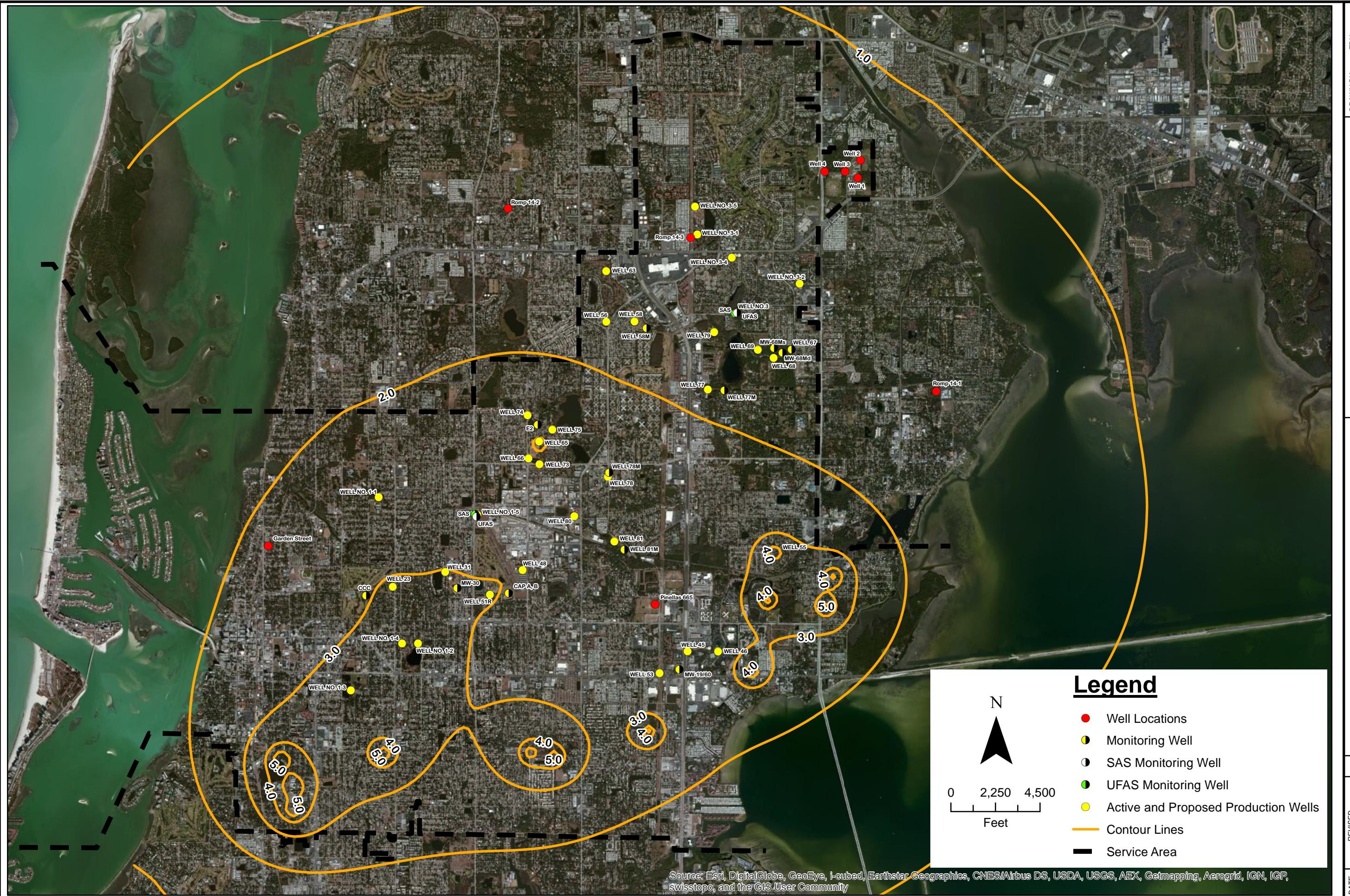


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CHECKED BY:	JMT			
DATE:	Sept. 2014			
FIGURE NO.:	10			
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	Tampa, Florida 33618			
	(813) 968-5382			

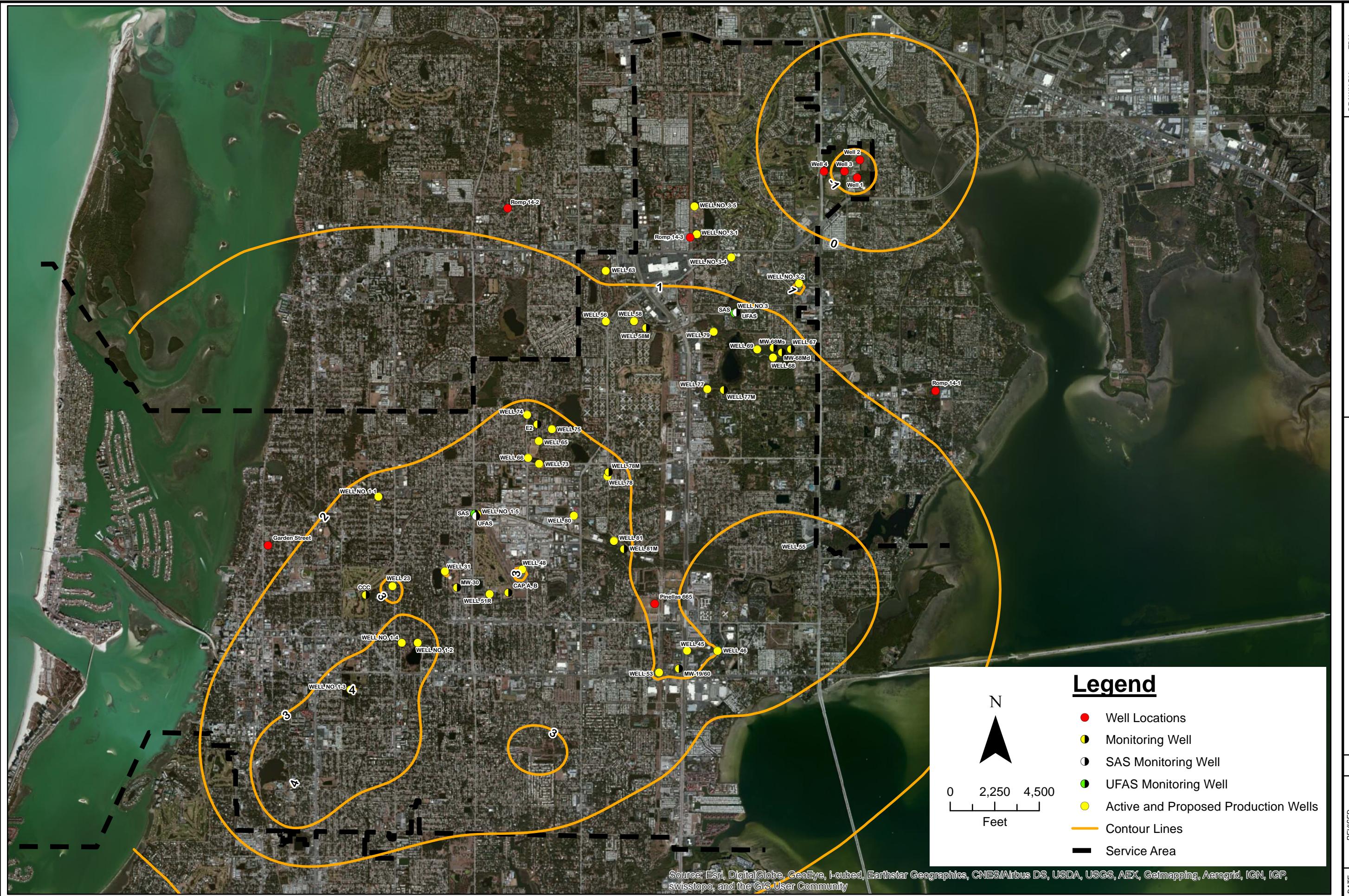




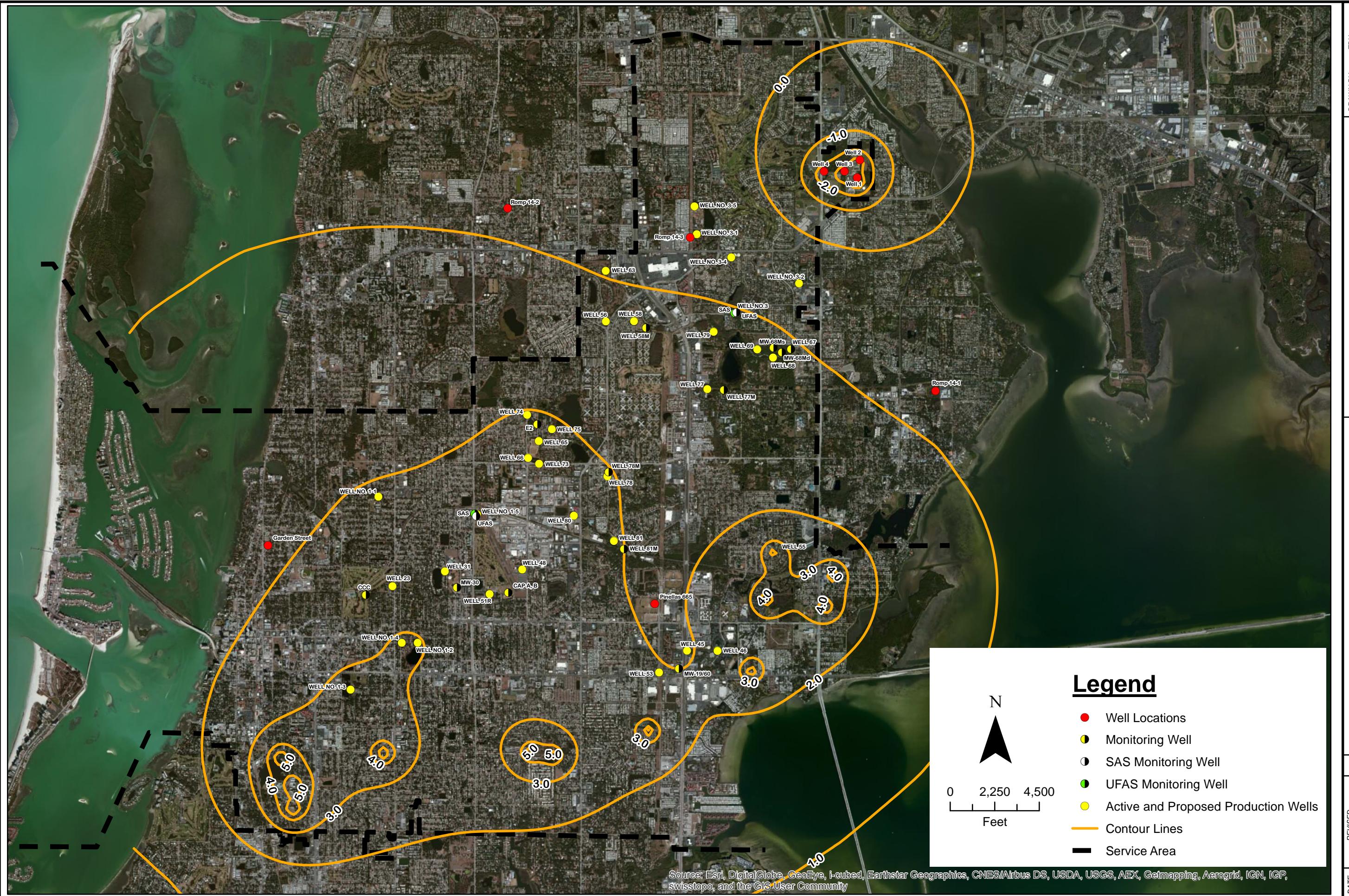
DATE	REVISED	Acad	GIS	Core
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CHECKED BY:	JMT			
DATE:	Sept. 2014			
FIGURE NO.:	12			
PREPARED BY:	LEGGETTE, BRASHEARS & GRAHAM, INC.			
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	Tampa, Florida 33618			
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DATE:	Sept. 2014			
FIGURE NO.:	13			
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CHECKED BY:	JMT	
DATE:	Sept. 2014	
FIGURE NO.:	14	
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	Tampa, Florida 33618	
	(813) 968-5382	
FILE NAME:	FIGURE14.MXD	





0
300
600
Feet

- Well Location
- Potential Well Location
- Pipeline Location
- - - Potential Pipeline Location

DATE	REVISED
FILE NAME:	FIGURE16.MXD

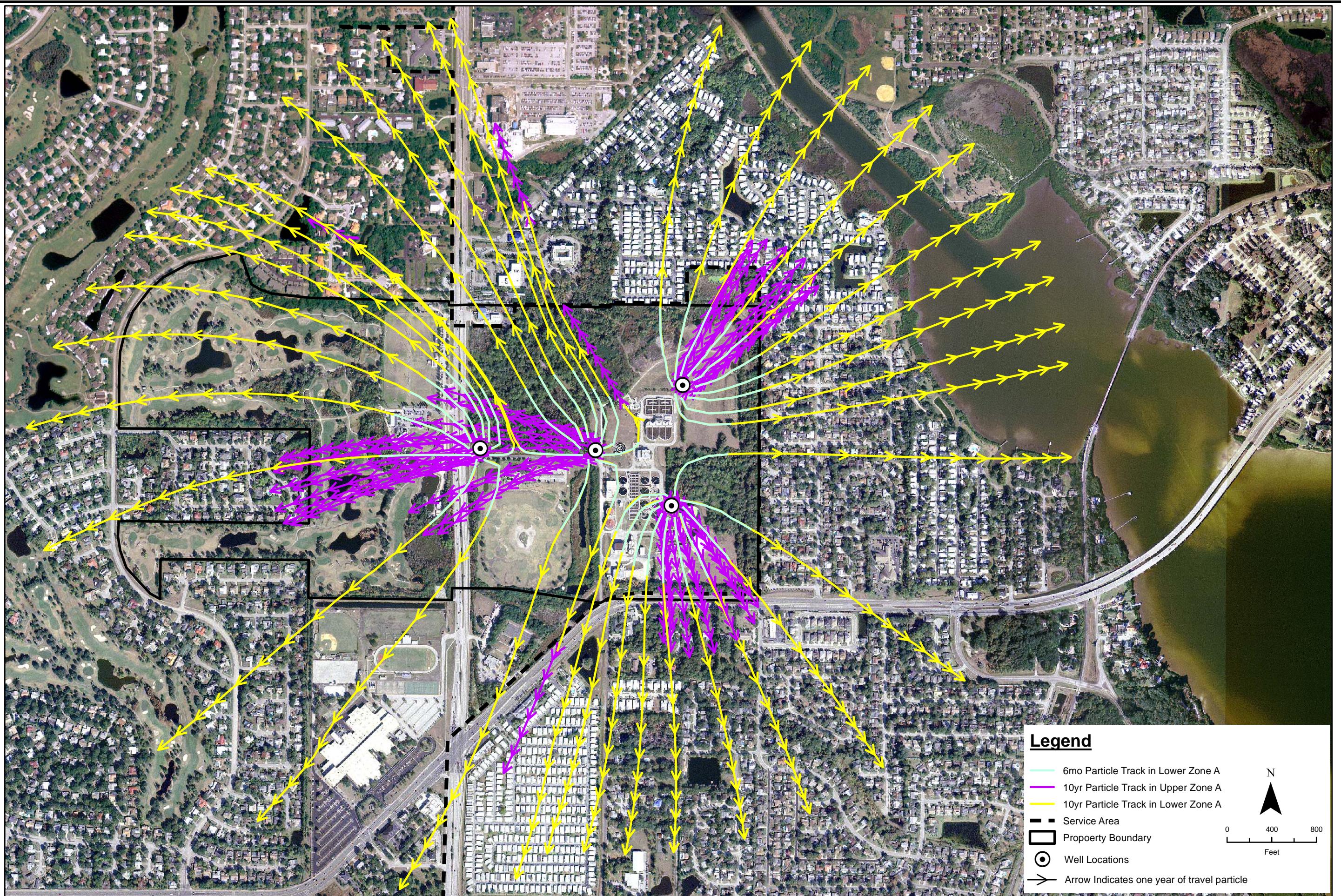
CITY OF CLEARWATER
GROUNDWATER REPLENISHMENT TEST PROGRAM STUDY
PRELIMINARY RECHARGE WELL LOCATIONS

Acad
 GIS
 Corel



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DATE: Sept. 2014
FIGURE NO.: 16



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		CHECKED BY:	JMT
		DATE:	Oct. 2014
		FIGURE NO.:	17
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		Tampa, Florida 33618	
		(813) 968-5382	
FILE NAME: FIGURE17.MXD			

TABLES

Table 1
Recharge Test Flow Data
City of Clearwater Groundwater Replenishment

Date	Totalizer (gal)	Total Flow (gal)	Avg Daily Flow (gal)	Average Rate (gpm)
4/3/14 12:00	977290			
4/11/14 12:00	4230130	3252840	406605	282.36
4/16/14 15:00	6309000	2078870	405633	281.69
4/23/14 15:00	9138500	2829500	404214	280.70
5/2/14 15:00	12322000	3183500	404254	280.73
5/6/14 15:00	13937220	1615220	403805	280.42
5/9/14 12:00	15085140	1147920	399277	277.28
5/12/14 17:00	16365000	1279860	398917	277.03
5/14/14 15:00	17130000	765000	399130	277.17
5/21/14 16:00	19932000	2802000	397917	276.33
5/30/2014 15:00	23509300	3577300	399327	277.31
6/4/2014 15:00	25504600	1995300	399060	277.13
6/12/2014 16:00	28701000	3196400	397480	276.03
6/18/2014 15:00	31066700	2365700	397041	275.72
6/26/2014 15:00	34230900	3164200	395525	274.67
7/2/2014 14:00	36587600	2356700	395530	274.67
7/10/2014 14:00	39767100	3179500	397438	276.00
7/21/2014 8:30	44015000	4247900	394389	273.88
8/8/2014 9:00	51143500	7128500	395570	274.70
8/14/2014 9:00	53513500	2370000	395000	274.31
8/20/2014 15:00	55981300	2467800	394848	274.20
8/21/2014 17:00	55981300	0	0	0.00
8/26/2014 15:00	57919500	1938200	394210	273.76
9/3/2014 15:00	61078500	3159000	394875	274.22
9/11/2014 15:00	64229100	3150600	393825	273.49
9/18/2014 16:00	66994900	2765800	392776	272.76
9/25/2014 16:00	69741800	2746900	392414	272.51
10/1/2014 15:00	72074400	2332600	391485	271.86

Table 2
RW-1 Water-Quality Data
City of Clearwater Groundwater Replenishment

	Bicarb ion	Chloride	Nitrate	Fluoride	Sulfate	Sulfide	Total Alk	TDS	TOC	Arsenic	Calcium	Iron	Mg	K	Sodium	Cond.	Temp.	pH	DO	ORP	Turb
11/7/2013		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.						
4/1/2014	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	
4/9/2014	190	470	0.01	1.6	29	2.9	190	1100	4.4	14	99	0.02	30	5.8	270	1932	23.9	7.02	0.35	-135.1	0.3
4/16/2014	190	450	0.01	1.7	34	3.6	190	1100	3.7	15	100	0.02	33	6.3	270	1998	24.6	7.13	0.12	-209	0.2
4/23/2014	200	500	0.01	0.15	37	3.8	200	1100	4.5	14	96	0.02	31	6.1	250	2021	24.8	7.28	0.18	-212.4	0.3
5/1/2014	190	500	0.01	1.6	44	2.8	190	1200	3.9	14	98	0.02	31	6	280	2056	25.2	7.12	0.3	-170.8	0.3
5/6/2014	190	580	0.01	2	44	2	190	1200	3.3	15	100	0.02	32	6.2	270	2069	25.1	7.17	0.15	-152.7	1.1
5/14/2014	200	500	0.07	1.9	54	2.8	200	1200	4.7	14	110	0.02	33	6.8	290	2079	25.4	6.79	0.55	-65	1.2
5/21/2014	190	580	0.01	0.24	52	3	190	1100	4.3	15	100	0.02	32	6.3	240	2067	24.1	7.22	0.98	-179.7	1.7
5/30/2014	180	470	0.01	1.8	42	3.3	180	1200	4	17	110	0.02	35	6.6	290	2085	24.9	7.21	0.86	-145.3	1.7
6/4/2014	180	480	0.01	1.9	45	3.4	180	1100	4.2	15	100	0.02	32	6.5	280	2122	25.2	7.14	0.47	-126.5	0.54
6/12/2014	230	550	0.1	2.2	40	5.3	190	1200	1.9	14	100	0.033	29	5.7	240	2180	25.8	7.25	0.5	-135.1	0.23
6/18/2014	230	560	0.1	2.2	40	5.3	190	1200	1.9	14	100	0.033	33	6	280	2119	24.9	7.22	0.63	-173.7	0.14
6/25/2014	230	560	0.1	2.3	43	5.1	190	1200	1.9	14	98	0.033	29	6	240	2182	25.5	7.36	0.71	-156.2	0.2
7/2/2014	210	580	0.1	2.5	48	4.9	170	1300	1.9	13	95	0.033	30	6	250	2207	25.9	7.24	0.71	-194.9	0.14
7/10/2014	240	580	0.1	2.1	47	5.2	200	1300	1.9	16	120	0.033	39	7.7	320	2132	24.9	7.17	3.83	-146.6	0.15
7/21/2014	190	610	0.1	2.1	45	5	160	1300	2.1	14	100	0.033	31	6.3	250	2323	24.5	7.22	1.4	-95.6	0.32
7/31/2014	240	600	0.1	2	43	5.4	200	1300	2.4	15	100	0.033	33	6.7	280	2299	24.3	7.25	0.38	-120.3	0.12
8/8/2014	240	600	0.1	2.2	45	5.7	200	1400	2.3	16	120	0.033	34	6.8	280	2376	25.8	7.25	0.28	-129.6	0.13
8/14/2014	220	590	0.1	2.1	43	5.2	180	1300	2.2	16	120	0.033	39	7.7	330	2366	25.2	7.27	0.56	-122.8	1.19
8/20/2014	240	600	0.1	2.1	47	5.3	200	1400	2.7	14	120	0.033	36	6.3	300	2410	25.9	7.26	0.14	-135.9	0.23
8/26/2014	240	600	0.1	2.2	48	5.4	200	840	2.1	14	120	0.033	37	7.7	310	2401	25.6	7.28	0.9	-114.6	0.17
9/3/2014	250	590	0.1	0.3	42	7.9	200	1300	2.1	13	110	0.033	34	7.1	280	2380	25.6	7.38	0.78	-118.8	0.51
9/11/2014	250	590	0.1	0.34	44	9.7	200	1400	2.2	15	100	0.033	32	6.4	270	2339	25.8	7.39	0.84	-140.7	2.5
9/18/2014	250	550	0.1	0.3	42	5.5	210	1400	2.4	16	140	0.033	42	7.6	340	2254	24.2	7.4	0.43	-128.7	0.18
9/25/2014	250	570	0.1	0.34	43	5.6	200	1200	2.3	15	130	0.033	41	7.1	330	2247	25.1	7.4	0.42	-123.1	0.14
10/1/2014	250	520	0.1	0.25	38	5.2	200	1300	2.1	14	110	0.033	31	6	260	2219	25	7.4	0.25	-143.5	4.57

Table 3
UZAMW-1 Water-Quality Data
City of Clearwater Groundwater Replenishment

	Bicarb Alk	Chloride	Nitrate	Fluoride	Sulfate	Sulfide	Total Alk	TDS	TOC	Arsenic	Calcium	Iron	Mg	K	Sodium	Cond.	Temp.	pH	DO	ORP	Turb
11/7/2013	190	160	0.01	N.A.	4.1	2.6	190	500	5.7	6.9	79	0.029	15	6.3	81						
4/1/2014	180	170	0.01	0.21	6.6	0.6	180	540	2.5	5.1	80	0.022	15	3.7	83	907	24.39	7.3	0.26	-233.4	2.2
4/9/2014	180	160	0.01	0.27	7.3	2.2	180	490	3.4	7	77	0.02	15	3.7	79	887	24.4	7.2	0.19	-109.2	0.7
4/16/2014	180	170	0.01	0.24	5.2	2.2	180	530	3.1	7.3	88	0.024	17	3.8	80	879	24.2	7.32	0.16	-165.6	0.6
4/23/2014	180	170	0.01	0.2	6.3	2.2	180	480	3.8	7	75	0.02	15	3.7	74	885	24.5	7.35	0.17	-182.7	0.7
5/1/2014	180	160	0.01	0.23	5.5	2.4	180	530	3.7	6.4	75	0.02	14	3.4	76	884	24.6	7.25	0.14	-148.2	1.4
5/6/2014	180	140	0.01	0.16	5.3	1.8	180	530	3.1	7.5	77	0.034	15	3.5	77	879	24.4	7.34	0.15	-98.5	1.3
5/14/2014	180	160	0.01	0.24	8.5	3	180	540	3.8	7	81	0.02	15	3.6	80	875	24.5	7.06	0.26	-111.2	2.2
5/21/2014	180	180	0.01	0.16	9.8	2.4	180	480	4	8.2	80	0.02	15	3.5	80	883	24.6	7.23	0.27	-101.6	0.35
5/30/2014	170	150	0.01	0.2	5.2	2	170	550	3.6	7.3	80	0.02	15	3.2	75	878	24.6	7.23	0.38	-82.5	0.56
6/4/2014	170	150	0.01	0.16	3.7	2.4	170	530	4.1	6.8	76	0.02	14	3	73	875	24.5	6.99	0.51	-18.3	0.72
6/12/2014	210	170	0.1	0.28	8.8	4	170	570	1.7	7.4	81	0.033	15	3.1	76	879	24.5	7.31	0.53	-119.6	0.32
6/18/2014	210	170	0.1	0.28	4.3	3.9	180	500	1.5	7.2	81	0.033	14	2.8	72	869	24.8	7.24	0.38	-77.8	0.31
6/25/2014	220	170	0.1	0.28	8.9	3.5	180	510	2	6.3	77	0.033	14	2.7	69	873	24.7	7.4	0.49	-211.4	0.2
7/2/2014	210	170	0.1	0.29	8.6	4.1	180	490	2.4	6.3	73	0.095	13	2.6	68	879	24.6	7.31	0.39	-190.8	0.2
7/10/2014	220	180	0.1	0.31	10	4.1	180	500	1.9	6.7	88	0.033	16	3.1	83	877	25	7.17	0.72	-139.3	0.2
7/21/2014	200	190	0.1	0.28	9.3	3.5	160	530	1.7	5.9	78	0.033	14	2.7	71	935	24.5	7.39	0.23	-105.7	0.51
8/4/2014	230	180	0.1	0.3	4.3	3.6	190	520	2.1	6.4	75	0.033	13	2.4	66	931	24.5	7.4	0.13	-174.9	0.58
8/8/2014	230	170	0.1	0.3	4.7	4	180	550	2.2	7.6	86	0.033	15	2.7	74	925	24.4	7.4	0.67	-153.9	0.53
8/14/2014	220	180	0.1	0.29	7.9	3.9	180	510	2.2	7	91	0.033	16	2.9	85	934	24.6	7.43	0.33	-168.6	0.96
8/20/2014	230	170	0.1	0.28	8.2	5.3	190	530	2.5	6.3	83	0.033	15	2.3	76	932	24.6	7.42	0.09	-163.9	0.18
8/26/2014	230	180	0.1	0.29	8.3	3.8	180	530	1.9	7.5	110	0.033	19	2.7	97	935	24.8	7.43	0.35	-165	0.21
9/3/2014	220	170	0.1	0.29	4.5	4.9	180	560	1.9	5.5	75	0.033	13	2.7	70	943	24.7	7.44	0.08	-190.8	0.39
9/11/2014	230	180	0.1	0.31	4.8	5.8	190	590	2.2	6.8	85	0.033	16	2.7	81	934	24.9	7.45	0.07	-208.3	1.58
9/18/2014	230	180	0.1	0.29	5	3.5	190	560	2.1	6.6	88	0.033	16	2.7	80	931	24.4	7.46	0.08	-126.7	0.28
9/25/2014	230	180	0.1	0.31	5.3	3.1	180	490	2.1	7	100	0.033	18	2.9	93	925	24.5	7.47	0.05	-190.5	0.31
10/1/2014	220	170	0.1	0.26	4.5	3.9	180	530	2	6.6	82	0.033	14	2.5	75	929	24.5	7.46	0.05	-207.2	2.15

Table 4
LZAMW-1 Water-Quality Data
City of Clearwater Groundwater Replenishment

	Bicarb Alk	Chloride	Nitrate	Fluoride	Sulfate	Sulfide	Total Alk	TDS	TOC	Arsenic	Calcium	Iron	Mg	K	Sodium	Cond.	Temp.	pH	DO	ORP	Turb
11/7/2013	160	290	0.01	N.A.	16	4	160	750	6.6	1.8	76	0.042	17	4.1	180						
4/1/2014	170	280	0.01	0.17	13	2	170	710	3.1	1.2	80	0.082	19	4.5	180	1358	24.49	7.47	0.013	-243.6	0.8
4/9/2014	160	290	0.01	0.25	19	3.9	160	730	3.2	2.2	79	0.02	18	4.2	170	1330	24.4	7.27	0.12	-112.1	0.6
4/16/2014	160	260	0.01	0.18	17	4.4	160	770	3	2.5	88	0.042	21	4.5	170	1336	24.3	7.43	0.17	-172.8	0.4
4/23/2014	170	320	0.01	0.16	17	4	170	750	4.2	2.3	76	0.04	18	4.3	170	1342	24.5	7.45	0.12	-205.5	0.5
5/1/2014	170	300	0.01	0.17	22	3.8	170	760	3.9	1.5	80	0.035	19	4.2	170	1342	24.8	7.38	0.1	-196.9	0.6
5/6/2014	170	270	0.01	0.18	20	4	170	750	2.7	1.4	83	0.033	19	4.4	160	1346	24.6	7.39	0.11	-100.2	1.1
5/14/2014	170	310	0.01	0.18	19	4.4	170	790	3.5	1.8	84	0.032	19	4.5	170	1335	24.5	7.21	0.13	-154.7	1.8
5/21/2014	170	340	0.01	0.17	22	4.2	170	710	3.5	1.8	85	0.037	19	4.6	170	1348	24.8	7.29	0.24	-212.7	0.2
5/30/2014	160	290	0.01	0.13	14	4.4	160	790	3.8	1.8	85	0.034	19	4.2	160	1339	24.7	7.27	0.45	-92.4	0.44
6/4/2014	160	280	0.01	0.093	11	4.6	160	740	4.1	1.7	82	0.031	18	4.3	170	1338	24.6	7.33	0.27	-131.3	0.57
6/12/2014	200	320	0.1	0.2	23	6.5	160	800	2	1.3	88	0.033	19	4.4	170	1338	24.6	7.4	0.25	-147.1	0.25
6/18/2014	210	320	0.1	0.2	15	6.8	170	690	1.8	1.3	77	0.046	18	3.9	150	1317	24.7	7.34	0.32	-103.8	0.25
6/25/2014	210	320	0.1	0.21	17	5.9	170	710	2	1.3	75	0.033	16	3.8	140	1320	24.7	7.49	0.38	-203.7	0.25
7/2/2014	210	330	0.1	0.22	24	6.3	170	740	2.2	1.3	74	0.033	16	3.8	140	1343	24.7	7.4	0.38	-182.6	0.19
7/10/2014	210	330	0.1	0.24	26	6.9	170	690	1.7	1.3	95	0.033	20	5	180	1319	24.6	7.31	0.49	-166.8	0.33
7/21/2014	190	360	0.1	0.2	16	6.9	160	740	2	1.3	80	0.033	17	4.1	150	1426	24.5	7.49	0.34	-213.4	0.42
8/4/2014	220	330	0.1	0.23	15	7.6	180	790	2.3	1.3	74	0.033	16	3.7	130	1422	24.6	7.5	0.14	-204.7	0.19
8/8/2014	220	330	0.1	0.23	15	6.7	180	770	2.3	1.3	81	0.033	17	3.8	140	1426	24.5	7.5	0.12	-186.6	0.28
8/14/2014	220	320	0.1	0.22	15	6.2	180	810	2.4	1.3	93	0.033	20	4.7	170	1431	24.6	7.52	0.04	-224.8	0.65
8/20/2014	220	320	0.1	0.21	22	6	180	820	2.5	1.3	80	0.037	17	3.5	150	1436	24.9	7.53	0.08	-192.4	0.18
8/26/2014	220	320	0.1	0.23	23	5.1	180	680	2.2	1.3	83	0.033	18	4.8	150	1426	24.7	7.54	0.04	-206.6	0.18
9/3/2014	220	320	0.1	0.22	15	9.4	180	820	2.2	1.3	85	0.033	19	4.6	160	1428	24.6	7.56	0.1	-217.2	0.29
9/11/2014	220	330	0.1	0.24	14	9.6	180	790	2.3	1.3	100	0.033	23	4.9	190	1430	24.7	7.55	0.05	-231.9	0.31
9/18/2014	220	330	0.1	0.21	13	6.5	180	810	2.3	1.3	100	0.048	22	4.9	190	1438	24.6	7.59	0.05	-283.7	0.28
9/25/2014	220	320	0.1	0.24	15	6.7	180	750	2.5	1.3	95	0.033	20	4.1	170	1425	24.5	7.59	0.04	-210.3	0.29
10/1/2014	220	310	0.1	0.19	15	6.4	180	760	2.3	1.3	91	0.039	19	4.3	160	1443	24.8	7.59	0.04	-245.9	1.39

Table 5
UZAMW-2 Water-Quality Data
City of Clearwater Groundwater Replenishment

	Bicarb Alk	Chloride	Nitrate	Fluoride	Sulfate	Sulfide	Total Alk	TDS	TOC	Arsenic	Calcium	Iron	Mg	K	Sodium	Cond.	Temp.	pH	DO	ORP	Turb
11/7/2013	180	86	0.01	N.A.	4.4	0.31	180	360	4.5	27	63	0.11	14	2.7	52						
4/1/2014	170	100	0.01	0.28	4.9	0.2	170	390	2.3	25	61	0.094	14	2.7	50	632	23.9	7.38	3.85	-128.9	4
4/9/2014	170	90	0.01	0.34	3.4	0.2	170	360	2.3	26	59	0.059	13	2.8	47	617	23.7	7.29	3.89	8.3	1.6
4/16/2014	170	91	0.01	0.32	4.4	0.2	170	380	2.3	27	70	0.1	16	3	49	616	23.6	7.26	3.85	-3.7	2.1
4/23/2014	170	99	0.01	0.29	4.8	0.2	170	360	3.3	26	60	0.09	14	3	47	627	23.8	7.38	3.45	-72.2	2.1
5/1/2014	180	92	0.04	0.31	3.4	0.4	180	390	3	26	62	0.11	14	2.9	48	621	24.1	7.31	3.05	-84.2	2.1
5/6/2014	170	80	0.01	0.34	5.2	0.1	170	360	2.1	28	59	0.097	14	2.8	48	624	24	7.36	2.89	-126.4	3.2
5/14/2014	180	95	0.01	0.31	5	0.1	180	410	2.8	26	65	0.17	14	3.1	50	624	24	7.24	3.33	-52.6	4
5/21/2014	170	110	0.01	0.34	6.4	0.2	170	330	3.5	27	63	0.14	14	2.8	46	624	24	7.2	3.31	-96.7	11.9
5/30/2014	160	85	0.01	0.29	5.6	0.39	160	420	2.7	28	64	0.14	15	2.6	48	621	24.2	7.35	3.04	57.3	3.71
6/4/2014	160	88	0.01	0.24	3.1	0.1	160	390	3.3	26	59	0.087	13	2.6	46	624	24.1	7.13	3.32	155	4.55
6/12/2014	200	100	0.1	0.39	4.1	1	160	370	1.2	28	63	0.05	14	2.7	48	618	24	7.26	3.31	26.9	2.51
6/18/2014	200	99	0.1	0.39	4	1	170	350	1.4	28	61	0.059	13	2.6	46	619	24.1	7.33	2.87	49.1	2.46
6/25/2014	210	99	0.1	0.39	4.1	1	170	360	1.3	26	56	0.085	12	2.5	41	625	24.2	7.45	1.43	-98.2	2.76
7/2/2014	200	100	0.1	0.41	4	1	170	340	1.8	26	60	0.19	13	2.5	45	622	24.2	7.44	2.08	-120	2.49
7/10/2014	200	100	0.1	0.43	4.8	1.3	170	340	1.5	31	68	0.052	15	3	53	617	24.2	7.24	0.38	28.9	2.06
7/21/2014	190	110	0.1	0.39	4	1	160	370	1.2	27	59	0.076	13	2.6	44	665	24	7.47	0.9	-72.3	2.69
8/4/2014	210	100	0.1	0.43	3.8	1	170	360	1.8	26	54	0.05	11	2.2	38	652	24.2	7.47	0.1	-108.1	2.31
8/8/2014	210	100	0.1	0.42	3.9	1	170	400	1.7	26	53	0.053	11	2.2	38	656	24.2	7.48	0.09	-90.9	2.12
8/14/2014	210	100	0.1	0.4	3.8	1	170	360	1.6	32	72	0.04	16	3	54	663	24.3	7.5	3.77	-93	2.89
8/20/2014	210	100	0.1	0.39	3.6	1	170	380	1.9	27	62	0.058	13	2.4	46	658	24.1	7.49	0.09	-97	1.89
8/26/2014	210	110	0.1	0.42	3.7	1	170	380	1.5	26	61	0.033	13	2.9	46	659	24.1	7.49	0.62	-53.5	1.86
9/3/2014	210	100	0.1	0.4	3.6	1	180	360	1.6	25	57	0.033	12	2.7	43	655	23.9	7.51	0.11	-93.3	1.78
9/11/2014	210	100	0.1	0.44	3.8	1	170	390	1.6	30	67	0.048	15	2.9	51	655	24.1	7.53	0.14	-84.9	4.86
9/18/2014	210	100	0.1	0.39	3.4	1	170	380	1.6	32	73	0.052	15	2.9	54	652	23.9	7.53	0.06	-87.5	2.21
9/25/2014	210	100	0.1	0.42	4	1	170	340	1.7	32	74	0.037	16	2.7	56	651	24	7.53	0.05	-107.4	1.59
10/1/2014	210	95	0.1	0.36	3.4	1	170	370	1.6	29	62	0.051	13	2.4	46	654	24	7.54	0.37	-40.4	6.55

Table 6
LZAMW-2 Water-Quality Data
City of Clearwater Groundwater Replenishment

	Bicarb Alk	Chloride	Nitrate	Fluoride	Sulfate	Sulfide	Total Alk	TDS	TOC	Arsenic	Calcium	Iron	Mg	K	Sodium	Cond.	Temp.	pH	DO	ORP	Turb
11/7/2013	180	340	0.01	N.A.	15	5.1	180	780	6.1	1.3	84	0.02	22	4.7	190						
4/1/2014	180	270	0.01	0.15	21	3.4	180	760	3.1	1	81	0.02	20	4.7	180	1418	24.4	7.38	0.38	-270.4	0.3
4/9/2014	170	310	0.01	0.23	21	4.6	170	780	2.9	1.9	78	0.02	20	4.6	180	1395	24.3	7.32	0.36	-209.4	0.4
4/16/2014	180	340	0.01	0.14	12	4.6	180	810	3	1.7	86	0.02	22	4.8	180	1399	24.3	7.3	0.49	-205.2	0.4
4/23/2014	180	330	0.01	0.16	19	3.6	180	770	4.3	2.1	80	0.02	21	4.8	180	1427	24.5	7.38	0.34	-222	0.3
5/1/2014	170	320	0.01	0.17	23	3.6	170	800	4	1.7	79	0.02	21	4.8	190	1408	24.6	7.33	0.33	-200.2	0.6
5/6/2014	180	350	0.01	0.2	19	4	180	800	3.4	1.2	80	0.044	21	4.8	180	1422	24.6	7.31	0.24	-122.6	0.3
5/14/2014	180	310	0.01	0.18	21	5.4	180	860	4.1	0.93	85	0.02	21	5.2	180	1423	24.7	7.33	0.83	-193.3	0.3
5/21/2014	180	360	0.01	0.19	27	4.4	180	740	3.4	2	81	0.02	20	4.7	160	1436	24.7	7.27	0.31	-219.1	0.13
5/30/2014	170	300	0.01	0.13	16	4.8	170	830	3.7	2.4	84	0.02	21	5	190	1422	24.7	7.3	0.28	-110.7	0.98
6/4/2014	170	310	0.01	0.077	13	3.8	170	790	4	1.6	82	0.02	20	4.9	180	1427	24.8	7.17	0.53	-83.5	0.26
6/12/2014	210	340	0.1	0.2	26	7.1	170	770	1.8	1.3	79	0.033	19	4.6	170	1418	24.9	7.3	0.38	-159.1	0.2
6/18/2014	220	350	0.1	0.2	16	6	180	750	1.9	1.3	78	0.033	21	4.7	180	1419	24.8	7.4	0.37	-154.7	0.18
6/25/2014	220	340	0.1	0.21	27	7.2	180	740	1.9	1.3	80	0.033	19	4.7	160	1428	24.7	7.48	0.51	-210.6	0.12
7/2/2014	220	350	0.1	0.21	27	6.8	180	720	2.5	1.3	88	0.033	22	5.2	190	1429	24.8	7.45	0.43	-216.3	0.11
7/10/2014	220	350	0.1	0.23	30	6.9	180	690	2	1.3	98	0.033	24	5.9	210	1416	24.7	7.29	0.28	-159.9	0.21
7/21/2014	210	360	0.1	0.2	18	8.1	170	810	1.9	1.3	79	0.033	19	4.8	160	1515	24.5	7.45	0.16	-233.2	0.23
8/4/2014	220	350	0.1	0.23	17	8.1	180	790	2.4	1.3	72	0.033	17	4.1	140	1507	24.7	7.46	0.1	-203.5	0.11
8/8/2014	230	360	0.1	0.22	17	7.4	190	900	2.5	1.3	75	0.033	17	4.4	150	1518	24.9	7.46	0.08	-174.6	0.16
8/14/2014	220	350	0.1	0.21	18	7.1	180	840	2.3	1.3	97	0.033	24	5.6	210	1528	24.8	7.48	0.07	-185.1	1.18
8/20/2014	230	340	0.1	0.21	26	7.3	190	810	2.6	1.3	87	0.033	21	4.7	180	1522	24.7	7.47	0.06	-172.6	0.12
8/26/2014	230	350	0.1	0.22	26	6.9	190	660	2.2	1.3	86	0.033	21	5.6	180	1523	24.7	7.49	0.07	-161.9	0.06
9/3/2014	230	350	0.1	0.21	26	10	190	730	2.2	1.3	79	0.033	20	5.3	170	1521	24.6	7.5	0.08	-190.1	0.43
9/11/2014	230	360	0.1	0.24	17	11	190	820	2.3	1.3	94	0.033	23	5.6	200	1519	24.7	7.52	0.1	-178.5	2.86
9/18/2014	230	340	0.1	0.2	16	7.7	190	860	2.2	1.3	110	0.033	26	5.9	220	1508	24.5	7.51	0.06	-210.9	0.19
9/25/2014	230	350	0.1	0.31	18	7.5	190	690	2.3	1.3	94	0.033	23	5.1	200	1511	24.6	7.53	0.05	-188.9	0.18
10/1/2014	230	330	0.1	0.19	16	7.5	190	820	2.4	1.3	94	0.033	22	5.2	190	1518	24.6	7.52	0.07	-127.8	3.81

APPENDIX A

FDEP Test Injection Well Construction Permit



Florida Department of
Environmental Protection
Southwest District Office
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926

September 25, 2012

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

Robert S. Fahey, P.E.
Utilities Engineering Manager
City of Clearwater Public Utilities
1650 N. Arcturas Avenue, Building C
Clearwater, Florida 33765
robert.fahey@myclearwater.com

PA File No. 0310013-001-UC/5R
City of Clearwater Northeast WRF
Class V, Group 2, Recharge Test Well
System, RW-1
Pinellas County

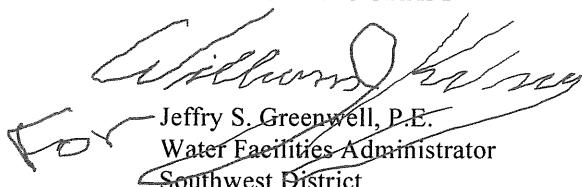
NOTICE OF PERMIT

Enclosed is PA File No. 0310013-001-UC/5R for the construction and testing of one Class V, Group 2, Recharge Test Well System, RW-1, and associated monitor wells, in order to obtain hydrologic and geologic information to determine the feasibility aquifer recharge into the Upper Floridan aquifer with reclaimed water meeting all full treatment and disinfection requirements of Rule 62-610.563(3), Florida Administrative Code, issued pursuant to Section 403.087(1), Florida Statutes. Any party to this Order (Permit) has the right to seek judicial review of the Permit pursuant to Section 120.68, Florida Statutes, by the filing of a Notice of Appeal pursuant to Rule 9.110, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000, and by filing a copy of the Notice of Appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The Notice of Appeal must be filed within 30 days from the date this Notice is filed with the Clerk of the Department.

Executed in Hillsborough County, Florida.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

UNDERGROUND INJECTION CONTROL PROGRAM


Jeffry S. Greenwell, P.E.
Water Facilities Administrator
Southwest District

CERTIFICATE OF SERVICE

The undersigned duly designated deputy clerk hereby certifies that this Notice of Permit and all copies were mailed before the close of business on September 25, 2012 to the persons listed below.

FILING AND ACKNOWLEDGMENT

FILED on this date, pursuant to § 120.52(11), Florida Statutes, with the designated Department clerk, receipt of which is hereby acknowledged.

Andrea Butler 9/25/12
Clerk Date

Copies Furnished To:

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Florida Department of
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Southwest District Office
13051 North Telecom Parkway
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Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

**STATE OF FLORIDA
UNDERGROUND INJECTION CONTROL
CLASS V CONSTRUCTION AND TESTING PERMIT**

PERMITTEE

Robert S. Fahey, P.E.
Utilities Engineering Manager
City of Clearwater Public Utilities
1650 N. Arcturas Avenue, Building C
Clearwater, Florida 33765
robert.fahey@mclearwater.com

PERMIT/CERTIFICATION

PA File No.: 0310013-001-UC/5R
Facility ID No.: FL0128937
WACS ID No.: 100417
Date of Issuance: September 25, 2012
Date of Expiration: September 24, 2017
Project: Class V, Group 2, Recharge Test
Well System, RW-1
Permit Processor: Bill Kelsey, P.G.

FACILITY

City of Clearwater Northeast WRF
3290 State Road 580
Clearwater, FL 34695

PROJECT LOCATION

County: Pinellas
Latitude: 28° 01' 45.48" N
Longitude: 82° 42' 11.05" W

This permit is issued under the provisions of Chapter 403, Florida Statutes, and Rules 62-4, 62-520, 62-528, 62-550, and 62-610 of the Florida Administrative Code. The above-named permittee is hereby authorized to perform the work or operate the facility shown on the application and other documents attached hereto or on file with the Department and made a part hereof, specifically described as follows:

TO CONSTRUCT AND TEST: A Recharge Test Well, RW-1, in order to obtain hydrologic and geologic information to determine the feasibility of aquifer recharge into the Upper Floridan aquifer with reclaimed water meeting all full treatment and disinfection requirements of Rule 62-610.563(3), Florida Administrative Code. Under this permit, the well will be tested for a period of six months with source water with a low dissolved oxygen content (<2.0 mg/L). This permit does not authorize the injection of reclaimed wastewater effluent.

Under this permit, RW-1 will be constructed with an 18-inch diameter steel surface casing to ± 85 feet below land surface (bls); a 12-inch diameter steel casing to ±220 feet bls; and an open hole to ±330 feet bls. Construction of three monitor wells is also included: Upper Zone Monitor Wells UZMW-1 and UZMW-2, completed to a depth of ±150 feet bls, and Lower Zone Monitor Well LZMW-1 to a depth of ±330 feet bls.

IN ACCORDANCE WITH: The Application to Construct DEP Form No. 62-528.900(1) submitted by the City of Clearwater Public Utilities with sufficient fee on February 8, 2012, with accompanying supporting documentation, and additional information submitted through April 5, 2012.

TO SERVE: City of Clearwater Northeast Water Reclamation Facility.

1. General Requirements

- a. This permit approval is based upon evaluation of the data contained in the permit application and the plans and/or specifications submitted in support of the application. It is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications or conditions of this permit may constitute grounds for revocation and enforcement action. Any changes in the plans and/or technical specifications, except as provided elsewhere in this permit, must be approved by the Department before being implemented.
- b. This permit does not relieve the permittee from liability for harm to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefrom; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.
- c. If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:
 - 1) A description of and cause of noncompliance; and
 - 2) The period of noncompliance, including dates and times; or, if not corrected the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent the recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.
- d. No underground injection is allowed that causes or allows movement of fluid into an underground source of drinking water if such fluid movement may cause a violation of any primary drinking water standard or may otherwise adversely affect the health of persons.
- e. All injected water must meet federal primary drinking water standards for total coliform, which must be no greater than 4 cfu per 100/mL at all times in the injected water in accordance with Rules 62-520.420(1) F.A.C.
- f. Prior to the beginning of recharge, a complete analysis of primary and secondary drinking water standards as listed in Rule 62-550.310 and 62-550.320 F.A.C. of the source water to be used during the test period, shall be submitted to the members of the TAC for review. The following parameters may be omitted: dioxin, asbestos, acrylamide and epichlorohydrin.
- g. The permittee is reminded of the necessity to comply with the pertinent regulations of any other regulatory agency, as well as any county, municipal, and federal regulations applicable to the project. This permit should not be construed to imply compliance with the rules and regulations of other regulatory agencies.
- h. The issuance of this Class V recharge well construction and testing permit does not obligate the Department to permit its operation, unless the recharge well, monitoring system and surface appurtenances qualify for an operation permit.

i. Class V Recharge and Monitoring Well Specifications

RW-1

Casing Diameter [O.D.] / Type	Depth (bls)	Formation
18" Steel	± 85'	Undifferentiated Surficial & Arcadia Formation
12" Steel	±220"	Tampa Member & Suwannee Limestone
Open Hole	±220-330'	Suwannee Limestone

UZMW-1 & UZMW-2

Casing Diameter [O.D.] / Type	Depth (bls)	Formation
12" Steel	±85'	Undifferentiated Surficial & Arcadia Formation
6" Schedule 40 PVC Certi-Lock	±95'	Tampa Member & Suwannee Limestone
Open Hole	±95-150'	Suwannee Limestone

LZMW-2

Casing Diameter [O.D.] / Type	Depth (bls)	Formation
12" Steel	±85'	Undifferentiated Surficial & Arcadia Formation
6" Schedule 40 PVC Certi-Lock	±220'	Suwannee Ls
Open Hole	±220-330'	Suwannee Ls

LZMW-1 (Existing ASR/SZMW well to be utilized)

Casing Diameter [O.D.] / Type	Depth (bls)	Formation
18" Steel / 56'		Undifferentiated Surface Clastics & Arcadia Fm
12" Steel / 209"		Tampa Mbr & Suwannee Ls
	209-275'	Suwannee Ls

2. Site Requirements

- a. The disposal of drilling fluids, cuttings, formation water or waste shall be in a sound environmental manner that avoids violation of surface and ground water quality standards. The disposal method shall be approved by the Department prior to start of construction.
- b. Hurricane Preparedness - Upon the issuance of a "Hurricane Watch" by the National Weather Service, the preparations to be made include, but are not necessarily limited to, the following:
 - 1) Secure all on-site salt and other stockpiled additive materials to prevent surface and/or ground water contamination.

- 2) Properly secure drilling equipment and rig(s) to prevent damage to well(s) and on-site treatment process equipment.
- c. The four water table monitoring wells surrounding the recharge well drilling pad shall be sampled and analyzed prior to drilling the recharge well and then weekly thereafter. Sampling shall include specific conductance, pH, chloride temperature, and water level.
- d. If historical or archaeological artifacts, such as Indian canoes, are discovered at any time within the project site, the permittee shall notify the Department's Southwest District Office and the Bureau of Historic Preservation, Division of Archives, History and Records Management, R.A. Gray Building, Tallahassee, Florida 32301, telephone (850) 487-2073.

3. Quality Assurance/Quality Control Requirements

- a. A professional engineer registered pursuant to Chapter 471, Florida Statutes, shall be retained throughout the construction period to be responsible for the construction operation and to certify the application, specifications, completion report and other related documents. The Department shall be notified immediately of any change of engineer.
- b. Where required by Chapter 471 (P.E.) or Chapter 492 (P.G.), Florida Statutes, applicable portions of permit applications and supporting documents that are submitted to the Department for public record shall be signed and sealed by the professional(s) who approved or prepared them.
- c. Continuous on-site supervision by qualified personnel (engineer and/or geologist, as applicable) is required during all testing and geophysical logging operations.
- d. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.
- e. All reports and other submittals required to comply with this permit shall be signed by a person authorized under Rules 62-528.340(1) or (2), F.A.C.
- f. In accordance with Rule 62-528.340(4), F.A.C., all reports shall contain the following certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

4. Construction and Testing Requirements

- a. The wells authorized under this permit shall be constructed by a Florida licensed water well contractor. Prior to the commencement of any work, the name of the Florida-licensed driller(s) supervising the drilling operations and the driller's registration number shall be submitted to the Department. The permittee or the engineer of record shall provide the Department with copies of all required federal, state or local permits prior to drilling the well.
- b. If any problem develops that may seriously hinder compliance with this permit, construction progress or good construction practice, the Department shall be notified immediately. The Department may require a detailed written report describing what problems have occurred, the remedial measures applied to assure compliance and the measures taken to prevent recurrence of the problem.
- c. Department review and approval is required prior to the intermediate and final casing seat selection. Annotated copies of geophysical logs, lithologic descriptions and logs and water quality data (from drilling and packer tests) must be submitted to the Department in support of the proposed intermediate and final casing seat selection.
- d. The cementing program, as required in Rule 62-528.410(5), F.A.C., shall be submitted to the Department and the Southwest Florida Water Management District for review. Cementing operations shall not commence prior to approval being granted.
- e. A natural background ground water quality sample shall be obtained from completed Recharge Test Well, RW-1, for primary and secondary standards (Rules 62-550.310 and .320, F.A.C.), excluding asbestos, dioxin, acrylamide and epichlorohydrin. The sample shall also be tested for municipal wastewater indicator parameters (Attachment A). "Natural background" means the condition of waters in the absence of man-induced alterations based on the best scientific information available to the Department (Rule 62-520.200(12), F.A.C.). The samples shall be taken after final completion and clearance of drilling fluids from the well.
- f. Department review and approval is required prior to the final casing seat selection in RW-1, UZMW-1, UZMW-2, and LZMW-2. Annotated copies of geophysical logs, lithologic descriptions and logs and water quality data (from drilling and packer tests) must be submitted to the Department in support of the proposed intermediate and final casing seat selection.
- g. All resistivity,, sonic, and caliper geophysical logs run on the pilot holes of the recharge and monitor wells shall be submitted with scales of one inch equals one hundred feet (1"=100'), two inches equals hundred feet (2"=100'), and five inches equals one hundred feet (5"=100').

5. Reporting Requirements

- a. This project shall be monitored by the Department with the assistance of the Technical Advisory Committee (TAC). The permittee shall submit all correspondence required by and relative to this permit concurrently to each member of the TAC. Such correspondence includes but is not limited to reports, schedules, analyses and geophysical logs required by the Department under the terms of this permit. The permittee is not required to provide specific correspondence to any TAC member who

submits to the permittee a written request to be omitted as a recipient of specific correspondence.
The TAC consists of representatives from these agencies:

Florida Department of Environmental Protection
Southwest District - UIC Program
13051 North Telecom Parkway
Temple Terrace, Florida 33637-0926
bill.kelsey@dep.state.fl.us
rommy.laheraaument@dep.state.fl.us

Florida Department of Environmental Protection
Underground Injection Control Program
2600 Blair Stone Road, MS 3530
Tallahassee, Florida 32399-2400
joe.haberfeld@dep.state.fl.us
george.heuler@dep.state.fl.us

Southwest Florida Water Management District
Well Construction Permitting
2379 Broad Street
Brooksville, Florida 34604-6899
davidn.arnold@swfwmd.state.fl.us
don.ellison@swfwmd.state.fl.us

- b. During the construction period allowed by this permit, daily progress reports shall be submitted to the Department and the Technical Advisory Committee each week. The reporting period shall run for seven (7) days and reports shall be mailed or emailed within 48 hours of the last day of the reporting period. The report shall include, but is not limited to, the following:
 - 1) A cover letter summarizing each week's activities and a projection of activities for the next reporting period;
 - 2) Description of daily footage drilled by diameter of bit or size of hole opener or reamer being used;
 - 3) Description of work during installation and cementing of casing, including amounts of casing and cement used, amount of salt and depth used;
 - 4) Lithologic log with cuttings description, formation and depth encountered;
 - 5) Collection of drilling cuttings every 10 feet and at every formation change;
 - 6) Water quality analyses;
 - 7) Description of work and type of testing accomplished including geophysical logging and pumping tests;
 - 8) Description of any construction problems that developed during the reporting period and current status;
 - 9) Copies of the driller's log are to be submitted with the weekly summary; and
 - 10) Description of any deviation survey conducted; and
 - 11) Details of any packer tests, pump tests and core analyses.

- c. Within 30 days of completion of Recharge Test Well, RW-1, the permittee or the authorized representative shall submit to the Department the following information:
 - 1) Certification of Class V Well Construction Completion, DEP Form 62-528.900(4);
 - 2) A copy of the Southwest Florida Water Management District (SWFWMD) Application to Construct, Repair, Modify or Abandon a Well (Form 41.10-410(1) Rev. 4/95); and
 - 3) A copy of the SWFWMD Well Completion Report (Form 41.10-410(2) Rev. 6/95).
- d. Upon completion of construction and testing, a final engineering report shall be submitted to the Department and the TAC. The report shall include, but not be limited to:
 - 1) All information and data collected under Rules 62-528.605, 62-528.615, and 62-528.635, F.A.C., with appropriate interpretations.
 - 2) A complete set of as-built engineering drawings (Florida-licensed Professional Engineer, signed and sealed).
 - 3) Mill certificates for the casings shall be included in the report.
 - 4) To the extent possible, the transmissivity of the injection zone and the maximum capacity within safe pressure limits shall be estimated.

The cover letter for the final engineering report shall be mailed to the U. S. EPA, Region 4, UIC Program, 61 Forsythe St. SW, Atlanta, GA 30303-8909.

- e. Upon completion of analysis of cores and sample cuttings recovered during the construction of wells covered by this permit (when no longer needed by the well owner), the permittee shall contact the Geological & Geotechnical Data Acquisition Program of the Florida Geological Survey (FGS) to arrange for the transfer of the cores and cuttings. The FGS shall also be contacted to arrange for the collection of 100 ml water samples, with nitric acid preservative for metal analysis, at the end of each packer test (where sufficient water is available) and aquifer background sample collection events.
- f. All cores, cuttings, and water samples shall be shipped to the Florida Geological Survey, Geological & Geotechnical Data Acquisition Program, 3915 Commonwealth Boulevard, Tallahassee, Florida 32399. All cores and samples shall clearly identify the site name, well name/number, depths of samples/cores, and the latitude/longitude location of the well(s) using the form contained as Attachment B to this permit.
- g. Prior to start of the recharge test, a detailed design of the source water treatment process and piping design shall be submitted to the TAC for approval.
- h. The recharge test will be performed for approximately six months at a continuous recharge rate of 300 gpm. The duration and volumes of this test may be adjusted with written concurrence from the Department.
- i. The recharge test well system shall be monitored in accordance with Rule 62-528.615, F.A.C. The monitoring parameters listed below shall be analyzed and reported for each monitor well listed above. All samples must be collected and analyzed in accordance with the quality assurance requirements of Chapter 62-160, F.A.C. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity:

Parameter	Units	Recording Frequency	Frequency of Analysis		
			RW-1	UZMW-1 & 2	LZMW-1 & 2
Flow Rate, max.	gpm	Continuous	a		
Flow Rate, min.	gpm	Continuous	a		
Flow Rate, avg.	gpm	Continuous	a		
Total Volume	mg	Daily/Monthly			
Injection Pressure, max.	psi	Continuous	a		
Injection Pressure, min.	psi	Continuous	a		
Injection Pressure, avg.	psi	Continuous	a		
Parameter	Units	Recording Frequency	Frequency of Analysis		
			RW-1	UZMW-1 & 2	LZMW-1 & 2
Water Level, max.	feet	Continuous		a	a
Water Level, min.	feet	Continuous		a	a
Water Level, avg.	feet	Continuous		a	a
Total Alkalinity	mg/L		W	W	W
Bicarbonate	mg/L		W	W	W
Total Organic Carbon	mg/L		W	W	W
Chloride	mg/L		W	W	W
Nitrate	mg/L		W	W	W
Sulfate	mg/L		W	W	W
Total Dissolved Solids	mg/L		W	W	W
Arsenic	µg/L		W	W	W
Calcium	mg/L		W	W	W
Iron	mg/L		W	W	W
Potassium	mg/L		W	W	W
Magnesium	mg/L		W	W	W
Sodium	mg/L		W	W	W
Iron, Total	mg/L		W	W	W
Iron, Dissolved	mg/L		W	W	W
Total Sulfide	mg/L		W	W	W
Dissolved Oxygen	mg/L		W	W	W
ORP	mV		W	W	W
pH	std.		W	W	W
Specific Conductivity	µmhos/c		W	W	W
Temperature	°C		W	W	W
Turbidity	NTU		W	W	W

W - Weekly;

a - Operational data reporting for flows, pressures and water levels: daily max, min and average from continuous reporting; monthly max, min, and average (calculated from daily averages).

- j. The permittee shall submit monthly operating reports (MORs) during operational testing which contain the recharge and monitoring well data required by this permit (Condition 5.h.). The report shall include:
- 1) A cover page summarizing both the current status of operational testing and all monthly activities, and includes the certification and signature required in Condition 3.f.;
 - 2) Operational and water quality data in a tabular format. Standardized forms for the project may be provided by the Department;
 - 3) Laboratory pages and supporting documentation.

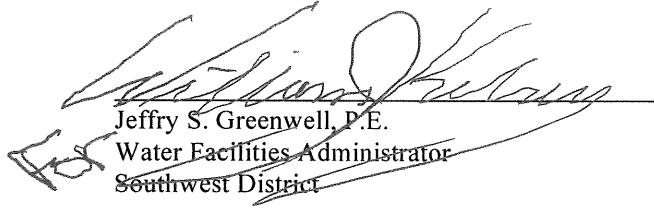
The report shall be submitted no later than the last day of the month immediately following the month of record. The MOR shall be submitted *via* direct electronic mail (e-mail) to UIC Staff at the Southwest District (SWD_UIC@dep.state.fl.us) and Tallahassee Offices (james.alexander@dep.state.fl.us) in Adobe™ (pdf) format. A hard copy of only the tabulated data shall be sent to the Department of Environmental Protection, UIC Program, Mail Station 3530, 2600 Blair Stone Road, Tallahassee, FL 32399-2400.

- k. Following the recharge test with potable water treated with the proposed treatment methodology for dissolved oxygen removal, the permittee shall prepare and submit a final report describing the test procedures and results for submittal to the TAC.

6. General Conditions

The permittee shall be aware of and operate under General Conditions Rule 62-528.307(1)(a) through (x) and 62-528.307(2)(a) through (e), F.A.C., contained in Attachment C of this permit. General Conditions are binding upon the permittee and enforceable pursuant to Chapter 403, Florida Statutes.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION



Jeffry S. Greenwell, P.E.
Water Facilities Administrator
Southwest District

Attachment A: Municipal Wastewater Indicator Parameters for Ground Water Monitoring

Attachment B: FDEP Underground Injection Control Program Sample Form
(Cores/Cuttings/Formation Water)

Attachment C: Rules 62-528.307(1)(a) through (x) and 62-528.307(2)(a) through (e), F.A.C.

ATTACHMENT A
CITY OF CLEARWATER PUBLIC UTILITIES PA FILE NO. 0310013-001-UC/5R

**MUNICIPAL WASTEWATER INDICATOR PARAMETERS
FOR GROUND WATER MONITORING**

Inorganics

Ammonia
Nitrogen (Organic)
Total Kjeldahl Nitrogen
Total Phosphorus (Phosphate)

Volatile Organics

Chloroethane
Chloroform
para-Dichlorobenzene (1,4 Dichlorobenzene)
1,2-Dichloroethylene (cis-1,2-Dichloroethylene or trans-1,2-Dichloroethylene)

Base/Neutral Organics

Anthracene
Butylbenzylphthallate
Dimethylphthallate
Naphthalene
Phenanthrene

Pesticides and PCBs

Aldrin
Dieldrin

Acid Extractables

2-Chlorophenol
Phenol
2,4,6-Trichlorophenol

Other

Conductivity
Biochemical Oxygen Demand
Chemical Oxygen Demand
Temperature

ATTACHMENT B
CITY OF CLEARWATER PUBLIC UTILITIES PA FILE NO. 0310013-001-UC/5R

**FDEP Underground Injection Control Program Sample Form
(Cores/Cuttings/Formation Water)**

Well Name:				
Well Type (Circle One) Class I Class V Exploratory Monitoring				
Date Collected:		Date Sent to FGS:		
Sample Type (Circle One) Core Cuttings Formation Water				
Preservative Used - If Formation Water Sample - (Circle One) Nitric N/A Other (Describe)				
Datum and Elevation:		Sample Interval:		
Elevation Method (Circle One) Survey USGS Quadrangle Other (Describe)				
Sample Interval Drilling Method (Circle One) Reverse Air Mud Rotary Sonic/Acoustic Other (Describe)				
Well Coordinates ° ' " N / ° ' " W				
Method (Circle One) AGPS (Hand Held) DGPS (GPS Survey) Map Derived				
FDEP Permit Number:				
Facility Name:				
Permittee (Owner):				
Facility Address:				
Drilling Company:		Lead Driller:		
Project Geologist:		Consulting Company:		

ATTACHMENT C
CITY OF CLEARWATER PUBLIC UTILITIES PA FILE NO. 0310013-001-UC/5R

62-528.307 Underground Injection Control: General Conditions for Permits.

The following general conditions shall be included in each of the respective types of underground injection control permits.

(1) All UIC Permits.

(a) The terms, conditions, requirements, limitations and restrictions set forth in this permit are "permit conditions" and are binding and enforceable pursuant to section 403.141, F.S.

(b) This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviation from the approved drawings, exhibits, specifications, or conditions of this permit may constitute grounds for revocation and enforcement action.

(c) As provided in subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit that may be required for other aspects of the total project which are not addressed in this permit.

(d) This permit conveys no title to land, water, does not constitute State recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title.

(e) This permit does not relieve the permittee from liability for harm to human health or welfare, animal, or plant life, or property caused by the construction or operation of this permitted source, or from penalties therefrom; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department.

(f) The permittee shall properly operate and maintain the facility and systems of treatment and control (and related appurtenances) that are installed and used by the permittee to achieve compliance with the conditions of this permit, or are required by Department rules. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to achieve compliance with the conditions of the permit and when required by Department rules.

(g) The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, upon presentation of credentials or other documents as may be required by law and at reasonable times, access to the premises where the permitted activity is located or conducted to:

1. Have access to and copy any records that must be kept under conditions of this permit;
2. Inspect the facility, equipment, practices, or operations regulated or required under this permit; and
3. Sample or monitor any substances or parameters at any location reasonably necessary to assure compliance with this permit or Department rules.

Reasonable time will depend on the nature of the concern being investigated.

(h) If, for any reason, the permittee does not comply with or will be unable to comply with any condition or limitation specified in this permit, the permittee shall immediately provide the Department with the following information:

1. A description of and cause of noncompliance; and
2. The period of noncompliance, including dates and times; or, if not corrected the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate, and prevent the recurrence of the noncompliance. The permittee shall be responsible for any and all damages which may result and may be subject to enforcement action by the Department for penalties or for revocation of this permit.

(i) In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data and other information relating to the construction or operation of this permitted source

which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except where such use is proscribed by sections 403.111 and 403.73, F.S. Such evidence shall only be used to the extent it is consistent with the Florida Rules of Civil Procedure and appropriate evidentiary rules.

(j) The permittee agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules.

(k) This permit is transferable only upon Department approval in accordance with rules 62-4.120 and 62-528.350, F.A.C. The permittee shall be liable for any non-compliance of the permitted activity until the transfer is approved by the Department.

(l) This permit or a copy thereof shall be kept at the work site of the permitted activity.

(m) The permittee shall comply with the following:

1. Upon request, the permittee shall furnish all records and plans required under Department rules. During enforcement actions, the retention period for all records shall be extended automatically unless the Department determines that the records are no longer required.

2. The permittee shall hold at the facility or other location designated by this permit records of all monitoring information (including calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation) required by the permit, copies of all reports required by this permit, and records of all data used to complete the application for this permit. These materials shall be retained at least three years from the date of the sample, measurement, report, or application unless otherwise specified by Department rule.

3. Records of monitoring information shall include:

- a. the date, exact place, and time of sampling or measurements;
- b. the person responsible for performing the sampling or measurements;
- c. the dates analyses were performed;
- d. the person responsible for performing the analyses;
- e. the analytical techniques or methods used;
- f. the results of such analyses.

4. The permittee shall furnish to the Department, within the time requested in writing, any information which the Department requests to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit.

5. If the permittee becomes aware that relevant facts were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be corrected promptly.

(n) All applications, reports, or information required by the Department shall be certified as being true, accurate, and complete.

(o) Reports of compliance or noncompliance with, or any progress reports on, requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each scheduled date.

(p) Any permit noncompliance constitutes a violation of the Safe Drinking Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

(q) It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

(r) The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

(s) This permit may be modified, revoked and reissued, or terminated for cause, as provided in 40 C.F.R. sections 144.39(a), 144.40(a), and 144.41 (1998). The filing of a request by the permittee for a permit modification, revocation or reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

(t) The permittee shall retain all records of all monitoring information concerning the nature and composition of injected fluid until five years after completion of any plugging and abandonment procedures specified under rule 62-528.435, F.A.C. The permittee shall deliver the records to the Department office that issued the permit at the conclusion of the retention period unless the permittee elects to continue retention of the records.

(u) All reports and other submittals required to comply with this permit shall be signed by a person authorized under rules 62-528.340(1) or (2), F.A.C. All reports shall contain the certification required in rule 62-528.340(4), F.A.C.

(v) The permittee shall notify the Department as soon as possible of any planned physical alterations or additions to the permitted facility. In addition, prior approval is required for activities described in rule 62-528.410(1)(h).

(w) The permittee shall give advance notice to the Department of any planned changes in the permitted facility or injection activity which may result in noncompliance with permit requirements.

(x) The permittee shall report any noncompliance which may endanger health or the environment including:

1. Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or

2. Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause, the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) All UIC Construction Permits.

(a) If injection is to continue beyond the expiration date of this permit the permittee shall apply for, and obtain an operation permit. If necessary to complete the two-year operational testing period, the permittee shall apply for renewal of the construction permit at least 60 days prior to the expiration date of this permit.

(b) Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures.

(c) The injection system shall be monitored in accordance with rules 62-528.425(1)(g) and 62-528.430(2), F.A.C. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

(d) The permittee shall submit monthly to the Department the results of all injection well and monitor well data required by this permit no later than the last day of the month immediately following the month of record. The results shall be sent to the Department of Environmental Protection, [Name]District Office, [Address]. A copy of this report shall also be sent to the Department of Environmental Protection, Underground Injection Control Program, MS 3530, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.

(e) Operational testing. Prior to operational testing, the permittee shall comply with the requirements of rule 62-528.450(3)(a),(b), and (c), F.A.C.

(f) Mechanical Integrity.

1. Injection is prohibited until the permittee affirmatively demonstrates that the well has mechanical integrity. Prior to operational testing the permittee shall establish, and thereafter maintain the mechanical integrity of the well at all times.

2. If the Department determines that the injection well lacks mechanical integrity, written notice shall be given to the permittee.

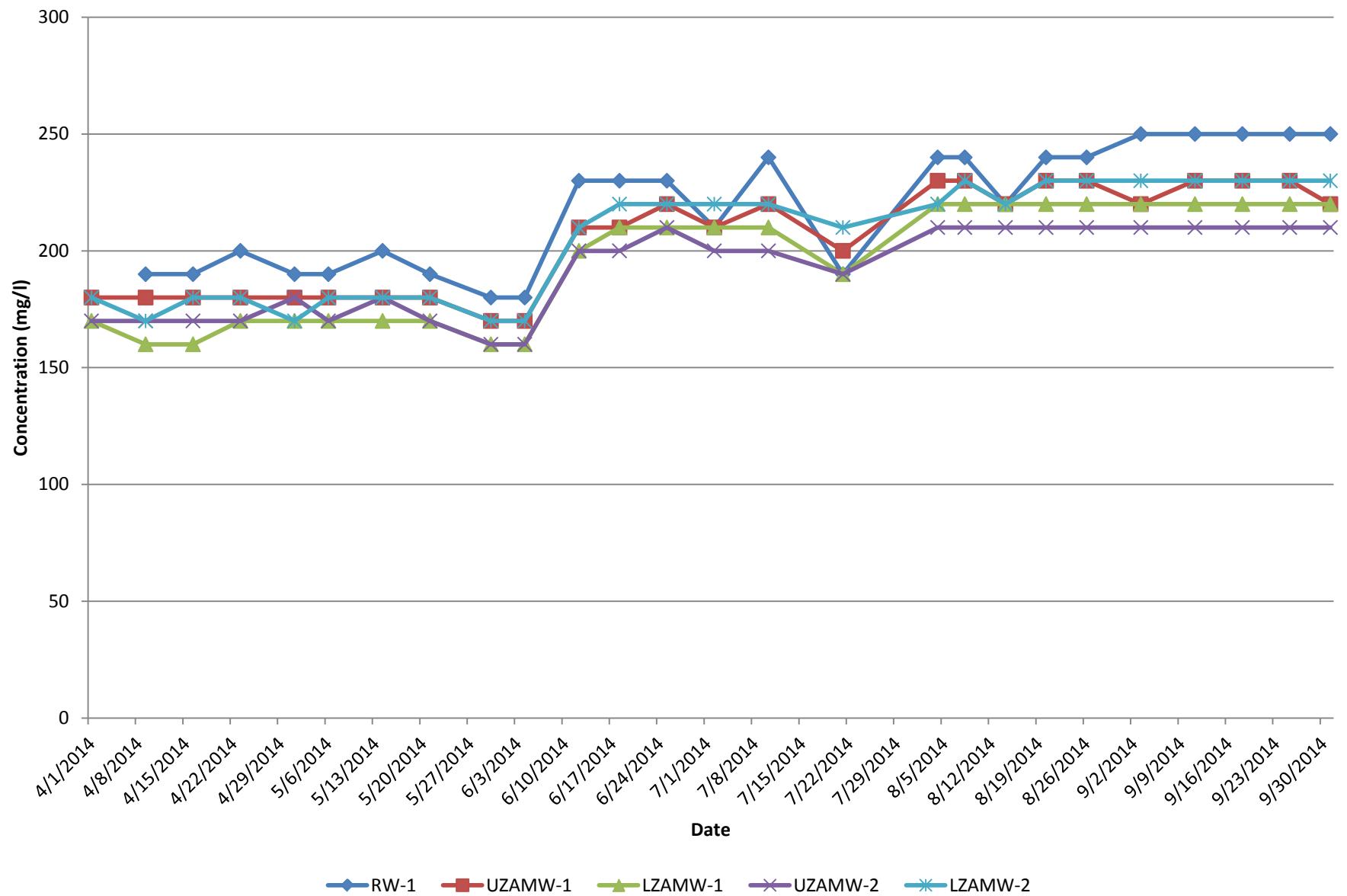
3. Within 48 hours of receiving written notice that the well lacks mechanical integrity, unless the Department requires immediate cessation of injection, the permittee shall cease injection into the well unless the Department allows continued injection pursuant to subparagraph 4 below.

4. The Department shall allow the permittee to continue operation of a well that lacks mechanical integrity if the permittee has made a satisfactory demonstration that fluid movement into or between underground sources of drinking water is not occurring.

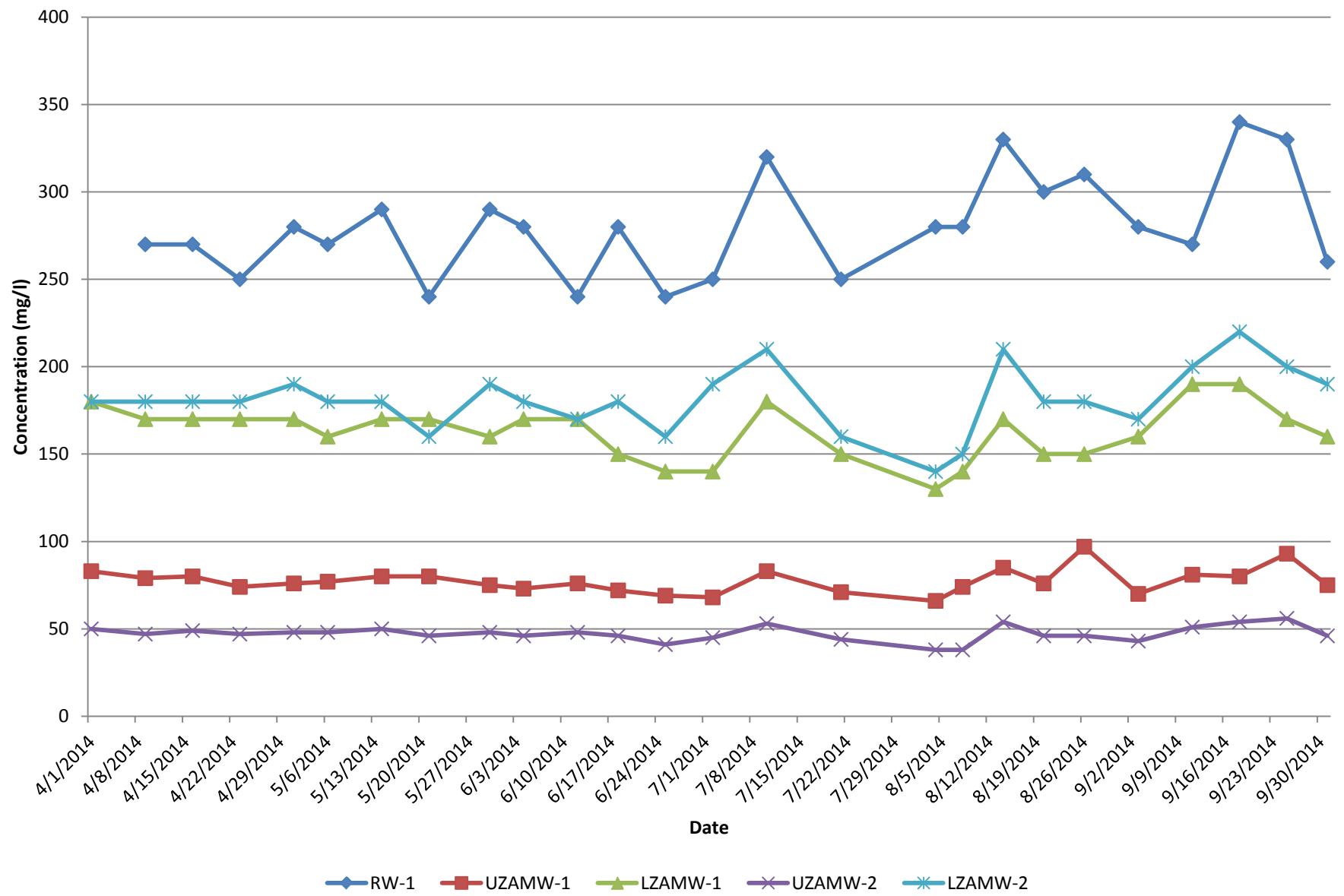
APPENDIX B

Recharge Test Water-Quality Graphs

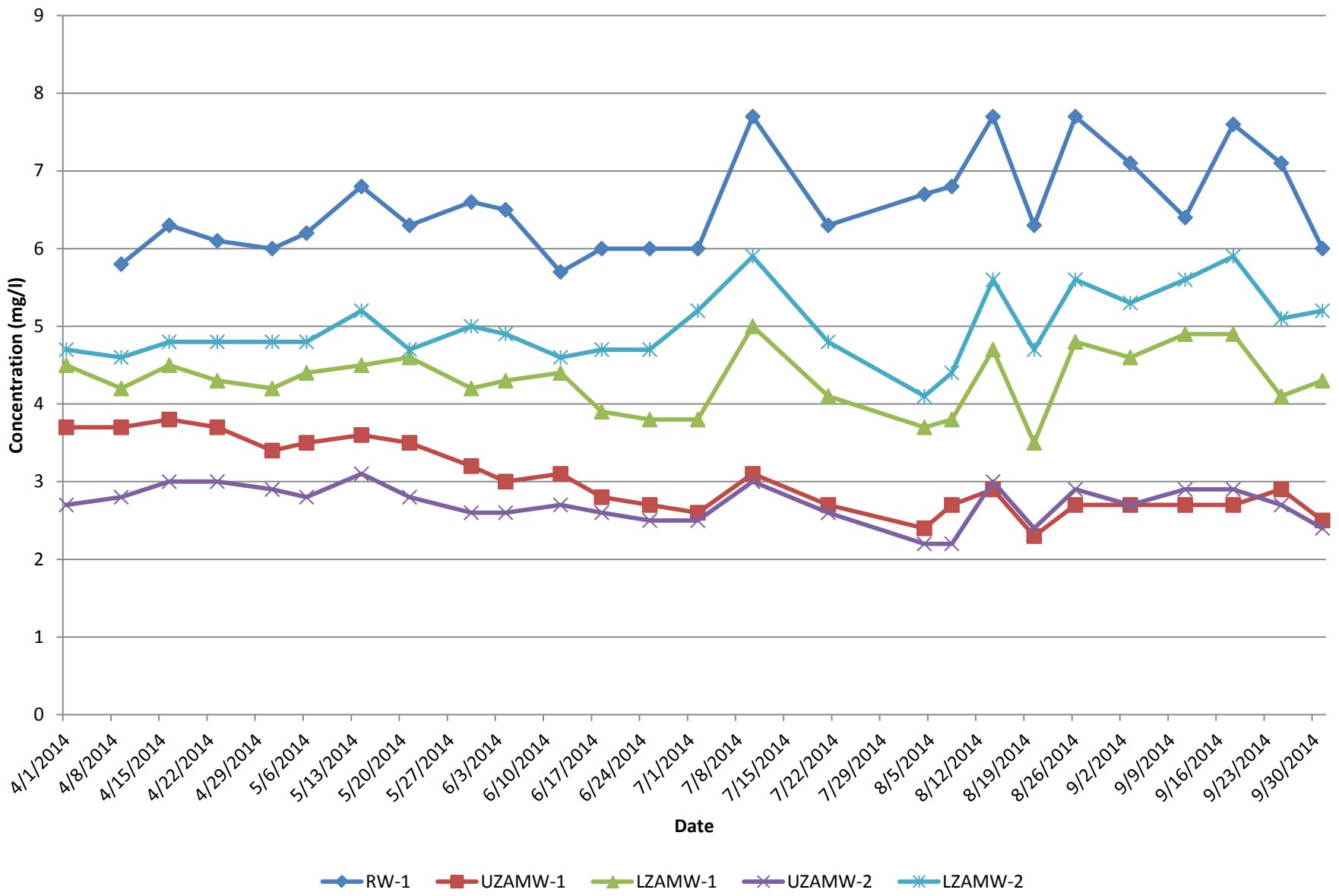
Recharge Test Bicarbonate Alkalinity Concentrations City of Clearwater Groundwater Replenishment Project



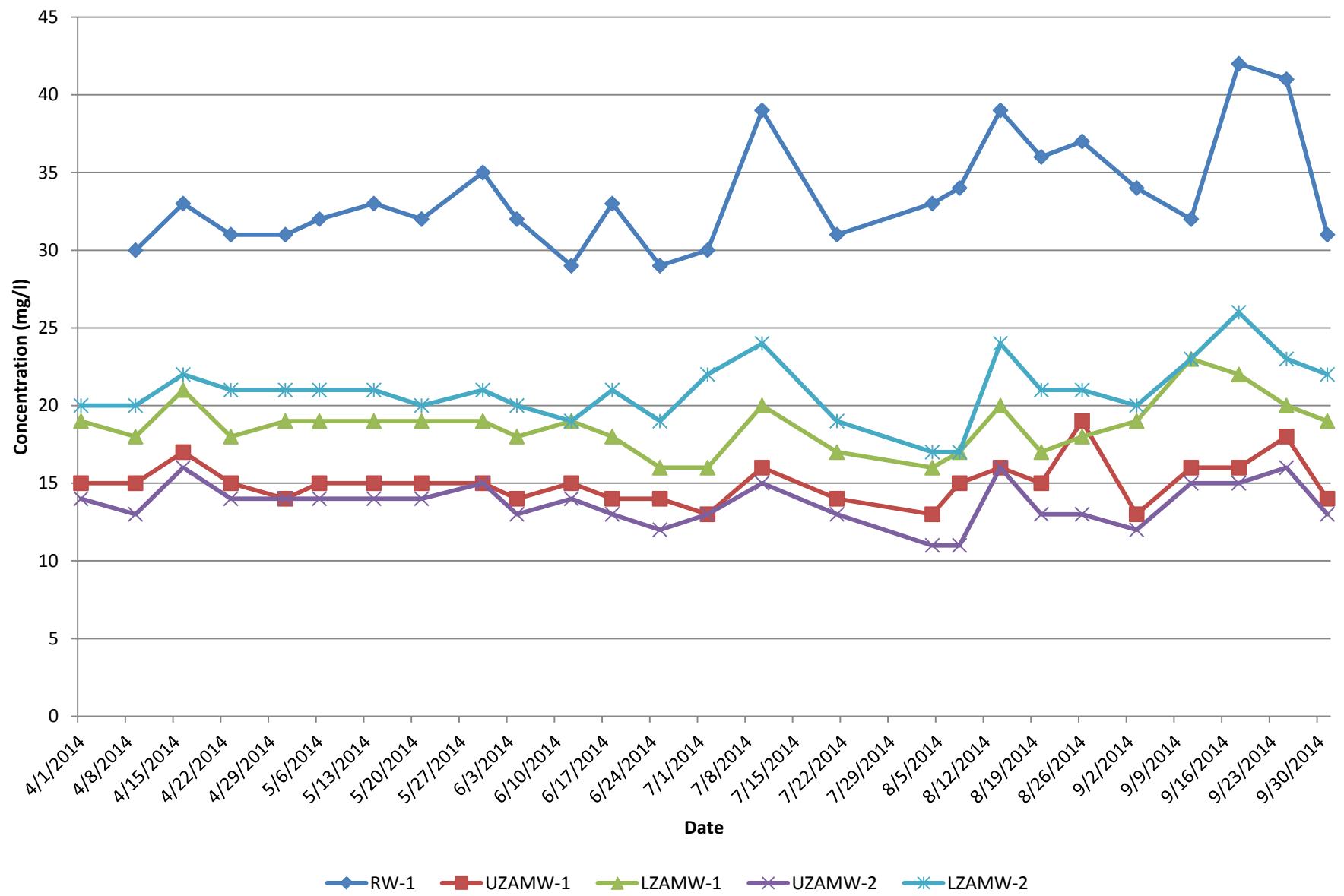
Recharge Test Sodium Concentrations City of Clearwater Groundwater Replenishment Project



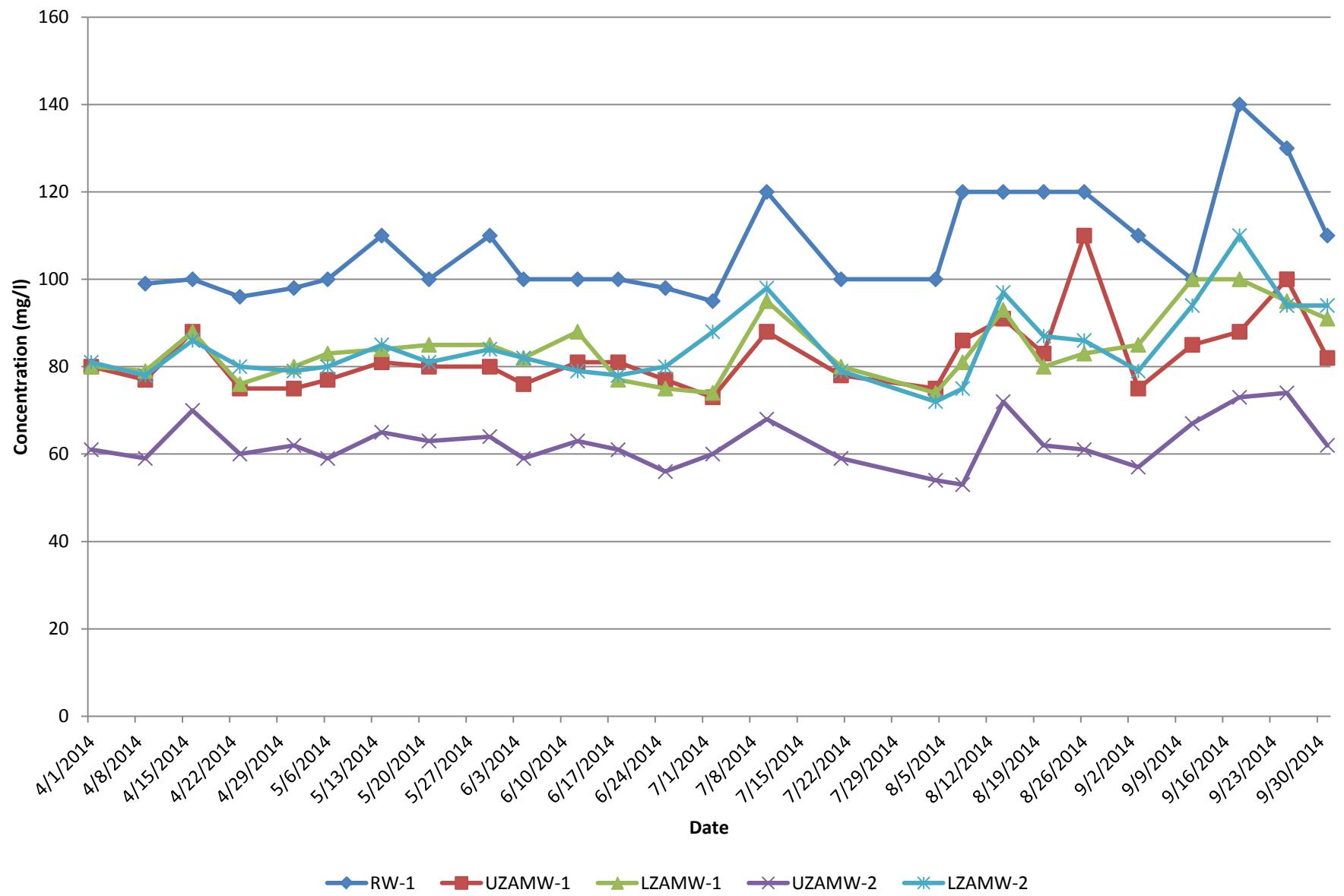
Recharge Test Potassium Concentrations City of Clearwater Groundwater Replenishment Project



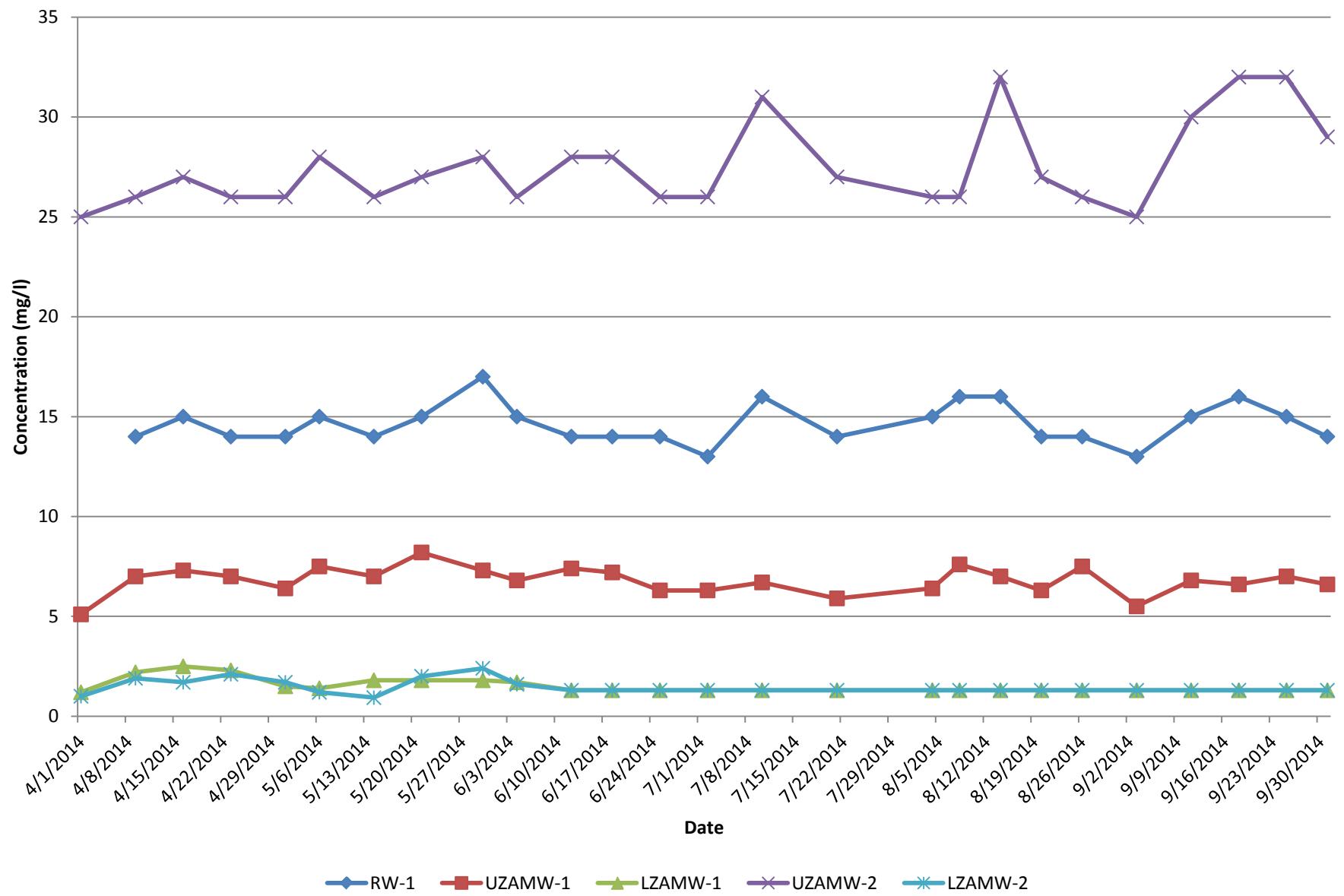
Recharge Test Magnesium Concentrations City of Clearwater Groundwater Replenishment Project



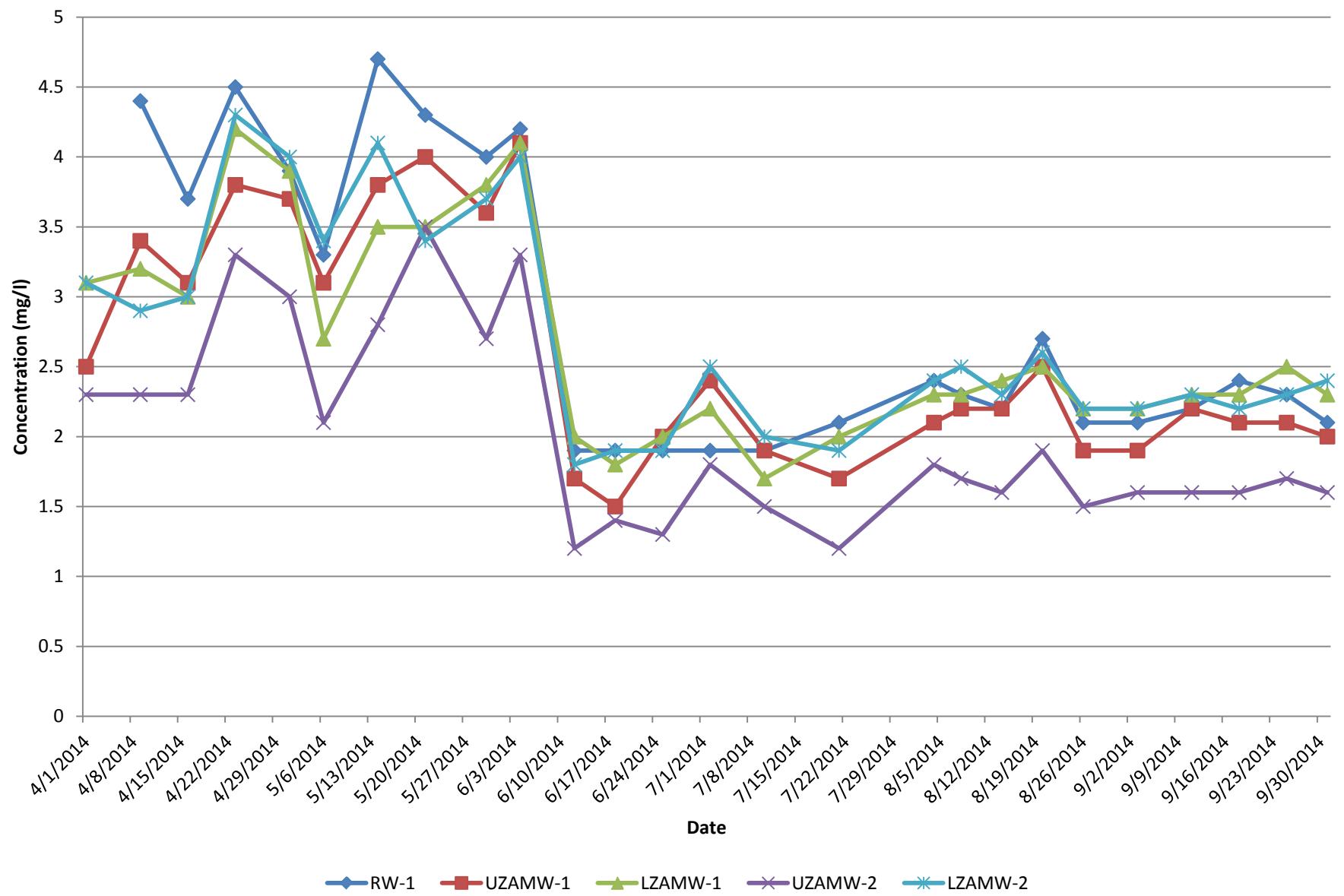
Recharge Test Calcium Concentrations City of Clearwater Groundwater Replenishment Project



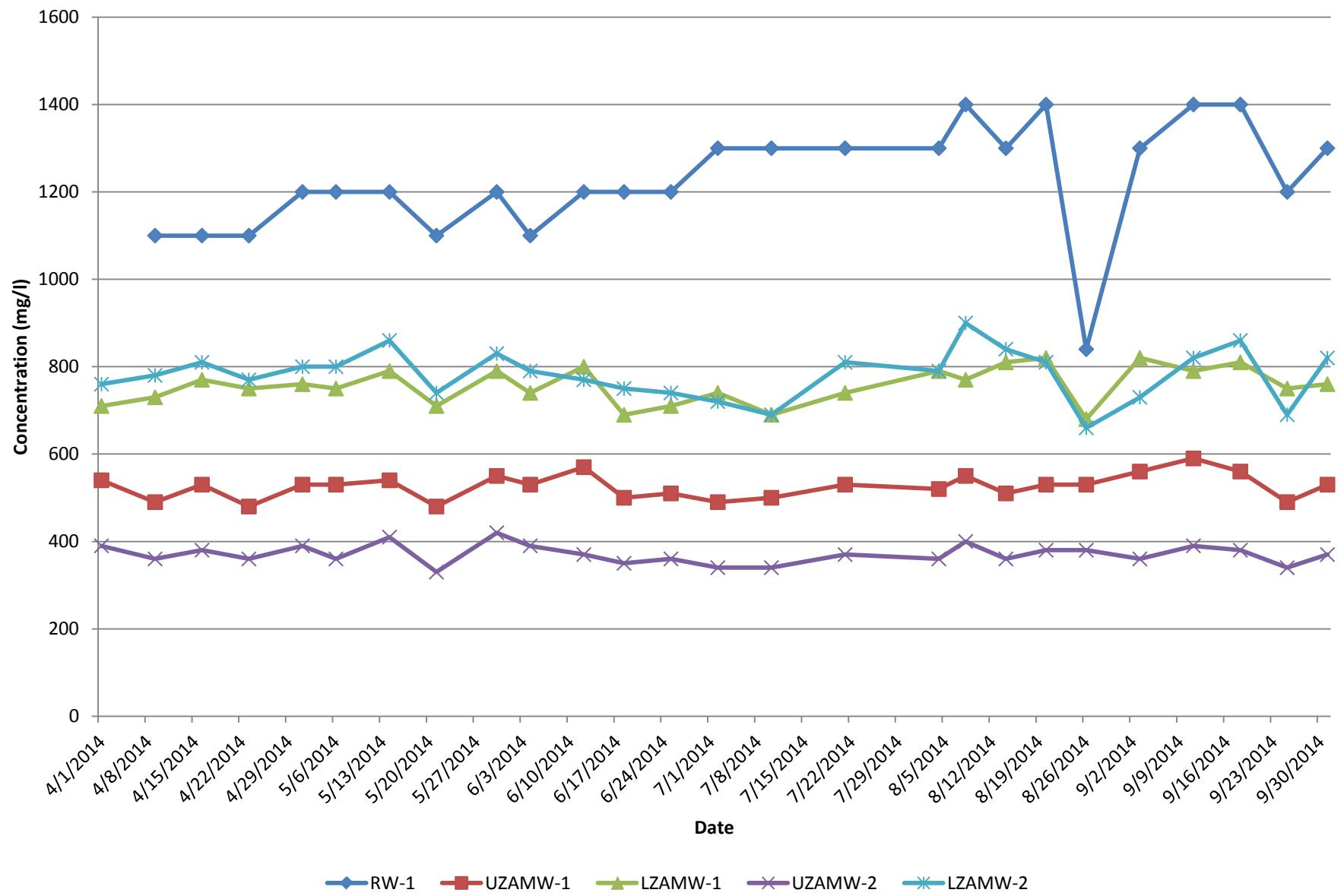
Recharge Test Arsenic Concentrations City of Clearwater Groundwater Replenishment Project



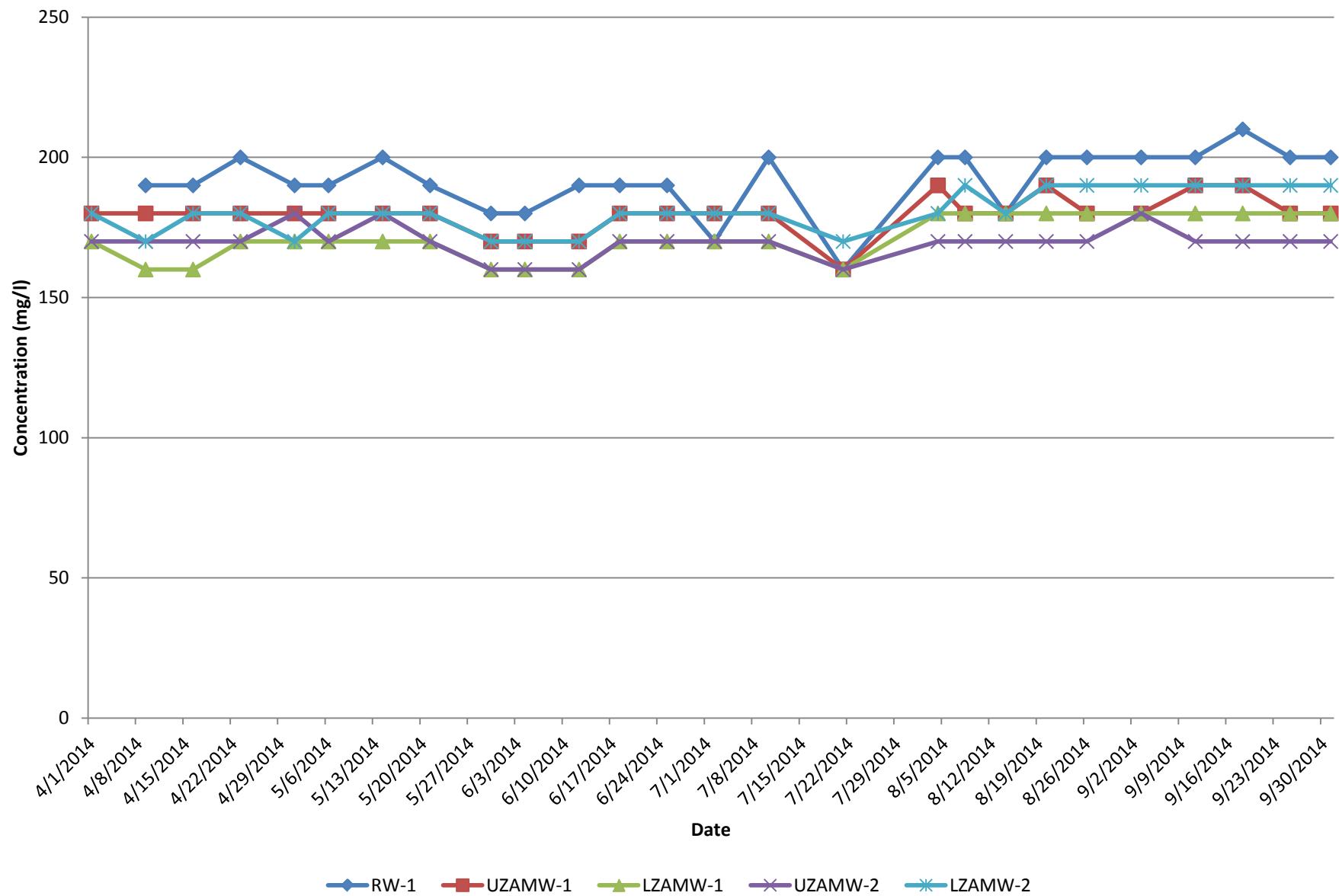
Recharge Test TOC Concentrations City of Clearwater Groundwater Replenishment Project



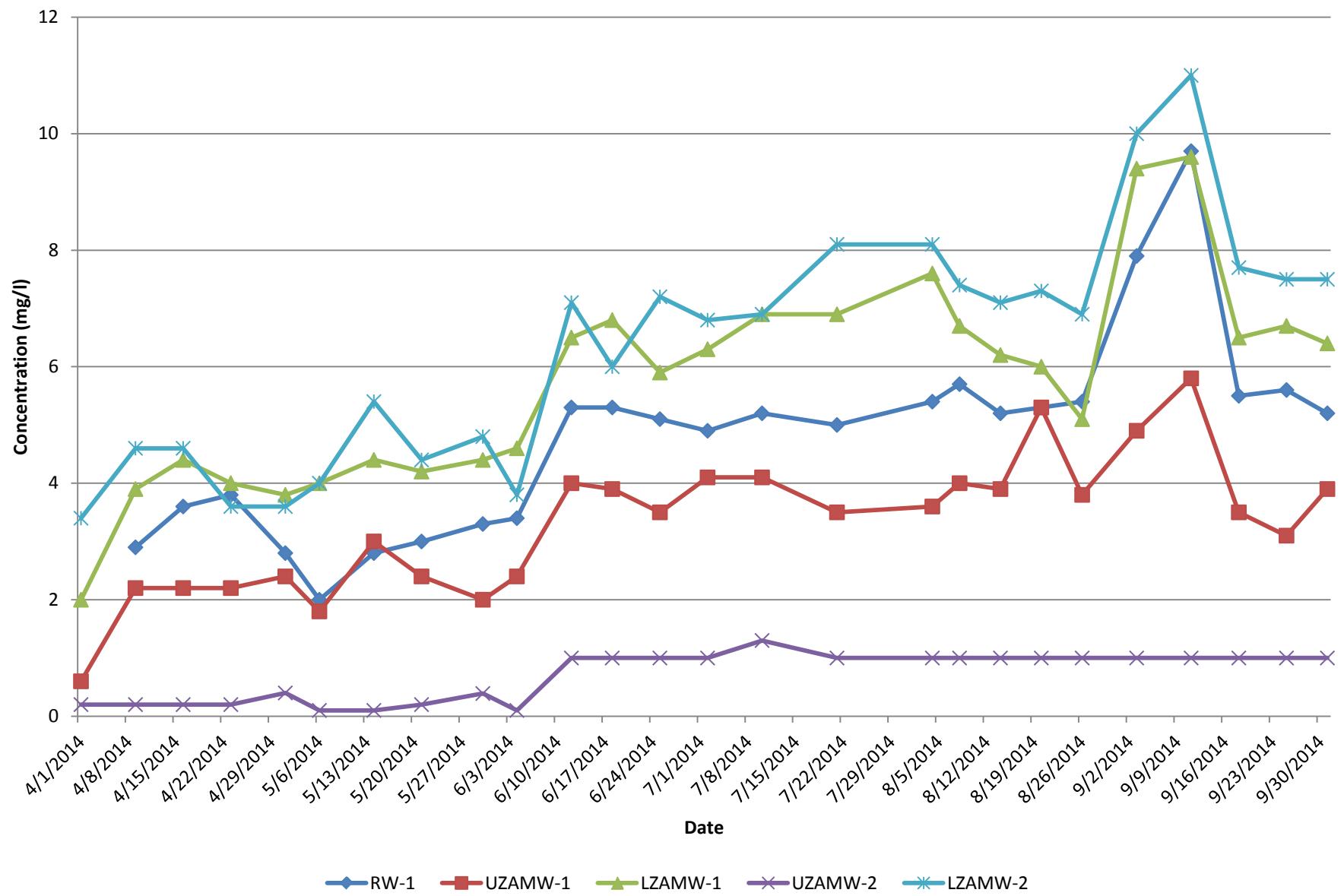
Recharge Test TDS Concentrations City of Clearwater Groundwater Replenishment Project



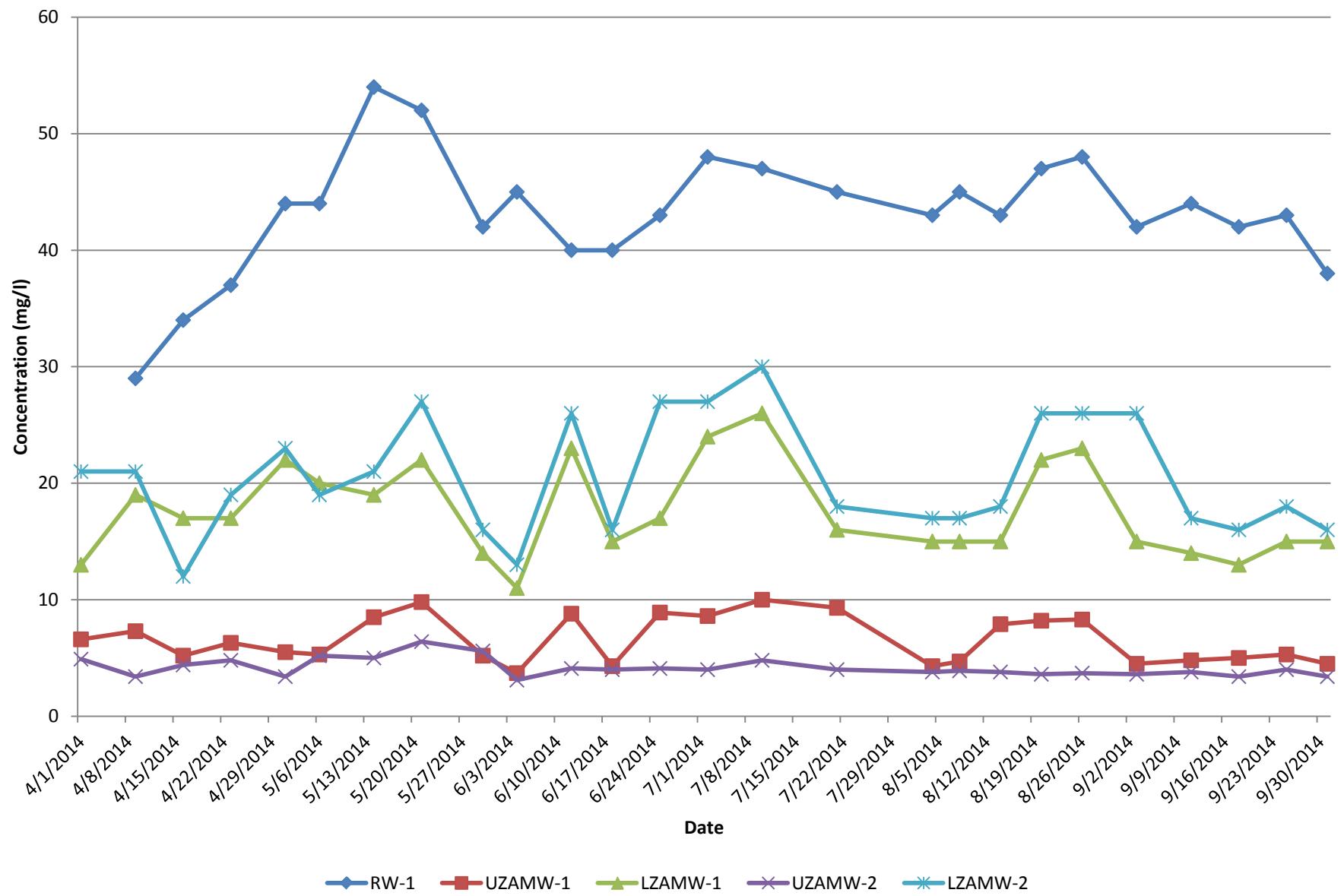
Recharge Test Total Alkalinity Concentrations City of Clearwater Groundwater Replenishment Project



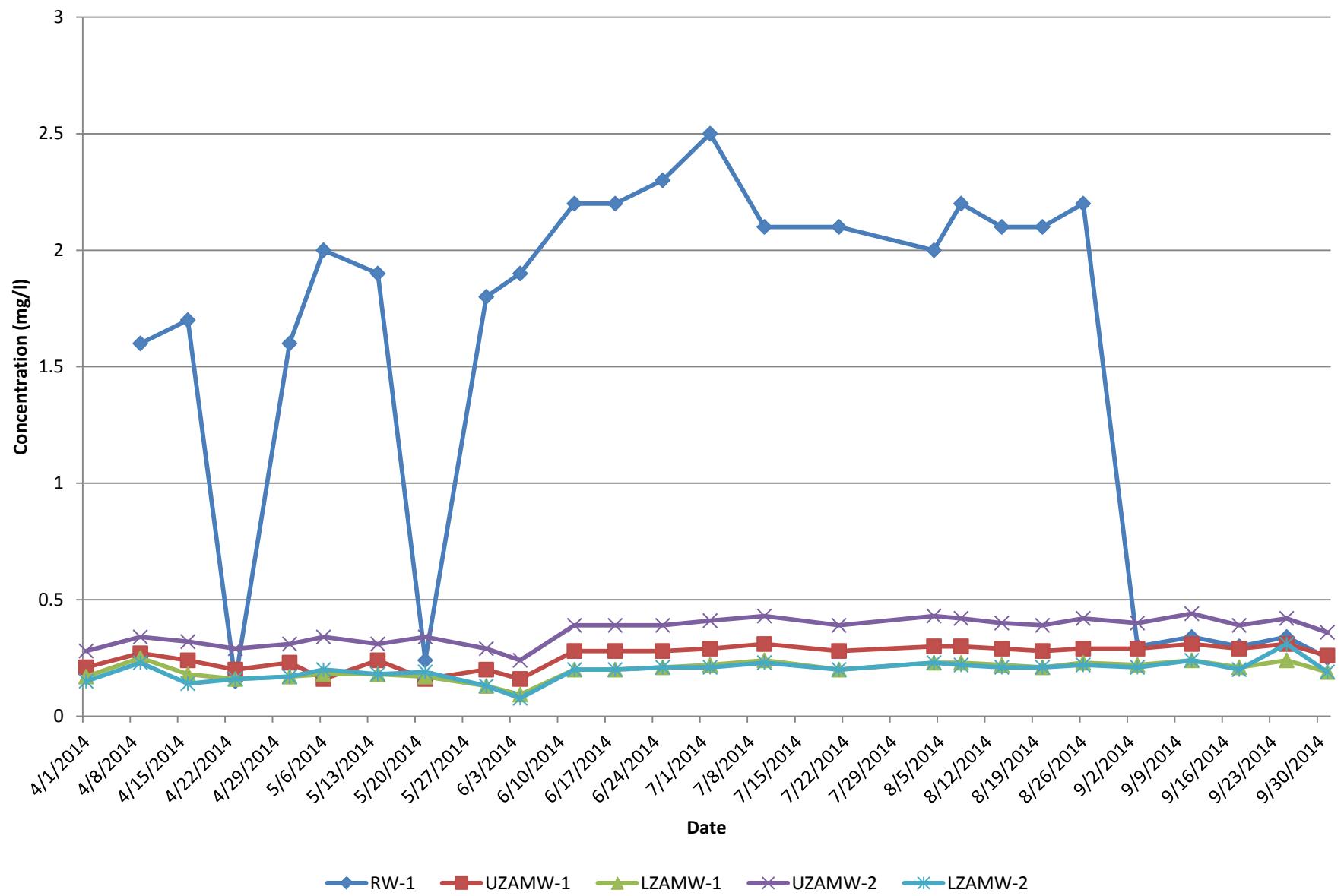
Recharge Test Sulfide Concentrations City of Clearwater Groundwater Replenishment Project



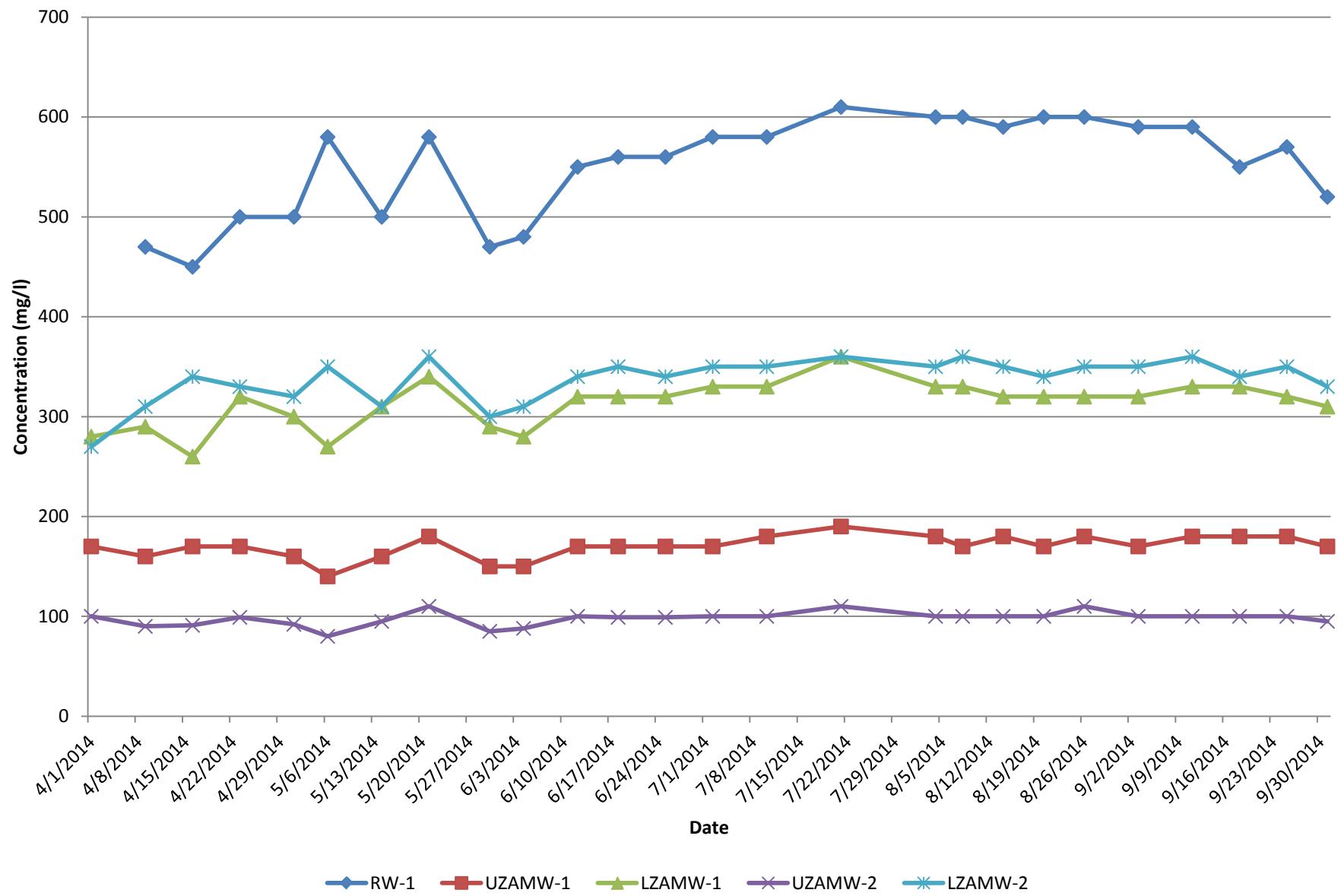
Recharge Test Sulfate Concentrations City of Clearwater Groundwater Replenishment Project



Recharge Test Fluoride Concentrations City of Clearwater Groundwater Replenishment Project



Recharge Test Chloride Concentrations City of Clearwater Groundwater Replenishment Project



APPENDIX C

Water-Quality Laboratory Reports

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

813-855-1844 FAX 813-855-2218



Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

April 17, 2014

Work Order: 1403320

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		UZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1403320-01						
Date/Time Collected		04/01/14 13:20						
Collected by		Richard Cofer						
Date/Time Received		04/01/14 14:00						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/03/14 09:42	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:42	1
Chloride	mg/L	170	EPA 300.0	2.0	0.50		04/10/14 17:49	10
Fluoride	mg/L	0.21	EPA 300.0	0.040	0.010		04/02/14 17:37	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:42	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/02/14 17:37	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:42	1
Sulfate	mg/L	6.6	EPA 300.0	0.60	0.20		04/02/14 17:37	1
Sulfide	mg/L	0.60	SM 4500SF	0.40	0.10		04/01/14 16:46	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/03/14 09:42	1
Total Dissolved Solids	mg/L	540	SM 2540C	10	10	04/02/14 13:59	04/04/14 15:57	1
Total Organic Carbon	mg/L	2.5	SM 5310B	1.0	0.060		04/07/14 11:51	1
Metals								
Arsenic	mg/L	0.0051	EPA 200.8	0.0050	0.00093	04/03/14 10:34	04/07/14 17:44	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	04/03/14 10:21	04/10/14 20:48	1
Iron	mg/L	0.022 I	EPA 200.7	0.10	0.020	04/03/14 10:21	04/10/14 20:48	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	04/03/14 10:21	04/10/14 20:48	1
Potassium	mg/L	3.7	EPA 200.7	0.050	0.010	04/03/14 10:21	04/10/14 20:48	1
Sodium	mg/L	83	EPA 200.7	0.50	0.13	04/03/14 10:21	04/10/14 20:48	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/11/14 10:27	1
Lab filtration for diss. metals								
04/14/14 15:26								

Sample Description	LZAMW-1
Matrix	Groundwater
SAL Sample Number	1403320-02
Date/Time Collected	04/01/14 12:50
Collected by	Richard Cofer
Date/Time Received	04/01/14 14:00

Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/03/14 09:48	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:48	1
Chloride	mg/L	280	EPA 300.0	20	5.0		04/10/14 18:00	100
Fluoride	mg/L	0.17	EPA 300.0	0.040	0.010		04/02/14 17:47	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:48	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/02/14 17:47	1

Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

April 17, 2014

Work Order: 1403320

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1403320-02						
Date/Time Collected		04/01/14 12:50						
Collected by		Richard Cofer						
Date/Time Received		04/01/14 14:00						
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:48	1
Sulfate	mg/L	13	EPA 300.0	0.60	0.20		04/02/14 17:47	1
Sulfide	mg/L	2.0	SM 4500SF	0.40	0.10		04/01/14 16:46	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/03/14 09:48	1
Total Dissolved Solids	mg/L	710	SM 2540C	10	10	04/02/14 13:59	04/04/14 15:57	1
Total Organic Carbon	mg/L	3.1	SM 5310B	1.0	0.060		04/07/14 11:51	1
Metals								
Arsenic	mg/L	0.0012 I	EPA 200.8	0.0050	0.00093	04/03/14 10:34	04/07/14 17:49	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	04/03/14 10:21	04/10/14 20:52	1
Iron	mg/L	0.082 I	EPA 200.7	0.10	0.020	04/03/14 10:21	04/10/14 20:52	1
Magnesium	mg/L	19	EPA 200.7	0.50	0.020	04/03/14 10:21	04/10/14 20:52	1
Potassium	mg/L	4.5	EPA 200.7	0.050	0.010	04/03/14 10:21	04/10/14 20:52	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	04/03/14 10:21	04/11/14 10:20	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/11/14 10:31	1
Lab filtration for diss. metals								
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403320-03						
Date/Time Collected		04/01/14 11:05						
Collected by		Richard Cofer						
Date/Time Received		04/01/14 14:00						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/03/14 09:53	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:53	1
Chloride	mg/L	100	EPA 300.0	2.0	0.50		04/10/14 18:11	10
Fluoride	mg/L	0.28	EPA 300.0	0.040	0.010		04/02/14 17:56	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:53	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/02/14 17:56	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 09:53	1
Sulfate	mg/L	4.9	EPA 300.0	0.60	0.20		04/02/14 17:56	1
Sulfide	mg/L	0.20 I	SM 4500SF	0.40	0.10		04/01/14 16:46	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/03/14 09:53	1
Total Dissolved Solids	mg/L	390	SM 2540C	10	10	04/02/14 13:59	04/04/14 15:57	1
Total Organic Carbon	mg/L	2.3	SM 5310B	1.0	0.060		04/07/14 11:51	1
Metals								

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

April 17, 2014

Work Order: 1403320

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403320-03						
Date/Time Collected		04/01/14 11:05						
Collected by		Richard Cofer						
Date/Time Received		04/01/14 14:00						
Arsenic	mg/L	0.025	EPA 200.8	0.0050	0.00093	04/03/14 10:34	04/07/14 17:54	1
Calcium	mg/L	61	EPA 200.7	0.50	0.042	04/03/14 10:21	04/10/14 20:55	1
Iron	mg/L	0.094 I	EPA 200.7	0.10	0.020	04/03/14 10:21	04/10/14 20:55	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	04/03/14 10:21	04/10/14 20:55	1
Potassium	mg/L	2.7	EPA 200.7	0.050	0.010	04/03/14 10:21	04/10/14 20:55	1
Sodium	mg/L	50	EPA 200.7	0.50	0.13	04/03/14 10:21	04/10/14 20:55	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/11/14 10:34	1
Lab filtration for diss. metals								
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403320-04						
Date/Time Collected		04/01/14 10:35						
Collected by		Richard Cofer						
Date/Time Received		04/01/14 14:00						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/03/14 10:04	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 10:04	1
Chloride	mg/L	270	EPA 300.0	20	5.0		04/10/14 18:23	100
Fluoride	mg/L	0.15	EPA 300.0	0.040	0.010		04/02/14 18:05	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 10:04	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/02/14 18:05	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/03/14 10:04	1
Sulfate	mg/L	21	EPA 300.0	0.60	0.20		04/02/14 18:05	1
Sulfide	mg/L	3.4	SM 4500SF	0.40	0.10		04/01/14 16:46	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/03/14 10:04	1
Total Dissolved Solids	mg/L	760	SM 2540C	10	10	04/02/14 13:59	04/04/14 15:57	1
Total Organic Carbon	mg/L	3.1	SM 5310B	1.0	0.060		04/07/14 11:51	1
Metals								
Arsenic	mg/L	0.0010 I	EPA 200.8	0.0050	0.00093	04/03/14 10:34	04/07/14 17:58	1
Calcium	mg/L	81	EPA 200.7	0.50	0.042	04/03/14 10:21	04/10/14 20:59	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/03/14 10:21	04/10/14 20:59	1
Magnesium	mg/L	20	EPA 200.7	0.50	0.020	04/03/14 10:21	04/10/14 20:59	1
Potassium	mg/L	4.7	EPA 200.7	0.050	0.010	04/03/14 10:21	04/10/14 20:59	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	04/03/14 10:21	04/11/14 10:23	10
Metals, Dissolved								

SOUTHERN ANALYTICAL LABORATORIES, INC.

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10014 North Dale Mabry Rd.
Tampa, FL 33618

April 17, 2014

Work Order: 1403320

Laboratory Report

Project Name	CLWGWR							
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403320-04						
Date/Time Collected		04/01/14 10:35						
Collected by		Richard Cofer						
Date/Time Received		04/01/14 14:00						
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/11/14 10:46	1
Lab filtration for diss. metals							04/14/14 15:26	

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

April 17, 2014

Work Order: 1403320

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

1110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1403320

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

813-855-1844 FAX 813-855-2218



Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

April 18, 2014

Work Order: 1403703

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		RW-1						
Matrix		Groundwater						
SAL Sample Number		1403703-01						
Date/Time Collected		04/09/14 15:55						
Collected by		Richard Cofer						
Date/Time Received		04/09/14 16:30						
Inorganics								
Bicarbonate Alkalinity	mg/L	190	SM 2320B	8.0	2.0		04/16/14 10:16	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:16	1
Chloride	mg/L	470	EPA 300.0	20	5.0		04/15/14 15:17	100
Fluoride	mg/L	1.6	EPA 300.0	0.040	0.010		04/10/14 23:51	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:16	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/10/14 23:51	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:16	1
Sulfate	mg/L	29	EPA 300.0	0.60	0.20		04/10/14 23:51	1
Sulfide	mg/L	2.9	SM 4500SF	0.40	0.10		04/16/14 08:50	1
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0		04/16/14 10:16	1
Total Dissolved Solids	mg/L	1,100	SM 2540C	10	10	04/11/14 09:42	04/14/14 16:55	1
Total Organic Carbon	mg/L	4.4	SM 5310B	1.0	0.060		04/10/14 09:58	1
Metals								
Arsenic	mg/L	0.014	EPA 200.8	0.0050	0.00093	04/11/14 08:53	04/14/14 14:13	1
Calcium	mg/L	99	EPA 200.7	0.50	0.042	04/14/14 14:07	04/16/14 12:12	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/14/14 14:07	04/16/14 12:12	1
Magnesium	mg/L	30	EPA 200.7	0.50	0.020	04/14/14 14:07	04/16/14 12:12	1
Potassium	mg/L	5.8	EPA 200.7	0.050	0.010	04/14/14 14:07	04/16/14 12:12	1
Sodium	mg/L	270	EPA 200.7	5.0	1.3	04/14/14 14:07	04/16/14 15:41	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/15/14 12:00	04/15/14 14:58	1
Lab filtration for diss. metals								

Sample Description	UZAMW-1						
Matrix	Groundwater						
SAL Sample Number	1403703-02						
Date/Time Collected	04/09/14 15:00						
Collected by	Richard Cofer						
Date/Time Received	04/09/14 16:30						

Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/16/14 10:22	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:22	1
Chloride	mg/L	160	EPA 300.0	2.0	0.50		04/15/14 15:26	10
Fluoride	mg/L	0.27	EPA 300.0	0.040	0.010		04/11/14 00:02	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:22	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/11/14 00:02	1

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10014 North Dale Mabry Rd.
Tampa, FL 33618

April 18, 2014

Work Order: 1403703

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1403703-02							
Date/Time Collected	04/09/14 15:00							
Collected by	Richard Cofer							
Date/Time Received	04/09/14 16:30							
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:22	1
Sulfate	mg/L	7.3	EPA 300.0	0.60	0.20		04/11/14 00:02	1
Sulfide	mg/L	2.2	SM 4500SF	0.40	0.10		04/16/14 08:50	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/16/14 10:22	1
Total Dissolved Solids	mg/L	490	SM 2540C	10	10	04/11/14 09:42	04/14/14 16:55	1
Total Organic Carbon	mg/L	3.4	SM 5310B	1.0	0.060		04/10/14 09:58	1
Metals								
Arsenic	mg/L	0.0070	EPA 200.8	0.0050	0.00093	04/11/14 08:53	04/14/14 14:18	1
Calcium	mg/L	77	EPA 200.7	0.50	0.042	04/14/14 14:07	04/16/14 12:15	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/14/14 14:07	04/16/14 12:15	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	04/14/14 14:07	04/16/14 12:15	1
Potassium	mg/L	3.7	EPA 200.7	0.050	0.010	04/14/14 14:07	04/16/14 12:15	1
Sodium	mg/L	79	EPA 200.7	0.50	0.13	04/14/14 14:07	04/16/14 12:15	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/15/14 12:00	04/15/14 15:01	1
Lab filtration for diss. metals							04/14/14 15:26	
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1403703-03							
Date/Time Collected	04/09/14 14:35							
Collected by	Richard Cofer							
Date/Time Received	04/09/14 16:30							
Inorganics								
Bicarbonate Alkalinity	mg/L	160	SM 2320B	8.0	2.0		04/16/14 10:27	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:27	1
Chloride	mg/L	290	EPA 300.0	2.0	0.50		04/15/14 15:36	10
Fluoride	mg/L	0.25	EPA 300.0	0.040	0.010		04/11/14 00:13	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:27	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/11/14 00:13	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:27	1
Sulfate	mg/L	19	EPA 300.0	0.60	0.20		04/11/14 00:13	1
Sulfide	mg/L	3.9	SM 4500SF	0.40	0.10		04/16/14 08:50	1
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0		04/16/14 10:27	1
Total Dissolved Solids	mg/L	730	SM 2540C	10	10	04/11/14 09:42	04/14/14 16:55	1
Total Organic Carbon	mg/L	3.2	SM 5310B	1.0	0.060		04/10/14 09:58	1
Metals								

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10014 North Dale Mabry Rd.
Tampa, FL 33618

April 18, 2014

Work Order: 1403703

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1403703-03						
Date/Time Collected		04/09/14 14:35						
Collected by		Richard Cofer						
Date/Time Received		04/09/14 16:30						
Arsenic	mg/L	0.0022 I	EPA 200.8	0.0050	0.00093	04/11/14 08:53	04/14/14 14:22	1
Calcium	mg/L	79	EPA 200.7	0.50	0.042	04/14/14 14:07	04/16/14 12:19	1
Iron	mg/L	0.020 I	EPA 200.7	0.10	0.020	04/14/14 14:07	04/16/14 12:19	1
Magnesium	mg/L	18	EPA 200.7	0.50	0.020	04/14/14 14:07	04/16/14 12:19	1
Potassium	mg/L	4.2	EPA 200.7	0.050	0.010	04/14/14 14:07	04/16/14 12:19	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	04/14/14 14:07	04/16/14 15:45	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/15/14 12:00	04/15/14 15:05	1
Lab filtration for diss. metals								
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403703-04						
Date/Time Collected		04/09/14 12:30						
Collected by		Richard Cofer						
Date/Time Received		04/09/14 16:30						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/16/14 10:32	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:32	1
Chloride	mg/L	90	EPA 300.0	2.0	0.50		04/15/14 16:13	10
Fluoride	mg/L	0.34	EPA 300.0	0.040	0.010		04/11/14 00:25	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:32	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/11/14 00:25	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:32	1
Sulfate	mg/L	3.4	EPA 300.0	0.60	0.20		04/11/14 00:25	1
Sulfide	mg/L	0.20 I	SM 4500SF	0.40	0.10		04/16/14 08:50	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/16/14 10:32	1
Total Dissolved Solids	mg/L	360	SM 2540C	10	10	04/11/14 09:42	04/14/14 16:55	1
Total Organic Carbon	mg/L	2.3	SM 5310B	1.0	0.060		04/10/14 09:58	1
Metals								
Arsenic	mg/L	0.026	EPA 200.8	0.0050	0.00093	04/11/14 08:53	04/14/14 14:27	1
Calcium	mg/L	59	EPA 200.7	0.50	0.042	04/14/14 14:07	04/16/14 12:29	1
Iron	mg/L	0.059 I	EPA 200.7	0.10	0.020	04/14/14 14:07	04/16/14 12:29	1
Magnesium	mg/L	13	EPA 200.7	0.50	0.020	04/14/14 14:07	04/16/14 12:29	1
Potassium	mg/L	2.8	EPA 200.7	0.050	0.010	04/14/14 14:07	04/16/14 12:29	1
Sodium	mg/L	47	EPA 200.7	0.50	0.13	04/14/14 14:07	04/16/14 12:29	1
Metals, Dissolved								

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Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403703-04						
Date/Time Collected		04/09/14 12:30						
Collected by		Richard Cofer						
Date/Time Received		04/09/14 16:30						
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/15/14 12:00	04/15/14 15:08	1
Lab filtration for diss. metals						04/14/14 15:26		
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403703-05						
Date/Time Collected		04/09/14 12:00						
Collected by		Richard Cofer						
Date/Time Received		04/09/14 16:30						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/16/14 10:38	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:38	1
Chloride	mg/L	310	EPA 300.0	2.0	0.50		04/15/14 16:23	10
Fluoride	mg/L	0.23	EPA 300.0	0.040	0.010		04/11/14 00:36	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:38	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/11/14 00:36	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/16/14 10:38	1
Sulfate	mg/L	21	EPA 300.0	0.60	0.20		04/11/14 00:36	1
Sulfide	mg/L	4.6	SM 4500SF	0.40	0.10		04/16/14 08:50	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/16/14 10:38	1
Total Dissolved Solids	mg/L	780	SM 2540C	10	10	04/11/14 09:42	04/14/14 16:55	1
Total Organic Carbon	mg/L	2.9	SM 5310B	1.0	0.060		04/10/14 09:58	1
Metals								
Arsenic	mg/L	0.0019 I	EPA 200.8	0.0050	0.00093	04/11/14 08:53	04/14/14 14:31	1
Calcium	mg/L	78	EPA 200.7	0.50	0.042	04/14/14 14:07	04/16/14 12:33	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/14/14 14:07	04/16/14 12:33	1
Magnesium	mg/L	20	EPA 200.7	0.50	0.020	04/14/14 14:07	04/16/14 12:33	1
Potassium	mg/L	4.6	EPA 200.7	0.050	0.010	04/14/14 14:07	04/16/14 12:33	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	04/14/14 14:07	04/16/14 15:48	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/15/14 12:00	04/15/14 15:12	1
Lab filtration for diss. metals						04/14/14 15:26		

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* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

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SAL Project No. 1403703

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April 30, 2014

Work Order: 1403961

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	RW-1							
Matrix	Groundwater							
SAL Sample Number	1403961-01							
Date/Time Collected	04/16/14 14:45							
Collected by	Richard Cofer							
Date/Time Received	04/16/14 15:25							
Inorganics								
Bicarbonate Alkalinity	mg/L	190	SM 2320B	8.0	2.0		04/18/14 12:19	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/18/14 12:19	1
Chloride	mg/L	450	EPA 300.0	20	5.0		04/29/14 23:00	100
Fluoride	mg/L	1.7	EPA 300.0	0.040	0.010		04/17/14 19:12	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/18/14 12:19	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/17/14 19:12	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/18/14 12:19	1
Sulfate	mg/L	34	EPA 300.0	0.60	0.20		04/17/14 19:12	1
Sulfide	mg/L	3.6	SM 4500SF	0.40	0.10		04/22/14 09:21	1
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0		04/18/14 12:19	1
Total Dissolved Solids	mg/L	1,100	SM 2540C	10	10	04/18/14 10:07	04/21/14 19:04	1
Total Organic Carbon	mg/L	3.7	SM 5310B	1.0	0.060		04/21/14 09:32	1
Metals								
Arsenic	mg/L	0.015	EPA 200.8	0.0050	0.00093	04/17/14 10:33	04/22/14 16:46	1
Calcium	mg/L	100	EPA 200.7	0.50	0.042	04/17/14 12:00	04/17/14 17:54	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/17/14 12:00	04/17/14 17:54	1
Magnesium	mg/L	33	EPA 200.7	0.50	0.020	04/17/14 12:00	04/17/14 17:54	1
Potassium	mg/L	6.3	EPA 200.7	0.050	0.010	04/17/14 12:00	04/17/14 17:54	1
Sodium	mg/L	270	EPA 200.7	5.0	1.3	04/17/14 12:00	04/18/14 10:40	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 12:46	1
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1403961-02							
Date/Time Collected	04/16/14 14:15							
Collected by	Richard Cofer							
Date/Time Received	04/16/14 15:25							
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/18/14 12:25	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/18/14 12:25	1
Chloride	mg/L	170	EPA 300.0	2.0	0.50		04/30/14 12:46	10
Fluoride	mg/L	0.24	EPA 300.0	0.040	0.010		04/17/14 11:41	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/18/14 12:25	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/17/14 11:41	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/18/14 12:25	1

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April 30, 2014

Work Order: 1403961

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1403961-02							
Date/Time Collected	04/16/14 14:15							
Collected by	Richard Cofer							
Date/Time Received	04/16/14 15:25							
Sulfate	mg/L	5.2	EPA 300.0	0.60	0.20	04/17/14 11:41	1	
Sulfide	mg/L	2.2	SM 4500SF	0.40	0.10	04/22/14 09:21	1	
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0	04/18/14 12:25	1	
Total Dissolved Solids	mg/L	530	SM 2540C	10	10	04/18/14 10:07	04/21/14 19:04	1
Total Organic Carbon	mg/L	3.1	SM 5310B	1.0	0.060	04/21/14 09:32	1	
Metals								
Arsenic	mg/L	0.0073	EPA 200.8	0.0050	0.00093	04/17/14 10:33	04/22/14 16:59	1
Calcium	mg/L	88	EPA 200.7	0.50	0.042	04/17/14 12:00	04/17/14 17:57	1
Iron	mg/L	0.024 I	EPA 200.7	0.10	0.020	04/17/14 12:00	04/17/14 17:57	1
Magnesium	mg/L	17	EPA 200.7	0.50	0.020	04/17/14 12:00	04/17/14 17:57	1
Potassium	mg/L	3.8	EPA 200.7	0.050	0.010	04/17/14 12:00	04/17/14 17:57	1
Sodium	mg/L	80	EPA 200.7	0.50	0.13	04/17/14 12:00	04/17/14 17:57	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/25/14 12:49	1	
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1403961-03							
Date/Time Collected	04/16/14 13:50							
Collected by	Richard Cofer							
Date/Time Received	04/16/14 15:25							
Inorganics								
Bicarbonate Alkalinity	mg/L	160	SM 2320B	8.0	2.0	04/18/14 12:30	1	
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	04/18/14 12:30	1	
Chloride	mg/L	260	EPA 300.0	4.0	1.0	04/29/14 23:23	20	
Fluoride	mg/L	0.18	EPA 300.0	0.040	0.010	04/17/14 11:50	1	
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	04/18/14 12:30	1	
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01	04/17/14 11:50	1	
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	04/18/14 12:30	1	
Sulfate	mg/L	17	EPA 300.0	0.60	0.20	04/17/14 11:50	1	
Sulfide	mg/L	4.4	SM 4500SF	0.40	0.10	04/22/14 09:21	1	
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0	04/18/14 12:30	1	
Total Dissolved Solids	mg/L	770	SM 2540C	10	10	04/18/14 10:07	04/21/14 19:04	1
Total Organic Carbon	mg/L	3.0	SM 5310B	1.0	0.060	04/21/14 09:32	1	
Metals								
Arsenic	mg/L	0.0025 I	EPA 200.8	0.0050	0.00093	04/17/14 10:33	04/22/14 17:04	1
Calcium	mg/L	88	EPA 200.7	0.50	0.042	04/17/14 12:00	04/17/14 18:07	1

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

NELAP Accredited

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April 30, 2014

Work Order: 1403961

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1403961-03						
Date/Time Collected		04/16/14 13:50						
Collected by		Richard Cofer						
Date/Time Received		04/16/14 15:25						
Iron	mg/L	0.042 I	EPA 200.7	0.10	0.020	04/17/14 12:00	04/17/14 18:07	1
Magnesium	mg/L	21	EPA 200.7	0.50	0.020	04/17/14 12:00	04/17/14 18:07	1
Potassium	mg/L	4.5	EPA 200.7	0.050	0.010	04/17/14 12:00	04/17/14 18:07	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	04/17/14 12:00	04/18/14 10:43	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 12:53	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1403961-04						
Date/Time Collected		04/16/14 12:00						
Collected by		Richard Cofer						
Date/Time Received		04/16/14 15:25						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/25/14 08:39	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 08:39	1
Chloride	mg/L	91	EPA 300.0	2.0	0.50		04/29/14 23:34	10
Fluoride	mg/L	0.32	EPA 300.0	0.040	0.010		04/17/14 12:00	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 08:39	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/17/14 12:00	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 08:39	1
Sulfate	mg/L	4.4	EPA 300.0	0.60	0.20		04/17/14 12:00	1
Sulfide	mg/L	0.20 I	SM 4500SF	0.40	0.10		04/22/14 09:21	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/25/14 08:39	1
Total Dissolved Solids	mg/L	380	SM 2540C	10	10	04/18/14 10:07	04/21/14 19:04	1
Total Organic Carbon	mg/L	2.3	SM 5310B	1.0	0.060		04/21/14 09:32	1
Metals								
Arsenic	mg/L	0.027	EPA 200.8	0.0050	0.00093	04/17/14 10:33	04/22/14 17:08	1
Calcium	mg/L	70	EPA 200.7	0.50	0.042	04/17/14 12:00	04/17/14 18:11	1
Iron	mg/L	0.10	EPA 200.7	0.10	0.020	04/17/14 12:00	04/17/14 18:11	1
Magnesium	mg/L	16	EPA 200.7	0.50	0.020	04/17/14 12:00	04/17/14 18:11	1
Potassium	mg/L	3.0	EPA 200.7	0.050	0.010	04/17/14 12:00	04/17/14 18:11	1
Sodium	mg/L	49	EPA 200.7	0.50	0.13	04/17/14 12:00	04/17/14 18:11	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 12:57	1

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

April 30, 2014

Work Order: 1403961

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	LZAMW-2							
Matrix	Groundwater							
SAL Sample Number	1403961-05							
Date/Time Collected	04/16/14 11:35							
Collected by	Richard Cofer							
Date/Time Received	04/16/14 15:25							
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/25/14 08:46	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 08:46	1
Chloride	mg/L	340	EPA 300.0	4.0	1.0		04/29/14 23:45	20
Fluoride	mg/L	0.14	EPA 300.0	0.040	0.010		04/17/14 17:08	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 08:46	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/17/14 17:08	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 08:46	1
Sulfate	mg/L	12	EPA 300.0	0.60	0.20		04/17/14 17:08	1
Sulfide	mg/L	4.6	SM 4500SF	0.40	0.10		04/22/14 09:21	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/25/14 08:46	1
Total Dissolved Solids	mg/L	810	SM 2540C	10	10	04/18/14 10:07	04/21/14 19:04	1
Total Organic Carbon	mg/L	3.0	SM 5310B	1.0	0.060		04/21/14 09:32	1
Metals								
Arsenic	mg/L	0.0017 I	EPA 200.8	0.0050	0.00093	04/17/14 10:33	04/22/14 17:22	1
Calcium	mg/L	86	EPA 200.7	0.50	0.042	04/17/14 12:00	04/17/14 18:15	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/17/14 12:00	04/17/14 18:15	1
Magnesium	mg/L	22	EPA 200.7	0.50	0.020	04/17/14 12:00	04/17/14 18:15	1
Potassium	mg/L	4.8	EPA 200.7	0.050	0.010	04/17/14 12:00	04/17/14 18:15	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	04/17/14 12:00	04/18/14 10:47	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 13:00	1

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10014 North Dale Mabry Rd.
Tampa, FL 33618

April 30, 2014

Work Order: 1403961

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
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Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

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SAL Project No. /4/0396/

Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

May 7, 2014

Work Order: 1404199

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		RW-1						
Matrix		Groundwater						
SAL Sample Number		1404199-01						
Date/Time Collected		04/23/14 14:35						
Collected by		Richard Cofer						
Date/Time Received		04/23/14 15:15						
Inorganics								
Bicarbonate Alkalinity	mg/L	200	SM 2320B	8.0	2.0		04/25/14 09:39	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:39	1
Chloride	mg/L	500	EPA 300.0	4.0	1.0		05/06/14 20:01	20
Fluoride	mg/L	0.15	EPA 300.0	0.040	0.010		04/24/14 23:20	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:39	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/24/14 23:20	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:39	1
Sulfate	mg/L	37	EPA 300.0	0.60	0.20		04/24/14 23:20	1
Sulfide	mg/L	3.8	SM 4500SF	0.40	0.10		04/29/14 12:23	1
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0		04/25/14 09:39	1
Total Dissolved Solids	mg/L	1,100	SM 2540C	10	10	04/28/14 07:38	04/29/14 14:43	1
Total Organic Carbon	mg/L	4.5	SM 5310B	1.0	0.060		04/28/14 14:07	1
Metals								
Arsenic	mg/L	0.014	EPA 200.8	0.0050	0.00093	04/29/14 11:00	05/01/14 14:44	1
Calcium	mg/L	96	EPA 200.7	0.50	0.042	04/25/14 09:31	04/25/14 17:57	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/25/14 09:31	04/25/14 17:57	1
Magnesium	mg/L	31	EPA 200.7	0.50	0.020	04/25/14 09:31	04/25/14 17:57	1
Potassium	mg/L	6.1	EPA 200.7	0.050	0.010	04/25/14 09:31	04/25/14 17:57	1
Sodium	mg/L	250	EPA 200.7	5.0	1.3	04/25/14 09:31	04/28/14 13:50	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 13:27	1
 Sample Description								
Matrix		UZAMW-1						
SAL Sample Number		Groundwater						
Date/Time Collected		1404199-02						
Collected by		04/23/14 14:00						
Date/Time Received		Richard Cofer						
		04/23/14 15:15						
 Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/25/14 09:44	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:44	1
Chloride	mg/L	170	EPA 300.0	2.0	0.50		05/06/14 20:13	10
Fluoride	mg/L	0.20	EPA 300.0	0.040	0.010		04/24/14 23:32	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:44	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/24/14 23:32	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:44	1

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10014 North Dale Mabry Rd.
Tampa, FL 33618

May 7, 2014

Work Order: 1404199

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404199-02							
Date/Time Collected	04/23/14 14:00							
Collected by	Richard Cofer							
Date/Time Received	04/23/14 15:15							
Sulfate	mg/L	6.3	EPA 300.0	0.60	0.20	04/24/14 23:32	1	
Sulfide	mg/L	2.2	SM 4500SF	0.40	0.10	04/29/14 12:23	1	
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0	04/25/14 09:44	1	
Total Dissolved Solids	mg/L	480	SM 2540C	10	10	04/28/14 07:38	04/29/14 14:43	1
Total Organic Carbon	mg/L	3.6	SM 5310B	1.0	0.060	04/28/14 15:02	1	
Metals								
Arsenic	mg/L	0.0070	EPA 200.8	0.0050	0.00093	04/29/14 11:00	05/01/14 14:48	1
Calcium	mg/L	75	EPA 200.7	0.50	0.042	04/25/14 09:31	04/25/14 18:00	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/25/14 09:31	04/25/14 18:00	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	04/25/14 09:31	04/25/14 18:00	1
Potassium	mg/L	3.7	EPA 200.7	0.050	0.010	04/25/14 09:31	04/25/14 18:00	1
Sodium	mg/L	74	EPA 200.7	0.50	0.13	04/25/14 09:31	04/25/14 18:00	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/25/14 13:30	1	
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404199-03							
Date/Time Collected	04/23/14 13:35							
Collected by	Richard Cofer							
Date/Time Received	04/23/14 15:15							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0	04/25/14 09:50	1	
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	04/25/14 09:50	1	
Chloride	mg/L	320	EPA 300.0	4.0	1.0	05/06/14 20:24	20	
Fluoride	mg/L	0.16	EPA 300.0	0.040	0.010	04/24/14 23:43	1	
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	04/25/14 09:50	1	
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01	04/24/14 23:43	1	
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	04/25/14 09:50	1	
Sulfate	mg/L	17	EPA 300.0	0.60	0.20	04/24/14 23:43	1	
Sulfide	mg/L	4.0	SM 4500SF	0.40	0.10	04/29/14 12:23	1	
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0	04/25/14 09:50	1	
Total Dissolved Solids	mg/L	750	SM 2540C	10	10	04/28/14 07:38	04/29/14 14:43	1
Total Organic Carbon	mg/L	4.2	SM 5310B	1.0	0.060	04/28/14 15:16	1	
Metals								
Arsenic	mg/L	0.0023 I	EPA 200.8	0.0050	0.00093	04/29/14 11:00	05/01/14 14:53	1
Calcium	mg/L	76	EPA 200.7	0.50	0.042	04/25/14 09:31	04/25/14 18:04	1

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

NELAP Accredited

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

May 7, 2014

Work Order: 1404199

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1404199-03						
Date/Time Collected		04/23/14 13:35						
Collected by		Richard Cofer						
Date/Time Received		04/23/14 15:15						
Iron	mg/L	0.040 I	EPA 200.7	0.10	0.020	04/25/14 09:31	04/25/14 18:04	1
Magnesium	mg/L	18	EPA 200.7	0.50	0.020	04/25/14 09:31	04/25/14 18:04	1
Potassium	mg/L	4.3	EPA 200.7	0.050	0.010	04/25/14 09:31	04/25/14 18:04	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	04/25/14 09:31	04/28/14 13:53	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 13:34	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1404199-04						
Date/Time Collected		04/23/14 11:45						
Collected by		Richard Cofer						
Date/Time Received		04/23/14 15:15						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/25/14 09:55	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:55	1
Chloride	mg/L	99	EPA 300.0	2.0	0.50		05/06/14 20:35	10
Fluoride	mg/L	0.29	EPA 300.0	0.040	0.010		04/24/14 23:54	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:55	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/24/14 23:54	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 09:55	1
Sulfate	mg/L	4.8	EPA 300.0	0.60	0.20		04/24/14 23:54	1
Sulfide	mg/L	0.20 I	SM 4500SF	0.40	0.10		04/29/14 12:23	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		04/25/14 09:55	1
Total Dissolved Solids	mg/L	360	SM 2540C	10	10	04/28/14 07:38	04/29/14 14:43	1
Total Organic Carbon	mg/L	3.3	SM 5310B	1.0	0.060		04/28/14 15:29	1
Metals								
Arsenic	mg/L	0.026	EPA 200.8	0.0050	0.00093	04/29/14 11:00	05/01/14 14:57	1
Calcium	mg/L	60	EPA 200.7	0.50	0.042	04/25/14 09:31	04/25/14 18:08	1
Iron	mg/L	0.090 I	EPA 200.7	0.10	0.020	04/25/14 09:31	04/25/14 18:08	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	04/25/14 09:31	04/25/14 18:08	1
Potassium	mg/L	3.0	EPA 200.7	0.050	0.010	04/25/14 09:31	04/25/14 18:08	1
Sodium	mg/L	47	EPA 200.7	0.50	0.13	04/25/14 09:31	04/25/14 18:08	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 13:37	1

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10014 North Dale Mabry Rd.
Tampa, FL 33618

May 7, 2014

Work Order: 1404199

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	LZAMW-2							
Matrix	Groundwater							
SAL Sample Number	1404199-05							
Date/Time Collected	04/23/14 11:20							
Collected by	Richard Cofer							
Date/Time Received	04/23/14 15:15							
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/25/14 10:01	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 10:01	1
Chloride	mg/L	330	EPA 300.0	4.0	1.0		05/06/14 20:47	20
Fluoride	mg/L	0.16	EPA 300.0	0.040	0.010		04/25/14 00:05	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 10:01	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		04/25/14 00:05	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		04/25/14 10:01	1
Sulfate	mg/L	19	EPA 300.0	0.60	0.20		04/25/14 00:05	1
Sulfide	mg/L	3.6	SM 4500SF	0.40	0.10		04/29/14 12:23	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		04/25/14 10:01	1
Total Dissolved Solids	mg/L	770	SM 2540C	10	10	04/29/14 09:20	04/30/14 11:45	1
Total Organic Carbon	mg/L	4.3	SM 5310B	1.0	0.060		04/28/14 15:43	1
Metals								
Arsenic	mg/L	0.0021 I	EPA 200.8	0.0050	0.00093	04/29/14 11:00	05/01/14 15:02	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	04/25/14 09:31	04/25/14 18:11	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	04/25/14 09:31	04/25/14 18:11	1
Magnesium	mg/L	21	EPA 200.7	0.50	0.020	04/25/14 09:31	04/25/14 18:11	1
Potassium	mg/L	4.8	EPA 200.7	0.050	0.010	04/25/14 09:31	04/25/14 18:11	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	04/25/14 09:31	04/28/14 13:57	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		04/25/14 13:41	1

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

May 7, 2014

Work Order: 1404199

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

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SAL Project No. 1404199

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
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May 19, 2014

Work Order: 1404392

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	RW-1							
Matrix	Groundwater							
SAL Sample Number	1404392-01							
Date/Time Collected	05/01/14 13:45							
Collected by	Richard Cofer							
Date/Time Received	05/01/14 16:00							
Inorganics								
Bicarbonate Alkalinity	mg/L	190	SM 2320B	8.0	2.0		05/08/14 12:28	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:28	1
Chloride	mg/L	500	EPA 300.0	4.0	1.0		05/14/14 02:03	20
Fluoride	mg/L	1.6	EPA 300.0	0.040	0.010		05/02/14 19:20	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:28	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/02/14 19:20	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:28	1
Sulfate	mg/L	44	EPA 300.0	0.60	0.20		05/02/14 19:20	1
Sulfide	mg/L	2.8	SM 4500SF	0.40	0.10		05/06/14 12:12	1
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0		05/08/14 12:28	1
Total Dissolved Solids	mg/L	1,200	SM 2540C	10	10	05/06/14 13:21	05/07/14 14:13	1
Total Organic Carbon	mg/L	3.9	SM 5310B	1.0	0.060		05/06/14 17:08	1
Metals								
Arsenic	mg/L	0.014	EPA 200.8	0.0050	0.00093	05/05/14 13:28	05/08/14 16:27	1
Calcium	mg/L	98	EPA 200.7	0.50	0.042	05/05/14 08:33	05/07/14 13:13	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/05/14 08:33	05/07/14 13:13	1
Magnesium	mg/L	31	EPA 200.7	0.50	0.020	05/05/14 08:33	05/07/14 13:13	1
Potassium	mg/L	6.0	EPA 200.7	0.050	0.010	05/05/14 08:33	05/07/14 13:13	1
Sodium	mg/L	280	EPA 200.7	5.0	1.3	05/05/14 08:33	05/07/14 15:59	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/05/14 13:43	1
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404392-02							
Date/Time Collected	05/01/14 13:20							
Collected by	Richard Cofer							
Date/Time Received	05/01/14 16:00							
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/08/14 12:34	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:34	1
Chloride	mg/L	160	EPA 300.0	2.0	0.50		05/14/14 02:14	10
Fluoride	mg/L	0.23	EPA 300.0	0.040	0.010		05/02/14 19:31	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:34	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/02/14 19:31	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:34	1

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10014 North Dale Mabry Rd.
Tampa, FL 33618

May 19, 2014

Work Order: 1404392

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404392-02							
Date/Time Collected	05/01/14 13:20							
Collected by	Richard Cofer							
Date/Time Received	05/01/14 16:00							
Sulfate	mg/L	5.5	EPA 300.0	0.60	0.20		05/02/14 19:31	1
Sulfide	mg/L	2.4	SM 4500SF	0.40	0.10		05/06/14 12:12	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/08/14 12:34	1
Total Dissolved Solids	mg/L	530	SM 2540C	10	10	05/06/14 13:21	05/07/14 14:13	1
Total Organic Carbon	mg/L	3.7	SM 5310B	1.0	0.060		05/06/14 17:22	1
Metals								
Arsenic	mg/L	0.0064	EPA 200.8	0.0050	0.00093	05/05/14 13:28	05/08/14 16:31	1
Calcium	mg/L	75	EPA 200.7	0.50	0.042	05/05/14 08:33	05/07/14 13:16	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/05/14 08:33	05/07/14 13:16	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	05/05/14 08:33	05/07/14 13:16	1
Potassium	mg/L	3.4	EPA 200.7	0.050	0.010	05/05/14 08:33	05/07/14 13:16	1
Sodium	mg/L	76	EPA 200.7	0.50	0.13	05/05/14 08:33	05/07/14 13:16	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/05/14 13:46	1
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404392-03							
Date/Time Collected	05/01/14 12:55							
Collected by	Richard Cofer							
Date/Time Received	05/01/14 16:00							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 12:40	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:40	1
Chloride	mg/L	300	EPA 300.0	4.0	1.0		05/14/14 02:26	20
Fluoride	mg/L	0.17	EPA 300.0	0.040	0.010		05/02/14 19:43	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:40	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/02/14 19:43	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:40	1
Sulfate	mg/L	22	EPA 300.0	0.60	0.20		05/02/14 19:43	1
Sulfide	mg/L	3.8	SM 4500SF	0.40	0.10		05/06/14 12:12	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 12:40	1
Total Dissolved Solids	mg/L	760	SM 2540C	10	10	05/06/14 13:21	05/07/14 14:13	1
Total Organic Carbon	mg/L	3.9	SM 5310B	1.0	0.060		05/06/14 17:35	1
Metals								
Arsenic	mg/L	0.0015 I	EPA 200.8	0.0050	0.00093	05/05/14 13:28	05/08/14 16:36	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	05/05/14 08:33	05/07/14 13:20	1

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Leslie C. Boardman, Q.A. Manager

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10014 North Dale Mabry Rd.
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May 19, 2014

Work Order: 1404392

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1404392-03						
Date/Time Collected		05/01/14 12:55						
Collected by		Richard Cofer						
Date/Time Received		05/01/14 16:00						
Iron	mg/L	0.035 I	EPA 200.7	0.10	0.020	05/05/14 08:33	05/07/14 13:20	1
Magnesium	mg/L	19	EPA 200.7	0.50	0.020	05/05/14 08:33	05/07/14 13:20	1
Potassium	mg/L	4.2	EPA 200.7	0.050	0.010	05/05/14 08:33	05/07/14 13:20	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	05/05/14 08:33	05/07/14 16:02	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/05/14 13:50	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1404392-04						
Date/Time Collected		05/01/14 11:10						
Collected by		Richard Cofer						
Date/Time Received		05/01/14 16:00						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/08/14 12:46	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:46	1
Chloride	mg/L	92	EPA 300.0	2.0	0.50		05/14/14 02:37	10
Fluoride	mg/L	0.31	EPA 300.0	0.040	0.010		05/02/14 19:54	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:46	1
Nitrate (as N)	mg/L	0.04	EPA 300.0	0.04	0.01		05/02/14 19:54	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:46	1
Sulfate	mg/L	3.4	EPA 300.0	0.60	0.20		05/02/14 19:54	1
Sulfide	mg/L	0.40	SM 4500SF	0.40	0.10		05/06/14 12:12	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/08/14 12:46	1
Total Dissolved Solids	mg/L	390	SM 2540C	10	10	05/06/14 13:21	05/07/14 14:13	1
Total Organic Carbon	mg/L	3.0	SM 5310B	1.0	0.060		05/06/14 17:49	1
Metals								
Arsenic	mg/L	0.026	EPA 200.8	0.0050	0.00093	05/05/14 13:28	05/08/14 16:50	1
Calcium	mg/L	62	EPA 200.7	0.50	0.042	05/05/14 08:33	05/07/14 13:24	1
Iron	mg/L	0.11	EPA 200.7	0.10	0.020	05/05/14 08:33	05/07/14 13:24	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	05/05/14 08:33	05/07/14 13:24	1
Potassium	mg/L	2.9	EPA 200.7	0.050	0.010	05/05/14 08:33	05/07/14 13:24	1
Sodium	mg/L	48	EPA 200.7	0.50	0.13	05/05/14 08:33	05/07/14 13:24	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/05/14 13:53	1

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May 19, 2014

Work Order: 1404392

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1404392-05						
Date/Time Collected		05/01/14 10:45						
Collected by		Richard Cofer						
Date/Time Received		05/01/14 16:00						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 12:52	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:52	1
Chloride	mg/L	320	EPA 300.0	4.0	1.0		05/14/14 02:48	20
Fluoride	mg/L	0.17	EPA 300.0	0.040	0.010		05/02/14 20:05	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:52	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/02/14 20:05	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 12:52	1
Sulfate	mg/L	23	EPA 300.0	0.60	0.20		05/02/14 20:05	1
Sulfide	mg/L	3.6	SM 4500SF	0.40	0.10		05/06/14 12:12	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 12:52	1
Total Dissolved Solids	mg/L	800	SM 2540C	10	10	05/06/14 13:21	05/07/14 14:13	1
Total Organic Carbon	mg/L	4.0	SM 5310B	1.0	0.060		05/06/14 18:03	1
Metals								
Arsenic	mg/L	0.0017 I	EPA 200.8	0.0050	0.00093	05/05/14 13:28	05/08/14 16:55	1
Calcium	mg/L	79	EPA 200.7	0.50	0.042	05/05/14 08:33	05/07/14 13:34	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/05/14 08:33	05/07/14 13:34	1
Magnesium	mg/L	21	EPA 200.7	0.50	0.020	05/05/14 08:33	05/07/14 13:34	1
Potassium	mg/L	4.8	EPA 200.7	0.050	0.010	05/05/14 08:33	05/07/14 13:34	1
Sodium	mg/L	190	EPA 200.7	5.0	1.3	05/05/14 08:33	05/07/14 16:06	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/05/14 13:57	1

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May 19, 2014

Work Order: 1404392

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

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EL 34677

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Cassette Brashears & Graham Inc

CINCHWR

Rutherford Clark

Matrix Codes:
 DW=Drinking Water WW=Wastewater
 SW=Surface Water SL=Sludge SO=Soil
 GW=Groundwater SA=Saline Water O=Other
 R=Reagent Water

	Sample Description
SAL Use Only	Sample No.

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May 23, 2014

Work Order: 1404528

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		RW-1						
Matrix		Groundwater						
SAL Sample Number		1404528-01						
Date/Time Collected		05/06/14 14:20						
Collected by		Richard Cofer						
Date/Time Received		05/06/14 15:10						
Inorganics								
Bicarbonate Alkalinity	mg/L	190	SM 2320B	8.0	2.0		05/08/14 13:16	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:16	1
Chloride	mg/L	580	EPA 300.0	20	5.0		05/15/14 04:45	100
Fluoride	mg/L	2.0	EPA 300.0	0.040	0.010		05/07/14 22:59	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:16	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/07/14 22:59	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:16	1
Sulfate	mg/L	44	EPA 300.0	0.60	0.20		05/07/14 22:59	1
Sulfide	mg/L	2.0	SM 4500SF	0.40	0.10		05/13/14 11:26	1
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0		05/08/14 13:16	1
Total Dissolved Solids	mg/L	1,200	SM 2540C	10	10	05/09/14 09:55	05/10/14 15:00	1
Total Organic Carbon	mg/L	3.3	SM 5310B	1.0	0.060		05/07/14 15:59	1
Metals								
Arsenic	mg/L	0.015	EPA 200.8	0.0050	0.00093	05/07/14 08:43	05/13/14 12:09	1
Calcium	mg/L	100	EPA 200.7	0.50	0.042	05/07/14 16:47	05/08/14 14:20	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/07/14 16:47	05/09/14 12:03	1
Magnesium	mg/L	32	EPA 200.7	0.50	0.020	05/07/14 16:47	05/08/14 14:20	1
Potassium	mg/L	6.2	EPA 200.7	0.050	0.010	05/07/14 16:47	05/08/14 14:20	1
Sodium	mg/L	270	EPA 200.7	5.0	1.3	05/07/14 16:47	05/09/14 13:06	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/14/14 16:40	1
 Inorganics								
Sample Description		UZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1404528-02						
Date/Time Collected		05/06/14 13:45						
Collected by		Richard Cofer						
Date/Time Received		05/06/14 15:10						

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May 23, 2014

Work Order: 1404528

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404528-02							
Date/Time Collected	05/06/14 13:45							
Collected by	Richard Cofer							
Date/Time Received	05/06/14 15:10							
Sulfate	mg/L	5.3	EPA 300.0	0.60	0.20		05/07/14 23:11	1
Sulfide	mg/L	1.8	SM 4500SF	0.40	0.10		05/13/14 11:26	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/08/14 13:22	1
Total Dissolved Solids	mg/L	530	SM 2540C	10	10	05/09/14 09:55	05/10/14 15:00	1
Total Organic Carbon	mg/L	3.1	SM 5310B	1.0	0.060		05/07/14 15:59	1
Metals								
Arsenic	mg/L	0.0075	EPA 200.8	0.0050	0.00093	05/07/14 08:43	05/13/14 12:13	1
Calcium	mg/L	77	EPA 200.7	0.50	0.042	05/07/14 16:47	05/08/14 14:23	1
Iron	mg/L	0.034 I	EPA 200.7	0.10	0.020	05/07/14 16:47	05/09/14 12:06	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	05/07/14 16:47	05/08/14 14:23	1
Potassium	mg/L	3.5	EPA 200.7	0.050	0.010	05/07/14 16:47	05/08/14 14:23	1
Sodium	mg/L	77	EPA 200.7	0.50	0.13	05/07/14 16:47	05/08/14 14:23	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/14/14 16:43	1
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1404528-03							
Date/Time Collected	05/06/14 13:20							
Collected by	Richard Cofer							
Date/Time Received	05/06/14 15:10							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 13:28	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:28	1
Chloride	mg/L	270	EPA 300.0	4.0	1.0		05/16/14 21:19	20
Fluoride	mg/L	0.18	EPA 300.0	0.040	0.010		05/15/14 05:03	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:28	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/07/14 23:22	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:28	1
Sulfate	mg/L	20	EPA 300.0	0.60	0.20		05/07/14 23:22	1
Sulfide	mg/L	4.0	SM 4500SF	0.40	0.10		05/13/14 11:26	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 13:28	1
Total Dissolved Solids	mg/L	750	SM 2540C	10	10	05/09/14 09:55	05/10/14 15:00	1
Total Organic Carbon	mg/L	2.7	SM 5310B	1.0	0.060		05/07/14 15:59	1
Metals								
Arsenic	mg/L	0.0014 I	EPA 200.8	0.0050	0.00093	05/07/14 08:43	05/13/14 12:18	1
Calcium	mg/L	83	EPA 200.7	0.50	0.042	05/07/14 16:47	05/08/14 14:27	1

Francis I. Daniels, Laboratory Director
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May 23, 2014

Work Order: 1404528

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1404528-03						
Date/Time Collected		05/06/14 13:20						
Collected by		Richard Cofer						
Date/Time Received		05/06/14 15:10						
Iron	mg/L	0.033 I	EPA 200.7	0.10	0.020	05/07/14 16:47	05/09/14 12:10	1
Magnesium	mg/L	19	EPA 200.7	0.50	0.020	05/07/14 16:47	05/08/14 14:27	1
Potassium	mg/L	4.4	EPA 200.7	0.050	0.010	05/07/14 16:47	05/08/14 14:27	1
Sodium	mg/L	160	EPA 200.7	5.0	1.3	05/07/14 16:47	05/09/14 13:10	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/14/14 16:56	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1404528-04						
Date/Time Collected		05/06/14 11:30						
Collected by		Richard Cofer						
Date/Time Received		05/06/14 15:10						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 13:33	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:33	1
Chloride	mg/L	80	EPA 300.0	2.0	0.50		05/16/14 21:30	10
Fluoride	mg/L	0.34	EPA 300.0	0.040	0.010		05/15/14 05:13	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:33	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/07/14 23:33	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/08/14 13:33	1
Sulfate	mg/L	5.2	EPA 300.0	0.60	0.20		05/07/14 23:33	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		05/13/14 11:26	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/08/14 13:33	1
Total Dissolved Solids	mg/L	360	SM 2540C	10	10	05/10/14 12:02	05/11/14 15:04	1
Total Organic Carbon	mg/L	2.1	SM 5310B	1.0	0.060		05/07/14 15:59	1
Metals								
Arsenic	mg/L	0.028	EPA 200.8	0.0050	0.00093	05/07/14 08:43	05/13/14 12:22	1
Calcium	mg/L	59	EPA 200.7	0.50	0.042	05/07/14 16:47	05/08/14 14:30	1
Iron	mg/L	0.097 I	EPA 200.7	0.10	0.020	05/07/14 16:47	05/09/14 12:13	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	05/07/14 16:47	05/08/14 14:30	1
Potassium	mg/L	2.8	EPA 200.7	0.050	0.010	05/07/14 16:47	05/08/14 14:30	1
Sodium	mg/L	48	EPA 200.7	0.50	0.13	05/07/14 16:47	05/08/14 14:30	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/14/14 16:59	1

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

May 23, 2014

Work Order: 1404528

Laboratory Report

Project Name	CLWGWR							
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	LZAMW-2							
Matrix	Groundwater							
SAL Sample Number	1404528-05							
Date/Time Collected	05/06/14 11:05							
Collected by	Richard Cofer							
Date/Time Received	05/06/14 15:10							
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/14/14 14:17	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/14/14 14:17	1
Chloride	mg/L	350	EPA 300.0	4.0	1.0		05/21/14 10:38	20
Fluoride	mg/L	0.20	EPA 300.0	0.040	0.010		05/15/14 05:22	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/14/14 14:17	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/07/14 23:45	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/14/14 14:17	1
Sulfate	mg/L	19	EPA 300.0	0.60	0.20		05/07/14 23:45	1
Sulfide	mg/L	4.0	SM 4500SF	0.40	0.10		05/13/14 11:26	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/14/14 14:17	1
Total Dissolved Solids	mg/L	800	SM 2540C	10	10	05/10/14 12:02	05/11/14 15:04	1
Total Organic Carbon	mg/L	3.4	SM 5310B	1.0	0.060		05/07/14 15:59	1
Metals								
Arsenic	mg/L	0.0012 I	EPA 200.8	0.0050	0.00093	05/07/14 08:43	05/13/14 12:27	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	05/07/14 16:47	05/08/14 14:34	1
Iron	mg/L	0.044 I	EPA 200.7	0.10	0.020	05/07/14 16:47	05/09/14 12:17	1
Magnesium	mg/L	21	EPA 200.7	0.50	0.020	05/07/14 16:47	05/08/14 14:34	1
Potassium	mg/L	4.8	EPA 200.7	0.050	0.010	05/07/14 16:47	05/08/14 14:34	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	05/07/14 16:47	05/09/14 13:13	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		05/14/14 17:03	1

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10014 North Dale Mabry Rd.
Tampa, FL 33618

May 23, 2014

Work Order: 1404528

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

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SAL Project No. 40452

Client Name	Leggette Brashears & Graham, Inc.		Contact / Phone:	Jeff Trommer		
Project Name / Location	CLWGWR					
Samplers: (Signature)	<i>Rod Coffa</i>					
Matrix Codes:				No. of Containers (Total per each location)		
DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water						
SAL Use Only	Sample No.	Sample Description	Date	Time		
01		9w-1	5-6-14	1420		
02		UZAMW-1		1345		
03		UZAMW-1		1320		
04		UZAMW-2		1130		
05		UZAMW-2		1105		
PARAMETER / CONTAINER DESCRIPTION				Instructions / Remarks		
500ml P, Cool				Q N N/A		
500ml P, Cool				Q N N/A		
250ml P, HNO3				Q N N/A		
250ml P, HCl				Q N N/A		
40ml AV, HCl				Q N N/A		
500ml P, Zn Acetate/NaOH				Q N N/A		
500ml P, Zn Total Sulfide				Q N N/A		
Fe, As, Ca, K, Mg, Na				Q N N/A		
TDS, F				Q N N/A		
Alkalinity, Bicarbonate, Chloride, Nitrate, Sulfate,				Q N N/A		
500ml P, Cool				Q N N/A		
Composite				Q N N/A		
Grab				Q N N/A		
Matrix				Q N N/A		
Samples intact upon arrival?				Q N N/A		
Received on ice? Temp _____				Q N N/A		
Proper preservatives indicated?				Q N N/A		
Rec'd within holding time?				Q N N/A		
Volatiles rec'd w/out headspace?				Q N N/A		
Proper containers used?				Q N N/A		
Containers Prepared:	Date/Time: 5-6-14, 1200	Received: <i>Rod Coffa</i>	Date/Time: 5-6-14, 1200	Seal intact?		
Relinquished:	Date/Time: 5-6-14	Received: <i>K. Meldman</i>	Date/Time: 5-6-14	Samples intact upon arrival?		
Relinquished:	Date/Time: 5-6-14	Received: <i>Rod Coffa</i>	Date/Time: 1510	Received on ice? Temp _____		
Relinquished:	Date/Time: 5-6-14	Received: <i>K. Meldman</i>	Date/Time: 1510	Proper preservatives indicated?		
Relinquished:	Date/Time: 5-6-14	Received: <i>Rod Coffa</i>	Date/Time: 1510	Rec'd within holding time?		
Relinquished:	Date/Time: 5-6-14	Received: <i>K. Meldman</i>	Date/Time: 1510	Volatiles rec'd w/out headspace?		
Relinquished:	Date/Time: 5-6-14	Received: <i>Rod Coffa</i>	Date/Time: 1510	Proper containers used?		

Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405036

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	RW-1							
Matrix	Groundwater							
SAL Sample Number	1405036-01							
Date/Time Collected	05/14/14 13:45							
Collected by	Richard Cofer							
Date/Time Received	05/14/14 15:23							
Inorganics								
Bicarbonate Alkalinity	mg/L	200	SM 2320B	8.0	2.0		05/16/14 14:13	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:13	1
Chloride	mg/L	500	EPA 300.0	20	5.0		06/02/14 21:20	100
Fluoride	mg/L	1.9	EPA 300.0	0.040	0.010		05/15/14 10:32	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:13	1
Nitrate (as N)	mg/L	0.07	EPA 300.0	0.04	0.01		05/15/14 10:32	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:13	1
Sulfate	mg/L	54	EPA 300.0	0.60	0.20		05/15/14 10:32	1
Sulfide	mg/L	2.8	SM 4500SF	0.40	0.10		05/20/14 16:49	1
Total Alkalinity	mg/L	200	SM 2320B	8.0	2.0		05/16/14 14:13	1
Total Dissolved Solids	mg/L	1,200	SM 2540C	10	10	05/21/14 10:24	05/22/14 10:46	1
Total Organic Carbon	mg/L	4.7	SM 5310B	1.0	0.060		05/15/14 14:40	1
Metals								
Arsenic	mg/L	0.014	EPA 200.8	0.0050	0.00093	05/19/14 12:10	05/22/14 18:31	1
Calcium	mg/L	110	EPA 200.7	0.50	0.042	05/19/14 09:01	05/21/14 13:41	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/19/14 09:01	05/21/14 13:41	1
Magnesium	mg/L	33	EPA 200.7	0.50	0.020	05/19/14 09:01	05/21/14 13:41	1
Potassium	mg/L	6.8	EPA 200.7	0.050	0.010	05/19/14 09:01	05/21/14 13:41	1
Sodium	mg/L	290	EPA 200.7	5.0	1.3	05/19/14 09:01	05/21/14 15:17	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 18:17	1
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405036-02							
Date/Time Collected	05/14/14 13:05							
Collected by	Richard Cofer							
Date/Time Received	05/14/14 15:23							
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/16/14 14:19	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:19	1
Chloride	mg/L	160	EPA 300.0	2.0	0.50		06/02/14 21:31	10
Fluoride	mg/L	0.24	EPA 300.0	0.040	0.010		05/15/14 21:07	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:19	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/15/14 21:07	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:19	1

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405036

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405036-02							
Date/Time Collected	05/14/14 13:05							
Collected by	Richard Cofer							
Date/Time Received	05/14/14 15:23							
Sulfate	mg/L	8.5	EPA 300.0	0.60	0.20	05/15/14 21:07	1	
Sulfide	mg/L	3.0	SM 4500SF	0.40	0.10	05/20/14 16:49	1	
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0	05/16/14 14:19	1	
Total Dissolved Solids	mg/L	540	SM 2540C	10	10	05/21/14 10:24	05/22/14 10:46	1
Total Organic Carbon	mg/L	3.8	SM 5310B	1.0	0.060	05/15/14 14:40	1	
Metals								
Arsenic	mg/L	0.0070	EPA 200.8	0.0050	0.00093	05/19/14 12:10	05/22/14 18:35	1
Calcium	mg/L	81	EPA 200.7	0.50	0.042	05/19/14 09:01	05/21/14 13:44	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/19/14 09:01	05/21/14 13:44	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	05/19/14 09:01	05/21/14 13:44	1
Potassium	mg/L	3.6	EPA 200.7	0.050	0.010	05/19/14 09:01	05/21/14 13:44	1
Sodium	mg/L	80	EPA 200.7	0.50	0.13	05/19/14 09:01	05/21/14 13:44	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/05/14 18:21	1	
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405036-03							
Date/Time Collected	05/14/14 12:35							
Collected by	Richard Cofer							
Date/Time Received	05/14/14 15:23							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0	05/16/14 14:25	1	
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	05/16/14 14:25	1	
Chloride	mg/L	310	EPA 300.0	2.0	0.50	06/02/14 21:42	10	
Fluoride	mg/L	0.18	EPA 300.0	0.040	0.010	05/15/14 21:18	1	
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	05/16/14 14:25	1	
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01	05/15/14 21:18	1	
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	05/16/14 14:25	1	
Sulfate	mg/L	19	EPA 300.0	0.60	0.20	05/15/14 21:18	1	
Sulfide	mg/L	4.4	SM 4500SF	0.40	0.10	05/20/14 16:49	1	
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0	05/16/14 14:25	1	
Total Dissolved Solids	mg/L	790	SM 2540C	10	10	05/21/14 10:24	05/22/14 10:46	1
Total Organic Carbon	mg/L	3.5	SM 5310B	1.0	0.060	05/15/14 14:40	1	
Metals								
Arsenic	mg/L	0.0018 I	EPA 200.8	0.0050	0.00093	05/19/14 12:10	05/22/14 18:40	1
Calcium	mg/L	84	EPA 200.7	0.50	0.042	05/19/14 09:01	05/21/14 13:47	1

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

NELAP Accredited

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10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405036

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1405036-03						
Date/Time Collected		05/14/14 12:35						
Collected by		Richard Cofer						
Date/Time Received		05/14/14 15:23						
Iron	mg/L	0.032 I	EPA 200.7	0.10	0.020	05/19/14 09:01	05/21/14 13:47	1
Magnesium	mg/L	19	EPA 200.7	0.50	0.020	05/19/14 09:01	05/21/14 13:47	1
Potassium	mg/L	4.5	EPA 200.7	0.050	0.010	05/19/14 09:01	05/21/14 13:47	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	05/19/14 09:01	05/21/14 15:20	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 18:24	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1405036-04						
Date/Time Collected		05/14/14 10:15						
Collected by		Richard Cofer						
Date/Time Received		05/14/14 15:23						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/16/14 14:32	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:32	1
Chloride	mg/L	95	EPA 300.0	2.0	0.50		06/02/14 21:54	10
Fluoride	mg/L	0.31	EPA 300.0	0.040	0.010		05/15/14 21:30	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:32	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/15/14 21:30	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:32	1
Sulfate	mg/L	5.0	EPA 300.0	0.60	0.20		05/15/14 21:30	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		05/20/14 16:49	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/16/14 14:32	1
Total Dissolved Solids	mg/L	410	SM 2540C	10	10	05/21/14 10:24	05/22/14 10:46	1
Total Organic Carbon	mg/L	2.8	SM 5310B	1.0	0.060		05/15/14 14:40	1
Metals								
Arsenic	mg/L	0.026	EPA 200.8	0.0050	0.00093	05/19/14 12:10	05/22/14 18:44	1
Calcium	mg/L	65	EPA 200.7	0.50	0.042	05/19/14 09:01	05/21/14 13:51	1
Iron	mg/L	0.17	EPA 200.7	0.10	0.020	05/19/14 09:01	05/21/14 13:51	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	05/19/14 09:01	05/21/14 13:51	1
Potassium	mg/L	3.1	EPA 200.7	0.050	0.010	05/19/14 09:01	05/21/14 13:51	1
Sodium	mg/L	50	EPA 200.7	0.50	0.13	05/19/14 09:01	05/21/14 13:51	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 18:35	1

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June 12, 2014

Work Order: 1405036

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1405036-05						
Date/Time Collected		05/14/14 09:50						
Collected by		Richard Cofer						
Date/Time Received		05/14/14 15:23						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/16/14 14:44	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:44	1
Chloride	mg/L	310	EPA 300.0	20	5.0		06/04/14 00:41	100
Fluoride	mg/L	0.18	EPA 300.0	0.040	0.010		05/15/14 21:41	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:44	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/15/14 21:41	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/16/14 14:44	1
Sulfate	mg/L	21	EPA 300.0	0.60	0.20		05/15/14 21:41	1
Sulfide	mg/L	5.4	SM 4500SF	0.40	0.10		05/20/14 16:49	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/16/14 14:44	1
Total Dissolved Solids	mg/L	860	SM 2540C	10	10	05/21/14 10:24	05/22/14 10:46	1
Total Organic Carbon	mg/L	4.1	SM 5310B	1.0	0.060		05/15/14 14:40	1
Metals								
Arsenic	mg/L	0.00093 U	EPA 200.8	0.0050	0.00093	05/19/14 12:10	05/22/14 18:49	1
Calcium	mg/L	85	EPA 200.7	0.50	0.042	05/19/14 09:01	05/21/14 13:55	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	05/19/14 09:01	05/21/14 13:55	1
Magnesium	mg/L	21	EPA 200.7	0.50	0.020	05/19/14 09:01	05/21/14 13:55	1
Potassium	mg/L	5.2	EPA 200.7	0.050	0.010	05/19/14 09:01	05/21/14 13:55	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	05/19/14 09:01	05/21/14 15:32	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 18:39	1

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405036

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677 813-855-1844 fax 813-855-2218

SAL Project No. 1405036

Client Name	Leggette Brashears & Graham, Inc.		Contact / Phone:	Jeff Trommer
Project Name / Location	CLW/GWR			
Samplers: (Signature)	<i>Reinhard C. Schaefer</i>			
Matrix Codes:	DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water	Sample Description	Date	Time
SAL Use Only	Sample No.	Matrix	Composite	Grab
500ml P, Cool	500ml P, Cool	Alkalinity, Bicarbonate, Chloride, Nitrate, Sulfate, TDS, F	Fe Dissolved (Filtered in field)	250ml P, Cool
250ml P, HNO3	250ml P, HNO3	Fe, As, Ca, K, Mg, Na	Total Sulfide	500ml P, Zn Acetate/NaOH
40ml AV, HCl	40ml AV, HCl	TOC	No. of Containers (Total per each location)	
				6

Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405283

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		RW-1						
Matrix		Groundwater						
SAL Sample Number		1405283-01						
Date/Time Collected		05/21/14 10:05						
Collected by		Client						
Date/Time Received		05/21/14 16:25						
Inorganics								
Bicarbonate Alkalinity	mg/L	190	SM 2320B	8.0	2.0		05/30/14 13:20	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:20	1
Chloride	mg/L	580	EPA 300.0	20	5.0		06/11/14 00:43	100
Fluoride	mg/L	0.24	EPA 300.0	0.040	0.010		05/22/14 15:14	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:20	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/22/14 15:14	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:20	1
Sulfate	mg/L	52	EPA 300.0	0.60	0.20		05/22/14 15:14	1
Sulfide	mg/L	3.0	SM 4500SF	0.40	0.10		05/23/14 08:47	1
Total Alkalinity	mg/L	190	SM 2320B	8.0	2.0		05/30/14 13:20	1
Total Dissolved Solids	mg/L	1,100	SM 2540C	10	10	05/27/14 07:57	05/28/14 09:17	1
Total Organic Carbon	mg/L	4.3	SM 5310B	1.0	0.060		05/22/14 10:34	1
Metals								
Arsenic	mg/L	0.015	EPA 200.8	0.0050	0.00093	06/02/14 08:41	06/03/14 10:19	1
Calcium	mg/L	100	EPA 200.7	0.50	0.042	06/02/14 08:45	06/06/14 11:32	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/02/14 08:45	06/06/14 11:32	1
Magnesium	mg/L	32	EPA 200.7	0.50	0.020	06/02/14 08:45	06/06/14 11:32	1
Potassium	mg/L	6.3	EPA 200.7	0.050	0.010	06/02/14 08:45	06/06/14 11:32	1
Sodium	mg/L	240	EPA 200.7	5.0	1.3	06/02/14 08:45	06/06/14 17:15	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 19:22	1
Sample Description		UZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1405283-02						
Date/Time Collected		05/21/14 11:15						
Collected by								
Date/Time Received		05/21/14 16:25						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/30/14 13:27	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:27	1
Chloride	mg/L	180	EPA 300.0	2.0	0.50		06/11/14 00:54	10
Fluoride	mg/L	0.16	EPA 300.0	0.040	0.010		05/22/14 15:14	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:27	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/22/14 15:14	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:27	1

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405283

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405283-02							
Date/Time Collected	05/21/14 11:15							
Collected by								
Date/Time Received	05/21/14 16:25							
Sulfate	mg/L	9.8	EPA 300.0	0.60	0.20		05/22/14 15:14	1
Sulfide	mg/L	2.4	SM 4500SF	0.40	0.10		05/23/14 08:47	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/30/14 13:27	1
Total Dissolved Solids	mg/L	480	SM 2540C	10	10	05/27/14 07:57	05/28/14 09:17	1
Total Organic Carbon	mg/L	4.0	SM 5310B	1.0	0.060		05/22/14 10:34	1
Metals								
Arsenic	mg/L	0.0082	EPA 200.8	0.0050	0.00093	06/02/14 08:41	06/03/14 10:23	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	06/02/14 08:45	06/06/14 11:35	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/02/14 08:45	06/06/14 11:35	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	06/02/14 08:45	06/06/14 11:35	1
Potassium	mg/L	3.5	EPA 200.7	0.050	0.010	06/02/14 08:45	06/06/14 11:35	1
Sodium	mg/L	80	EPA 200.7	0.50	0.13	06/02/14 08:45	06/06/14 11:35	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 19:25	1
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405283-03							
Date/Time Collected	05/21/14 13:35							
Collected by								
Date/Time Received	05/21/14 16:25							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/30/14 13:34	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:34	1
Chloride	mg/L	340	EPA 300.0	20	5.0		06/11/14 01:06	100
Fluoride	mg/L	0.17	EPA 300.0	0.040	0.010		05/22/14 15:14	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:34	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/22/14 15:14	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:34	1
Sulfate	mg/L	22	EPA 300.0	0.60	0.20		05/22/14 15:14	1
Sulfide	mg/L	4.2	SM 4500SF	0.40	0.10		05/23/14 08:47	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/30/14 13:34	1
Total Dissolved Solids	mg/L	710	SM 2540C	10	10	05/27/14 07:57	05/28/14 09:17	1
Total Organic Carbon	mg/L	3.5	SM 5310B	1.0	0.060		05/22/14 10:34	1
Metals								
Arsenic	mg/L	0.0018 I	EPA 200.8	0.0050	0.00093	06/02/14 08:41	06/03/14 10:28	1
Calcium	mg/L	85	EPA 200.7	0.50	0.042	06/02/14 08:45	06/06/14 11:39	1

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

NELAP Accredited

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405283

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405283-03							
Date/Time Collected	05/21/14 13:35							
Collected by								
Date/Time Received	05/21/14 16:25							
Iron	mg/L	0.037 I	EPA 200.7	0.10	0.020	06/02/14 08:45	06/06/14 11:39	1
Magnesium	mg/L	19	EPA 200.7	0.50	0.020	06/02/14 08:45	06/06/14 11:39	1
Potassium	mg/L	4.6	EPA 200.7	0.050	0.010	06/02/14 08:45	06/06/14 11:39	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	06/02/14 08:45	06/06/14 17:28	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/05/14 19:29	1
Sample Description	UZAMW-2							
Matrix	Groundwater							
SAL Sample Number	1405283-04							
Date/Time Collected	05/21/14 14:55							
Collected by								
Date/Time Received	05/21/14 16:25							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/30/14 13:41	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:41	1
Chloride	mg/L	110	EPA 300.0	2.0	0.50		06/11/14 12:02	10
Fluoride	mg/L	0.34	EPA 300.0	0.040	0.010		05/22/14 15:14	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:41	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/22/14 15:14	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:41	1
Sulfate	mg/L	6.4	EPA 300.0	0.60	0.20		05/22/14 15:14	1
Sulfide	mg/L	0.20 I	SM 4500SF	0.40	0.10		05/23/14 08:47	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		05/30/14 13:41	1
Total Dissolved Solids	mg/L	330	SM 2540C	10	10	05/27/14 07:57	05/28/14 09:17	1
Total Organic Carbon	mg/L	3.5	SM 5310B	1.0	0.060		05/22/14 10:34	1
Metals								
Arsenic	mg/L	0.027	EPA 200.8	0.0050	0.00093	06/02/14 08:41	06/03/14 10:32	1
Calcium	mg/L	63	EPA 200.7	0.50	0.042	06/02/14 08:45	06/06/14 11:42	1
Iron	mg/L	0.14	EPA 200.7	0.10	0.020	06/02/14 08:45	06/06/14 11:42	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	06/02/14 08:45	06/06/14 11:42	1
Potassium	mg/L	2.8	EPA 200.7	0.050	0.010	06/02/14 08:45	06/06/14 11:42	1
Sodium	mg/L	46	EPA 200.7	0.50	0.13	06/02/14 08:45	06/06/14 11:42	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/10/14 15:12	1

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 12, 2014

Work Order: 1405283

Laboratory Report

Project Name	CLWGWR							
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1405283-05						
Date/Time Collected		05/21/14 15:30						
Collected by								
Date/Time Received		05/21/14 16:25						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/30/14 13:53	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:53	1
Chloride	mg/L	360	EPA 300.0	20	5.0		06/11/14 01:28	100
Fluoride	mg/L	0.19	EPA 300.0	0.040	0.010		05/22/14 15:14	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:53	1
Nitrate (as N)	mg/L	0.01 U	EPA 300.0	0.04	0.01		05/22/14 15:14	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		05/30/14 13:53	1
Sulfate	mg/L	27	EPA 300.0	0.60	0.20		05/22/14 15:14	1
Sulfide	mg/L	4.4	SM 4500SF	0.40	0.10		05/23/14 08:47	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		05/30/14 13:53	1
Total Dissolved Solids	mg/L	740	SM 2540C	10	10	05/27/14 07:57	05/28/14 09:17	1
Total Organic Carbon	mg/L	3.4	SM 5310B	1.0	0.060		05/22/14 10:34	1
Metals								
Arsenic	mg/L	0.0020 I	EPA 200.8	0.0050	0.00093	06/02/14 08:41	06/03/14 10:46	1
Calcium	mg/L	81	EPA 200.7	0.50	0.042	06/02/14 08:45	06/06/14 11:46	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/02/14 08:45	06/06/14 11:46	1
Magnesium	mg/L	20	EPA 200.7	0.50	0.020	06/02/14 08:45	06/06/14 11:46	1
Potassium	mg/L	4.7	EPA 200.7	0.050	0.010	06/02/14 08:45	06/06/14 11:46	1
Sodium	mg/L	160	EPA 200.7	5.0	1.3	06/02/14 08:45	06/06/14 17:32	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/10/14 15:16	1

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June 12, 2014

Work Order: 1405283

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Questions regarding this report should be directed to :

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Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that appears to read "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

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SAL Project No. 1405283

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 18, 2014

Work Order: 1405573

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		RW-1						
Matrix		Groundwater						
SAL Sample Number		1405573-01						
Date/Time Collected		05/30/14 15:35						
Collected by		Richard Cofer						
Date/Time Received		05/30/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		06/06/14 12:33	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:33	1
Chloride	mg/L	470	EPA 300.0	20	5.0		06/13/14 02:42	100
Fluoride	mg/L	1.8	EPA 300.0	0.040	0.010		06/02/14 18:19	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:33	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/02/14 18:19	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:33	1
Sulfate	mg/L	42	EPA 300.0	0.60	0.20		06/02/14 18:19	1
Sulfide	mg/L	3.3	SM 4500SF	0.40	0.10		06/03/14 16:28	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		06/06/14 12:33	1
Total Dissolved Solids	mg/L	1,200	SM 2540C	10	10	06/04/14 11:08	06/05/14 17:17	1
Total Organic Carbon	mg/L	4.0	SM 5310B	1.0	0.060		06/02/14 22:01	1
Metals								
Arsenic	mg/L	0.017	EPA 200.8	0.0050	0.00093	06/03/14 11:26	06/09/14 11:39	1
Calcium	mg/L	110	EPA 200.7	0.50	0.042	06/11/14 11:09	06/11/14 19:30	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/11/14 11:09	06/11/14 19:30	1
Magnesium	mg/L	35	EPA 200.7	0.50	0.020	06/11/14 11:09	06/11/14 19:30	1
Potassium	mg/L	6.6	EPA 200.7	0.050	0.010	06/11/14 11:09	06/11/14 19:30	1
Sodium	mg/L	290	EPA 200.7	5.0	1.3	06/11/14 11:09	06/12/14 12:51	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/10/14 16:10	1
Sample Description		UZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1405573-02						
Date/Time Collected		05/30/14 13:15						
Collected by		Richard Cofer						
Date/Time Received		05/30/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		06/06/14 12:39	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:39	1
Chloride	mg/L	150	EPA 300.0	2.0	0.50		06/13/14 02:53	10
Fluoride	mg/L	0.20	EPA 300.0	0.040	0.010		06/02/14 18:30	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:39	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/02/14 18:30	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:39	1

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

813-855-1844 FAX 813-855-2218



Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

June 18, 2014

Work Order: 1405573

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405573-02							
Date/Time Collected	05/30/14 13:15							
Collected by	Richard Cofer							
Date/Time Received	05/30/14 15:50							
Sulfate	mg/L	5.2	EPA 300.0	0.60	0.20	06/02/14 18:30	1	
Sulfide	mg/L	2.0	SM 4500SF	0.40	0.10	06/03/14 16:28	1	
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0	06/06/14 12:39	1	
Total Dissolved Solids	mg/L	550	SM 2540C	10	10	06/04/14 11:08	06/05/14 17:17	1
Total Organic Carbon	mg/L	3.6	SM 5310B	1.0	0.060	06/02/14 22:14	1	
Metals								
Arsenic	mg/L	0.0073	EPA 200.8	0.0050	0.00093	06/03/14 11:26	06/09/14 11:43	1
Calcium	mg/L	80	EPA 200.7	0.50	0.042	06/11/14 11:09	06/11/14 19:33	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/11/14 11:09	06/11/14 19:33	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	06/11/14 11:09	06/11/14 19:33	1
Potassium	mg/L	3.2	EPA 200.7	0.050	0.010	06/11/14 11:09	06/11/14 19:33	1
Sodium	mg/L	75	EPA 200.7	0.50	0.13	06/11/14 11:09	06/11/14 19:33	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/10/14 16:13	1	
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405573-03							
Date/Time Collected	05/30/14 12:50							
Collected by	Richard Cofer							
Date/Time Received	05/30/14 15:50							
Inorganics								
Bicarbonate Alkalinity	mg/L	160	SM 2320B	8.0	2.0	06/06/14 12:45	1	
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	06/06/14 12:45	1	
Chloride	mg/L	290	EPA 300.0	20	5.0	06/13/14 04:35	100	
Fluoride	mg/L	0.13	EPA 300.0	0.040	0.010	06/02/14 18:42	1	
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	06/06/14 12:45	1	
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01	06/02/14 18:42	1	
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	06/06/14 12:45	1	
Sulfate	mg/L	14	EPA 300.0	0.60	0.20	06/02/14 18:42	1	
Sulfide	mg/L	4.4	SM 4500SF	0.40	0.10	06/03/14 16:28	1	
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0	06/06/14 12:45	1	
Total Dissolved Solids	mg/L	790	SM 2540C	10	10	06/04/14 11:08	06/05/14 17:17	1
Total Organic Carbon	mg/L	3.8	SM 5310B	1.0	0.060	06/02/14 22:52	1	
Metals								
Arsenic	mg/L	0.0018 I	EPA 200.8	0.0050	0.00093	06/03/14 11:26	06/09/14 11:48	1
Calcium	mg/L	85	EPA 200.7	0.50	0.042	06/11/14 11:09	06/11/14 19:46	1

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

NELAP Accredited

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June 18, 2014

Work Order: 1405573

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1405573-03						
Date/Time Collected		05/30/14 12:50						
Collected by		Richard Cofer						
Date/Time Received		05/30/14 15:50						
Iron	mg/L	0.034 I	EPA 200.7	0.10	0.020	06/11/14 11:09	06/11/14 19:46	1
Magnesium	mg/L	19	EPA 200.7	0.50	0.020	06/11/14 11:09	06/11/14 19:46	1
Potassium	mg/L	4.2	EPA 200.7	0.050	0.010	06/11/14 11:09	06/11/14 19:46	1
Sodium	mg/L	160	EPA 200.7	5.0	1.3	06/11/14 11:09	06/12/14 12:54	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/10/14 16:17	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1405573-04						
Date/Time Collected		05/30/14 15:00						
Collected by		Richard Cofer						
Date/Time Received		05/30/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	160	SM 2320B	8.0	2.0		06/06/14 12:51	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:51	1
Chloride	mg/L	85	EPA 300.0	2.0	0.50		06/13/14 04:46	10
Fluoride	mg/L	0.29	EPA 300.0	0.040	0.010		06/02/14 18:53	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:51	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/02/14 18:53	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:51	1
Sulfate	mg/L	5.6	EPA 300.0	0.60	0.20		06/02/14 18:53	1
Sulfide	mg/L	0.39 I	SM 4500SF	0.40	0.10		06/03/14 16:28	1
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0		06/06/14 12:51	1
Total Dissolved Solids	mg/L	420	SM 2540C	10	10	06/04/14 11:08	06/05/14 17:17	1
Total Organic Carbon	mg/L	2.7	SM 5310B	1.0	0.060		06/02/14 22:42	1
Metals								
Arsenic	mg/L	0.028	EPA 200.8	0.0050	0.00093	06/03/14 11:26	06/09/14 11:52	1
Calcium	mg/L	64	EPA 200.7	0.50	0.042	06/11/14 11:09	06/11/14 19:50	1
Iron	mg/L	0.14	EPA 200.7	0.10	0.020	06/11/14 11:09	06/11/14 19:50	1
Magnesium	mg/L	15	EPA 200.7	0.50	0.020	06/11/14 11:09	06/11/14 19:50	1
Potassium	mg/L	2.6	EPA 200.7	0.050	0.010	06/11/14 11:09	06/11/14 19:50	1
Sodium	mg/L	48	EPA 200.7	0.50	0.13	06/11/14 11:09	06/11/14 19:50	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/10/14 16:45	1

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June 18, 2014

Work Order: 1405573

Laboratory Report

Project Name	CLWGWR							
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	LZAMW-2							
Matrix	Groundwater							
SAL Sample Number	1405573-05							
Date/Time Collected	05/30/14 14:35							
Collected by	Richard Cofer							
Date/Time Received	05/30/14 15:50							
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		06/06/14 12:57	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:57	1
Chloride	mg/L	300	EPA 300.0	20	5.0		06/13/14 04:57	100
Fluoride	mg/L	0.13	EPA 300.0	0.040	0.010		06/02/14 19:04	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:57	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/02/14 19:04	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/06/14 12:57	1
Sulfate	mg/L	16	EPA 300.0	0.60	0.20		06/02/14 19:04	1
Sulfide	mg/L	4.8	SM 4500SF	0.40	0.10		06/03/14 16:28	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		06/06/14 12:57	1
Total Dissolved Solids	mg/L	830	SM 2540C	10	10	06/04/14 11:08	06/05/14 17:17	1
Total Organic Carbon	mg/L	3.7	SM 5310B	1.0	0.060		06/02/14 22:55	1
Metals								
Arsenic	mg/L	0.0024 I	EPA 200.8	0.0050	0.00093	06/03/14 11:26	06/09/14 11:57	1
Calcium	mg/L	84	EPA 200.7	0.50	0.042	06/11/14 11:09	06/11/14 19:54	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/11/14 11:09	06/11/14 19:54	1
Magnesium	mg/L	21	EPA 200.7	0.50	0.020	06/11/14 11:09	06/11/14 19:54	1
Potassium	mg/L	5.0	EPA 200.7	0.050	0.010	06/11/14 11:09	06/11/14 19:54	1
Sodium	mg/L	190	EPA 200.7	5.0	1.3	06/11/14 11:09	06/12/14 12:58	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020		06/10/14 16:49	1

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* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Q Sample held beyond the accepted holding time.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that reads "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

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SAL Project No. 1405573

Client Name		Project Name / Location		Samplers: (Signature)		Contact / Phone:	
Leggette Brashears & Graham, Inc.		CLWGW/R		<i>Richard Cogar</i>		Jeff Trommer	
PARAMETER / CONTAINER DESCRIPTION							
SAL Use Only	Matrix Codes:	Sample Description	Date	Time	Matrix	TOC	No. of Containers (Total per each location)
Sample No.	DW-Drinking Water WW-Wastewater SW-SurfaceWater SL-Sludge SO-Soil GW-Groundwater SA-Saline Water O-Other R-Reagent Water						
01	WW - 1	5-30-14	1535	GW	X	1	1
02	ZZAmw - 1		1315	GW	X	1	1
03	ZZAmw - 1		1232	GW	X	1	1
04	ZZAmw - 2		1500	GW	X	1	1
05	ZZAmw - 2		1525	GW	X	1	1
Instructions / Remarks							
Containers Prepared/ Relinquished	Date/Time: <u>3-14-14</u>	Received: <u>1530</u>	Date/Time:	Received:	Date/Time:	Seal intact?	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A
Relinquished:	Date/Time: <u>5-30-14</u>	Received: <u>1530</u>	Date/Time: <u>1530</u>	Received: <u>5-30-14</u>	Date/Time: <u>5-30-14</u>	Received on ice? Temp _____	<input checked="" type="checkbox"/> N <input type="checkbox"/> N/A
Relinquished:	Date/Time:	Received:	Date/Time:	Received:	Date/Time:	Proper preservatives indicated?	<input checked="" type="checkbox"/> N <input type="checkbox"/> N/A
Relinquished:	Date/Time:	Received:	Date/Time:	Received:	Date/Time:	Rec'd w/in holding time?	<input checked="" type="checkbox"/> N <input type="checkbox"/> N/A
Relinquished:	Date/Time:	Received:	Date/Time:	Received:	Date/Time:	Volatile rec'd w/out headspace?	<input checked="" type="checkbox"/> Y <input type="checkbox"/> N <input checked="" type="checkbox"/> N/A
Relinquished:	Date/Time:	Received:	Date/Time:	Received:	Date/Time:	Proper containers used?	<input checked="" type="checkbox"/> N <input type="checkbox"/> N/A

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10014 North Dale Mabry Rd.
Tampa, FL 33618

July 3, 2014

Work Order: 1405795

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		RW-1						
Matrix		Groundwater						
SAL Sample Number		1405795-01						
Date/Time Collected		06/04/14 15:30						
Collected by		Richard Cofer						
Date/Time Received		06/04/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	180	SM 2320B	8.0	2.0		06/17/14 12:02	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:02	1
Chloride	mg/L	480	EPA 300.0	2.0	0.50		07/02/14 19:04	10
Fluoride	mg/L	1.9	EPA 300.0	0.040	0.010		06/06/14 20:36	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:02	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/06/14 20:36	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:02	1
Sulfate	mg/L	45	EPA 300.0	0.60	0.20		06/06/14 20:36	1
Sulfide	mg/L	3.4	SM 4500SF	0.40	0.10		06/10/14 08:05	1
Total Alkalinity	mg/L	180	SM 2320B	8.0	2.0		06/17/14 12:02	1
Total Dissolved Solids	mg/L	1,100	SM 2540C	10	10	06/10/14 11:52	06/12/14 10:16	1
Total Organic Carbon	mg/L	4.2	SM 5310B	1.0	0.060		06/09/14 17:20	1
Metals								
Arsenic	mg/L	0.015	EPA 200.8	0.0050	0.00093	06/13/14 08:50	06/17/14 16:10	1
Calcium	mg/L	100	EPA 200.7	0.50	0.042	06/17/14 10:04	06/17/14 14:57	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/17/14 10:04	06/17/14 14:57	1
Magnesium	mg/L	32	EPA 200.7	0.50	0.020	06/17/14 10:04	06/17/14 14:57	1
Potassium	mg/L	6.5	EPA 200.7	0.050	0.010	06/17/14 10:04	06/17/14 14:57	1
Sodium	mg/L	280	EPA 200.7	5.0	1.3	06/17/14 10:04	06/17/14 16:03	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/19/14 12:56	06/19/14 14:36	1
Sample Description		UZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1405795-02						
Date/Time Collected		06/04/14 14:45						
Collected by		Richard Cofer						
Date/Time Received		06/04/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		06/17/14 12:09	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:09	1
Chloride	mg/L	150	EPA 300.0	2.0	0.50		07/02/14 19:16	10
Fluoride	mg/L	0.16	EPA 300.0	0.040	0.010		06/06/14 20:48	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:09	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/06/14 20:48	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:09	1

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July 3, 2014

Work Order: 1405795

Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description	UZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405795-02							
Date/Time Collected	06/04/14 14:45							
Collected by	Richard Cofer							
Date/Time Received	06/04/14 15:50							
Sulfate	mg/L	3.7	EPA 300.0	0.60	0.20	06/06/14 20:48	1	
Sulfide	mg/L	2.4	SM 4500SF	0.40	0.10	06/10/14 08:05	1	
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0	06/17/14 12:09	1	
Total Dissolved Solids	mg/L	530	SM 2540C	10	10	06/11/14 13:58	06/12/14 12:21	1
Total Organic Carbon	mg/L	4.1	SM 5310B	1.0	0.060	06/09/14 19:11	1	
Metals								
Arsenic	mg/L	0.0068	EPA 200.8	0.0050	0.00093	06/13/14 08:50	06/17/14 16:33	1
Calcium	mg/L	76	EPA 200.7	0.50	0.042	06/17/14 10:04	06/17/14 15:00	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/17/14 10:04	06/17/14 15:00	1
Magnesium	mg/L	14	EPA 200.7	0.50	0.020	06/17/14 10:04	06/17/14 15:00	1
Potassium	mg/L	3.0	EPA 200.7	0.050	0.010	06/17/14 10:04	06/17/14 15:00	1
Sodium	mg/L	73	EPA 200.7	0.50	0.13	06/17/14 10:04	06/17/14 15:00	1
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/19/14 12:56	06/19/14 14:39	1
Sample Description	LZAMW-1							
Matrix	Groundwater							
SAL Sample Number	1405795-03							
Date/Time Collected	06/04/14 14:20							
Collected by	Richard Cofer							
Date/Time Received	06/04/14 15:50							
Inorganics								
Bicarbonate Alkalinity	mg/L	160	SM 2320B	8.0	2.0	06/17/14 12:15	1	
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	06/17/14 12:15	1	
Chloride	mg/L	280	EPA 300.0	2.0	0.50	07/02/14 19:27	10	
Fluoride	mg/L	0.093	EPA 300.0	0.040	0.010	06/06/14 20:59	1	
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	06/17/14 12:15	1	
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01	06/06/14 20:59	1	
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0	06/17/14 12:15	1	
Sulfate	mg/L	11	EPA 300.0	0.60	0.20	06/06/14 20:59	1	
Sulfide	mg/L	4.6	SM 4500SF	0.40	0.10	06/10/14 08:05	1	
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0	06/17/14 12:15	1	
Total Dissolved Solids	mg/L	740	SM 2540C	10	10	06/11/14 13:58	06/12/14 12:21	1
Total Organic Carbon	mg/L	4.1	SM 5310B	1.0	0.060	06/09/14 19:24	1	
Metals								
Arsenic	mg/L	0.0017 I	EPA 200.8	0.0050	0.00093	06/13/14 08:50	06/17/14 16:38	1
Calcium	mg/L	82	EPA 200.7	0.50	0.042	06/17/14 10:04	06/17/14 15:03	1

NELAP Accredited

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Laboratory Report

Project Name		CLWGWR						
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-1						
Matrix		Groundwater						
SAL Sample Number		1405795-03						
Date/Time Collected		06/04/14 14:20						
Collected by		Richard Cofer						
Date/Time Received		06/04/14 15:50						
Iron	mg/L	0.031 I	EPA 200.7	0.10	0.020	06/17/14 10:04	06/17/14 15:03	1
Magnesium	mg/L	18	EPA 200.7	0.50	0.020	06/17/14 10:04	06/17/14 15:03	1
Potassium	mg/L	4.3	EPA 200.7	0.050	0.010	06/17/14 10:04	06/17/14 15:03	1
Sodium	mg/L	170	EPA 200.7	5.0	1.3	06/17/14 10:04	06/17/14 16:06	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/19/14 12:56	06/19/14 14:42	1
Sample Description		UZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1405795-04						
Date/Time Collected		06/04/14 12:30						
Collected by		Richard Cofer						
Date/Time Received		06/04/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	160	SM 2320B	8.0	2.0		06/17/14 12:28	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:28	1
Chloride	mg/L	88	EPA 300.0	2.0	0.50		07/02/14 19:38	10
Fluoride	mg/L	0.24	EPA 300.0	0.040	0.010		06/06/14 21:10	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:28	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/06/14 21:10	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:28	1
Sulfate	mg/L	3.1	EPA 300.0	0.60	0.20		06/06/14 21:10	1
Sulfide	mg/L	0.10 U	SM 4500SF	0.40	0.10		06/10/14 08:05	1
Total Alkalinity	mg/L	160	SM 2320B	8.0	2.0		06/17/14 12:28	1
Total Dissolved Solids	mg/L	390	SM 2540C	10	10	06/11/14 13:58	06/12/14 12:21	1
Total Organic Carbon	mg/L	3.3	SM 5310B	1.0	0.060		06/09/14 19:38	1
Metals								
Arsenic	mg/L	0.026	EPA 200.8	0.0050	0.00093	06/13/14 08:50	06/17/14 16:42	1
Calcium	mg/L	59	EPA 200.7	0.50	0.042	06/17/14 10:04	06/17/14 15:07	1
Iron	mg/L	0.087 I	EPA 200.7	0.10	0.020	06/17/14 10:04	06/17/14 15:07	1
Magnesium	mg/L	13	EPA 200.7	0.50	0.020	06/17/14 10:04	06/17/14 15:07	1
Potassium	mg/L	2.6	EPA 200.7	0.050	0.010	06/17/14 10:04	06/17/14 15:07	1
Sodium	mg/L	46	EPA 200.7	0.50	0.13	06/17/14 10:04	06/17/14 15:07	1
Metals, Dissolved		Iron						
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/19/14 12:56	06/19/14 14:46	1

SOUTHERN ANALYTICAL LABORATORIES, INC.

110 BAYVIEW BOULEVARD, OLDSMAR, FL 34677

813-855-1844 FAX 813-855-2218



Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

July 3, 2014

Work Order: 1405795

Laboratory Report

Project Name	CLWGWR							
Parameters	Units	Results *	Method	PQL	MDL	Prepared	Analyzed	Dilution
Sample Description		LZAMW-2						
Matrix		Groundwater						
SAL Sample Number		1405795-05						
Date/Time Collected		06/04/14 12:05						
Collected by		Richard Cofer						
Date/Time Received		06/04/14 15:50						
Inorganics								
Bicarbonate Alkalinity	mg/L	170	SM 2320B	8.0	2.0		06/17/14 12:35	1
Carbonate Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:35	1
Chloride	mg/L	310	EPA 300.0	2.0	0.50		07/02/14 19:49	10
Fluoride	mg/L	0.077	EPA 300.0	0.040	0.010		06/06/14 21:21	1
Hydroxide Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:35	1
Nitrate (as N)	mg/L	0.01 U,Q	EPA 300.0	0.04	0.01		06/06/14 21:21	1
Phenolphthalein Alkalinity	mg/L	2.0 U	SM 2320B	8.0	2.0		06/17/14 12:35	1
Sulfate	mg/L	13	EPA 300.0	0.60	0.20		06/06/14 21:21	1
Sulfide	mg/L	3.8	SM 4500SF	0.40	0.10		06/10/14 08:05	1
Total Alkalinity	mg/L	170	SM 2320B	8.0	2.0		06/17/14 12:35	1
Total Dissolved Solids	mg/L	790	SM 2540C	10	10	06/11/14 13:58	06/12/14 12:21	1
Total Organic Carbon	mg/L	4.0	SM 5310B	1.0	0.060		06/09/14 19:52	1
Metals								
Arsenic	mg/L	0.0016 I	EPA 200.8	0.0050	0.00093	06/13/14 08:50	06/17/14 16:47	1
Calcium	mg/L	82	EPA 200.7	0.50	0.042	06/17/14 10:04	06/17/14 15:17	1
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/17/14 10:04	06/17/14 15:17	1
Magnesium	mg/L	20	EPA 200.7	0.50	0.020	06/17/14 10:04	06/17/14 15:17	1
Potassium	mg/L	4.9	EPA 200.7	0.050	0.010	06/17/14 10:04	06/17/14 15:17	1
Sodium	mg/L	180	EPA 200.7	5.0	1.3	06/17/14 10:04	06/17/14 16:18	10
Metals, Dissolved								
Iron	mg/L	0.020 U	EPA 200.7	0.10	0.020	06/19/14 12:56	06/19/14 14:50	1

SOUTHERN ANALYTICAL LABORATORIES, INC.

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Leggette, Brashears and Graham, Inc.
10014 North Dale Mabry Rd.
Tampa, FL 33618

July 3, 2014

Work Order: 1405795

* Qualifiers, Notes and Definitions

Results followed by a "U" indicate that the sample was analyzed but the compound was not detected. Results followed by "I" indicate that the reported value is between the laboratory method detection limits and the laboratory practical quantitation limit.

A statement of estimated uncertainty of test results is available upon request.

For methods marked with **, all QC criteria have been met for this method which is equivalent to a SAL certified method.

Test results in this report meet all the requirements of the NELAC standards. Any applicable qualifiers are shown below.

Q Sample held beyond the accepted holding time.

Questions regarding this report should be directed to :

Kathryn Nordmark
Telephone (813) 855-1844 FAX (813) 855-2218
Kathryn@southernanalyticallabs.com

A handwritten signature in black ink that reads "Francis I. Daniels".

Francis I. Daniels, Laboratory Director
Leslie C. Boardman, Q.A. Manager

SOUTHERN ANALYTICAL LABORATORIES, INC.

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SAL Project No. 1405795

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-61115-1

Client Project/Site: Clearwater Groundwater (CLWGRS)

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

6/26/2014 9:18:07 AM

Nancy Robertson, Project Manager II

(813)885-7427

nancy.robertson@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-61115-1	RW-1	Water	06/12/14 15:50	06/12/14 16:50
660-61115-2	UZAMW-1	Water	06/12/14 15:20	06/12/14 16:50
660-61115-3	LZAMW-1	Water	06/12/14 14:55	06/12/14 16:50
660-61115-4	UZAMW-2	Water	06/12/14 13:05	06/12/14 16:50
660-61115-5	LZAMW-2	Water	06/12/14 12:25	06/12/14 16:50

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Job ID: 660-61115-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-61115-1

Comments

No additional comments.

Receipt

The samples were received on 6/12/2014 4:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 1.4° C and 4.5° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-334459.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
L	Off-scale high. Actual value is known to be greater than the value given.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Detection Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: RW-1

Lab Sample ID: 660-61115-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	47		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.29		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	550		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	12		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	95000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	5700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	29000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	240000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.8		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.4		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO3	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1300		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61115-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	8.8		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.28		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	7.4		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	81000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	3100		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	15000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	76000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.7		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	4.0		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO3	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	570		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61115-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	23		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.20		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	88000		250	130	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-61115-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	62	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	4400		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	19000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	170000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.0		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	160		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	160		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	800		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61115-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.1		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.39		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	28		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	63000		250	130	ug/L	1		6020A	Total Recoverable
Iron	97	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	14000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	48000		500	250	ug/L	1		6020A	Total Recoverable
Iron	50	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	160		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	160		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	370		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61115-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	26		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.20		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	340		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	79000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	4600		500	170	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-61115-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	19000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	170000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.8		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.1		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	770		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: RW-1

Lab Sample ID: 660-61115-1

Matrix: Water

Date Collected: 06/12/14 15:50

Date Received: 06/12/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	47		0.50	0.25	mg/L			06/17/14 22:42	1
Fluoride	0.29		0.10	0.025	mg/L			06/17/14 22:42	1
Chloride	550		10	5.0	mg/L			06/18/14 11:54	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	12		2.5	1.3	ug/L			06/17/14 22:33	1
Calcium	95000		250	130	ug/L			06/17/14 22:33	1
Iron	33	U	100	33	ug/L			06/17/14 22:33	1
Potassium	5700		500	170	ug/L			06/17/14 22:33	1
Magnesium	29000		250	43	ug/L			06/17/14 22:33	1
Sodium	240000		500	250	ug/L			06/17/14 22:33	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			06/17/14 20:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/25/14 11:31	1
Total Organic Carbon	1.8		1.0	0.50	mg/L			06/18/14 07:51	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.4		1.0	1.0	mg/L			06/16/14 13:08	1
Alkalinity	190		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			06/16/14 08:37	1
Total Dissolved Solids	1300		25	25	mg/L			06/17/14 10:15	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61115-2

Matrix: Water

Date Collected: 06/12/14 15:20

Date Received: 06/12/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	8.8		0.50	0.25	mg/L			06/17/14 23:26	1
Fluoride	0.28		0.10	0.025	mg/L			06/17/14 23:26	1
Chloride	170		2.0	1.0	mg/L			06/18/14 12:37	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.4		2.5	1.3	ug/L			06/17/14 23:10	1
Calcium	81000		250	130	ug/L			06/17/14 23:10	1
Iron	33	U	100	33	ug/L			06/17/14 23:10	1
Potassium	3100		500	170	ug/L			06/17/14 23:10	1
Magnesium	15000		250	43	ug/L			06/17/14 23:10	1
Sodium	76000		500	250	ug/L			06/17/14 23:10	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			06/17/14 21:12	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/25/14 11:31	1
Total Organic Carbon	1.7		1.0	0.50	mg/L			06/18/14 08:35	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	4.0		1.0	1.0	mg/L			06/16/14 13:08	1
Alkalinity	170		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			06/16/14 08:37	1
Total Dissolved Solids	570		17	17	mg/L			06/17/14 10:15	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61115-3

Matrix: Water

Date Collected: 06/12/14 14:55

Date Received: 06/12/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	23		0.50	0.25	mg/L			06/17/14 23:40	1
Fluoride	0.20		0.10	0.025	mg/L			06/17/14 23:40	1
Chloride	320		5.0	2.5	mg/L			06/18/14 12:52	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		06/16/14 16:04	06/17/14 23:17	1
Calcium	88000		250	130	ug/L		06/16/14 16:04	06/17/14 23:17	1
Iron	62	I	100	33	ug/L		06/16/14 16:04	06/17/14 23:17	1
Potassium	4400		500	170	ug/L		06/16/14 16:04	06/17/14 23:17	1
Magnesium	19000		250	43	ug/L		06/16/14 16:04	06/17/14 23:17	1
Sodium	170000		500	250	ug/L		06/16/14 16:04	06/17/14 23:17	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/17/14 08:10	06/17/14 21:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 08:39	1
Total Organic Carbon	2.0		1.0	0.50	mg/L			06/18/14 08:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.5		1.0	1.0	mg/L			06/16/14 13:08	1
Alkalinity	160		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Alkalinity as CaCO ₃	160		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Ion as HCO ₃ ⁻	200		1.0	1.0	mg/L			06/16/14 08:37	1
Total Dissolved Solids	800		25	25	mg/L			06/17/14 10:15	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61115-4

Matrix: Water

Date Collected: 06/12/14 13:05

Date Received: 06/12/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.1		0.50	0.25	mg/L			06/17/14 23:54	1
Fluoride	0.39		0.10	0.025	mg/L			06/17/14 23:54	1
Chloride	100		2.0	1.0	mg/L			06/18/14 13:06	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	28		2.5	1.3	ug/L			06/17/14 23:25	1
Calcium	63000		250	130	ug/L			06/17/14 23:25	1
Iron	97 I		100	33	ug/L			06/17/14 23:25	1
Potassium	2700		500	170	ug/L			06/17/14 23:25	1
Magnesium	14000		250	43	ug/L			06/17/14 23:25	1
Sodium	48000		500	250	ug/L			06/17/14 23:25	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	50 I		100	33	ug/L			06/17/14 21:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 08:39	1
Total Organic Carbon	1.2		1.0	0.50	mg/L			06/18/14 09:04	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			06/16/14 13:08	1
Alkalinity	160		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Alkalinity as CaCO ₃	160		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Ion as HCO ₃ ⁻	200		1.0	1.0	mg/L			06/16/14 08:37	1
Total Dissolved Solids	370		10	10	mg/L			06/17/14 10:15	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61115-5

Matrix: Water

Date Collected: 06/12/14 12:25

Date Received: 06/12/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	26		0.50	0.25	mg/L			06/18/14 00:09	1
Fluoride	0.20		0.10	0.025	mg/L			06/18/14 00:09	1
Chloride	340		5.0	2.5	mg/L			06/18/14 13:21	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		06/16/14 16:04	06/17/14 23:47	1
Calcium	79000		250	130	ug/L		06/16/14 16:04	06/17/14 23:47	1
Iron	33	U	100	33	ug/L		06/16/14 16:04	06/17/14 23:47	1
Potassium	4600		500	170	ug/L		06/16/14 16:04	06/17/14 23:47	1
Magnesium	19000		250	43	ug/L		06/16/14 16:04	06/17/14 23:47	1
Sodium	170000		500	250	ug/L		06/16/14 16:04	06/17/14 23:47	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/17/14 08:10	06/17/14 21:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 08:39	1
Total Organic Carbon	1.8		1.0	0.50	mg/L			06/18/14 09:21	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.1		1.0	1.0	mg/L			06/16/14 13:08	1
Alkalinity	170		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			06/16/14 08:37	1
Total Dissolved Solids	770		25	25	mg/L			06/17/14 10:15	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-334691/45

Matrix: Water

Analysis Batch: 334691

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			06/17/14 21:59	1
Fluoride	0.025	U	0.10	0.025	mg/L			06/17/14 21:59	1

Lab Sample ID: LCS 680-334691/46

Matrix: Water

Analysis Batch: 334691

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec.	Limits	RPD
		Result	Qualifier					
Sulfate	10.0	9.79		mg/L		98	90 - 110	
Fluoride	2.00	2.02		mg/L		101	90 - 110	

Lab Sample ID: LCSD 680-334691/47

Matrix: Water

Analysis Batch: 334691

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec.	Limits	RPD
		Result	Qualifier					
Sulfate	10.0	9.86		mg/L		99	90 - 110	1
Fluoride	2.00	2.03		mg/L		101	90 - 110	0

Lab Sample ID: 660-61115-1 MS

Matrix: Water

Analysis Batch: 334691

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier				
Sulfate	47		10.0	56.0	L	mg/L		92	80 - 120
Fluoride	0.29		2.00	2.27		mg/L		99	80 - 120

Lab Sample ID: 660-61115-1 MSD

Matrix: Water

Analysis Batch: 334691

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier				
Sulfate	47		10.0	56.0	L	mg/L		93	80 - 120
Fluoride	0.29		2.00	2.28		mg/L		99	80 - 120

Lab Sample ID: MB 680-334841/5

Matrix: Water

Analysis Batch: 334841

Analyte	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result							
Chloride	0.25	U	0.50	0.25	mg/L		06/18/14 10:57	1

Lab Sample ID: LCS 680-334841/6

Matrix: Water

Analysis Batch: 334841

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Chloride	10.0	9.83		mg/L		98	90 - 110

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 680-334841/7

Matrix: Water

Analysis Batch: 334841

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec.	RPD	RPD Limit
Chloride	10.0	9.80		mg/L		98	90 - 110	0 30

Lab Sample ID: 660-61115-1 MS

Matrix: Water

Analysis Batch: 334841

Client Sample ID: RW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
Chloride	550		200	748		mg/L		97	80 - 120

Lab Sample ID: 660-61115-1 MSD

Matrix: Water

Analysis Batch: 334841

Client Sample ID: RW-1
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	RPD Limit
Chloride	550		200	752		mg/L		98	80 - 120	0 30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-334522/1-A

Matrix: Water

Analysis Batch: 334839

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 334522

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		06/16/14 16:04	06/17/14 22:19	1
Calcium	130	U	250	130	ug/L		06/16/14 16:04	06/17/14 22:19	1
Iron	33	U	100	33	ug/L		06/16/14 16:04	06/17/14 22:19	1
Potassium	170	U	500	170	ug/L		06/16/14 16:04	06/17/14 22:19	1
Magnesium	43	U	250	43	ug/L		06/16/14 16:04	06/17/14 22:19	1
Sodium	250	U	500	250	ug/L		06/16/14 16:04	06/17/14 22:19	1

Lab Sample ID: LCS 680-334522/2-A

Matrix: Water

Analysis Batch: 334839

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 334522

Analyte	MB		Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	Limits
	Result	Qualifier							
Arsenic	100		100	108		ug/L		108	75 - 125
Calcium	5000		5000	5420		ug/L		108	75 - 125
Iron	5000		5000	5440		ug/L		109	75 - 125
Potassium	5000		5000	5230		ug/L		105	75 - 125
Magnesium	5000		5000	5240		ug/L		105	75 - 125
Sodium	5000		5000	5380		ug/L		108	75 - 125

Lab Sample ID: 660-61115-1 MS

Matrix: Water

Analysis Batch: 334839

Client Sample ID: RW-1
Prep Type: Total Recoverable
Prep Batch: 334522

Analyte	MB		Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	Limits
	Result	Qualifier							
Arsenic	12		100	121		ug/L		108	75 - 125
Calcium	95000		5000	121000	J3	ug/L		517	75 - 125

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 660-61115-1 MS

Matrix: Water

Analysis Batch: 334839

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 334522

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier					
Iron	33	U	5000	5950		ug/L		119	75 - 125	
Potassium	5700		5000	11200		ug/L		111	75 - 125	
Magnesium	29000		5000	41100	J3	ug/L		238	75 - 125	
Sodium	240000		5000	303000	J3	ug/L		1176	75 - 125	

Lab Sample ID: 660-61115-1 MSD

Matrix: Water

Analysis Batch: 334839

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 334522

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	12		100	122		ug/L		110	75 - 125	1	20
Calcium	95000		5000	111000	J3	ug/L		324	75 - 125	8	20
Iron	33	U	5000	5390		ug/L		108	75 - 125	10	20
Potassium	5700		5000	11700		ug/L		119	75 - 125	4	20
Magnesium	29000		5000	38400	J3	ug/L		184	75 - 125	7	20
Sodium	240000		5000	280000	J3	ug/L		707	75 - 125	8	20

Lab Sample ID: MB 680-334566/1-B

Matrix: Water

Analysis Batch: 334839

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 334567

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		06/17/14 08:10	06/17/14 20:21	1

Lab Sample ID: LCS 680-334566/2-B

Matrix: Water

Analysis Batch: 334839

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 334567

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	5370		ug/L		107	75 - 125

Lab Sample ID: 660-61115-1 MS

Matrix: Water

Analysis Batch: 334839

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 334567

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	33	U	5000	5330		ug/L		107	75 - 125

Lab Sample ID: 660-61115-1 MSD

Matrix: Water

Analysis Batch: 334839

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 334567

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	33	U	5000	4910		ug/L		98	75 - 125	8	20

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: LCS 660-149015/15

Matrix: Water

Analysis Batch: 149015

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Nitrite as N	0.500	0.511		mg/L		102	90 - 110

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-334459/1

Matrix: Water

Analysis Batch: 334459

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			06/16/14 13:08	1

Lab Sample ID: LCS 680-334459/2

Matrix: Water

Analysis Batch: 334459

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Sulfide	10.0	10.2		mg/L		102	75 - 125

Lab Sample ID: LCSD 680-334459/3

Matrix: Water

Analysis Batch: 334459

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec.	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Sulfide	10.0	10.2		mg/L		102	75 - 125	0	30

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-334950/35

Client Sample ID: Method Blank
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 334950

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			06/18/14 03:30	1

Lab Sample ID: LCS 680-334950/34

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 334950

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Organic Carbon	20.0	18.8		mg/L		94	80 - 120

Lab Sample ID: 660-61115-1 MS

Client Sample ID: RW-1
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 334950

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	Limits
	Result	Qualifier							
Total Organic Carbon	1.8		20.0	20.5		mg/L		94	80 - 120

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 660-61115-1 MSD

Matrix: Water

Analysis Batch: 334950

Client Sample ID: RW-1

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier			%Rec.			
Total Organic Carbon	1.8		20.0	20.9		mg/L		96	80 - 120	2	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-149037/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 149037

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	1.0	mg/L			06/16/14 08:37	1
Bicarbonate ion as HCO ₃	1.0	U	1.0	1.0	mg/L			06/16/14 08:37	1

Lab Sample ID: LCS 660-149037/3

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 149037

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	Dil Fac
	Added							
Alkalinity	118	113		mg/L		96	80 - 120	

Lab Sample ID: 660-61115-5 DU

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 149037

Analyte	Sample	Sample	DU	DU	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	170		168		mg/L			0.1	30
Bicarbonate Alkalinity as CaCO ₃	170		168		mg/L			0.1	30
Bicarbonate ion as HCO ₃	210		205		mg/L			0.1	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-149074/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 149074

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			06/17/14 10:15	1

Lab Sample ID: LCS 660-149074/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 149074

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	Dil Fac
	Added							
Total Dissolved Solids	10000	9970		mg/L		100	80 - 120	

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: 660-61115-4 DU

Matrix: Water

Analysis Batch: 149074

Client Sample ID: UZAMW-2

Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	370		372		mg/L		0	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

HPLC/IC

Analysis Batch: 334691

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	300.0	
660-61115-1 MS	RW-1	Total/NA	Water	300.0	
660-61115-1 MSD	RW-1	Total/NA	Water	300.0	
660-61115-2	UZAMW-1	Total/NA	Water	300.0	
660-61115-3	LZAMW-1	Total/NA	Water	300.0	
660-61115-4	UZAMW-2	Total/NA	Water	300.0	
660-61115-5	LZAMW-2	Total/NA	Water	300.0	
LCS 680-334691/46	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-334691/47	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-334691/45	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 334841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	300.0	
660-61115-1 MS	RW-1	Total/NA	Water	300.0	
660-61115-1 MSD	RW-1	Total/NA	Water	300.0	
660-61115-2	UZAMW-1	Total/NA	Water	300.0	
660-61115-3	LZAMW-1	Total/NA	Water	300.0	
660-61115-4	UZAMW-2	Total/NA	Water	300.0	
660-61115-5	LZAMW-2	Total/NA	Water	300.0	
LCS 680-334841/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-334841/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-334841/5	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 334522

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total Recoverable	Water	3005A	
660-61115-1 MS	RW-1	Total Recoverable	Water	3005A	
660-61115-1 MSD	RW-1	Total Recoverable	Water	3005A	
660-61115-2	UZAMW-1	Total Recoverable	Water	3005A	
660-61115-3	LZAMW-1	Total Recoverable	Water	3005A	
660-61115-4	UZAMW-2	Total Recoverable	Water	3005A	
660-61115-5	LZAMW-2	Total Recoverable	Water	3005A	
LCS 680-334522/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-334522/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 334566

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Dissolved	Water	FILTRATION	
660-61115-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-61115-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-61115-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-61115-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-61115-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-61115-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-334566/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-334566/1-B	Method Blank	Dissolved	Water	FILTRATION	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Metals (Continued)

Prep Batch: 334567

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Dissolved	Water	3005A	334566
660-61115-1 MS	RW-1	Dissolved	Water	3005A	334566
660-61115-1 MSD	RW-1	Dissolved	Water	3005A	334566
660-61115-2	UZAMW-1	Dissolved	Water	3005A	334566
660-61115-3	LZAMW-1	Dissolved	Water	3005A	334566
660-61115-4	UZAMW-2	Dissolved	Water	3005A	334566
660-61115-5	LZAMW-2	Dissolved	Water	3005A	334566
LCS 680-334566/2-B	Lab Control Sample	Dissolved	Water	3005A	334566
MB 680-334566/1-B	Method Blank	Dissolved	Water	3005A	334566

Analysis Batch: 334839

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Dissolved	Water	6020A	334567
660-61115-1	RW-1	Total Recoverable	Water	6020A	334522
660-61115-1 MS	RW-1	Dissolved	Water	6020A	334567
660-61115-1 MS	RW-1	Total Recoverable	Water	6020A	334522
660-61115-1 MSD	RW-1	Dissolved	Water	6020A	334567
660-61115-1 MSD	RW-1	Total Recoverable	Water	6020A	334522
660-61115-2	UZAMW-1	Dissolved	Water	6020A	334567
660-61115-2	UZAMW-1	Total Recoverable	Water	6020A	334522
660-61115-3	LZAMW-1	Dissolved	Water	6020A	334567
660-61115-3	LZAMW-1	Total Recoverable	Water	6020A	334522
660-61115-4	UZAMW-2	Dissolved	Water	6020A	334567
660-61115-4	UZAMW-2	Total Recoverable	Water	6020A	334522
660-61115-5	LZAMW-2	Dissolved	Water	6020A	334567
660-61115-5	LZAMW-2	Total Recoverable	Water	6020A	334522
LCS 680-334522/2-A	Lab Control Sample	Total Recoverable	Water	6020A	334522
LCS 680-334566/2-B	Lab Control Sample	Dissolved	Water	6020A	334567
MB 680-334522/1-A	Method Blank	Total Recoverable	Water	6020A	334522
MB 680-334566/1-B	Method Blank	Dissolved	Water	6020A	334567

General Chemistry

Analysis Batch: 149015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 660-149015/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-149015/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 149037

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	SM 2320B	
660-61115-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-61115-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-61115-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-61115-5	LZAMW-2	Total/NA	Water	SM 2320B	
660-61115-5 DU	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-149037/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-149037/1	Method Blank	Total/NA	Water	SM 2320B	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

General Chemistry (Continued)

Analysis Batch: 149074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	SM 2540C	5
660-61115-2	UZAMW-1	Total/NA	Water	SM 2540C	6
660-61115-3	LZAMW-1	Total/NA	Water	SM 2540C	7
660-61115-4	UZAMW-2	Total/NA	Water	SM 2540C	8
660-61115-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	9
660-61115-5	LZAMW-2	Total/NA	Water	SM 2540C	10
LCS 660-149074/2	Lab Control Sample	Total/NA	Water	SM 2540C	11
MB 660-149074/1	Method Blank	Total/NA	Water	SM 2540C	12

Analysis Batch: 149298

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	353.2	10
660-61115-2	UZAMW-1	Total/NA	Water	353.2	11

Analysis Batch: 149326

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-3	LZAMW-1	Total/NA	Water	353.2	12
660-61115-4	UZAMW-2	Total/NA	Water	353.2	13
660-61115-5	LZAMW-2	Total/NA	Water	353.2	14

Analysis Batch: 334459

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	4500 S2 F-2011	11
660-61115-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	12
660-61115-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	13
660-61115-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	14
660-61115-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	15
LCS 680-334459/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	16
LCSD 680-334459/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	17
MB 680-334459/1	Method Blank	Total/NA	Water	4500 S2 F-2011	18

Analysis Batch: 334950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61115-1	RW-1	Total/NA	Water	5310 B-2011	1
660-61115-1 MS	RW-1	Total/NA	Water	5310 B-2011	2
660-61115-1 MSD	RW-1	Total/NA	Water	5310 B-2011	3
660-61115-2	UZAMW-1	Total/NA	Water	5310 B-2011	4
660-61115-3	LZAMW-1	Total/NA	Water	5310 B-2011	5
660-61115-4	UZAMW-2	Total/NA	Water	5310 B-2011	6
660-61115-5	LZAMW-2	Total/NA	Water	5310 B-2011	7
LCS 680-334950/34	Lab Control Sample	Total/NA	Water	5310 B-2011	8
MB 680-334950/35	Method Blank	Total/NA	Water	5310 B-2011	9

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: RW-1

Date Collected: 06/12/14 15:50

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	334691	06/17/14 22:42	PAT	TAL SAV
Total/NA	Analysis	300.0		20	334841	06/18/14 11:54	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			334566	06/17/14 08:08	SP	TAL SAV
Dissolved	Prep	3005A			334567	06/17/14 08:10	SP	TAL SAV
Dissolved	Analysis	6020A		1	334839	06/17/14 20:36	BWR	TAL SAV
Total Recoverable	Prep	3005A			334522	06/16/14 16:04	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	334839	06/17/14 22:33	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149298	06/25/14 11:31	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	334459	06/16/14 13:08	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	334950	06/18/14 07:51	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149037	06/16/14 08:37	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149074	06/17/14 10:15	TKO	TAL TAM

Client Sample ID: UZAMW-1

Date Collected: 06/12/14 15:20

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	334691	06/17/14 23:26	PAT	TAL SAV
Total/NA	Analysis	300.0		4	334841	06/18/14 12:37	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			334566	06/17/14 08:08	SP	TAL SAV
Dissolved	Prep	3005A			334567	06/17/14 08:10	SP	TAL SAV
Dissolved	Analysis	6020A		1	334839	06/17/14 21:12	BWR	TAL SAV
Total Recoverable	Prep	3005A			334522	06/16/14 16:04	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	334839	06/17/14 23:10	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149298	06/25/14 11:31	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	334459	06/16/14 13:08	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	334950	06/18/14 08:35	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149037	06/16/14 08:37	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149074	06/17/14 10:15	TKO	TAL TAM

Client Sample ID: LZAMW-1

Date Collected: 06/12/14 14:55

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	334691	06/17/14 23:40	PAT	TAL SAV
Total/NA	Analysis	300.0		10	334841	06/18/14 12:52	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			334566	06/17/14 08:08	SP	TAL SAV
Dissolved	Prep	3005A			334567	06/17/14 08:10	SP	TAL SAV
Dissolved	Analysis	6020A		1	334839	06/17/14 21:20	BWR	TAL SAV
Total Recoverable	Prep	3005A			334522	06/16/14 16:04	SP	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: LZAMW-1

Date Collected: 06/12/14 14:55

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6020A		1	334839	06/17/14 23:17	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149326	06/26/14 08:39	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	334459	06/16/14 13:08	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	334950	06/18/14 08:50	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149037	06/16/14 08:37	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149074	06/17/14 10:15	TKO	TAL TAM

Client Sample ID: UZAMW-2

Date Collected: 06/12/14 13:05

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	334691	06/17/14 23:54	PAT	TAL SAV
Total/NA	Analysis	300.0		4	334841	06/18/14 13:06	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			334566	06/17/14 08:08	SP	TAL SAV
Dissolved	Prep	3005A			334567	06/17/14 08:10	SP	TAL SAV
Dissolved	Analysis	6020A		1	334839	06/17/14 21:27	BWR	TAL SAV
Total Recoverable	Prep	3005A			334522	06/16/14 16:04	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	334839	06/17/14 23:25	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149326	06/26/14 08:39	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	334459	06/16/14 13:08	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	334950	06/18/14 09:04	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149037	06/16/14 08:37	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149074	06/17/14 10:15	TKO	TAL TAM

Client Sample ID: LZAMW-2

Date Collected: 06/12/14 12:25

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	334691	06/18/14 00:09	PAT	TAL SAV
Total/NA	Analysis	300.0		10	334841	06/18/14 13:21	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			334566	06/17/14 08:08	SP	TAL SAV
Dissolved	Prep	3005A			334567	06/17/14 08:10	SP	TAL SAV
Dissolved	Analysis	6020A		1	334839	06/17/14 21:49	BWR	TAL SAV
Total Recoverable	Prep	3005A			334522	06/16/14 16:04	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	334839	06/17/14 23:47	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149326	06/26/14 08:39	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	334459	06/16/14 13:08	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	334950	06/18/14 09:21	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149037	06/16/14 08:37	SC1	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Client Sample ID: LZAMW-2

Date Collected: 06/12/14 12:25

Date Received: 06/12/14 16:50

Lab Sample ID: 660-61115-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	149074	06/17/14 10:15	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

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Method Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61115-1

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-14 *

Laboratory: TestAmerica Savannah

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E87052	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-61115-1

Login Number: 61115

List Source: TestAmerica Tampa

List Number: 1

Creator: Redding, Charles S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-61115-1

Login Number: 61115

List Source: TestAmerica Savannah

List Number: 2

List Creation: 06/14/14 06:14 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-61221-1

Client Project/Site: Clearwater Groundwater (CLWGRS)

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

6/26/2014 10:13:36 AM

Nancy Robertson, Project Manager II

(813)885-7427

nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-61221-1	RW-1	Water	06/18/14 15:40	06/18/14 16:30
660-61221-2	UZAMW-1	Water	06/18/14 13:10	06/18/14 16:30
660-61221-3	LZAMW-1	Water	06/18/14 12:40	06/18/14 16:30
660-61221-4	UZAMW-2	Water	06/18/14 14:40	06/18/14 16:30
660-61221-5	LZAMW-2	Water	06/18/14 14:10	06/18/14 16:30

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Job ID: 660-61221-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-61221-1

Comments

No additional comments.

Receipt

The samples were received on 6/18/2014 4:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.9° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-335393.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: RW-1

Lab Sample ID: 660-61221-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	40		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	2.2		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	560		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	14		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	100000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6000		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	33000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	280000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.9		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.3		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1200		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61221-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.3		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.28		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	7.2		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	81000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2800		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	14000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	72000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.5		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	500		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61221-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.20		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	77000		250	130	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-61221-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	60	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	3900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	18000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	150000		500	250	ug/L	1		6020A	Total Recoverable
Iron	46	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.8		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.8		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	690		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61221-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.0		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.39		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	99		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	28		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	61000		250	130	ug/L	1		6020A	Total Recoverable
Iron	87	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	2600		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	13000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	46000		500	250	ug/L	1		6020A	Total Recoverable
Iron	59	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.4		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	350		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61221-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	16		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.20		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	350		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	78000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	4700		500	170	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-61221-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	21000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	180000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.9		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.0		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	750		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: RW-1

Lab Sample ID: 660-61221-1

Matrix: Water

Date Collected: 06/18/14 15:40

Date Received: 06/18/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	40		1.0	0.50	mg/L			06/20/14 13:24	2
Fluoride	2.2		0.20	0.050	mg/L			06/20/14 13:24	2
Chloride	560		10	5.0	mg/L			06/20/14 13:39	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		2.5	1.3	ug/L			06/23/14 23:04	1
Calcium	100000		250	130	ug/L			06/23/14 23:04	1
Iron	33	U	100	33	ug/L			06/23/14 23:04	1
Potassium	6000		500	170	ug/L			06/23/14 23:04	1
Magnesium	33000		250	43	ug/L			06/25/14 07:06	1
Sodium	280000		500	250	ug/L			06/25/14 07:06	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			06/23/14 17:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 09:14	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			06/25/14 00:25	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.3		1.0	1.0	mg/L			06/20/14 13:39	1
Alkalinity	190		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			06/23/14 08:30	1
Total Dissolved Solids	1200		25	25	mg/L			06/20/14 15:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61221-2

Matrix: Water

Date Collected: 06/18/14 13:10

Date Received: 06/18/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.3		0.50	0.25	mg/L			06/20/14 13:53	1
Fluoride	0.28		0.10	0.025	mg/L			06/20/14 13:53	1
Chloride	170		2.0	1.0	mg/L			06/20/14 14:07	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.2		2.5	1.3	ug/L			06/23/14 23:40	1
Calcium	81000		250	130	ug/L			06/23/14 23:40	1
Iron	33	U	100	33	ug/L			06/23/14 23:40	1
Potassium	2800		500	170	ug/L			06/23/14 23:40	1
Magnesium	14000		250	43	ug/L			06/25/14 07:57	1
Sodium	72000		500	250	ug/L			06/25/14 07:57	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			06/23/14 17:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 09:40	1
Total Organic Carbon	1.5		1.0	0.50	mg/L			06/25/14 00:42	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.9		1.0	1.0	mg/L			06/20/14 13:39	1
Alkalinity	180		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			06/23/14 08:30	1
Total Dissolved Solids	500		17	17	mg/L			06/20/14 15:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61221-3

Matrix: Water

Date Collected: 06/18/14 12:40

Date Received: 06/18/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			06/20/14 14:22	1
Fluoride	0.20		0.10	0.025	mg/L			06/20/14 14:22	1
Chloride	320		5.0	2.5	mg/L			06/20/14 14:36	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		06/20/14 15:35	06/23/14 23:47	1
Calcium	77000		250	130	ug/L		06/20/14 15:35	06/23/14 23:47	1
Iron	60	I	100	33	ug/L		06/20/14 15:35	06/23/14 23:47	1
Potassium	3900		500	170	ug/L		06/20/14 15:35	06/23/14 23:47	1
Magnesium	18000		250	43	ug/L		06/20/14 15:35	06/25/14 08:04	1
Sodium	150000		500	250	ug/L		06/20/14 15:35	06/25/14 08:04	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	46	I	100	33	ug/L		06/20/14 15:08	06/23/14 17:48	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 09:40	1
Total Organic Carbon	1.8		1.0	0.50	mg/L			06/25/14 01:33	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.8		1.0	1.0	mg/L			06/20/14 13:39	1
Alkalinity	170		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			06/23/14 08:30	1
Total Dissolved Solids	690		25	25	mg/L			06/20/14 15:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61221-4

Matrix: Water

Date Collected: 06/18/14 14:40

Date Received: 06/18/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.0		0.50	0.25	mg/L			06/20/14 15:19	1
Fluoride	0.39		0.10	0.025	mg/L			06/20/14 15:19	1
Chloride	99		2.0	1.0	mg/L			06/20/14 15:34	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	28		2.5	1.3	ug/L		06/20/14 15:35	06/23/14 23:55	1
Calcium	61000		250	130	ug/L		06/20/14 15:35	06/23/14 23:55	1
Iron	87 I		100	33	ug/L		06/20/14 15:35	06/23/14 23:55	1
Potassium	2600		500	170	ug/L		06/20/14 15:35	06/23/14 23:55	1
Magnesium	13000		250	43	ug/L		06/20/14 15:35	06/25/14 08:11	1
Sodium	46000		500	250	ug/L		06/20/14 15:35	06/25/14 08:11	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	59 I		100	33	ug/L		06/20/14 15:08	06/23/14 17:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 09:40	1
Total Organic Carbon	1.4		1.0	0.50	mg/L			06/25/14 01:51	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			06/20/14 13:39	1
Alkalinity	170		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	200		1.0	1.0	mg/L			06/23/14 08:30	1
Total Dissolved Solids	350		10	10	mg/L			06/20/14 15:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61221-5

Matrix: Water

Date Collected: 06/18/14 14:10

Date Received: 06/18/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	16		0.50	0.25	mg/L			06/20/14 15:48	1
Fluoride	0.20		0.10	0.025	mg/L			06/20/14 15:48	1
Chloride	350		5.0	2.5	mg/L			06/20/14 16:03	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		06/20/14 15:35	06/24/14 00:17	1
Calcium	78000		250	130	ug/L		06/20/14 15:35	06/24/14 00:17	1
Iron	33	U	100	33	ug/L		06/20/14 15:35	06/24/14 00:17	1
Potassium	4700		500	170	ug/L		06/20/14 15:35	06/24/14 00:17	1
Magnesium	21000		250	43	ug/L		06/20/14 15:35	06/25/14 08:19	1
Sodium	180000		500	250	ug/L		06/20/14 15:35	06/25/14 08:19	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/20/14 15:08	06/23/14 18:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			06/26/14 09:40	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			06/25/14 02:05	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.0		1.0	1.0	mg/L			06/20/14 13:39	1
Alkalinity	180		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			06/23/14 08:30	1
Total Dissolved Solids	750		25	25	mg/L			06/20/14 15:06	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-335313/5

Matrix: Water

Analysis Batch: 335313

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			06/20/14 10:51	1
Fluoride	0.025	U	0.10	0.025	mg/L			06/20/14 10:51	1
Chloride	0.25	U	0.50	0.25	mg/L			06/20/14 10:51	1

Lab Sample ID: LCS 680-335313/6

Matrix: Water

Analysis Batch: 335313

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	10.2		mg/L		102	90 - 110	
Fluoride	2.00	2.05		mg/L		102	90 - 110	
Chloride	10.0	9.83		mg/L		98	90 - 110	

Lab Sample ID: LCSD 680-335313/7

Matrix: Water

Analysis Batch: 335313

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Result	Qualifier								
Sulfate	10.0	10.2		mg/L		102	90 - 110		0	30
Fluoride	2.00	2.05		mg/L		102	90 - 110		0	30
Chloride	10.0	9.84		mg/L		98	90 - 110		0	30

Lab Sample ID: 660-61231-F-1 MS

Matrix: Water

Analysis Batch: 335313

Analyte	Sample Result	Sample Qualifier	Spike Added	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	6.0		40.0	45.0		mg/L		97	80 - 120	
Fluoride	0.23	I	8.00	8.21		mg/L		100	80 - 120	
Chloride	3.5		40.0	42.6		mg/L		98	80 - 120	

Lab Sample ID: 660-61231-F-1 MSD

Matrix: Water

Analysis Batch: 335313

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD	MSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Sulfate	6.0		40.0	45.1		mg/L		98	80 - 120		0	30
Fluoride	0.23	I	8.00	8.25		mg/L		100	80 - 120		0	30
Chloride	3.5		40.0	42.7		mg/L		98	80 - 120		0	30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-335424/1-A

Matrix: Water

Analysis Batch: 335987

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		06/20/14 15:35	06/23/14 22:49	1
Calcium	130	U	250	130	ug/L		06/20/14 15:35	06/23/14 22:49	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 680-335424/1-A

Matrix: Water

Analysis Batch: 335987

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		06/20/14 15:35	06/23/14 22:49	1
Potassium	170	U	500	170	ug/L		06/20/14 15:35	06/23/14 22:49	1

Lab Sample ID: MB 680-335424/1-A

Matrix: Water

Analysis Batch: 336146

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Magnesium	43	U	250	43	ug/L		06/20/14 15:35	06/25/14 06:51	1
Sodium	250	U	500	250	ug/L		06/20/14 15:35	06/25/14 06:51	1

Lab Sample ID: LCS 680-335424/2-A

Matrix: Water

Analysis Batch: 335987

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	Spike		Result	LCS Qualifier	Unit	D	%Rec	Limits
	Added							
Arsenic	100		106		ug/L		106	75 - 125
Calcium	5000		5240		ug/L		105	75 - 125
Iron	5000		5310		ug/L		106	75 - 125
Potassium	5000		5010		ug/L		100	75 - 125

Lab Sample ID: LCS 680-335424/2-A

Matrix: Water

Analysis Batch: 336146

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	Spike		Result	LCS Qualifier	Unit	D	%Rec	Limits
	Added							
Magnesium	5000		5040		ug/L		101	75 - 125
Sodium	5000		4960		ug/L		99	75 - 125

Lab Sample ID: 660-61221-1 MS

Matrix: Water

Analysis Batch: 335987

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	Sample		Spike Added	MS		D	%Rec	Limits
	Result	Qualifier		Result	Qualifier			
Arsenic	14		100	122			108	75 - 125
Calcium	100000		5000	118000	J3		334	75 - 125
Iron	33	U	5000	5460			109	75 - 125
Potassium	6000		5000	11300			107	75 - 125

Lab Sample ID: 660-61221-1 MS

Matrix: Water

Analysis Batch: 336146

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	Sample		Spike Added	MS		D	%Rec	Limits
	Result	Qualifier		Result	Qualifier			
Magnesium	33000		5000	35900	J3		57	75 - 125
Sodium	280000		5000	264000	J3		-229	75 - 125

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 660-61221-1 MSD

Matrix: Water

Analysis Batch: 335987

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Arsenic	14		100	116		ug/L		102	75 - 125	5	20	
Calcium	100000		5000	103000	J3	ug/L		38	75 - 125	13	20	
Iron	33	U	5000	4770		ug/L		95	75 - 125	13	20	
Potassium	6000		5000	10900		ug/L		99	75 - 125	4	20	

Lab Sample ID: 660-61221-1 MSD

Matrix: Water

Analysis Batch: 336146

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 335424

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Magnesium	33000		5000	42300	J3	ug/L		184	75 - 125	16	20	
Sodium	280000		5000	312000	J3	ug/L		735	75 - 125	17	20	

Lab Sample ID: MB 680-335418/1-B

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 335987

Prep Batch: 335419

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		06/20/14 15:08	06/23/14 16:49	1

Lab Sample ID: LCS 680-335418/2-B

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 335987

Prep Batch: 335419

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	4510		ug/L		90	75 - 125

Lab Sample ID: 660-61221-1 MS

Client Sample ID: RW-1

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 335987

Prep Batch: 335419

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	33	U	5000	5030		ug/L		101	75 - 125

Lab Sample ID: 660-61221-1 MSD

Client Sample ID: RW-1

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 335987

Prep Batch: 335419

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Iron	33	U	5000	4920		ug/L		98	75 - 125	2	20	

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: LCS 660-149171/15

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 149171

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Nitrite as N	0.500	0.505		mg/L		101	90 - 110

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 660-61221-1 MS

Matrix: Water

Analysis Batch: 149171

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrite as N	0.10		0.500	0.490	I	mg/L		98	90 - 110

Lab Sample ID: 660-61221-1 MSD

Matrix: Water

Analysis Batch: 149171

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrite as N	0.10		0.500	0.548		mg/L		110	90 - 110

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-335393/1

Matrix: Water

Analysis Batch: 335393

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			06/20/14 13:39	1

Lab Sample ID: LCS 680-335393/2

Matrix: Water

Analysis Batch: 335393

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	10.0	10.1		mg/L		101	75 - 125

Lab Sample ID: LCSD 680-335393/3

Matrix: Water

Analysis Batch: 335393

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	10.0	9.93		mg/L		99	75 - 125

Lab Sample ID: 640-48267-D-5 DU

Matrix: Water

Analysis Batch: 335393

Analyte	Sample	Sample	DU	DU	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	U	mg/L			06/24/14 19:34	1

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-336095/6

Matrix: Water

Analysis Batch: 336095

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			06/24/14 19:34	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCS 680-336095/5

Matrix: Water

Analysis Batch: 336095

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
Total Organic Carbon	20.0	20.3		mg/L		101	80 - 120

Lab Sample ID: 640-48268-J-1 MS

Matrix: Water

Analysis Batch: 336095

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	3.5		20.0	24.1		mg/L		103	80 - 120

Lab Sample ID: 640-48268-J-1 MSD

Matrix: Water

Analysis Batch: 336095

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Organic Carbon	3.5		20.0	22.3		mg/L		94	80 - 120	8	25

Lab Sample ID: 640-48287-L-1 DU

Matrix: Water

Analysis Batch: 336095

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	7.2			7.45		mg/L		4	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-149235/1

Matrix: Water

Analysis Batch: 149235

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	1.0	mg/L			06/23/14 08:30	1
Bicarbonate ion as HCO3	1.0	U	1.0	1.0	mg/L			06/23/14 08:30	1

Lab Sample ID: LCS 660-149235/3

Matrix: Water

Analysis Batch: 149235

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Alkalinity	118	117		mg/L		99	80 - 120

Lab Sample ID: 660-61221-1 DU

Matrix: Water

Analysis Batch: 149235

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier				
Alkalinity	190			192		mg/L		2	30
Bicarbonate Alkalinity as CaCO3	190			192		mg/L		2	30
Bicarbonate ion as HCO3	230			234		mg/L		2	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-149211/1

Matrix: Water

Analysis Batch: 149211

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			06/20/14 15:06	1

Lab Sample ID: LCS 660-149211/2

Matrix: Water

Analysis Batch: 149211

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Dissolved Solids	10000	9900		mg/L	99	80 - 120	

Lab Sample ID: 660-61221-4 DU

Matrix: Water

Analysis Batch: 149211

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	350		364		mg/L		3	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

HPLC/IC

Analysis Batch: 335313

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Total/NA	Water	300.0	
660-61221-1	RW-1	Total/NA	Water	300.0	
660-61221-2	UZAMW-1	Total/NA	Water	300.0	
660-61221-2	UZAMW-1	Total/NA	Water	300.0	
660-61221-3	LZAMW-1	Total/NA	Water	300.0	
660-61221-3	LZAMW-1	Total/NA	Water	300.0	
660-61221-4	UZAMW-2	Total/NA	Water	300.0	
660-61221-4	UZAMW-2	Total/NA	Water	300.0	
660-61221-5	LZAMW-2	Total/NA	Water	300.0	
660-61221-5	LZAMW-2	Total/NA	Water	300.0	
660-61231-F-1 MS	Matrix Spike	Total/NA	Water	300.0	
660-61231-F-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 680-335313/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-335313/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-335313/5	Method Blank	Total/NA	Water	300.0	

Metals

Filtration Batch: 335418

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Dissolved	Water	FILTRATION	
660-61221-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-61221-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-61221-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-61221-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-61221-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-61221-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-335418/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-335418/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 335419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Dissolved	Water	3005A	335418
660-61221-1 MS	RW-1	Dissolved	Water	3005A	335418
660-61221-1 MSD	RW-1	Dissolved	Water	3005A	335418
660-61221-2	UZAMW-1	Dissolved	Water	3005A	335418
660-61221-3	LZAMW-1	Dissolved	Water	3005A	335418
660-61221-4	UZAMW-2	Dissolved	Water	3005A	335418
660-61221-5	LZAMW-2	Dissolved	Water	3005A	335418
LCS 680-335418/2-B	Lab Control Sample	Dissolved	Water	3005A	335418
MB 680-335418/1-B	Method Blank	Dissolved	Water	3005A	335418

Prep Batch: 335424

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Total Recoverable	Water	3005A	
660-61221-1 MS	RW-1	Total Recoverable	Water	3005A	
660-61221-1 MSD	RW-1	Total Recoverable	Water	3005A	
660-61221-2	UZAMW-1	Total Recoverable	Water	3005A	
660-61221-3	LZAMW-1	Total Recoverable	Water	3005A	
660-61221-4	UZAMW-2	Total Recoverable	Water	3005A	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Metals (Continued)

Prep Batch: 335424 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-5	LZAMW-2	Total Recoverable	Water	3005A	
LCS 680-335424/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-335424/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 335987

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Dissolved	Water	6020A	335419
660-61221-1	RW-1	Total Recoverable	Water	6020A	335424
660-61221-1 MS	RW-1	Dissolved	Water	6020A	335419
660-61221-1 MS	RW-1	Total Recoverable	Water	6020A	335424
660-61221-1 MSD	RW-1	Dissolved	Water	6020A	335419
660-61221-1 MSD	RW-1	Total Recoverable	Water	6020A	335424
660-61221-2	UZAMW-1	Dissolved	Water	6020A	335419
660-61221-2	UZAMW-1	Total Recoverable	Water	6020A	335424
660-61221-3	LZAMW-1	Dissolved	Water	6020A	335419
660-61221-3	LZAMW-1	Total Recoverable	Water	6020A	335424
660-61221-4	UZAMW-2	Dissolved	Water	6020A	335419
660-61221-4	UZAMW-2	Total Recoverable	Water	6020A	335424
660-61221-5	LZAMW-2	Dissolved	Water	6020A	335419
660-61221-5	LZAMW-2	Total Recoverable	Water	6020A	335424
LCS 680-335418/2-B	Lab Control Sample	Dissolved	Water	6020A	335419
LCS 680-335424/2-A	Lab Control Sample	Total Recoverable	Water	6020A	335424
MB 680-335418/1-B	Method Blank	Dissolved	Water	6020A	335419
MB 680-335424/1-A	Method Blank	Total Recoverable	Water	6020A	335424

Analysis Batch: 336146

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Total Recoverable	Water	6020A	335424
660-61221-1 MS	RW-1	Total Recoverable	Water	6020A	335424
660-61221-1 MSD	RW-1	Total Recoverable	Water	6020A	335424
660-61221-2	UZAMW-1	Total Recoverable	Water	6020A	335424
660-61221-3	LZAMW-1	Total Recoverable	Water	6020A	335424
660-61221-4	UZAMW-2	Total Recoverable	Water	6020A	335424
660-61221-5	LZAMW-2	Total Recoverable	Water	6020A	335424
LCS 680-335424/2-A	Lab Control Sample	Total Recoverable	Water	6020A	335424
MB 680-335424/1-A	Method Blank	Total Recoverable	Water	6020A	335424

General Chemistry

Analysis Batch: 149171

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1 MS	RW-1	Total/NA	Water	353.2	
660-61221-1 MSD	RW-1	Total/NA	Water	353.2	
LCS 660-149171/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-149171/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 149211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Total/NA	Water	SM 2540C	
660-61221-2	UZAMW-1	Total/NA	Water	SM 2540C	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

General Chemistry (Continued)

Analysis Batch: 149211 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-61221-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-61221-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-61221-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-149211/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-149211/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 149235

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Total/NA	Water	SM 2320B	
660-61221-1 DU	RW-1	Total/NA	Water	SM 2320B	
660-61221-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-61221-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-61221-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-61221-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-149235/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-149235/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 149326

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61221-1	RW-1	Total/NA	Water	353.2	
660-61221-2	UZAMW-1	Total/NA	Water	353.2	
660-61221-3	LZAMW-1	Total/NA	Water	353.2	
660-61221-4	UZAMW-2	Total/NA	Water	353.2	
660-61221-5	LZAMW-2	Total/NA	Water	353.2	

Analysis Batch: 335393

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48267-D-5 DU	Duplicate	Total/NA	Water	4500 S2 F-2011	
660-61221-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-61221-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-61221-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-61221-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-61221-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-335393/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-335393/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-335393/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 336095

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48268-J-1 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-48268-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
640-48287-L-1 DU	Duplicate	Total/NA	Water	5310 B-2011	
660-61221-1	RW-1	Total/NA	Water	5310 B-2011	
660-61221-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-61221-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-61221-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-61221-5	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-336095/5	Lab Control Sample	Total/NA	Water	5310 B-2011	
MB 680-336095/6	Method Blank	Total/NA	Water	5310 B-2011	

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: RW-1

Date Collected: 06/18/14 15:40

Date Received: 06/18/14 16:30

Lab Sample ID: 660-61221-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	335313	06/20/14 13:24	PAT	TAL SAV
Total/NA	Analysis	300.0		20	335313	06/20/14 13:39	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			335418	06/20/14 15:07	BJB	TAL SAV
Dissolved	Prep	3005A			335419	06/20/14 15:08	BJB	TAL SAV
Dissolved	Analysis	6020A		1	335987	06/23/14 17:04	BWR	TAL SAV
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	335987	06/23/14 23:04	BWR	TAL SAV
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	336146	06/25/14 07:06	BWR	TAL SAV
Total/NA	Analysis	353.2			149326	06/26/14 09:14	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			335393	06/20/14 13:39	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011			336095	06/25/14 00:25	CMP	TAL SAV
Total/NA	Analysis	SM 2320B			149235	06/23/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			149211	06/20/14 15:06	TKO	TAL TAM

Client Sample ID: UZAMW-1

Date Collected: 06/18/14 13:10

Date Received: 06/18/14 16:30

Lab Sample ID: 660-61221-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	335313	06/20/14 13:53	PAT	TAL SAV
Total/NA	Analysis	300.0		4	335313	06/20/14 14:07	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			335418	06/20/14 15:07	BJB	TAL SAV
Dissolved	Prep	3005A			335419	06/20/14 15:08	BJB	TAL SAV
Dissolved	Analysis	6020A		1	335987	06/23/14 17:40	BWR	TAL SAV
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	335987	06/23/14 23:40	BWR	TAL SAV
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	336146	06/25/14 07:57	BWR	TAL SAV
Total/NA	Analysis	353.2			149326	06/26/14 09:40	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			335393	06/20/14 13:39	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011			336095	06/25/14 00:42	CMP	TAL SAV
Total/NA	Analysis	SM 2320B			149235	06/23/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			149211	06/20/14 15:06	TKO	TAL TAM

Client Sample ID: LZAMW-1

Date Collected: 06/18/14 12:40

Date Received: 06/18/14 16:30

Lab Sample ID: 660-61221-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	335313	06/20/14 14:22	PAT	TAL SAV
Total/NA	Analysis	300.0		10	335313	06/20/14 14:36	PAT	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61221-3

Date Collected: 06/18/14 12:40

Matrix: Water

Date Received: 06/18/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab	
Dissolved	Filtration	FILTRATION			335418	06/20/14 15:07	BJB	TAL SAV	
Dissolved	Prep	3005A			335419	06/20/14 15:08	BJB	TAL SAV	
Dissolved	Analysis	6020A		1	335987	06/23/14 17:48	BWR	TAL SAV	
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV	
Total Recoverable	Analysis	6020A		1	335987	06/23/14 23:47	BWR	TAL SAV	
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV	
Total Recoverable	Analysis	6020A		1	336146	06/25/14 08:04	BWR	TAL SAV	
Total/NA	Analysis	353.2			1	149326	06/26/14 09:40	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			1	335393	06/20/14 13:39	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011			1	336095	06/25/14 01:33	CMP	TAL SAV
Total/NA	Analysis	SM 2320B			1	149235	06/23/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149211	06/20/14 15:06	TKO	TAL TAM	

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61221-4

Date Collected: 06/18/14 14:40

Matrix: Water

Date Received: 06/18/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab	
Total/NA	Analysis	300.0		1	335313	06/20/14 15:19	PAT	TAL SAV	
Total/NA	Analysis	300.0		4	335313	06/20/14 15:34	PAT	TAL SAV	
Dissolved	Filtration	FILTRATION			335418	06/20/14 15:07	BJB	TAL SAV	
Dissolved	Prep	3005A			335419	06/20/14 15:08	BJB	TAL SAV	
Dissolved	Analysis	6020A		1	335987	06/23/14 17:55	BWR	TAL SAV	
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV	
Total Recoverable	Analysis	6020A		1	335987	06/23/14 23:55	BWR	TAL SAV	
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV	
Total Recoverable	Analysis	6020A		1	336146	06/25/14 08:11	BWR	TAL SAV	
Total/NA	Analysis	353.2			1	149326	06/26/14 09:40	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			1	335393	06/20/14 13:39	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011			1	336095	06/25/14 01:51	CMP	TAL SAV
Total/NA	Analysis	SM 2320B			1	149235	06/23/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149211	06/20/14 15:06	TKO	TAL TAM	

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61221-5

Date Collected: 06/18/14 14:10

Matrix: Water

Date Received: 06/18/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	335313	06/20/14 15:48	PAT	TAL SAV
Total/NA	Analysis	300.0		10	335313	06/20/14 16:03	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			335418	06/20/14 15:07	BJB	TAL SAV
Dissolved	Prep	3005A			335419	06/20/14 15:08	BJB	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61221-5

Date Collected: 06/18/14 14:10

Matrix: Water

Date Received: 06/18/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6020A		1	335987	06/23/14 18:17	BWR	TAL SAV
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	335987	06/24/14 00:17	BWR	TAL SAV
Total Recoverable	Prep	3005A			335424	06/20/14 15:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	336146	06/25/14 08:19	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149326	06/26/14 09:40	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	335393	06/20/14 13:39	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	336095	06/25/14 02:05	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149235	06/23/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149211	06/20/14 15:06	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-14 *

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-14 *
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-30-14 *
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-14 *
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-14 *
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	02-28-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-14 *
Michigan	State Program	5	9925	06-30-14 *
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-14 *
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-14 *
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-14 *
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-14 *
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-14 *
Wisconsin	State Program	5	999819810	08-31-14

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater (CLWGRS)

TestAmerica Job ID: 660-61221-1

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Chain of Custody Record

TestAmerica
TEST LABORATORY ENVIRONMENTAL TESTINGCOC No
660-57033-18302.1Page
Page 1 of 1

Client Information

Client Contact

Jeff Trommer

Company

Leggette, Brashears & Graham, Inc.

Address

10014 N. Dale Mabry Highway Suite 205

Due Date Requested:

TAT Requested (days):

State, Zip

FL, 33618

Phone:

Email:

fstrommer@bgtampa.com

Project Name:

Clearwater Groundwater Analysis

Site:

Sample:

Richard Cofar

Lab PM:

Robertson, Nancy

E-Mail:

nancy.robertson@testamericanainc.com

Carrier Tracking No(s):

SSDW#:

Analysis Requested										Preservation Codes:	
2640C - Total Dissolved Solids										A - HCl	M - Hexane
353.2 - Nitrate										B - NaOH	N - None
2320B - Alkalinity and Bicarbonate Alkalinity										C - Zn Acetate	O - AsNaO2
300_ORGFM_28D - Chloride, Fluoride & Sulfate										D - Nitric Acid	P - Na2O3S
6020A - Iron										E - NaHSO4	Q - Na2S2O3
6020A - As, Fe, Ca, K, Mg, Na										F - MeOH	R - Na2S2S3O3
SM4600_S2_F - Total Sulfide										G - Anchor	S - H2SO4
SM6310_TOC_B - Total Organic Carbon										H - Ascorbic Acid	T - TSP Dodecahydrate
										I - Ice	U - Acetone
										J - DI Water	V - MCAA
										K - EDTA	W - pH 4.5
										L - EDA	Z - other (specify)
										Other:	

Sample Identification

Sample Date

Sample Time

Preservation Codes:

(C=comp, G=Grab)

Bt-Tissue, Au-Au)

Special Instructions/Note:

6-13-14 15:40 G Water

1310 Water

1240 Water

1440 Water

1410 Water

PO #:

Purchase Order not required

WO #:

CLNGRS

Project #:

66007-675

Sample Type (W=water, S=solid, O=organic)

Matrix (W=water, A=air, G=grab)

Sample ID:

Date:

Time:

Refrigerated by:

Received by:

Method of Shipment:

Date/Time:

Received by:

Date/Time:

Received by:

Date/Time:

Date/Time:

Received by:

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-61221-1

Login Number: 61221

List Source: TestAmerica Tampa

List Number: 1

Creator: McNulty, Carol

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-61374-1

Client Project/Site: Clearwater Groundwater CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

7/10/2014 1:50:18 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-61374-1	RW-1	Water	06/26/14 14:45	06/26/14 15:40
660-61374-2	UZAMW-1	Water	06/26/14 12:10	06/26/14 15:40
660-61374-3	LZAMW-1	Water	06/26/14 11:40	06/26/14 15:40
660-61374-4	UZAMW-2	Water	06/26/14 13:55	06/26/14 15:40
660-61374-5	LZAMW-2	Water	06/26/14 13:25	06/26/14 15:40

Case Narrative

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Job ID: 660-61374-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-61374-1

Comments

No additional comments.

Receipt

The samples were received on 6/26/2014 3:40 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.5° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Detection Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: RW-1

Lab Sample ID: 660-61374-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	43		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	2.3		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	560		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	14		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	98000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6000		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	29000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	240000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.9		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.1		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1200		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61374-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	8.9		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.28		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		5.0	2.5	mg/L	10		300.0	Total/NA
Arsenic	6.3		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	77000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	14000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	69000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.0		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	510		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61374-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	17		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	75000		250	130	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-61374-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Potassium	3800		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	140000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.0		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	710		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61374-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.1		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.39		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	99		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	26		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	56000		250	130	ug/L	1		6020A	Total Recoverable
Iron	85 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	2500		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	12000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	41000		500	250	ug/L	1		6020A	Total Recoverable
Iron	130		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	360		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61374-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	27		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	340		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	80000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	4700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	19000		250	43	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-61374-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	160000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.9		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.2		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	740		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: RW-1

Date Collected: 06/26/14 14:45

Date Received: 06/26/14 15:40

Lab Sample ID: 660-61374-1

Matrix: Water

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	43		1.0	0.50	mg/L			07/01/14 13:20	2
Fluoride	2.3		0.20	0.050	mg/L			07/01/14 13:20	2
Chloride	560		10	5.0	mg/L			07/01/14 13:34	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		2.5	1.3	ug/L			07/02/14 06:26	1
Calcium	98000		250	130	ug/L			07/02/14 06:26	1
Iron	33	U	100	33	ug/L			07/02/14 06:26	1
Potassium	6000		500	170	ug/L			07/02/14 06:26	1
Magnesium	29000		250	43	ug/L			07/02/14 06:26	1
Sodium	240000		500	250	ug/L			07/02/14 06:26	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			07/06/14 15:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			07/09/14 15:18	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			07/03/14 21:13	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.1		1.0	1.0	mg/L			07/03/14 11:59	1
Alkalinity	190		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Ion as HCO ₃	230		1.0	1.0	mg/L			06/30/14 09:40	1
Total Dissolved Solids	1200		25	25	mg/L			06/30/14 15:37	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61374-2

Matrix: Water

Date Collected: 06/26/14 12:10

Date Received: 06/26/14 15:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	8.9		0.50	0.25	mg/L			07/01/14 13:48	1
Fluoride	0.28		0.10	0.025	mg/L			07/01/14 13:48	1
Chloride	170		5.0	2.5	mg/L			07/01/14 14:03	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.3		2.5	1.3	ug/L			07/02/14 07:03	1
Calcium	77000		250	130	ug/L			07/02/14 07:03	1
Iron	33	U	100	33	ug/L			07/02/14 07:03	1
Potassium	2700		500	170	ug/L			07/02/14 07:03	1
Magnesium	14000		250	43	ug/L			07/02/14 07:03	1
Sodium	69000		500	250	ug/L			07/02/14 07:03	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			07/06/14 16:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			07/09/14 15:18	1
Total Organic Carbon	2.0		1.0	0.50	mg/L			07/03/14 21:28	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.5		1.0	1.0	mg/L			07/03/14 11:59	1
Alkalinity	180		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			06/30/14 09:40	1
Total Dissolved Solids	510		17	17	mg/L			06/30/14 15:37	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61374-3

Matrix: Water

Date Collected: 06/26/14 11:40

Date Received: 06/26/14 15:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	17		0.50	0.25	mg/L			07/01/14 14:46	1
Fluoride	0.21		0.10	0.025	mg/L			07/01/14 14:46	1
Chloride	320		5.0	2.5	mg/L			07/01/14 15:00	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		06/27/14 15:46	07/02/14 07:10	1
Calcium	75000		250	130	ug/L		06/27/14 15:46	07/02/14 07:10	1
Iron	33	U	100	33	ug/L		06/27/14 15:46	07/02/14 07:10	1
Potassium	3800		500	170	ug/L		06/27/14 15:46	07/02/14 07:10	1
Magnesium	16000		250	43	ug/L		06/27/14 15:46	07/02/14 07:10	1
Sodium	140000		500	250	ug/L		06/27/14 15:46	07/02/14 07:10	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/30/14 14:41	07/06/14 16:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			07/09/14 15:18	1
Total Organic Carbon	2.0		1.0	0.50	mg/L			07/03/14 21:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.9		1.0	1.0	mg/L			07/03/14 11:59	1
Alkalinity	170		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			06/30/14 09:40	1
Total Dissolved Solids	710		25	25	mg/L			06/30/14 15:37	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: UZAMW-2

Lab Sample ID: 660-61374-4

Matrix: Water

Date Collected: 06/26/14 13:55

Date Received: 06/26/14 15:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.1		0.50	0.25	mg/L			07/01/14 15:15	1
Fluoride	0.39		0.10	0.025	mg/L			07/01/14 15:15	1
Chloride	99		2.0	1.0	mg/L			07/01/14 15:29	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	26		2.5	1.3	ug/L		06/27/14 15:46	07/02/14 07:17	1
Calcium	56000		250	130	ug/L		06/27/14 15:46	07/02/14 07:17	1
Iron	85 I		100	33	ug/L		06/27/14 15:46	07/02/14 07:17	1
Potassium	2500		500	170	ug/L		06/27/14 15:46	07/02/14 07:17	1
Magnesium	12000		250	43	ug/L		06/27/14 15:46	07/02/14 07:17	1
Sodium	41000		500	250	ug/L		06/27/14 15:46	07/02/14 07:17	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	130		100	33	ug/L		06/30/14 14:41	07/06/14 16:20	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			07/09/14 15:18	1
Total Organic Carbon	1.3		1.0	0.50	mg/L			07/03/14 22:09	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			07/03/14 11:59	1
Alkalinity	170		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			06/30/14 09:40	1
Total Dissolved Solids	360		10	10	mg/L			06/30/14 15:37	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61374-5

Matrix: Water

Date Collected: 06/26/14 13:25

Date Received: 06/26/14 15:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	27		0.50	0.25	mg/L			07/01/14 16:12	1
Fluoride	0.21		0.10	0.025	mg/L			07/01/14 16:12	1
Chloride	340		5.0	2.5	mg/L			07/01/14 16:27	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		06/27/14 15:46	07/02/14 07:39	1
Calcium	80000		250	130	ug/L		06/27/14 15:46	07/02/14 07:39	1
Iron	33	U	100	33	ug/L		06/27/14 15:46	07/02/14 07:39	1
Potassium	4700		500	170	ug/L		06/27/14 15:46	07/02/14 07:39	1
Magnesium	19000		250	43	ug/L		06/27/14 15:46	07/02/14 07:39	1
Sodium	160000		500	250	ug/L		06/27/14 15:46	07/02/14 07:39	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/30/14 14:41	07/06/14 16:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			07/09/14 15:18	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			07/03/14 22:27	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.2		1.0	1.0	mg/L			07/03/14 11:59	1
Alkalinity	180		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			06/30/14 09:40	1
Total Dissolved Solids	740		25	25	mg/L			06/30/14 15:37	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-337073/5

Matrix: Water

Analysis Batch: 337073

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			07/01/14 10:12	1
Fluoride	0.025	U	0.10	0.025	mg/L			07/01/14 10:12	1
Chloride	0.25	U	0.50	0.25	mg/L			07/01/14 10:12	1

Lab Sample ID: LCS 680-337073/6

Matrix: Water

Analysis Batch: 337073

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Sulfate	10.0		10.4		mg/L		104	90 - 110	
Fluoride	2.00		2.09		mg/L		105	90 - 110	
Chloride	10.0		9.85		mg/L		99	90 - 110	

Lab Sample ID: LCSD 680-337073/7

Matrix: Water

Analysis Batch: 337073

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Added									
Sulfate	10.0		10.4		mg/L		104	90 - 110	0	30
Fluoride	2.00		2.09		mg/L		105	90 - 110	0	30
Chloride	10.0		9.86		mg/L		99	90 - 110	0	30

Lab Sample ID: 660-61374-2 MS

Matrix: Water

Analysis Batch: 337073

Client Sample ID: UZAMW-1

Prep Type: Total/NA

Analyte	Sample		Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	
	Result	Qualifier								
Sulfate	7.4		100	106		mg/L		98	80 - 120	
Fluoride	0.28		20.0	20.2		mg/L		100	80 - 120	
Chloride	170		100	267		mg/L		96	80 - 120	

Lab Sample ID: 660-61374-2 MSD

Matrix: Water

Analysis Batch: 337073

Client Sample ID: UZAMW-1

Prep Type: Total/NA

Analyte	Sample		Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier									
Sulfate	7.4		100	104		mg/L		96	80 - 120	2	30
Fluoride	0.28		20.0	19.8		mg/L		98	80 - 120	2	30
Chloride	170		100	265		mg/L		95	80 - 120	1	30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-336687/1-A

Matrix: Water

Analysis Batch: 337267

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 336687

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		06/27/14 15:46	07/02/14 06:11	1
Calcium	130	U	250	130	ug/L		06/27/14 15:46	07/02/14 06:11	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 680-336687/1-A

Matrix: Water

Analysis Batch: 337267

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 336687

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/27/14 15:46	07/02/14 06:11	1
Potassium	170	U	500	170	ug/L		06/27/14 15:46	07/02/14 06:11	1
Magnesium	43	U	250	43	ug/L		06/27/14 15:46	07/02/14 06:11	1
Sodium	250	U	500	250	ug/L		06/27/14 15:46	07/02/14 06:11	1

Lab Sample ID: LCS 680-336687/2-A

Matrix: Water

Analysis Batch: 337267

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 336687

LCS LCS

Analyte		Spike Added	Result	Qualifier	Unit	D	%Rec	Limits
Arsenic		100	101		ug/L		101	75 - 125
Calcium		5000	5090		ug/L		102	75 - 125
Iron		5000	5050		ug/L		101	75 - 125
Potassium		5000	4940		ug/L		99	75 - 125
Magnesium		5000	4760		ug/L		95	75 - 125
Sodium		5000	4640		ug/L		93	75 - 125

Lab Sample ID: 660-61374-1 MS

Matrix: Water

Analysis Batch: 337267

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 336687

MS MS

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	14		100	114		ug/L		100	75 - 125
Calcium	98000		5000	106000	J3	ug/L		159	75 - 125
Iron	33	U	5000	4760		ug/L		95	75 - 125
Potassium	6000		5000	10800		ug/L		96	75 - 125
Magnesium	29000		5000	34800		ug/L		120	75 - 125
Sodium	240000		5000	257000	J3	ug/L		327	75 - 125

Lab Sample ID: 660-61374-1 MSD

Matrix: Water

Analysis Batch: 337267

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 336687

MSD MSD

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	14		100	109		ug/L		96	75 - 125	4	20
Calcium	98000		5000	106000	J3	ug/L		161	75 - 125	0	20
Iron	33	U	5000	4590		ug/L		92	75 - 125	4	20
Potassium	6000		5000	10600		ug/L		92	75 - 125	2	20
Magnesium	29000		5000	34700		ug/L		117	75 - 125	0	20
Sodium	240000		5000	256000	J3	ug/L		313	75 - 125	0	20

Lab Sample ID: MB 680-337584/1-A

Matrix: Water

Analysis Batch: 337946

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 337584

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		06/30/14 14:41	07/06/14 15:14	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-337584/2-A

Matrix: Water

Analysis Batch: 337946

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 337584

Analyte	Sample Result	Sample Qualifier	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron			5000	5360		ug/L		107	75 - 125

Lab Sample ID: 660-61374-1 MS

Matrix: Water

Analysis Batch: 337946

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 337584

Analyte	Sample Result	Sample Qualifier	Spike	MS	MS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron	33	U	5000	4980		ug/L		100	75 - 125

Lab Sample ID: 660-61374-1 MSD

Matrix: Water

Analysis Batch: 337946

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 337584

Analyte	Sample Result	Sample Qualifier	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron	33	U	5000	5180		ug/L		104	75 - 125

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: LCS 660-149400/15

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analysis Batch: 149400

Analyte	Sample Result	Sample Qualifier	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Nitrite as N			0.500	0.521		mg/L		104	90 - 110

Lab Sample ID: 660-61369-A-1 MS

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analysis Batch: 149400

Analyte	Sample Result	Sample Qualifier	Spike	MS	MS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Nitrite as N	0.10	U	0.500	0.522		mg/L		104	90 - 110

Lab Sample ID: 660-61369-A-1 MSD

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analysis Batch: 149400

Analyte	Sample Result	Sample Qualifier	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Nitrite as N	0.10	U	0.500	0.523		mg/L		105	90 - 110

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-337572/1

Client Sample ID: Method Blank

Prep Type: Total/NA

Analysis Batch: 337572

Analyte	Result	Qualifier	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
			Result	Qualifier							
Total Sulfide	1.0	U			1.0	1.0	mg/L			07/03/14 11:59	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method: 4500 S2 F-2011 - Sulfide, Total (Continued)

Lab Sample ID: LCS 680-337572/2

Matrix: Water

Analysis Batch: 337572

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	10.0	10.5		mg/L		105	75 - 125

Lab Sample ID: 400-92634-G-1 MS

Matrix: Water

Analysis Batch: 337572

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Total Sulfide	1.0	U	10.0	10.6		mg/L		106	75 - 125

Lab Sample ID: 400-92634-G-1 MSD

Matrix: Water

Analysis Batch: 337572

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Sulfide	1.0	U	10.0	10.4		mg/L		104	75 - 125	2	30

Lab Sample ID: 640-48436-C-2 DU

Matrix: Water

Analysis Batch: 337572

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	Prepared	Analyzed	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Sulfide	1.0	U		1.0	U	mg/L				NC	30

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-337815/6

Matrix: Water

Analysis Batch: 337815

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L				1

Lab Sample ID: LCS 680-337815/5

Matrix: Water

Analysis Batch: 337815

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Organic Carbon	20.0	19.6		mg/L		98	80 - 120

Lab Sample ID: 640-48335-F-3 MS

Matrix: Water

Analysis Batch: 337815

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	
	Result	Qualifier	Added	Result	Qualifier					
Total Organic Carbon	2.6		20.0	22.3		mg/L		98	80 - 120	

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 640-48335-F-3 MSD

Matrix: Water

Analysis Batch: 337815

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Organic Carbon	2.6		20.0	22.2		mg/L		98	80 - 120	0	25

Lab Sample ID: 660-61363-N-12 DU

Matrix: Water

Analysis Batch: 337815

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	%Rec.	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier						
Total Organic Carbon	18			18.3	mg/L				0.05	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-149429/1

Matrix: Water

Analysis Batch: 149429

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	1.0	mg/L			06/30/14 09:40	1
Bicarbonate ion as HCO ₃	1.0	U	1.0	1.0	mg/L			06/30/14 09:40	1

Lab Sample ID: LCS 660-149429/3

Matrix: Water

Analysis Batch: 149429

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	Dil Fac
	Added	Result	Qualifier					
Alkalinity		118	118	mg/L		100	80 - 120	

Lab Sample ID: 660-61374-1 DU

Matrix: Water

Analysis Batch: 149429

Client Sample ID: RW-1
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	%Rec.	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier						
Alkalinity	190		192		mg/L			0.5	30	
Bicarbonate Alkalinity as CaCO ₃	190		192		mg/L			0.5	30	
Bicarbonate ion as HCO ₃	230		234		mg/L			0.5	30	

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-149433/1

Matrix: Water

Analysis Batch: 149433

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			06/30/14 15:37	1	

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QC Sample Results

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 660-149433/2

Matrix: Water

Analysis Batch: 149433

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.	Limits
		Result	Qualifier				99	
Total Dissolved Solids	10000	9910		mg/L			99	80 - 120

Lab Sample ID: 660-61374-4 DU

Matrix: Water

Analysis Batch: 149433

Analyte	Sample Result	Sample Qualifier	DU	DU	Unit	D	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier				3	
Total Dissolved Solids	360		368		mg/L			3	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

HPLC/IC

Analysis Batch: 337073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Total/NA	Water	300.0	
660-61374-1	RW-1	Total/NA	Water	300.0	
660-61374-2	UZAMW-1	Total/NA	Water	300.0	
660-61374-2	UZAMW-1	Total/NA	Water	300.0	
660-61374-2 MS	UZAMW-1	Total/NA	Water	300.0	
660-61374-2 MSD	UZAMW-1	Total/NA	Water	300.0	
660-61374-3	LZAMW-1	Total/NA	Water	300.0	
660-61374-3	LZAMW-1	Total/NA	Water	300.0	
660-61374-4	UZAMW-2	Total/NA	Water	300.0	
660-61374-4	UZAMW-2	Total/NA	Water	300.0	
660-61374-5	LZAMW-2	Total/NA	Water	300.0	
660-61374-5	LZAMW-2	Total/NA	Water	300.0	
LCS 680-337073/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-337073/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-337073/5	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 336687

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Total Recoverable	Water	3005A	
660-61374-1 MS	RW-1	Total Recoverable	Water	3005A	
660-61374-1 MSD	RW-1	Total Recoverable	Water	3005A	
660-61374-2	UZAMW-1	Total Recoverable	Water	3005A	
660-61374-3	LZAMW-1	Total Recoverable	Water	3005A	
660-61374-4	UZAMW-2	Total Recoverable	Water	3005A	
660-61374-5	LZAMW-2	Total Recoverable	Water	3005A	
LCS 680-336687/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-336687/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 336954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Dissolved	Water	FILTRATION	
660-61374-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-61374-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-61374-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-61374-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-61374-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-61374-5	LZAMW-2	Dissolved	Water	FILTRATION	

Analysis Batch: 337267

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Total Recoverable	Water	6020A	336687
660-61374-1 MS	RW-1	Total Recoverable	Water	6020A	336687
660-61374-1 MSD	RW-1	Total Recoverable	Water	6020A	336687
660-61374-2	UZAMW-1	Total Recoverable	Water	6020A	336687
660-61374-3	LZAMW-1	Total Recoverable	Water	6020A	336687
660-61374-4	UZAMW-2	Total Recoverable	Water	6020A	336687
660-61374-5	LZAMW-2	Total Recoverable	Water	6020A	336687
LCS 680-336687/2-A	Lab Control Sample	Total Recoverable	Water	6020A	336687

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Metals (Continued)

Analysis Batch: 337267 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-336687/1-A	Method Blank	Total Recoverable	Water	6020A	336687

Prep Batch: 337584

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Dissolved	Water	3005A	336954
660-61374-1 MS	RW-1	Dissolved	Water	3005A	336954
660-61374-1 MSD	RW-1	Dissolved	Water	3005A	336954
660-61374-2	UZAMW-1	Dissolved	Water	3005A	336954
660-61374-3	LZAMW-1	Dissolved	Water	3005A	336954
660-61374-4	UZAMW-2	Dissolved	Water	3005A	336954
660-61374-5	LZAMW-2	Dissolved	Water	3005A	336954
LCS 680-337584/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-337584/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 337946

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Dissolved	Water	6020A	337584
660-61374-1 MS	RW-1	Dissolved	Water	6020A	337584
660-61374-1 MSD	RW-1	Dissolved	Water	6020A	337584
660-61374-2	UZAMW-1	Dissolved	Water	6020A	337584
660-61374-3	LZAMW-1	Dissolved	Water	6020A	337584
660-61374-4	UZAMW-2	Dissolved	Water	6020A	337584
660-61374-5	LZAMW-2	Dissolved	Water	6020A	337584
LCS 680-337584/2-A	Lab Control Sample	Total Recoverable	Water	6020A	337584
MB 680-337584/1-A	Method Blank	Total Recoverable	Water	6020A	337584

General Chemistry

Analysis Batch: 149400

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61369-A-1 MS	Matrix Spike	Total/NA	Water	353.2	
660-61369-A-1 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	
LCS 660-149400/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-149400/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 149429

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Total/NA	Water	SM 2320B	
660-61374-1 DU	RW-1	Total/NA	Water	SM 2320B	
660-61374-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-61374-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-61374-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-61374-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-149429/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-149429/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 149433

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Total/NA	Water	SM 2540C	
660-61374-2	UZAMW-1	Total/NA	Water	SM 2540C	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

General Chemistry (Continued)

Analysis Batch: 149433 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-61374-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-61374-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-61374-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-149433/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-149433/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 149668

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61374-1	RW-1	Total/NA	Water	353.2	
660-61374-2	UZAMW-1	Total/NA	Water	353.2	
660-61374-3	LZAMW-1	Total/NA	Water	353.2	
660-61374-4	UZAMW-2	Total/NA	Water	353.2	
660-61374-5	LZAMW-2	Total/NA	Water	353.2	

Analysis Batch: 337572

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-92634-G-1 MS	Matrix Spike	Total/NA	Water	4500 S2 F-2011	
400-92634-G-1 MSD	Matrix Spike Duplicate	Total/NA	Water	4500 S2 F-2011	
640-48436-C-2 DU	Duplicate	Total/NA	Water	4500 S2 F-2011	
660-61374-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-61374-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-61374-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-61374-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-61374-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-337572/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
MB 680-337572/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 337815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48335-F-3 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-48335-F-3 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-61363-N-12 DU	Duplicate	Total/NA	Water	5310 B-2011	
660-61374-1	RW-1	Total/NA	Water	5310 B-2011	
660-61374-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-61374-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-61374-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-61374-5	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-337815/5	Lab Control Sample	Total/NA	Water	5310 B-2011	
MB 680-337815/6	Method Blank	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: RW-1

Lab Sample ID: 660-61374-1

Matrix: Water

Date Collected: 06/26/14 14:45

Date Received: 06/26/14 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	337073	07/01/14 13:20	PAT	TAL SAV
Total/NA	Analysis	300.0		20	337073	07/01/14 13:34	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			336954	06/30/14 14:40	BJB	TAL SAV
Dissolved	Prep	3005A			337584	06/30/14 14:41	BCB	TAL SAV
Dissolved	Analysis	6020A		1	337946	07/06/14 15:29	CME	TAL SAV
Total Recoverable	Prep	3005A			336687	06/27/14 15:46	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	337267	07/02/14 06:26	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149668	07/09/14 15:18	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	337572	07/03/14 11:59	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	337815	07/03/14 21:13	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149429	06/30/14 09:40	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149433	06/30/14 15:37	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-61374-2

Matrix: Water

Date Collected: 06/26/14 12:10

Date Received: 06/26/14 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	337073	07/01/14 13:48	PAT	TAL SAV
Total/NA	Analysis	300.0		10	337073	07/01/14 14:03	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			336954	06/30/14 14:40	BJB	TAL SAV
Dissolved	Prep	3005A			337584	06/30/14 14:41	BCB	TAL SAV
Dissolved	Analysis	6020A		1	337946	07/06/14 16:06	CME	TAL SAV
Total Recoverable	Prep	3005A			336687	06/27/14 15:46	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	337267	07/02/14 07:03	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149668	07/09/14 15:18	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	337572	07/03/14 11:59	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	337815	07/03/14 21:28	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149429	06/30/14 09:40	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149433	06/30/14 15:37	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-61374-3

Matrix: Water

Date Collected: 06/26/14 11:40

Date Received: 06/26/14 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	337073	07/01/14 14:46	PAT	TAL SAV
Total/NA	Analysis	300.0		10	337073	07/01/14 15:00	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			336954	06/30/14 14:40	BJB	TAL SAV
Dissolved	Prep	3005A			337584	06/30/14 14:41	BCB	TAL SAV
Dissolved	Analysis	6020A		1	337946	07/06/14 16:13	CME	TAL SAV
Total Recoverable	Prep	3005A			336687	06/27/14 15:46	SP	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: LZAMW-1

Date Collected: 06/26/14 11:40

Date Received: 06/26/14 15:40

Lab Sample ID: 660-61374-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6020A		1	337267	07/02/14 07:10	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149668	07/09/14 15:18	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	337572	07/03/14 11:59	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	337815	07/03/14 21:50	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149429	06/30/14 09:40	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149433	06/30/14 15:37	TKO	TAL TAM

Client Sample ID: UZAMW-2

Date Collected: 06/26/14 13:55

Date Received: 06/26/14 15:40

Lab Sample ID: 660-61374-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	337073	07/01/14 15:15	PAT	TAL SAV
Total/NA	Analysis	300.0		4	337073	07/01/14 15:29	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			336954	06/30/14 14:40	BJB	TAL SAV
Dissolved	Prep	3005A			337584	06/30/14 14:41	BCB	TAL SAV
Dissolved	Analysis	6020A		1	337946	07/06/14 16:20	CME	TAL SAV
Total Recoverable	Prep	3005A			336687	06/27/14 15:46	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	337267	07/02/14 07:17	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149668	07/09/14 15:18	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	337572	07/03/14 11:59	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	337815	07/03/14 22:09	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149429	06/30/14 09:40	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	149433	06/30/14 15:37	TKO	TAL TAM

Client Sample ID: LZAMW-2

Date Collected: 06/26/14 13:25

Date Received: 06/26/14 15:40

Lab Sample ID: 660-61374-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	337073	07/01/14 16:12	PAT	TAL SAV
Total/NA	Analysis	300.0		10	337073	07/01/14 16:27	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			336954	06/30/14 14:40	BJB	TAL SAV
Dissolved	Prep	3005A			337584	06/30/14 14:41	BCB	TAL SAV
Dissolved	Analysis	6020A		1	337946	07/06/14 16:42	CME	TAL SAV
Total Recoverable	Prep	3005A			336687	06/27/14 15:46	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	337267	07/02/14 07:39	BWR	TAL SAV
Total/NA	Analysis	353.2		1	149668	07/09/14 15:18	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	337572	07/03/14 11:59	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	337815	07/03/14 22:27	CMP	TAL SAV
Total/NA	Analysis	SM 2320B		1	149429	06/30/14 09:40	SC1	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-61374-5

Date Collected: 06/26/14 13:25

Matrix: Water

Date Received: 06/26/14 15:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	149433	06/30/14 15:37	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-14 *
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-30-14 *
Georgia	State Program	4	N/A	06-30-15
Guam	State Program	9	803	06-30-15
Hawaii	State Program	9	09-005r	04-16-15
Illinois	NELAP	5	200022	06-30-15
Indiana	State Program	5	N/A	11-30-14
Iowa	State Program	7	353	06-30-14 *
Kentucky (DW)	State Program	4	353	07-01-15
Kentucky (UST)	State Program	4	90084	12-31-14
Louisiana	NELAP	6	18	06-30-15
Louisiana (DW)	NELAP	6	30690	06-30-14 *
Maine	State Program	6	LA140023	12-31-14
Maryland	State Program	1	GA00006	08-16-14
Massachusetts	State Program	3	250	12-31-14
Michigan	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-14 *
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	06-30-15
Nebraska	State Program	8	TestAmerica-Savannah	01-01-15
New Jersey	NELAP	7	TestAmerica-Savannah	06-30-14 *
New Mexico	State Program	2	GA769	08-31-14
New York	State Program	6	N/A	06-30-15
North Carolina (DW)	NELAP	6	10842	06-30-14 *
North Carolina (WW/SW)	State Program	2	13701	03-31-15
Oklahoma	State Program	4	269	06-30-15
Pennsylvania	NELAP	6	9984	12-31-14
Puerto Rico	State Program	3	68-00474	08-31-14
South Carolina	State Program	2	GA00006	06-30-15
Tennessee	State Program	4	98001	12-31-14
Texas	NELAP	4	TN02961	06-30-15
USDA	Federal	6	T104704185-08-TX	06-11-17
Virginia	NELAP	3	SAV 3-04	06-14-15
Washington	State Program	10	460161	06-10-15
West Virginia (DW)	State Program	3	C805	12-31-14
West Virginia DEP	State Program	3	9950C	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.
Project/Site: Clearwater Groundwater CLWGRS

TestAmerica Job ID: 660-61374-1

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-14
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa



TestAmerica Tampa

6712 Benjamin Road Suite 100

Tampa, FL 33634
Phone (813) 885-7427 Fax (813) 885-7049

Client Information

Client Information

Jeff Ihommer

Leggette, Brashears & Graham, Inc.

Address:
10014 N. Dale Mabry Highway Suite

Chain of Custody Record

ESTAMERICA

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-61374-1

Login Number: 61374

List Source: TestAmerica Tampa

List Number: 1

Creator: Redding, Charles S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-61374-1

Login Number: 61374

List Source: TestAmerica Savannah

List Number: 2

List Creation: 06/27/14 10:51 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-61221-1

Login Number: 61221

List Source: TestAmerica Savannah

List Number: 2

List Creation: 06/20/14 07:43 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62011-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer

Authorized for release by:

8/18/2014 3:57:08 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62011-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62011-1	RW-1	Water	07/31/14 10:25	07/31/14 16:30

1

2

3

4

5

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14

Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62011-1

Job ID: 660-62011-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62011-1

Comments

No additional comments.

Receipt

The sample was received on 7/31/2014 4:30 PM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.9° C.

Metals

Method 6020A: The method blank for batch 342426 contained arsenic above the method detection limit (MDL). Associated samples were not re-analyzed because results were less than the reporting limit (RL) OR practical quantitation limit (PQL). The samples are flagged with V.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate(MS/MSD) associated with batch 680-342278.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62011-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
L	Off-scale high. Actual value is known to be greater than the value given.
V	Indicates that the analyte was detected at or above the method detection limit in both the sample and the associated method blank and the value of 10 times the blank value was equal to or greater than the associated sample value.
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62011-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	43		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	2.0		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	600		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	15	V	2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	100000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	33000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	280000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.4		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.4		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	240		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1300		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62011-1

Matrix: Water

Date Collected: 07/31/14 10:25

Date Received: 07/31/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	43		1.0	0.50	mg/L			08/04/14 23:04	2
Fluoride	2.0		0.20	0.050	mg/L			08/04/14 23:04	2
Chloride	600		10	5.0	mg/L			08/04/14 23:20	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	15	V	2.5	1.3	ug/L		08/05/14 07:42	08/09/14 15:50	1
Calcium	100000		250	130	ug/L		08/05/14 07:42	08/09/14 15:50	1
Iron	33	U	100	33	ug/L		08/05/14 07:42	08/09/14 15:50	1
Potassium	6700		500	170	ug/L		08/05/14 07:42	08/09/14 15:50	1
Magnesium	33000		250	43	ug/L		08/05/14 07:42	08/09/14 15:50	1
Sodium	280000		500	250	ug/L		08/05/14 07:42	08/09/14 15:50	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/04/14 09:48	08/18/14 14:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/01/14 14:44	1
Total Organic Carbon	2.4		1.0	0.50	mg/L			08/15/14 03:40	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.4		1.0	1.0	mg/L			08/04/14 09:30	1
Alkalinity	200		1.0	1.0	mg/L			08/01/14 07:40	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			08/01/14 07:40	1
Bicarbonate Ion as HCO ₃	240		1.0	1.0	mg/L			08/01/14 07:40	1
Total Dissolved Solids	1300		25	25	mg/L			08/05/14 11:26	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-342409/5

Matrix: Water

Analysis Batch: 342409

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			08/04/14 16:08	1
Fluoride	0.025	U	0.10	0.025	mg/L			08/04/14 16:08	1
Chloride	0.25	U	0.50	0.25	mg/L			08/04/14 16:08	1

Lab Sample ID: LCS 680-342409/6

Matrix: Water

Analysis Batch: 342409

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LC	LC	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	10.2		mg/L		102	90 - 110	
Fluoride	2.00	2.08		mg/L		104	90 - 110	
Chloride	10.0	10.1		mg/L		101	90 - 110	

Lab Sample ID: LCSD 680-342409/7

Matrix: Water

Analysis Batch: 342409

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
		Result	Qualifier							
Sulfate	10.0	10.2		mg/L		102	90 - 110		0	30
Fluoride	2.00	2.08		mg/L		104	90 - 110		0	30
Chloride	10.0	10.1		mg/L		101	90 - 110		0	30

Lab Sample ID: 660-62007-K-1 MS

Matrix: Water

Analysis Batch: 342409

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	0.25	U	10.0	9.37		mg/L		94	80 - 120	
Fluoride	0.082	I	2.00	2.12		mg/L		102	80 - 120	
Chloride	14		10.0	24.1		mg/L		98	80 - 120	

Lab Sample ID: 660-62007-K-1 MSD

Matrix: Water

Analysis Batch: 342409

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Sulfate	0.25	U	10.0	9.63		mg/L		96	80 - 120		3	30
Fluoride	0.082	I	2.00	2.18		mg/L		105	80 - 120		2	30
Chloride	14		10.0	24.4		mg/L		101	80 - 120		1	30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-342426/1-A

Matrix: Water

Analysis Batch: 343412

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 342426

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.97	I	2.5	1.3	ug/L		08/05/14 07:42	08/09/14 15:36	1
Calcium	130	U	250	130	ug/L		08/05/14 07:42	08/09/14 15:36	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 680-342426/1-A

Matrix: Water

Analysis Batch: 343412

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 342426

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/05/14 07:42	08/09/14 15:36	1
Potassium	170	U	500	170	ug/L		08/05/14 07:42	08/09/14 15:36	1
Magnesium	43	U	250	43	ug/L		08/05/14 07:42	08/09/14 15:36	1
Sodium	250	U	500	250	ug/L		08/05/14 07:42	08/09/14 15:36	1

Lab Sample ID: LCS 680-342426/2-A

Matrix: Water

Analysis Batch: 343412

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 342426

Spike LCS LCS

Analyte		Spike Added	Result	Qualifier	Unit	D	%Rec	Limits
Arsenic		100	105		ug/L		105	75 - 125
Calcium		5000	5220		ug/L		104	75 - 125
Iron		5000	5220		ug/L		104	75 - 125
Potassium		5000	5300		ug/L		106	75 - 125
Magnesium		5000	5210		ug/L		104	75 - 125
Sodium		5000	5010		ug/L		100	75 - 125

Lab Sample ID: 640-48720-D-8-B MS

Matrix: Water

Analysis Batch: 343412

Client Sample ID: Matrix Spike

Prep Type: Total Recoverable

Prep Batch: 342426

MS MS

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	1.6	I V	100	106		ug/L		105	75 - 125
Calcium	340000	J3	5000	333000	J3	ug/L	-181	75 - 125	
Iron	33	U	5000	4910		ug/L	98	75 - 125	
Potassium	110000	J3	5000	109000	J3	ug/L	33	75 - 125	
Magnesium	240000	J3	5000	236000	J3	ug/L	-153	75 - 125	
Sodium	1700000	J3 L	5000	1630000	J3 L	ug/L	-1580	75 - 125	

Lab Sample ID: 640-48720-D-8-C MSD

Matrix: Water

Analysis Batch: 343412

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total Recoverable

Prep Batch: 342426

MSD MSD

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	1.6	I V	100	106		ug/L		104	75 - 125	0	20
Calcium	340000	J3	5000	343000	J3	ug/L	10	75 - 125	3	20	
Iron	33	U	5000	5050		ug/L	101	75 - 125	3	20	
Potassium	110000	J3	5000	107000	J3	ug/L	7	75 - 125	1	20	
Magnesium	240000	J3	5000	245000	J3	ug/L	19	75 - 125	4	20	
Sodium	1700000	J3 L	5000	1670000	J3 L	ug/L	-860	75 - 125	2	20	

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-150386/13

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150386

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L		08/01/14 14:25		1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: LCS 660-150386/15

Matrix: Water

Analysis Batch: 150386

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
Nitrate Nitrite as N	1.00	0.987		mg/L	99	90 - 110	
Nitrite as N	0.500	0.547		mg/L	109	90 - 110	

Lab Sample ID: 660-62006-I-3 MS

Matrix: Water

Analysis Batch: 150386

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10	U	1.00	1.02		mg/L	102	90 - 110	
Nitrite as N	0.10	U	0.500	0.567		mg/L	113	90 - 110	

Lab Sample ID: 660-62006-I-3 MSD

Matrix: Water

Analysis Batch: 150386

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10	U	1.00	1.00		mg/L	100	90 - 110	
Nitrite as N	0.10	U	0.500	0.562		mg/L	112	90 - 110	

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-342278/1

Client Sample ID: Method Blank

Prep Type: Total/NA

Matrix: Water

Analysis Batch: 342278

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/04/14 09:30	1

Lab Sample ID: LCS 680-342278/2

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Matrix: Water

Analysis Batch: 342278

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	9.99	9.38		mg/L	94	75 - 125	

Lab Sample ID: LCSD 680-342278/3

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Matrix: Water

Analysis Batch: 342278

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	9.99	9.34		mg/L	93	75 - 125	

Lab Sample ID: 660-62011-1 DU

Client Sample ID: RW-1

Prep Type: Total/NA

Matrix: Water

Analysis Batch: 342278

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Sulfide	5.4		5.11		mg/L		6	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-150366/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150366

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			08/01/14 07:40	1
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	1.0	mg/L			08/01/14 07:40	1
Bicarbonate ion as HCO ₃	1.0	U	1.0	1.0	mg/L			08/01/14 07:40	1

Lab Sample ID: LCS 660-150366/3

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150366

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Alkalinity	118	119		mg/L	100	80 - 120	

Lab Sample ID: 660-61897-B-6 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150366

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	310		310		mg/L		0.2	30
Bicarbonate Alkalinity as CaCO ₃	310		310		mg/L		0.2	30
Bicarbonate ion as HCO ₃	380		379		mg/L		0.2	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-150443/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150443

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			08/05/14 11:26	1

Lab Sample ID: LCS 660-150443/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150443

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Dissolved Solids	10000	9950		mg/L	100	80 - 120	

Lab Sample ID: 660-62007-F-1 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150443

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	270		276		mg/L		1	20

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 400-226884/35

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			08/15/14 00:18	1

Lab Sample ID: LCS 400-226884/36

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Organic Carbon		10.0	10.5	mg/L		105	80 - 120

Lab Sample ID: MRL 400-226884/3

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike	MRL	MRL	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Organic Carbon		1.00	1.13	mg/L		113	50 - 150

Lab Sample ID: 400-94549-J-1 MSD

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Organic Carbon	4.1		5.00	8.76		mg/L		93	76 - 117	1	16

Lab Sample ID: 400-94549-K-1 MS

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	4.1		5.00	8.63		mg/L		91	76 - 117

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 342409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62007-K-1 MS	Matrix Spike	Total/NA	Water	300.0	
660-62007-K-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
660-62011-1	RW-1	Total/NA	Water	300.0	
660-62011-1	RW-1	Total/NA	Water	300.0	
LCS 680-342409/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-342409/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-342409/5	Method Blank	Total/NA	Water	300.0	

Metals

Filtration Batch: 342292

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62011-1	RW-1	Dissolved	Water	FILTRATION	

Prep Batch: 342297

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62011-1	RW-1	Dissolved	Water	3005A	342297

Prep Batch: 342426

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48720-D-8-B MS	Matrix Spike	Total Recoverable	Water	3005A	
640-48720-D-8-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
660-62011-1	RW-1	Total Recoverable	Water	3005A	
LCS 680-342426/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-342426/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 343412

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48720-D-8-B MS	Matrix Spike	Total Recoverable	Water	6020A	342426
640-48720-D-8-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	342426
660-62011-1	RW-1	Total Recoverable	Water	6020A	342426
LCS 680-342426/2-A	Lab Control Sample	Total Recoverable	Water	6020A	342426
MB 680-342426/1-A	Method Blank	Total Recoverable	Water	6020A	342426

Analysis Batch: 344680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62011-1	RW-1	Dissolved	Water	6020A	342297

General Chemistry

Analysis Batch: 150366

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-61897-B-6 DU	Duplicate	Total/NA	Water	SM 2320B	
660-62011-1	RW-1	Total/NA	Water	SM 2320B	
LCS 660-150366/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-150366/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 150386

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62006-I-3 MS	Matrix Spike	Total/NA	Water	353.2	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62011-1

General Chemistry (Continued)

Analysis Batch: 150386 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62006-I-3 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	
660-62011-1	RW-1	Total/NA	Water	353.2	
LCS 660-150386/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-150386/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 150443

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62007-F-1 DU	Duplicate	Total/NA	Water	SM 2540C	
660-62011-1	RW-1	Total/NA	Water	SM 2540C	
LCS 660-150443/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-150443/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 226884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-94549-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5310B	
400-94549-K-1 MS	Matrix Spike	Total/NA	Water	SM 5310B	
660-62011-1	RW-1	Total/NA	Water	SM 5310B	
LCS 400-226884/36	Lab Control Sample	Total/NA	Water	SM 5310B	
MB 400-226884/35	Method Blank	Total/NA	Water	SM 5310B	
MRL 400-226884/3	Lab Control Sample	Total/NA	Water	SM 5310B	

Analysis Batch: 342278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62011-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62011-1 DU	RW-1	Total/NA	Water	4500 S2 F-2011	
LCS 680-342278/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-342278/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-342278/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62011-1

Date Collected: 07/31/14 10:25

Matrix: Water

Date Received: 07/31/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	342409	08/04/14 23:04	PAT	TAL SAV
Total/NA	Analysis	300.0		20	342409	08/04/14 23:20	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			342292	08/04/14 09:44	BJB	TAL SAV
Dissolved	Prep	3005A			342297	08/04/14 09:48	BJB	TAL SAV
Dissolved	Analysis	6020A		1	344680	08/18/14 14:30	BWR	TAL SAV
Total Recoverable	Prep	3005A			342426	08/05/14 07:42	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	343412	08/09/14 15:50	CME	TAL SAV
Total/NA	Analysis	353.2		1	150386	08/01/14 14:44	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	342278	08/04/14 09:30	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150366	08/01/14 07:40	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150443	08/05/14 11:26	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 03:40	BAB	TAL PEN

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62011-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM
SM 5310B	Organic Carbon, Total (TOC)	SM	TAL PEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Pensacola

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alabama	State Program	4	40150	06-30-15
Arizona	State Program	9	AZ0710	01-11-15
Arkansas DEQ	State Program	6	88-0689	09-01-14
Florida	NELAP	4	E81010	06-30-15
Georgia	State Program	4	N/A	06-30-15
Illinois	NELAP	5	200041	10-09-14
Kansas	NELAP	7	E-10253	10-31-14
Kentucky (UST)	State Program	4	53	06-30-14 *
Louisiana	NELAP	6	30976	06-30-15
Maryland	State Program	3	233	09-30-14
Massachusetts	State Program	1	M-FL094	06-30-15
Michigan	State Program	5	9912	06-30-14 *
New Jersey	NELAP	2	FL006	06-30-15
North Carolina (WW/SW)	State Program	4	314	12-31-14
Oklahoma	State Program	6	9810	08-31-14
Pennsylvania	NELAP	3	68-00467	01-31-15
Rhode Island	State Program	1	LAO00307	12-30-14
South Carolina	State Program	4	96026	06-30-14 *
Tennessee	State Program	4	TN02907	06-30-15
Texas	NELAP	6	T104704286-12-5	09-30-14
USDA	Federal		P330-13-00193	07-01-16
Virginia	NELAP	3	460166	06-14-15
West Virginia DEP	State Program	3	136	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62011-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

1 2 3 4 5 6 7 8 9 10 11 12 13 14

TestAmerica Tampa
 6712 Benjamin Road Suite 100
 Tampa, FL 33634
 Phone (813) 885-7427 Fax (813) 885-7049

Chain of Custody Record

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Ron Ewinuske I	Lab P.M.: Robertson, Nancy	Carrier Tracking No(s):	COC No: 680-57520-18302.1
Client Contact:	Phone: 813-968-5862	E-Mail: nancy.robertson@testamericainc.com		Page: 1 of 1
Jeff Trommer				Job #:
Company: Leagueite, Brashears & Graham, Inc.				
Address: 11014 N Dale Mabry Highway Suite 205	Due Date Requested:			
City: Tampa	TAT Requested (days):			
State, ZIP: FL, 33618	PO#:			
Phone:	Purchase Order not required			
Email: jtrommer@bgtampa.com	WO#:			
Project Name: Cleanwater Groundwater Analysis	Project #: 6600767-5			
Site: 2100-025	SSC#:			

Analysis Requested		Preservation Codes:	
2640C - Total Dissolved Solids		A - HCl	M - Hexane
363.2 - Nitrate		B - NaOH	N - None
2320B - Alkalinity and Bicarbonate Alkalinity		C - Zn Acetate	O - AsNaO2
300_ORGFM_28D - Chloride, Fluoride & Sulfate		D - Nitric Acid	P - Na2O4S
6020A - Iron		E - NaHSO4	Q - Na2O3
6020A - As, Fe, Ca, K, Mg, Na		F - MeOH	R - Na2S2O3
SM4500_S2_F - Total Sulfide		G - Anticor	S - H2S2O4
SM5310_TOC_B - Total Organic Carbon		H - Ascorbic Acid	T - TSP Dodecahydrate
		I - Ice	U - Acetone
		J - DI Water	V - MCQA
		K - EDTA	W - pH 4.5
		L - EDA	Z - other (specify)
		Other:	

Total Number of containers:

Special Instructions/Note:



680-62011 Chain of Custody

Possible Hazard Identification	<input checked="" type="checkbox"/> Non-Hazard	<input type="checkbox"/> Flammable	<input type="checkbox"/> Skin Irritant	<input type="checkbox"/> Poison B	<input type="checkbox"/> Unknown	<input type="checkbox"/> Radiological
Deliverable Requested: I, II, III, IV, Other (specify)						
Empty Kit Relinquished by:	Date: 7-23-14	Time: 16:59	Method of Shipment:			
Relinquished by:	Date/Time:	Received by:	Date/Time:	Archive For:	Months	
Reinstituted by:	Date/Time:	Received by:	Date/Time:	Company		
Special Instructions/QC Requirements:						

Return To Client Disposal By Lab

(A fee may be assessed if samples are retained longer than 1 month)

Custody Seals intact: A Yes A No	Custody Seal No.:
Ron Ewinuske	7/31/14 1630
Relinquished by:	Received by:
Reinstituted by:	Received by:
Cooler Temperature(s) °C and Other Remarks: 3.5 / 2.9°C - Clear	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62011-1

Login Number: 62011

List Source: TestAmerica Tampa

List Number: 1

Creator: Hamilton, Austin I

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62011-1

Login Number: 62011

List Source: TestAmerica Pensacola

List Number: 3

List Creation: 08/13/14 11:08 AM

Creator: Summers, Dustin H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.2°C IR5
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62011-1

Login Number: 62011

List Source: TestAmerica Savannah

List Number: 2

List Creation: 08/02/14 06:13 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62067-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

8/18/2014 10:52:36 AM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62067-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62067-1	LZAMW-2	Water	08/04/14 15:25	08/05/14 09:00
660-62067-2	UZAMW-2	Water	08/04/14 15:55	08/05/14 09:00
660-62067-3	LZAMW-1	Water	08/04/14 14:10	08/05/14 09:00
660-62067-4	UZAMW-1	Water	08/04/14 14:40	08/05/14 09:00

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62067-1

Job ID: 660-62067-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62067-1

Comments

No additional comments.

Receipt

The samples were received on 8/5/2014 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.5° C.

Metals

Method 6020A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for batch 343296 were outside control limits. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. The sample is flagged with J3.

No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate(MS/MSD)associated with batch 680-642688.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
L	Off-scale high. Actual value is known to be greater than the value given.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62067-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	17		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.23		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	350		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	72000	J3	250	130	ug/L	1		6020A	Total Recoverable
Potassium	4100	J3	500	170	ug/L	1		6020A	Total Recoverable
Magnesium	17000	J3	250	43	ug/L	1		6020A	Total Recoverable
Sodium	140000	J3	500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.4		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	8.1		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	790		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62067-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.8		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.43		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	26		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	54000		250	130	ug/L	1		6020A	Total Recoverable
Iron	73	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	2200		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	11000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	38000		500	250	ug/L	1		6020A	Total Recoverable
Iron	50	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.8		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	1.0		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	360		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62067-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.23		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	330		5.0	2.5	mg/L	10		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62067-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	1.3	I	2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	74000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	3700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	130000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.6		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	790		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62067-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.3		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.30		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	180		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	6.4		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	75000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2400		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	13000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	66000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.1		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.6		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	520		17	17	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62067-1

Date Collected: 08/04/14 15:25

Matrix: Water

Date Received: 08/05/14 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	17		0.50	0.25	mg/L			08/06/14 18:31	1
Fluoride	0.23		0.10	0.025	mg/L			08/06/14 18:31	1
Chloride	350		5.0	2.5	mg/L			08/06/14 18:46	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	J3 U	2.5	1.3	ug/L			08/07/14 08:51	1
Calcium	72000	J3	250	130	ug/L			08/07/14 08:51	1
Iron	33	J3 U	100	33	ug/L			08/07/14 08:51	1
Potassium	4100	J3	500	170	ug/L			08/07/14 08:51	1
Magnesium	17000	J3	250	43	ug/L			08/07/14 08:51	1
Sodium	140000	J3	500	250	ug/L			08/07/14 08:51	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/06/14 20:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/05/14 12:20	1
Total Organic Carbon	2.4		1.0	0.50	mg/L			08/15/14 05:54	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	8.1		1.0	1.0	mg/L			08/06/14 10:40	1
Alkalinity	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	790		25	25	mg/L			08/06/14 12:36	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62067-2

Matrix: Water

Date Collected: 08/04/14 15:55

Date Received: 08/05/14 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.8		0.50	0.25	mg/L			08/06/14 19:02	1
Fluoride	0.43		0.10	0.025	mg/L			08/06/14 19:02	1
Chloride	100		2.0	1.0	mg/L			08/06/14 19:17	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	26		2.5	1.3	ug/L			08/09/14 09:49	1
Calcium	54000		250	130	ug/L			08/09/14 09:49	1
Iron	73 I		100	33	ug/L			08/09/14 09:49	1
Potassium	2200		500	170	ug/L			08/09/14 09:49	1
Magnesium	11000		250	43	ug/L			08/09/14 09:49	1
Sodium	38000		500	250	ug/L			08/09/14 09:49	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	50 I		100	33	ug/L			08/09/14 17:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/05/14 12:21	1
Total Organic Carbon	1.8		1.0	0.50	mg/L			08/15/14 08:11	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0		1.0	1.0	mg/L			08/06/14 10:40	1
Alkalinity	170		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	360		10	10	mg/L			08/06/14 12:36	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62067-3

Matrix: Water

Date Collected: 08/04/14 14:10

Date Received: 08/05/14 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			08/06/14 20:03	1
Fluoride	0.23		0.10	0.025	mg/L			08/06/14 20:03	1
Chloride	330		5.0	2.5	mg/L			08/06/14 20:19	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	I	2.5	1.3	ug/L			08/09/14 09:56	1
Calcium	74000		250	130	ug/L			08/09/14 09:56	1
Iron	33	U	100	33	ug/L			08/09/14 09:56	1
Potassium	3700		500	170	ug/L			08/09/14 09:56	1
Magnesium	16000		250	43	ug/L			08/09/14 09:56	1
Sodium	130000		500	250	ug/L			08/09/14 09:56	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/09/14 17:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/05/14 12:22	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			08/15/14 08:33	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.6		1.0	1.0	mg/L			08/06/14 10:40	1
Alkalinity	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	790		25	25	mg/L			08/06/14 12:36	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62067-4

Matrix: Water

Date Collected: 08/04/14 14:40

Date Received: 08/05/14 09:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.3		0.50	0.25	mg/L			08/06/14 20:34	1
Fluoride	0.30		0.10	0.025	mg/L			08/06/14 20:34	1
Chloride	180		2.0	1.0	mg/L			08/06/14 20:50	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.4		2.5	1.3	ug/L			08/09/14 10:04	1
Calcium	75000		250	130	ug/L			08/09/14 10:04	1
Iron	33	U	100	33	ug/L			08/09/14 10:04	1
Potassium	2400		500	170	ug/L			08/09/14 10:04	1
Magnesium	13000		250	43	ug/L			08/09/14 10:04	1
Sodium	66000		500	250	ug/L			08/09/14 10:04	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/09/14 17:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/05/14 12:23	1
Total Organic Carbon	2.1		1.0	0.50	mg/L			08/15/14 08:56	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.6		1.0	1.0	mg/L			08/06/14 10:40	1
Alkalinity	190		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	520		17	17	mg/L			08/06/14 12:36	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-342832/5

Matrix: Water

Analysis Batch: 342832

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			08/06/14 16:12	1
Fluoride	0.025	U	0.10	0.025	mg/L			08/06/14 16:12	1
Chloride	0.25	U	0.50	0.25	mg/L			08/06/14 16:12	1

Lab Sample ID: LCS 680-342832/6

Matrix: Water

Analysis Batch: 342832

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
	Added								
Sulfate	10.0		10.3		mg/L		103	90 - 110	
Fluoride	2.00		2.09		mg/L		104	90 - 110	
Chloride	10.0		10.1		mg/L		101	90 - 110	

Lab Sample ID: LCSD 680-342832/7

Matrix: Water

Analysis Batch: 342832

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Added										
Sulfate	10.0		10.3		mg/L		103	90 - 110		0	30
Fluoride	2.00		2.09		mg/L		105	90 - 110		0	30
Chloride	10.0		10.1		mg/L		101	90 - 110		0	30

Lab Sample ID: 660-62031-E-1 MS

Matrix: Water

Analysis Batch: 342832

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier		Result	Qualifier					
Sulfate	24		10.0	33.8		mg/L		101	80 - 120	
Fluoride	0.12		2.00	2.23		mg/L		105	80 - 120	
Chloride	51	L	10.0	60.4	L	mg/L		97	80 - 120	

Lab Sample ID: 660-62031-E-1 MSD

Matrix: Water

Analysis Batch: 342832

Analyte	Sample		Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Sulfate	24		10.0	33.6		mg/L		99	80 - 120	1	30
Fluoride	0.12		2.00	2.19		mg/L		103	80 - 120	2	30
Chloride	51	L	10.0	60.1	L	mg/L		95	80 - 120	0	30

Lab Sample ID: 680-103917-E-1 MS

Matrix: Water

Analysis Batch: 342832

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Sulfate	18		20.0	37.9		mg/L		100	80 - 120		
Fluoride	0.49		4.00	4.63		mg/L		103	80 - 120		
Chloride	16		20.0	35.5		mg/L		100	80 - 120		

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 680-103917-E-1 MSD

Matrix: Water

Analysis Batch: 342832

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	18		20.0	38.4		mg/L		103	80 - 120	1	30
Fluoride	0.49		4.00	4.73		mg/L		106	80 - 120	2	30
Chloride	16		20.0	36.0		mg/L		102	80 - 120	1	30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-342896/1-A

Matrix: Water

Analysis Batch: 343296

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 342896

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		08/07/14 08:51	08/09/14 08:07	1
Calcium	130	U	250	130	ug/L		08/07/14 08:51	08/09/14 08:07	1
Iron	33	U	100	33	ug/L		08/07/14 08:51	08/09/14 08:07	1
Potassium	170	U	500	170	ug/L		08/07/14 08:51	08/09/14 08:07	1
Magnesium	43	U	250	43	ug/L		08/07/14 08:51	08/09/14 08:07	1
Sodium	250	U	500	250	ug/L		08/07/14 08:51	08/09/14 08:07	1

Lab Sample ID: LCS 680-342896/2-A

Matrix: Water

Analysis Batch: 343296

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 342896

Analyte	MB	MB	Spike	LCS	LCS	Unit	D	%Rec	Limits	Dil Fac
	Result	Qualifier	Added	Result	Qualifier					
Arsenic			100	102		ug/L		102	75 - 125	
Calcium			5000	5000		ug/L		100	75 - 125	
Iron			5000	5000		ug/L		100	75 - 125	
Potassium			5000	4730		ug/L		95	75 - 125	
Magnesium			5000	4660		ug/L		93	75 - 125	
Sodium			5000	4550		ug/L		91	75 - 125	

Lab Sample ID: 660-62067-1 MS

Matrix: Water

Analysis Batch: 343296

Client Sample ID: LZAMW-2
Prep Type: Total Recoverable
Prep Batch: 342896

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	Dil Fac
	Result	Qualifier	Added	Result	Qualifier					
Arsenic	1.3	J3 U	100	106		ug/L		106	75 - 125	
Calcium	72000	J3	5000	82100	J3	ug/L		207	75 - 125	
Iron	33	J3 U	5000	4860		ug/L		97	75 - 125	
Potassium	4100	J3	5000	9110		ug/L		100	75 - 125	
Magnesium	17000	J3	5000	22600		ug/L		117	75 - 125	
Sodium	140000	J3	5000	158000	J3	ug/L		286	75 - 125	

Lab Sample ID: 660-62067-1 MSD

Matrix: Water

Analysis Batch: 343296

Client Sample ID: LZAMW-2
Prep Type: Total Recoverable
Prep Batch: 342896

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD
	Result	Qualifier	Added	Result	Qualifier					
Arsenic	1.3	J3 U	100	130	J3	ug/L		130	75 - 125	21
Calcium	72000	J3	5000	106000	J3	ug/L		693	75 - 125	26

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 660-62067-1 MSD

Matrix: Water

Analysis Batch: 343296

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	33	J3 U	5000	6390	J3	ug/L		128	75 - 125	27	20
Potassium	4100	J3	5000	10500	J3	ug/L		129	75 - 125	15	20
Magnesium	17000	J3	5000	29700	J3	ug/L		259	75 - 125	27	20
Sodium	140000	J3	5000	193000	J3	ug/L		985	75 - 125	20	20

Lab Sample ID: MB 680-342869/1-B

Matrix: Water

Analysis Batch: 343420

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		08/06/14 20:58	08/09/14 16:09	1

Lab Sample ID: LCS 680-342869/2-B

Matrix: Water

Analysis Batch: 343420

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	5040		ug/L		101	75 - 125

Lab Sample ID: 660-62067-1 MS

Matrix: Water

Analysis Batch: 343420

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	33	U	5000	4700		ug/L		94	75 - 125

Lab Sample ID: 660-62067-1 MSD

Matrix: Water

Analysis Batch: 343420

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	33	U	5000	4890		ug/L		98	75 - 125	4	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-150445/12

Matrix: Water

Analysis Batch: 150445

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/05/14 11:46	1

Lab Sample ID: MB 660-150445/13

Matrix: Water

Analysis Batch: 150445

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/05/14 11:48	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: LCS 660-150445/14

Matrix: Water

Analysis Batch: 150445

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Nitrate Nitrite as N	1.00	1.00		mg/L		100	90 - 110
Nitrite as N	0.500	0.544		mg/L		109	90 - 110

Lab Sample ID: LCS 660-150445/15

Matrix: Water

Analysis Batch: 150445

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Nitrate Nitrite as N	1.00	1.01		mg/L		101	90 - 110
Nitrite as N	0.500	0.542		mg/L		108	90 - 110

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-342688/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 342688

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/06/14 10:40	1

Lab Sample ID: LCS 680-342688/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 342688

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Total Sulfide	9.99	9.86		mg/L		99	75 - 125

Lab Sample ID: LCSD 680-342688/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 342688

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	RPD	Limit
Total Sulfide	9.99	10.0		mg/L		100	75 - 125	2

Lab Sample ID: 660-62067-1 DU

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 342688

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Sulfide	8.1		8.05		mg/L		1	30

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-150614/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150614

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	1.0	U	1.0	1.0	mg/L			08/11/14 09:01	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: MB 660-150614/1

Matrix: Water

Analysis Batch: 150614

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate ion as HCO ₃	1.0	U	1.0	1.0	mg/L			08/11/14 09:01	1

Lab Sample ID: LCS 660-150614/3

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analysis Batch: 150614

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD
	Added	Result							
Alkalinity	118	119	mg/L			101	80 - 120		

Lab Sample ID: 660-62046-C-1 DU

Client Sample ID: Duplicate

Prep Type: Total/NA

Analysis Batch: 150614

Analyte	Sample		DU		Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	20		20.3		mg/L		0.2	30
Bicarbonate Alkalinity as CaCO ₃	20		20.3		mg/L		0.2	30
Bicarbonate ion as HCO ₃	25		24.7		mg/L		0.2	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-150485/1

Client Sample ID: Method Blank

Prep Type: Total/NA

Analysis Batch: 150485

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			08/06/14 12:36	1

Lab Sample ID: LCS 660-150485/2

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analysis Batch: 150485

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD
	Added	Result							
Total Dissolved Solids	10000	9970	mg/L			100	80 - 120		

Lab Sample ID: 660-62067-2 DU

Client Sample ID: UZAMW-2

Prep Type: Total/NA

Analysis Batch: 150485

Analyte	Sample		DU		Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	360		372		mg/L		2	20

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 400-226884/35

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			08/15/14 00:18	1

Lab Sample ID: LCS 400-226884/36

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
	Added							
Total Organic Carbon		10.0	10.5		mg/L		105	80 - 120

Lab Sample ID: MRL 400-226884/3

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike		MRL Result	MRL Qualifier	Unit	D	%Rec	Limits
	Added							
Total Organic Carbon		1.00	1.13		mg/L		113	50 - 150

Lab Sample ID: 400-94453-D-1 MS

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	21		5.00	25.3		mg/L		80	76 - 117

Lab Sample ID: 400-94453-D-1 MSD

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Organic Carbon	21		5.00	25.3		mg/L		80	76 - 117	0	16

Lab Sample ID: 400-94549-J-1 MSD

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Total Organic Carbon	4.1		5.00	8.76		mg/L		93	76 - 117	1	16

Lab Sample ID: 400-94549-K-1 MS

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	4.1		5.00	8.63		mg/L		91	76 - 117

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 342832

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62031-E-1 MS	Matrix Spike	Total/NA	Water	300.0	
660-62031-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
660-62067-1	LZAMW-2	Total/NA	Water	300.0	
660-62067-1	LZAMW-2	Total/NA	Water	300.0	
660-62067-2	UZAMW-2	Total/NA	Water	300.0	
660-62067-2	UZAMW-2	Total/NA	Water	300.0	
660-62067-3	LZAMW-1	Total/NA	Water	300.0	
660-62067-3	LZAMW-1	Total/NA	Water	300.0	
660-62067-4	UZAMW-1	Total/NA	Water	300.0	
660-62067-4	UZAMW-1	Total/NA	Water	300.0	
680-103917-E-1 MS	Matrix Spike	Total/NA	Water	300.0	
680-103917-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 680-342832/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-342832/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-342832/5	Method Blank	Total/NA	Water	300.0	

Metals

Filtration Batch: 342869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Dissolved	Water	FILTRATION	
660-62067-1 MS	LZAMW-2	Dissolved	Water	FILTRATION	
660-62067-1 MSD	LZAMW-2	Dissolved	Water	FILTRATION	
660-62067-2	UZAMW-2	Dissolved	Water	FILTRATION	
660-62067-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62067-4	UZAMW-1	Dissolved	Water	FILTRATION	
LCS 680-342869/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-342869/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 342872

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Dissolved	Water	3005A	342869
660-62067-1 MS	LZAMW-2	Dissolved	Water	3005A	342869
660-62067-1 MSD	LZAMW-2	Dissolved	Water	3005A	342869
660-62067-2	UZAMW-2	Dissolved	Water	3005A	342869
660-62067-3	LZAMW-1	Dissolved	Water	3005A	342869
660-62067-4	UZAMW-1	Dissolved	Water	3005A	342869
LCS 680-342869/2-B	Lab Control Sample	Dissolved	Water	3005A	342869
MB 680-342869/1-B	Method Blank	Dissolved	Water	3005A	342869

Prep Batch: 342896

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Total Recoverable	Water	3005A	
660-62067-1 MS	LZAMW-2	Total Recoverable	Water	3005A	
660-62067-1 MSD	LZAMW-2	Total Recoverable	Water	3005A	
660-62067-2	UZAMW-2	Total Recoverable	Water	3005A	
660-62067-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62067-4	UZAMW-1	Total Recoverable	Water	3005A	
LCS 680-342896/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-342896/1-A	Method Blank	Total Recoverable	Water	3005A	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Analysis Batch: 343296

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Total Recoverable	Water	6020A	342896
660-62067-1 MS	LZAMW-2	Total Recoverable	Water	6020A	342896
660-62067-1 MSD	LZAMW-2	Total Recoverable	Water	6020A	342896
660-62067-2	UZAMW-2	Total Recoverable	Water	6020A	342896
660-62067-3	LZAMW-1	Total Recoverable	Water	6020A	342896
660-62067-4	UZAMW-1	Total Recoverable	Water	6020A	342896
LCS 680-342896/2-A	Lab Control Sample	Total Recoverable	Water	6020A	342896
MB 680-342896/1-A	Method Blank	Total Recoverable	Water	6020A	342896

Analysis Batch: 343420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Dissolved	Water	6020A	342872
660-62067-1 MS	LZAMW-2	Dissolved	Water	6020A	342872
660-62067-1 MSD	LZAMW-2	Dissolved	Water	6020A	342872
660-62067-2	UZAMW-2	Dissolved	Water	6020A	342872
660-62067-3	LZAMW-1	Dissolved	Water	6020A	342872
660-62067-4	UZAMW-1	Dissolved	Water	6020A	342872
LCS 680-342869/2-B	Lab Control Sample	Dissolved	Water	6020A	342872
MB 680-342869/1-B	Method Blank	Dissolved	Water	6020A	342872

General Chemistry

Analysis Batch: 150445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62053-F-5 MS	Matrix Spike	Total/NA	Water	353.2	
660-62053-F-5 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	
660-62067-1	LZAMW-2	Total/NA	Water	353.2	
660-62067-2	UZAMW-2	Total/NA	Water	353.2	
660-62067-3	LZAMW-1	Total/NA	Water	353.2	
660-62067-4	UZAMW-1	Total/NA	Water	353.2	
LCS 660-150445/14	Lab Control Sample	Total/NA	Water	353.2	
LCS 660-150445/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-150445/12	Method Blank	Total/NA	Water	353.2	
MB 660-150445/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 150485

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Total/NA	Water	SM 2540C	
660-62067-2	UZAMW-2	Total/NA	Water	SM 2540C	
660-62067-2 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-62067-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62067-4	UZAMW-1	Total/NA	Water	SM 2540C	
LCS 660-150485/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-150485/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 150614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62046-C-1 DU	Duplicate	Total/NA	Water	SM 2320B	
660-62067-1	LZAMW-2	Total/NA	Water	SM 2320B	
660-62067-2	UZAMW-2	Total/NA	Water	SM 2320B	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62067-1

General Chemistry (Continued)

Analysis Batch: 150614 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-3	LZAMW-1	Total/NA	Water	SM 2320B	5
660-62067-4	UZAMW-1	Total/NA	Water	SM 2320B	5
LCS 660-150614/3	Lab Control Sample	Total/NA	Water	SM 2320B	6
MB 660-150614/1	Method Blank	Total/NA	Water	SM 2320B	6

Analysis Batch: 226884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-94453-D-1 MS	Matrix Spike	Total/NA	Water	SM 5310B	8
400-94453-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5310B	9
400-94549-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5310B	9
400-94549-K-1 MS	Matrix Spike	Total/NA	Water	SM 5310B	10
660-62067-1	LZAMW-2	Total/NA	Water	SM 5310B	10
660-62067-2	UZAMW-2	Total/NA	Water	SM 5310B	11
660-62067-3	LZAMW-1	Total/NA	Water	SM 5310B	11
660-62067-4	UZAMW-1	Total/NA	Water	SM 5310B	12
LCS 400-226884/36	Lab Control Sample	Total/NA	Water	SM 5310B	12
MB 400-226884/35	Method Blank	Total/NA	Water	SM 5310B	13
MRL 400-226884/3	Lab Control Sample	Total/NA	Water	SM 5310B	13

Analysis Batch: 342688

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62067-1	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62067-1 DU	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62067-2	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62067-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62067-4	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
LCS 680-342688/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-342688/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-342688/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62067-1

Matrix: Water

Date Collected: 08/04/14 15:25

Date Received: 08/05/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	342832	08/06/14 18:31	PAT	TAL SAV
Total/NA	Analysis	300.0		10	342832	08/06/14 18:46	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			342869	08/06/14 20:42	CRW	TAL SAV
Dissolved	Prep	3005A			342872	08/06/14 20:58	CRW	TAL SAV
Dissolved	Analysis	6020A		1	343420	08/09/14 16:24	CME	TAL SAV
Total Recoverable	Prep	3005A			342896	08/07/14 08:51	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	343296	08/09/14 08:58	CME	TAL SAV
Total/NA	Analysis	353.2		1	150445	08/05/14 12:20	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	342688	08/06/14 10:40	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150485	08/06/14 12:36	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 05:54	BAB	TAL PEN

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62067-2

Matrix: Water

Date Collected: 08/04/14 15:55

Date Received: 08/05/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	342832	08/06/14 19:02	PAT	TAL SAV
Total/NA	Analysis	300.0		4	342832	08/06/14 19:17	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			342869	08/06/14 20:42	CRW	TAL SAV
Dissolved	Prep	3005A			342872	08/06/14 20:58	CRW	TAL SAV
Dissolved	Analysis	6020A		1	343420	08/09/14 17:00	CME	TAL SAV
Total Recoverable	Prep	3005A			342896	08/07/14 08:51	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	343296	08/09/14 09:49	CME	TAL SAV
Total/NA	Analysis	353.2		1	150445	08/05/14 12:21	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	342688	08/06/14 10:40	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150485	08/06/14 12:36	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 08:11	BAB	TAL PEN

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62067-3

Matrix: Water

Date Collected: 08/04/14 14:10

Date Received: 08/05/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	342832	08/06/14 20:03	PAT	TAL SAV
Total/NA	Analysis	300.0		10	342832	08/06/14 20:19	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			342869	08/06/14 20:42	CRW	TAL SAV
Dissolved	Prep	3005A			342872	08/06/14 20:58	CRW	TAL SAV
Dissolved	Analysis	6020A		1	343420	08/09/14 17:07	CME	TAL SAV
Total Recoverable	Prep	3005A			342896	08/07/14 08:51	BJB	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62067-3

Date Collected: 08/04/14 14:10

Matrix: Water

Date Received: 08/05/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6020A		1	343296	08/09/14 09:56	CME	TAL SAV
Total/NA	Analysis	353.2		1	150445	08/05/14 12:22	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	342688	08/06/14 10:40	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150485	08/06/14 12:36	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 08:33	BAB	TAL PEN

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62067-4

Date Collected: 08/04/14 14:40

Matrix: Water

Date Received: 08/05/14 09:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	342832	08/06/14 20:34	PAT	TAL SAV
Total/NA	Analysis	300.0		4	342832	08/06/14 20:50	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			342869	08/06/14 20:42	CRW	TAL SAV
Dissolved	Prep	3005A			342872	08/06/14 20:58	CRW	TAL SAV
Dissolved	Analysis	6020A		1	343420	08/09/14 17:29	CME	TAL SAV
Total Recoverable	Prep	3005A			342896	08/07/14 08:51	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	343296	08/09/14 10:04	CME	TAL SAV
Total/NA	Analysis	353.2		1	150445	08/05/14 12:23	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	342688	08/06/14 10:40	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150485	08/06/14 12:36	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 08:56	BAB	TAL PEN

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62067-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM
SM 5310B	Organic Carbon, Total (TOC)	SM	TAL PEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Pensacola

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alabama	State Program	4	40150	06-30-15
Arizona	State Program	9	AZ0710	01-11-15
Arkansas DEQ	State Program	6	88-0689	09-01-14
Florida	NELAP	4	E81010	06-30-15
Georgia	State Program	4	N/A	06-30-15
Illinois	NELAP	5	200041	10-09-14
Kansas	NELAP	7	E-10253	10-31-14
Kentucky (UST)	State Program	4	53	06-30-14 *
Louisiana	NELAP	6	30976	06-30-15
Maryland	State Program	3	233	09-30-14
Massachusetts	State Program	1	M-FL094	06-30-15
Michigan	State Program	5	9912	06-30-14 *
New Jersey	NELAP	2	FL006	06-30-15
North Carolina (WW/SW)	State Program	4	314	12-31-14
Oklahoma	State Program	6	9810	08-31-14
Pennsylvania	NELAP	3	68-00467	01-31-15
Rhode Island	State Program	1	LAO00307	12-30-14
South Carolina	State Program	4	96026	06-30-14 *
Tennessee	State Program	4	TN02907	06-30-15
Texas	NELAP	6	T104704286-12-5	09-30-14
USDA	Federal		P330-13-00193	07-01-16
Virginia	NELAP	3	460166	06-14-15
West Virginia DEP	State Program	3	136	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62067-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-14 *
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

TestAmerica Tampa
6712 Benjamin Road Suite 100
Tampa, FL 33634
Phone (813) 885-7427 Fax (813) 885-7049

TestAmerica
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Chain of Custody Record

Client Information

Client Contact:	Jeff Trommer	Sample #: <u>Richard Coker</u>	Lab FM: Robertson, Nancy	Carrier Tracking No(s):	COC No: 660-58072-18581.1
Company:	Liegertte, Brashears & Graham, Inc.	Phone #: <u>813-376-3792</u>	E-Mail: nancy.robertson@testamericainc.com	Page #:	Page 1 of 1
Analysis Requested					
<input type="checkbox"/> Preservation Codes: A - HCl M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Anchors S - H2SC4 H - Ascorbic Acid T - TSP Dodecylhydrate I - Ice U - Acetone J - DI Water V - MCA-A K - EDTA W - pH 4-5 L - EDA Z - other (specify) Other:					
Total Number of Samples Taken: <u>10</u>					
3632 - Nitrate 300 - DRGM-28D - Chloride, Fluoride & Sulphate 2320B - Alkalinity and Bicarbonate Alkalinity 6020A - As, Fe, Ca, K, Mg, Na 6020A - Iron SM6400 - 2Z-F - Total Sulfide SM6310 - TOC-B - Total Organic Carbon 2640G - Total Dissolved Solids 2640G - Dissolved Solids (DSD) (Dissolved Solids)					
Project #: <u>CHURCHES</u> Job #: <u>66007675</u> SSOW#:					
Sample Identification Date: <u>8-4-14</u> Time: <u>1525</u> Matrix: <u>Water</u> <u>12 AM w-2</u> <u>1503</u> <u>1</u> <u>12 AM w-2</u> <u>1410</u> <u>1</u> <u>12 AM w-1</u> <u>1440</u> <u>1</u> <u>12 AM w-1</u> <u>1440</u> <u>1</u>					
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological Deliverable Requested: I, II, III, IV, Other Specified Empty Kit Relinquished by: <u>Richard Coker</u> Relinquished by: <u>Richard Coker</u> Relinquished by: Custody Seals Intact: Yes <input checked="" type="checkbox"/> No					
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For Months Special Instructions/QC Requirements:					
Date/Time:	8-5-14 / 0900	Received At:	Received by:	Method of Shipment:	
Date/Time:	8-5-14 / 0900	Company:	Company	Date/Time:	Company
Cooler Temperature(s) °C and Other Remarks: <u>2.5/27 CU-07 660-62067</u>					

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62067-1

Login Number: 62067

List Source: TestAmerica Tampa

List Number: 1

Creator: Conner, Keaton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62067-1

Login Number: 62067

List Source: TestAmerica Pensacola

List Number: 3

List Creation: 08/13/14 11:08 AM

Creator: Summers, Dustin H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.2°C IR5
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62154-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

8/19/2014 9:51:33 AM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

LINKS

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results through

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www.testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62154-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62154-1	RW-1	Water	08/08/14 15:20	08/08/14 16:00
660-62154-2	UZAMW-1	Water	08/08/14 12:40	08/08/14 16:00
660-62154-3	LZAMW-1	Water	08/08/14 12:10	08/08/14 16:00
660-62154-4	UZAMW-2	Water	08/08/14 14:40	08/08/14 16:00
660-62154-5	LZAMW-2	Water	08/08/14 14:10	08/08/14 16:00

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62154-1

Job ID: 660-62154-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62154-1

Comments

No additional comments.

Receipt

The samples were received on 8/8/2014 4:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.2° C.

Metals

The dissolved iron is higher than the total iron on sample UZAMW-2. The results were confirmed.

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-343704.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62154-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62154-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	45		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	2.2		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	600		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	16		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	120000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6800		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	34000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	280000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.7		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO3	240		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1400		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62154-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.7		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.30		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	7.6		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	86000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	15000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	74000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	4.0		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO3	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO3	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	550		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62154-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.23		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	330		5.0	2.5	mg/L	10		300.0	Total/NA
Arsenic	1.3	I	2.5	1.3	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62154-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	81000		250	130	ug/L	1		6020A	Total
Iron	55 I		100	33	ug/L	1		6020A	Recoverable
Potassium	3800		500	170	ug/L	1		6020A	Total
Magnesium	17000		250	43	ug/L	1		6020A	Recoverable
Sodium	140000		500	250	ug/L	1		6020A	Total
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		SM 5310B	Recoverable
									Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.7		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	770		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62154-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.9		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.42		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	26		2.5	1.3	ug/L	1		6020A	Total
Calcium	53000		250	130	ug/L	1		6020A	Recoverable
Iron	83 I		100	33	ug/L	1		6020A	Total
Potassium	2200		500	170	ug/L	1		6020A	Recoverable
Magnesium	11000		250	43	ug/L	1		6020A	Total
Sodium	38000		500	250	ug/L	1		6020A	Recoverable
Iron	53 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.7		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	400		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62154-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	17		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.22		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	360		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	75000		250	130	ug/L	1		6020A	Total
									Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62154-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Potassium	4400		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	17000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	150000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.5		1.0	0.50	mg/L	1		SM 5310B	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.4		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	900		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62154-1

Date Collected: 08/08/14 15:20

Matrix: Water

Date Received: 08/08/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	45		1.0	0.50	mg/L			08/12/14 20:25	2
Fluoride	2.2		0.20	0.050	mg/L			08/12/14 20:25	2
Chloride	600		10	5.0	mg/L			08/12/14 20:40	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	16		2.5	1.3	ug/L			08/16/14 08:36	1
Calcium	120000		250	130	ug/L			08/16/14 08:36	1
Iron	33	U	100	33	ug/L			08/16/14 08:36	1
Potassium	6800		500	170	ug/L			08/16/14 08:36	1
Magnesium	34000		250	43	ug/L			08/16/14 08:36	1
Sodium	280000		500	250	ug/L			08/16/14 08:36	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/15/14 16:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/09/14 08:46	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			08/15/14 04:02	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.7		1.0	1.0	mg/L			08/12/14 15:22	1
Alkalinity	200		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	240		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	1400		25	25	mg/L			08/12/14 07:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62154-2

Matrix: Water

Date Collected: 08/08/14 12:40

Date Received: 08/08/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.7		0.50	0.25	mg/L			08/12/14 21:27	1
Fluoride	0.30		0.10	0.025	mg/L			08/12/14 21:27	1
Chloride	170		2.0	1.0	mg/L			08/12/14 21:42	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.6		2.5	1.3	ug/L			08/16/14 08:59	1
Calcium	86000		250	130	ug/L			08/16/14 08:59	1
Iron	33	U	100	33	ug/L			08/16/14 08:59	1
Potassium	2700		500	170	ug/L			08/16/14 08:59	1
Magnesium	15000		250	43	ug/L			08/16/14 08:59	1
Sodium	74000		500	250	ug/L			08/16/14 08:59	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/15/14 16:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/09/14 08:49	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			08/15/14 04:25	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	4.0		1.0	1.0	mg/L			08/12/14 15:22	1
Alkalinity	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	550		17	17	mg/L			08/12/14 07:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62154-3

Matrix: Water

Date Collected: 08/08/14 12:10

Date Received: 08/08/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			08/12/14 21:57	1
Fluoride	0.23		0.10	0.025	mg/L			08/12/14 21:57	1
Chloride	330		5.0	2.5	mg/L			08/12/14 22:13	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	I	2.5	1.3	ug/L		08/14/14 08:43	08/16/14 09:06	1
Calcium	81000		250	130	ug/L		08/14/14 08:43	08/16/14 09:06	1
Iron	55	I	100	33	ug/L		08/14/14 08:43	08/16/14 09:06	1
Potassium	3800		500	170	ug/L		08/14/14 08:43	08/16/14 09:06	1
Magnesium	17000		250	43	ug/L		08/14/14 08:43	08/16/14 09:06	1
Sodium	140000		500	250	ug/L		08/14/14 08:43	08/16/14 09:06	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/13/14 07:44	08/15/14 16:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/09/14 08:51	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			08/15/14 04:47	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.7		1.0	1.0	mg/L			08/12/14 15:22	1
Alkalinity	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	770		25	25	mg/L			08/12/14 07:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62154-4

Matrix: Water

Date Collected: 08/08/14 14:40

Date Received: 08/08/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.9		0.50	0.25	mg/L			08/12/14 22:28	1
Fluoride	0.42		0.10	0.025	mg/L			08/12/14 22:28	1
Chloride	100		2.0	1.0	mg/L			08/12/14 22:44	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	26		2.5	1.3	ug/L			08/16/14 09:13	1
Calcium	53000		250	130	ug/L			08/16/14 09:13	1
Iron	83 I		100	33	ug/L			08/16/14 09:13	1
Potassium	2200		500	170	ug/L			08/16/14 09:13	1
Magnesium	11000		250	43	ug/L			08/16/14 09:13	1
Sodium	38000		500	250	ug/L			08/16/14 09:13	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	53 I		100	33	ug/L			08/15/14 16:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/09/14 08:52	1
Total Organic Carbon	1.7		1.0	0.50	mg/L			08/15/14 05:09	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/12/14 15:22	1
Alkalinity	170		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	400		10	10	mg/L			08/12/14 07:06	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62154-5

Matrix: Water

Date Collected: 08/08/14 14:10

Date Received: 08/08/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	17		0.50	0.25	mg/L			08/12/14 22:59	1
Fluoride	0.22		0.10	0.025	mg/L			08/12/14 22:59	1
Chloride	360		5.0	2.5	mg/L			08/12/14 23:14	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/14/14 08:43	08/16/14 09:21	1
Calcium	75000		250	130	ug/L		08/14/14 08:43	08/16/14 09:21	1
Iron	33	U	100	33	ug/L		08/14/14 08:43	08/16/14 09:21	1
Potassium	4400		500	170	ug/L		08/14/14 08:43	08/16/14 09:21	1
Magnesium	17000		250	43	ug/L		08/14/14 08:43	08/16/14 09:21	1
Sodium	150000		500	250	ug/L		08/14/14 08:43	08/16/14 09:21	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/13/14 07:44	08/15/14 17:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/09/14 08:53	1
Total Organic Carbon	2.5		1.0	0.50	mg/L			08/15/14 05:32	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.4		1.0	1.0	mg/L			08/12/14 15:22	1
Alkalinity	190		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			08/11/14 09:01	1
Total Dissolved Solids	900		25	25	mg/L			08/12/14 07:06	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62154-1

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-343725/5

Matrix: Water

Analysis Batch: 343725

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			08/12/14 17:20	1
Fluoride	0.025	U	0.10	0.025	mg/L			08/12/14 17:20	1
Chloride	0.25	U	0.50	0.25	mg/L			08/12/14 17:20	1

Lab Sample ID: LCS 680-343725/6

Matrix: Water

Analysis Batch: 343725

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LC	CS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	10.1		mg/L		101	90 - 110	
Fluoride	2.00	2.07		mg/L		103	90 - 110	
Chloride	10.0	10.1		mg/L		101	90 - 110	

Lab Sample ID: LCSD 680-343725/7

Matrix: Water

Analysis Batch: 343725

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
		Result	Qualifier							
Sulfate	10.0	10.1		mg/L		101	90 - 110		0	30
Fluoride	2.00	2.06		mg/L		103	90 - 110		0	30
Chloride	10.0	10.0		mg/L		100	90 - 110		0	30

Lab Sample ID: 680-103948-E-1 MS

Matrix: Water

Analysis Batch: 343725

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	0.70		10.0	10.9		mg/L		102	80 - 120	
Fluoride	0.025	U	2.00	2.12		mg/L		106	80 - 120	
Chloride	2.1		10.0	12.3		mg/L		102	80 - 120	

Lab Sample ID: 680-103948-E-1 MSD

Matrix: Water

Analysis Batch: 343725

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier							
Sulfate	0.70		10.0	11.0		mg/L		103	80 - 120		1	30
Fluoride	0.025	U	2.00	2.14		mg/L		107	80 - 120		1	30
Chloride	2.1		10.0	12.4		mg/L		103	80 - 120		1	30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-344019/1-A

Matrix: Water

Analysis Batch: 344507

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 344019

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		08/14/14 08:43	08/16/14 07:30	1
Calcium	130	U	250	130	ug/L		08/14/14 08:43	08/16/14 07:30	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 680-344019/1-A

Matrix: Water

Analysis Batch: 344507

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 344019

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/14/14 08:43	08/16/14 07:30	1
Potassium	170	U	500	170	ug/L		08/14/14 08:43	08/16/14 07:30	1
Magnesium	43	U	250	43	ug/L		08/14/14 08:43	08/16/14 07:30	1
Sodium	250	U	500	250	ug/L		08/14/14 08:43	08/16/14 07:30	1

Lab Sample ID: LCS 680-344019/2-A

Matrix: Water

Analysis Batch: 344507

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 344019

MB MB

Analyte	Result	Qualifier	RL	LCS	Unit	D	%Rec	Limits
Arsenic			100	118	ug/L		118	75 - 125
Calcium			5000	5930	ug/L		119	75 - 125
Iron			5000	6140	ug/L		123	75 - 125
Potassium			5000	5590	ug/L		112	75 - 125
Magnesium			5000	5470	ug/L		109	75 - 125
Sodium			5000	5390	ug/L		108	75 - 125

Lab Sample ID: MB 680-343772/1-B

Matrix: Water

Analysis Batch: 344508

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 343773

MB MB

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/13/14 07:44	08/15/14 14:52	1

Lab Sample ID: LCS 680-343772/2-B

Matrix: Water

Analysis Batch: 344508

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 343773

MB MB

Analyte	Result	Qualifier	RL	LCS	Unit	D	%Rec	Limits
Iron			5000	4740	ug/L		95	75 - 125

Lab Sample ID: 680-104021-L-1-E MS

Matrix: Water

Analysis Batch: 344508

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 343773

MB MB

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit ug/L	D	%Rec	Limits
Iron	33	U	5000	4420				88	75 - 125

Lab Sample ID: 680-104021-L-1-F MSD

Matrix: Water

Analysis Batch: 344508

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 343773

MB MB

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit ug/L	D	%Rec	RPD	Limit
Iron	33	U	5000	5310				106	75 - 125	18 20

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 640-48809-B-35-B MS

Matrix: Water

Analysis Batch: 344507

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 344019

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Arsenic	1.3	U	100	101		ug/L		101	75 - 125
Calcium	2600		5000	7580		ug/L		100	75 - 125
Iron	1200		5000	6350		ug/L		104	75 - 125
Potassium	1100		5000	5870		ug/L		95	75 - 125
Magnesium	1200		5000	5820		ug/L		92	75 - 125
Sodium	8800	J3	5000	13600		ug/L		95	75 - 125

Lab Sample ID: 640-48809-B-35-C MSD

Matrix: Water

Analysis Batch: 344507

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 344019

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	1.3	U	100	90.9		ug/L		91	75 - 125	11	20
Calcium	2600		5000	6810		ug/L		85	75 - 125	11	20
Iron	1200		5000	5650		ug/L		89	75 - 125	12	20
Potassium	1100		5000	5360		ug/L		85	75 - 125	9	20
Magnesium	1200		5000	5190		ug/L		79	75 - 125	11	20
Sodium	8800	J3	5000	12300	J3	ug/L		71	75 - 125	9	20

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-150576/12

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150576

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/09/14 08:43	1

Lab Sample ID: LCS 660-150576/13

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150576

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Nitrate Nitrite as N	1.00	0.991		mg/L		99	90 - 110
Nitrite as N	0.500	0.497	I	mg/L		99	90 - 110

Lab Sample ID: 660-62154-1 MS

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150576

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10		1.00	0.991		mg/L		99	90 - 110
Nitrite as N	0.10		0.500	0.496	I	mg/L		99	90 - 110

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 660-62154-1 MSD

Matrix: Water

Analysis Batch: 150576

Client Sample ID: RW-1

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	RPD	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier			%Rec.			
Nitrate Nitrite as N	0.10		1.00	0.993		mg/L	D	99	90 - 110	0	30
Nitrite as N	0.10		0.500	0.491	I	mg/L		98	90 - 110	1	30

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-343704/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 343704

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L	D		08/12/14 15:22	1

Lab Sample ID: LCS 680-343704/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 343704

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	Dil Fac
	Added	Result	Qualifier					
Total Sulfide	9.99	9.96		mg/L	D	100	75 - 125	

Lab Sample ID: LCSD 680-343704/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 343704

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec.	Limits	RPD	RPD	Limit
	Added	Result	Qualifier							
Total Sulfide	9.99	9.96		mg/L	D	100	75 - 125	0	30	

Lab Sample ID: 660-62154-1 DU

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 343704

Analyte	Sample	Sample	DU	DU	Unit	D	Prepared	Analyzed	Dil Fac	
	Result	Qualifier								
Total Sulfide	5.7		5.61		mg/L	D			1	30

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-150614/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150614

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L	D		08/11/14 09:01	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	1.0	mg/L			08/11/14 09:01	1
Bicarbonate ion as HCO3	1.0	U	1.0	1.0	mg/L			08/11/14 09:01	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 660-150614/3

Matrix: Water

Analysis Batch: 150614

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
Alkalinity	118	119		mg/L		101	80 - 120

Lab Sample ID: 660-62113-E-1 DU

Matrix: Water

Analysis Batch: 150614

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	180		186		mg/L		0.5	30
Bicarbonate Alkalinity as CaCO ₃	180		186		mg/L		0.5	30
Bicarbonate ion as HCO ₃	230		227		mg/L		0.5	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-150628/1

Client Sample ID: Method Blank
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 150628

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			08/12/14 07:06	1

Lab Sample ID: LCS 660-150628/2

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 150628

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	%Rec.
Total Dissolved Solids	10000	9970		mg/L		100	80 - 120

Lab Sample ID: 660-62154-4 DU

Client Sample ID: UZAMW-2
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 150628

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Total Dissolved Solids	400		388		mg/L		4	20

Method: SM 5310B - Organic Carbon, Total (TOC)

Lab Sample ID: MB 400-226884/35

Client Sample ID: Method Blank
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 226884

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			08/15/14 00:18	1

Lab Sample ID: LCS 400-226884/36

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 226884

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec.	%Rec.
Total Organic Carbon	10.0	10.5		mg/L		105	80 - 120

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 5310B - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: MRL 400-226884/3

Matrix: Water

Analysis Batch: 226884

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	MRL Result	MRL Qualifier	Unit	D	%Rec.	Limits
Total Organic Carbon	1.00	1.13		mg/L		113	50 - 150

Lab Sample ID: 400-94549-J-1 MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 226884

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec.	RPD	Limit	
Total Organic Carbon	4.1		5.00	8.76		mg/L		93	76 - 117	1	16

Lab Sample ID: 400-94549-K-1 MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 226884

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec.	RPD	Limit	
Total Organic Carbon	4.1		5.00	8.63		mg/L		91	76 - 117		

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62154-1

HPLC/IC

Analysis Batch: 343725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Total/NA	Water	300.0	
660-62154-1	RW-1	Total/NA	Water	300.0	
660-62154-2	UZAMW-1	Total/NA	Water	300.0	
660-62154-2	UZAMW-1	Total/NA	Water	300.0	
660-62154-3	LZAMW-1	Total/NA	Water	300.0	
660-62154-3	LZAMW-1	Total/NA	Water	300.0	
660-62154-4	UZAMW-2	Total/NA	Water	300.0	
660-62154-4	UZAMW-2	Total/NA	Water	300.0	
660-62154-5	LZAMW-2	Total/NA	Water	300.0	
660-62154-5	LZAMW-2	Total/NA	Water	300.0	
680-103948-E-1 MS	Matrix Spike	Total/NA	Water	300.0	
680-103948-E-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 680-343725/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-343725/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-343725/5	Method Blank	Total/NA	Water	300.0	

Metals

Filtration Batch: 343772

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Dissolved	Water	FILTRATION	
660-62154-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62154-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62154-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62154-5	LZAMW-2	Dissolved	Water	FILTRATION	
680-104021-L-1-E MS	Matrix Spike	Dissolved	Water	FILTRATION	
680-104021-L-1-F MSD	Matrix Spike Duplicate	Dissolved	Water	FILTRATION	
LCS 680-343772/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-343772/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 343773

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Dissolved	Water	3005A	343772
660-62154-2	UZAMW-1	Dissolved	Water	3005A	343772
660-62154-3	LZAMW-1	Dissolved	Water	3005A	343772
660-62154-4	UZAMW-2	Dissolved	Water	3005A	343772
660-62154-5	LZAMW-2	Dissolved	Water	3005A	343772
680-104021-L-1-E MS	Matrix Spike	Dissolved	Water	3005A	343772
680-104021-L-1-F MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	343772
LCS 680-343772/2-B	Lab Control Sample	Dissolved	Water	3005A	343772
MB 680-343772/1-B	Method Blank	Dissolved	Water	3005A	343772

Prep Batch: 344019

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48809-B-35-B MS	Matrix Spike	Dissolved	Water	3005A	
640-48809-B-35-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
660-62154-1	RW-1	Total Recoverable	Water	3005A	
660-62154-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62154-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62154-4	UZAMW-2	Total Recoverable	Water	3005A	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Prep Batch: 344019 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-5	LZAMW-2	Total Recoverable	Water	3005A	
LCS 680-344019/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-344019/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 344507

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48809-B-35-B MS	Matrix Spike	Dissolved	Water	6020A	344019
640-48809-B-35-C MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	344019
660-62154-1	RW-1	Total Recoverable	Water	6020A	344019
660-62154-2	UZAMW-1	Total Recoverable	Water	6020A	344019
660-62154-3	LZAMW-1	Total Recoverable	Water	6020A	344019
660-62154-4	UZAMW-2	Total Recoverable	Water	6020A	344019
660-62154-5	LZAMW-2	Total Recoverable	Water	6020A	344019
LCS 680-344019/2-A	Lab Control Sample	Total Recoverable	Water	6020A	344019
MB 680-344019/1-A	Method Blank	Total Recoverable	Water	6020A	344019

Analysis Batch: 344508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Dissolved	Water	6020A	343773
660-62154-2	UZAMW-1	Dissolved	Water	6020A	343773
660-62154-3	LZAMW-1	Dissolved	Water	6020A	343773
660-62154-4	UZAMW-2	Dissolved	Water	6020A	343773
660-62154-5	LZAMW-2	Dissolved	Water	6020A	343773
680-104021-L-1-E MS	Matrix Spike	Dissolved	Water	6020A	343773
680-104021-L-1-F MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	343773
LCS 680-343772/2-B	Lab Control Sample	Dissolved	Water	6020A	343773
MB 680-343772/1-B	Method Blank	Dissolved	Water	6020A	343773

General Chemistry

Analysis Batch: 150576

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Total/NA	Water	353.2	
660-62154-1 MS	RW-1	Total/NA	Water	353.2	
660-62154-1 MSD	RW-1	Total/NA	Water	353.2	
660-62154-2	UZAMW-1	Total/NA	Water	353.2	
660-62154-3	LZAMW-1	Total/NA	Water	353.2	
660-62154-4	UZAMW-2	Total/NA	Water	353.2	
660-62154-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-150576/13	Lab Control Sample	Total/NA	Water	353.2	
MB 660-150576/12	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 150614

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62113-E-1 DU	Duplicate	Total/NA	Water	SM 2320B	
660-62154-1	RW-1	Total/NA	Water	SM 2320B	
660-62154-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62154-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-62154-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62154-5	LZAMW-2	Total/NA	Water	SM 2320B	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry (Continued)

Analysis Batch: 150614 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 660-150614/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-150614/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 150628

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Total/NA	Water	SM 2540C	
660-62154-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62154-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62154-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62154-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-62154-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-150628/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-150628/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 226884

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
400-94549-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	SM 5310B	
400-94549-K-1 MS	Matrix Spike	Total/NA	Water	SM 5310B	
660-62154-1	RW-1	Total/NA	Water	SM 5310B	
660-62154-2	UZAMW-1	Total/NA	Water	SM 5310B	
660-62154-3	LZAMW-1	Total/NA	Water	SM 5310B	
660-62154-4	UZAMW-2	Total/NA	Water	SM 5310B	
660-62154-5	LZAMW-2	Total/NA	Water	SM 5310B	
LCS 400-226884/36	Lab Control Sample	Total/NA	Water	SM 5310B	
MB 400-226884/35	Method Blank	Total/NA	Water	SM 5310B	
MRL 400-226884/3	Lab Control Sample	Total/NA	Water	SM 5310B	

Analysis Batch: 343704

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62154-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62154-1 DU	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62154-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62154-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62154-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62154-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-343704/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-343704/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-343704/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62154-1

Date Collected: 08/08/14 15:20

Matrix: Water

Date Received: 08/08/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		2	343725	08/12/14 20:25	PAT	TAL SAV
Total/NA	Analysis	300.0		20	343725	08/12/14 20:40	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			343772	08/13/14 07:42	SP	TAL SAV
Dissolved	Prep	3005A			343773	08/13/14 07:44	SP	TAL SAV
Dissolved	Analysis	6020A		1	344508	08/15/14 16:32	BWR	TAL SAV
Total Recoverable	Prep	3005A			344019	08/14/14 08:43	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	344507	08/16/14 08:36	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150576	08/09/14 08:46	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	343704	08/12/14 15:22	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150628	08/12/14 07:06	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 04:02	BAB	TAL PEN

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62154-2

Date Collected: 08/08/14 12:40

Matrix: Water

Date Received: 08/08/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	343725	08/12/14 21:27	PAT	TAL SAV
Total/NA	Analysis	300.0		4	343725	08/12/14 21:42	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			343772	08/13/14 07:42	SP	TAL SAV
Dissolved	Prep	3005A			343773	08/13/14 07:44	SP	TAL SAV
Dissolved	Analysis	6020A		1	344508	08/15/14 16:40	BWR	TAL SAV
Total Recoverable	Prep	3005A			344019	08/14/14 08:43	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	344507	08/16/14 08:59	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150576	08/09/14 08:49	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	343704	08/12/14 15:22	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150628	08/12/14 07:06	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 04:25	BAB	TAL PEN

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62154-3

Date Collected: 08/08/14 12:10

Matrix: Water

Date Received: 08/08/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	343725	08/12/14 21:57	PAT	TAL SAV
Total/NA	Analysis	300.0		10	343725	08/12/14 22:13	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			343772	08/13/14 07:42	SP	TAL SAV
Dissolved	Prep	3005A			343773	08/13/14 07:44	SP	TAL SAV
Dissolved	Analysis	6020A		1	344508	08/15/14 16:47	BWR	TAL SAV
Total Recoverable	Prep	3005A			344019	08/14/14 08:43	SP	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62154-3

Date Collected: 08/08/14 12:10

Matrix: Water

Date Received: 08/08/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6020A		1	344507	08/16/14 09:06	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150576	08/09/14 08:51	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	343704	08/12/14 15:22	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150628	08/12/14 07:06	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 04:47	BAB	TAL PEN

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62154-4

Date Collected: 08/08/14 14:40

Matrix: Water

Date Received: 08/08/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	343725	08/12/14 22:28	PAT	TAL SAV
Total/NA	Analysis	300.0		4	343725	08/12/14 22:44	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			343772	08/13/14 07:42	SP	TAL SAV
Dissolved	Prep	3005A			343773	08/13/14 07:44	SP	TAL SAV
Dissolved	Analysis	6020A		1	344508	08/15/14 16:54	BWR	TAL SAV
Total Recoverable	Prep	3005A			344019	08/14/14 08:43	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	344507	08/16/14 09:13	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150576	08/09/14 08:52	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	343704	08/12/14 15:22	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150628	08/12/14 07:06	TKO	TAL TAM
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 05:09	BAB	TAL PEN

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62154-5

Date Collected: 08/08/14 14:10

Matrix: Water

Date Received: 08/08/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	343725	08/12/14 22:59	PAT	TAL SAV
Total/NA	Analysis	300.0		10	343725	08/12/14 23:14	PAT	TAL SAV
Dissolved	Filtration	FILTRATION			343772	08/13/14 07:42	SP	TAL SAV
Dissolved	Prep	3005A			343773	08/13/14 07:44	SP	TAL SAV
Dissolved	Analysis	6020A		1	344508	08/15/14 17:01	BWR	TAL SAV
Total Recoverable	Prep	3005A			344019	08/14/14 08:43	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	344507	08/16/14 09:21	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150576	08/09/14 08:53	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	343704	08/12/14 15:22	ANH	TAL SAV
Total/NA	Analysis	SM 2320B		1	150614	08/11/14 09:01	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150628	08/12/14 07:06	TKO	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62154-1

Client Sample ID: LZAMW-2

Date Collected: 08/08/14 14:10

Date Received: 08/08/14 16:00

Lab Sample ID: 660-62154-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 5310B		1	226884	08/15/14 05:32	BAB	TAL PEN

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM
SM 5310B	Organic Carbon, Total (TOC)	SM	TAL PEN

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL PEN = TestAmerica Pensacola, 3355 McLemore Drive, Pensacola, FL 32514, TEL (850)474-1001

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Pensacola

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alabama	State Program	4	40150	06-30-15
Arizona	State Program	9	AZ0710	01-11-15
Arkansas DEQ	State Program	6	88-0689	09-01-14
Florida	NELAP	4	E81010	06-30-15
Georgia	State Program	4	N/A	06-30-15
Illinois	NELAP	5	200041	10-09-14
Kansas	NELAP	7	E-10253	10-31-14
Kentucky (UST)	State Program	4	53	06-30-14 *
Louisiana	NELAP	6	30976	06-30-15
Maryland	State Program	3	233	09-30-14
Massachusetts	State Program	1	M-FL094	06-30-15
Michigan	State Program	5	9912	06-30-14 *
New Jersey	NELAP	2	FL006	06-30-15
North Carolina (WW/SW)	State Program	4	314	12-31-14
Oklahoma	State Program	6	9810	08-31-14
Pennsylvania	NELAP	3	68-00467	01-31-15
Rhode Island	State Program	1	LAO00307	12-30-14
South Carolina	State Program	4	96026	06-30-14 *
Tennessee	State Program	4	TN02907	06-30-15
Texas	NELAP	6	T104704286-12-5	09-30-14
USDA	Federal		P330-13-00193	07-01-16
Virginia	NELAP	3	460166	06-14-15
West Virginia DEP	State Program	3	136	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62154-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62154-1

Login Number: 62154

List Source: TestAmerica Tampa

List Number: 1

Creator: Conner, Keaton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62154-1

Login Number: 62154

List Source: TestAmerica Pensacola

List Number: 3

List Creation: 08/13/14 11:08 AM

Creator: Summers, Dustin H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	1.2°C IR5
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62154-1

Login Number: 62154

List Source: TestAmerica Savannah

List Number: 2

List Creation: 08/12/14 09:15 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62258-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

8/25/2014 2:14:01 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62258-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62258-1	RW-1	Water	08/14/14 15:10	08/14/14 16:00
660-62258-2	UZAMW-1	Water	08/14/14 12:40	08/14/14 16:00
660-62258-3	LZAMW-1	Water	08/14/14 12:10	08/14/14 16:00
660-62258-4	UZAMW-2	Water	08/14/14 14:25	08/14/14 16:00
660-62258-5	LZAMW-2	Water	08/14/14 13:55	08/14/14 16:00

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62258-1

Job ID: 660-62258-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62258-1

Comments

No additional comments.

Receipt

The samples were received on 8/14/2014 4:00 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.8° C.

Metals

Method 6020A: Due to the high concentration of analytes, the matrix spike / matrix spike duplicate (MS/MSD) for batch 345203 could not be evaluated for accuracy and precision. The associated laboratory control sample (LCS) met acceptance criteria. The sample is flagged with J3.

No additional analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-344598.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62258-1

Qualifiers

Metals

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62258-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	43		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	2.1		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	590		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	16		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	120000	J3	250	130	ug/L	1		6020A	Total Recoverable
Potassium	7700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	39000	J3	250	43	ug/L	1		6020A	Total Recoverable
Sodium	330000	J3	500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.2		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1300		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62258-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	7.9		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.29		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	180		2.5	1.3	mg/L	5		300.0	Total/NA
Arsenic	7.0		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	91000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	85000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	510		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62258-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.22		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	93000		250	130	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62258-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	39	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	4700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	20000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	170000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.4		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.2		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	810		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62258-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.8		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.40		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	32		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	72000		250	130	ug/L	1		6020A	Total Recoverable
Iron	100		100	33	ug/L	1		6020A	Total Recoverable
Potassium	3000		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	54000		500	250	ug/L	1		6020A	Total Recoverable
Iron	40	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	360		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62258-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	18		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	350		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	97000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	5600		500	170	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62258-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	24000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	210000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.1		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	840		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62258-1

Date Collected: 08/14/14 15:10

Matrix: Water

Date Received: 08/14/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	43		1.0	0.50	mg/L			08/18/14 23:06	2
Fluoride	2.1		0.20	0.050	mg/L			08/18/14 23:06	2
Chloride	590		10	5.0	mg/L			08/18/14 22:52	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	16		2.5	1.3	ug/L		08/18/14 10:37	08/20/14 17:05	1
Calcium	120000	J3	250	130	ug/L		08/18/14 10:37	08/20/14 17:05	1
Iron	33	U	100	33	ug/L		08/18/14 10:37	08/20/14 17:05	1
Potassium	7700		500	170	ug/L		08/18/14 10:37	08/20/14 17:05	1
Magnesium	39000	J3	250	43	ug/L		08/18/14 10:37	08/20/14 17:05	1
Sodium	330000	J3	500	250	ug/L		08/18/14 10:37	08/20/14 17:05	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/19/14 14:03	08/20/14 23:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/14/14 17:49	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			08/22/14 12:26	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.2		1.0	1.0	mg/L			08/18/14 09:58	1
Alkalinity	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Ion as HCO ₃	220		1.0	1.0	mg/L			08/19/14 08:05	1
Total Dissolved Solids	1300		25	25	mg/L			08/18/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62258-2

Matrix: Water

Date Collected: 08/14/14 12:40

Date Received: 08/14/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.9		0.50	0.25	mg/L			08/18/14 23:35	1
Fluoride	0.29		0.10	0.025	mg/L			08/18/14 23:35	1
Chloride	180		2.5	1.3	mg/L			08/18/14 23:20	5

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.0		2.5	1.3	ug/L			08/20/14 17:41	1
Calcium	91000		250	130	ug/L			08/20/14 17:41	1
Iron	33	U	100	33	ug/L			08/20/14 17:41	1
Potassium	2900		500	170	ug/L			08/20/14 17:41	1
Magnesium	16000		250	43	ug/L			08/20/14 17:41	1
Sodium	85000		500	250	ug/L			08/20/14 17:41	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/21/14 00:22	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/14/14 17:51	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			08/22/14 12:44	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.9		1.0	1.0	mg/L			08/18/14 09:58	1
Alkalinity	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/19/14 08:05	1
Total Dissolved Solids	510		17	17	mg/L			08/18/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62258-3

Matrix: Water

Date Collected: 08/14/14 12:10

Date Received: 08/14/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			08/19/14 00:33	1
Fluoride	0.22		0.10	0.025	mg/L			08/19/14 00:33	1
Chloride	320		5.0	2.5	mg/L			08/18/14 23:49	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/18/14 10:37	08/20/14 17:49	1
Calcium	93000		250	130	ug/L		08/18/14 10:37	08/20/14 17:49	1
Iron	39	I	100	33	ug/L		08/18/14 10:37	08/20/14 17:49	1
Potassium	4700		500	170	ug/L		08/18/14 10:37	08/20/14 17:49	1
Magnesium	20000		250	43	ug/L		08/18/14 10:37	08/20/14 17:49	1
Sodium	170000		500	250	ug/L		08/18/14 10:37	08/20/14 17:49	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/19/14 14:03	08/21/14 00:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/14/14 17:52	1
Total Organic Carbon	2.4		1.0	0.50	mg/L			08/22/14 12:58	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.2		1.0	1.0	mg/L			08/18/14 09:58	1
Alkalinity	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/19/14 08:05	1
Total Dissolved Solids	810		25	25	mg/L			08/18/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62258-4

Matrix: Water

Date Collected: 08/14/14 14:25

Date Received: 08/14/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.8		0.50	0.25	mg/L			08/19/14 01:01	1
Fluoride	0.40		0.10	0.025	mg/L			08/19/14 01:01	1
Chloride	100		2.0	1.0	mg/L			08/19/14 00:47	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	32		2.5	1.3	ug/L			08/20/14 17:56	1
Calcium	72000		250	130	ug/L			08/20/14 17:56	1
Iron	100		100	33	ug/L			08/20/14 17:56	1
Potassium	3000		500	170	ug/L			08/20/14 17:56	1
Magnesium	16000		250	43	ug/L			08/20/14 17:56	1
Sodium	54000		500	250	ug/L			08/20/14 17:56	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	40	I	100	33	ug/L			08/21/14 00:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/14/14 17:53	1
Total Organic Carbon	1.6		1.0	0.50	mg/L			08/22/14 13:13	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/18/14 09:58	1
Alkalinity	170		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			08/19/14 08:05	1
Total Dissolved Solids	360		10	10	mg/L			08/18/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62258-5

Matrix: Water

Date Collected: 08/14/14 13:55

Date Received: 08/14/14 16:00

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	18		0.50	0.25	mg/L			08/19/14 02:28	1
Fluoride	0.21		0.10	0.025	mg/L			08/19/14 02:28	1
Chloride	350		5.0	2.5	mg/L			08/19/14 01:45	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/18/14 10:37	08/20/14 18:18	1
Calcium	97000		250	130	ug/L		08/18/14 10:37	08/20/14 18:18	1
Iron	33	U	100	33	ug/L		08/18/14 10:37	08/20/14 18:18	1
Potassium	5600		500	170	ug/L		08/18/14 10:37	08/20/14 18:18	1
Magnesium	24000		250	43	ug/L		08/18/14 10:37	08/20/14 18:18	1
Sodium	210000		500	250	ug/L		08/18/14 10:37	08/20/14 18:18	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/19/14 14:03	08/21/14 00:58	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/14/14 17:59	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			08/22/14 14:47	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.1		1.0	1.0	mg/L			08/18/14 09:58	1
Alkalinity	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/19/14 08:05	1
Total Dissolved Solids	840		25	25	mg/L			08/18/14 09:38	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: LCS 680-344784/39

Matrix: Water

Analysis Batch: 344784

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.	RPD	Limit
		Result	Qualifier				Limits		
Sulfate	10.0	9.70		mg/L		97	90 - 110		
Fluoride	2.00	2.10		mg/L		105	90 - 110		
Chloride	10.0	10.1		mg/L		101	90 - 110		

Lab Sample ID: LCSD 680-344784/40

Matrix: Water

Analysis Batch: 344784

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	Limit
		Result	Qualifier				Limits		
Sulfate	10.0	9.75		mg/L		97	90 - 110	0	30
Fluoride	2.00	2.10		mg/L		105	90 - 110	0	30
Chloride	10.0	10.1		mg/L		101	90 - 110	0	30

Lab Sample ID: 660-62258-3 MS

Matrix: Water

Analysis Batch: 344784

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Sulfate	13		100	108		mg/L		95	80 - 120		
Fluoride	0.30		20.0	20.4		mg/L		100	80 - 120		
Chloride	320		100	417		mg/L		92	80 - 120		

Lab Sample ID: 660-62258-3 MSD

Matrix: Water

Analysis Batch: 344784

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Sulfate	13		100	108		mg/L		96	80 - 120	0	30
Fluoride	0.30		20.0	20.5		mg/L		101	80 - 120	0	30
Chloride	320		100	418		mg/L		94	80 - 120	0	30

Lab Sample ID: 660-62258-5 MS

Matrix: Water

Analysis Batch: 344784

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Sulfate	14		100	110		mg/L		95	80 - 120		
Fluoride	0.30		20.0	20.3		mg/L		100	80 - 120		
Chloride	350		100	444		mg/L		93	80 - 120		

Lab Sample ID: 660-62258-5 MSD

Matrix: Water

Analysis Batch: 344784

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				Limits		
Sulfate	14		100	110		mg/L		95	80 - 120	0	30
Fluoride	0.30		20.0	20.3		mg/L		100	80 - 120	0	30
Chloride	350		100	443		mg/L		92	80 - 120	0	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-344620/1-A

Matrix: Water

Analysis Batch: 345203

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 344620

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		08/18/14 10:37	08/20/14 16:50	1
Calcium	130	U	250	130	ug/L		08/18/14 10:37	08/20/14 16:50	1
Iron	33	U	100	33	ug/L		08/18/14 10:37	08/20/14 16:50	1
Potassium	170	U	500	170	ug/L		08/18/14 10:37	08/20/14 16:50	1
Magnesium	43	U	250	43	ug/L		08/18/14 10:37	08/20/14 16:50	1
Sodium	250	U	500	250	ug/L		08/18/14 10:37	08/20/14 16:50	1

Lab Sample ID: LCS 680-344620/2-A

Matrix: Water

Analysis Batch: 345203

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 344620

Analyte	Spike		Added	LCS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Arsenic	100		100	107		ug/L		107	75 - 125
Calcium	5000		5000	5690		ug/L		114	75 - 125
Iron	5000		5000	5530		ug/L		111	75 - 125
Potassium	5000		5000	5440		ug/L		109	75 - 125
Magnesium	5000		5000	5600		ug/L		112	75 - 125
Sodium	5000		5000	5530		ug/L		111	75 - 125

Lab Sample ID: 660-62258-1 MS

Matrix: Water

Analysis Batch: 345203

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 344620

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Arsenic	16		100	131		ug/L		115	75 - 125
Calcium	120000	J3	5000	125000	J3	ug/L		35	75 - 125
Iron	33	U	5000	5600		ug/L		112	75 - 125
Potassium	7700		5000	13400		ug/L		115	75 - 125
Magnesium	39000	J3	5000	43300		ug/L		83	75 - 125
Sodium	330000	J3	5000	320000	J3	ug/L		-110	75 - 125

Lab Sample ID: 660-62258-1 MSD

Matrix: Water

Analysis Batch: 345203

Client Sample ID: RW-1

Prep Type: Total Recoverable

Prep Batch: 344620

Analyte	Sample		Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Arsenic	16		100	124		ug/L		108	75 - 125	6	20
Calcium	120000	J3	5000	120000	J3	ug/L		-57	75 - 125	4	20
Iron	33	U	5000	5270		ug/L		105	75 - 125	6	20
Potassium	7700		5000	12600		ug/L		99	75 - 125	6	20
Magnesium	39000	J3	5000	41400	J3	ug/L		45	75 - 125	5	20
Sodium	330000	J3	5000	308000	J3	ug/L		-347	75 - 125	4	20

Lab Sample ID: MB 680-344830/1-B

Matrix: Water

Analysis Batch: 345243

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 344831

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		08/19/14 14:03	08/20/14 23:31	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-344830/2-B

Matrix: Water

Analysis Batch: 345243

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 344831

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit ug/L	D	%Rec	%Rec.
		Iron	4860				

Lab Sample ID: 660-62258-1 MS

Matrix: Water

Analysis Batch: 345243

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 344831

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit ug/L	D	%Rec	%Rec.
	Iron	U	5000	5660	I				

Lab Sample ID: 660-62258-1 MSD

Matrix: Water

Analysis Batch: 345243

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 344831

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit ug/L	D	%Rec	%Rec.	RPD
	Iron	U	5000	6170	I					

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-150739/12

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150739

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Nitrate as N	0.10							

Lab Sample ID: LCS 660-150739/13

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150739

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit mg/L	D	%Rec	%Rec.
	Nitrate Nitrite as N	1.00	0.993				
Nitrite as N	0.500	0.498	I	mg/L	100	90 - 110	

Lab Sample ID: 660-62258-4 MS

Client Sample ID: UZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150739

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec.
	Nitrate Nitrite as N	0.10	1.00	0.951	mg/L				
Nitrite as N	0.10		0.500	0.493	I	mg/L		99	90 - 110

Lab Sample ID: 660-62258-4 MSD

Client Sample ID: UZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150739

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec.	RPD
	Nitrate Nitrite as N	0.10	1.00	0.952	mg/L					
Nitrite as N	0.10		0.500	0.493	I	mg/L		99	90 - 110	0

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-344598/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 344598

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/18/14 09:58	1

Lab Sample ID: LCS 680-344598/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 344598

Analyte	Spike		LCS	LCS	Unit	D	%Rec	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	
Total Sulfide		9.98	9.48	mg/L		95	75 - 125		

Lab Sample ID: LCSD 680-344598/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 344598

Analyte	Spike		LCSD	LCSD	Unit	D	%Rec	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	
Total Sulfide		9.98	9.51	mg/L		95	75 - 125	0	30

Lab Sample ID: 680-104285-K-1 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 344598

Analyte	Sample		DU	DU	Unit	D	RPD
	Result	Qualifier					
Total Sulfide	1.4		1.0	U	mg/L		NC

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-345606/3

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 345606

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			08/22/14 05:42	1

Lab Sample ID: LCS 680-345606/4

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 345606

Analyte	Spike		LCS	LCS	Unit	D	%Rec	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	
Total Organic Carbon		20.0	20.9	mg/L		104	80 - 120		

Lab Sample ID: LCSD 680-345606/5

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 345606

Analyte	Spike		LCSD	LCSD	Unit	D	%Rec	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	
Total Organic Carbon		20.0	20.6	mg/L		103	80 - 120	1	25

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: 640-48861-F-10 MS

Matrix: Water

Analysis Batch: 345606

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	2.3		20.0	23.5		mg/L		106	80 - 120

**Client Sample ID: Matrix Spike
Prep Type: Total/NA**

Lab Sample ID: 640-48861-F-10 MSD

Matrix: Water

Analysis Batch: 345606

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	2.3		20.0	23.1		mg/L		104	80 - 120

**Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA**

Lab Sample ID: 640-48829-I-1 DU

Matrix: Water

Analysis Batch: 345606

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	%Rec	RPD
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	10			9.84		mg/L			3 25

**Client Sample ID: Duplicate
Prep Type: Total/NA**

Lab Sample ID: MB 680-345611/35

Matrix: Water

Analysis Batch: 345611

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	Prepared	Analyzed
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	0.50	U		1.0		mg/L			08/22/14 14:01

**Client Sample ID: Method Blank
Prep Type: Total/NA**

Lab Sample ID: LCS 680-345611/36

Matrix: Water

Analysis Batch: 345611

Analyte	Sample	Sample	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon			20.0	20.5		mg/L		103	80 - 120

**Client Sample ID: Lab Control Sample
Prep Type: Total/NA**

Lab Sample ID: LCSD 680-345611/37

Matrix: Water

Analysis Batch: 345611

Analyte	Sample	Sample	Spike	LCSD	LCSD	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon			20.0	20.5		mg/L		102	80 - 120

**Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA**

Lab Sample ID: 660-62258-5 MS

Matrix: Water

Analysis Batch: 345611

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	2.3		20.0	23.3		mg/L		105	80 - 120

**Client Sample ID: LZAMW-2
Prep Type: Total/NA**

Lab Sample ID: 660-62258-5 MSD

Matrix: Water

Analysis Batch: 345611

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	2.3		20.0	23.2		mg/L		105	80 - 120

**Client Sample ID: LZAMW-2
Prep Type: Total/NA**

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-150842/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150842

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	1.0	mg/L			08/19/14 08:05	1
Bicarbonate ion as HCO ₃	1.0	U	1.0	1.0	mg/L			08/19/14 08:05	1

Lab Sample ID: LCS 660-150842/3

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150842

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Alkalinity	118	123		mg/L	104	80 - 120	

Lab Sample ID: 660-62258-3 DU

Client Sample ID: LZAMW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150842

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	180		178		mg/L		0.4	30
Bicarbonate Alkalinity as CaCO ₃	180		178		mg/L		0.4	30
Bicarbonate ion as HCO ₃	220		217		mg/L		0.4	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-150805/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150805

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			08/18/14 09:38	1

Lab Sample ID: LCS 660-150805/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150805

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier				
Total Dissolved Solids	10000	9940		mg/L	99	80 - 120	

Lab Sample ID: 660-62258-4 DU

Client Sample ID: UZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150805

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	360		360	360	mg/L		1	20

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 344784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total/NA	Water	300.0	
660-62258-1	RW-1	Total/NA	Water	300.0	
660-62258-2	UZAMW-1	Total/NA	Water	300.0	
660-62258-2	UZAMW-1	Total/NA	Water	300.0	
660-62258-3	LZAMW-1	Total/NA	Water	300.0	
660-62258-3	LZAMW-1	Total/NA	Water	300.0	
660-62258-3 MS	LZAMW-1	Total/NA	Water	300.0	
660-62258-3 MSD	LZAMW-1	Total/NA	Water	300.0	
660-62258-4	UZAMW-2	Total/NA	Water	300.0	
660-62258-4	UZAMW-2	Total/NA	Water	300.0	
660-62258-5	LZAMW-2	Total/NA	Water	300.0	
660-62258-5	LZAMW-2	Total/NA	Water	300.0	
660-62258-5 MS	LZAMW-2	Total/NA	Water	300.0	
660-62258-5 MSD	LZAMW-2	Total/NA	Water	300.0	
LCS 680-344784/39	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-344784/40	Lab Control Sample Dup	Total/NA	Water	300.0	

Metals

Prep Batch: 344620

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total Recoverable	Water	3005A	
660-62258-1 MS	RW-1	Total Recoverable	Water	3005A	
660-62258-1 MSD	RW-1	Total Recoverable	Water	3005A	
660-62258-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62258-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62258-4	UZAMW-2	Total Recoverable	Water	3005A	
660-62258-5	LZAMW-2	Total Recoverable	Water	3005A	
LCS 680-344620/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-344620/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 344830

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Dissolved	Water	FILTRATION	
660-62258-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62258-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62258-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62258-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62258-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62258-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-344830/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-344830/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 344831

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Dissolved	Water	3005A	344830
660-62258-1 MS	RW-1	Dissolved	Water	3005A	344830
660-62258-1 MSD	RW-1	Dissolved	Water	3005A	344830
660-62258-2	UZAMW-1	Dissolved	Water	3005A	344830
660-62258-3	LZAMW-1	Dissolved	Water	3005A	344830

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Prep Batch: 344831 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-4	UZAMW-2	Dissolved	Water	3005A	344830
660-62258-5	LZAMW-2	Dissolved	Water	3005A	344830
LCS 680-344830/2-B	Lab Control Sample	Dissolved	Water	3005A	344830
MB 680-344830/1-B	Method Blank	Dissolved	Water	3005A	344830

Analysis Batch: 345203

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total Recoverable	Water	6020A	344620
660-62258-1 MS	RW-1	Total Recoverable	Water	6020A	344620
660-62258-1 MSD	RW-1	Total Recoverable	Water	6020A	344620
660-62258-2	UZAMW-1	Total Recoverable	Water	6020A	344620
660-62258-3	LZAMW-1	Total Recoverable	Water	6020A	344620
660-62258-4	UZAMW-2	Total Recoverable	Water	6020A	344620
660-62258-5	LZAMW-2	Total Recoverable	Water	6020A	344620
LCS 680-344620/2-A	Lab Control Sample	Total Recoverable	Water	6020A	344620
MB 680-344620/1-A	Method Blank	Total Recoverable	Water	6020A	344620

Analysis Batch: 345243

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Dissolved	Water	6020A	344831
660-62258-1 MS	RW-1	Dissolved	Water	6020A	344831
660-62258-1 MSD	RW-1	Dissolved	Water	6020A	344831
660-62258-2	UZAMW-1	Dissolved	Water	6020A	344831
660-62258-3	LZAMW-1	Dissolved	Water	6020A	344831
660-62258-4	UZAMW-2	Dissolved	Water	6020A	344831
660-62258-5	LZAMW-2	Dissolved	Water	6020A	344831
LCS 680-344830/2-B	Lab Control Sample	Dissolved	Water	6020A	344831
MB 680-344830/1-B	Method Blank	Dissolved	Water	6020A	344831

General Chemistry

Analysis Batch: 150739

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total/NA	Water	353.2	
660-62258-2	UZAMW-1	Total/NA	Water	353.2	
660-62258-3	LZAMW-1	Total/NA	Water	353.2	
660-62258-4	UZAMW-2	Total/NA	Water	353.2	
660-62258-4 MS	UZAMW-2	Total/NA	Water	353.2	
660-62258-4 MSD	UZAMW-2	Total/NA	Water	353.2	
660-62258-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-150739/13	Lab Control Sample	Total/NA	Water	353.2	
MB 660-150739/12	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 150805

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total/NA	Water	SM 2540C	
660-62258-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62258-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62258-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62258-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry (Continued)

Analysis Batch: 150805 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-150805/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-150805/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 150842

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total/NA	Water	SM 2320B	
660-62258-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62258-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-62258-3 DU	LZAMW-1	Total/NA	Water	SM 2320B	
660-62258-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62258-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-150842/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-150842/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 344598

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62258-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62258-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62258-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62258-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
680-104285-K-1 DU	Duplicate	Total/NA	Water	4500 S2 F-2011	
LCS 680-344598/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-344598/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-344598/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 345606

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48829-I-1 DU	Duplicate	Total/NA	Water	5310 B-2011	
640-48861-F-10 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-48861-F-10 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-62258-1	RW-1	Total/NA	Water	5310 B-2011	
660-62258-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-62258-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-62258-4	UZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-345606/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-345606/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-345606/3	Method Blank	Total/NA	Water	5310 B-2011	

Analysis Batch: 345611

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62258-5	LZAMW-2	Total/NA	Water	5310 B-2011	
660-62258-5 MS	LZAMW-2	Total/NA	Water	5310 B-2011	
660-62258-5 MSD	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-345611/36	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-345611/37	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-345611/35	Method Blank	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62258-1

Matrix: Water

Date Collected: 08/14/14 15:10

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	344784	08/18/14 22:52	DAS	TAL SAV
Total/NA	Analysis	300.0		2	344784	08/18/14 23:06	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			344830	08/19/14 14:01	BJB	TAL SAV
Dissolved	Prep	3005A			344831	08/19/14 14:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	345243	08/20/14 23:46	BWR	TAL SAV
Total Recoverable	Prep	3005A			344620	08/18/14 10:37	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345203	08/20/14 17:05	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150739	08/14/14 17:49	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	344598	08/18/14 09:58	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	345606	08/22/14 12:26	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150842	08/19/14 08:05	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150805	08/18/14 09:38	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62258-2

Matrix: Water

Date Collected: 08/14/14 12:40

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	344784	08/18/14 23:20	DAS	TAL SAV
Total/NA	Analysis	300.0		1	344784	08/18/14 23:35	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			344830	08/19/14 14:01	BJB	TAL SAV
Dissolved	Prep	3005A			344831	08/19/14 14:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	345243	08/21/14 00:22	BWR	TAL SAV
Total Recoverable	Prep	3005A			344620	08/18/14 10:37	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345203	08/20/14 17:41	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150739	08/14/14 17:51	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	344598	08/18/14 09:58	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	345606	08/22/14 12:44	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150842	08/19/14 08:05	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150805	08/18/14 09:38	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62258-3

Matrix: Water

Date Collected: 08/14/14 12:10

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	344784	08/18/14 23:49	DAS	TAL SAV
Total/NA	Analysis	300.0		1	344784	08/19/14 00:33	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			344830	08/19/14 14:01	BJB	TAL SAV
Dissolved	Prep	3005A			344831	08/19/14 14:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	345243	08/21/14 00:29	BWR	TAL SAV
Total Recoverable	Prep	3005A			344620	08/18/14 10:37	SP	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62258-3

Date Collected: 08/14/14 12:10

Matrix: Water

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6020A		1	345203	08/20/14 17:49	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150739	08/14/14 17:52	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	344598	08/18/14 09:58	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	345606	08/22/14 12:58	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150842	08/19/14 08:05	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150805	08/18/14 09:38	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62258-4

Date Collected: 08/14/14 14:25

Matrix: Water

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	344784	08/19/14 00:47	DAS	TAL SAV
Total/NA	Analysis	300.0		1	344784	08/19/14 01:01	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			344830	08/19/14 14:01	BJB	TAL SAV
Dissolved	Prep	3005A			344831	08/19/14 14:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	345243	08/21/14 00:36	BWR	TAL SAV
Total Recoverable	Prep	3005A			344620	08/18/14 10:37	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345203	08/20/14 17:56	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150739	08/14/14 17:53	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	344598	08/18/14 09:58	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	345606	08/22/14 13:13	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150842	08/19/14 08:05	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150805	08/18/14 09:38	TKO	TAL TAM

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62258-5

Date Collected: 08/14/14 13:55

Matrix: Water

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	344784	08/19/14 01:45	DAS	TAL SAV
Total/NA	Analysis	300.0		1	344784	08/19/14 02:28	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			344830	08/19/14 14:01	BJB	TAL SAV
Dissolved	Prep	3005A			344831	08/19/14 14:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	345243	08/21/14 00:58	BWR	TAL SAV
Total Recoverable	Prep	3005A			344620	08/18/14 10:37	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345203	08/20/14 18:18	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150739	08/14/14 17:59	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	344598	08/18/14 09:58	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	345611	08/22/14 14:47	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150842	08/19/14 08:05	SC1	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62258-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62258-5

Date Collected: 08/14/14 13:55

Matrix: Water

Date Received: 08/14/14 16:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	150805	08/18/14 09:38	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62258-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-15
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Guam	State Program	4	803	06-30-15
Hawaii	State Program	9	09-005r	04-16-15
Illinois	NELAP	9	N/A	06-30-15
Indiana	State Program	5	200022	11-30-14
Iowa	State Program	5	N/A	06-30-15
Kentucky (DW)	State Program	7	353	07-01-15
Kentucky (UST)	State Program	4	90084	12-31-14
Louisiana	NELAP	4	18	06-30-15
Louisiana (DW)	NELAP	6	30690	06-30-14 *
Maine	State Program	6	LA140023	12-31-14
Maryland	State Program	1	GA00006	08-16-14 *
Massachusetts	State Program	3	250	12-31-14
Michigan	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	8	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	7	GA769	06-30-15
New Mexico	State Program	2	N/A	06-30-15
New York	NELAP	6	10842	03-31-15
North Carolina (DW)	State Program	2	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	4	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62258-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62258-1

Login Number: 62258

List Source: TestAmerica Tampa

List Number: 1

Creator: Conner, Keaton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62258-1

Login Number: 62258

List Source: TestAmerica Savannah

List Number: 2

List Creation: 08/15/14 09:56 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62067-1

Login Number: 62067

List Source: TestAmerica Savannah

List Number: 2

List Creation: 08/06/14 06:30 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62381-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

8/27/2014 3:20:59 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62381-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62381-1	RW-1	Water	08/20/14 14:50	08/20/14 15:50
660-62381-2	UZAMW-1	Water	08/20/14 12:10	08/20/14 15:50
660-62381-3	LZAMW-1	Water	08/20/14 11:40	08/20/14 15:50
660-62381-4	UZAMW-2	Water	08/20/14 14:10	08/20/14 15:50
660-62381-5	LZAMW-2	Water	08/20/14 13:40	08/20/14 15:50

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62381-1

Job ID: 660-62381-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62381-1

Comments

No additional comments.

Receipt

The samples were received on 8/20/2014 3:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.4° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-345700.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62381-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62381-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	47		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	2.1		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	600		10	5.0	mg/L	20		300.0	Total/NA
Arsenic	14		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	120000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6300		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	36000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	300000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.7		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.3		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	240		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1400		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62381-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	8.2		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.28		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	6.3		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	83000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2300		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	15000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	76000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.5		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.3		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	530		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62381-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	22		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	80000		250	130	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62381-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	42	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	3500		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	17000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	150000		500	250	ug/L	1		6020A	Total Recoverable
Iron	37	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	2.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.0		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	820		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62381-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.6		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.39		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
Arsenic	27		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	62000		250	130	ug/L	1		6020A	Total Recoverable
Iron	88	I	100	33	ug/L	1		6020A	Total Recoverable
Potassium	2400		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	13000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	46000		500	250	ug/L	1		6020A	Total Recoverable
Iron	58	I	100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.9		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	380		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62381-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	26		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	340		5.0	2.5	mg/L	10		300.0	Total/NA
Calcium	87000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	4700		500	170	ug/L	1		6020A	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62381-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Magnesium	21000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	180000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.3		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	810		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62381-1

Matrix: Water

Date Collected: 08/20/14 14:50

Date Received: 08/20/14 15:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	47		1.0	0.50	mg/L			08/25/14 17:03	2
Fluoride	2.1		0.20	0.050	mg/L			08/25/14 17:03	2
Chloride	600		10	5.0	mg/L			08/25/14 16:49	20

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		2.5	1.3	ug/L			08/26/14 09:30	1
Calcium	120000		250	130	ug/L			08/26/14 09:30	1
Iron	33	U	100	33	ug/L			08/26/14 09:30	1
Potassium	6300		500	170	ug/L			08/26/14 09:30	1
Magnesium	36000		250	43	ug/L			08/26/14 09:30	1
Sodium	300000		500	250	ug/L			08/26/14 09:30	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/25/14 21:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/21/14 12:57	1
Total Organic Carbon	2.7		1.0	0.50	mg/L			08/26/14 20:37	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.3		1.0	1.0	mg/L			08/25/14 10:54	1
Alkalinity	200		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	240		1.0	1.0	mg/L			08/22/14 08:30	1
Total Dissolved Solids	1400		25	25	mg/L			08/22/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62381-2

Matrix: Water

Date Collected: 08/20/14 12:10

Date Received: 08/20/14 15:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	8.2		0.50	0.25	mg/L			08/25/14 17:32	1
Fluoride	0.28		0.10	0.025	mg/L			08/25/14 17:32	1
Chloride	170		2.0	1.0	mg/L			08/25/14 17:18	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.3		2.5	1.3	ug/L			08/26/14 09:38	1
Calcium	83000		250	130	ug/L			08/26/14 09:38	1
Iron	33	U	100	33	ug/L			08/26/14 09:38	1
Potassium	2300		500	170	ug/L			08/26/14 09:38	1
Magnesium	15000		250	43	ug/L			08/26/14 09:38	1
Sodium	76000		500	250	ug/L			08/26/14 09:38	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			08/25/14 21:30	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/21/14 13:03	1
Total Organic Carbon	2.5		1.0	0.50	mg/L			08/26/14 21:27	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.3		1.0	1.0	mg/L			08/25/14 10:54	1
Alkalinity	190		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			08/22/14 08:30	1
Total Dissolved Solids	530		17	17	mg/L			08/22/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62381-3

Matrix: Water

Date Collected: 08/20/14 11:40

Date Received: 08/20/14 15:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	22		0.50	0.25	mg/L			08/25/14 18:59	1
Fluoride	0.21		0.10	0.025	mg/L			08/25/14 18:59	1
Chloride	320		5.0	2.5	mg/L			08/25/14 18:44	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/25/14 10:08	08/26/14 09:45	1
Calcium	80000		250	130	ug/L		08/25/14 10:08	08/26/14 09:45	1
Iron	42	I	100	33	ug/L		08/25/14 10:08	08/26/14 09:45	1
Potassium	3500		500	170	ug/L		08/25/14 10:08	08/26/14 09:45	1
Magnesium	17000		250	43	ug/L		08/25/14 10:08	08/26/14 09:45	1
Sodium	150000		500	250	ug/L		08/25/14 10:08	08/26/14 09:45	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	37	I	100	33	ug/L		08/25/14 07:36	08/25/14 21:36	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/21/14 13:05	1
Total Organic Carbon	2.6		1.0	0.50	mg/L			08/26/14 21:43	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.0		1.0	1.0	mg/L			08/25/14 10:54	1
Alkalinity	180		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			08/22/14 08:30	1
Total Dissolved Solids	820		25	25	mg/L			08/22/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62381-4

Matrix: Water

Date Collected: 08/20/14 14:10

Date Received: 08/20/14 15:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.6		0.50	0.25	mg/L			08/25/14 19:27	1
Fluoride	0.39		0.10	0.025	mg/L			08/25/14 19:27	1
Chloride	100		2.0	1.0	mg/L			08/25/14 19:13	4

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	27		2.5	1.3	ug/L		08/25/14 10:08	08/26/14 10:00	1
Calcium	62000		250	130	ug/L		08/25/14 10:08	08/26/14 10:00	1
Iron	88 I		100	33	ug/L		08/25/14 10:08	08/26/14 10:00	1
Potassium	2400		500	170	ug/L		08/25/14 10:08	08/26/14 10:00	1
Magnesium	13000		250	43	ug/L		08/25/14 10:08	08/26/14 10:00	1
Sodium	46000		500	250	ug/L		08/25/14 10:08	08/26/14 10:00	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	58 I		100	33	ug/L		08/25/14 07:36	08/25/14 21:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/21/14 13:06	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			08/26/14 22:00	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/25/14 10:54	1
Alkalinity	170		1.0	1.0	mg/L			08/22/14 12:30	1
Bicarbonate Alkalinity as CaCO3	170		1.0	1.0	mg/L			08/22/14 12:30	1
Bicarbonate Ion as HCO3	210		1.0	1.0	mg/L			08/22/14 12:30	1
Total Dissolved Solids	380		10	10	mg/L			08/22/14 09:38	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62381-5

Matrix: Water

Date Collected: 08/20/14 13:40

Date Received: 08/20/14 15:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	26		0.50	0.25	mg/L			08/25/14 19:56	1
Fluoride	0.21		0.10	0.025	mg/L			08/25/14 19:56	1
Chloride	340		5.0	2.5	mg/L			08/25/14 19:42	10

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/25/14 10:08	08/26/14 10:07	1
Calcium	87000		250	130	ug/L		08/25/14 10:08	08/26/14 10:07	1
Iron	33	U	100	33	ug/L		08/25/14 10:08	08/26/14 10:07	1
Potassium	4700		500	170	ug/L		08/25/14 10:08	08/26/14 10:07	1
Magnesium	21000		250	43	ug/L		08/25/14 10:08	08/26/14 10:07	1
Sodium	180000		500	250	ug/L		08/25/14 10:08	08/26/14 10:07	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		08/25/14 07:36	08/25/14 21:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/21/14 13:07	1
Total Organic Carbon	2.6		1.0	0.50	mg/L			08/26/14 22:14	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.3		1.0	1.0	mg/L			08/25/14 10:54	1
Alkalinity	190		1.0	1.0	mg/L			08/22/14 12:30	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			08/22/14 12:30	1
Bicarbonate Ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			08/22/14 12:30	1
Total Dissolved Solids	810		25	25	mg/L			08/22/14 09:38	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-345712/5

Matrix: Water

Analysis Batch: 345712

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			08/25/14 12:15	1
Fluoride	0.025	U	0.10	0.025	mg/L			08/25/14 12:15	1
Chloride	0.25	U	0.50	0.25	mg/L			08/25/14 12:15	1

Lab Sample ID: LCS 680-345712/6

Matrix: Water

Analysis Batch: 345712

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	9.62		mg/L		96	90 - 110	
Fluoride	2.00	2.10		mg/L		105	90 - 110	
Chloride	10.0	10.0		mg/L		100	90 - 110	

Lab Sample ID: LCSD 680-345712/7

Matrix: Water

Analysis Batch: 345712

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
		Result	Qualifier							
Sulfate	10.0	9.67		mg/L		97	90 - 110		1	30
Fluoride	2.00	2.10		mg/L		105	90 - 110		0	30
Chloride	10.0	10.0		mg/L		100	90 - 110		0	30

Lab Sample ID: 660-62376-C-1 MS

Matrix: Water

Analysis Batch: 345712

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	110		200	305		mg/L		95	80 - 120	
Fluoride	0.50	U	40.0	40.2		mg/L		100	80 - 120	
Chloride	470		200	671		mg/L		102	80 - 120	

Lab Sample ID: 660-62376-C-1 MSD

Matrix: Water

Analysis Batch: 345712

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	110		200	309		mg/L		97	80 - 120	1	30
Fluoride	0.50	U	40.0	40.6		mg/L		102	80 - 120	1	30
Chloride	470		200	681		mg/L		106	80 - 120	1	30

Lab Sample ID: 680-104090-B-14 MS

Matrix: Water

Analysis Batch: 345712

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Sulfate	130		40.0	166		mg/L		92	80 - 120
Fluoride	0.21	I	8.00	8.17		mg/L		100	80 - 120
Chloride	6.7		40.0	46.5		mg/L		99	80 - 120

Client Sample ID: Matrix Spike
Prep Type: Total/NA

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 680-104090-B-14 MSD

Matrix: Water

Analysis Batch: 345712

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	130		40.0	167		mg/L		94	80 - 120	0	30
Fluoride	0.21	I	8.00	8.17		mg/L		100	80 - 120	0	30
Chloride	6.7		40.0	46.6		mg/L		100	80 - 120	0	30

Lab Sample ID: 680-104090-B-11 DU

Matrix: Water

Analysis Batch: 345712

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	RPD Limit
	Result	Qualifier	Result	Qualifier				
Sulfate	96		96.1		mg/L		0.1	30
Fluoride	0.32	I	0.312	I	mg/L		1	30
Chloride	25		25.3		mg/L		0.07	30

Lab Sample ID: MB 680-345753/29

Matrix: Water

Analysis Batch: 345753

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			08/25/14 18:01	1
Fluoride	0.025	U	0.10	0.025	mg/L			08/25/14 18:01	1
Chloride	0.25	U	0.50	0.25	mg/L			08/25/14 18:01	1

Lab Sample ID: LCS 680-345753/30

Matrix: Water

Analysis Batch: 345753

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Sulfate	10.0	9.55		mg/L		95	90 - 110
Fluoride	2.00	2.09		mg/L		104	90 - 110
Chloride	10.0	10.0		mg/L		100	90 - 110

Lab Sample ID: LCSD 680-345753/31

Matrix: Water

Analysis Batch: 345753

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier						
Sulfate	10.0	9.57		mg/L		96	90 - 110	0	30
Fluoride	2.00	2.09		mg/L		104	90 - 110	0	30
Chloride	10.0	10.0		mg/L		100	90 - 110	0	30

Lab Sample ID: 460-81512-B-1 MS

Matrix: Water

Analysis Batch: 345753

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Sulfate	0.31	I	10.0	9.78		mg/L		95	80 - 120
Fluoride	0.14		2.00	2.11		mg/L		98	80 - 120
Chloride	2.2		10.0	12.3		mg/L		101	80 - 120

Client Sample ID: Matrix Spike
Prep Type: Total/NA

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 460-81512-B-1 MSD

Matrix: Water

Analysis Batch: 345753

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	0.31	I	10.0	9.79		mg/L		95	80 - 120	0	30
Fluoride	0.14		2.00	2.12		mg/L		99	80 - 120	0	30
Chloride	2.2		10.0	12.3		mg/L		101	80 - 120	0	30

Lab Sample ID: 680-104415-H-1 MS

Matrix: Water

Analysis Batch: 345753

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	150		40.0	182		mg/L		90	80 - 120		
Fluoride	0.42		8.00	8.37		mg/L		99	80 - 120		
Chloride	17		40.0	56.0		mg/L		99	80 - 120		

Lab Sample ID: 680-104415-H-1 MSD

Matrix: Water

Analysis Batch: 345753

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	150		40.0	182		mg/L		92	80 - 120	0	30
Fluoride	0.42		8.00	8.39		mg/L		100	80 - 120	0	30
Chloride	17		40.0	56.1		mg/L		99	80 - 120	0	30

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-345672/1-A

Matrix: Water

Analysis Batch: 345970

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 345672

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		08/25/14 10:08	08/26/14 09:08	1
Calcium	130	U	250	130	ug/L		08/25/14 10:08	08/26/14 09:08	1
Iron	33	U	100	33	ug/L		08/25/14 10:08	08/26/14 09:08	1
Potassium	170	U	500	170	ug/L		08/25/14 10:08	08/26/14 09:08	1
Magnesium	43	U	250	43	ug/L		08/25/14 10:08	08/26/14 09:08	1
Sodium	250	U	500	250	ug/L		08/25/14 10:08	08/26/14 09:08	1

Lab Sample ID: LCS 680-345672/2-A

Matrix: Water

Analysis Batch: 345970

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 345672

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Arsenic	100	106		ug/L		106	75 - 125
Calcium	5000	5530		ug/L		111	75 - 125
Iron	5000	5600		ug/L		112	75 - 125
Potassium	5000	5020		ug/L		100	75 - 125
Magnesium	5000	5320		ug/L		106	75 - 125
Sodium	5000	5240		ug/L		105	75 - 125

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-104455-C-3-B MS

Matrix: Water

Analysis Batch: 345970

Client Sample ID: Matrix Spike

Prep Type: Total Recoverable

Prep Batch: 345672

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Arsenic	14		100	116		ug/L		102	75 - 125
Calcium	140000	J3	5000	138000	J3	ug/L		-10	75 - 125
Iron	11000	J3	5000	15900		ug/L		98	75 - 125
Potassium	21000	J3	5000	25200		ug/L		78	75 - 125
Magnesium	24000	J3	5000	27900		ug/L		81	75 - 125
Sodium	130000	J3	5000	132000	J3	ug/L		2	75 - 125

Lab Sample ID: 680-104455-C-3-C MSD

Matrix: Water

Analysis Batch: 345970

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total Recoverable

Prep Batch: 345672

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	14		100	102		ug/L		88	75 - 125	13	20
Calcium	140000	J3	5000	119000	J3	ug/L		-390	75 - 125	15	20
Iron	11000	J3	5000	13600	J3	ug/L		53	75 - 125	15	20
Potassium	21000	J3	5000	22400	J3	ug/L		23	75 - 125	12	20
Magnesium	24000	J3	5000	24000	J3	ug/L		3	75 - 125	15	20
Sodium	130000	J3	5000	114000	J3	ug/L		-375	75 - 125	15	20

Lab Sample ID: MB 680-345624/1-B

Matrix: Water

Analysis Batch: 345915

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 345625

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		08/25/14 07:36	08/25/14 20:00	1

Lab Sample ID: LCS 680-345624/2-B

Matrix: Water

Analysis Batch: 345915

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 345625

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	6130		ug/L		123	75 - 125

Lab Sample ID: 680-104388-G-1-E MS

Matrix: Water

Analysis Batch: 345915

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 345625

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	69	I	5000	5520		ug/L		109	75 - 125

Lab Sample ID: 680-104388-G-1-F MSD

Matrix: Water

Analysis Batch: 345915

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 345625

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	69	I	5000	5220		ug/L		103	75 - 125	6	20

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-150919/13

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150919

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/21/14 12:36	1

Lab Sample ID: LCS 660-150919/15

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150919

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Nitrate Nitrite as N		1.00	1.01		mg/L		101	90 - 110	
Nitrite as N		0.500	0.499	I	mg/L		100	90 - 110	

Lab Sample ID: 660-62381-1 MS

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150919

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits	
	Result	Qualifier		Result	Qualifier					
Nitrate Nitrite as N	0.10		1.00	0.992		mg/L		99	90 - 110	
Nitrite as N	0.10		0.500	0.489	I	mg/L		98	90 - 110	

Lab Sample ID: 660-62381-1 MSD

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150919

Analyte	Sample		Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Nitrate Nitrite as N	0.10		1.00	0.982		mg/L		98	90 - 110	1	30
Nitrite as N	0.10		0.500	0.494	I	mg/L		99	90 - 110	1	30

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-345700/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 345700

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/25/14 10:54	1

Lab Sample ID: LCS 680-345700/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 345700

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Total Sulfide		9.97	9.85		mg/L		99	75 - 125	

Lab Sample ID: LCSD 680-345700/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 345700

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Added									
Total Sulfide		9.97	9.93		mg/L		100	75 - 125	1	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-346089/4

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346089

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			08/26/14 18:36	1

Lab Sample ID: LCS 680-346089/5

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346089

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits	RPD
	Added	Result	Qualifier					
Total Organic Carbon		20.0	21.5	mg/L		107	80 - 120	

Lab Sample ID: LCSD 680-346089/6

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346089

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	RPD
	Added	Result	Qualifier					
Total Organic Carbon		20.0	21.4	mg/L		107	80 - 120	1

Lab Sample ID: 660-62364-H-1 MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346089

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec
	Result	Qualifier	Added	Result	Qualifier			
Total Organic Carbon	4.3		20.0	25.4		mg/L		106

Lab Sample ID: 660-62364-H-1 MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346089

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec
	Result	Qualifier	Added	Result	Qualifier			
Total Organic Carbon	4.3		20.0	24.9		mg/L		103

Lab Sample ID: 660-62381-5 DU

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346089

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	RPD
	Result	Qualifier	Added	Result	Qualifier			
Total Organic Carbon	2.6			2.59		mg/L		0.3

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-150971/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 150971

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate Alkalinity as CaCO3	3.16		1.0	1.0	mg/L			08/22/14 08:30	1
Bicarbonate ion as HCO3	3.86		1.0	1.0	mg/L			08/22/14 08:30	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 660-150971/3

Matrix: Water

Analysis Batch: 150971

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec.	Limits
		Result	Qualifier			%Rec.	
Alkalinity	118	119		mg/L		101	80 - 120

Lab Sample ID: 660-62373-D-4 DU

Matrix: Water

Analysis Batch: 150971

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	74		73.7		mg/L		0.2	30
Bicarbonate Alkalinity as CaCO ₃	56		55.1		mg/L		1	30
Bicarbonate ion as HCO ₃	68		67.2		mg/L		1	30

Lab Sample ID: MB 660-150997/1

Matrix: Water

Analysis Batch: 150997

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L		08/22/14 12:30		1
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	1.0	mg/L		08/22/14 12:30		1
Bicarbonate ion as HCO ₃	1.0	U	1.0	1.0	mg/L		08/22/14 12:30		1

Lab Sample ID: LCS 660-150997/3

Matrix: Water

Analysis Batch: 150997

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	MB	MB	Spike Added	LCS	LCS	Unit	D	%Rec.	Limits
	Result	Qualifier		Result	Qualifier				
Alkalinity	118		118	121		mg/L		103	80 - 120

Lab Sample ID: 660-62381-4 DU

Matrix: Water

Analysis Batch: 150997

Client Sample ID: UZAMW-2
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Result	Qualifier					
Alkalinity	170		171		mg/L		0.7	30	
Bicarbonate Alkalinity as CaCO ₃	170		171		mg/L		0.7	30	
Bicarbonate ion as HCO ₃	210		208		mg/L		0.7	30	

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-150954/1

Matrix: Water

Analysis Batch: 150954

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB	MB	Spike Added	LCS	LCS	Unit	D	%Rec.	Limits
	Result	Qualifier		Result	Qualifier				
Total Dissolved Solids	5.0	U	5.0	5.0		mg/L		100	80 - 120

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2540C - Solids, Total Dissolved (TDS) (Continued)

Lab Sample ID: LCS 660-150954/2

Matrix: Water

Analysis Batch: 150954

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.	Limits
		Result	Qualifier				99	
Total Dissolved Solids	10000	9910		mg/L			99	80 - 120

Lab Sample ID: 660-62381-4 DU

Matrix: Water

Analysis Batch: 150954

Analyte	Sample Result	Sample Qualifier	DU	DU	Unit	D	RPD	RPD	Limit
	Result	Qualifier	Result	Qualifier				1	
Total Dissolved Solids	380		372		mg/L			1	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 345712

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62376-C-1 MS	Matrix Spike	Total/NA	Water	300.0	
660-62376-C-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
660-62381-1	RW-1	Total/NA	Water	300.0	
660-62381-1	RW-1	Total/NA	Water	300.0	
660-62381-2	UZAMW-1	Total/NA	Water	300.0	
660-62381-2	UZAMW-1	Total/NA	Water	300.0	
680-104090-B-11 DU	Duplicate	Total/NA	Water	300.0	
680-104090-B-14 MS	Matrix Spike	Total/NA	Water	300.0	
680-104090-B-14 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 680-345712/6	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-345712/7	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-345712/5	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 345753

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-81512-B-1 MS	Matrix Spike	Total/NA	Water	300.0	
460-81512-B-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
660-62381-3	LZAMW-1	Total/NA	Water	300.0	
660-62381-3	LZAMW-1	Total/NA	Water	300.0	
660-62381-4	UZAMW-2	Total/NA	Water	300.0	
660-62381-4	UZAMW-2	Total/NA	Water	300.0	
660-62381-5	LZAMW-2	Total/NA	Water	300.0	
660-62381-5	LZAMW-2	Total/NA	Water	300.0	
680-104415-H-1 MS	Matrix Spike	Total/NA	Water	300.0	
680-104415-H-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 680-345753/30	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-345753/31	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-345753/29	Method Blank	Total/NA	Water	300.0	

Metals

Filtration Batch: 345624

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Dissolved	Water	FILTRATION	
660-62381-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62381-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62381-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62381-5	LZAMW-2	Dissolved	Water	FILTRATION	
680-104388-G-1-E MS	Matrix Spike	Dissolved	Water	FILTRATION	
680-104388-G-1-F MSD	Matrix Spike Duplicate	Dissolved	Water	FILTRATION	
LCS 680-345624/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-345624/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 345625

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Dissolved	Water	3005A	345624
660-62381-2	UZAMW-1	Dissolved	Water	3005A	345624
660-62381-3	LZAMW-1	Dissolved	Water	3005A	345624
660-62381-4	UZAMW-2	Dissolved	Water	3005A	345624
660-62381-5	LZAMW-2	Dissolved	Water	3005A	345624

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Prep Batch: 345625 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
680-104388-G-1-E MS	Matrix Spike	Dissolved	Water	3005A	345624
680-104388-G-1-F MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	345624
LCS 680-345624/2-B	Lab Control Sample	Dissolved	Water	3005A	345624
MB 680-345624/1-B	Method Blank	Dissolved	Water	3005A	345624

Prep Batch: 345672

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Total Recoverable	Water	3005A	8
660-62381-2	UZAMW-1	Total Recoverable	Water	3005A	9
660-62381-3	LZAMW-1	Total Recoverable	Water	3005A	10
660-62381-4	UZAMW-2	Total Recoverable	Water	3005A	11
660-62381-5	LZAMW-2	Total Recoverable	Water	3005A	12
680-104455-C-3-B MS	Matrix Spike	Total Recoverable	Water	3005A	13
680-104455-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	14
LCS 680-345672/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-345672/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 345915

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Dissolved	Water	6020A	345625
660-62381-2	UZAMW-1	Dissolved	Water	6020A	345625
660-62381-3	LZAMW-1	Dissolved	Water	6020A	345625
660-62381-4	UZAMW-2	Dissolved	Water	6020A	345625
660-62381-5	LZAMW-2	Dissolved	Water	6020A	345625
680-104388-G-1-E MS	Matrix Spike	Dissolved	Water	6020A	345625
680-104388-G-1-F MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	345625
LCS 680-345624/2-B	Lab Control Sample	Dissolved	Water	6020A	345625
MB 680-345624/1-B	Method Blank	Dissolved	Water	6020A	345625

Analysis Batch: 345970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Total Recoverable	Water	6020A	345672
660-62381-2	UZAMW-1	Total Recoverable	Water	6020A	345672
660-62381-3	LZAMW-1	Total Recoverable	Water	6020A	345672
660-62381-4	UZAMW-2	Total Recoverable	Water	6020A	345672
660-62381-5	LZAMW-2	Total Recoverable	Water	6020A	345672
680-104455-C-3-B MS	Matrix Spike	Total Recoverable	Water	6020A	345672
680-104455-C-3-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	345672
LCS 680-345672/2-A	Lab Control Sample	Total Recoverable	Water	6020A	345672
MB 680-345672/1-A	Method Blank	Total Recoverable	Water	6020A	345672

General Chemistry

Analysis Batch: 150919

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Total/NA	Water	353.2	
660-62381-1 MS	RW-1	Total/NA	Water	353.2	
660-62381-1 MSD	RW-1	Total/NA	Water	353.2	
660-62381-2	UZAMW-1	Total/NA	Water	353.2	
660-62381-3	LZAMW-1	Total/NA	Water	353.2	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry (Continued)

Analysis Batch: 150919 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-4	UZAMW-2	Total/NA	Water	353.2	
660-62381-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-150919/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-150919/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 150954

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Total/NA	Water	SM 2540C	
660-62381-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62381-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62381-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62381-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-62381-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-150954/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-150954/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 150971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62373-D-4 DU	Duplicate	Total/NA	Water	SM 2320B	
660-62381-1	RW-1	Total/NA	Water	SM 2320B	
660-62381-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62381-3	LZAMW-1	Total/NA	Water	SM 2320B	
LCS 660-150971/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-150971/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 150997

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62381-4 DU	UZAMW-2	Total/NA	Water	SM 2320B	
660-62381-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-150997/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-150997/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 345700

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62381-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62381-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62381-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62381-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-345700/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-345700/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-345700/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 346089

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62364-H-1 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
660-62364-H-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-62381-1	RW-1	Total/NA	Water	5310 B-2011	
660-62381-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-62381-3	LZAMW-1	Total/NA	Water	5310 B-2011	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62381-1

General Chemistry (Continued)

Analysis Batch: 346089 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62381-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-62381-5	LZAMW-2	Total/NA	Water	5310 B-2011	
660-62381-5 DU	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-346089/5	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-346089/6	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-346089/4	Method Blank	Total/NA	Water	5310 B-2011	

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Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62381-1

Matrix: Water

Date Collected: 08/20/14 14:50

Date Received: 08/20/14 15:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	345712	08/25/14 16:49	DAS	TAL SAV
Total/NA	Analysis	300.0		2	345712	08/25/14 17:03	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			345624	08/25/14 07:34	SP	TAL SAV
Dissolved	Prep	3005A			345625	08/25/14 07:36	SP	TAL SAV
Dissolved	Analysis	6020A		1	345915	08/25/14 21:25	BWR	TAL SAV
Total Recoverable	Prep	3005A			345672	08/25/14 10:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345970	08/26/14 09:30	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150919	08/21/14 12:57	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	345700	08/25/14 10:54	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346089	08/26/14 20:37	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150971	08/22/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150954	08/22/14 09:38	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62381-2

Matrix: Water

Date Collected: 08/20/14 12:10

Date Received: 08/20/14 15:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	345712	08/25/14 17:18	DAS	TAL SAV
Total/NA	Analysis	300.0		1	345712	08/25/14 17:32	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			345624	08/25/14 07:34	SP	TAL SAV
Dissolved	Prep	3005A			345625	08/25/14 07:36	SP	TAL SAV
Dissolved	Analysis	6020A		1	345915	08/25/14 21:30	BWR	TAL SAV
Total Recoverable	Prep	3005A			345672	08/25/14 10:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345970	08/26/14 09:38	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150919	08/21/14 13:03	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	345700	08/25/14 10:54	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346089	08/26/14 21:27	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150971	08/22/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150954	08/22/14 09:38	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62381-3

Matrix: Water

Date Collected: 08/20/14 11:40

Date Received: 08/20/14 15:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	345753	08/25/14 18:44	DAS	TAL SAV
Total/NA	Analysis	300.0		1	345753	08/25/14 18:59	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			345624	08/25/14 07:34	SP	TAL SAV
Dissolved	Prep	3005A			345625	08/25/14 07:36	SP	TAL SAV
Dissolved	Analysis	6020A		1	345915	08/25/14 21:36	BWR	TAL SAV
Total Recoverable	Prep	3005A			345672	08/25/14 10:08	SP	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62381-3

Date Collected: 08/20/14 11:40

Matrix: Water

Date Received: 08/20/14 15:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Analysis	6020A		1	345970	08/26/14 09:45	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150919	08/21/14 13:05	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	345700	08/25/14 10:54	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346089	08/26/14 21:43	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150971	08/22/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150954	08/22/14 09:38	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62381-4

Date Collected: 08/20/14 14:10

Matrix: Water

Date Received: 08/20/14 15:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	345753	08/25/14 19:13	DAS	TAL SAV
Total/NA	Analysis	300.0		1	345753	08/25/14 19:27	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			345624	08/25/14 07:34	SP	TAL SAV
Dissolved	Prep	3005A			345625	08/25/14 07:36	SP	TAL SAV
Dissolved	Analysis	6020A		1	345915	08/25/14 21:41	BWR	TAL SAV
Total Recoverable	Prep	3005A			345672	08/25/14 10:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345970	08/26/14 10:00	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150919	08/21/14 13:06	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	345700	08/25/14 10:54	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346089	08/26/14 22:00	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150997	08/22/14 12:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	150954	08/22/14 09:38	TKO	TAL TAM

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62381-5

Date Collected: 08/20/14 13:40

Matrix: Water

Date Received: 08/20/14 15:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	345753	08/25/14 19:42	DAS	TAL SAV
Total/NA	Analysis	300.0		1	345753	08/25/14 19:56	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			345624	08/25/14 07:34	SP	TAL SAV
Dissolved	Prep	3005A			345625	08/25/14 07:36	SP	TAL SAV
Dissolved	Analysis	6020A		1	345915	08/25/14 21:46	BWR	TAL SAV
Total Recoverable	Prep	3005A			345672	08/25/14 10:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	345970	08/26/14 10:07	BWR	TAL SAV
Total/NA	Analysis	353.2		1	150919	08/21/14 13:07	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	345700	08/25/14 10:54	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346089	08/26/14 22:14	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	150997	08/22/14 12:30	SC1	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62381-1

Client Sample ID: LZAMW-2

Date Collected: 08/20/14 13:40

Date Received: 08/20/14 15:50

Lab Sample ID: 660-62381-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 2540C		1	150954	08/22/14 09:38	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62381-1

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-15
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Guam	State Program	4	803	06-30-15
Hawaii	State Program	9	09-005r	04-16-15
Illinois	NELAP	9	N/A	06-30-15
Indiana	State Program	5	200022	11-30-14
Iowa	State Program	5	N/A	06-30-15
Kentucky (DW)	State Program	7	353	07-01-15
Kentucky (UST)	State Program	4	90084	12-31-14
Louisiana	NELAP	4	18	06-30-15
Louisiana (DW)	NELAP	6	30690	06-30-14 *
Maine	State Program	6	LA140023	12-31-14
Maryland	State Program	1	GA00006	08-16-14 *
Massachusetts	State Program	3	250	12-31-14
Michigan	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	8	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	7	GA769	06-30-15
New Mexico	State Program	2	N/A	06-30-15
New York	NELAP	6	10842	03-31-15
North Carolina (DW)	State Program	2	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62381-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-14 *

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62381-1

Login Number: 62381

List Source: TestAmerica Tampa

List Number: 1

Creator: Redding, Charles S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62381-1

Login Number: 62381

List Source: TestAmerica Savannah

List Number: 2

List Creation: 08/22/14 08:51 AM

Creator: Conner, Keaton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62487-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer

Authorized for release by:

9/4/2014 4:31:03 PM
Jess Hornsby, Project Manager I
(813)885-7427
jess.hornsby@testamericainc.com

Designee for

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62487-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62487-1	RW-1	Water	08/26/14 14:45	08/27/14 16:40
660-62487-2	UZAMW-1	Water	08/26/14 12:10	08/27/14 16:40
660-62487-3	LZAMW-1	Water	08/26/14 11:40	08/27/14 16:40
660-62487-4	UZAMW-2	Water	08/26/14 13:55	08/27/14 16:40
660-62487-5	LZAMW-2	Water	08/26/14 13:25	08/27/14 16:40

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62487-1

Job ID: 660-62487-1

Laboratory: TestAmerica Tampa

Narrative

Receipt

The samples were received on 8/27/2014 4:40 PM; the samples arrived in good condition, properly preserved and on ice. The temperature of the cooler at receipt was 3.4°C.

Metals

Method 6020A: The method blank for batch 347019 contained Iron above the method detection limit (MDL). Associated samples were not re-analyzed because results were less than the practical quantitation limit (PQL).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-346563.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62487-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
V	Indicates that the analyte was detected at or above the method detection limit in both the sample and the associated method blank and the value of 10 times the blank value was equal to or greater than the associated sample value.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation

These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62487-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	46		1.0	0.50	mg/L	2	300.0		Total/NA
Fluoride	2.2		0.20	0.050	mg/L	2	300.0		Total/NA
Chloride	600		10	5.0	mg/L	20	300.0		Total/NA
SiO ₂ , Silica	25000		500	50	ug/L	1	200.7 Rev 4.4		Dissolved
Arsenic	14		2.5	1.3	ug/L	1	6020A		Total Recoverable
Calcium	120000		250	130	ug/L	1	6020A		Total Recoverable
Iron	61	I V	100	33	ug/L	1	6020A		Total Recoverable
Potassium	7700		500	170	ug/L	1	6020A		Total Recoverable
Magnesium	37000		250	43	ug/L	1	6020A		Total Recoverable
Sodium	310000		500	250	ug/L	1	6020A		Total Recoverable
Total Organic Carbon	2.1		1.0	0.50	mg/L	1	5310 B-2011		Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.4		1.0	1.0	mg/L	1	4500 S2 F-2011		Total/NA
Alkalinity	200		1.0	1.0	mg/L	1	SM 2320B		Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1	SM 2320B		Total/NA
Bicarbonate ion as HCO ₃	240		1.0	1.0	mg/L	1	SM 2320B		Total/NA
Total Dissolved Solids	840		50	50	mg/L	1	SM 2540C		Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62487-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	8.3		0.50	0.25	mg/L	1	300.0		Total/NA
Fluoride	0.29		0.10	0.025	mg/L	1	300.0		Total/NA
Chloride	180		2.5	1.3	mg/L	5	300.0		Total/NA
SiO ₂ , Silica	26000		500	50	ug/L	1	200.7 Rev 4.4		Dissolved
Arsenic	7.5		2.5	1.3	ug/L	1	6020A		Total Recoverable
Calcium	110000		250	130	ug/L	1	6020A		Total Recoverable
Iron	56	I V	100	33	ug/L	1	6020A		Total Recoverable
Potassium	2700		500	170	ug/L	1	6020A		Total Recoverable
Magnesium	19000		250	43	ug/L	1	6020A		Total Recoverable
Sodium	97000		500	250	ug/L	1	6020A		Total Recoverable
Total Organic Carbon	1.9		1.0	0.50	mg/L	1	5310 B-2011		Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.8		1.0	1.0	mg/L	1	4500 S2 F-2011		Total/NA
Alkalinity	180		1.0	1.0	mg/L	1	SM 2320B		Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1	SM 2320B		Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1	SM 2320B		Total/NA
Total Dissolved Solids	530		17	17	mg/L	1	SM 2540C		Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62487-3

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62487-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	23		0.50	0.25	mg/L	1	300.0		Total/NA
Fluoride	0.23		0.10	0.025	mg/L	1	300.0		Total/NA
Chloride	320		5.0	2.5	mg/L	10	300.0		Total/NA
SiO ₂ , Silica	20000		500	50	ug/L	1	200.7 Rev 4.4		Dissolved
Calcium	83000		250	130	ug/L	1	6020A		Total Recoverable
Iron	100	V	100	33	ug/L	1	6020A		Total Recoverable
Potassium	4800		500	170	ug/L	1	6020A		Total Recoverable
Magnesium	18000		250	43	ug/L	1	6020A		Total Recoverable
Sodium	150000		500	250	ug/L	1	6020A		Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1	5310 B-2011		Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.1		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	680		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62487-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.7		0.50	0.25	mg/L	1	300.0		Total/NA
Fluoride	0.42		0.10	0.025	mg/L	1	300.0		Total/NA
Chloride	110		2.0	1.0	mg/L	4	300.0		Total/NA
SiO ₂ , Silica	31000		500	50	ug/L	1	200.7 Rev 4.4		Dissolved
Arsenic	26		2.5	1.3	ug/L	1	6020A		Total Recoverable
Calcium	61000		250	130	ug/L	1	6020A		Total Recoverable
Iron	140	V	100	33	ug/L	1	6020A		Total Recoverable
Potassium	2900		500	170	ug/L	1	6020A		Total Recoverable
Magnesium	13000		250	43	ug/L	1	6020A		Total Recoverable
Sodium	46000		500	250	ug/L	1	6020A		Total Recoverable
Total Organic Carbon	1.5		1.0	0.50	mg/L	1	5310 B-2011		Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	380		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62487-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	26		0.50	0.25	mg/L	1	300.0		Total/NA
Fluoride	0.22		0.10	0.025	mg/L	1	300.0		Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62487-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	350		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	18000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	86000		250	130	ug/L	1		6020A	Total Recoverable
Iron	46	I V	100	33	ug/L	1		6020A	Total Recoverable
Potassium	5600		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	21000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	180000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	660		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62487-1

Matrix: Water

Date Collected: 08/26/14 14:45

Date Received: 08/27/14 16:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	46		1.0	0.50	mg/L			09/03/14 19:52	2
Fluoride	2.2		0.20	0.050	mg/L			09/03/14 19:52	2
Chloride	600		10	5.0	mg/L			09/03/14 19:37	20

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	25000		500	50	ug/L			08/29/14 12:44	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		2.5	1.3	ug/L		08/28/14 14:20	08/30/14 23:20	1
Calcium	120000		250	130	ug/L		08/28/14 14:20	08/30/14 23:20	1
Iron	61 I V		100	33	ug/L		09/03/14 07:28	09/04/14 04:33	1
Potassium	7700		500	170	ug/L		09/03/14 07:28	09/04/14 04:33	1
Magnesium	37000		250	43	ug/L		08/28/14 14:20	08/30/14 23:20	1
Sodium	310000		500	250	ug/L		08/28/14 14:20	08/30/14 23:20	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/03/14 08:47	09/03/14 23:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 15:04	1
Total Organic Carbon	2.1		1.0	0.50	mg/L			08/30/14 05:24	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.4		1.0	1.0	mg/L			08/29/14 09:18	1
Alkalinity	200		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate ion as HCO ₃	240		1.0	1.0	mg/L			08/28/14 09:30	1
Total Dissolved Solids	840		50	50	mg/L			08/28/14 13:31	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62487-2

Matrix: Water

Date Collected: 08/26/14 12:10

Date Received: 08/27/14 16:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	8.3		0.50	0.25	mg/L			09/03/14 20:23	1
Fluoride	0.29		0.10	0.025	mg/L			09/03/14 20:23	1
Chloride	180		2.5	1.3	mg/L			09/03/14 20:08	5

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	26000		500	50	ug/L			08/29/14 12:47	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.5		2.5	1.3	ug/L		08/28/14 14:20	08/30/14 23:27	1
Calcium	110000		250	130	ug/L		08/28/14 14:20	08/30/14 23:27	1
Iron	56 I V		100	33	ug/L		09/03/14 07:28	09/04/14 04:40	1
Potassium	2700		500	170	ug/L		09/03/14 07:28	09/04/14 04:40	1
Magnesium	19000		250	43	ug/L		08/28/14 14:20	08/30/14 23:27	1
Sodium	97000		500	250	ug/L		08/28/14 14:20	08/30/14 23:27	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/03/14 08:47	09/04/14 00:32	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 15:05	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			08/30/14 05:38	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.8		1.0	1.0	mg/L			08/29/14 09:18	1
Alkalinity	180		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			08/28/14 09:30	1
Total Dissolved Solids	530		17	17	mg/L			08/28/14 13:31	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62487-3

Matrix: Water

Date Collected: 08/26/14 11:40

Date Received: 08/27/14 16:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	23		0.50	0.25	mg/L			09/03/14 21:25	1
Fluoride	0.23		0.10	0.025	mg/L			09/03/14 21:25	1
Chloride	320		5.0	2.5	mg/L			09/03/14 20:38	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	20000		500	50	ug/L			08/29/14 12:50	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/28/14 14:20	08/30/14 23:35	1
Calcium	83000		250	130	ug/L		08/28/14 14:20	08/30/14 23:35	1
Iron	100	V	100	33	ug/L		09/03/14 07:28	09/04/14 04:48	1
Potassium	4800		500	170	ug/L		09/03/14 07:28	09/04/14 04:48	1
Magnesium	18000		250	43	ug/L		08/28/14 14:20	08/30/14 23:35	1
Sodium	150000		500	250	ug/L		08/28/14 14:20	08/30/14 23:35	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/03/14 08:47	09/04/14 00:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 15:06	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			08/30/14 05:56	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.1		1.0	1.0	mg/L			08/29/14 09:18	1
Alkalinity	180		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L			08/28/14 09:30	1
Total Dissolved Solids	680		25	25	mg/L			08/28/14 13:31	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62487-4

Matrix: Water

Date Collected: 08/26/14 13:55

Date Received: 08/27/14 16:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.7		0.50	0.25	mg/L			09/03/14 21:55	1
Fluoride	0.42		0.10	0.025	mg/L			09/03/14 21:55	1
Chloride	110		2.0	1.0	mg/L			09/03/14 21:40	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	31000		500	50	ug/L			08/29/14 12:54	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	26		2.5	1.3	ug/L		08/28/14 14:20	08/30/14 23:42	1
Calcium	61000		250	130	ug/L		08/28/14 14:20	08/30/14 23:42	1
Iron	140	V	100	33	ug/L		09/03/14 07:28	09/04/14 04:55	1
Potassium	2900		500	170	ug/L		09/03/14 07:28	09/04/14 04:55	1
Magnesium	13000		250	43	ug/L		08/28/14 14:20	08/30/14 23:42	1
Sodium	46000		500	250	ug/L		08/28/14 14:20	08/30/14 23:42	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/03/14 08:47	09/04/14 00:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 15:07	1
Total Organic Carbon	1.5		1.0	0.50	mg/L			08/30/14 06:11	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			08/29/14 09:18	1
Alkalinity	170		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			08/28/14 09:30	1
Total Dissolved Solids	380		10	10	mg/L			08/28/14 13:31	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62487-5

Matrix: Water

Date Collected: 08/26/14 13:25

Date Received: 08/27/14 16:40

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	26		0.50	0.25	mg/L			09/03/14 23:28	1
Fluoride	0.22		0.10	0.025	mg/L			09/03/14 23:28	1
Chloride	350		5.0	2.5	mg/L			09/03/14 23:12	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	18000		500	50	ug/L			08/29/14 12:57	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		08/28/14 14:20	08/30/14 23:49	1
Calcium	86000		250	130	ug/L		08/28/14 14:20	08/30/14 23:49	1
Iron	46	I V	100	33	ug/L		09/03/14 07:28	09/04/14 05:02	1
Potassium	5600		500	170	ug/L		09/03/14 07:28	09/04/14 05:02	1
Magnesium	21000		250	43	ug/L		08/28/14 14:20	08/30/14 23:49	1
Sodium	180000		500	250	ug/L		08/28/14 14:20	08/30/14 23:49	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/03/14 08:47	09/04/14 01:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 15:09	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			08/30/14 06:27	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.9		1.0	1.0	mg/L			08/29/14 09:18	1
Alkalinity	190		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			08/28/14 09:30	1
Total Dissolved Solids	660		25	25	mg/L			08/28/14 13:31	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-347156/27

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 347156

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/03/14 15:46	1
Fluoride	0.025	U	0.10	0.025	mg/L			09/03/14 15:46	1
Chloride	0.25	U	0.50	0.25	mg/L			09/03/14 15:46	1

Lab Sample ID: LCS 680-347156/28

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 347156

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	%Rec.
	Added								
Sulfate	10.0		10.3		mg/L		103	90 - 110	
Fluoride	2.00		2.10		mg/L		105	90 - 110	
Chloride	10.0		10.2		mg/L		102	90 - 110	

Lab Sample ID: LCSD 680-347156/29

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 347156

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Added										
Sulfate	10.0		10.3		mg/L		103	90 - 110		0	30
Fluoride	2.00		2.10		mg/L		105	90 - 110		0	30
Chloride	10.0		10.1		mg/L		101	90 - 110		0	30

Lab Sample ID: 660-62487-3 MS

Client Sample ID: LZAMW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 347156

Analyte	Sample Result	Sample Qualifier	Spike		MS Result	MS Qualifier	Unit	D	%Rec	Limits	%Rec.
			Added								
Sulfate	22		100		123		mg/L		102	80 - 120	
Fluoride	0.33		20.0		20.8		mg/L		102	80 - 120	
Chloride	320		100		423		mg/L		99	80 - 120	

Lab Sample ID: 660-62487-3 MSD

Client Sample ID: LZAMW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 347156

Analyte	Sample Result	Sample Qualifier	Spike		MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD
			Added								
Sulfate	22		100		123		mg/L		101	80 - 120	0
Fluoride	0.33		20.0		20.7		mg/L		102	80 - 120	0
Chloride	320		100		422		mg/L		98	80 - 120	0

Lab Sample ID: MB 680-347228/53

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 347228

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/03/14 22:26	1
Fluoride	0.025	U	0.10	0.025	mg/L			09/03/14 22:26	1
Chloride	0.25	U	0.50	0.25	mg/L			09/03/14 22:26	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 680-347228/54

Matrix: Water

Analysis Batch: 347228

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec.	
		Result	Qualifier			%Rec.	Limits
Sulfate	10.0	10.3		mg/L		103	90 - 110
Fluoride	2.00	2.10		mg/L		105	90 - 110
Chloride	10.0	10.1		mg/L		101	90 - 110

Lab Sample ID: LCSD 680-347228/55

Matrix: Water

Analysis Batch: 347228

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec.		RPD	Limit
		Result	Qualifier			%Rec.	Limits		
Sulfate	10.0	10.3		mg/L		103	90 - 110	0	30
Fluoride	2.00	2.10		mg/L		105	90 - 110	0	30
Chloride	10.0	10.2		mg/L		102	90 - 110	0	30

Lab Sample ID: 680-104679-J-2 MS

Matrix: Water

Analysis Batch: 347228

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	
	Result	Qualifier	Added	Result	Qualifier			%Rec.	Limits
Sulfate	160		100	259		mg/L		98	80 - 120
Fluoride	0.26	I	20.0	20.5		mg/L		101	80 - 120
Chloride	350		100	450		mg/L		95	80 - 120

Lab Sample ID: 680-104679-J-2 MSD

Matrix: Water

Analysis Batch: 347228

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	
	Result	Qualifier	Added	Result	Qualifier			%Rec.	Limits
Sulfate	160		100	261		mg/L		99	80 - 120
Fluoride	0.26	I	20.0	20.6		mg/L		102	80 - 120
Chloride	350		100	453		mg/L		98	80 - 120

Lab Sample ID: 680-104816-W-1 MS

Matrix: Water

Analysis Batch: 347228

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	
	Result	Qualifier	Added	Result	Qualifier			%Rec.	Limits
Sulfate	13		10.0	23.3		mg/L		102	80 - 120
Fluoride	0.38		2.00	2.40		mg/L		101	80 - 120
Chloride	8.1		10.0	17.9		mg/L		98	80 - 120

Lab Sample ID: 680-104816-W-1 MSD

Matrix: Water

Analysis Batch: 347228

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	
	Result	Qualifier	Added	Result	Qualifier			%Rec.	Limits
Sulfate	13		10.0	23.3		mg/L		101	80 - 120
Fluoride	0.38		2.00	2.41		mg/L		102	80 - 120
Chloride	8.1		10.0	18.0		mg/L		99	80 - 120

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 680-346658/1-A

Matrix: Water

Analysis Batch: 346651

Client Sample ID: Method Blank

Prep Type: Dissolved

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
SiO ₂ , Silica	50	U	500	50	ug/L			08/29/14 12:08	1

Lab Sample ID: LCS 680-346658/2-A

Matrix: Water

Analysis Batch: 346651

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
SiO ₂ , Silica		10000	9780		ug/L		98	85 - 115	

Lab Sample ID: 680-104415-F-1-B MS

Matrix: Water

Analysis Batch: 346651

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Analyte	Sample		Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	
	Result	Qualifier								
SiO ₂ , Silica	40000		10000	48900		ug/L		87	75 - 125	

Lab Sample ID: 680-104415-F-1-C MSD

Matrix: Water

Analysis Batch: 346651

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Analyte	Sample		Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier									
SiO ₂ , Silica	40000		10000	48400		ug/L		82	75 - 125	1	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-346432/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 346860

Prep Batch: 346432

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		08/28/14 14:20	08/30/14 19:55	1
Calcium	130	U	250	130	ug/L		08/28/14 14:20	08/30/14 19:55	1
Magnesium	43	U	250	43	ug/L		08/28/14 14:20	08/30/14 19:55	1
Sodium	250	U	500	250	ug/L		08/28/14 14:20	08/30/14 19:55	1

Lab Sample ID: LCS 680-346432/2-A

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 346860

Prep Batch: 346432

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Arsenic	100		100		ug/L		100	75 - 125	
Calcium	5000		5240		ug/L		105	75 - 125	
Magnesium	5000		5100		ug/L		102	75 - 125	
Sodium	5000		5050		ug/L		101	75 - 125	

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-104617-C-13-B MS

Matrix: Water

Analysis Batch: 346860

Client Sample ID: Matrix Spike

Prep Type: Total Recoverable

Prep Batch: 346432

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Arsenic	16		100	109		ug/L		92	75 - 125
Calcium	110000	J3	5000	103000	J3	ug/L		-40	75 - 125
Magnesium	21000	J3	5000	24200	J3	ug/L		63	75 - 125
Sodium	26000	J3	5000	28800	J3	ug/L		56	75 - 125

Lab Sample ID: 680-104617-C-13-C MSD

Matrix: Water

Analysis Batch: 346860

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total Recoverable

Prep Batch: 346432

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	16		100	117		ug/L		101	75 - 125	7	20
Calcium	110000	J3	5000	112000	J3	ug/L		141	75 - 125	8	20
Magnesium	21000	J3	5000	26300		ug/L		104	75 - 125	8	20
Sodium	26000	J3	5000	30600		ug/L		92	75 - 125	6	20

Lab Sample ID: MB 680-347019/1-A

Matrix: Water

Analysis Batch: 347373

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 347019

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33.3	I	100	33	ug/L		09/03/14 07:28	09/04/14 01:38	1
Potassium	170	U	500	170	ug/L		09/03/14 07:28	09/04/14 01:38	1

Lab Sample ID: LCS 680-347019/2-A

Matrix: Water

Analysis Batch: 347373

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 347019

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added						
Iron	5000	5380		ug/L		108	75 - 125
Potassium	5000	5400		ug/L		108	75 - 125

Lab Sample ID: 680-104639-A-1-C MS

Matrix: Water

Analysis Batch: 347373

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 347019

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	13000	J3	5000	20400	J3	ug/L		142	75 - 125
Potassium	2200		5000	7680		ug/L		109	75 - 125

Lab Sample ID: 680-104639-A-1-D MSD

Matrix: Water

Analysis Batch: 347373

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 347019

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	13000	J3	5000	20300	J3	ug/L		139	75 - 125	1	20
Potassium	2200		5000	8060		ug/L		116	75 - 125	5	20

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 680-347047/1-B

Matrix: Water

Analysis Batch: 347373

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 347048

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		09/03/14 08:47	09/03/14 23:40	1

Lab Sample ID: LCS 680-347047/2-B

Matrix: Water

Analysis Batch: 347373

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 347048

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Iron		5000	5270		ug/L		105	75 - 125	

Lab Sample ID: 660-62487-1 MS

Matrix: Water

Analysis Batch: 347373

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 347048

Analyte	Sample		Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	
	Result	Qualifier								
Iron	33	U	5000	4970		ug/L		99	75 - 125	

Lab Sample ID: 660-62487-1 MSD

Matrix: Water

Analysis Batch: 347373

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 347048

Analyte	Sample		Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD
	Result	Qualifier								
Iron	33	U	5000	5260		ug/L		105	75 - 125	6

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-151099/12

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151099

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 14:29	1

Lab Sample ID: MB 660-151099/13

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151099

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			08/27/14 14:30	1

Lab Sample ID: LCS 660-151099/14

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151099

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Nitrate Nitrite as N	1.00		0.950		mg/L		95	90 - 110	
Nitrite as N	0.500	I	0.496	I	mg/L		99	90 - 110	

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: LCS 660-151099/15

Matrix: Water

Analysis Batch: 151099

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
Nitrate Nitrite as N	1.00	1.02		mg/L		102	90 - 110
Nitrite as N	0.500	0.496	I	mg/L		99	90 - 110

Lab Sample ID: 660-62489-D-1 MS

Matrix: Water

Analysis Batch: 151099

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10	U	1.00	1.06		mg/L		106	90 - 110
Nitrite as N	0.10	U	0.500	0.522		mg/L		104	90 - 110

Lab Sample ID: 660-62489-D-1 MSD

Matrix: Water

Analysis Batch: 151099

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10	U	1.00	1.06		mg/L		106	90 - 110
Nitrite as N	0.10	U	0.500	0.525		mg/L		105	90 - 110

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-346563/1

Client Sample ID: Method Blank

Matrix: Water

Analysis Batch: 346563

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U		1.0	mg/L			08/29/14 09:18	1

Lab Sample ID: LCS 680-346563/2

Client Sample ID: Lab Control Sample

Matrix: Water

Analysis Batch: 346563

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	9.98	9.75		mg/L		98	75 - 125

Lab Sample ID: LCSD 680-346563/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Analysis Batch: 346563

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	9.98	9.94		mg/L		100	75 - 125

Lab Sample ID: 660-62487-1 DU

Client Sample ID: RW-1

Matrix: Water

Analysis Batch: 346563

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Sulfide	5.4		5.25		mg/L		2	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-346770/3

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346770

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			08/29/14 23:00	1

Lab Sample ID: LCS 680-346770/4

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346770

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Organic Carbon		20.0	21.1	mg/L		105	80 - 120		

Lab Sample ID: LCSD 680-346770/5

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346770

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec.	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Organic Carbon		20.0	20.9	mg/L		104	80 - 120	1	25

Lab Sample ID: 640-48932-M-1 MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346770

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	21		20.0	42.2		mg/L		106	80 - 120

Lab Sample ID: 640-48932-M-1 MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346770

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	21		20.0	41.4		mg/L		102	80 - 120

Lab Sample ID: 660-62302-G-2 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 346770

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	18			18.0		mg/L		2	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-151165/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151165

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	1.0	mg/L			08/28/14 09:30	1
Bicarbonate ion as HCO3	1.0	U	1.0	1.0	mg/L			08/28/14 09:30	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 660-151165/3

Matrix: Water

Analysis Batch: 151165

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec.	Limits
		Result	Qualifier			%Rec.	
Alkalinity	118	124		mg/L		105	80 - 120

Lab Sample ID: 660-62434-D-6 DU

Matrix: Water

Analysis Batch: 151165

Client Sample ID: Duplicate

Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	410		409		mg/L		0.07	30
Bicarbonate Alkalinity as CaCO ₃	410		409		mg/L		0.07	30
Bicarbonate ion as HCO ₃	500		499		mg/L		0.07	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-151128/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151128

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			08/28/14 13:31	1

Lab Sample ID: LCS 660-151128/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151128

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits
	Added	Result	Qualifier			%Rec.	
Total Dissolved Solids	10000	10000		mg/L		100	80 - 120

Lab Sample ID: 660-62487-5 DU

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151128

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	660		590		mg/L		11	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 347156

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total/NA	Water	300.0	
660-62487-1	RW-1	Total/NA	Water	300.0	
660-62487-2	UZAMW-1	Total/NA	Water	300.0	
660-62487-2	UZAMW-1	Total/NA	Water	300.0	
660-62487-3	LZAMW-1	Total/NA	Water	300.0	
660-62487-3	LZAMW-1	Total/NA	Water	300.0	
660-62487-3 MS	LZAMW-1	Total/NA	Water	300.0	
660-62487-3 MSD	LZAMW-1	Total/NA	Water	300.0	
660-62487-4	UZAMW-2	Total/NA	Water	300.0	
660-62487-4	UZAMW-2	Total/NA	Water	300.0	
LCS 680-347156/28	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-347156/29	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-347156/27	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 347228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-5	LZAMW-2	Total/NA	Water	300.0	
660-62487-5	LZAMW-2	Total/NA	Water	300.0	
680-104679-J-2 MS	Matrix Spike	Total/NA	Water	300.0	
680-104679-J-2 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
680-104816-W-1 MS	Matrix Spike	Total/NA	Water	300.0	
680-104816-W-1 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	
LCS 680-347228/54	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-347228/55	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-347228/53	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 346432

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total Recoverable	Water	3005A	
660-62487-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62487-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62487-4	UZAMW-2	Total Recoverable	Water	3005A	
660-62487-5	LZAMW-2	Total Recoverable	Water	3005A	
680-104617-C-13-B MS	Matrix Spike	Total Recoverable	Water	3005A	
680-104617-C-13-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
LCS 680-346432/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-346432/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 346651

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Dissolved	Water	200.7 Rev 4.4	346658
660-62487-2	UZAMW-1	Dissolved	Water	200.7 Rev 4.4	346658
660-62487-3	LZAMW-1	Dissolved	Water	200.7 Rev 4.4	346658
660-62487-4	UZAMW-2	Dissolved	Water	200.7 Rev 4.4	346658
660-62487-5	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	346658
680-104415-F-1-B MS	Matrix Spike	Dissolved	Water	200.7 Rev 4.4	346658
680-104415-F-1-C MSD	Matrix Spike Duplicate	Dissolved	Water	200.7 Rev 4.4	346658
LCS 680-346658/2-A	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	346658

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Analysis Batch: 346651 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-346658/1-A	Method Blank	Dissolved	Water	200.7 Rev 4.4	346658

Filtration Batch: 346658

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Dissolved	Water	FILTRATION	
660-62487-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62487-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62487-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62487-5	LZAMW-2	Dissolved	Water	FILTRATION	
680-104415-F-1-B MS	Matrix Spike	Dissolved	Water	FILTRATION	
680-104415-F-1-C MSD	Matrix Spike Duplicate	Dissolved	Water	FILTRATION	
LCS 680-346658/2-A	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-346658/1-A	Method Blank	Dissolved	Water	FILTRATION	

Analysis Batch: 346860

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total Recoverable	Water	6020A	346432
660-62487-2	UZAMW-1	Total Recoverable	Water	6020A	346432
660-62487-3	LZAMW-1	Total Recoverable	Water	6020A	346432
660-62487-4	UZAMW-2	Total Recoverable	Water	6020A	346432
660-62487-5	LZAMW-2	Total Recoverable	Water	6020A	346432
680-104617-C-13-B MS	Matrix Spike	Total Recoverable	Water	6020A	346432
680-104617-C-13-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	346432
LCS 680-346432/2-A	Lab Control Sample	Total Recoverable	Water	6020A	346432
MB 680-346432/1-A	Method Blank	Total Recoverable	Water	6020A	346432

Prep Batch: 347019

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total Recoverable	Water	3005A	
660-62487-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62487-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62487-4	UZAMW-2	Total Recoverable	Water	3005A	
660-62487-5	LZAMW-2	Total Recoverable	Water	3005A	
680-104639-A-1-C MS	Matrix Spike	Dissolved	Water	3005A	
680-104639-A-1-D MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
LCS 680-347019/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-347019/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 347047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Dissolved	Water	FILTRATION	
660-62487-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62487-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62487-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62487-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62487-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62487-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-347047/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-347047/1-B	Method Blank	Dissolved	Water	FILTRATION	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Prep Batch: 347048

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Dissolved	Water	3005A	347047
660-62487-1 MS	RW-1	Dissolved	Water	3005A	347047
660-62487-1 MSD	RW-1	Dissolved	Water	3005A	347047
660-62487-2	UZAMW-1	Dissolved	Water	3005A	347047
660-62487-3	LZAMW-1	Dissolved	Water	3005A	347047
660-62487-4	UZAMW-2	Dissolved	Water	3005A	347047
660-62487-5	LZAMW-2	Dissolved	Water	3005A	347047
LCS 680-347047/2-B	Lab Control Sample	Dissolved	Water	3005A	347047
MB 680-347047/1-B	Method Blank	Dissolved	Water	3005A	347047

Analysis Batch: 347373

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Dissolved	Water	6020A	347048
660-62487-1	RW-1	Total Recoverable	Water	6020A	347019
660-62487-1 MS	RW-1	Dissolved	Water	6020A	347048
660-62487-1 MSD	RW-1	Dissolved	Water	6020A	347048
660-62487-2	UZAMW-1	Dissolved	Water	6020A	347048
660-62487-2	UZAMW-1	Total Recoverable	Water	6020A	347019
660-62487-3	LZAMW-1	Dissolved	Water	6020A	347048
660-62487-3	LZAMW-1	Total Recoverable	Water	6020A	347019
660-62487-4	UZAMW-2	Dissolved	Water	6020A	347048
660-62487-4	UZAMW-2	Total Recoverable	Water	6020A	347019
660-62487-5	LZAMW-2	Dissolved	Water	6020A	347048
660-62487-5	LZAMW-2	Total Recoverable	Water	6020A	347019
680-104639-A-1-C MS	Matrix Spike	Dissolved	Water	6020A	347019
680-104639-A-1-D MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	347019
LCS 680-347019/2-A	Lab Control Sample	Total Recoverable	Water	6020A	347019
LCS 680-347047/2-B	Lab Control Sample	Dissolved	Water	6020A	347048
MB 680-347019/1-A	Method Blank	Total Recoverable	Water	6020A	347019
MB 680-347047/1-B	Method Blank	Dissolved	Water	6020A	347048

General Chemistry

Analysis Batch: 151099

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total/NA	Water	353.2	
660-62487-2	UZAMW-1	Total/NA	Water	353.2	
660-62487-3	LZAMW-1	Total/NA	Water	353.2	
660-62487-4	UZAMW-2	Total/NA	Water	353.2	
660-62487-5	LZAMW-2	Total/NA	Water	353.2	
660-62489-D-1 MS	Matrix Spike	Total/NA	Water	353.2	
660-62489-D-1 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	
LCS 660-151099/14	Lab Control Sample	Total/NA	Water	353.2	
LCS 660-151099/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-151099/12	Method Blank	Total/NA	Water	353.2	
MB 660-151099/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 151128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total/NA	Water	SM 2540C	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry (Continued)

Analysis Batch: 151128 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62487-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62487-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62487-5	LZAMW-2	Total/NA	Water	SM 2540C	
660-62487-5 DU	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-151128/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-151128/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 151165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62434-D-6 DU	Duplicate	Total/NA	Water	SM 2320B	
660-62487-1	RW-1	Total/NA	Water	SM 2320B	
660-62487-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62487-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-62487-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62487-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-151165/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-151165/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 346563

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62487-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62487-1 DU	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62487-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62487-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62487-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62487-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-346563/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-346563/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-346563/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 346770

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-48932-M-1 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-48932-M-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-62302-G-2 DU	Duplicate	Total/NA	Water	5310 B-2011	
660-62487-1	RW-1	Total/NA	Water	5310 B-2011	
660-62487-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-62487-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-62487-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-62487-5	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-346770/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-346770/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-346770/3	Method Blank	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62487-1

Matrix: Water

Date Collected: 08/26/14 14:45

Date Received: 08/27/14 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	347156	09/03/14 19:37	DAS	TAL SAV
Total/NA	Analysis	300.0		2	347156	09/03/14 19:52	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			346658	08/29/14 10:39	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	346651	08/29/14 12:44	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347047	09/03/14 08:45	BJB	TAL SAV
Dissolved	Prep	3005A			347048	09/03/14 08:47	BJB	TAL SAV
Dissolved	Analysis	6020A		1	347373	09/03/14 23:55	BWR	TAL SAV
Total Recoverable	Prep	3005A			346432	08/28/14 14:20	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	346860	08/30/14 23:20	BWR	TAL SAV
Total Recoverable	Prep	3005A			347019	09/03/14 07:28	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	347373	09/04/14 04:33	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151099	08/27/14 15:04	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	346563	08/29/14 09:18	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346770	08/30/14 05:24	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151165	08/28/14 09:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151128	08/28/14 13:31	RWF	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62487-2

Matrix: Water

Date Collected: 08/26/14 12:10

Date Received: 08/27/14 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	347156	09/03/14 20:08	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347156	09/03/14 20:23	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			346658	08/29/14 10:39	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	346651	08/29/14 12:47	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347047	09/03/14 08:45	BJB	TAL SAV
Dissolved	Prep	3005A			347048	09/03/14 08:47	BJB	TAL SAV
Dissolved	Analysis	6020A		1	347373	09/04/14 00:32	BWR	TAL SAV
Total Recoverable	Prep	3005A			346432	08/28/14 14:20	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	346860	08/30/14 23:27	BWR	TAL SAV
Total Recoverable	Prep	3005A			347019	09/03/14 07:28	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	347373	09/04/14 04:40	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151099	08/27/14 15:05	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	346563	08/29/14 09:18	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346770	08/30/14 05:38	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151165	08/28/14 09:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151128	08/28/14 13:31	RWF	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62487-3

Matrix: Water

Date Collected: 08/26/14 11:40

Date Received: 08/27/14 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	347156	09/03/14 20:38	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347156	09/03/14 21:25	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			346658	08/29/14 10:39	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	346651	08/29/14 12:50	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347047	09/03/14 08:45	BJB	TAL SAV
Dissolved	Prep	3005A			347048	09/03/14 08:47	BJB	TAL SAV
Dissolved	Analysis	6020A		1	347373	09/04/14 00:39	BWR	TAL SAV
Total Recoverable	Prep	3005A			346432	08/28/14 14:20	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	346860	08/30/14 23:35	BWR	TAL SAV
Total Recoverable	Prep	3005A			347019	09/03/14 07:28	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	347373	09/04/14 04:48	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151099	08/27/14 15:06	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	346563	08/29/14 09:18	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346770	08/30/14 05:56	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151165	08/28/14 09:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151128	08/28/14 13:31	RWF	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62487-4

Matrix: Water

Date Collected: 08/26/14 13:55

Date Received: 08/27/14 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	347156	09/03/14 21:40	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347156	09/03/14 21:55	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			346658	08/29/14 10:39	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	346651	08/29/14 12:54	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347047	09/03/14 08:45	BJB	TAL SAV
Dissolved	Prep	3005A			347048	09/03/14 08:47	BJB	TAL SAV
Dissolved	Analysis	6020A		1	347373	09/04/14 00:46	BWR	TAL SAV
Total Recoverable	Prep	3005A			346432	08/28/14 14:20	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	346860	08/30/14 23:42	BWR	TAL SAV
Total Recoverable	Prep	3005A			347019	09/03/14 07:28	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	347373	09/04/14 04:55	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151099	08/27/14 15:07	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	346563	08/29/14 09:18	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346770	08/30/14 06:11	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151165	08/28/14 09:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151128	08/28/14 13:31	RWF	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62487-5

Matrix: Water

Date Collected: 08/26/14 13:25

Date Received: 08/27/14 16:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	347228	09/03/14 23:12	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347228	09/03/14 23:28	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			346658	08/29/14 10:39	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	346651	08/29/14 12:57	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347047	09/03/14 08:45	BJB	TAL SAV
Dissolved	Prep	3005A			347048	09/03/14 08:47	BJB	TAL SAV
Dissolved	Analysis	6020A		1	347373	09/04/14 01:08	BWR	TAL SAV
Total Recoverable	Prep	3005A			346432	08/28/14 14:20	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	346860	08/30/14 23:49	BWR	TAL SAV
Total Recoverable	Prep	3005A			347019	09/03/14 07:28	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	347373	09/04/14 05:02	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151099	08/27/14 15:09	RWF	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	346563	08/29/14 09:18	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	346770	08/30/14 06:27	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151165	08/28/14 09:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151128	08/28/14 13:31	RWF	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-15
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Guam	State Program	4	803	06-30-15
Hawaii	State Program	9	09-005r	04-16-15
Illinois	NELAP	9	N/A	06-30-15
Indiana	State Program	5	200022	11-30-14
Iowa	State Program	5	N/A	06-30-15
Kentucky (DW)	State Program	7	353	07-01-15
Kentucky (UST)	State Program	4	90084	12-31-14
Louisiana	NELAP	4	18	06-30-15
Louisiana (DW)	NELAP	6	30690	06-30-14 *
Maine	State Program	6	LA140023	12-31-14
Maryland	State Program	1	GA00006	08-16-14 *
Massachusetts	State Program	3	250	12-31-14
Michigan	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	8	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	7	GA769	06-30-15
New Mexico	State Program	2	N/A	06-30-15
New York	NELAP	6	10842	03-31-15
North Carolina (DW)	State Program	2	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62487-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-14 *
Wyoming	State Program	8	8TMS-L	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa



TestAmerica Tampa
6712 Benjamin Road Suite 1000

TestAmerica Tampa
6712 Benjamin Road Suite 100

Chain of Custody Record

TestAmericana

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Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62487-1

Login Number: 62487

List Source: TestAmerica Tampa

List Number: 1

Creator: Williams, Jennifer

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	False	Check done at department level as required.

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62487-1

Login Number: 62487

List Source: TestAmerica Savannah

List Number: 2

List Creation: 08/28/14 09:25 AM

Creator: Conner, Keaton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62629-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

9/10/2014 3:48:52 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62629-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62629-1	RW-1	Water	09/03/14 15:45	09/03/14 16:30
660-62629-2	UZAMW-1	Water	09/03/14 13:10	09/03/14 16:30
660-62629-3	LZAMW-1	Water	09/03/14 12:40	09/03/14 16:30
660-62629-4	UZAMW-2	Water	09/03/14 14:40	09/03/14 16:30
660-62629-5	LZAMW-2	Water	09/03/14 14:10	09/03/14 16:30

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62629-1

Job ID: 660-62629-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62629-1

Comments

No additional comments.

Receipt

The samples were received on 9/3/2014 4:30 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.4° C.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-347534.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62629-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	42		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	0.30		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	590		10	5.0	mg/L	20		300.0	Total/NA
SiO ₂ , Silica	24000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	13		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	110000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	7100		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	34000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	280000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.1		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1300		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62629-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.5		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.29		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		2.5	1.3	mg/L	5		300.0	Total/NA
SiO ₂ , Silica	26000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	5.5		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	75000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	13000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	70000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.9		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	4.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	560		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62629-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.22		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62629-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	20000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	85000		250	130	ug/L	1		6020A	Total Recoverable
Iron	40 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	4600		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	19000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	160000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	9.4		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	820		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62629-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.8		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.40		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	31000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	25		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	57000		250	130	ug/L	1		6020A	Total Recoverable
Iron	78 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	12000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	43000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	1.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	360		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62629-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	26		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	350		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	18000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62629-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Calcium	79000		250	130	ug/L	1		6020A	Total
Potassium	5300		500	170	ug/L	1		6020A	Recoverable
Magnesium	20000		250	43	ug/L	1		6020A	Total
Sodium	170000		500	250	ug/L	1		6020A	Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	10		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	730		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62629-1

Matrix: Water

Date Collected: 09/03/14 15:45

Date Received: 09/03/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	42		1.0	0.50	mg/L			09/07/14 14:13	2
Fluoride	0.30		0.20	0.050	mg/L			09/07/14 14:13	2
Chloride	590		10	5.0	mg/L			09/07/14 13:59	20

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	24000		500	50	ug/L			09/05/14 12:31	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	13		2.5	1.3	ug/L		09/05/14 10:21	09/08/14 23:08	1
Calcium	110000		250	130	ug/L		09/05/14 10:21	09/08/14 23:08	1
Iron	33	U	100	33	ug/L		09/05/14 10:21	09/08/14 23:08	1
Potassium	7100		500	170	ug/L		09/05/14 10:21	09/08/14 23:08	1
Magnesium	34000		250	43	ug/L		09/05/14 10:21	09/08/14 23:08	1
Sodium	280000		500	250	ug/L		09/05/14 10:21	09/08/14 23:08	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/09/14 08:09	09/09/14 15:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/04/14 11:48	1
Total Organic Carbon	2.1		1.0	0.50	mg/L			09/05/14 00:32	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.9		1.0	1.0	mg/L			09/05/14 09:37	1
Alkalinity	200		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L			09/04/14 10:50	1
Total Dissolved Solids	1300		25	25	mg/L			09/05/14 13:26	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62629-2

Matrix: Water

Date Collected: 09/03/14 13:10

Date Received: 09/03/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.5		0.50	0.25	mg/L			09/07/14 14:42	1
Fluoride	0.29		0.10	0.025	mg/L			09/07/14 14:42	1
Chloride	170		2.5	1.3	mg/L			09/07/14 14:28	5

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	26000		500	50	ug/L			09/05/14 12:46	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5.5		2.5	1.3	ug/L		09/05/14 10:21	09/08/14 23:16	1
Calcium	75000		250	130	ug/L		09/05/14 10:21	09/08/14 23:16	1
Iron	33	U	100	33	ug/L		09/05/14 10:21	09/08/14 23:16	1
Potassium	2700		500	170	ug/L		09/05/14 10:21	09/08/14 23:16	1
Magnesium	13000		250	43	ug/L		09/05/14 10:21	09/08/14 23:16	1
Sodium	70000		500	250	ug/L		09/05/14 10:21	09/08/14 23:16	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/09/14 08:09	09/09/14 15:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/04/14 11:49	1
Total Organic Carbon	1.9		1.0	0.50	mg/L			09/05/14 00:48	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	4.9		1.0	1.0	mg/L			09/05/14 09:44	1
Alkalinity	180		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			09/04/14 10:50	1
Total Dissolved Solids	560		17	17	mg/L			09/05/14 13:26	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62629-3

Matrix: Water

Date Collected: 09/03/14 12:40

Date Received: 09/03/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			09/07/14 15:11	1
Fluoride	0.22		0.10	0.025	mg/L			09/07/14 15:11	1
Chloride	320		5.0	2.5	mg/L			09/07/14 14:57	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	20000		500	50	ug/L			09/05/14 12:49	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/05/14 10:21	09/08/14 23:23	1
Calcium	85000		250	130	ug/L		09/05/14 10:21	09/08/14 23:23	1
Iron	40	I	100	33	ug/L		09/05/14 10:21	09/08/14 23:23	1
Potassium	4600		500	170	ug/L		09/05/14 10:21	09/08/14 23:23	1
Magnesium	19000		250	43	ug/L		09/05/14 10:21	09/08/14 23:23	1
Sodium	160000		500	250	ug/L		09/05/14 10:21	09/08/14 23:23	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/09/14 08:09	09/09/14 15:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/04/14 11:51	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			09/05/14 01:02	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	9.4		1.0	1.0	mg/L			09/05/14 09:44	1
Alkalinity	180		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			09/04/14 10:50	1
Total Dissolved Solids	820		25	25	mg/L			09/05/14 13:26	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62629-4

Matrix: Water

Date Collected: 09/03/14 14:40

Date Received: 09/03/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.8		0.50	0.25	mg/L			09/09/14 11:16	1
Fluoride	0.40		0.10	0.025	mg/L			09/07/14 16:09	1
Chloride	100		2.0	1.0	mg/L			09/07/14 15:54	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	31000		500	50	ug/L			09/05/14 12:58	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	25		2.5	1.3	ug/L		09/05/14 10:21	09/08/14 23:45	1
Calcium	57000		250	130	ug/L		09/05/14 10:21	09/08/14 23:45	1
Iron	78 I		100	33	ug/L		09/05/14 10:21	09/08/14 23:45	1
Potassium	2700		500	170	ug/L		09/05/14 10:21	09/08/14 23:45	1
Magnesium	12000		250	43	ug/L		09/05/14 10:21	09/08/14 23:45	1
Sodium	43000		500	250	ug/L		09/05/14 10:21	09/08/14 23:45	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/09/14 08:09	09/09/14 15:56	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/04/14 11:52	1
Total Organic Carbon	1.6		1.0	0.50	mg/L			09/05/14 01:16	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			09/05/14 09:44	1
Alkalinity	180		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			09/04/14 10:50	1
Total Dissolved Solids	360		10	10	mg/L			09/05/14 13:26	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62629-5

Matrix: Water

Date Collected: 09/03/14 14:10

Date Received: 09/03/14 16:30

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	26		0.50	0.25	mg/L			09/09/14 11:31	1
Fluoride	0.21		0.10	0.025	mg/L			09/07/14 16:37	1
Chloride	350		5.0	2.5	mg/L			09/07/14 16:23	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	18000		500	50	ug/L			09/05/14 13:01	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/05/14 10:21	09/08/14 23:52	1
Calcium	79000		250	130	ug/L		09/05/14 10:21	09/08/14 23:52	1
Iron	33	U	100	33	ug/L		09/05/14 10:21	09/08/14 23:52	1
Potassium	5300		500	170	ug/L		09/05/14 10:21	09/08/14 23:52	1
Magnesium	20000		250	43	ug/L		09/05/14 10:21	09/08/14 23:52	1
Sodium	170000		500	250	ug/L		09/05/14 10:21	09/08/14 23:52	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/09/14 08:09	09/09/14 16:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/04/14 11:53	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			09/05/14 01:31	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	10		1.0	1.0	mg/L			09/05/14 09:47	1
Alkalinity	190		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			09/04/14 10:50	1
Total Dissolved Solids	730		25	25	mg/L			09/05/14 13:26	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-347731/5

Matrix: Water

Analysis Batch: 347731

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/07/14 11:51	1
Fluoride	0.025	U	0.10	0.025	mg/L			09/07/14 11:51	1
Chloride	0.25	U	0.50	0.25	mg/L			09/07/14 11:51	1

Lab Sample ID: LCS 680-347731/6

Matrix: Water

Analysis Batch: 347731

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	9.90		mg/L		99	90 - 110	
Fluoride	2.00	2.05		mg/L		103	90 - 110	
Chloride	10.0	9.98		mg/L		100	90 - 110	

Lab Sample ID: LCSD 680-347731/7

Matrix: Water

Analysis Batch: 347731

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
		Result	Qualifier							
Sulfate	10.0	9.95		mg/L		99	90 - 110		1	30
Fluoride	2.00	2.07		mg/L		103	90 - 110		1	30
Chloride	10.0	9.98		mg/L		100	90 - 110		0	30

Lab Sample ID: 680-104683-E-4 MS

Matrix: Water

Analysis Batch: 347731

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	22		10.0	31.6		mg/L		93	80 - 120	
Fluoride	0.042	I	2.00	2.03		mg/L		99	80 - 120	
Chloride	30		10.0	39.5		mg/L		98	80 - 120	

Lab Sample ID: 680-104683-E-4 MSD

Matrix: Water

Analysis Batch: 347731

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	22		10.0	31.7		mg/L		93	80 - 120	0	30
Fluoride	0.042	I	2.00	2.05		mg/L		100	80 - 120	1	30
Chloride	30		10.0	39.6		mg/L		99	80 - 120	0	30

Lab Sample ID: MB 680-348006/5

Matrix: Water

Analysis Batch: 348006

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/09/14 10:19	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 680-348006/6

Matrix: Water

Analysis Batch: 348006

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.	RPD	Limit
		Result	Qualifier				Limits		
Sulfate	10.0	9.81		mg/L		98	90 - 110		

Lab Sample ID: LCSD 680-348006/7

Matrix: Water

Analysis Batch: 348006

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	Limit
		Result	Qualifier				Limits		
Sulfate	10.0	9.92		mg/L		99	90 - 110	1	30

Lab Sample ID: 680-104683-E-4 MS

Matrix: Water

Analysis Batch: 348006

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Sulfate	22		10.0	31.5		mg/L		94	80 - 120

Lab Sample ID: 680-104683-E-4 MSD

Matrix: Water

Analysis Batch: 348006

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Sulfate	22		10.0	31.5		mg/L		94	80 - 120

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 680-347602/1-A

Matrix: Water

Analysis Batch: 347608

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
SiO ₂ , Silica	50	U	500	50	ug/L			09/05/14 12:22	1

Lab Sample ID: LCS 680-347602/2-A

Matrix: Water

Analysis Batch: 347608

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
SiO ₂ , Silica	10000	9870		ug/L		99	85 - 115

Lab Sample ID: 660-62629-1 MS

Matrix: Water

Analysis Batch: 347608

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
SiO ₂ , Silica	24000		10000	32100		ug/L		80	75 - 125

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 660-62629-1 MSD

Matrix: Water

Analysis Batch: 347608

Client Sample ID: RW-1

Prep Type: Dissolved

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier						
SiO ₂ , Silica	24000		10000	32400		ug/L		83	75 - 125	1	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-347551/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 348089

Prep Batch: 347551

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		09/05/14 10:21	09/09/14 13:22	1
Calcium	130	U	250	130	ug/L		09/05/14 10:21	09/09/14 13:22	1
Iron	33	U	100	33	ug/L		09/05/14 10:21	09/09/14 13:22	1
Potassium	170	U	500	170	ug/L		09/05/14 10:21	09/09/14 13:22	1
Magnesium	43	U	250	43	ug/L		09/05/14 10:21	09/09/14 13:22	1
Sodium	250	U	500	250	ug/L		09/05/14 10:21	09/09/14 13:22	1

Lab Sample ID: LCS 680-347551/2-A

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 348089

Prep Batch: 347551

Analyte	MB	MB	Spike	LCS	LCS	Unit	D	%Rec	Limits	Dil Fac
	Result	Qualifier	Added	Result	Qualifier					
Arsenic			100	104		ug/L		104	75 - 125	1
Calcium			5000	5430		ug/L		109	75 - 125	
Iron			5000	5260		ug/L		105	75 - 125	
Potassium			5000	5850		ug/L		117	75 - 125	
Magnesium			5000	5250		ug/L		105	75 - 125	
Sodium			5000	5320		ug/L		106	75 - 125	

Lab Sample ID: 680-104890-C-7-B MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 348089

Prep Batch: 347551

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	Dil Fac
	Result	Qualifier	Added	Result	Qualifier					
Arsenic	1.3	U	100	101		ug/L		101	75 - 125	1
Calcium	100000	J3	5000	108000		ug/L		81	75 - 125	
Iron	48	I	5000	4980		ug/L		99	75 - 125	
Potassium	1200		5000	6680		ug/L		111	75 - 125	
Magnesium	21000		5000	25900		ug/L		99	75 - 125	
Sodium	31000	J3	5000	35800		ug/L		93	75 - 125	

Lab Sample ID: 680-104890-C-7-C MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 348089

Prep Batch: 347551

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD
	Result	Qualifier	Added	Result	Qualifier					
Arsenic	1.3	U	100	96.0		ug/L		96	75 - 125	5
Calcium	100000	J3	5000	105000	J3	ug/L		17	75 - 125	3
Iron	48	I	5000	4700		ug/L		93	75 - 125	6
Potassium	1200		5000	6310		ug/L		103	75 - 125	6

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-104890-C-7-C MSD

Matrix: Water

Analysis Batch: 348089

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total Recoverable

Prep Batch: 347551

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier			%Rec		
Magnesium	21000		5000	24900		ug/L		79	75 - 125	4
Sodium	31000	J3	5000	34400	J3	ug/L		65	75 - 125	4

Lab Sample ID: MB 680-347950/1-B

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 348209

Prep Batch: 347951

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		09/09/14 08:09	09/09/14 15:20	1

Lab Sample ID: LCS 680-347950/2-B

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 348209

Prep Batch: 347951

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	RPD	Limit
	Added	Result	Qualifier			%Rec			
Iron	5000	5210		ug/L		104	75 - 125		

Lab Sample ID: 680-104936-F-3-E MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 348209

Prep Batch: 347951

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec.	Limits	RPD
	Result	Qualifier	Added	Result	Qualifier			%Rec		
Iron	33	U	5000	5480		ug/L		110	75 - 125	

Lab Sample ID: 680-104936-F-3-F MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 348209

Prep Batch: 347951

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec.	Limits	RPD
	Result	Qualifier	Added	Result	Qualifier			%Rec		
Iron	33	U	5000	5610		ug/L		112	75 - 125	2

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-151300/12

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151300

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/04/14 11:30	1

Lab Sample ID: LCS 660-151300/13

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151300

Analyte	Spike	LCS	LCS	Unit	D	%Rec.	Limits	RPD	Limit
	Added	Result	Qualifier			%Rec			
Nitrate Nitrite as N	1.00	1.02		mg/L		102	90 - 110		
Nitrite as N	0.500	0.502		mg/L		100	90 - 110		

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 660-62629-5 MS

Matrix: Water

Analysis Batch: 151300

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10		1.00	1.02		mg/L		102	90 - 110
Nitrite as N	0.10		0.500	0.493	I	mg/L		99	90 - 110

Lab Sample ID: 660-62629-5 MSD

Matrix: Water

Analysis Batch: 151300

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Nitrate Nitrite as N	0.10		1.00	1.01		mg/L		101	90 - 110	1	30
Nitrite as N	0.10		0.500	0.490	I	mg/L		98	90 - 110	1	30

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-347534/1

Matrix: Water

Analysis Batch: 347534

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			09/05/14 09:37	1

Lab Sample ID: LCS 680-347534/2

Matrix: Water

Analysis Batch: 347534

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	9.98	9.95		mg/L		100	75 - 125

Lab Sample ID: LCSD 680-347534/3

Matrix: Water

Analysis Batch: 347534

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Added	Result	Qualifier						
Total Sulfide	9.98	9.95		mg/L		100	75 - 125	0	30

Lab Sample ID: 660-62613-F-2 DU

Matrix: Water

Analysis Batch: 347534

Analyte	Sample	Sample	DU	DU	Unit	D	Prepared	Analyzed	Dil Fac	RPD	Limit
	Result	Qualifier									
Total Sulfide	1.0	U	1.0	U	mg/L				NC	30	

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-347554/3

Matrix: Water

Analysis Batch: 347554

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			09/04/14 23:46	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCS 680-347554/4

Matrix: Water

Analysis Batch: 347554

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
Total Organic Carbon	20.0	20.9		mg/L		105	80 - 120

Lab Sample ID: LCSD 680-347554/5

Matrix: Water

Analysis Batch: 347554

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec.	RPD	RPD Limit
Total Organic Carbon	20.0	20.7		mg/L		103	80 - 120	1	25

Lab Sample ID: 680-104590-H-4 MS

Matrix: Water

Analysis Batch: 347554

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec.
Total Organic Carbon	0.50	U	20.0	20.7		mg/L		104	80 - 120

Lab Sample ID: 680-104590-H-4 MSD

Matrix: Water

Analysis Batch: 347554

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec.	RPD	RPD Limit
Total Organic Carbon	0.50	U	20.0	21.0		mg/L		105	80 - 120	1	25

Lab Sample ID: 660-62629-5 DU

Matrix: Water

Analysis Batch: 347554

Client Sample ID: LZAMW-2
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Total Organic Carbon	2.2		2.15		mg/L		3	25

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-151309/1

Client Sample ID: Method Blank
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151309

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	1.0	U	1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	1.0	mg/L			09/04/14 10:50	1
Bicarbonate ion as HCO3	1.0	U	1.0	1.0	mg/L			09/04/14 10:50	1

Lab Sample ID: LCS 660-151309/3

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151309

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
Alkalinity	118	122		mg/L		103	80 - 120

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 660-62602-C-5 DU

Matrix: Water

Analysis Batch: 151309

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	1.0	U	1.0	U	mg/L		NC	30
Bicarbonate Alkalinity as CaCO ₃	1.0	U	1.0	U	mg/L		NC	30
Bicarbonate ion as HCO ₃	1.0	U	1.0	U	mg/L		NC	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-151341/1

Client Sample ID: Method Blank
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151341

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			09/05/14 13:26	1

Lab Sample ID: LCS 660-151341/2

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151341

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Total Dissolved Solids	10000	9950		mg/L	99	80 - 120	

Lab Sample ID: 660-62629-4 DU

Client Sample ID: UZAMW-2
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151341

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	360		360		mg/L		1	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 347731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Total/NA	Water	300.0	5
660-62629-1	RW-1	Total/NA	Water	300.0	5
660-62629-2	UZAMW-1	Total/NA	Water	300.0	6
660-62629-2	UZAMW-1	Total/NA	Water	300.0	6
660-62629-3	LZAMW-1	Total/NA	Water	300.0	7
660-62629-3	LZAMW-1	Total/NA	Water	300.0	7
660-62629-4	UZAMW-2	Total/NA	Water	300.0	8
660-62629-4	UZAMW-2	Total/NA	Water	300.0	8
660-62629-5	LZAMW-2	Total/NA	Water	300.0	9
660-62629-5	LZAMW-2	Total/NA	Water	300.0	9
680-104683-E-4 MS	Matrix Spike	Total/NA	Water	300.0	10
680-104683-E-4 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	10
LCS 680-347731/6	Lab Control Sample	Total/NA	Water	300.0	11
LCSD 680-347731/7	Lab Control Sample Dup	Total/NA	Water	300.0	11
MB 680-347731/5	Method Blank	Total/NA	Water	300.0	12

Analysis Batch: 348006

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-4	UZAMW-2	Total/NA	Water	300.0	13
660-62629-5	LZAMW-2	Total/NA	Water	300.0	14
680-104683-E-4 MS	Matrix Spike	Total/NA	Water	300.0	14
680-104683-E-4 MSD	Matrix Spike Duplicate	Total/NA	Water	300.0	14
LCS 680-348006/6	Lab Control Sample	Total/NA	Water	300.0	14
LCSD 680-348006/7	Lab Control Sample Dup	Total/NA	Water	300.0	14
MB 680-348006/5	Method Blank	Total/NA	Water	300.0	14

Metals

Prep Batch: 347551

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Total Recoverable	Water	3005A	
660-62629-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62629-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62629-4	UZAMW-2	Total Recoverable	Water	3005A	
660-62629-5	LZAMW-2	Total Recoverable	Water	3005A	
680-104890-C-7-B MS	Matrix Spike	Total Recoverable	Water	3005A	
680-104890-C-7-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
LCS 680-347551/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-347551/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 347602

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Dissolved	Water	FILTRATION	
660-62629-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62629-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62629-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62629-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62629-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62629-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-347602/2-A	Lab Control Sample	Dissolved	Water	FILTRATION	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Filtration Batch: 347602 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-347602/1-A	Method Blank	Dissolved	Water	FILTRATION	

Analysis Batch: 347608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Dissolved	Water	200.7 Rev 4.4	347602
660-62629-1 MS	RW-1	Dissolved	Water	200.7 Rev 4.4	347602
660-62629-1 MSD	RW-1	Dissolved	Water	200.7 Rev 4.4	347602
660-62629-2	UZAMW-1	Dissolved	Water	200.7 Rev 4.4	347602
660-62629-3	LZAMW-1	Dissolved	Water	200.7 Rev 4.4	347602
660-62629-4	UZAMW-2	Dissolved	Water	200.7 Rev 4.4	347602
660-62629-5	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	347602
LCS 680-347602/2-A	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	347602
MB 680-347602/1-A	Method Blank	Dissolved	Water	200.7 Rev 4.4	347602

Filtration Batch: 347950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Dissolved	Water	FILTRATION	
660-62629-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62629-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62629-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62629-5	LZAMW-2	Dissolved	Water	FILTRATION	
680-104936-F-3-E MS	Matrix Spike	Dissolved	Water	FILTRATION	
680-104936-F-3-F MSD	Matrix Spike Duplicate	Dissolved	Water	FILTRATION	
LCS 680-347950/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-347950/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 347951

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Dissolved	Water	3005A	347950
660-62629-2	UZAMW-1	Dissolved	Water	3005A	347950
660-62629-3	LZAMW-1	Dissolved	Water	3005A	347950
660-62629-4	UZAMW-2	Dissolved	Water	3005A	347950
660-62629-5	LZAMW-2	Dissolved	Water	3005A	347950
680-104936-F-3-E MS	Matrix Spike	Dissolved	Water	3005A	347950
680-104936-F-3-F MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	347950
LCS 680-347950/2-B	Lab Control Sample	Dissolved	Water	3005A	347950
MB 680-347950/1-B	Method Blank	Dissolved	Water	3005A	347950

Analysis Batch: 348089

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Total Recoverable	Water	6020A	347551
660-62629-2	UZAMW-1	Total Recoverable	Water	6020A	347551
660-62629-3	LZAMW-1	Total Recoverable	Water	6020A	347551
660-62629-4	UZAMW-2	Total Recoverable	Water	6020A	347551
660-62629-5	LZAMW-2	Total Recoverable	Water	6020A	347551
680-104890-C-7-B MS	Matrix Spike	Total Recoverable	Water	6020A	347551
680-104890-C-7-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	347551
LCS 680-347551/2-A	Lab Control Sample	Total Recoverable	Water	6020A	347551
MB 680-347551/1-A	Method Blank	Total Recoverable	Water	6020A	347551

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Analysis Batch: 348209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Dissolved	Water	6020A	347951
660-62629-2	UZAMW-1	Dissolved	Water	6020A	347951
660-62629-3	LZAMW-1	Dissolved	Water	6020A	347951
660-62629-4	UZAMW-2	Dissolved	Water	6020A	347951
660-62629-5	LZAMW-2	Dissolved	Water	6020A	347951
680-104936-F-3-E MS	Matrix Spike	Dissolved	Water	6020A	347951
680-104936-F-3-F MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	347951
LCS 680-347950/2-B	Lab Control Sample	Dissolved	Water	6020A	347951
MB 680-347950/1-B	Method Blank	Dissolved	Water	6020A	347951

General Chemistry

Analysis Batch: 151300

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Total/NA	Water	353.2	11
660-62629-2	UZAMW-1	Total/NA	Water	353.2	12
660-62629-3	LZAMW-1	Total/NA	Water	353.2	13
660-62629-4	UZAMW-2	Total/NA	Water	353.2	14
660-62629-5	LZAMW-2	Total/NA	Water	353.2	
660-62629-5 MS	LZAMW-2	Total/NA	Water	353.2	
660-62629-5 MSD	LZAMW-2	Total/NA	Water	353.2	
LCS 660-151300/13	Lab Control Sample	Total/NA	Water	353.2	
MB 660-151300/12	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 151309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62602-C-5 DU	Duplicate	Total/NA	Water	SM 2320B	
660-62629-1	RW-1	Total/NA	Water	SM 2320B	
660-62629-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62629-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-62629-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62629-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-151309/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-151309/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 151341

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Total/NA	Water	SM 2540C	
660-62629-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62629-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62629-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62629-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-62629-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-151341/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-151341/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 347534

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62613-F-2 DU	Duplicate	Total/NA	Water	4500 S2 F-2011	
660-62629-1	RW-1	Total/NA	Water	4500 S2 F-2011	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62629-1

General Chemistry (Continued)

Analysis Batch: 347534 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62629-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62629-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62629-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-347534/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-347534/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-347534/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 347554

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62629-1	RW-1	Total/NA	Water	5310 B-2011	
660-62629-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-62629-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-62629-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-62629-5	LZAMW-2	Total/NA	Water	5310 B-2011	
660-62629-5 DU	LZAMW-2	Total/NA	Water	5310 B-2011	
680-104590-H-4 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
680-104590-H-4 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
LCS 680-347554/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-347554/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-347554/3	Method Blank	Total/NA	Water	5310 B-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62629-1

Matrix: Water

Date Collected: 09/03/14 15:45

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	347731	09/07/14 13:59	DAS	TAL SAV
Total/NA	Analysis	300.0		2	347731	09/07/14 14:13	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			347602	09/05/14 10:38	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	347608	09/05/14 12:31	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347950	09/09/14 08:07	BBJ	TAL SAV
Dissolved	Prep	3005A			347951	09/09/14 08:09	BBJ	TAL SAV
Dissolved	Analysis	6020A		1	348209	09/09/14 15:34	BWR	TAL SAV
Total Recoverable	Prep	3005A			347551	09/05/14 10:21	BBJ	TAL SAV
Total Recoverable	Analysis	6020A		1	348089	09/08/14 23:08	BWR	TAL SAV
Total/NA	Analysis	353.2			151300	09/04/14 11:48	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			347534	09/05/14 09:37	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011			347554	09/05/14 00:32	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			151309	09/04/14 10:50	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			151341	09/05/14 13:26	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62629-2

Matrix: Water

Date Collected: 09/03/14 13:10

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		5	347731	09/07/14 14:28	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347731	09/07/14 14:42	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			347602	09/05/14 10:38	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	347608	09/05/14 12:46	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347950	09/09/14 08:07	BBJ	TAL SAV
Dissolved	Prep	3005A			347951	09/09/14 08:09	BBJ	TAL SAV
Dissolved	Analysis	6020A		1	348209	09/09/14 15:42	BWR	TAL SAV
Total Recoverable	Prep	3005A			347551	09/05/14 10:21	BBJ	TAL SAV
Total Recoverable	Analysis	6020A		1	348089	09/08/14 23:16	BWR	TAL SAV
Total/NA	Analysis	353.2			151300	09/04/14 11:49	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			347534	09/05/14 09:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011			347554	09/05/14 00:48	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			151309	09/04/14 10:50	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			151341	09/05/14 13:26	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62629-3

Matrix: Water

Date Collected: 09/03/14 12:40

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	347731	09/07/14 14:57	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347731	09/07/14 15:11	DAS	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62629-3

Date Collected: 09/03/14 12:40

Matrix: Water

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			347602	09/05/14 10:38	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	347608	09/05/14 12:49	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347950	09/09/14 08:07	BJB	TAL SAV
Dissolved	Prep	3005A			347951	09/09/14 08:09	BJB	TAL SAV
Dissolved	Analysis	6020A		1	348209	09/09/14 15:49	BWR	TAL SAV
Total Recoverable	Prep	3005A			347551	09/05/14 10:21	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	348089	09/08/14 23:23	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151300	09/04/14 11:51	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	347534	09/05/14 09:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	347554	09/05/14 01:02	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151309	09/04/14 10:50	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151341	09/05/14 13:26	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62629-4

Date Collected: 09/03/14 14:40

Matrix: Water

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	347731	09/07/14 15:54	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347731	09/07/14 16:09	DAS	TAL SAV
Total/NA	Analysis	300.0		1	348006	09/09/14 11:16	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			347602	09/05/14 10:38	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	347608	09/05/14 12:58	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347950	09/09/14 08:07	BJB	TAL SAV
Dissolved	Prep	3005A			347951	09/09/14 08:09	BJB	TAL SAV
Dissolved	Analysis	6020A		1	348209	09/09/14 15:56	BWR	TAL SAV
Total Recoverable	Prep	3005A			347551	09/05/14 10:21	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	348089	09/08/14 23:45	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151300	09/04/14 11:52	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	347534	09/05/14 09:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	347554	09/05/14 01:16	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151309	09/04/14 10:50	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151341	09/05/14 13:26	TKO	TAL TAM

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62629-5

Date Collected: 09/03/14 14:10

Matrix: Water

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	347731	09/07/14 16:23	DAS	TAL SAV
Total/NA	Analysis	300.0		1	347731	09/07/14 16:37	DAS	TAL SAV
Total/NA	Analysis	300.0		1	348006	09/09/14 11:31	DAS	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62629-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62629-5

Date Collected: 09/03/14 14:10

Matrix: Water

Date Received: 09/03/14 16:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			347602	09/05/14 10:38	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	347608	09/05/14 13:01	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			347950	09/09/14 08:07	BJB	TAL SAV
Dissolved	Prep	3005A			347951	09/09/14 08:09	BJB	TAL SAV
Dissolved	Analysis	6020A		1	348209	09/09/14 16:04	BWR	TAL SAV
Total Recoverable	Prep	3005A			347551	09/05/14 10:21	BJB	TAL SAV
Total Recoverable	Analysis	6020A		1	348089	09/08/14 23:52	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151300	09/04/14 11:53	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	347534	09/05/14 09:47	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	347554	09/05/14 01:31	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151309	09/04/14 10:50	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151341	09/05/14 13:26	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-15
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Guam	State Program	4	803	06-30-15
Hawaii	State Program	9	09-005r	04-16-15
Illinois	NELAP	9	N/A	06-30-15
Indiana	State Program	5	200022	11-30-14
Iowa	State Program	5	N/A	06-30-15
Kentucky (DW)	State Program	7	353	07-01-15
Kentucky (UST)	State Program	4	90084	12-31-14
Louisiana	NELAP	4	18	06-30-15
Louisiana (DW)	NELAP	6	30690	06-30-14 *
Maine	State Program	6	LA140023	12-31-14
Maryland	State Program	1	GA00006	08-16-14 *
Massachusetts	State Program	3	250	12-31-14
Michigan	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	8	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	7	GA769	06-30-15
New Mexico	State Program	2	N/A	06-30-15
New York	NELAP	6	10842	03-31-15
North Carolina (DW)	State Program	2	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-14 *
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62629-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

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TestAmerica Tampa

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62629-1

Login Number: 62629

List Source: TestAmerica Tampa

List Number: 1

Creator: Conner, Keaton

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-62780-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

9/18/2014 4:21:19 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

LINKS

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The
Expert

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www.testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62780-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62780-1	RW-1	Water	09/11/14 14:40	09/11/14 15:55
660-62780-2	UZAMW-1	Water	09/11/14 12:10	09/11/14 15:55
660-62780-3	LZAMW-1	Water	09/11/14 11:40	09/11/14 15:55
660-62780-4	UZAMW-2	Water	09/11/14 13:55	09/11/14 15:55
660-62780-5	LZAMW-2	Water	09/11/14 13:25	09/11/14 15:55

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62780-1

Job ID: 660-62780-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62780-1

Comments

No additional comments.

Receipt

The samples were received on 9/11/2014 3:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0° C.

Metals

Method 200.7: The matrix spike (MS) recovery for batch 349316 was outside control limits for dissolved iron. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits. The sample is qualified with J3.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-348971.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62780-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62780-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	44		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	0.34		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	590		10	5.0	mg/L	20		300.0	Total/NA
SiO ₂ , Silica	23000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	15		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	100000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6400		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	32000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	270000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	9.7		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1400		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62780-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.8		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.31		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	180		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	25000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	6.8		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	85000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	81000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.8		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	590		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62780-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	14		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.24		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62780-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	330		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	19000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	100000		250	130	ug/L	1		6020A	Total Recoverable
Iron	63 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	4900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	23000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	190000		500	250	ug/L	1		6020A	Total Recoverable
Iron	33 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	9.6		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	790		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62780-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.8		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.44		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	30000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	30		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	67000		250	130	ug/L	1		6020A	Total Recoverable
Iron	100		100	33	ug/L	1		6020A	Total Recoverable
Potassium	2900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	15000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	51000		500	250	ug/L	1		6020A	Total Recoverable
Iron	48 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	1.0		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	390		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62780-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	17		0.50	0.25	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62780-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoride	0.24		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	360		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	17000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	94000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	5600		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	23000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	200000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	11		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	820		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62780-1

Matrix: Water

Date Collected: 09/11/14 14:40

Date Received: 09/11/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	44		1.0	0.50	mg/L			09/15/14 23:44	2
Fluoride	0.34		0.20	0.050	mg/L			09/15/14 23:44	2
Chloride	590		10	5.0	mg/L			09/15/14 23:28	20

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	23000		500	50	ug/L			09/18/14 10:48	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	15		2.5	1.3	ug/L		09/15/14 13:12	09/16/14 22:48	1
Calcium	100000		250	130	ug/L		09/15/14 13:12	09/16/14 22:48	1
Iron	33	U	100	33	ug/L		09/15/14 13:12	09/16/14 22:48	1
Potassium	6400		500	170	ug/L		09/15/14 13:12	09/16/14 22:48	1
Magnesium	32000		250	43	ug/L		09/15/14 13:12	09/16/14 22:48	1
Sodium	270000		500	250	ug/L		09/15/14 13:12	09/16/14 22:48	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	J3 U	100	33	ug/L		09/16/14 09:03	09/17/14 02:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/12/14 13:49	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			09/15/14 14:01	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	9.7		1.0	1.0	mg/L			09/15/14 11:44	1
Alkalinity	200		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate ion as HCO ₃ ⁻	250		1.0	1.0	mg/L			09/15/14 08:00	1
Total Dissolved Solids	1400		25	25	mg/L			09/15/14 11:00	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62780-2

Matrix: Water

Date Collected: 09/11/14 12:10

Date Received: 09/11/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.8		0.50	0.25	mg/L			09/16/14 00:15	1
Fluoride	0.31		0.10	0.025	mg/L			09/16/14 00:15	1
Chloride	180		2.0	1.0	mg/L			09/15/14 23:59	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	25000		500	50	ug/L			09/18/14 11:05	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.8		2.5	1.3	ug/L		09/15/14 13:12	09/16/14 22:55	1
Calcium	85000		250	130	ug/L		09/15/14 13:12	09/16/14 22:55	1
Iron	33	U	100	33	ug/L		09/15/14 13:12	09/16/14 22:55	1
Potassium	2700		500	170	ug/L		09/15/14 13:12	09/16/14 22:55	1
Magnesium	16000		250	43	ug/L		09/15/14 13:12	09/16/14 22:55	1
Sodium	81000		500	250	ug/L		09/15/14 13:12	09/16/14 22:55	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/16/14 09:03	09/17/14 02:50	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/12/14 13:53	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			09/15/14 14:15	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.8		1.0	1.0	mg/L			09/15/14 11:44	1
Alkalinity	190		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			09/15/14 08:00	1
Total Dissolved Solids	590		17	17	mg/L			09/15/14 11:00	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62780-3

Matrix: Water

Date Collected: 09/11/14 11:40

Date Received: 09/11/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	14		0.50	0.25	mg/L			09/16/14 00:45	1
Fluoride	0.24		0.10	0.025	mg/L			09/16/14 00:45	1
Chloride	330		5.0	2.5	mg/L			09/16/14 00:30	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	19000		500	50	ug/L			09/18/14 11:08	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/15/14 13:12	09/16/14 23:02	1
Calcium	100000		250	130	ug/L		09/15/14 13:12	09/16/14 23:02	1
Iron	63	I	100	33	ug/L		09/15/14 13:12	09/16/14 23:02	1
Potassium	4900		500	170	ug/L		09/15/14 13:12	09/16/14 23:02	1
Magnesium	23000		250	43	ug/L		09/15/14 13:12	09/16/14 23:02	1
Sodium	190000		500	250	ug/L		09/15/14 13:12	09/16/14 23:02	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	I	100	33	ug/L		09/16/14 09:03	09/17/14 02:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/12/14 13:54	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			09/15/14 14:30	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	9.6		1.0	1.0	mg/L			09/15/14 11:44	1
Alkalinity	180		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			09/15/14 08:00	1
Total Dissolved Solids	790		25	25	mg/L			09/15/14 11:00	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62780-4

Matrix: Water

Date Collected: 09/11/14 13:55

Date Received: 09/11/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.8		0.50	0.25	mg/L			09/16/14 01:47	1
Fluoride	0.44		0.10	0.025	mg/L			09/16/14 01:47	1
Chloride	100		2.0	1.0	mg/L			09/16/14 01:32	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	30000		500	50	ug/L			09/18/14 11:11	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	30		2.5	1.3	ug/L		09/15/14 13:12	09/16/14 23:24	1
Calcium	67000		250	130	ug/L		09/15/14 13:12	09/16/14 23:24	1
Iron	100		100	33	ug/L		09/15/14 13:12	09/16/14 23:24	1
Potassium	2900		500	170	ug/L		09/15/14 13:12	09/16/14 23:24	1
Magnesium	15000		250	43	ug/L		09/15/14 13:12	09/16/14 23:24	1
Sodium	51000		500	250	ug/L		09/15/14 13:12	09/16/14 23:24	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	48	I	100	33	ug/L		09/16/14 09:03	09/17/14 03:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/12/14 13:55	1
Total Organic Carbon	1.6		1.0	0.50	mg/L			09/15/14 14:46	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0		1.0	1.0	mg/L			09/15/14 11:44	1
Alkalinity	170		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			09/15/14 08:00	1
Total Dissolved Solids	390		10	10	mg/L			09/15/14 11:00	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62780-5

Matrix: Water

Date Collected: 09/11/14 13:25

Date Received: 09/11/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	17		0.50	0.25	mg/L			09/16/14 02:49	1
Fluoride	0.24		0.10	0.025	mg/L			09/16/14 02:49	1
Chloride	360		5.0	2.5	mg/L			09/16/14 02:02	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	17000		500	50	ug/L			09/18/14 11:20	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/15/14 13:12	09/16/14 23:32	1
Calcium	94000		250	130	ug/L		09/15/14 13:12	09/16/14 23:32	1
Iron	33	U	100	33	ug/L		09/15/14 13:12	09/16/14 23:32	1
Potassium	5600		500	170	ug/L		09/15/14 13:12	09/16/14 23:32	1
Magnesium	23000		250	43	ug/L		09/15/14 13:12	09/16/14 23:32	1
Sodium	200000		500	250	ug/L		09/15/14 13:12	09/16/14 23:32	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/16/14 09:03	09/17/14 03:26	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/12/14 13:57	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			09/15/14 15:04	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	11		1.0	1.0	mg/L			09/15/14 11:44	1
Alkalinity	190		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			09/15/14 08:00	1
Bicarbonate ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			09/15/14 08:00	1
Total Dissolved Solids	820		25	25	mg/L			09/15/14 11:00	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-349027/32

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349027

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/15/14 21:56	1
Fluoride	0.025	U	0.10	0.025	mg/L			09/15/14 21:56	1
Chloride	0.25	U	0.50	0.25	mg/L			09/15/14 21:56	1

Lab Sample ID: LCS 680-349027/33

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349027

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	10.4		mg/L		104	90 - 110	
Fluoride	2.00	2.14		mg/L		107	90 - 110	
Chloride	10.0	10.1		mg/L		101	90 - 110	

Lab Sample ID: LCSD 680-349027/34

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349027

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Added	Result	Qualifier							
Sulfate	10.0	10.4		mg/L		104	90 - 110		0	30
Fluoride	2.00	2.14		mg/L		107	90 - 110		0	30
Chloride	10.0	10.1		mg/L		101	90 - 110		0	30

Lab Sample ID: 660-62780-5 MS

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349027

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	15		100	120		mg/L		105	80 - 120	
Fluoride	0.41		20.0	21.9		mg/L		107	80 - 120	
Chloride	360		100	454		mg/L		97	80 - 120	

Lab Sample ID: 660-62780-5 MSD

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349027

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	15		100	120		mg/L		105	80 - 120	0	30
Fluoride	0.41		20.0	22.0		mg/L		108	80 - 120	0	30
Chloride	360		100	454		mg/L		97	80 - 120	0	30

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 680-349520/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 349584

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
SiO ₂ , Silica	50	U	500	50	ug/L			09/18/14 10:42	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-349520/2-A

Matrix: Water

Analysis Batch: 349584

Analyte		Spike	LCS	LCS	Unit	D	%Rec	%Rec.
		Added	Result	Qualifier				
SiO ₂ , Silica		10000	9770		ug/L		98	85 - 115

Lab Sample ID: 660-62780-1 MS

Matrix: Water

Analysis Batch: 349584

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
SiO ₂ , Silica	23000		10000	30900		ug/L		78	75 - 125

Lab Sample ID: 660-62780-1 MSD

Matrix: Water

Analysis Batch: 349584

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
SiO ₂ , Silica	23000		10000	30800		ug/L		77	75 - 125	0	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-348990/1-A

Matrix: Water

Analysis Batch: 349316

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		09/15/14 13:12	09/16/14 21:56	1
Calcium	130	U	250	130	ug/L		09/15/14 13:12	09/16/14 21:56	1
Iron	33	U	100	33	ug/L		09/15/14 13:12	09/16/14 21:56	1
Potassium	170	U	500	170	ug/L		09/15/14 13:12	09/16/14 21:56	1
Magnesium	43	U	250	43	ug/L		09/15/14 13:12	09/16/14 21:56	1
Sodium	250	U	500	250	ug/L		09/15/14 13:12	09/16/14 21:56	1

Lab Sample ID: LCS 680-348990/2-A

Matrix: Water

Analysis Batch: 349316

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Arsenic	100	99.6		ug/L		100	75 - 125
Calcium	5000	5090		ug/L		102	75 - 125
Iron	5000	5020		ug/L		100	75 - 125
Potassium	5000	5280		ug/L		106	75 - 125
Magnesium	5000	5090		ug/L		102	75 - 125
Sodium	5000	5010		ug/L		100	75 - 125

Lab Sample ID: 680-105251-A-20-B MS

Matrix: Water

Analysis Batch: 349316

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Arsenic	1.3	J3 U	100	111		ug/L		111	75 - 125
Calcium	1800	J3	5000	7420		ug/L		113	75 - 125

Client Sample ID: Matrix Spike
Prep Type: Total Recoverable
Prep Batch: 348990

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-105251-A-20-B MS

Matrix: Water

Analysis Batch: 349316

Client Sample ID: Matrix Spike

Prep Type: Total Recoverable

Prep Batch: 348990

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier					
Iron	120	J3	5000	5800		ug/L		114	75 - 125	
Potassium	510	J3	5000	6170		ug/L		113	75 - 125	
Magnesium	580	J3	5000	6270		ug/L		114	75 - 125	
Sodium	2600	J3	5000	8090		ug/L		111	75 - 125	

Lab Sample ID: 680-105251-A-20-C MSD

Matrix: Water

Analysis Batch: 349316

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total Recoverable

Prep Batch: 348990

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	1.3	J3 U	100	132	J3	ug/L		132	75 - 125	17	20
Calcium	1800	J3	5000	9130	J3	ug/L		147	75 - 125	21	20
Iron	120	J3	5000	7110	J3	ug/L		140	75 - 125	20	20
Potassium	510	J3	5000	7370	J3	ug/L		137	75 - 125	18	20
Magnesium	580	J3	5000	7770	J3	ug/L		144	75 - 125	21	20
Sodium	2600	J3	5000	9850	J3	ug/L		146	75 - 125	20	20

Lab Sample ID: MB 680-349065/1-B

Matrix: Water

Analysis Batch: 349316

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 349067

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		09/16/14 09:03	09/17/14 01:58	1

Lab Sample ID: LCS 680-349065/2-B

Matrix: Water

Analysis Batch: 349316

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 349067

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	5310		ug/L		106	75 - 125

Lab Sample ID: 660-62780-1 MS

Matrix: Water

Analysis Batch: 349316

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 349067

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	33	J3 U	5000	6320	J3	ug/L		126	75 - 125

Lab Sample ID: 660-62780-1 MSD

Matrix: Water

Analysis Batch: 349316

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 349067

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	33	J3 U	5000	5620		ug/L		112	75 - 125	12	20

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-151521/12

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151521

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/12/14 13:47	1

Lab Sample ID: LCS 660-151521/13

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151521

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
	Added	Result						
Nitrate Nitrite as N		1.00	1.04		mg/L		104	90 - 110
Nitrite as N		0.500	0.520		mg/L		104	90 - 110

Lab Sample ID: 660-62780-1 MS

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151521

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Result	Qualifier				
Nitrate Nitrite as N	0.10		1.00	1.03		mg/L		103	90 - 110
Nitrite as N	0.10		0.500	0.512		mg/L		102	90 - 110

Lab Sample ID: 660-62780-1 MSD

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151521

Analyte	Sample		Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier		Result	Qualifier						
Nitrate Nitrite as N	0.10		1.00	1.03		mg/L		103	90 - 110	0	30
Nitrite as N	0.10		0.500	0.509		mg/L		102	90 - 110	1	30

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-348971/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 348971

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U		1.0	mg/L			09/15/14 11:44	1

Lab Sample ID: LCS 680-348971/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 348971

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
	Added	Result						
Total Sulfide		9.99	10.2		mg/L		102	75 - 125

Lab Sample ID: LCSD 680-348971/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 348971

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result								
Total Sulfide		9.99	10.0		mg/L		100	75 - 125	2	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 4500 S2 F-2011 - Sulfide, Total (Continued)

Lab Sample ID: 660-62780-1 DU

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 348971

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Sulfide	9.7		9.35		mg/L		4	30

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-349165/4

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349165

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			09/15/14 11:33	1

Lab Sample ID: LCS 680-349165/5

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349165

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Organic Carbon	20.0	21.3		mg/L		106	80 - 120		

Lab Sample ID: LCSD 680-349165/6

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349165

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Organic Carbon	20.0	21.0		mg/L		105	80 - 120	1	25

Lab Sample ID: 640-49110-J-1 MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349165

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	3.9		20.0	26.1		mg/L		111	80 - 120

Lab Sample ID: 640-49110-J-1 MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 349165

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	3.9		20.0	25.6		mg/L		109	80 - 120

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-151562/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151562

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity	1.0	U	1.0	mg/L			09/15/14 08:00	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	mg/L			09/15/14 08:00	1
Bicarbonate ion as HCO3	1.0	U	1.0	mg/L			09/15/14 08:00	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 660-151562/3

Matrix: Water

Analysis Batch: 151562

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
Alkalinity	118	129		mg/L	109	80 - 120	

Lab Sample ID: 660-62780-2 DU

Matrix: Water

Analysis Batch: 151562

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	RPD
	Result	Qualifier	Result	Qualifier				
Alkalinity	190		185		mg/L		1	30
Bicarbonate Alkalinity as CaCO ₃	190		185		mg/L		1	30
Bicarbonate ion as HCO ₃	230		226		mg/L		1	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-151555/1

Matrix: Water

Analysis Batch: 151555

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			09/15/14 11:00	1

Lab Sample ID: LCS 660-151555/2

Matrix: Water

Analysis Batch: 151555

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
Total Dissolved Solids	10000	9850		mg/L	99	80 - 120	

Lab Sample ID: 660-62780-4 DU

Matrix: Water

Analysis Batch: 151555

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	RPD
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	390		412		mg/L		6	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 349027

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Total/NA	Water	300.0	
660-62780-1	RW-1	Total/NA	Water	300.0	
660-62780-2	UZAMW-1	Total/NA	Water	300.0	
660-62780-2	UZAMW-1	Total/NA	Water	300.0	
660-62780-3	LZAMW-1	Total/NA	Water	300.0	
660-62780-3	LZAMW-1	Total/NA	Water	300.0	
660-62780-4	UZAMW-2	Total/NA	Water	300.0	
660-62780-4	UZAMW-2	Total/NA	Water	300.0	
660-62780-5	LZAMW-2	Total/NA	Water	300.0	
660-62780-5	LZAMW-2	Total/NA	Water	300.0	
660-62780-5 MS	LZAMW-2	Total/NA	Water	300.0	
660-62780-5 MSD	LZAMW-2	Total/NA	Water	300.0	
LCS 680-349027/33	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-349027/34	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-349027/32	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 348990

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Total Recoverable	Water	3005A	
660-62780-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62780-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62780-4	UZAMW-2	Total Recoverable	Water	3005A	
660-62780-5	LZAMW-2	Total Recoverable	Water	3005A	
680-105251-A-20-B MS	Matrix Spike	Total Recoverable	Water	3005A	
680-105251-A-20-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	3005A	
LCS 680-348990/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-348990/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 349065

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Dissolved	Water	FILTRATION	
660-62780-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62780-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62780-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62780-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62780-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62780-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-349065/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-349065/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 349067

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Dissolved	Water	3005A	349065
660-62780-1 MS	RW-1	Dissolved	Water	3005A	349065
660-62780-1 MSD	RW-1	Dissolved	Water	3005A	349065
660-62780-2	UZAMW-1	Dissolved	Water	3005A	349065
660-62780-3	LZAMW-1	Dissolved	Water	3005A	349065
660-62780-4	UZAMW-2	Dissolved	Water	3005A	349065

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Prep Batch: 349067 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-5	LZAMW-2	Dissolved	Water	3005A	349065
LCS 680-349065/2-B	Lab Control Sample	Dissolved	Water	3005A	349065
MB 680-349065/1-B	Method Blank	Dissolved	Water	3005A	349065

Analysis Batch: 349316

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Dissolved	Water	6020A	349067
660-62780-1	RW-1	Total Recoverable	Water	6020A	348990
660-62780-1 MS	RW-1	Dissolved	Water	6020A	349067
660-62780-1 MSD	RW-1	Dissolved	Water	6020A	349067
660-62780-2	UZAMW-1	Dissolved	Water	6020A	349067
660-62780-2	UZAMW-1	Total Recoverable	Water	6020A	348990
660-62780-3	LZAMW-1	Dissolved	Water	6020A	349067
660-62780-3	LZAMW-1	Total Recoverable	Water	6020A	348990
660-62780-4	UZAMW-2	Dissolved	Water	6020A	349067
660-62780-4	UZAMW-2	Total Recoverable	Water	6020A	348990
660-62780-5	LZAMW-2	Dissolved	Water	6020A	349067
660-62780-5	LZAMW-2	Total Recoverable	Water	6020A	348990
680-105251-A-20-B MS	Matrix Spike	Total Recoverable	Water	6020A	348990
680-105251-A-20-C MSD	Matrix Spike Duplicate	Total Recoverable	Water	6020A	348990
LCS 680-348990/2-A	Lab Control Sample	Total Recoverable	Water	6020A	348990
LCS 680-349065/2-B	Lab Control Sample	Dissolved	Water	6020A	349067
MB 680-348990/1-A	Method Blank	Total Recoverable	Water	6020A	348990
MB 680-349065/1-B	Method Blank	Dissolved	Water	6020A	349067

Filtration Batch: 349520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Dissolved	Water	FILTRATION	
660-62780-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62780-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62780-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62780-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62780-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62780-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-349520/2-A	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-349520/1-A	Method Blank	Dissolved	Water	FILTRATION	

Analysis Batch: 349584

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Dissolved	Water	200.7 Rev 4.4	349520
660-62780-1 MS	RW-1	Dissolved	Water	200.7 Rev 4.4	349520
660-62780-1 MSD	RW-1	Dissolved	Water	200.7 Rev 4.4	349520
660-62780-2	UZAMW-1	Dissolved	Water	200.7 Rev 4.4	349520
660-62780-3	LZAMW-1	Dissolved	Water	200.7 Rev 4.4	349520
660-62780-4	UZAMW-2	Dissolved	Water	200.7 Rev 4.4	349520
660-62780-5	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	349520
LCS 680-349520/2-A	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	349520
MB 680-349520/1-A	Method Blank	Dissolved	Water	200.7 Rev 4.4	349520

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry

Analysis Batch: 151521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Total/NA	Water	353.2	
660-62780-1 MS	RW-1	Total/NA	Water	353.2	
660-62780-1 MSD	RW-1	Total/NA	Water	353.2	
660-62780-2	UZAMW-1	Total/NA	Water	353.2	
660-62780-3	LZAMW-1	Total/NA	Water	353.2	
660-62780-4	UZAMW-2	Total/NA	Water	353.2	
660-62780-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-151521/13	Lab Control Sample	Total/NA	Water	353.2	
MB 660-151521/12	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 151555

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Total/NA	Water	SM 2540C	
660-62780-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62780-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62780-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62780-4 DU	UZAMW-2	Total/NA	Water	SM 2540C	
660-62780-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-151555/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-151555/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 151562

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Total/NA	Water	SM 2320B	
660-62780-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62780-2 DU	UZAMW-1	Total/NA	Water	SM 2320B	
660-62780-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-62780-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62780-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-151562/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-151562/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 348971

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62780-1 DU	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62780-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62780-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62780-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62780-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-348971/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-348971/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-348971/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 349165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-49110-J-1 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-49110-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-62780-1	RW-1	Total/NA	Water	5310 B-2011	
660-62780-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-62780-3	LZAMW-1	Total/NA	Water	5310 B-2011	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62780-1

General Chemistry (Continued)

Analysis Batch: 349165 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62780-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-62780-5	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-349165/5	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-349165/6	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-349165/4	Method Blank	Total/NA	Water	5310 B-2011	

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Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62780-1

Matrix: Water

Date Collected: 09/11/14 14:40

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	349027	09/15/14 23:28	DAS	TAL SAV
Total/NA	Analysis	300.0		2	349027	09/15/14 23:44	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			349520	09/18/14 09:54	SP	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	349584	09/18/14 10:48	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			349065	09/16/14 09:01	BJB	TAL SAV
Dissolved	Prep	3005A			349067	09/16/14 09:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	349316	09/17/14 02:13	BWR	TAL SAV
Total Recoverable	Prep	3005A			348990	09/15/14 13:12	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	349316	09/16/14 22:48	BWR	TAL SAV
Total/NA	Analysis	353.2			151521	09/12/14 13:49	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			348971	09/15/14 11:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011			349165	09/15/14 14:01	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			151562	09/15/14 08:00	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			151555	09/15/14 11:00	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62780-2

Matrix: Water

Date Collected: 09/11/14 12:10

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	349027	09/15/14 23:59	DAS	TAL SAV
Total/NA	Analysis	300.0		1	349027	09/16/14 00:15	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			349520	09/18/14 09:54	SP	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	349584	09/18/14 11:05	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			349065	09/16/14 09:01	BJB	TAL SAV
Dissolved	Prep	3005A			349067	09/16/14 09:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	349316	09/17/14 02:50	BWR	TAL SAV
Total Recoverable	Prep	3005A			348990	09/15/14 13:12	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	349316	09/16/14 22:55	BWR	TAL SAV
Total/NA	Analysis	353.2			151521	09/12/14 13:53	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			348971	09/15/14 11:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011			349165	09/15/14 14:15	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			151562	09/15/14 08:00	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			151555	09/15/14 11:00	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62780-3

Matrix: Water

Date Collected: 09/11/14 11:40

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	349027	09/16/14 00:30	DAS	TAL SAV
Total/NA	Analysis	300.0		1	349027	09/16/14 00:45	DAS	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62780-3

Date Collected: 09/11/14 11:40

Matrix: Water

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			349520	09/18/14 09:54	SP	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	349584	09/18/14 11:08	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			349065	09/16/14 09:01	BJB	TAL SAV
Dissolved	Prep	3005A			349067	09/16/14 09:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	349316	09/17/14 02:57	BWR	TAL SAV
Total Recoverable	Prep	3005A			348990	09/15/14 13:12	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	349316	09/16/14 23:02	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151521	09/12/14 13:54	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	348971	09/15/14 11:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	349165	09/15/14 14:30	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151562	09/15/14 08:00	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151555	09/15/14 11:00	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62780-4

Date Collected: 09/11/14 13:55

Matrix: Water

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	349027	09/16/14 01:32	DAS	TAL SAV
Total/NA	Analysis	300.0		1	349027	09/16/14 01:47	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			349520	09/18/14 09:54	SP	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	349584	09/18/14 11:11	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			349065	09/16/14 09:01	BJB	TAL SAV
Dissolved	Prep	3005A			349067	09/16/14 09:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	349316	09/17/14 03:04	BWR	TAL SAV
Total Recoverable	Prep	3005A			348990	09/15/14 13:12	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	349316	09/16/14 23:24	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151521	09/12/14 13:55	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	348971	09/15/14 11:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	349165	09/15/14 14:46	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151562	09/15/14 08:00	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151555	09/15/14 11:00	TKO	TAL TAM

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62780-5

Date Collected: 09/11/14 13:25

Matrix: Water

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	349027	09/16/14 02:02	DAS	TAL SAV
Total/NA	Analysis	300.0		1	349027	09/16/14 02:49	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			349520	09/18/14 09:54	SP	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	349584	09/18/14 11:20	BCB	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62780-1

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62780-5

Matrix: Water

Date Collected: 09/11/14 13:25

Date Received: 09/11/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			349065	09/16/14 09:01	BJB	TAL SAV
Dissolved	Prep	3005A			349067	09/16/14 09:03	BJB	TAL SAV
Dissolved	Analysis	6020A		1	349316	09/17/14 03:26	BWR	TAL SAV
Total Recoverable	Prep	3005A			348990	09/15/14 13:12	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	349316	09/16/14 23:32	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151521	09/12/14 13:57	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	348971	09/15/14 11:44	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	349165	09/15/14 15:04	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151562	09/15/14 08:00	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151555	09/15/14 11:00	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
A2LA	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
Alabama	ISO/IEC 17025		399.01	02-28-15
Arkansas DEQ	State Program	4	41450	06-30-15
California	State Program	6	88-0692	01-31-15
Colorado	NELAP	9	3217CA	07-31-14 *
Connecticut	State Program	8	N/A	12-31-14
Florida	State Program	1	PH-0161	03-31-15
GA Dept. of Agriculture	NELAP	4	E87052	06-30-15
Georgia	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Guam	State Program	4	803	06-30-15
Hawaii	State Program	9	09-005r	04-16-15
Illinois	NELAP	9	N/A	06-30-15
Indiana	State Program	5	200022	11-30-14
Iowa	State Program	5	N/A	06-30-15
Kentucky (DW)	State Program	7	353	07-01-15
Kentucky (UST)	State Program	4	90084	12-31-14
Louisiana	NELAP	4	18	06-30-15
Louisiana (DW)	NELAP	6	30690	06-30-14 *
Maine	State Program	6	LA140023	12-31-14
Maryland	State Program	1	GA00006	08-16-14 *
Massachusetts	State Program	3	250	12-31-14
Michigan	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	8	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	7	GA769	06-30-15
New Mexico	State Program	2	N/A	06-30-15
New York	NELAP	6	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-15
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62780-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

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TestAmerica Tampa

Chain of Custody Record

TestAmerica Tampa
6712 Benjamin Road Suite 100
Tampa, FL 33634
Phone (813) 885-7427 Fax (813)

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62780-1

Login Number: 62780

List Source: TestAmerica Tampa

List Number: 1

Creator: Southers, Kristin B

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62780-1

Login Number: 62780

List Source: TestAmerica Savannah

List Number: 2

List Creation: 09/12/14 08:36 AM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

[TestAmerica Job ID: 660-62916-1](#)

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer

Authorized for release by:

9/26/2014 11:41:48 AM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

LINKS

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62916-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-62916-1	RW-1	Water	09/18/14 10:30	09/18/14 17:35
660-62916-2	UZAMW-1	Water	09/18/14 11:40	09/18/14 17:35
660-62916-3	LZAMW-1	Water	09/18/14 13:05	09/18/14 17:35
660-62916-4	UZAMW-2	Water	09/18/14 14:15	09/18/14 17:35
660-62916-5	LZAMW-2	Water	09/18/14 14:55	09/18/14 17:35

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62916-1

Job ID: 660-62916-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-62916-1

Comments

No additional comments.

Receipt

The samples were received on 9/18/2014 5:35 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.4° C.

Metals

Method FILTRATION: The following samples requested dissolved metals and were not filtered in the field: (660-62916-5 MS), (660-62916-5 MSD), LZAMW-1 (660-62916-3), LZAMW-2 (660-62916-5), RW-1 (660-62916-1), UZAMW-1 (660-62916-2), UZAMW-2 (660-62916-4). These samples were filtered and preserved upon receipt to the laboratory.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate(MS/MSD) associated with batch 680-350251.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62916-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62916-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	42		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	0.30		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	550		10	5.0	mg/L	20		300.0	Total/NA
SiO ₂ , Silica	26000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	16		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	140000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	7600		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	42000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	340000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.4		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1400		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62916-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	5.0		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.29		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	180		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	28000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	6.6		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	88000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	80000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.1		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	560		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62916-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	13		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.21		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-62916-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	330		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	21000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	100000		250	130	ug/L	1		6020A	Total Recoverable
Iron	150		100	33	ug/L	1		6020A	Total Recoverable
Potassium	4900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	22000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	190000		500	250	ug/L	1		6020A	Total Recoverable
Iron	48 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	810		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62916-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.4		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.39		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	34000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	32		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	73000		250	130	ug/L	1		6020A	Total Recoverable
Iron	120		100	33	ug/L	1		6020A	Total Recoverable
Potassium	2900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	15000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	54000		500	250	ug/L	1		6020A	Total Recoverable
Iron	52 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	380		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62916-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	16		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.20		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-62916-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	340		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	19000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	110000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	5900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	26000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	220000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.2		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.7		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	860		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62916-1

Matrix: Water

Date Collected: 09/18/14 10:30

Date Received: 09/18/14 17:35

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	42		1.0	0.50	mg/L			09/24/14 00:45	2
Fluoride	0.30		0.20	0.050	mg/L			09/24/14 00:45	2
Chloride	550		10	5.0	mg/L			09/23/14 23:58	20

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	26000		500	50	ug/L			09/25/14 08:28	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	16		2.5	1.3	ug/L		09/22/14 11:08	09/23/14 00:48	1
Calcium	140000		250	130	ug/L		09/22/14 11:08	09/23/14 00:48	1
Iron	33	U	100	33	ug/L		09/23/14 13:27	09/24/14 23:13	1
Potassium	7600		500	170	ug/L		09/22/14 11:08	09/23/14 00:48	1
Magnesium	42000		250	43	ug/L		09/22/14 11:08	09/23/14 00:48	1
Sodium	340000		500	250	ug/L		09/22/14 11:08	09/23/14 00:48	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/23/14 10:34	09/23/14 17:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/19/14 15:23	1
Total Organic Carbon	2.4		1.0	0.50	mg/L			09/23/14 00:17	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.5		1.0	1.0	mg/L			09/23/14 12:51	1
Alkalinity	210		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate Alkalinity as CaCO ₃	210		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L			09/19/14 11:10	1
Total Dissolved Solids	1400		25	25	mg/L			09/22/14 11:21	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62916-2

Matrix: Water

Date Collected: 09/18/14 11:40

Date Received: 09/18/14 17:35

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.0		0.50	0.25	mg/L			09/24/14 01:46	1
Fluoride	0.29		0.10	0.025	mg/L			09/24/14 01:46	1
Chloride	180		2.0	1.0	mg/L			09/24/14 01:31	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	28000		500	50	ug/L			09/25/14 08:43	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.6		2.5	1.3	ug/L			09/22/14 11:08	1
Calcium	88000		250	130	ug/L			09/23/14 00:53	1
Iron	33	U	100	33	ug/L			09/23/14 13:27	1
Potassium	2700		500	170	ug/L			09/22/14 11:08	1
Magnesium	16000		250	43	ug/L			09/22/14 11:08	1
Sodium	80000		500	250	ug/L			09/22/14 11:08	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			09/23/14 10:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/19/14 15:26	1
Total Organic Carbon	2.1		1.0	0.50	mg/L			09/23/14 00:33	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.5		1.0	1.0	mg/L			09/23/14 12:51	1
Alkalinity	190		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			09/19/14 11:10	1
Total Dissolved Solids	560		17	17	mg/L			09/22/14 11:21	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62916-3

Matrix: Water

Date Collected: 09/18/14 13:05

Date Received: 09/18/14 17:35

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	13		0.50	0.25	mg/L			09/24/14 02:17	1
Fluoride	0.21		0.10	0.025	mg/L			09/24/14 02:17	1
Chloride	330		5.0	2.5	mg/L			09/24/14 02:02	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	21000		500	50	ug/L			09/25/14 08:46	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/22/14 11:08	09/23/14 00:59	1
Calcium	100000		250	130	ug/L		09/22/14 11:08	09/23/14 00:59	1
Iron	150		100	33	ug/L		09/23/14 13:27	09/24/14 23:24	1
Potassium	4900		500	170	ug/L		09/22/14 11:08	09/23/14 00:59	1
Magnesium	22000		250	43	ug/L		09/22/14 11:08	09/23/14 00:59	1
Sodium	190000		500	250	ug/L		09/22/14 11:08	09/23/14 00:59	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	48	I	100	33	ug/L		09/23/14 10:34	09/23/14 18:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/19/14 15:27	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			09/23/14 00:50	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.5		1.0	1.0	mg/L			09/23/14 12:51	1
Alkalinity	180		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			09/19/14 11:10	1
Total Dissolved Solids	810		25	25	mg/L			09/22/14 11:21	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62916-4

Matrix: Water

Date Collected: 09/18/14 14:15

Date Received: 09/18/14 17:35

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.4		0.50	0.25	mg/L			09/24/14 02:48	1
Fluoride	0.39		0.10	0.025	mg/L			09/24/14 02:48	1
Chloride	100		2.0	1.0	mg/L			09/24/14 02:32	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	34000		500	50	ug/L			09/25/14 08:49	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	32		2.5	1.3	ug/L			09/22/14 11:08	1
Calcium	73000		250	130	ug/L			09/23/14 01:04	1
Iron	120		100	33	ug/L			09/24/14 23:29	1
Potassium	2900		500	170	ug/L			09/23/14 01:04	1
Magnesium	15000		250	43	ug/L			09/23/14 01:04	1
Sodium	54000		500	250	ug/L			09/23/14 01:04	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	52	I	100	33	ug/L			09/23/14 10:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/19/14 15:31	1
Total Organic Carbon	1.6		1.0	0.50	mg/L			09/23/14 01:10	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			09/23/14 12:51	1
Alkalinity	170		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L			09/19/14 11:10	1
Total Dissolved Solids	380		10	10	mg/L			09/22/14 11:21	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62916-5

Matrix: Water

Date Collected: 09/18/14 14:55

Date Received: 09/18/14 17:35

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	16		0.50	0.25	mg/L			09/24/14 03:49	1
Fluoride	0.20		0.10	0.025	mg/L			09/24/14 03:49	1
Chloride	340		5.0	2.5	mg/L			09/24/14 03:03	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	19000		500	50	ug/L			09/25/14 08:58	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/22/14 11:08	09/23/14 01:09	1
Calcium	110000		250	130	ug/L		09/22/14 11:08	09/23/14 01:09	1
Iron	33	U	100	33	ug/L		09/23/14 13:27	09/24/14 23:34	1
Potassium	5900		500	170	ug/L		09/22/14 11:08	09/23/14 01:09	1
Magnesium	26000		250	43	ug/L		09/22/14 11:08	09/23/14 01:09	1
Sodium	220000		500	250	ug/L		09/22/14 11:08	09/23/14 01:09	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/23/14 10:34	09/23/14 18:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/19/14 15:32	1
Total Organic Carbon	2.2		1.0	0.50	mg/L			09/23/14 01:55	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.7		1.0	1.0	mg/L			09/23/14 12:51	1
Alkalinity	190		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate ion as HCO ₃ ⁻	230		1.0	1.0	mg/L			09/19/14 11:10	1
Total Dissolved Solids	860		25	25	mg/L			09/22/14 11:21	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-350332/32

Matrix: Water

Analysis Batch: 350332

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/23/14 21:55	1
Fluoride	0.025	U	0.10	0.025	mg/L			09/23/14 21:55	1
Chloride	0.25	U	0.50	0.25	mg/L			09/23/14 21:55	1

Lab Sample ID: LCS 680-350332/33

Matrix: Water

Analysis Batch: 350332

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	9.89		mg/L		99	90 - 110	
Fluoride	2.00	1.99		mg/L		99	90 - 110	
Chloride	10.0	9.97		mg/L		100	90 - 110	

Lab Sample ID: LCSD 680-350332/34

Matrix: Water

Analysis Batch: 350332

Analyte	Spike Added	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
		Result	Qualifier							
Sulfate	10.0	9.90		mg/L		99	90 - 110		0	30
Fluoride	2.00	2.00		mg/L		100	90 - 110		0	30
Chloride	10.0	9.94		mg/L		99	90 - 110		0	30

Lab Sample ID: 660-62916-1 MS

Matrix: Water

Analysis Batch: 350332

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	40		200	248		mg/L		104	80 - 120		
Fluoride	0.58		40.0	41.8		mg/L		103	80 - 120		
Chloride	550		200	764		mg/L		107	80 - 120		

Lab Sample ID: 660-62916-1 MSD

Matrix: Water

Analysis Batch: 350332

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	40		200	245		mg/L		102	80 - 120	1	30
Fluoride	0.58		40.0	41.4		mg/L		102	80 - 120	1	30
Chloride	550		200	760		mg/L		104	80 - 120	1	30

Lab Sample ID: 660-62916-5 MS

Matrix: Water

Analysis Batch: 350332

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	14		100	117		mg/L		104	80 - 120		
Fluoride	0.33		20.0	21.0		mg/L		103	80 - 120		
Chloride	340		100	441		mg/L		102	80 - 120		

Client Sample ID: LZAMW-2

Prep Type: Total/NA

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 660-62916-5 MSD

Matrix: Water

Analysis Batch: 350332

Client Sample ID: LZAMW-2

Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	14		100	118		mg/L		105	80 - 120	1	30
Fluoride	0.33		20.0	21.1		mg/L		104	80 - 120	1	30
Chloride	340		100	448		mg/L		109	80 - 120	2	30

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 680-350562/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 350725

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
SiO ₂ , Silica	50	U	500	50	ug/L			09/25/14 08:22	1

Lab Sample ID: LCS 680-350562/2-A

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 350725

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits	Dil Fac
	Added	Result	Qualifier					
SiO ₂ , Silica	10000	10800		ug/L		108	85 - 115	

Lab Sample ID: 660-62916-1 MS

Client Sample ID: RW-1

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 350725

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	Dil Fac
	Result	Qualifier	Added	Result	Qualifier					
SiO ₂ , Silica	26000		10000	35100		ug/L		88	75 - 125	

Lab Sample ID: 660-62916-1 MSD

Client Sample ID: RW-1

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 350725

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
SiO ₂ , Silica	26000		10000	35000		ug/L		86	75 - 125	0	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-350028/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total Recoverable

Analysis Batch: 350430

Prep Batch: 350028

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		09/22/14 11:08	09/22/14 23:28	1
Calcium	130	U	250	130	ug/L		09/22/14 11:08	09/22/14 23:28	1
Potassium	170	U	500	170	ug/L		09/22/14 11:08	09/22/14 23:28	1
Magnesium	43	U	250	43	ug/L		09/22/14 11:08	09/22/14 23:28	1
Sodium	250	U	500	250	ug/L		09/22/14 11:08	09/22/14 23:28	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-350028/2-A

Matrix: Water

Analysis Batch: 350430

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 350028

Analyte	Spike	LCS	LCS	%Rec.		
	Added	Result	Qualifier	Unit	D	Limits
Arsenic	100	106		ug/L	106	75 - 125
Calcium	5000	5510		ug/L	110	75 - 125
Potassium	5000	5180		ug/L	104	75 - 125
Magnesium	5000	5290		ug/L	106	75 - 125
Sodium	5000	5350		ug/L	107	75 - 125

Lab Sample ID: MB 680-350264/1-A

Matrix: Water

Analysis Batch: 350644

Client Sample ID: Method Blank

Prep Type: Total Recoverable

Prep Batch: 350264

Analyte	MB	MB	%Rec.						
	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/23/14 13:27	09/24/14 21:54	1

Lab Sample ID: LCS 680-350264/2-A

Matrix: Water

Analysis Batch: 350644

Client Sample ID: Lab Control Sample

Prep Type: Total Recoverable

Prep Batch: 350264

Analyte	Spike	LCS	LCS	%Rec.		
	Added	Result	Qualifier	Unit	D	Limits
Iron	5000	5930		ug/L	119	75 - 125

Lab Sample ID: 460-82563-K-2-B MS

Matrix: Water

Analysis Batch: 350430

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 350028

Analyte	Sample	Sample	Spike	MS	MS	%Rec.		
	Result	Qualifier	Added	Result	Qualifier	Unit	D	Limits
Arsenic	2.4	I	100	112		ug/L	109	75 - 125
Calcium	110000	J3	5000	126000	J3	ug/L	382	75 - 125
Potassium	3100		5000	8550		ug/L	109	75 - 125
Magnesium	40000	J3	5000	50600	J3	ug/L	204	75 - 125
Sodium	40000	J3	5000	48900	J3	ug/L	186	75 - 125

Lab Sample ID: 460-82563-K-2-C MSD

Matrix: Water

Analysis Batch: 350430

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 350028

Analyte	Sample	Sample	Spike	MSD	MSD	%Rec.		
	Result	Qualifier	Added	Result	Qualifier	Unit	D	RPD
Arsenic	2.4	I	100	109		ug/L	107	75 - 125
Calcium	110000	J3	5000	125000	J3	ug/L	368	75 - 125
Potassium	3100		5000	8410		ug/L	106	75 - 125
Magnesium	40000	J3	5000	50300	J3	ug/L	198	75 - 125
Sodium	40000	J3	5000	48800	J3	ug/L	184	75 - 125

Lab Sample ID: MB 680-350208/1-B

Matrix: Water

Analysis Batch: 350489

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 350209

Analyte	MB	MB	%Rec.						
	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		09/23/14 10:34	09/23/14 17:02	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 680-350208/2-B

Matrix: Water

Analysis Batch: 350489

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 350209

Analyte	Sample Result	Sample Qualifier	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron			5000	5410		ug/L		108	75 - 125

Lab Sample ID: 660-62916-1 MS

Matrix: Water

Analysis Batch: 350489

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 350209

Analyte	Sample Result	Sample Qualifier	Spike	MS	MS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron	33	U	5000	5210		ug/L		104	75 - 125

Lab Sample ID: 660-62916-1 MSD

Matrix: Water

Analysis Batch: 350489

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 350209

Analyte	Sample Result	Sample Qualifier	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron	33	U	5000	5340		ug/L		107	75 - 125

Lab Sample ID: 460-82563-K-2-E MS

Matrix: Water

Analysis Batch: 350644

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 350264

Analyte	Sample Result	Sample Qualifier	Spike	MS	MS	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron	2700	U	5000	8590		ug/L		118	75 - 125

Lab Sample ID: 460-82563-K-2-F MSD

Matrix: Water

Analysis Batch: 350644

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 350264

Analyte	Sample Result	Sample Qualifier	Spike	MSD	MSD	Unit	D	%Rec	%Rec.
			Added	Result	Qualifier				
Iron	2700	U	5000	8080		ug/L		108	75 - 125

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-151708/13

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151708

Analyte	MB Result	MB Qualifier	Spike	LCS	LCS	Unit	D	Prepared	Analyzed	Dil Fac
			Added	Result	Qualifier					
Nitrate as N	0.10	U		0.50		mg/L			09/19/14 15:19	1

Lab Sample ID: LCS 660-151708/15

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151708

Analyte	Spike	Spike	LCS	LCS	Unit	D	%Rec	Limits
		Added	Result	Qualifier				
Nitrate Nitrite as N	1.00		1.02		mg/L		102	90 - 110
Nitrite as N	0.500		0.508		mg/L		102	90 - 110

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite (Continued)

Lab Sample ID: 660-62916-1 MS

Matrix: Water

Analysis Batch: 151708

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
Nitrate Nitrite as N	0.10		1.00	1.03		mg/L		103	90 - 110
Nitrite as N	0.10		0.500	0.497	I	mg/L		99	90 - 110

Lab Sample ID: 660-62916-1 MSD

Matrix: Water

Analysis Batch: 151708

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Nitrate Nitrite as N	0.10		1.00	1.03		mg/L		103	90 - 110	0	30
Nitrite as N	0.10		0.500	0.501		mg/L		100	90 - 110	1	30

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-350251/1

Matrix: Water

Analysis Batch: 350251

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			09/23/14 12:51	1

Lab Sample ID: LCS 680-350251/2

Matrix: Water

Analysis Batch: 350251

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Sulfide	10.0	10.2		mg/L		102	75 - 125

Lab Sample ID: LCSD 680-350251/3

Matrix: Water

Analysis Batch: 350251

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD	Limit
	Added	Result	Qualifier						
Total Sulfide	10.0	9.85		mg/L		99	75 - 125	3	30

Lab Sample ID: 660-62916-1 DU

Matrix: Water

Analysis Batch: 350251

Analyte	Sample	Sample	DU	DU	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier	Result	Qualifier					
Total Sulfide	5.5		5.74		mg/L				4

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-350183/3

Matrix: Water

Analysis Batch: 350183

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			09/22/14 22:49	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 5310 B-2011 - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCS 680-350183/4

Matrix: Water

Analysis Batch: 350183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike	LCS	LCS	Unit	D	%Rec	%Rec.
	Added	Result	Qualifier				
Total Organic Carbon	20.0	21.3		mg/L		107	80 - 120

Lab Sample ID: LCSD 680-350183/5

Matrix: Water

Analysis Batch: 350183

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	%Rec.	RPD
	Added	Result	Qualifier					
Total Organic Carbon	20.0	21.2		mg/L		106	80 - 120	1

Lab Sample ID: 640-49179-Y-1 MS

Matrix: Water

Analysis Batch: 350183

Client Sample ID: Matrix Spike
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec
	Result	Qualifier	Added	Result	Qualifier			
Total Organic Carbon	0.50	U	20.0	21.8		mg/L		109

Lab Sample ID: 640-49179-Y-1 MSD

Matrix: Water

Analysis Batch: 350183

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec
	Result	Qualifier	Added	Result	Qualifier			
Total Organic Carbon	0.50	U	20.0	21.5		mg/L		107

Lab Sample ID: 680-105448-I-2 DU

Matrix: Water

Analysis Batch: 350183

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample	Sample	Spike	DU	DU	Unit	D	RPD
	Result	Qualifier	Added	Result	Qualifier			
Total Organic Carbon	5.4	U	20.0	5.19		mg/L		4

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-151703/1

Client Sample ID: Method Blank
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151703

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Alkalinity	1.0	U	1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	1.0	mg/L			09/19/14 11:10	1
Bicarbonate ion as HCO3	1.0	U	1.0	1.0	mg/L			09/19/14 11:10	1

Lab Sample ID: LCS 660-151703/3

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Matrix: Water

Analysis Batch: 151703

Analyte	Spike	LCS	LCS	Unit	D	%Rec
	Added	Result	Qualifier			
Alkalinity	118	120		mg/L	102	80 - 120

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 660-62916-3 DU

Matrix: Water

Analysis Batch: 151703

Client Sample ID: LZAMW-1

Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	180		181		mg/L		0.2	30
Bicarbonate Alkalinity as CaCO ₃	180		181		mg/L		0.2	30
Bicarbonate ion as HCO ₃	220		220		mg/L		0.2	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-151731/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151731

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			09/22/14 11:21	1

Lab Sample ID: LCS 660-151731/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151731

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Total Dissolved Solids	10000	9890		mg/L	99	80 - 120	

Lab Sample ID: 660-62897-B-5 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151731

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	180		188		mg/L		3	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 350332

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Total/NA	Water	300.0	
660-62916-1	RW-1	Total/NA	Water	300.0	
660-62916-1 MS	RW-1	Total/NA	Water	300.0	
660-62916-1 MSD	RW-1	Total/NA	Water	300.0	
660-62916-2	UZAMW-1	Total/NA	Water	300.0	
660-62916-2	UZAMW-1	Total/NA	Water	300.0	
660-62916-3	LZAMW-1	Total/NA	Water	300.0	
660-62916-3	LZAMW-1	Total/NA	Water	300.0	
660-62916-4	UZAMW-2	Total/NA	Water	300.0	
660-62916-4	UZAMW-2	Total/NA	Water	300.0	
660-62916-5	LZAMW-2	Total/NA	Water	300.0	
660-62916-5	LZAMW-2	Total/NA	Water	300.0	
660-62916-5 MS	LZAMW-2	Total/NA	Water	300.0	
660-62916-5 MSD	LZAMW-2	Total/NA	Water	300.0	
LCS 680-350332/33	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-350332/34	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-350332/32	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 350028

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-82563-K-2-B MS	Matrix Spike	Dissolved	Water	3005A	
460-82563-K-2-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
660-62916-1	RW-1	Total Recoverable	Water	3005A	
660-62916-2	UZAMW-1	Total Recoverable	Water	3005A	
660-62916-3	LZAMW-1	Total Recoverable	Water	3005A	
660-62916-4	UZAMW-2	Total Recoverable	Water	3005A	
660-62916-5	LZAMW-2	Total Recoverable	Water	3005A	
LCS 680-350028/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-350028/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 350208

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Dissolved	Water	FILTRATION	
660-62916-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62916-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62916-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62916-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62916-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62916-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-350208/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-350208/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 350209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Dissolved	Water	3005A	350208
660-62916-1 MS	RW-1	Dissolved	Water	3005A	350208
660-62916-1 MSD	RW-1	Dissolved	Water	3005A	350208
660-62916-2	UZAMW-1	Dissolved	Water	3005A	350208

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Prep Batch: 350209 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-3	LZAMW-1	Dissolved	Water	3005A	350208
660-62916-4	UZAMW-2	Dissolved	Water	3005A	350208
660-62916-5	LZAMW-2	Dissolved	Water	3005A	350208
LCS 680-350208/2-B	Lab Control Sample	Dissolved	Water	3005A	350208
MB 680-350208/1-B	Method Blank	Dissolved	Water	3005A	350208

Prep Batch: 350264

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-82563-K-2-E MS	Matrix Spike	Dissolved	Water	3005A	350264
460-82563-K-2-F MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	350264
660-62916-1	RW-1	Total Recoverable	Water	3005A	350264
660-62916-2	UZAMW-1	Total Recoverable	Water	3005A	350264
660-62916-3	LZAMW-1	Total Recoverable	Water	3005A	350264
660-62916-4	UZAMW-2	Total Recoverable	Water	3005A	350264
660-62916-5	LZAMW-2	Total Recoverable	Water	3005A	350264
LCS 680-350264/2-A	Lab Control Sample	Total Recoverable	Water	3005A	350264
MB 680-350264/1-A	Method Blank	Total Recoverable	Water	3005A	350264

Analysis Batch: 350430

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-82563-K-2-B MS	Matrix Spike	Dissolved	Water	6020A	350028
460-82563-K-2-C MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	350028
660-62916-1	RW-1	Total Recoverable	Water	6020A	350028
660-62916-2	UZAMW-1	Total Recoverable	Water	6020A	350028
660-62916-3	LZAMW-1	Total Recoverable	Water	6020A	350028
660-62916-4	UZAMW-2	Total Recoverable	Water	6020A	350028
660-62916-5	LZAMW-2	Total Recoverable	Water	6020A	350028
LCS 680-350028/2-A	Lab Control Sample	Total Recoverable	Water	6020A	350028
MB 680-350028/1-A	Method Blank	Total Recoverable	Water	6020A	350028

Analysis Batch: 350489

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Dissolved	Water	6020A	350209
660-62916-1 MS	RW-1	Dissolved	Water	6020A	350209
660-62916-1 MSD	RW-1	Dissolved	Water	6020A	350209
660-62916-2	UZAMW-1	Dissolved	Water	6020A	350209
660-62916-3	LZAMW-1	Dissolved	Water	6020A	350209
660-62916-4	UZAMW-2	Dissolved	Water	6020A	350209
660-62916-5	LZAMW-2	Dissolved	Water	6020A	350209
LCS 680-350208/2-B	Lab Control Sample	Dissolved	Water	6020A	350209
MB 680-350208/1-B	Method Blank	Dissolved	Water	6020A	350209

Filtration Batch: 350562

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Dissolved	Water	FILTRATION	
660-62916-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-62916-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-62916-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-62916-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-62916-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-62916-5	LZAMW-2	Dissolved	Water	FILTRATION	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Filtration Batch: 350562 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 680-350562/2-A	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-350562/1-A	Method Blank	Dissolved	Water	FILTRATION	

Analysis Batch: 350644

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-82563-K-2-E MS	Matrix Spike	Dissolved	Water	6020A	350264
460-82563-K-2-F MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	350264
660-62916-1	RW-1	Total Recoverable	Water	6020A	350264
660-62916-2	UZAMW-1	Total Recoverable	Water	6020A	350264
660-62916-3	LZAMW-1	Total Recoverable	Water	6020A	350264
660-62916-4	UZAMW-2	Total Recoverable	Water	6020A	350264
660-62916-5	LZAMW-2	Total Recoverable	Water	6020A	350264
LCS 680-350264/2-A	Lab Control Sample	Total Recoverable	Water	6020A	350264
MB 680-350264/1-A	Method Blank	Total Recoverable	Water	6020A	350264

Analysis Batch: 350725

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Dissolved	Water	200.7 Rev 4.4	350562
660-62916-1 MS	RW-1	Dissolved	Water	200.7 Rev 4.4	350562
660-62916-1 MSD	RW-1	Dissolved	Water	200.7 Rev 4.4	350562
660-62916-2	UZAMW-1	Dissolved	Water	200.7 Rev 4.4	350562
660-62916-3	LZAMW-1	Dissolved	Water	200.7 Rev 4.4	350562
660-62916-4	UZAMW-2	Dissolved	Water	200.7 Rev 4.4	350562
660-62916-5	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	350562
LCS 680-350562/2-A	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	350562
MB 680-350562/1-A	Method Blank	Dissolved	Water	200.7 Rev 4.4	350562

General Chemistry

Analysis Batch: 151703

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Total/NA	Water	SM 2320B	
660-62916-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-62916-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-62916-3 DU	LZAMW-1	Total/NA	Water	SM 2320B	
660-62916-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-62916-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-151703/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-151703/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 151708

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Total/NA	Water	353.2	
660-62916-1 MS	RW-1	Total/NA	Water	353.2	
660-62916-1 MSD	RW-1	Total/NA	Water	353.2	
660-62916-2	UZAMW-1	Total/NA	Water	353.2	
660-62916-3	LZAMW-1	Total/NA	Water	353.2	
660-62916-4	UZAMW-2	Total/NA	Water	353.2	
660-62916-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-151708/15	Lab Control Sample	Total/NA	Water	353.2	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-62916-1

General Chemistry (Continued)

Analysis Batch: 151708 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 660-151708/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 151731

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62897-B-5 DU	Duplicate	Total/NA	Water	SM 2540C	
660-62916-1	RW-1	Total/NA	Water	SM 2540C	
660-62916-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-62916-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-62916-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-62916-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-151731/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-151731/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 350183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-49179-Y-1 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-49179-Y-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-62916-1	RW-1	Total/NA	Water	5310 B-2011	
660-62916-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-62916-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-62916-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-62916-5	LZAMW-2	Total/NA	Water	5310 B-2011	
680-105448-I-2 DU	Duplicate	Total/NA	Water	5310 B-2011	
LCS 680-350183/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-350183/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-350183/3	Method Blank	Total/NA	Water	5310 B-2011	

Analysis Batch: 350251

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-62916-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62916-1 DU	RW-1	Total/NA	Water	4500 S2 F-2011	
660-62916-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62916-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-62916-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-62916-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-350251/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-350251/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-350251/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-62916-1

Matrix: Water

Date Collected: 09/18/14 10:30

Date Received: 09/18/14 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	350332	09/23/14 23:58	DAS	TAL SAV
Total/NA	Analysis	300.0		2	350332	09/24/14 00:45	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			350562	09/25/14 07:51	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	350725	09/25/14 08:28	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			350208	09/23/14 10:32	BJB	TAL SAV
Dissolved	Prep	3005A			350209	09/23/14 10:34	BJB	TAL SAV
Dissolved	Analysis	6020A		1	350489	09/23/14 17:46	BWR	TAL SAV
Total Recoverable	Prep	3005A			350028	09/22/14 11:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350430	09/23/14 00:48	BWR	TAL SAV
Total Recoverable	Prep	3005A			350264	09/23/14 13:27	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350644	09/24/14 23:13	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151708	09/19/14 15:23	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	350251	09/23/14 12:51	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	350183	09/23/14 00:17	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151703	09/19/14 11:10	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151731	09/22/14 11:21	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-62916-2

Matrix: Water

Date Collected: 09/18/14 11:40

Date Received: 09/18/14 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	350332	09/24/14 01:31	DAS	TAL SAV
Total/NA	Analysis	300.0		1	350332	09/24/14 01:46	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			350562	09/25/14 07:51	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	350725	09/25/14 08:43	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			350208	09/23/14 10:32	BJB	TAL SAV
Dissolved	Prep	3005A			350209	09/23/14 10:34	BJB	TAL SAV
Dissolved	Analysis	6020A		1	350489	09/23/14 18:37	BWR	TAL SAV
Total Recoverable	Prep	3005A			350028	09/22/14 11:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350430	09/23/14 00:53	BWR	TAL SAV
Total Recoverable	Prep	3005A			350264	09/23/14 13:27	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350644	09/24/14 23:18	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151708	09/19/14 15:26	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	350251	09/23/14 12:51	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	350183	09/23/14 00:33	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151703	09/19/14 11:10	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151731	09/22/14 11:21	TKO	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-62916-3

Matrix: Water

Date Collected: 09/18/14 13:05

Date Received: 09/18/14 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	350332	09/24/14 02:02	DAS	TAL SAV
Total/NA	Analysis	300.0		1	350332	09/24/14 02:17	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			350562	09/25/14 07:51	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	350725	09/25/14 08:46	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			350208	09/23/14 10:32	BJB	TAL SAV
Dissolved	Prep	3005A			350209	09/23/14 10:34	BJB	TAL SAV
Dissolved	Analysis	6020A		1	350489	09/23/14 18:44	BWR	TAL SAV
Total Recoverable	Prep	3005A			350028	09/22/14 11:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350430	09/23/14 00:59	BWR	TAL SAV
Total Recoverable	Prep	3005A			350264	09/23/14 13:27	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350644	09/24/14 23:24	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151708	09/19/14 15:27	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	350251	09/23/14 12:51	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	350183	09/23/14 00:50	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151703	09/19/14 11:10	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151731	09/22/14 11:21	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-62916-4

Matrix: Water

Date Collected: 09/18/14 14:15

Date Received: 09/18/14 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	350332	09/24/14 02:32	DAS	TAL SAV
Total/NA	Analysis	300.0		1	350332	09/24/14 02:48	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			350562	09/25/14 07:51	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	350725	09/25/14 08:49	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			350208	09/23/14 10:32	BJB	TAL SAV
Dissolved	Prep	3005A			350209	09/23/14 10:34	BJB	TAL SAV
Dissolved	Analysis	6020A		1	350489	09/23/14 18:52	BWR	TAL SAV
Total Recoverable	Prep	3005A			350028	09/22/14 11:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350430	09/23/14 01:04	BWR	TAL SAV
Total Recoverable	Prep	3005A			350264	09/23/14 13:27	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350644	09/24/14 23:29	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151708	09/19/14 15:31	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	350251	09/23/14 12:51	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	350183	09/23/14 01:10	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151703	09/19/14 11:10	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151731	09/22/14 11:21	TKO	TAL TAM

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-62916-5

Matrix: Water

Date Collected: 09/18/14 14:55

Date Received: 09/18/14 17:35

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	350332	09/24/14 03:03	DAS	TAL SAV
Total/NA	Analysis	300.0		1	350332	09/24/14 03:49	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			350562	09/25/14 07:51	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	350725	09/25/14 08:58	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			350208	09/23/14 10:32	BJB	TAL SAV
Dissolved	Prep	3005A			350209	09/23/14 10:34	BJB	TAL SAV
Dissolved	Analysis	6020A		1	350489	09/23/14 18:59	BWR	TAL SAV
Total Recoverable	Prep	3005A			350028	09/22/14 11:08	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350430	09/23/14 01:09	BWR	TAL SAV
Total Recoverable	Prep	3005A			350264	09/23/14 13:27	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	350644	09/24/14 23:34	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151708	09/19/14 15:32	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	350251	09/23/14 12:51	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	350183	09/23/14 01:55	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151703	09/19/14 11:10	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151731	09/22/14 11:21	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	08-16-14 *
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-15
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-62916-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

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TestAmerica Tampa

TestAmerica Tampa

6712 Benjamin Road Suite 100
Tampa, FL 33634
Phone (813) 885-7427 Fax (813) 885-7049

Chain of Custody Record

TestAmerica

6712 Benjamin Road Suite 100

Tampa, FL 33634

Phone (813) 885-7427 Fax (813) 885-7049

Client Information

Jeff Trommer

Leggerte, Brashears & Graham, Inc.

Address:

10014 N. Dale Mabry Highway Suite 205

City:

Tampa

State, Zip:

FL, 33618

Phone:

Email:

jtrommer@jbgtampa.com

Project Name:

Cleanwater Groundwater Analysis

Site:

LWGRS

Sample No:

813-376-0637

Carrier Tracking No(s):

Lab PM:

Nancy Robertson

E-Mail:

nancy.robertson@testamericainc.com

Analysis Requested

Job #:

Preservation Codes:

A - HCl
B - NaOH
C - Cr Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Anchor
H - Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
T - TSP Dodecahydrate
U - Acetone
V - MCBA
W - ph 4-5
Z - other (specify)

Method of Shipment:

660-63916 Chain of Custody

Page:

Page 1 of 1

Date/Time:

9-18-14 17:35

Company:

KRC

Received by:

J. W. M.

Date/Time:

9-18-14 17:35

Company:

TA-TPA

Received by:

Date/Time:

Company:

Cooler Temperature(s) °C and Other Remarks:

4.0 / 4.4 Cn-09

Empty Kit Relinquished by:

Ron Edwards

Date/Time:

9-18-14 17:35

Company:

KRC

Received by:

J. W. M.

Date/Time:

9-18-14 17:35

Company:

TA-TPA

Relinquished by:

Date/Time:

Company:

Custody Seals intact:

Yes

No

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62916-1

Login Number: 62916

List Source: TestAmerica Tampa

List Number: 1

Creator: Redding, Charles S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62916-1

Login Number: 62916

List Source: TestAmerica Savannah

List Number: 2

List Creation: 09/20/14 09:04 AM

Creator: Banda, Christy S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-62629-1

Login Number: 62629

List Source: TestAmerica Savannah

List Number: 2

List Creation: 09/04/14 09:16 AM

Creator: White, Menica R

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	False	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-63039-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:

10/2/2014 4:23:12 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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www.testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63039-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-63039-1	RW-1	Water	09/25/14 15:40	09/25/14 16:50
660-63039-2	UZAMW-1	Water	09/25/14 13:10	09/25/14 16:50
660-63039-3	LZAMW-1	Water	09/25/14 12:40	09/25/14 16:50
660-63039-4	UZAMW-2	Water	09/25/14 14:55	09/25/14 16:50
660-63039-5	LZAMW-2	Water	09/25/14 14:25	09/25/14 16:50

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63039-1

Job ID: 660-63039-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-63039-1

Comments

No additional comments.

Receipt

The samples were received on 9/25/2014 4:50 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.8° C.

Metals

Method FILTRATION: The following samples requested dissolved metals and were not filtered in the field: (660-63039-1 MS), (660-63039-1 MSD), LZAMW-1 (660-63039-3), LZAMW-2 (660-63039-5), RW-1 (660-63039-1), UZAMW-1 (660-63039-2), UZAMW-2 (660-63039-4). These samples were filtered and preserved upon receipt to the laboratory.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-351301.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63039-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

General Chemistry

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-63039-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	43		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	0.34		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	570		10	5.0	mg/L	20		300.0	Total/NA
SiO ₂ , Silica	26000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	15		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	130000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	7100		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	41000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	330000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.6		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1200		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-63039-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	5.3		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.31		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	180		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	27000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	7.0		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	100000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2900		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	18000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	93000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.1		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.1		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	490		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63039-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.24		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-63039-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	320		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	21000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	95000		250	130	ug/L	1		6020A	Total Recoverable
Iron	75 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	4100		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	20000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	170000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.5		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.7		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	750		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-63039-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.0		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.42		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	100		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	34000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	32		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	74000		250	130	ug/L	1		6020A	Total Recoverable
Iron	100		100	33	ug/L	1		6020A	Total Recoverable
Potassium	2700		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	16000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	56000		500	250	ug/L	1		6020A	Total Recoverable
Iron	37 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.7		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	340		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63039-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	18		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.31		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	350		5.0	2.5	mg/L	10		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-63039-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
SiO ₂ , Silica	19000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	94000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	5100		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	23000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	200000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	690		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-63039-1

Matrix: Water

Date Collected: 09/25/14 15:40

Date Received: 09/25/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	43		1.0	0.50	mg/L			09/30/14 21:44	2
Fluoride	0.34		0.20	0.050	mg/L			09/30/14 21:44	2
Chloride	570		10	5.0	mg/L			09/30/14 21:30	20

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	26000		500	50	ug/L			10/02/14 14:05	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	15		2.5	1.3	ug/L		09/29/14 09:41	09/30/14 03:23	1
Calcium	130000		250	130	ug/L		09/29/14 09:41	09/30/14 03:23	1
Iron	33	U	100	33	ug/L		09/29/14 09:41	09/30/14 03:23	1
Potassium	7100		500	170	ug/L		09/29/14 09:41	09/30/14 03:23	1
Magnesium	41000		250	43	ug/L		09/29/14 09:41	09/30/14 03:23	1
Sodium	330000		500	250	ug/L		09/29/14 09:41	09/30/14 03:23	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		10/01/14 08:35	10/01/14 16:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/26/14 15:22	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			09/30/14 02:03	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.6		1.0	1.0	mg/L			09/30/14 09:35	1
Alkalinity	200		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L			09/29/14 08:30	1
Total Dissolved Solids	1200		25	25	mg/L			09/26/14 13:44	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-63039-2

Matrix: Water

Date Collected: 09/25/14 13:10

Date Received: 09/25/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	5.3		0.50	0.25	mg/L			09/30/14 22:13	1
Fluoride	0.31		0.10	0.025	mg/L			09/30/14 22:13	1
Chloride	180		2.0	1.0	mg/L			09/30/14 21:59	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	27000		500	50	ug/L			10/02/14 14:20	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	7.0		2.5	1.3	ug/L		09/29/14 09:41	09/30/14 03:39	1
Calcium	100000		250	130	ug/L		09/29/14 09:41	09/30/14 03:39	1
Iron	33	U	100	33	ug/L		09/29/14 09:41	09/30/14 03:39	1
Potassium	2900		500	170	ug/L		09/29/14 09:41	09/30/14 03:39	1
Magnesium	18000		250	43	ug/L		09/29/14 09:41	09/30/14 03:39	1
Sodium	93000		500	250	ug/L		09/29/14 09:41	09/30/14 03:39	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		10/01/14 08:35	10/01/14 16:42	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/26/14 15:26	1
Total Organic Carbon	2.1		1.0	0.50	mg/L			09/30/14 02:19	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.1		1.0	1.0	mg/L			09/30/14 09:35	1
Alkalinity	180		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			09/29/14 08:30	1
Total Dissolved Solids	490		17	17	mg/L			09/26/14 13:44	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63039-3

Matrix: Water

Date Collected: 09/25/14 12:40

Date Received: 09/25/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			09/30/14 23:11	1
Fluoride	0.24		0.10	0.025	mg/L			09/30/14 23:11	1
Chloride	320		5.0	2.5	mg/L			09/30/14 22:56	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	21000		500	50	ug/L			10/02/14 14:23	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/29/14 09:41	09/30/14 03:45	1
Calcium	95000		250	130	ug/L		09/29/14 09:41	09/30/14 03:45	1
Iron	75	I	100	33	ug/L		09/29/14 09:41	09/30/14 03:45	1
Potassium	4100		500	170	ug/L		09/29/14 09:41	09/30/14 03:45	1
Magnesium	20000		250	43	ug/L		09/29/14 09:41	09/30/14 03:45	1
Sodium	170000		500	250	ug/L		09/29/14 09:41	09/30/14 03:45	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		10/01/14 08:35	10/01/14 16:49	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/26/14 15:30	1
Total Organic Carbon	2.5		1.0	0.50	mg/L			09/30/14 02:40	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.7		1.0	1.0	mg/L			09/30/14 09:35	1
Alkalinity	180		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			09/29/14 08:30	1
Total Dissolved Solids	750		17	17	mg/L			09/26/14 13:44	1

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-63039-4

Matrix: Water

Date Collected: 09/25/14 14:55

Date Received: 09/25/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.0		0.50	0.25	mg/L			09/30/14 23:40	1
Fluoride	0.42		0.10	0.025	mg/L			09/30/14 23:40	1
Chloride	100		2.0	1.0	mg/L			09/30/14 23:25	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	34000		500	50	ug/L			10/02/14 14:26	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	32		2.5	1.3	ug/L		09/29/14 09:41	09/30/14 03:50	1
Calcium	74000		250	130	ug/L		09/29/14 09:41	09/30/14 03:50	1
Iron	100		100	33	ug/L		09/29/14 09:41	09/30/14 03:50	1
Potassium	2700		500	170	ug/L		09/29/14 09:41	09/30/14 03:50	1
Magnesium	16000		250	43	ug/L		09/29/14 09:41	09/30/14 03:50	1
Sodium	56000		500	250	ug/L		09/29/14 09:41	09/30/14 03:50	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	37	I	100	33	ug/L		10/01/14 08:35	10/01/14 16:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/26/14 15:31	1
Total Organic Carbon	1.7		1.0	0.50	mg/L			09/30/14 02:56	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			09/30/14 09:35	1
Alkalinity	170		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			09/29/14 08:30	1
Total Dissolved Solids	340		10	10	mg/L			09/26/14 13:44	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63039-5

Matrix: Water

Date Collected: 09/25/14 14:25

Date Received: 09/25/14 16:50

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	18		0.50	0.25	mg/L			10/01/14 00:37	1
Fluoride	0.31		0.10	0.025	mg/L			10/01/14 00:37	1
Chloride	350		5.0	2.5	mg/L			09/30/14 23:54	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	19000		500	50	ug/L			10/02/14 14:35	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		09/29/14 09:41	09/30/14 03:55	1
Calcium	94000		250	130	ug/L		09/29/14 09:41	09/30/14 03:55	1
Iron	33	U	100	33	ug/L		09/29/14 09:41	09/30/14 03:55	1
Potassium	5100		500	170	ug/L		09/29/14 09:41	09/30/14 03:55	1
Magnesium	23000		250	43	ug/L		09/29/14 09:41	09/30/14 03:55	1
Sodium	200000		500	250	ug/L		09/29/14 09:41	09/30/14 03:55	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		10/01/14 08:35	10/01/14 17:19	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/26/14 15:32	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			09/30/14 03:10	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.5		1.0	1.0	mg/L			09/30/14 09:35	1
Alkalinity	190		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			09/29/14 08:30	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			09/29/14 08:30	1
Total Dissolved Solids	690		25	25	mg/L			09/26/14 13:44	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-351472/29

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351472

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			09/30/14 19:20	1
Fluoride	0.025	U	0.10	0.025	mg/L			09/30/14 19:20	1
Chloride	0.25	U	0.50	0.25	mg/L			09/30/14 19:20	1

Lab Sample ID: LCS 680-351472/30

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351472

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	10.2		mg/L		102	90 - 110	
Fluoride	2.00	2.07		mg/L		104	90 - 110	
Chloride	10.0	9.97		mg/L		100	90 - 110	

Lab Sample ID: LCSD 680-351472/31

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351472

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Added	Result	Qualifier							
Sulfate	10.0	10.2		mg/L		102	90 - 110		0	30
Fluoride	2.00	2.07		mg/L		104	90 - 110		0	30
Chloride	10.0	9.98		mg/L		100	90 - 110		0	30

Lab Sample ID: 660-63039-5 MS

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351472

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	16		100	119		mg/L		103	80 - 120	
Fluoride	0.43		20.0	21.0		mg/L		103	80 - 120	
Chloride	350		100	448		mg/L		93	80 - 120	

Lab Sample ID: 660-63039-5 MSD

Client Sample ID: LZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351472

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	16		100	120		mg/L		104	80 - 120	1	30
Fluoride	0.43		20.0	21.3		mg/L		104	80 - 120	1	30
Chloride	350		100	448		mg/L		93	80 - 120	0	30

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 680-351776/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 351798

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
SiO ₂ , Silica	50	U	500	50	ug/L			10/02/14 13:59	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-351776/2-A

Matrix: Water

Analysis Batch: 351798

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Analyte	Sample Result	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
			Result	Qualifier				
SiO ₂ , Silica	10000	10000	10100		ug/L		101	85 - 115

Lab Sample ID: 660-63039-1 MS

Matrix: Water

Analysis Batch: 351798

Client Sample ID: RW-1

Prep Type: Dissolved

Analyte	Sample Result	Spike Added	MS	MS	Unit	D	%Rec	%Rec.
			Result	Qualifier				
SiO ₂ , Silica	26000	10000	34900		ug/L		87	75 - 125

Lab Sample ID: 660-63039-1 MSD

Matrix: Water

Analysis Batch: 351798

Client Sample ID: RW-1

Prep Type: Dissolved

Analyte	Sample Result	Spike Added	MSD	MSD	Unit	D	%Rec	%Rec.
			Result	Qualifier				
SiO ₂ , Silica	26000	10000	35000		ug/L		88	75 - 125

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-351115/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total Recoverable

Prep Batch: 351115

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		09/29/14 09:41	09/30/14 01:32	1
Calcium	130	U	250	130	ug/L		09/29/14 09:41	09/30/14 01:32	1
Iron	33	U	100	33	ug/L		09/29/14 09:41	09/30/14 01:32	1
Potassium	170	U	500	170	ug/L		09/29/14 09:41	09/30/14 01:32	1
Magnesium	43	U	250	43	ug/L		09/29/14 09:41	09/30/14 01:32	1
Sodium	250	U	500	250	ug/L		09/29/14 09:41	09/30/14 01:32	1

Lab Sample ID: LCS 680-351115/2-A

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total Recoverable

Prep Batch: 351115

Analyte	Sample Result	Spike Added	LC	LC	Unit	D	%Rec	%Rec.
			Result	Qualifier				
Arsenic	100	100	107		ug/L		107	75 - 125
Calcium	5000	5000	5650		ug/L		113	75 - 125
Iron	5000	5000	5360		ug/L		107	75 - 125
Potassium	5000	5000	5360		ug/L		107	75 - 125
Magnesium	5000	5000	5770		ug/L		115	75 - 125
Sodium	5000	5000	5580		ug/L		112	75 - 125

Lab Sample ID: 680-105535-M-1-B MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Dissolved

Prep Batch: 351115

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier		Added	Result				
Arsenic	1.3	U	100	109		ug/L		109	75 - 125
Calcium	11000	J3	5000	15900		ug/L		100	75 - 125

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-105535-M-1-B MS

Matrix: Water

Analysis Batch: 351329

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 351115

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier					
Iron	38	I	5000	5320		ug/L		106	75 - 125	
Potassium	1900		5000	7130		ug/L		104	75 - 125	
Magnesium	1300	J3	5000	7140		ug/L		116	75 - 125	
Sodium	52000	J3	5000	53900	J3	ug/L		42	75 - 125	

Lab Sample ID: 680-105535-M-1-C MSD

Matrix: Water

Analysis Batch: 351329

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 351115

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	1.3	U	100	125		ug/L		125	75 - 125	14	20
Calcium	11000	J3	5000	17800	J3	ug/L		139	75 - 125	12	20
Iron	38	I	5000	6160		ug/L		122	75 - 125	15	20
Potassium	1900		5000	8120		ug/L		124	75 - 125	13	20
Magnesium	1300	J3	5000	8060	J3	ug/L		134	75 - 125	12	20
Sodium	52000	J3	5000	60800	J3	ug/L		179	75 - 125	12	20

Lab Sample ID: MB 680-351458/1-B

Matrix: Water

Analysis Batch: 351699

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 351459

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		10/01/14 08:35	10/01/14 15:51	1

Lab Sample ID: LCS 680-351458/2-B

Matrix: Water

Analysis Batch: 351699

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 351459

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	5350		ug/L		107	75 - 125

Lab Sample ID: 660-63039-1 MS

Matrix: Water

Analysis Batch: 351699

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 351459

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	33	U	5000	5450		ug/L		109	75 - 125

Lab Sample ID: 660-63039-1 MSD

Matrix: Water

Analysis Batch: 351699

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 351459

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	33	U	5000	5060		ug/L		101	75 - 125	7	20

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-151875/13

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151875

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			09/26/14 15:17	1

Lab Sample ID: LCS 660-151875/15

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151875

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Nitrate Nitrite as N		1.00	1.01		mg/L		101	90 - 110	
Nitrite as N		0.500	0.502		mg/L		100	90 - 110	

Lab Sample ID: 660-63039-1 MS

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151875

Analyte	Sample		Spike Added	MS		Unit	D	%Rec	Limits		
	Result	Qualifier		Result	Qualifier						
Nitrate Nitrite as N	0.10		1.00	1.07		mg/L	107	90 - 110			
Nitrite as N	0.10			0.509		mg/L		102		90 - 110	

Lab Sample ID: 660-63039-1 MSD

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151875

Analyte	Sample		Spike Added	MSD		Unit	D	%Rec	Limits	RPD	Limit	
	Result	Qualifier		Result	Qualifier							
Nitrate Nitrite as N	0.10		1.00	1.07		mg/L	107	90 - 110		0	30	
Nitrite as N	0.10			0.508		mg/L		102		0	30	

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-351301/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351301

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			09/30/14 09:35	1

Lab Sample ID: LCS 680-351301/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351301

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	
	Added								
Total Sulfide		10.0	8.79		mg/L		88	75 - 125	

Lab Sample ID: LCSD 680-351301/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351301

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
	Added									
Total Sulfide		10.0	9.27		mg/L		93	75 - 125	5	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 4500 S2 F-2011 - Sulfide, Total (Continued)

Lab Sample ID: 660-63039-1 DU

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351301

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Sulfide	5.6		5.63		mg/L		1	30

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-351299/3

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351299

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			09/29/14 22:55	1

Lab Sample ID: LCS 680-351299/4

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351299

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Organic Carbon	20.0	19.1		mg/L		95	80 - 120		

Lab Sample ID: LCSD 680-351299/5

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351299

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	RPD	Limit
	Added	Result	Qualifier						
Total Organic Carbon	20.0	18.8		mg/L		94	80 - 120	1	25

Lab Sample ID: 640-49222-I-1 MS

Client Sample ID: Matrix Spike

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351299

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	16		20.0	36.3		mg/L		99	80 - 120

Lab Sample ID: 640-49222-I-1 MSD

Client Sample ID: Matrix Spike Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351299

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Total Organic Carbon	16		20.0	35.7		mg/L		96	80 - 120

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-151926/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 151926

Analyte	MB	MB	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity	1.0	U	1.0	mg/L			09/29/14 08:30	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	mg/L			09/29/14 08:30	1
Bicarbonate ion as HCO3	1.0	U	1.0	mg/L			09/29/14 08:30	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: LCS 660-151926/3

Matrix: Water

Analysis Batch: 151926

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				Limits
Alkalinity	118	123		mg/L		104	80 - 120

Lab Sample ID: 660-63039-1 DU

Matrix: Water

Analysis Batch: 151926

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	200		205		mg/L		0.1	30
Bicarbonate Alkalinity as CaCO ₃	200		205		mg/L		0.1	30
Bicarbonate ion as HCO ₃	250		250		mg/L		0.1	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-151869/1

Matrix: Water

Analysis Batch: 151869

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			09/26/14 13:44	1

Lab Sample ID: LCS 660-151869/2

Matrix: Water

Analysis Batch: 151869

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				Limits
Total Dissolved Solids	10000	9860		mg/L		99	80 - 120

Lab Sample ID: 660-63028-A-2 DU

Matrix: Water

Analysis Batch: 151869

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	360		364		mg/L		1	20

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 351472

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Total/NA	Water	300.0	
660-63039-1	RW-1	Total/NA	Water	300.0	
660-63039-2	UZAMW-1	Total/NA	Water	300.0	
660-63039-2	UZAMW-1	Total/NA	Water	300.0	
660-63039-3	LZAMW-1	Total/NA	Water	300.0	
660-63039-3	LZAMW-1	Total/NA	Water	300.0	
660-63039-4	UZAMW-2	Total/NA	Water	300.0	
660-63039-4	UZAMW-2	Total/NA	Water	300.0	
660-63039-5	LZAMW-2	Total/NA	Water	300.0	
660-63039-5	LZAMW-2	Total/NA	Water	300.0	
660-63039-5 MS	LZAMW-2	Total/NA	Water	300.0	
660-63039-5 MSD	LZAMW-2	Total/NA	Water	300.0	
LCS 680-351472/30	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-351472/31	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-351472/29	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 351115

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Total Recoverable	Water	3005A	
660-63039-2	UZAMW-1	Total Recoverable	Water	3005A	
660-63039-3	LZAMW-1	Total Recoverable	Water	3005A	
660-63039-4	UZAMW-2	Total Recoverable	Water	3005A	
660-63039-5	LZAMW-2	Total Recoverable	Water	3005A	
680-105535-M-1-B MS	Matrix Spike	Dissolved	Water	3005A	
680-105535-M-1-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
LCS 680-351115/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-351115/1-A	Method Blank	Total Recoverable	Water	3005A	

Analysis Batch: 351329

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Total Recoverable	Water	6020A	351115
660-63039-2	UZAMW-1	Total Recoverable	Water	6020A	351115
660-63039-3	LZAMW-1	Total Recoverable	Water	6020A	351115
660-63039-4	UZAMW-2	Total Recoverable	Water	6020A	351115
660-63039-5	LZAMW-2	Total Recoverable	Water	6020A	351115
680-105535-M-1-B MS	Matrix Spike	Dissolved	Water	6020A	351115
680-105535-M-1-C MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	351115
LCS 680-351115/2-A	Lab Control Sample	Total Recoverable	Water	6020A	351115
MB 680-351115/1-A	Method Blank	Total Recoverable	Water	6020A	351115

Filtration Batch: 351458

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Dissolved	Water	FILTRATION	
660-63039-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-63039-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-63039-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-63039-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-63039-4	UZAMW-2	Dissolved	Water	FILTRATION	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Filtration Batch: 351458 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-351458/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-351458/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 351459

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Dissolved	Water	3005A	351458
660-63039-1 MS	RW-1	Dissolved	Water	3005A	351458
660-63039-1 MSD	RW-1	Dissolved	Water	3005A	351458
660-63039-2	UZAMW-1	Dissolved	Water	3005A	351458
660-63039-3	LZAMW-1	Dissolved	Water	3005A	351458
660-63039-4	UZAMW-2	Dissolved	Water	3005A	351458
660-63039-5	LZAMW-2	Dissolved	Water	3005A	351458
LCS 680-351458/2-B	Lab Control Sample	Dissolved	Water	3005A	351458
MB 680-351458/1-B	Method Blank	Dissolved	Water	3005A	351458

Analysis Batch: 351699

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Dissolved	Water	6020A	351459
660-63039-1 MS	RW-1	Dissolved	Water	6020A	351459
660-63039-1 MSD	RW-1	Dissolved	Water	6020A	351459
660-63039-2	UZAMW-1	Dissolved	Water	6020A	351459
660-63039-3	LZAMW-1	Dissolved	Water	6020A	351459
660-63039-4	UZAMW-2	Dissolved	Water	6020A	351459
660-63039-5	LZAMW-2	Dissolved	Water	6020A	351459
LCS 680-351458/2-B	Lab Control Sample	Dissolved	Water	6020A	351459
MB 680-351458/1-B	Method Blank	Dissolved	Water	6020A	351459

Filtration Batch: 351776

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Dissolved	Water	FILTRATION	
660-63039-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-63039-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-63039-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-63039-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-63039-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-63039-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-351776/2-A	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-351776/1-A	Method Blank	Dissolved	Water	FILTRATION	

Analysis Batch: 351798

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Dissolved	Water	200.7 Rev 4.4	351776
660-63039-1 MS	RW-1	Dissolved	Water	200.7 Rev 4.4	351776
660-63039-1 MSD	RW-1	Dissolved	Water	200.7 Rev 4.4	351776
660-63039-2	UZAMW-1	Dissolved	Water	200.7 Rev 4.4	351776
660-63039-3	LZAMW-1	Dissolved	Water	200.7 Rev 4.4	351776
660-63039-4	UZAMW-2	Dissolved	Water	200.7 Rev 4.4	351776
660-63039-5	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	351776
LCS 680-351776/2-A	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	351776
MB 680-351776/1-A	Method Blank	Dissolved	Water	200.7 Rev 4.4	351776

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry

Analysis Batch: 151869

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63028-A-2 DU	Duplicate	Total/NA	Water	SM 2540C	
660-63039-1	RW-1	Total/NA	Water	SM 2540C	
660-63039-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-63039-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-63039-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-63039-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-151869/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-151869/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 151875

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Total/NA	Water	353.2	
660-63039-1 MS	RW-1	Total/NA	Water	353.2	
660-63039-1 MSD	RW-1	Total/NA	Water	353.2	
660-63039-2	UZAMW-1	Total/NA	Water	353.2	
660-63039-3	LZAMW-1	Total/NA	Water	353.2	
660-63039-4	UZAMW-2	Total/NA	Water	353.2	
660-63039-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-151875/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-151875/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 151926

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Total/NA	Water	SM 2320B	
660-63039-1 DU	RW-1	Total/NA	Water	SM 2320B	
660-63039-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-63039-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-63039-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-63039-5	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-151926/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-151926/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 351299

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-49222-I-1 MS	Matrix Spike	Total/NA	Water	5310 B-2011	
640-49222-I-1 MSD	Matrix Spike Duplicate	Total/NA	Water	5310 B-2011	
660-63039-1	RW-1	Total/NA	Water	5310 B-2011	
660-63039-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-63039-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-63039-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-63039-5	LZAMW-2	Total/NA	Water	5310 B-2011	
LCS 680-351299/4	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-351299/5	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-351299/3	Method Blank	Total/NA	Water	5310 B-2011	

Analysis Batch: 351301

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-63039-1 DU	RW-1	Total/NA	Water	4500 S2 F-2011	
660-63039-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-63039-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63039-1

General Chemistry (Continued)

Analysis Batch: 351301 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63039-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-63039-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-351301/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-351301/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-351301/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-63039-1

Matrix: Water

Date Collected: 09/25/14 15:40

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	351472	09/30/14 21:30	DAS	TAL SAV
Total/NA	Analysis	300.0		2	351472	09/30/14 21:44	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			351776	10/02/14 13:31	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	351798	10/02/14 14:05	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			351458	10/01/14 08:34	SP	TAL SAV
Dissolved	Prep	3005A			351459	10/01/14 08:35	SP	TAL SAV
Dissolved	Analysis	6020A		1	351699	10/01/14 16:06	BWR	TAL SAV
Total Recoverable	Prep	3005A			351115	09/29/14 09:41	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	351329	09/30/14 03:23	BWR	TAL SAV
Total/NA	Analysis	353.2			151875	09/26/14 15:22	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			351301	09/30/14 09:35	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011			351299	09/30/14 02:03	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			151926	09/29/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			151869	09/26/14 13:44	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-63039-2

Matrix: Water

Date Collected: 09/25/14 13:10

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	351472	09/30/14 21:59	DAS	TAL SAV
Total/NA	Analysis	300.0		1	351472	09/30/14 22:13	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			351776	10/02/14 13:31	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	351798	10/02/14 14:20	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			351458	10/01/14 08:34	SP	TAL SAV
Dissolved	Prep	3005A			351459	10/01/14 08:35	SP	TAL SAV
Dissolved	Analysis	6020A		1	351699	10/01/14 16:42	BWR	TAL SAV
Total Recoverable	Prep	3005A			351115	09/29/14 09:41	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	351329	09/30/14 03:39	BWR	TAL SAV
Total/NA	Analysis	353.2			151875	09/26/14 15:26	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			351301	09/30/14 09:35	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011			351299	09/30/14 02:19	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			151926	09/29/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			151869	09/26/14 13:44	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63039-3

Matrix: Water

Date Collected: 09/25/14 12:40

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	351472	09/30/14 22:56	DAS	TAL SAV
Total/NA	Analysis	300.0		1	351472	09/30/14 23:11	DAS	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63039-3

Date Collected: 09/25/14 12:40

Matrix: Water

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			351776	10/02/14 13:31	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	351798	10/02/14 14:23	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			351458	10/01/14 08:34	SP	TAL SAV
Dissolved	Prep	3005A			351459	10/01/14 08:35	SP	TAL SAV
Dissolved	Analysis	6020A		1	351699	10/01/14 16:49	BWR	TAL SAV
Total Recoverable	Prep	3005A			351115	09/29/14 09:41	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	351329	09/30/14 03:45	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151875	09/26/14 15:30	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	351301	09/30/14 09:35	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	351299	09/30/14 02:40	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151926	09/29/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151869	09/26/14 13:44	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-63039-4

Date Collected: 09/25/14 14:55

Matrix: Water

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	351472	09/30/14 23:25	DAS	TAL SAV
Total/NA	Analysis	300.0		1	351472	09/30/14 23:40	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			351776	10/02/14 13:31	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	351798	10/02/14 14:26	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			351458	10/01/14 08:34	SP	TAL SAV
Dissolved	Prep	3005A			351459	10/01/14 08:35	SP	TAL SAV
Dissolved	Analysis	6020A		1	351699	10/01/14 16:57	BWR	TAL SAV
Total Recoverable	Prep	3005A			351115	09/29/14 09:41	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	351329	09/30/14 03:50	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151875	09/26/14 15:31	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	351301	09/30/14 09:35	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	351299	09/30/14 02:56	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151926	09/29/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151869	09/26/14 13:44	TKO	TAL TAM

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63039-5

Date Collected: 09/25/14 14:25

Matrix: Water

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	351472	09/30/14 23:54	DAS	TAL SAV
Total/NA	Analysis	300.0		1	351472	10/01/14 00:37	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			351776	10/02/14 13:31	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	351798	10/02/14 14:35	BCB	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63039-5

Date Collected: 09/25/14 14:25

Matrix: Water

Date Received: 09/25/14 16:50

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			351458	10/01/14 08:34	SP	TAL SAV
Dissolved	Prep	3005A			351459	10/01/14 08:35	SP	TAL SAV
Dissolved	Analysis	6020A		1	351699	10/01/14 17:19	BWR	TAL SAV
Total Recoverable	Prep	3005A			351115	09/29/14 09:41	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	351329	09/30/14 03:55	BWR	TAL SAV
Total/NA	Analysis	353.2		1	151875	09/26/14 15:32	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	351301	09/30/14 09:35	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	351299	09/30/14 03:10	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	151926	09/29/14 08:30	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	151869	09/26/14 13:44	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14 *
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	09-24-16
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-15
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14 *
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63039-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

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TestAmerica Tampa

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TestAmerica Tampa
 6712 Benjamin Road Suite 100
 Tampa, FL 33634
 Phone (813) 855-7427 Fax (813) 855-7049

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information		Lab P/M: Robertson, Nancy	Carrier Tracking No(s): nancy.robertson@testamericainc.com	COC No: 660-57064-18302-1
Address: 10014 N. Dale Mabry Highway Suite 205		Date/Time: 9-25-14 1650	Page: Page 1 of 1	Page:
City: Tampa		Received by: <i>Richard Coker</i>	Job #:	Job #:
State, Zip: FL, 33618		Date/Time: 9-25-14 1650	Company:	Company
Phone: Email: Project Name: Clearwater Groundwater Analysis		Received By: <i>Richard Coker</i>	Date/Time: 9-25-14 1650	Company
Site: <i>CLWGRS</i>		SSC#:		

Due Date Requested:	
TAT Requested (days):	

Field Filtered Sample (Yes or No)	
Perform MS/MSD (Yes or No)	

Preservation Codes:	
---------------------	--

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-63039-1

Login Number: 63039

List Source: TestAmerica Tampa

List Number: 1

Creator: Redding, Charles S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-63039-1

Login Number: 63039

List Source: TestAmerica Savannah

List Number: 2

List Creation: 09/27/14 08:40 AM

Creator: Banda, Christy S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Tampa
6712 Benjamin Road
Suite 100
Tampa, FL 33634
Tel: (813)885-7427

TestAmerica Job ID: 660-63138-1

Client Project/Site: Clearwater Groundwater Analysis CLWGRS

For:

Leggette, Brashears & Graham, Inc.
10014 N. Dale Mabry Highway
Suite 205
Tampa, Florida 33618

Attn: Jeff Trommer



Authorized for release by:
10/13/2014 1:34:23 PM

Nancy Robertson, Project Manager II
(813)885-7427
nancy.robertson@testamericainc.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Sample Summary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63138-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
660-63138-1	RW-1	Water	10/01/14 14:45	10/01/14 15:55
660-63138-2	UZAMW-1	Water	10/01/14 12:10	10/01/14 15:55
660-63138-3	LZAMW-1	Water	10/01/14 11:40	10/01/14 15:55
660-63138-4	UZAMW-2	Water	10/01/14 14:10	10/01/14 15:55
660-63138-5	LZAMW-2	Water	10/01/14 13:40	10/01/14 15:55

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Case Narrative

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63138-1

Job ID: 660-63138-1

Laboratory: TestAmerica Tampa

Narrative

Job Narrative 660-63138-1

Comments

No additional comments.

Receipt

The samples were received on 10/1/2014 3:55 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.0° C.

Metals

Method FILTRATION: The following samples requested dissolved metals and were not filtered in the field: LZAMW-1 (660-63138-3), LZAMW-2 (660-63138-5), RW-1 (660-63138-1), UZAMW-1 (660-63138-2), UZAMW-2 (660-63138-4). These samples were filtered and preserved upon receipt to the laboratory.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry

Method SM 4500 S2 F: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with batch 680-351985 and 352403.

Method SM 5310B: The matrix spike and matrix spike duplicate (MS/MSD) for batch analytical 352314 could not be evaluated due to sample matrix interferences. The laboratory control sample (LCS) passed acceptance criteria. In lieu of the MS/MSD, the laboratory control sample duplicate (LCSD) was utilized to provide precision data for this batch.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Leggette, Brashears & Graham, Inc.

Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63138-1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.

Metals

Qualifier	Qualifier Description
U	Indicates that the compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J3	Estimated value; value may not be accurate. Spike recovery or RPD outside of criteria.

General Chemistry

Qualifier	Qualifier Description
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
U	Indicates that the compound was analyzed for but not detected.

Glossary

Abbreviation These commonly used abbreviations may or may not be present in this report.

□	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

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Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-63138-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	38		1.0	0.50	mg/L	2		300.0	Total/NA
Fluoride	0.25		0.20	0.050	mg/L	2		300.0	Total/NA
Chloride	520		10	5.0	mg/L	20		300.0	Total/NA
SiO ₂ , Silica	24000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	14		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	110000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	6000		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	31000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	260000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.1		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	5.2		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	1300		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-1

Lab Sample ID: 660-63138-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	4.5		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.26		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	170		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	26000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	6.6		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	82000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	2500		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	14000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	75000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.0		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	3.9		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	530		17	17	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63138-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	15		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.19		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1 (Continued)

Lab Sample ID: 660-63138-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	310		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	20000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	91000		250	130	ug/L	1		6020A	Total Recoverable
Iron	50 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	4300		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	19000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	160000		500	250	ug/L	1		6020A	Total Recoverable
Iron	39 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	2.3		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	6.4		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	760		25	25	mg/L	1		SM 2540C	Total/NA

Client Sample ID: UZAMW-2

Lab Sample ID: 660-63138-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	3.4		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.36		0.10	0.025	mg/L	1		300.0	Total/NA
Chloride	95		2.0	1.0	mg/L	4		300.0	Total/NA
SiO ₂ , Silica	32000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Arsenic	29		2.5	1.3	ug/L	1		6020A	Total Recoverable
Calcium	62000		250	130	ug/L	1		6020A	Total Recoverable
Iron	93 I		100	33	ug/L	1		6020A	Total Recoverable
Potassium	2400		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	13000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	46000		500	250	ug/L	1		6020A	Total Recoverable
Iron	51 I		100	33	ug/L	1		6020A	Dissolved
Total Organic Carbon	1.6		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Alkalinity	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	210		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	370		10	10	mg/L	1		SM 2540C	Total/NA

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63138-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	16		0.50	0.25	mg/L	1		300.0	Total/NA
Fluoride	0.19		0.10	0.025	mg/L	1		300.0	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Detection Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2 (Continued)

Lab Sample ID: 660-63138-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	330		5.0	2.5	mg/L	10		300.0	Total/NA
SiO ₂ , Silica	17000		500	50	ug/L	1		200.7 Rev 4.4	Dissolved
Calcium	94000		250	130	ug/L	1		6020A	Total Recoverable
Potassium	5200		500	170	ug/L	1		6020A	Total Recoverable
Magnesium	22000		250	43	ug/L	1		6020A	Total Recoverable
Sodium	190000		500	250	ug/L	1		6020A	Total Recoverable
Total Organic Carbon	2.4		1.0	0.50	mg/L	1		5310 B-2011	Total/NA
Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Total Sulfide	7.5		1.0	1.0	mg/L	1		4500 S2 F-2011	Total/NA
Alkalinity	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L	1		SM 2320B	Total/NA
Total Dissolved Solids	820		25	25	mg/L	1		SM 2540C	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Tampa

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-63138-1

Matrix: Water

Date Collected: 10/01/14 14:45

Date Received: 10/01/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	38		1.0	0.50	mg/L			10/07/14 01:46	2
Fluoride	0.25		0.20	0.050	mg/L			10/07/14 01:46	2
Chloride	520		10	5.0	mg/L			10/07/14 01:30	20

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	24000		500	50	ug/L			10/09/14 10:55	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	14		2.5	1.3	ug/L			10/06/14 10:35	10/07/14 10:05
Calcium	110000		250	130	ug/L			10/06/14 10:35	10/07/14 10:05
Iron	33	U	100	33	ug/L			10/06/14 10:35	10/07/14 10:05
Potassium	6000		500	170	ug/L			10/06/14 10:35	10/07/14 10:05
Magnesium	31000		250	43	ug/L			10/06/14 10:35	10/07/14 10:05
Sodium	260000		500	250	ug/L			10/06/14 10:35	10/07/14 10:05

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			10/07/14 08:07	10/07/14 16:08

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			10/02/14 16:13	1
Total Organic Carbon	2.1		1.0	0.50	mg/L			10/03/14 15:53	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	5.2		1.0	1.0	mg/L			10/03/14 15:55	1
Alkalinity	200		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate Alkalinity as CaCO ₃	200		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate ion as HCO ₃	250		1.0	1.0	mg/L			10/02/14 12:45	1
Total Dissolved Solids	1300		25	25	mg/L			10/02/14 13:25	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-1

Lab Sample ID: 660-63138-2

Matrix: Water

Date Collected: 10/01/14 12:10

Date Received: 10/01/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	4.5		0.50	0.25	mg/L			10/07/14 02:16	1
Fluoride	0.26		0.10	0.025	mg/L			10/07/14 02:16	1
Chloride	170		2.0	1.0	mg/L			10/07/14 02:01	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	26000		500	50	ug/L			10/09/14 10:58	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.6		2.5	1.3	ug/L			10/06/14 10:35	1
Calcium	82000		250	130	ug/L			10/06/14 10:35	1
Iron	33	U	100	33	ug/L			10/06/14 10:35	1
Potassium	2500		500	170	ug/L			10/06/14 10:35	1
Magnesium	14000		250	43	ug/L			10/06/14 10:35	1
Sodium	75000		500	250	ug/L			10/06/14 10:35	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L			10/07/14 08:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			10/02/14 16:14	1
Total Organic Carbon	2.0		1.0	0.50	mg/L			10/03/14 16:07	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	3.9		1.0	1.0	mg/L			10/03/14 15:55	1
Alkalinity	180		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate ion as HCO ₃	220		1.0	1.0	mg/L			10/02/14 12:45	1
Total Dissolved Solids	530		17	17	mg/L			10/02/14 13:25	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63138-3

Matrix: Water

Date Collected: 10/01/14 11:40

Date Received: 10/01/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	15		0.50	0.25	mg/L			10/07/14 03:49	1
Fluoride	0.19		0.10	0.025	mg/L			10/07/14 03:49	1
Chloride	310		5.0	2.5	mg/L			10/07/14 03:03	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	20000		500	50	ug/L			10/09/14 11:01	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		10/06/14 10:35	10/07/14 10:20	1
Calcium	91000		250	130	ug/L		10/06/14 10:35	10/07/14 10:20	1
Iron	50	I	100	33	ug/L		10/06/14 10:35	10/07/14 10:20	1
Potassium	4300		500	170	ug/L		10/06/14 10:35	10/07/14 10:20	1
Magnesium	19000		250	43	ug/L		10/06/14 10:35	10/07/14 10:20	1
Sodium	160000		500	250	ug/L		10/06/14 10:35	10/07/14 10:20	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	39	I	100	33	ug/L		10/07/14 08:07	10/07/14 16:40	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			10/02/14 16:17	1
Total Organic Carbon	2.3		1.0	0.50	mg/L			10/03/14 16:23	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	6.4		1.0	1.0	mg/L			10/03/14 15:55	1
Alkalinity	180		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate Alkalinity as CaCO ₃	180		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate ion as HCO ₃ ⁻	220		1.0	1.0	mg/L			10/02/14 12:45	1
Total Dissolved Solids	760		25	25	mg/L			10/02/14 13:25	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: UZAMW-2

Lab Sample ID: 660-63138-4

Matrix: Water

Date Collected: 10/01/14 14:10

Date Received: 10/01/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	3.4		0.50	0.25	mg/L			10/07/14 04:20	1
Fluoride	0.36		0.10	0.025	mg/L			10/07/14 04:20	1
Chloride	95		2.0	1.0	mg/L			10/07/14 04:04	4

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	32000		500	50	ug/L			10/09/14 11:04	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	29		2.5	1.3	ug/L		10/06/14 10:35	10/07/14 10:28	1
Calcium	62000		250	130	ug/L		10/06/14 10:35	10/07/14 10:28	1
Iron	93 I		100	33	ug/L		10/06/14 10:35	10/07/14 10:28	1
Potassium	2400		500	170	ug/L		10/06/14 10:35	10/07/14 10:28	1
Magnesium	13000		250	43	ug/L		10/06/14 10:35	10/07/14 10:28	1
Sodium	46000		500	250	ug/L		10/06/14 10:35	10/07/14 10:28	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	51 I		100	33	ug/L		10/07/14 08:07	10/07/14 16:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			10/02/14 16:19	1
Total Organic Carbon	1.6		1.0	0.50	mg/L			10/03/14 17:12	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	1.0	U	1.0	1.0	mg/L			10/07/14 13:22	1
Alkalinity	170		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate Alkalinity as CaCO ₃	170		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate ion as HCO ₃ ⁻	210		1.0	1.0	mg/L			10/02/14 12:45	1
Total Dissolved Solids	370		10	10	mg/L			10/02/14 13:25	1

Client Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63138-5

Matrix: Water

Date Collected: 10/01/14 13:40

Date Received: 10/01/14 15:55

Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	16		0.50	0.25	mg/L			10/07/14 04:51	1
Fluoride	0.19		0.10	0.025	mg/L			10/07/14 04:51	1
Chloride	330		5.0	2.5	mg/L			10/07/14 04:35	10

Method: 200.7 Rev 4.4 - Metals (ICP) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
SiO ₂ , Silica	17000		500	50	ug/L			10/09/14 11:07	1

Method: 6020A - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	1.3	U	2.5	1.3	ug/L		10/06/14 10:35	10/07/14 10:35	1
Calcium	94000		250	130	ug/L		10/06/14 10:35	10/07/14 10:35	1
Iron	33	U	100	33	ug/L		10/06/14 10:35	10/07/14 10:35	1
Potassium	5200		500	170	ug/L		10/06/14 10:35	10/07/14 10:35	1
Magnesium	22000		250	43	ug/L		10/06/14 10:35	10/07/14 10:35	1
Sodium	190000		500	250	ug/L		10/06/14 10:35	10/07/14 10:35	1

Method: 6020A - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	33	U	100	33	ug/L		10/10/14 14:53	10/10/14 20:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	0.10	U	0.50	0.10	mg/L			10/02/14 16:20	1
Total Organic Carbon	2.4		1.0	0.50	mg/L			10/03/14 17:26	1
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Sulfide	7.5		1.0	1.0	mg/L			10/07/14 13:22	1
Alkalinity	190		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate Alkalinity as CaCO ₃	190		1.0	1.0	mg/L			10/02/14 12:45	1
Bicarbonate ion as HCO ₃	230		1.0	1.0	mg/L			10/02/14 12:45	1
Total Dissolved Solids	820		25	25	mg/L			10/02/14 13:25	1

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 680-352266/27

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352266

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Sulfate	0.25	U	0.50	0.25	mg/L			10/06/14 23:27	1
Fluoride	0.025	U	0.10	0.025	mg/L			10/06/14 23:27	1
Chloride	0.25	U	0.50	0.25	mg/L			10/06/14 23:27	1

Lab Sample ID: LCS 680-352266/28

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352266

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	Limits	%Rec.
		Result	Qualifier					
Sulfate	10.0	9.53		mg/L		95	90 - 110	
Fluoride	2.00	1.92		mg/L		96	90 - 110	
Chloride	10.0	9.37		mg/L		94	90 - 110	

Lab Sample ID: LCSD 680-352266/29

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352266

Analyte	Spike	LCSD	LCSD	Unit	D	%Rec	Limits	%Rec.	RPD	Limit
	Added	Result	Qualifier							
Sulfate	10.0	9.52		mg/L		95	90 - 110		0	30
Fluoride	2.00	1.91		mg/L		96	90 - 110		0	30
Chloride	10.0	9.34		mg/L		93	90 - 110		0	30

Lab Sample ID: 660-63138-3 MS

Client Sample ID: LZAMW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352266

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	%Rec.
	Result	Qualifier	Added	Result	Qualifier					
Sulfate	13		100	116		mg/L		103	80 - 120	
Fluoride	0.25		20.0	20.8		mg/L		104	80 - 120	
Chloride	310		100	407		mg/L		97	80 - 120	

Lab Sample ID: 660-63138-3 MSD

Client Sample ID: LZAMW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352266

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Sulfate	13		100	117		mg/L		103	80 - 120	0	30
Fluoride	0.25		20.0	20.9		mg/L		104	80 - 120	1	30
Chloride	310		100	407		mg/L		97	80 - 120	0	30

Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 680-352838/1-A

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Dissolved

Analysis Batch: 352812

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
SiO ₂ , Silica	50	U	500	50	ug/L			10/09/14 10:43	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: LCS 680-352838/2-A

Matrix: Water

Analysis Batch: 352812

Analyte		Spike	LCS	LCS	Unit	D	%Rec	%Rec.
		Added	Result	Qualifier				
SiO ₂ , Silica		10000	9700		ug/L		97	85 - 115

Lab Sample ID: 660-63138-5 MS

Matrix: Water

Analysis Batch: 352812

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec.
	Result	Qualifier	Added	Result	Qualifier				
SiO ₂ , Silica	17000		10000	25700		ug/L		83	75 - 125

Lab Sample ID: 660-63138-5 MSD

Matrix: Water

Analysis Batch: 352812

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec.	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
SiO ₂ , Silica	17000		10000	25900		ug/L		85	75 - 125	1	20

Method: 6020A - Metals (ICP/MS)

Lab Sample ID: MB 680-352161/1-A

Matrix: Water

Analysis Batch: 352392

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	1.3	U	2.5	1.3	ug/L		10/06/14 10:35	10/07/14 07:00	1
Calcium	130	U	250	130	ug/L		10/06/14 10:35	10/07/14 07:00	1
Iron	33	U	100	33	ug/L		10/06/14 10:35	10/07/14 07:00	1
Potassium	170	U	500	170	ug/L		10/06/14 10:35	10/07/14 07:00	1
Magnesium	43	U	250	43	ug/L		10/06/14 10:35	10/07/14 07:00	1
Sodium	250	U	500	250	ug/L		10/06/14 10:35	10/07/14 07:00	1

Lab Sample ID: LCS 680-352161/2-A

Matrix: Water

Analysis Batch: 352392

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Arsenic	100	104		ug/L		104	75 - 125
Calcium	5000	5250		ug/L		105	75 - 125
Iron	5000	5300		ug/L		106	75 - 125
Potassium	5000	5090		ug/L		102	75 - 125
Magnesium	5000	5070		ug/L		101	75 - 125
Sodium	5000	5060		ug/L		101	75 - 125

Lab Sample ID: 680-105752-G-9-B MS

Matrix: Water

Analysis Batch: 352392

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Arsenic	14		100	125		ug/L		111	75 - 125
Calcium	65000	J3	5000	67700	J3	ug/L		49	75 - 125

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: 680-105752-G-9-B MS

Matrix: Water

Analysis Batch: 352392

Client Sample ID: Matrix Spike

Prep Type: Dissolved

Prep Batch: 352161

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits	
	Result	Qualifier	Added	Result	Qualifier					
Iron	1600		5000	7270		ug/L		114	75 - 125	
Potassium	2900		5000	8280		ug/L		107	75 - 125	
Magnesium	45000	J3	5000	48200	J3	ug/L		71	75 - 125	
Sodium	12000	J3	5000	16600		ug/L		102	75 - 125	

Lab Sample ID: 680-105752-G-9-C MSD

Matrix: Water

Analysis Batch: 352392

Client Sample ID: Matrix Spike Duplicate

Prep Type: Dissolved

Prep Batch: 352161

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Arsenic	14		100	114		ug/L		101	75 - 125	9	20
Calcium	65000	J3	5000	61100	J3	ug/L		-83	75 - 125	10	20
Iron	1600		5000	6550		ug/L		99	75 - 125	10	20
Potassium	2900		5000	7700		ug/L		96	75 - 125	7	20
Magnesium	45000	J3	5000	43600	J3	ug/L		-21	75 - 125	10	20
Sodium	12000	J3	5000	15100	J3	ug/L		72	75 - 125	9	20

Lab Sample ID: MB 680-352279/1-B

Matrix: Water

Analysis Batch: 352581

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 352280

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		10/07/14 08:07	10/07/14 15:57	1

Lab Sample ID: LCS 680-352279/2-B

Matrix: Water

Analysis Batch: 352581

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 352280

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Iron	5000	5670		ug/L		113	75 - 125

Lab Sample ID: 660-63138-1 MS

Matrix: Water

Analysis Batch: 352581

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 352280

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	Limits
	Result	Qualifier	Added	Result	Qualifier				
Iron	33	U	5000	5710		ug/L		114	75 - 125

Lab Sample ID: 660-63138-1 MSD

Matrix: Water

Analysis Batch: 352581

Client Sample ID: RW-1

Prep Type: Dissolved

Prep Batch: 352280

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	Limits	RPD	Limit
	Result	Qualifier	Added	Result	Qualifier						
Iron	33	U	5000	6070		ug/L		121	75 - 125	6	20

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 6020A - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 680-353062/1-B

Matrix: Water

Analysis Batch: 353201

Client Sample ID: Method Blank

Prep Type: Dissolved

Prep Batch: 353064

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Iron	33	U	100	33	ug/L		10/10/14 14:53	10/10/14 20:24	1

Lab Sample ID: LCS 680-353062/2-B

Matrix: Water

Analysis Batch: 353201

Client Sample ID: Lab Control Sample

Prep Type: Dissolved

Prep Batch: 353064

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD
	Added								
Iron		5000	5830		ug/L		117	75 - 125	

Lab Sample ID: LCSD 680-353062/3-B

Matrix: Water

Analysis Batch: 353201

Client Sample ID: Lab Control Sample Dup

Prep Type: Dissolved

Prep Batch: 353064

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD
	Added								
Iron		5000	5730		ug/L		115	75 - 125	2

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 660-152017/13

Client Sample ID: Method Blank

Prep Type: Total/NA

Analysis Batch: 152017

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Nitrate as N	0.10	U	0.50	0.10	mg/L			10/02/14 16:05	1

Lab Sample ID: LCS 660-152017/15

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analysis Batch: 152017

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD
	Added								
Nitrate Nitrite as N		1.00	1.00		mg/L		100	90 - 110	
Nitrite as N		0.500	0.506		mg/L		101	90 - 110	

Lab Sample ID: 640-49308-J-1 MS

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analysis Batch: 152017

Analyte	Sample		Spike	MS		Unit	D	%Rec	Limits
	Result	Qualifier		Added					
Nitrate Nitrite as N	0.10	U	1.00	0.991		mg/L		99	90 - 110
Nitrite as N	0.10	U	0.500	0.492	I	mg/L		98	90 - 110

Lab Sample ID: 640-49308-J-1 MSD

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analysis Batch: 152017

Analyte	Sample		Spike	MSD		Unit	D	%Rec	Limits	RPD
	Result	Qualifier		Added						
Nitrate Nitrite as N	0.10	U	1.00	0.990		mg/L		99	90 - 110	0
Nitrite as N	0.10	U	0.500	0.496	I	mg/L		99	90 - 110	1

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 4500 S2 F-2011 - Sulfide, Total

Lab Sample ID: MB 680-351985/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351985

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			10/03/14 15:55	1

Lab Sample ID: LCS 680-351985/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351985

Analyte	Spike		LCS	LCS	Unit	D	%Rec.	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	
Total Sulfide		9.98	9.80	mg/L		98	75 - 125		

Lab Sample ID: LCSD 680-351985/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351985

Analyte	Spike		LCSD	LCSD	Unit	D	%Rec.	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	
Total Sulfide		9.98	9.80	mg/L		98	75 - 125	0	30

Lab Sample ID: 640-49314-E-1 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 351985

Analyte	Sample		DU	DU	Unit	D	Prepared	Analyzed	RPD
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	U	mg/L			NC	30

Lab Sample ID: MB 680-352403/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352403

Analyte	MB		RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	1.0	mg/L			10/07/14 13:22	1

Lab Sample ID: LCS 680-352403/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352403

Analyte	Spike		LCS	LCS	Unit	D	%Rec.	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	
Total Sulfide		9.98	10.2	mg/L		102	75 - 125		

Lab Sample ID: LCSD 680-352403/3

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352403

Analyte	Spike		LCSD	LCSD	Unit	D	%Rec.	Limits	RPD
	Added	Result	Qualifier	Unit	D	%Rec.	Limits	RPD	
Total Sulfide		9.98	10.1	mg/L		101	75 - 125	2	30

Lab Sample ID: 660-63138-4 DU

Client Sample ID: UZAMW-2

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352403

Analyte	Sample		DU	DU	Unit	D	Prepared	Analyzed	RPD
	Result	Qualifier							
Total Sulfide	1.0	U	1.0	U	mg/L			NC	30

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: 5310 B-2011 - Organic Carbon, Total (TOC)

Lab Sample ID: MB 680-352314/4

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352314

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Organic Carbon	0.50	U	1.0	0.50	mg/L			10/03/14 14:16	1

Lab Sample ID: LCS 680-352314/5

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352314

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec	Limits	RPD
	Added								
Total Organic Carbon		20.0	18.9		mg/L		94	80 - 120	

Lab Sample ID: LCSD 680-352314/6

Client Sample ID: Lab Control Sample Dup

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352314

Analyte	Spike		LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD
	Added								
Total Organic Carbon		20.0	18.6		mg/L		93	80 - 120	1

Lab Sample ID: 680-105839-H-17 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 352314

Analyte	Sample		DU Result	DU Qualifier	Unit	D		RPD
	Result	Qualifier						
Total Organic Carbon	0.51	I		0.50	U	mg/L		NC

Method: SM 2320B - Alkalinity

Lab Sample ID: MB 660-152016/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 152016

Analyte	MB		RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier						
Alkalinity	1.0	U	1.0	1.0 mg/L			10/02/14 12:45	1
Bicarbonate Alkalinity as CaCO3	1.0	U	1.0	1.0 mg/L			10/02/14 12:45	1
Bicarbonate ion as HCO3	1.0	U	1.0	1.0 mg/L			10/02/14 12:45	1

Lab Sample ID: LCS 660-152016/3

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 152016

Analyte	Spike		LCS Result	LCS Qualifier	Unit	D	%Rec
	Added						
Alkalinity		118	122		mg/L		103

Lab Sample ID: 660-63138-1 DU

Client Sample ID: RW-1

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 152016

Analyte	Sample		DU Result	DU Qualifier	Unit	D		RPD
	Result	Qualifier						
Alkalinity	200		202		mg/L			0.6
Bicarbonate Alkalinity as CaCO3	200		202		mg/L			0.6
Bicarbonate ion as HCO3	250		247		mg/L			0.6

TestAmerica Tampa

QC Sample Results

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method: SM 2320B - Alkalinity (Continued)

Lab Sample ID: 660-63138-5 DU

Matrix: Water

Analysis Batch: 152016

Client Sample ID: LZAMW-2

Prep Type: Total/NA

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Alkalinity	190		187		mg/L		0.3	30
Bicarbonate Alkalinity as CaCO ₃	190		187		mg/L		0.3	30
Bicarbonate ion as HCO ₃	230		229		mg/L		0.3	30

Method: SM 2540C - Solids, Total Dissolved (TDS)

Lab Sample ID: MB 660-152009/1

Client Sample ID: Method Blank

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 152009

Analyte	MB	MB	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Total Dissolved Solids	5.0	U	5.0	5.0	mg/L			10/02/14 13:25	1

Lab Sample ID: LCS 660-152009/2

Client Sample ID: Lab Control Sample

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 152009

Analyte	Spike	LCS	LCS	Unit	D	%Rec	Limits
	Added	Result	Qualifier				
Total Dissolved Solids	10000	9980		mg/L	100	100	80 - 120

Lab Sample ID: 660-63130-B-1 DU

Client Sample ID: Duplicate

Matrix: Water

Prep Type: Total/NA

Analysis Batch: 152009

Analyte	Sample	Sample	DU	DU	Unit	D	RPD	Limit
	Result	Qualifier	Result	Qualifier				
Total Dissolved Solids	460		476		mg/L		4	20

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

HPLC/IC

Analysis Batch: 352266

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Total/NA	Water	300.0	
660-63138-1	RW-1	Total/NA	Water	300.0	
660-63138-2	UZAMW-1	Total/NA	Water	300.0	
660-63138-2	UZAMW-1	Total/NA	Water	300.0	
660-63138-3	LZAMW-1	Total/NA	Water	300.0	
660-63138-3	LZAMW-1	Total/NA	Water	300.0	
660-63138-3 MS	LZAMW-1	Total/NA	Water	300.0	
660-63138-3 MSD	LZAMW-1	Total/NA	Water	300.0	
660-63138-4	UZAMW-2	Total/NA	Water	300.0	
660-63138-4	UZAMW-2	Total/NA	Water	300.0	
660-63138-5	LZAMW-2	Total/NA	Water	300.0	
660-63138-5	LZAMW-2	Total/NA	Water	300.0	
LCS 680-352266/28	Lab Control Sample	Total/NA	Water	300.0	
LCSD 680-352266/29	Lab Control Sample Dup	Total/NA	Water	300.0	
MB 680-352266/27	Method Blank	Total/NA	Water	300.0	

Metals

Prep Batch: 352161

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Total Recoverable	Water	3005A	
660-63138-2	UZAMW-1	Total Recoverable	Water	3005A	
660-63138-3	LZAMW-1	Total Recoverable	Water	3005A	
660-63138-4	UZAMW-2	Total Recoverable	Water	3005A	
660-63138-5	LZAMW-2	Total Recoverable	Water	3005A	
680-105752-G-9-B MS	Matrix Spike	Dissolved	Water	3005A	
680-105752-G-9-C MSD	Matrix Spike Duplicate	Dissolved	Water	3005A	
LCS 680-352161/2-A	Lab Control Sample	Total Recoverable	Water	3005A	
MB 680-352161/1-A	Method Blank	Total Recoverable	Water	3005A	

Filtration Batch: 352279

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Dissolved	Water	FILTRATION	
660-63138-1 MS	RW-1	Dissolved	Water	FILTRATION	
660-63138-1 MSD	RW-1	Dissolved	Water	FILTRATION	
660-63138-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-63138-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-63138-4	UZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-352279/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-352279/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 352280

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Dissolved	Water	3005A	352279
660-63138-1 MS	RW-1	Dissolved	Water	3005A	352279
660-63138-1 MSD	RW-1	Dissolved	Water	3005A	352279
660-63138-2	UZAMW-1	Dissolved	Water	3005A	352279
660-63138-3	LZAMW-1	Dissolved	Water	3005A	352279
660-63138-4	UZAMW-2	Dissolved	Water	3005A	352279
LCS 680-352279/2-B	Lab Control Sample	Dissolved	Water	3005A	352279

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.
 Project/Site: Clearwater Groundwater Analysis CLWGRS

TestAmerica Job ID: 660-63138-1

Metals (Continued)

Prep Batch: 352280 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 680-352279/1-B	Method Blank	Dissolved	Water	3005A	352279

Analysis Batch: 352392

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Total Recoverable	Water	6020A	352161
660-63138-2	UZAMW-1	Total Recoverable	Water	6020A	352161
660-63138-3	LZAMW-1	Total Recoverable	Water	6020A	352161
660-63138-4	UZAMW-2	Total Recoverable	Water	6020A	352161
660-63138-5	LZAMW-2	Total Recoverable	Water	6020A	352161
680-105752-G-9-B MS	Matrix Spike	Dissolved	Water	6020A	352161
680-105752-G-9-C MSD	Matrix Spike Duplicate	Dissolved	Water	6020A	352161
LCS 680-352161/2-A	Lab Control Sample	Total Recoverable	Water	6020A	352161
MB 680-352161/1-A	Method Blank	Total Recoverable	Water	6020A	352161

Analysis Batch: 352581

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Dissolved	Water	6020A	352280
660-63138-1 MS	RW-1	Dissolved	Water	6020A	352280
660-63138-1 MSD	RW-1	Dissolved	Water	6020A	352280
660-63138-2	UZAMW-1	Dissolved	Water	6020A	352280
660-63138-3	LZAMW-1	Dissolved	Water	6020A	352280
660-63138-4	UZAMW-2	Dissolved	Water	6020A	352280
LCS 680-352279/2-B	Lab Control Sample	Dissolved	Water	6020A	352280
MB 680-352279/1-B	Method Blank	Dissolved	Water	6020A	352280

Analysis Batch: 352812

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Dissolved	Water	200.7 Rev 4.4	352838
660-63138-2	UZAMW-1	Dissolved	Water	200.7 Rev 4.4	352838
660-63138-3	LZAMW-1	Dissolved	Water	200.7 Rev 4.4	352838
660-63138-4	UZAMW-2	Dissolved	Water	200.7 Rev 4.4	352838
660-63138-5	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	352838
660-63138-5 MS	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	352838
660-63138-5 MSD	LZAMW-2	Dissolved	Water	200.7 Rev 4.4	352838
LCS 680-352838/2-A	Lab Control Sample	Dissolved	Water	200.7 Rev 4.4	352838
MB 680-352838/1-A	Method Blank	Dissolved	Water	200.7 Rev 4.4	352838

Filtration Batch: 352838

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Dissolved	Water	FILTRATION	
660-63138-2	UZAMW-1	Dissolved	Water	FILTRATION	
660-63138-3	LZAMW-1	Dissolved	Water	FILTRATION	
660-63138-4	UZAMW-2	Dissolved	Water	FILTRATION	
660-63138-5	LZAMW-2	Dissolved	Water	FILTRATION	
660-63138-5 MS	LZAMW-2	Dissolved	Water	FILTRATION	
660-63138-5 MSD	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-352838/2-A	Lab Control Sample	Dissolved	Water	FILTRATION	
MB 680-352838/1-A	Method Blank	Dissolved	Water	FILTRATION	

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Metals (Continued)

Filtration Batch: 353062

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-5	LZAMW-2	Dissolved	Water	FILTRATION	
LCS 680-353062/2-B	Lab Control Sample	Dissolved	Water	FILTRATION	
LCSD 680-353062/3-B	Lab Control Sample Dup	Dissolved	Water	FILTRATION	
MB 680-353062/1-B	Method Blank	Dissolved	Water	FILTRATION	

Prep Batch: 353064

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-5	LZAMW-2	Dissolved	Water	3005A	353062
LCS 680-353062/2-B	Lab Control Sample	Dissolved	Water	3005A	353062
LCSD 680-353062/3-B	Lab Control Sample Dup	Dissolved	Water	3005A	353062
MB 680-353062/1-B	Method Blank	Dissolved	Water	3005A	353062

Analysis Batch: 353201

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-5	LZAMW-2	Dissolved	Water	6020A	353064
LCS 680-353062/2-B	Lab Control Sample	Dissolved	Water	6020A	353064
LCSD 680-353062/3-B	Lab Control Sample Dup	Dissolved	Water	6020A	353064
MB 680-353062/1-B	Method Blank	Dissolved	Water	6020A	353064

General Chemistry

Analysis Batch: 152009

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63130-B-1 DU	Duplicate	Total/NA	Water	SM 2540C	
660-63138-1	RW-1	Total/NA	Water	SM 2540C	
660-63138-2	UZAMW-1	Total/NA	Water	SM 2540C	
660-63138-3	LZAMW-1	Total/NA	Water	SM 2540C	
660-63138-4	UZAMW-2	Total/NA	Water	SM 2540C	
660-63138-5	LZAMW-2	Total/NA	Water	SM 2540C	
LCS 660-152009/2	Lab Control Sample	Total/NA	Water	SM 2540C	
MB 660-152009/1	Method Blank	Total/NA	Water	SM 2540C	

Analysis Batch: 152016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Total/NA	Water	SM 2320B	
660-63138-1 DU	RW-1	Total/NA	Water	SM 2320B	
660-63138-2	UZAMW-1	Total/NA	Water	SM 2320B	
660-63138-3	LZAMW-1	Total/NA	Water	SM 2320B	
660-63138-4	UZAMW-2	Total/NA	Water	SM 2320B	
660-63138-5	LZAMW-2	Total/NA	Water	SM 2320B	
660-63138-5 DU	LZAMW-2	Total/NA	Water	SM 2320B	
LCS 660-152016/3	Lab Control Sample	Total/NA	Water	SM 2320B	
MB 660-152016/1	Method Blank	Total/NA	Water	SM 2320B	

Analysis Batch: 152017

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-49308-J-1 MS	Matrix Spike	Total/NA	Water	353.2	
640-49308-J-1 MSD	Matrix Spike Duplicate	Total/NA	Water	353.2	
660-63138-1	RW-1	Total/NA	Water	353.2	
660-63138-2	UZAMW-1	Total/NA	Water	353.2	

TestAmerica Tampa

QC Association Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

General Chemistry (Continued)

Analysis Batch: 152017 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-3	LZAMW-1	Total/NA	Water	353.2	
660-63138-4	UZAMW-2	Total/NA	Water	353.2	
660-63138-5	LZAMW-2	Total/NA	Water	353.2	
LCS 660-152017/15	Lab Control Sample	Total/NA	Water	353.2	
MB 660-152017/13	Method Blank	Total/NA	Water	353.2	

Analysis Batch: 351985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
640-49314-E-1 DU	Duplicate	Total/NA	Water	4500 S2 F-2011	
660-63138-1	RW-1	Total/NA	Water	4500 S2 F-2011	
660-63138-2	UZAMW-1	Total/NA	Water	4500 S2 F-2011	
660-63138-3	LZAMW-1	Total/NA	Water	4500 S2 F-2011	
LCS 680-351985/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-351985/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-351985/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Analysis Batch: 352314

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-1	RW-1	Total/NA	Water	5310 B-2011	
660-63138-2	UZAMW-1	Total/NA	Water	5310 B-2011	
660-63138-3	LZAMW-1	Total/NA	Water	5310 B-2011	
660-63138-4	UZAMW-2	Total/NA	Water	5310 B-2011	
660-63138-5	LZAMW-2	Total/NA	Water	5310 B-2011	
680-105839-H-17 DU	Duplicate	Total/NA	Water	5310 B-2011	
LCS 680-352314/5	Lab Control Sample	Total/NA	Water	5310 B-2011	
LCSD 680-352314/6	Lab Control Sample Dup	Total/NA	Water	5310 B-2011	
MB 680-352314/4	Method Blank	Total/NA	Water	5310 B-2011	

Analysis Batch: 352403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
660-63138-4	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-63138-4 DU	UZAMW-2	Total/NA	Water	4500 S2 F-2011	
660-63138-5	LZAMW-2	Total/NA	Water	4500 S2 F-2011	
LCS 680-352403/2	Lab Control Sample	Total/NA	Water	4500 S2 F-2011	
LCSD 680-352403/3	Lab Control Sample Dup	Total/NA	Water	4500 S2 F-2011	
MB 680-352403/1	Method Blank	Total/NA	Water	4500 S2 F-2011	

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: RW-1

Lab Sample ID: 660-63138-1

Matrix: Water

Date Collected: 10/01/14 14:45

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		20	352266	10/07/14 01:30	DAS	TAL SAV
Total/NA	Analysis	300.0		2	352266	10/07/14 01:46	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			352838	10/09/14 01:15	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	352812	10/09/14 10:55	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			352279	10/07/14 08:05	SP	TAL SAV
Dissolved	Prep	3005A			352280	10/07/14 08:07	SP	TAL SAV
Dissolved	Analysis	6020A		1	352581	10/07/14 16:08	BWR	TAL SAV
Total Recoverable	Prep	3005A			352161	10/06/14 10:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	352392	10/07/14 10:05	BWR	TAL SAV
Total/NA	Analysis	353.2			152017	10/02/14 16:13	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			351985	10/03/14 15:55	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011			352314	10/03/14 15:53	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			152016	10/02/14 12:45	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			152009	10/02/14 13:25	TKO	TAL TAM

Client Sample ID: UZAMW-1

Lab Sample ID: 660-63138-2

Matrix: Water

Date Collected: 10/01/14 12:10

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	352266	10/07/14 02:01	DAS	TAL SAV
Total/NA	Analysis	300.0		1	352266	10/07/14 02:16	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			352838	10/09/14 01:15	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	352812	10/09/14 10:58	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			352279	10/07/14 08:05	SP	TAL SAV
Dissolved	Prep	3005A			352280	10/07/14 08:07	SP	TAL SAV
Dissolved	Analysis	6020A		1	352581	10/07/14 16:35	BWR	TAL SAV
Total Recoverable	Prep	3005A			352161	10/06/14 10:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	352392	10/07/14 10:13	BWR	TAL SAV
Total/NA	Analysis	353.2			152017	10/02/14 16:14	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011			351985	10/03/14 15:55	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011			352314	10/03/14 16:07	PAT	TAL SAV
Total/NA	Analysis	SM 2320B			152016	10/02/14 12:45	SC1	TAL TAM
Total/NA	Analysis	SM 2540C			152009	10/02/14 13:25	TKO	TAL TAM

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63138-3

Matrix: Water

Date Collected: 10/01/14 11:40

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	352266	10/07/14 03:03	DAS	TAL SAV
Total/NA	Analysis	300.0		1	352266	10/07/14 03:49	DAS	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-1

Lab Sample ID: 660-63138-3

Date Collected: 10/01/14 11:40

Matrix: Water

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			352838	10/09/14 01:15	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	352812	10/09/14 11:01	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			352279	10/07/14 08:05	SP	TAL SAV
Dissolved	Prep	3005A			352280	10/07/14 08:07	SP	TAL SAV
Dissolved	Analysis	6020A		1	352581	10/07/14 16:40	BWR	TAL SAV
Total Recoverable	Prep	3005A			352161	10/06/14 10:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	352392	10/07/14 10:20	BWR	TAL SAV
Total/NA	Analysis	353.2		1	152017	10/02/14 16:17	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	351985	10/03/14 15:55	AJO	TAL SAV
Total/NA	Analysis	5310 B-2011		1	352314	10/03/14 16:23	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	152016	10/02/14 12:45	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	152009	10/02/14 13:25	TKO	TAL TAM

Client Sample ID: UZAMW-2

Lab Sample ID: 660-63138-4

Date Collected: 10/01/14 14:10

Matrix: Water

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		4	352266	10/07/14 04:04	DAS	TAL SAV
Total/NA	Analysis	300.0		1	352266	10/07/14 04:20	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			352838	10/09/14 01:15	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	352812	10/09/14 11:04	BCB	TAL SAV
Dissolved	Filtration	FILTRATION			352279	10/07/14 08:05	SP	TAL SAV
Dissolved	Prep	3005A			352280	10/07/14 08:07	SP	TAL SAV
Dissolved	Analysis	6020A		1	352581	10/07/14 16:46	BWR	TAL SAV
Total Recoverable	Prep	3005A			352161	10/06/14 10:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	352392	10/07/14 10:28	BWR	TAL SAV
Total/NA	Analysis	353.2		1	152017	10/02/14 16:19	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	352403	10/07/14 13:22	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	352314	10/03/14 17:12	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	152016	10/02/14 12:45	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	152009	10/02/14 13:25	TKO	TAL TAM

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63138-5

Date Collected: 10/01/14 13:40

Matrix: Water

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		10	352266	10/07/14 04:35	DAS	TAL SAV
Total/NA	Analysis	300.0		1	352266	10/07/14 04:51	DAS	TAL SAV
Dissolved	Filtration	FILTRATION			352838	10/09/14 01:15	BCB	TAL SAV
Dissolved	Analysis	200.7 Rev 4.4		1	352812	10/09/14 11:07	BCB	TAL SAV

TestAmerica Tampa

Lab Chronicle

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Client Sample ID: LZAMW-2

Lab Sample ID: 660-63138-5

Date Collected: 10/01/14 13:40

Matrix: Water

Date Received: 10/01/14 15:55

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Filtration	FILTRATION			353062	10/10/14 14:51	SP	TAL SAV
Dissolved	Prep	3005A			353064	10/10/14 14:53	SP	TAL SAV
Dissolved	Analysis	6020A		1	353201	10/10/14 20:46	BWR	TAL SAV
Total Recoverable	Prep	3005A			352161	10/06/14 10:35	SP	TAL SAV
Total Recoverable	Analysis	6020A		1	352392	10/07/14 10:35	BWR	TAL SAV
Total/NA	Analysis	353.2		1	152017	10/02/14 16:20	ELE	TAL TAM
Total/NA	Analysis	4500 S2 F-2011		1	352403	10/07/14 13:22	ANH	TAL SAV
Total/NA	Analysis	5310 B-2011		1	352314	10/03/14 17:26	PAT	TAL SAV
Total/NA	Analysis	SM 2320B		1	152016	10/02/14 12:45	SC1	TAL TAM
Total/NA	Analysis	SM 2540C		1	152009	10/02/14 13:25	TKO	TAL TAM

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858

TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Method Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	MCAWW	TAL SAV
200.7 Rev 4.4	Metals (ICP)	40CFR136A	TAL SAV
6020A	Metals (ICP/MS)	SW846	TAL SAV
353.2	Nitrogen, Nitrate-Nitrite	MCAWW	TAL TAM
4500 S2 F-2011	Sulfide, Total	SM	TAL SAV
5310 B-2011	Organic Carbon, Total (TOC)	SM	TAL SAV
SM 2320B	Alkalinity	SM	TAL TAM
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL TAM

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAV = TestAmerica Savannah, 5102 LaRoche Avenue, Savannah, GA 31404, TEL (912)354-7858
TAL TAM = TestAmerica Tampa, 6712 Benjamin Road, Suite 100, Tampa, FL 33634, TEL (813)885-7427

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Tampa

The certifications listed below are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Florida	NELAP	4	E84282	06-30-15

Laboratory: TestAmerica Savannah

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
	AFCEE		SAVLAB	
A2LA	DoD ELAP		399.01	02-28-15
A2LA	ISO/IEC 17025		399.01	02-28-15
Alabama	State Program	4	41450	06-30-15
Arkansas DEQ	State Program	6	88-0692	01-31-15
California	NELAP	9	3217CA	07-31-14 *
Colorado	State Program	8	N/A	12-31-14
Connecticut	State Program	1	PH-0161	03-31-15
Florida	NELAP	4	E87052	06-30-15
GA Dept. of Agriculture	State Program	4	N/A	06-12-17
Georgia	State Program	4	N/A	06-30-15
Georgia	State Program	4	803	06-30-15
Guam	State Program	9	09-005r	04-16-15
Hawaii	State Program	9	N/A	06-30-15
Illinois	NELAP	5	200022	11-30-14 *
Indiana	State Program	5	N/A	06-30-15
Iowa	State Program	7	353	07-01-15
Kentucky (DW)	State Program	4	90084	12-31-14
Kentucky (UST)	State Program	4	18	06-30-15
Louisiana	NELAP	6	30690	06-30-14 *
Louisiana (DW)	NELAP	6	LA140023	12-31-14
Maine	State Program	1	GA00006	09-24-16
Maryland	State Program	3	250	12-31-14
Massachusetts	State Program	1	M-GA006	06-30-15
Michigan	State Program	5	9925	06-30-15
Mississippi	State Program	4	N/A	06-30-15
Montana	State Program	8	CERT0081	01-01-15
Nebraska	State Program	7	TestAmerica-Savannah	06-30-15
New Jersey	NELAP	2	GA769	06-30-15
New Mexico	State Program	6	N/A	06-30-15
New York	NELAP	2	10842	03-31-15
North Carolina (DW)	State Program	4	13701	07-31-15
North Carolina (WW/SW)	State Program	4	269	12-31-14
Oklahoma	State Program	6	9984	08-31-15
Pennsylvania	NELAP	3	68-00474	06-30-15
Puerto Rico	State Program	2	GA00006	12-31-14
South Carolina	State Program	4	98001	06-30-14 *
Tennessee	State Program	4	TN02961	06-30-15
Texas	NELAP	6	T104704185-08-TX	11-30-14 *
USDA	Federal		SAV 3-04	06-11-17
Virginia	NELAP	3	460161	06-14-15
Washington	State Program	10	C805	06-10-15
West Virginia (DW)	State Program	3	9950C	12-31-14
West Virginia DEP	State Program	3	94	06-30-15

* Certification renewal pending - certification considered valid.

TestAmerica Tampa

Certification Summary

Client: Leggette, Brashears & Graham, Inc.

TestAmerica Job ID: 660-63138-1

Project/Site: Clearwater Groundwater Analysis CLWGRS

Laboratory: TestAmerica Savannah (Continued)

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Wisconsin	State Program	5	999819810	08-31-15
Wyoming	State Program	8	8TMS-L	06-30-15

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TestAmerica Tampa



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Page 1 of 1

Address: _____

Logbook, Diaries & Journal, nice
Address:

Due Date Requested:

Preservation Codeless.

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-63138-1

Login Number: 63138

List Source: TestAmerica Tampa

List Number: 1

Creator: Southers, Kristin B

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Leggette, Brashears & Graham, Inc.

Job Number: 660-63138-1

Login Number: 63138

List Source: TestAmerica Savannah

List Number: 2

List Creation: 10/02/14 02:07 PM

Creator: West, Lauren H

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX D
IndeWater Core Analysis Report

**PRELIMINARY EVALUATION OF THE TRACE METAL LEACHING POTENTIAL OF
SOURCE WATER FROM THE CLEARWATER GROUNDWATER REPLENISHMENT
PROJECT**

By

INDEWATER, LLC
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REPORT PRESENTED TO THE CITY OF CLEARWATER, FLORIDA

INDEWATER, LLC

JULY 31, 2014

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ACKNOWLEDGMENTS

We sincerely appreciate the financial support for this project provided by the City of Clearwater, Florida and the Southwest Florida Water Management District. The delivery of this project was aided by in-kind services provided by the University of Florida Department of Environmental Engineering Sciences, the University of Florida Department of Soil and Water Sciences and the Florida Geological Survey. Field support during core collection and preservation was provided by Leggette, Brashears & Graham, Inc. Field support, including operation of the Pilot System, during the core-column studies was provided by the City of Clearwater and Tetra Tech. The contributions of these organizations are gratefully acknowledged.

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CHAPTER 1 INTRODUCTION

Background

In an effort to reduce discharge of and more fully utilize reclaimed water the City of Clearwater (City) is proceeding with a Groundwater Replenishment (GWR) Program and is investigating the potential to purify reclaimed water from the City's Northeast Water Reclamation Facility (NEWRF). The GWR Program will investigate the effects of recharging Lower Zone A of the Upper Floridan aquifer (UFA) with up to 3 million gallons per day (MGD) of purified reclaimed water at the NEWRF site (Figure 1-1). The GWR Program has included the construction and operation of a Pilot Treatment System (Pilot System) that included ultrafiltration (UF), reverse osmosis (RO), advanced oxidation process (AOP) and post-treatment stabilization via carbon dioxide, calcium hydroxide (CaOH_2) and sodium bisulfide (NaHS) addition. The Pilot System also included membrane degasification contactors and the addition of NaHS for degasification of the purified reclaimed water. The GWR Program has included construction of exploratory wells, with core collection, a test recharge well and associated monitoring wells. An aquifer performance test (APT) and long duration test recharge event, using native groundwater water, are also included as part of the GWR Program.

The Southwest Florida Water Management District (SWFWMD) is co-operatively funding the GRW Program. The SWFWMD is very interested in this alternative water supply project and wants to ensure that risk to the groundwater resources and other groundwater users in the area are minimized. The mobilization of metals such as arsenic, uranium, selenium, vanadium, iron, antimony and molybdenum during Artificial

Recharge (AR) and Aquifer Storage Recovery (ASR) have become a regulatory concern for implementing these alternative water supply strategies (Arthur and Fischler, 2008; Arthur et al., 2007a). The feasibility of small and large-scale direct recharge projects has come into question due to the occurrence of these metals when present above the maximum contaminant levels (MCL) at ASR sites in Florida (Arthur et al., 2005, 2002). Arsenic, whose MCL is 10 µg/L, has been shown to be toxic even at low-level exposures. Field-scale and laboratory-scale research efforts, to date, have focused on the primary mineral phases and conditions that contribute to the mobilization of arsenic (Price and Pichler, 2006; Jones and Pichler, 2007; Mirecki, 2006, Norton 2007, Norton et al., 2011). Research at ASR facilities, utilizing pretreatment techniques, has shown that oxidants in the injection water are the primary factors controlling mobilization and that removing the oxidants (primarily oxygen) can eliminate the mobilization issue (Norton, et al., 2014).

Purpose

Trace metal leaching potential is dependent on the chemical properties of the injected water and the native aquifer conditions. Research to date has been limited to treated surface water or treated groundwater as the source water for injection. The water used for injection, therefore, contained minerals (e.g., calcium carbonate) and other compounds (e.g., dissolved organic matter) natural to the sources of the water. The City intends to inject purified reclaimed water that has been through a multiple treatment barrier process of UF, RO and AOP, with subsequent stabilization via addition of carbon dioxide, CaOH₂ and NaHS, and membrane contactors for degasification. The interaction of the aggressive nature of RO treated water with the aquifer may pose another mobilization mechanism. Given that the Clearwater Groundwater

Replenishment Project is proposing to recharge purified reclaimed water into the Lower Zone A (Suwannee Limestone) of the UFA, the potential for mobilization of trace metals, by the oxidation of native minerals, and the potential for dissolution of limestone needed to be evaluated. The purpose of this project was, therefore, to assist the City with conducting a preliminary (initial) evaluation of the trace metal leaching potential, including limestone dissolution, of source waters from the City's Pilot System. The tests were completed using Suwannee limestone cores collected from adjacent to a future exploratory well (i.e., Test Recharge Well No. 1 (TRW-1)) constructed at the site (Figure 1-1).

Objectives and Tasks

The primary objective of this project was to complete a preliminary evaluation of the oxidation and dissolution potential of six proposed pretreatment levels, including; 1) stabilized UF/RO/AOP water, 2) membrane degasified UF/RO/AOP water with 2-Log DO removal, 3) membrane degasified UF/RO/AOP water with 4-Log DO removal, 4) chemically treated UF/RO/AOP water with 2-Log DO removal, 5) chemically treated UF/RO/AOP water with 4-Log DO removal, and 6) chemically treated UFRO/AOP water with 1 to 2-Log DO removal, on limestone cores collected at a proposed recharge well site. All UF/RO/AOP purified water will be chemically stabilized by the addition of CaOH₂, prior to receiving additional treatment. A secondary objective of this project was to complete a limited mineralogical analysis of the rock core to support geochemical modeling being completed by the City.

This project was broken into three major tasks. Task 1 included the collection and preservation of Suwannee limestone cores from the intended recharge interval at the NEWRF site. Task 1 also included completion of intact core-column studies, utilizing

preserved core materials, to evaluate the trace metal leaching potential of source waters from the Pilot System. Task 2 included a limited mineralogical analysis of leached (rock cores utilized in Task 1) and un-leached core samples. Reporting was completed under Task 3.



Figure 1-1. Site location map showing TRW-1 well location.

CHAPTER 2 INTACT CORE COLUMN STUDIES

Objective

The primary objective of this project was to complete a preliminary evaluation of the oxidation and dissolution potential of six proposed pretreatment levels, including; 1) stabilized UF/RO/AOP water, 2) membrane degasified UF/RO/AOP water with 2-Log DO removal, 3) membrane degasified UF/RO/AOP water with 4-Log DO removal, 4) chemically treated UF/RO/AOP water with 2-Log DO removal, 5) chemically treated UF/RO/AOP water with 4-Log DO removal, and 6) chemically treated UFRO/AOP water with 1 to 2-Log DO removal, on limestone cores collected at a proposed recharge well site. All UF/RO/AOP purified water will be chemically stabilized by the addition of CaOH₂, prior to receiving additional treatment.

Methods

Core Collection and Preservation

Laboratory investigations of arsenic mobilization during ASR completed to date have relied upon core materials that have been in storage under atmospheric (i.e., warehouse) conditions (Arthur et al., 2007a, Fischler et al., 2010, Arthur et al., 2007b). The results of these studies may have been impacted by the alteration (e.g., pyrite oxidation) of the core samples by exposure to an oxygen rich environment. Results from a recent ASR batch study, utilizing split samples of preserved and purposefully unpreserved core materials, indicated that core preservation is necessary to prevent oxidation of the core materials prior to testing and analysis (Norton 2011). Therefore, this task included collection and preservation of Suwannee Limestone core for use in intact core-column studies.

In April 2013 core samples from the Lower Zone A (Suwannee Limestone) of the Upper Floridan Aquifer were collected at the City's NEWRF. Coring was conducted at approximately 12 feet North of TRW-1, which is located at latitude 28° 01' 47.46"N, longitude 82° 42' 11.81"W (Figure 1-1). Cores were collected using a Failing 1500 wire-line coring rig and a 2.5-inch HQ core barrel (Bit Size: 3.78-inch OD and 2.5-inch ID). These tools produce an approximate 2.5-inch OD core.

Surface casings were installed, prior to coring, to maintain bore-hole competence within the upper unconsolidated sediments and to prevent cross-connection of waters between the surficial aquifer, productive intervals of the intermediate confining unit, the Tampa Member, and the underlying Suwannee Limestone. A 4-inch steel casing was set in place across the unconsolidated surficial sediments and into the Tampa Member from 0 to 80 feet (ft) below land surface (bls).

To minimize core-exposure to atmospheric conditions (i.e., maintain native conditions) during drilling, make-up water used to cool the bit during coring was pumped from the nearby TRW-1 well, which is constructed with an open bore-hole interval within the Lower Zone A of the Suwannee Limestone. Samples collected at the TRW-1 well showed the source of drilling makeup water to be reducing, with a strong sulfur odor. The air-lift technique was used to clear the bore-hole of cuttings approximately every 10 to 20 ft by inserting a PVC tremie pipe to approximately 60 ft (bls), which is about 140 ft above the top of the core interval. With the outer core-barrel sitting near the bottom of the open hole, air was pushed into the upper-casing. As the air rises and expands it creates a lift (suction) effect and pulls water into the borehole from the lower formation. The water rises with the air and is allowed to discharge at the surface. While care was

taken to maintain native conditions during coring, it is possible that air was entrained through the pipes, hoses, pumps, and tanks that make up the drilling system. However, pumping the well with the air-lift technique should have caused native groundwater to flow into the bore-hole, reducing the exposure of the core to non-native conditions. The entire thickness of the Lower Zone A of the Suwannee Limestone from approximately 200 to 340 ft (bls) was cored using this procedure. In general, core recovery rates were high, exceeding 90% recovered for many of the core intervals. Core recovery appeared to be low in areas of high porosity, fractures, and/or poorly indurated sediments. A geologic log completed during coring is provided in Appendix A.

Upon retrieval of the core from the core barrel, the core was placed onto 5 ft sections of longitudinally split 3-inch thin wall PVC tube (Figure 2-1). Photographs of the core were taken and the core was covered with the top half of the PVC tube. The two halves were then taped together using vinyl tape and the core was inserted into the core-storage vessels. The core-preservation vessels were constructed of 3-inch Sch. 80 PVC pipe, capped on each end, with an inlet and outlet brass valves near each end of the pipe and a dual-scale pressure/vacuum gauge installed at the outlet (top) valve (Figures 2-2 and 2-3). New natural sponges were used as packing material to fill the gap between the inner core sleeve and outer core preservation vessel. Once the vessels were capped, at the upper valve, a vacuum (-28 to -29 inch Hg) was applied for less than 1-minute. This was followed by the application of a positive nitrogen (N_2) head of approximately 11 to 12 psi, at the lower valve, while continuing to pull the vacuum at the top valve. The N_2 feed line was purged prior to connection at the lower valve. The N_2 flow was then turned off by closing the lower valve and a vacuum of -28

to -29 inches Hg was again applied. This procedure, vacuum and N₂ flush, was repeated three times prior to the final fill of N₂ of 11 to 15 psi. This procedure was applied to each vessel and, to date (July 2014), none of the vessels has lost more than approximately 1-2 psi of pressure. Approximately 110 ft of core was preserved using this technique. Another 10 ft of core was deliberately left unpreserved and stored only in cold-storage boxes.



Figure 2-1. Core placed onto 3-inch split, thin-wall PVC tube.



Figure 2-2. Core preservation vessels ready to receive core.



Figure 2-3. Core preservation vessels in storage rack at UF-EES laboratory.

Selection of Core Materials

Batch-scale laboratory studies of Florida ASR sites completed to date have utilized unpreserved and crushed core materials (Arthur et al., 2007a; Fischler et al., 2010, Arthur et al., 2007b). Crushing the rock core increases the exposed surface area, thereby increasing the potential for oxidation of the core which has been shown to affect leaching test results. For flow through column experiments, crushing the core also alters the porosity, adversely affecting the flow paths and flow rates through the core material. Therefore, intact core materials were utilized during this study.

Core materials utilized in this study were from the 260 to 290 feet bls interval, as this is the expected to be the primary productive interval of the TRW-1 well. A description of the core material utilized in this study is provided in Appendix A.

Core Hydraulic Tests

Laboratory testing was conducted to 1) evaluate the hydraulic properties of the Suwannee Limestone core materials collected at the City's NEWRF and 2) confirm that the natural organic rubber sleeve prevented short-circuiting of source waters, along the walls of the core, during column studies. Core columns were, therefore, setup and tested at the University of Florida (UF) Environmental Engineering Sciences (EES) laboratory using the general design of intact core columns described in Norton 2011 and detailed below.

The hydraulic properties of the limestone cores at depths of interest were determined by several tests including salt water pulse, salt water step, and falling head tests. These tests were completed using rubber sleeve materials of different thickness to determine the most effective rubber thickness for sealing the core within the column (Appendix B). The results from the initial laboratory testing were used to improve the

design (test methods including materials, sampling regime, etc.) of the column tests, prior to completing intact core column (trace-metal leaching) tests at the Pilot System.

Cores collected near TRW-1 at the City's NEWRF were used in the initial tests. These cores were retrieved from near the interval at which cores were collected for use in the trace metal leaching tests. Initial analysis was performed on each core by measuring the length and diameter to calculate the volume of the core. Dead volume was estimated based on measuring the uneven ends of the cores due to core breaking methods. Clean breaks could not be achieved without altering the hydraulic conductivity on the rock core ends.

Each column segment was constructed of 3-inch Sch. 40 PVC pipe of approximately 12-inches in length. To prevent short-circuiting of flow between the core and the PVC pipe, a natural rubber sleeve was used to seal the outer wall of the core segment to the PVC pipe. The rubber sleeve was inserted into the PVC pipe and the ends of the rubber sleeve were then pulled back over the edge of the PVC pipe, from the inside of the pipe the natural rubber was pulled outward, and clamped to the pipe using metal-ring clamps (Figure 2-4). A vacuum applied to the space between the inner wall of the pipe and the rubber sleeve caused the sleeve to expand outward, as it was pulled against the inner wall of the PVC pipe. This provided a secure and air tight seal and allowed for a segment of rock core to be inserted into the sleeve. The vacuum was slowly released holding the core and PVC end cap in place.

Solid 2.5-inch O.D. Sch. 80 PVC rods were machined to 2-inches in length, drilled through the center and tapped on one end for tube fitting. These sections were used in sealing the top and bottom of the core column during testing. Stainless steel

compression fittings, 1/8-inch Teflon tubing, and various valves and gas tubing materials were used to connect the core column to the water reservoirs and vacuum pump. The 1/8-inch Teflon tubing was extended through the solid PVC segments to near the face of the core such that the amount of dead space between the PVC plug and the core was minimized. The column was orientated in a vertical position, with the inlet on bottom and outlet on top, to allow the column to be filled from the bottom to the top to minimize trapping of air in the column, which could affect flow through the core. Images of a rock core and the initial column setup can be seen in Figure 2-4. The steps for conducting the salt water pulse, step, and falling head tests can be found in Appendix B.

The results from the initial core hydraulic tests conducted at the UF-EES laboratory were used to refine the sampling regime and guide the column tests conducted in the field at the Pilot System. Upon completion of the field event, cores used in the intact core column leaching tests were returned to the UF-EES laboratory for further examination (e.g., inspection, measurement, photography, etc.) in order to assess the hydraulic properties of the core (Appendix B). The core materials used in the leaching tests were not exposed to any additional water during the examination. After completing the examination, the cores were transferred to the FGS laboratory in Tallahassee, FL for mineralogical analysis (Chapter 3).

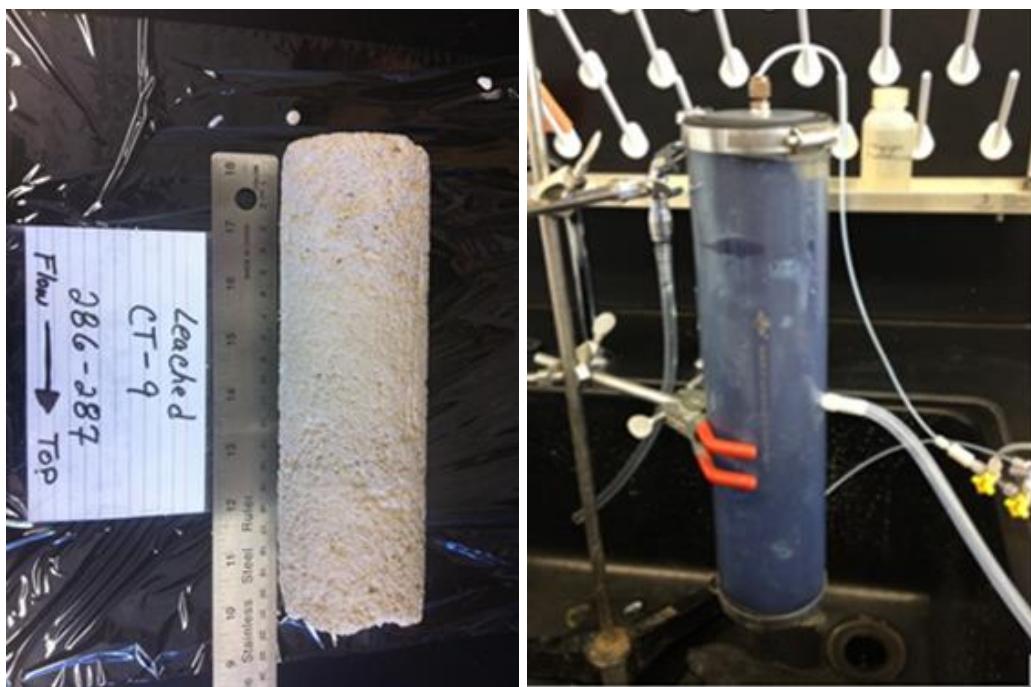


Figure 2-4. Rock core (left) and column fixture with core inside (right)

Column Leaching Tests

Nine intact core column tests were completed as part of this task, to provide a preliminary evaluation of the trace-metal leaching potential of six source waters, of varying treatment levels, produced by the Pilot System. The original scope of work included the completion of seven column tests (six column test using waters produced by the Pilot System and one test using native groundwater). However, there was a disruption in the operations of the Pilot System during the completion of column test CT-2 (high-DO test) during the initial field event. Therefore column tests CT-1 (NGW) and CT-2 were repeated at a later date. The original tests were identified as column tests CT-1a and CT-2a, while the repeats for these tests were identified as column tests CT-1b and CT-2b.

As described in Table 2-1 below, the Pilot System was operated, during the column tests, in a manner to produce waters with varying levels of dissolved oxygen

(DO), while consistently maintaining other key water quality parameters (e.g., pH, calcium concentrations, etc.). The column tests (CT) completed during this study included the following treatments:

- CT-1a and CT-1b were completed using native groundwater with a measured column inlet DO concentration of 18 ppb,
- CT-2a and CT-2b utilized high-DO source water with a measured column inlet DO concentration between 6.89 to 7.35 ppm and 7.14 to 8.21 ppm, respectively,
- CT-3 utilized source water with 2.2-log DO removal, through membrane degasification and without sodium hydrosulfide (NaHS) addition, which provided a column inlet DO concentration of 60 ppb,
- CT-4 utilized source water with 3-log DO removal, through membrane degasification and without NaHS addition, which provided a column inlet DO concentration of 9 ppb,
- CT-5 utilized source water with 2.3-log DO removal, through a combination of membrane degasification and NaHS addition, which provided a column inlet DO concentration of 40 ppb,
- CT-6 utilized source water with 3.5-log DO removal, through a combination of membrane degasification and NaHS addition, which provided a column inlet DO concentration of 3 ppb, and;
- CT-7 utilized source water with 1.2-log DO removal, through a combination of membrane degasification and NaHS addition, which provided a column inlet concentration of 600 ppb.

The DO concentration of the native groundwater was measured by a Rosemount Analytical sensor (model 1056 analyzer and TR 490 sensor) temporarily installed at the TRW-1 wellhead. The DO levels of the other waters used during the column tests were reported by the City of Clearwater using a Rosemount Analytical sensor (model 1056 analyzer and TR 490 sensor) permanently installed at the Pilot System. DO levels reported by the Hach field DO meter, installed inline, at the column outlet proved unreliable for measuring trace (low) DO levels and, therefore, are not addressed in this report.

The column tests were conducted in the field in order to easily obtain access to the native groundwater and source waters utilized during the experiments. Column test CT-1a and CT-2a were completed during August 7 to 8, 2013. The remaining column tests (CT-1b, CT-2b, CT-3, CT-4, CT-5, CT-6 and CT-7) were completed September 30, 2013 to October 3, 2013.

Preserved core, collected near the TRW-1 well (described above), was transported to the field in core storage vessels. The vessels were opened to retrieve the core for use in column tests just prior to executing the leaching tests. Once a core storage vessel was opened a segment of the core that was about 20 cm in length was selected in order to obtain an approximate (estimated) 100 mL pore volume. The exact length of each core was measured in the lab after completion of the column leaching test. The core was immediately submerged in a large bucket filled with native groundwater that was being continually pumped from the TRW-1 well so as to minimize exposure to oxygen. The column was packed using a wet packing method to minimize air entrapment. The packing took place in a second large bucket filled with native

groundwater. The column setup was the same as the setup used in the lab tests to determine the hydraulic properties of the cores, as described above. The column test utilized the thin rubber tubing, as described in Appendix B. Once the columns were packed under native groundwater, the column was transferred and connected to the Pilot System. When two core segments were retrieved from a single core storage vessel, one core segment, once packed in a column as described above, was left in a bucket under flowing native groundwater conditions to minimize exposure to atmospheric conditions. The packed columns were kept under native groundwater for no more than 6 hours. An image of the column test setup is provided in Figure 2-5.

A needle valve was used to connect the columns to the source water connection of the Pilot System. The column was orientated vertically such that source water would flow through tubing and enter the bottom of the column and exit through the top. All connecting tubing was flushed with source water prior to connection with the column in order to minimize trapped air. The top piece of the column was connected to tubing to allow water to flow out of the column and to an in-line DO meter followed by an in-line conductivity meter then to an in-line pH meter. From the pH meter water would flow through the tubing to the sampling location. All field probes were calibrated prior to use. As the sample exited the column, and passed the inline meters, the samples were allowed to drop into a plastic syringe. During collection the sample weight was monitored using a scale. Once the desired aliquot of sample was collected, a 0.45 micron filter was attached to the syringe, the sample was pressed through the filter and into a pre-labeled and pre-weighted plastic (HDPE) vial. Before sampling took place, the vials received a few drops of 1:4 nitric acid in them in order to preserve the samples

under low pH conditions. Upon collection all sample vials were tightly capped, placed on ice and stored in coolers.



Figure 2-5. Column test setup with connection to Pilot System

Column effluent water was sampled continuously during each leaching test, to provide high-resolution profiles of arsenic and other trace metals. Upon completion of the field events, the samples were brought to the UF-EES laboratory for dilution with nano-pure water, where required, to bring the final sample volume up to around 20 mL. Some of the samples had less than 20 mL volume because of the frequency at which the samples needed to be taken during the early phase of the column test in order to attempt to capture a more representative arsenic leaching profile. Therefore, the first 14 samples taken were diluted with 13 mL of water, and samples 15 through 24 were

diluted with 10 mL of water. The remaining samples (numbers 25 through 45) were not diluted. A concentration factor was used to determine the correct concentration of the arsenic once the analysis was complete. In addition to the samples collected during the leaching experiments, there were two samples taken of the source water before the start of the column tests as well as two samples taken at the end of the column tests. These samples allowed for background concentrations in the source water to be determined. The background samples and every fifth sample (e.g., sample numbers 5, 10, 15, etc.) collected during the column test was sent to Activation Laboratories, Ltd. for analysis (59 elements measured by ICP-MS). Samples for analysis of major anions (IC) and alkalinity (titration) were collected from the source water prior to and after the column tests and near the middle (sample number 27) and end (sample number 37) of the column tests. The samples were also analyzed by Activation Laboratories, Ltd. All other samples were analyzed for total arsenic (SM-3113B) by Benchmark EnviroAnalytical, Inc.

Table 2-1. Source waters utilized during column tests and their respective treatments

		COLUMN						
		1b	2b	3	4	5	6	7
Native Groundwater		x	-	-	-	-	-	-
TREATMENT	RO/AOP	-	x	x	x	x	x	x
	Stabilization	-	x	x	x	x	x	x
	Membrane Degasification	-	-	x	x	x	x	x
	Bisulfide Addition	-	-	-	-	2 ppm	2 ppm	2 ppm
FINISHED WATER CONCENTRATION	Calcium (mg/L as CaCO ₃)	-	78	78	78	78	78	78
	pH (S.U.)	-	7.8	7.8	7.8	7.8	7.8	7.8
	Peroxide (mg/L)	NM	1.2	1.2	1.2	0	0	0
	Total Chlorine (mg/L)	NM	0.2	0.2	0.2	0	0	0
	Dissolved Oxygen (Log Removal)	-	Not removed	2.2-log removal	3-log removal	2.3-log removal	3.5-log removal	1.2 log removal
	Dissolved Oxygen (mg/L)	-	Not removed	60 ppb	9 ppb	40 ppb	3 ppb	600 ppb

Results and Discussion

Core Hydraulic Tests

The porosities of the rock cores from the City's NEWRF were estimated to range between 11% and 22%. The vertical hydraulic conductivity of these cores are estimated to be around 12.3 m/day and 13.2 m/day. It was also observed from the results of the lab tests that the thin rubber tube worked well, thus it was used for all column experiments conducted in the field. Data for these results can be found in the Appendix B.

Detailed information for each of the nine rock cores used in the field testing can be found in Table 2-2 below. The length of the core was measured in the lab at the UF-EES after the column tests (leaching tests) were completed. The porosity of each rock core was determined based on moment analysis of the breakthrough curve for the conductivity of the effluent water over time. The method for calculating rock porosity is presented in Appendix B. The porosity of the cores for CT-1a and CT-1b were not determined because these columns utilized native groundwater and, therefore, there was no change in conductivity during the tests and a breakthrough curve was not generated.

There are several potential sources of error for these tests. It was difficult to maintain a constant flow rate for each column test as the discharge pressure from the Pilot System varied during the tests. Any dead volume or short-circuiting in the columns could have caused error as well. It is possible that CT-2a and CT-2b had some dead volume during the tests since the porosity of these cores was calculated to be much higher than the other cores. Dead volume would have occurred if the ends of the core did not match up well with the end pieces in the column.

Table 2-2. Core hydraulic test results.

Column Test ID	Test Water Parameters	Core Depth Interval (ft)	Core Length (cm)	Estimated Porosity
CT-1a	Native Groundwater	261 - 262	21.75	N/A
CT-1b	Native Groundwater	274.5 - 275.5	21.75	N/A
CT-2a	High-DO Surface Water	265 - 266	22	20%
CT-2b	High-DO Surface Water	286 - 287	19	22%
CT-3	2.2-Log DO removal, no NaHS	277 - 278	20.75	11%
CT-4	3-Log DO removal, no NaHS	282.5 - 283.5	19	15%
CT-5	2.3-Log DO removal with NaHS addition	276 - 277	24	14%
CT-6	3.5-Log DO removal with NaHS addition	281 - 282	16.75	16%
CT-7	1.2-Log DO removal with NaHS addition	285 - 286	19.5	16%

Note: All depth intervals are approximate.

Column Leaching Tests

As seen in Figure 2-6 and in Table 2-3 the peak arsenic concentrations measured for column tests CT-1a, CT-1b, CT-3, CT-4 and CT-5 were 24.42, 17.97, 42.13, 17.97 and 41.31 µg/L, respectively, which exceed the arsenic MCL of 10 µg/L. Arsenic remained below the 10 µg/L MCL during CT-2a, CT-2b, CT-6 and CT-7. Arsenic was, therefore, measured above the 10 µg/L MCL in 5 of the 9 columns test completed at the Clearwater site. The peak arsenic concentration was measured early, with approximately one to two pore volumes flushed through the core, in each of the column tests. The arsenic leaching curves presented in Figure 2-6 are difficult to interpret as there does not appear to be a significant correlation between the peak arsenic concentration observed during these experiments and the inlet source water quality,

including inlet DO concentration, the Pilot System treatment process utilized or the native arsenic concentration of the core.

Upon further review, however, there does appear to be significant correlations between the column inlet DO concentrations and the peak arsenic concentrations measured during the column tests. There is also a significant correlation between the column inlet DO concentrations and the total mass of arsenic leached during the column tests, as determined by integration of the arsenic values for the column effluent samples (Table 2-3). As seen in Figure 2-7, there are strong correlations ($R^2 = 0.896$ and 0.914) between the core column inlet DO concentrations, where inlet DO concentrations ranged from 20 ppb to 60 ppb, and the peak arsenic concentrations and the total mass of arsenic leached from the columns for the relatively low-DO column tests (CT-1a, CT-1b, CT-3 through CT-6). The increase in peak arsenic concentrations, and mass of arsenic leached from the core, with increasing inlet DO concentrations, is expected, based on arsenic leaching patterns reported at ASR sites in Florida. However, for core columns conducted with an inlet DO greater than 60 ppb, this relationship presents as a negative correlation, with the mass of arsenic leached from the core decreasing as inlet DO concentration increases. There is not sufficient arsenic leaching data for columns with inlet DO concentrations between 60 ppb and 7,000 ppb to properly evaluate this relationship. Sorption or co-precipitation of arsenic with newly formed iron-oxides at DO concentrations above 60 ppb is a possible mechanisms for the removal of arsenic from solution at high-DO concentrations.

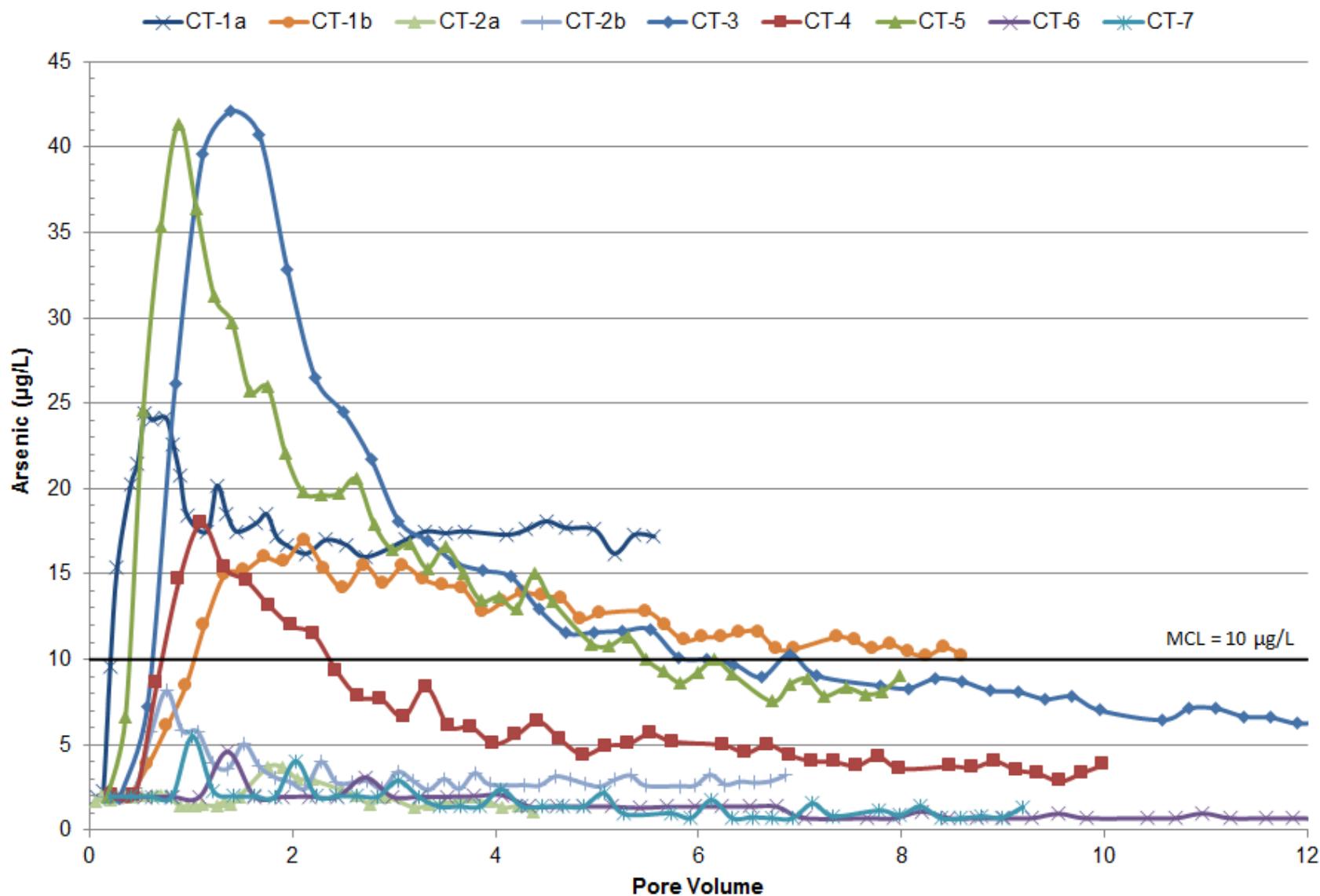


Figure 2-6. Arsenic concentration ($\mu\text{g}/\text{L}$) versus cumulative sample pore volume. Native groundwater columns CT-1a and CT-1b plotted using an assumed core porosity of 15 percent. For all other columns see Table 2-2.

Table 2-3. Column leaching test results.

Column Test ID	Test Parameters	Inlet DO	Peak As during CT (ppb)	Pore Volume at Peak Arsenic	Leached Arsenic Mass (ug)	Measured Arsenic in Core (ppm)
CT-1a	NGW	18 ppb ^a	24.42	0.54 ^c	8.33	N.A.
CT-1b	NGW	18 ppb ^a	16.91	2.11 ^c	10.02	2
CT-2a	High-DO SW	6.89 - 7.35 ppm ^a	3.69	1.76	0.95	N.A.
CT-2b	High-DO SW	7.14 - 8.21 ppm ^a	8.15	0.76	2.78	<1
CT-3	2.2-Log DO removal without NaHS	60 ppb ^b	42.13	1.40	11.64	<1
CT-4	3-Log DO removal without NaHS	9 ppb ^b	17.97	1.10	5.51	<1
CT-5	2.3-Log DO removal with NaHS	40 ppb ^b	41.31	0.88	13.63	2
CT-6	3.5-Log DO removal with NaHS	3 ppb ^b	4.59	1.36	1.22	<1
CT-7	1.2-Log DO removal with NaHS	600 ppb ^b	5.49	1.01	1.39	<1

a = As by temporary Rosemount Analytical instrument installed at TRW-1 well

b = As reported by Rosemount Analytical instrument permanently mounted at Pilot System

c = pore volume estimate based on assumed core porosity of 15%

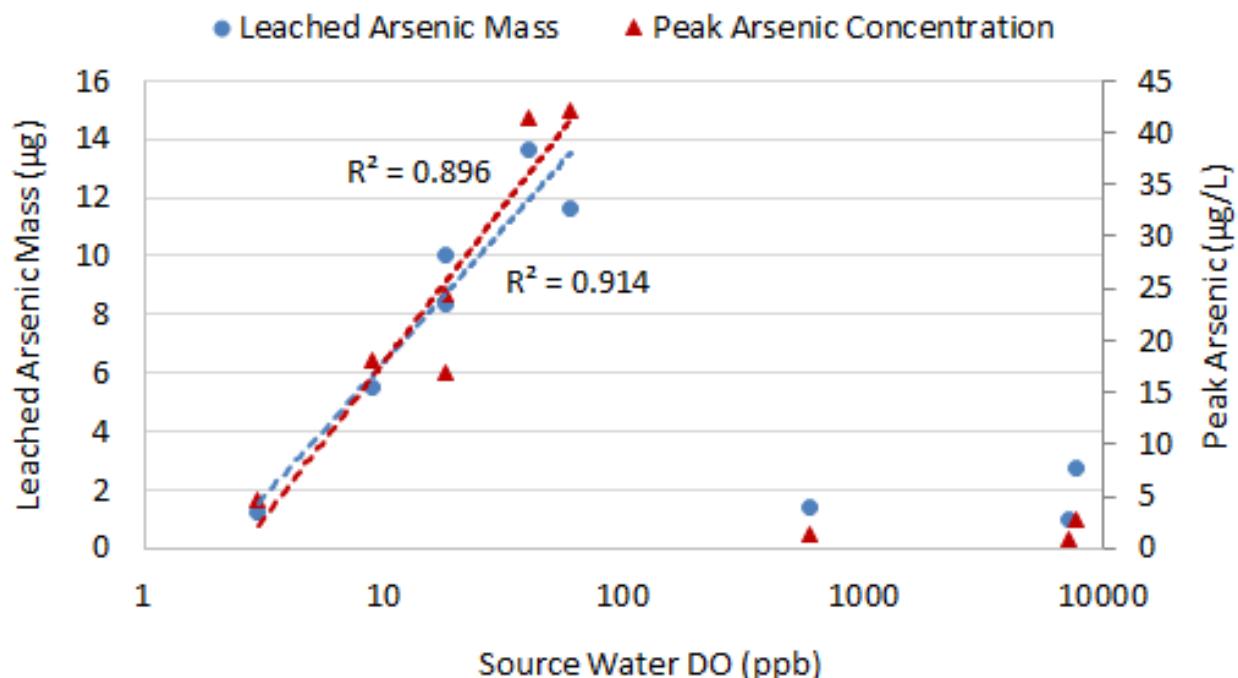
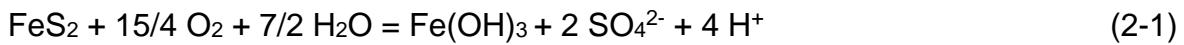


Figure 2-7. Peak arsenic concentration ($\mu\text{g}/\text{L}$) and mass of arsenic (μg) leached versus core column source water DO (ppb) concentration.

Assuming pyrite oxidation by DO occurred during the column tests, as follows, the formation of iron oxides (HFOs) would be expected:



However, with the exception of the native groundwater columns (CT-1a and CT-1b), a single sample in CT-7 (sample CT-7-30 = 20 µg/L) and CT-2a (average = 103 µg/L, n = 9), iron concentrations were reported below the method detection limit of 10 µg/L in all columns (Figure 2-8). This suggests that iron was rapidly removed from solution, likely through precipitation as iron oxides, during each of the tests. It should be noted, however, that another possible explanation for the lack of iron in these samples is precipitation of iron within the sample bottles. Core columns CT-1a and CT-2a were completed during the initial site visit, prior to the completion of the remaining columns due to a disruption in the operation of the Pilot System. Upon review of the dataset for CT-1a and CT-2a, and prior to completion of the remaining column tests, it was apparent that there was an interface in the analytical method (ICP-MS) used by Activation Laboratories, Ltd., as arsenic was reported below the MDL for all samples for CT-1a and CT-2a. These samples were digested, for total recoverable metals analysis, with hydrochloric acid. The arsenic results for CT-1a and CT-2a provide by Activation Laboratories, Ltd. contradict the results provided by Benchmark EnviroAnalytical, Inc., which utilized SM-3113B for arsenic analysis (Figure 2-6). The digestion method was, therefore, modified prior to completing the remaining columns. The digestion method also appears to have had an effect on the analytical results for iron. While significant concentrations of iron were measured in samples collected from CT-1a, CT-1b and CT-2a, as reported by Activation Laboratories, Ltd., iron was reported at or below the MDL

for the remaining columns. As a further complicating factor, the disruption of Pilot System operations occurred about one-third of the way through column test CT-2a. It appears this had an impact on leaching tests results for this column as low-pH water was passed through the core, which may have caused dissolution of the core.

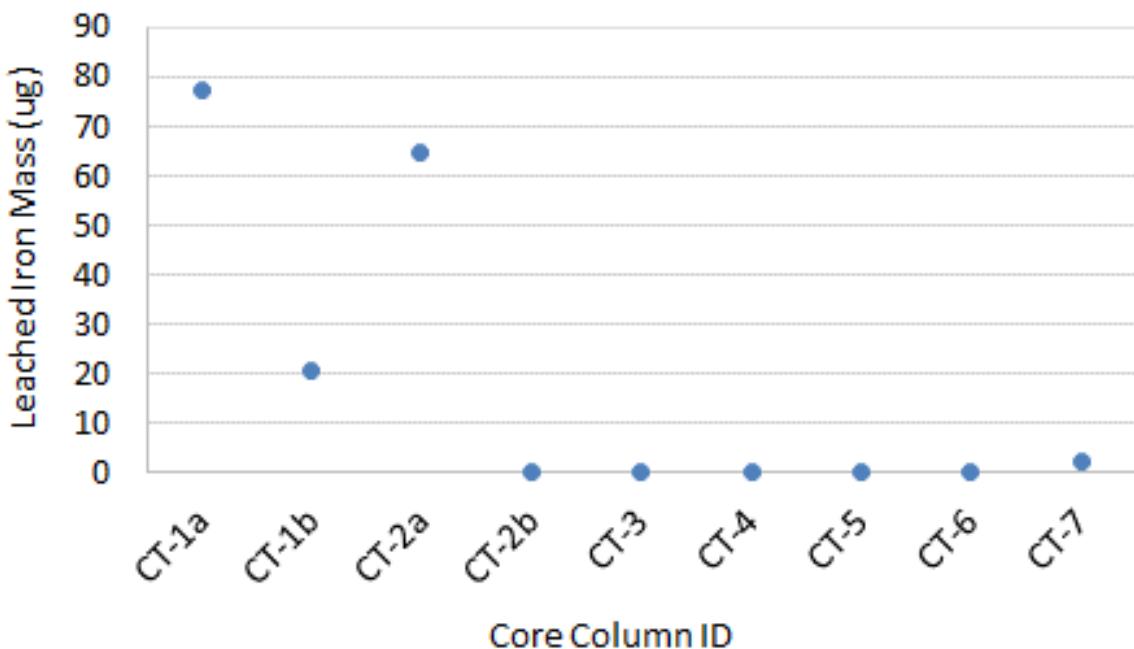


Figure 2-8. Mass of iron (μg) leached during core column tests. Samples with concentrations reported below the MDL (10 $\mu\text{g/L}$) were given a value of $\frac{1}{2}$ the MDL in mass calculations.

As presented in Eq. 2-1, the oxidation of pyrite produces sulfate through the oxidation of sulfide. As a Group VI element, molybdenum tends to mimic the behavior of sulfur in environmental systems, with stable oxidation states of +2, +4 and +6 (Railsback 2003). The mass of molybdenum leached from the core at each respective column inlet DO concentration follows a similar trend to that of arsenic, as shown in Figure 2-9. The mass of molybdenum leached from the core increases with increasing DO concentrations up to 60 ppb. At inlet DO concentrations above 60 ppb, this relationship reverses, with the mass of molybdenum decreasing with increasing DO. In

addition, there is a strong correlation ($R^2 = 0.943$) between the mass of molybdenum and mass of arsenic leached from the core (Figure 2-10).

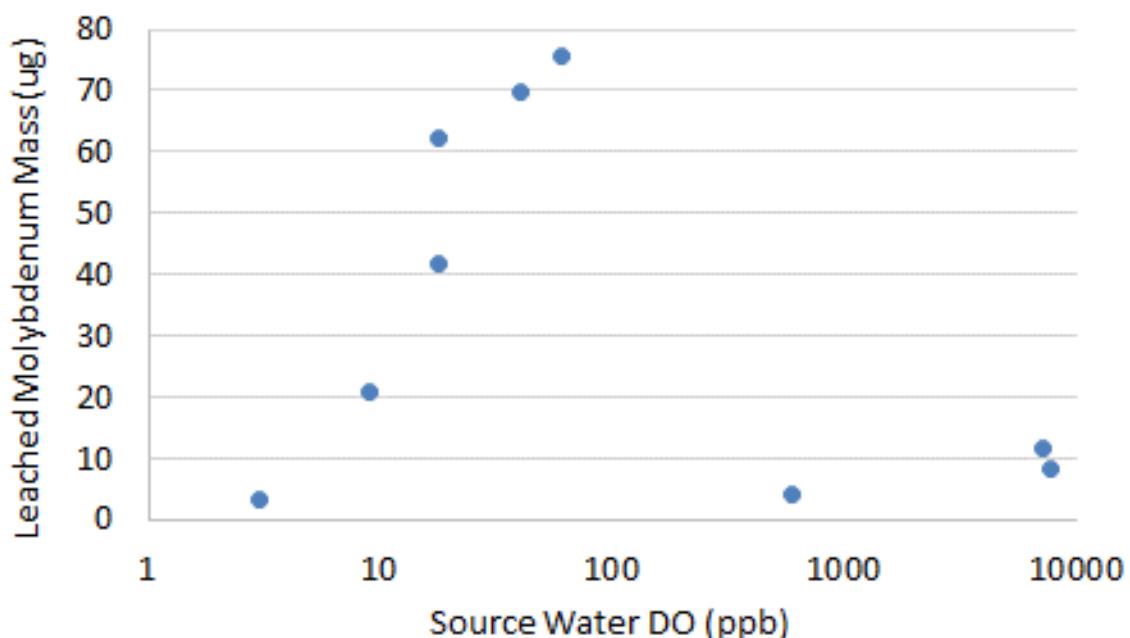


Figure 2-9. Mass of molybdenum leached (μg) versus core column source water DO (ppb) concentration.

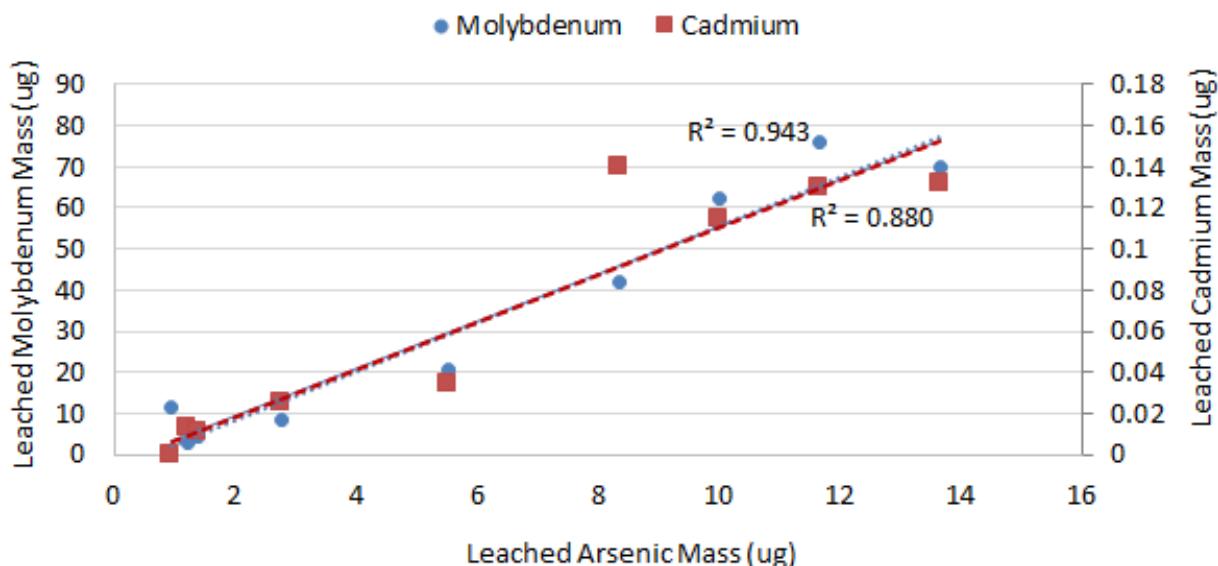


Figure 2-10. Mass of molybdenum and cadmium leached (μg) versus mass arsenic (μg) leached from core. Mass of cadmium for CT-2a considered an outlier and not included.

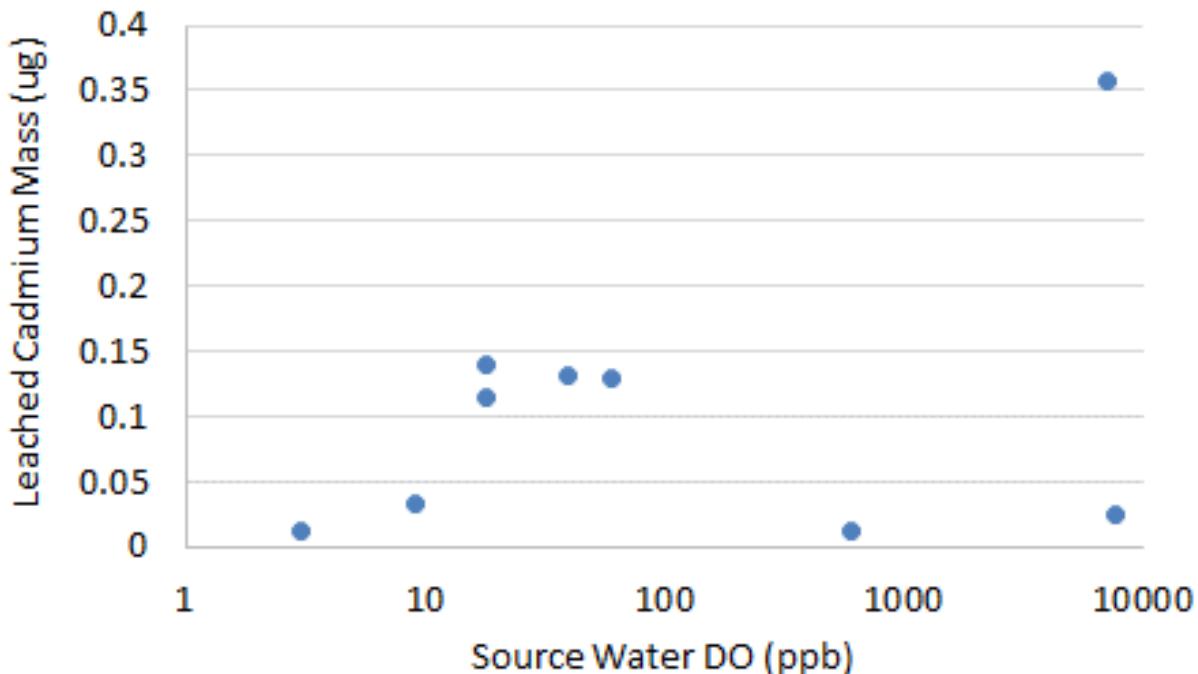


Figure 2-11. Mass cadmium leached (μg) versus source water DO. Mass of cadmium for CT-2a considered an outlier as this test was conducted during a disruption in Pilot System operations.

Although it is commonly found in environmental systems in the +2 oxidation state, as it tends to form simple oxide and simple sulfide minerals (Railsback 2003), cadmium is another redox sensitive metal with stable oxidation states of +1 and +2. Cadmium presented a behavior similar to that of arsenic, when comparing the source water DO concentration to the mass of cadmium leached from the core (Figure 2-11). The results from CT-2a, which was completed during a disruption in Pilot System operations, may be considered an outlier as this test had one sample with a reported cadmium concentration of 4.36 $\mu\text{g/L}$, while all other samples from this column test were reported at less than 0.12 $\mu\text{g/L}$. There is a significant correlation between the mass of arsenic leached and the mass of cadmium leached from the core ($R^2 = 0.880$), as shown in Figure 2-10, when excluding the results from CT-2a.

The leaching results for magnesium and manganese were similar to the iron results for these tests (Figure 2-12). Magnesium, iron and manganese remained below background concentrations, with the exception of native groundwater columns (CT-1a and CT-1b) and during CT-2a. The mass of manganese and iron leached during CT-2a is considered an outlier, however, as this test was conducted during a disruption in Pilot System operations, which allowed unstabilized (low-pH) water to pass through the column.

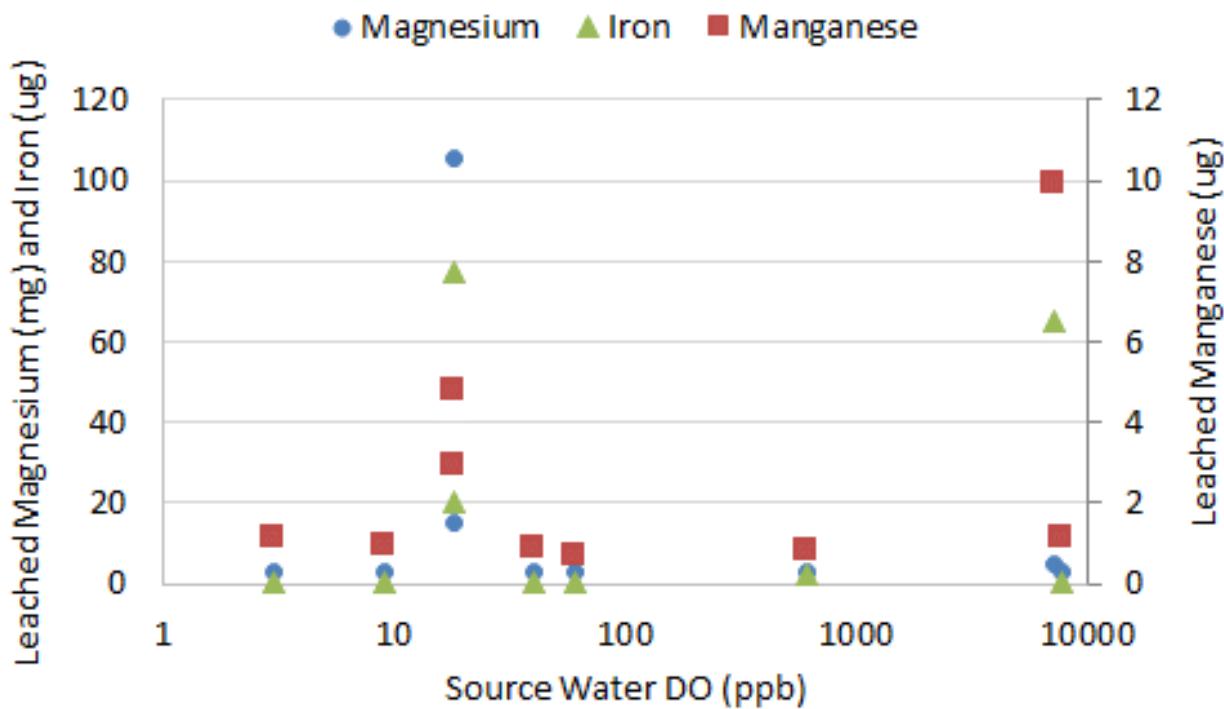


Figure 2-12. Mass magnesium (mg), iron (μ g) and manganese (μ g) leached from core versus source water DO. Mass of manganese and iron for CT-2a considered an outlier as this test was conducted during a disruption in Pilot System operations.

Uranium has been detected at concentrations above background levels at ASR sites in Florida, indicating uranium may be mobilized during AR. Uranium concentrations remained relatively low, however, in all column tests, with the exception of the native groundwater column CT-1b (Figure 2-13).

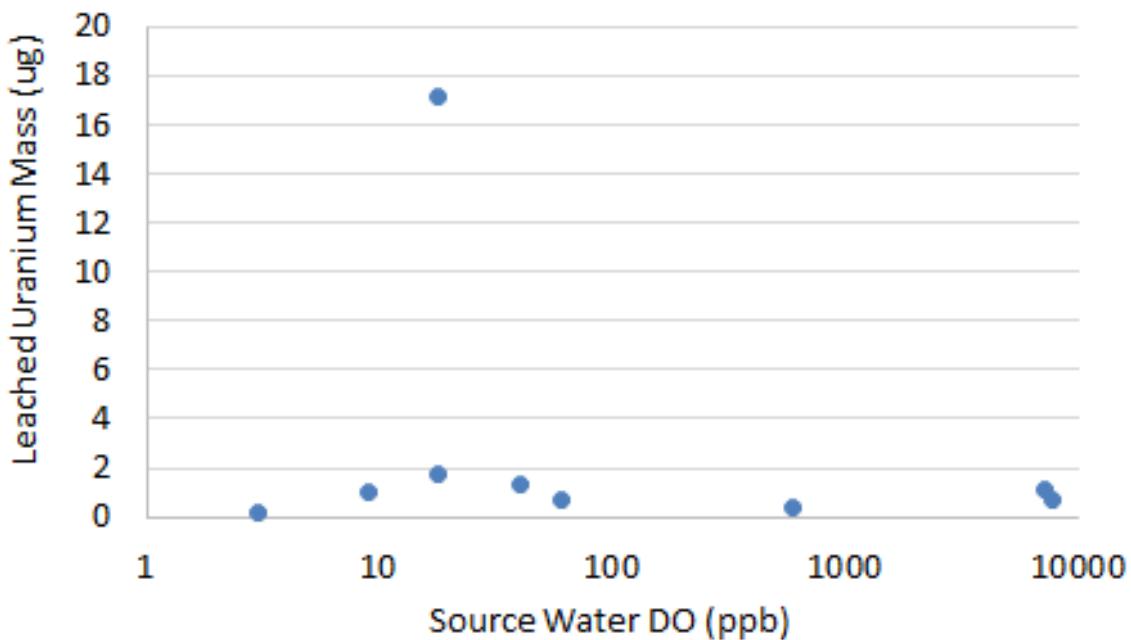


Figure 2-13. Uranium mass leached from core versus source water DO.

Other oxidizers, beyond DO, such as nitrate, chlorine, peroxide and sulfate, present in the source waters used during the column experiments were considered as potential mechanisms for arsenic release during pyrite oxidation. There was, however, no significant correlation between the concentration of these oxidizers in the source water and the mass of arsenic released from the core (Figure 2-14).

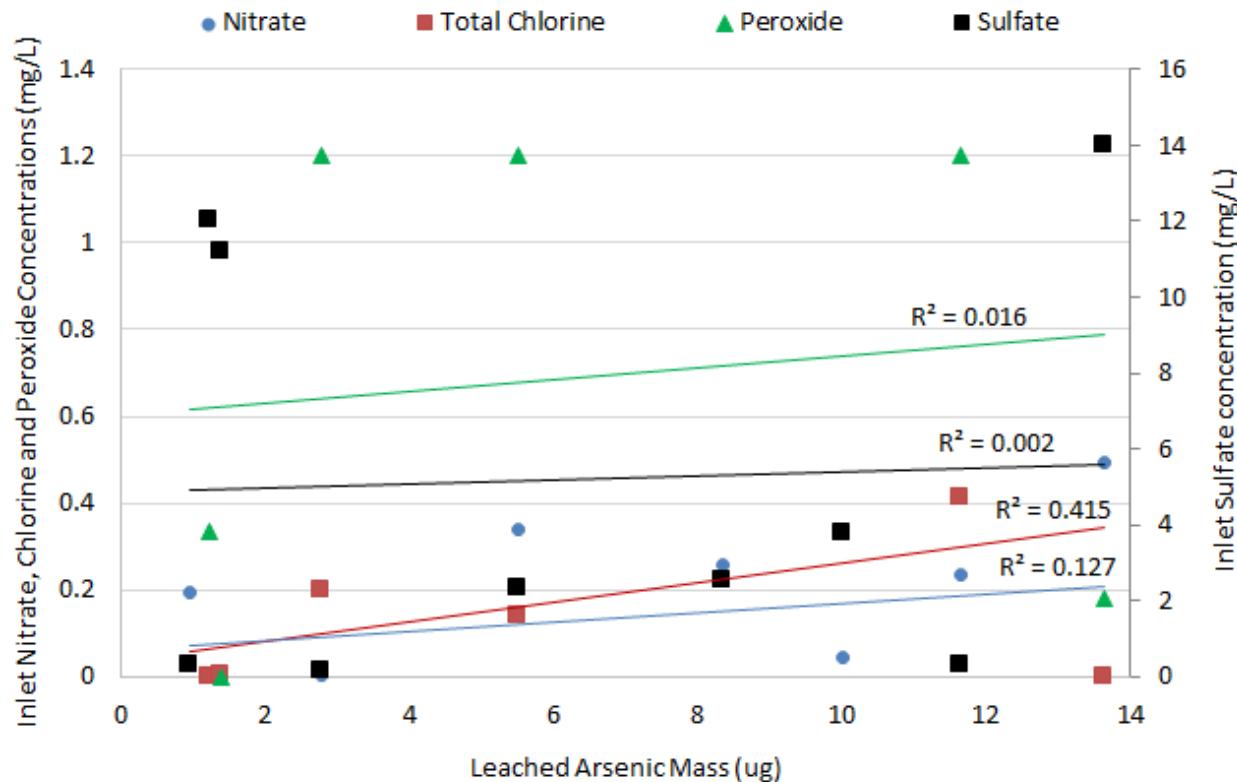


Figure 2-14: Mass of arsenic (μg) leached versus core column source water nitrate, total chlorine, peroxide and sulfate concentrations (mg/L).

While the discussion presented herein provides a summary of the column tests results, results for the complete aqueous analysis completed during this study are presented in Appendix C.

CHAPTER 3 MINERALOGICAL ANALYSIS

Objective

A secondary objective of this project is to complete a limited chemical and mineralogical analysis of core collected from the site in order to better understand the leaching potential of trace metals in the aquifer during AR and to support geochemical modeling being completed by the City.

Methods

Sample Collection

Core from a borehole adjacent to the Clearwater recharge well, TRW-1 (Figure 1-1), was collected and stored under anaerobic conditions. For a description of core collection and preservation methods see Chapter 2. Whole-rock geochemical analysis was completed on 14 core samples from TRW-1. The 14 samples consisted of preserved core from the Suwannee Limestone of the UFA with a depth range of 274-289 feet below land surface (ft BLS). Whole-rock geochemical analyses for these samples included multi-element, multi-method techniques as described below. Detailed mineralogical analyses were accomplished through a combination of scanning electron microscopy and electron probe microanalysis.

Core selection was completed in two parts. The first set of seven preserved samples were chosen from samples used in the column leaching test (Chapter 2) and the second set were chosen to match as closely as possible to the depths of the first seven samples. These latter samples remained preserved and unleached (Table 3-1).

Each sample consisted of approximately 6 to 12 inch length (15.24 to 30.48 cm) and 2.5 inch diameter (6.35 cm) rock core. After the column leaching tests were

completed subsamples of the seven leached cores and the seven preserved and unleached cores were collected by the following procedure: A water-cooled trim saw was used to cut the thin section tabs from all core sections. To minimize contamination, the trim saw is reserved solely for projects requiring geochemical analysis. After trimming, each sample was rinsed with distilled de-ionized water. The samples were air-dried overnight on a clean countertop in the laboratory. Thin section tabs were sent to Vancouver Petrographics Ltd (VanPetro; British Columbia, Canada) for polished slide preparation. The remaining sample material was sent to Activation Laboratories Ltd (ActLabs; Ancaster, Canada) for crushing and bulk rock analyses.

Splitting and Pulverizing

Rock powders were required for lithogeochemical analyses. The crushing and pulverization of core samples into rock powders, including the splitting of core samples, was done by ActLabs, analysis code RX2. Additional details on the laboratory methods can be found at the ActLabs website:

<http://www.actlabs.com/list.aspx?menu=64&app=226&cat1=549&tp=12&lk=no>

Table 3-1. Sample ID and analyses.

Column Test ID	TEST Parameters *	Sample Depth (ft BLS)	Core Condition	Formation	Lithogeochem	Thin section (SEM and WDS)	XRD
CT-1b	NGW	274-275.5	Leached	Suwannee Limestone	X	X	X
CT-5	2.3 log DO removal w/ NaHS	276-277	Leached	Suwannee Limestone	X	X	X
CT-3	2.2 log DO removal w/out NaHS	277-278	Leached	Suwannee Limestone	X	X	X
CT-6	3.5 log DO removal w/ NaHS	281-282	Leached	Suwannee Limestone	X	X	X
CT-4	3 log DO removal w/out NaHS	282.5-283.5	Leached	Suwannee Limestone	X	X	X
CT-7	1.2 log DO removal w/ NaHS	285-286	Leached	Suwannee Limestone	X	X	X
CT-2b	High DO SW	286-287	Leached	Suwannee Limestone	X	X	X
-	Preserved Core	274	Unleached	Suwannee Limestone	X	X	X
-	Preserved Core	275-276	Unleached	Suwannee Limestone	X	X	X
-	Preserved Core	278-279	Unleached	Suwannee Limestone	X	X	X
-	Preserved Core	279-280	Unleached	Suwannee Limestone	X	X	X
-	Preserved Core	280-281	Unleached	Suwannee Limestone	X	X	X
-	Preserved Core	284-285	Unleached	Suwannee Limestone	X	X	X
-	Preserved Core	288-289	Unleached	Suwannee Limestone	X	X	X

*NGW = native groundwater, SW = source water, w/ = with, NaHS = sodium hydrosulfide, DO = dissolved oxygen

Scanning Electron Microscopy and Microprobe Analysis

Trace mineralogical analyses were completed for a variety of spectroscopic analyses, including scanning electron microscopy (SEM), back-scattered electron imaging (BSE) and electron probe microanalysis (EPMA) which included energy-dispersive x-ray spectroscopy (EDS) and wavelength dispersive spectroscopy (WDS). Prior to image analysis, all thin sections were sputter-coated with carbon at the University of New Mexico Center for Micro-engineered Materials (UNM/CMEM). BSE images enhance contrast between different minerals or mineral compositions based on the average atomic number; the higher the average atomic number, the brighter the mineral. Note the several bright pyrite framboids in Figure 3-1. These BSE images were used along with EDS to locate and verify the presence of pyrite grains in the thin sections.

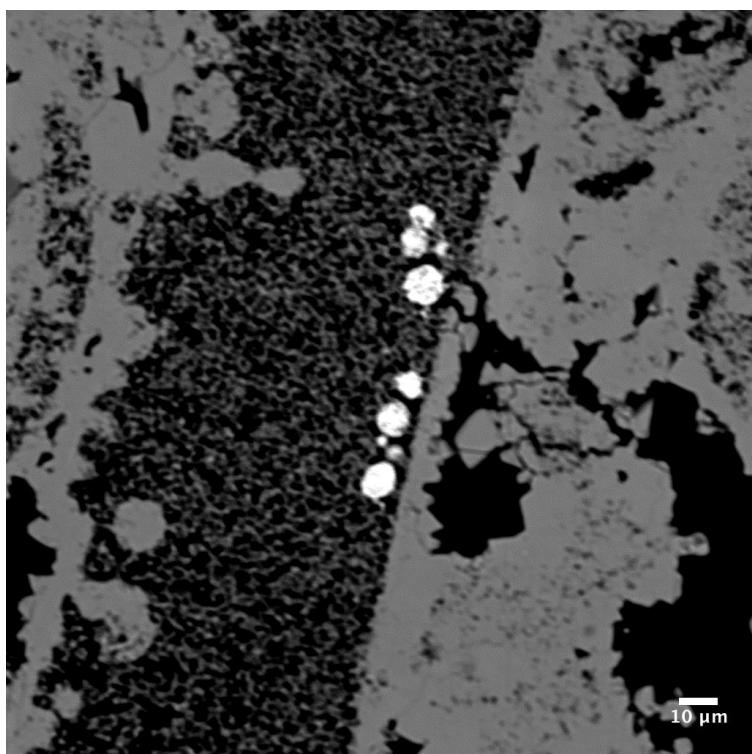


Figure 3-1. BSE image of pyrite framboids in a carbonate matrix, unleached 275-276 ft sample.

Quantitative EPMA was performed remotely via the Internet at UNM/CMEM using a JEOL 8200 microprobe with five wavelength dispersive spectrometers and an ultrathin-window energy dispersive spectrometer. A beam of accelerated electrons is focused (within 1-9 cubic microns) on the surface of the specimen and characteristic X-rays are produced and detected at a particular energy (or wavelength) and the intensity is measured to determine concentration. It is these "characteristic x-ray lines", ranging in energy from 0.1 - 15 keV that the electron microprobe uses to identify and quantify the elements present in the sample. Each element has a specific set of X-rays that it emits. These X-rays are collected as peaks in a spectrum, which correspond to specific X-ray lines that allows the elements to be identified. A typical peak width for WDS is 2-20 eV allowing better resolution than EDS which is 70-130 eV (Goldstein et al., 2007). The increased resolution of WDS allows easier detection and identification of peaks at concentrations about an order of magnitude lower than EDS. The resolution differences between EDS and WDS are important in situations in which adjacent peaks overlap, making it difficult to identify or quantify each of the peaks. The better resolution of the WDS makes identifying and quantifying these peaks possible.

Polished, carbon-coated thin sections were analyzed using a 20 nÅ probe current. Minerals were analyzed by one of two element settings: a metal setting that included 11 elements, and a carbonate setting with 14 oxides. Element maps of selected specimens were also collected, and show within-grain elemental distributions which are based on intensity (or counts) over the collection period and represent a greater concentration based on material concentration (Figure 3-2). Within each element map is a composite picture (CP), which does not reflect composition.

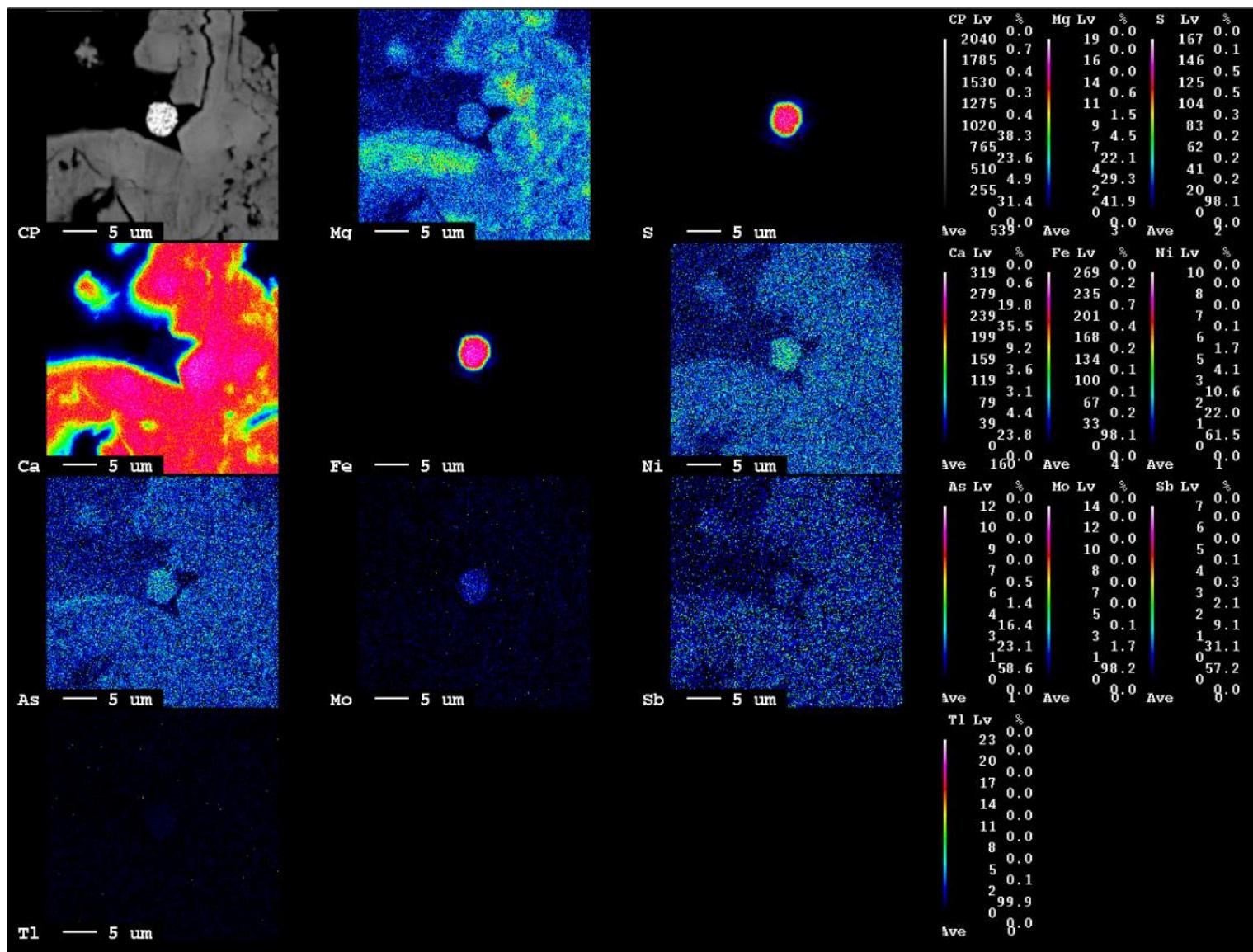


Figure 3-2. Element map, pyrite framboid in carbonate, unleached 274 ft sample.

The theoretical analytical detection limit for analyzed arsenic concentration was approximately 160 ppm; however, this threshold can vary in response to instrumental settings and sample matrix. Accuracy and precision of arsenic analyses performed with the UNM/CMEM microprobe were assessed using non-certified reference material obtained from the U.S. Geological Survey (USGS) Geochemical Reference Materials Program. Preferably, any calibration standard used should be similar to the material being analyzed and at the same concentrations expected in the unknown samples. Suitable low arsenic standards, other than the USGS basalt glass reference material utilized in this study, are not available. The USGS reference materials were prepared in a basalt glass matrix, with target arsenic concentrations of zero ppm, 500 ppm, 2,000 ppm, and 5,000 ppm (actual values as determined by the USGS were zero, 723 ppm, 3200 ppm, and 8600 ppm, respectively). Quantitative analyses of the project samples were completed using WDS with detection limits listed in Table 3-2. Detection limits for the metal analyses were based on the 1-sigma value for sulfides from the “Taylor pyrite standard” and oxides were based on USGS basalt glass reference material (personal communication Mike Spilde, UNM, Institute of Meteoritics). Figure 3-3 shows a calibration check curve for arsenic using the basalt glass reference material and the UNM/CMEM JEOL 8200.

Table 3-2. Detection limits for WDS metals and carbonate analyses.

Element	Mo	As	Fe	S	Se	Co	Tl	Ni	Cu	Ti	Ca
ppm	155	161	159	68	167	163	246	182	255	137	96
1-sigma detection limits for sulfides on pyrite standard.											
Oxide	Al ₂ O ₃	SrO	Na ₂ O	FeO	SiO ₂	P ₂ O ₅	MgO	CaO	MoO ₃	As ₂ O ₅	BaO
ppm	142	157	102	190	208	268	189	165	194	232	308
1-sigma detection limits for oxides on basalt glass reference material											
TiO ₂	415	UO ₂	260	247							

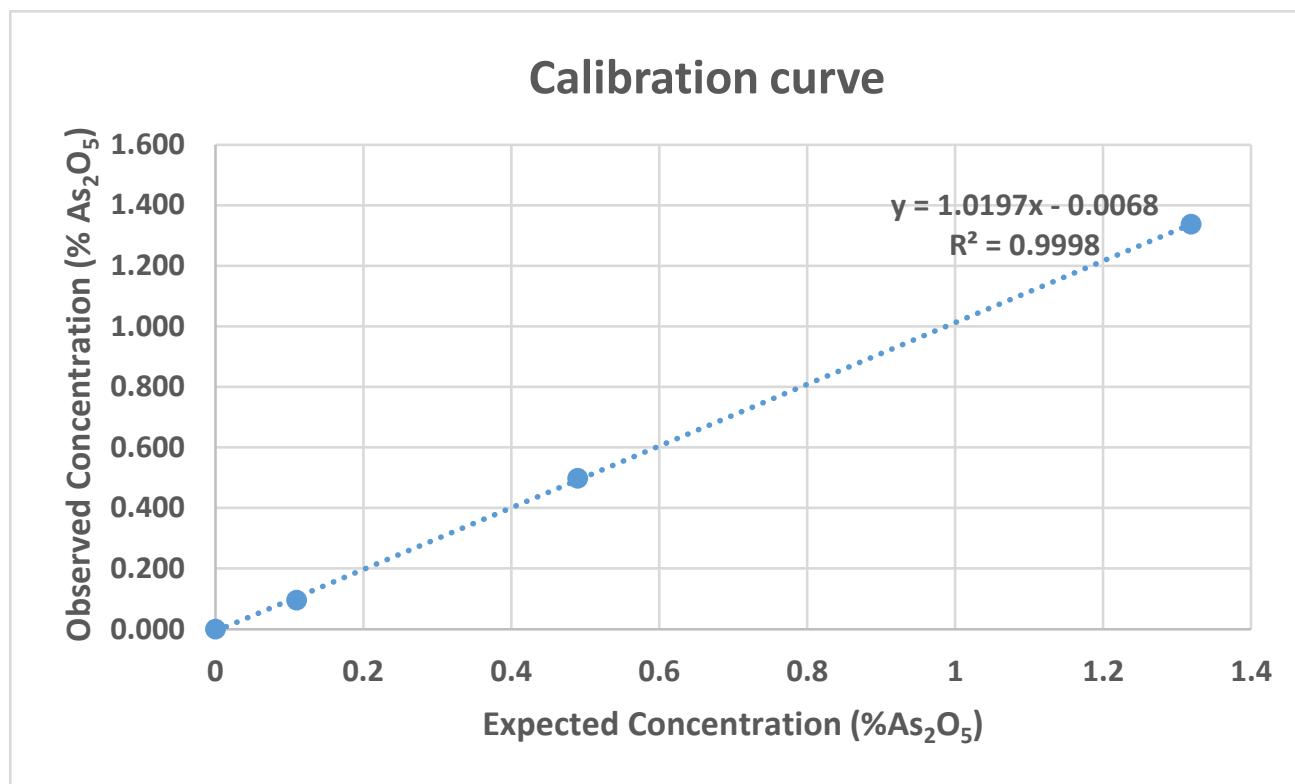


Figure 3-3. Calibration curve based on USGS basalt glass reference material.

X-Ray Diffraction (XRD) Analysis

Fourteen limestone aquifer core samples were analyzed via x-ray diffraction (XRD), in conjunction with various techniques to pre-concentrate residual non-carbonate minerals. The latter occur in the rock only at low levels but could have geochemical significance, especially in the context of trace metal dynamics. The pre-concentration techniques included selective dissolution followed by density- and size-fractionation. Details of these procedures are provided below.

Selective dissolution of carbonates was done using sodium acetate buffered at pH 5 (Rabenhorst and Wilding, 1984) as an extractant of the core limestone powders. The residual mineral impurities (“residue”) comprised <1% of the rock mass based on our recovery. Density fractionations using a solution of sodium polytungstate of density 2.86 g cm⁻³ were performed on 5 of the 14 limestone residue samples, selected based on coverage of the range of composition. Two density separation techniques were tested, separatory funnel and centrifugation, with the latter proving more efficacious. Primary focus was placed on the heavy (>2.86 SG) fraction since the light fraction contained abundant quartz as a diluents of minerals that could be of potential interest. Simple particle size fractionation was performed on selected samples using ultrasound (for dispersion) followed by settling and collection of supernatant using a pipette. All of these separates (whole residues, density and particle-size fractions) were analyzed by XRD. Total- and high-density sands from one sample were examined under petrographic microscope via grain mount (immersion medium of refractive Index 1.52) using principles of optical crystallography (Shelley, 1985).

Samples of the whole rock were analyzed by XRD (Harris and White, 2008) both in the form of petrographic thin sections (2-80° 2θ) and powders of the cores that had

been ground. Both thin sections and powders were provided by the Florida Geological Survey. Analyses were performed using a computer-controlled x-ray diffractometer equipped with stepping motor and graphite crystal monochromator. Samples were scanned at various scanning rates (depending upon objectives) in the range of 2-80° 2θ using Cu K α radiation. Thin sections were scanned “as is.” Powders were scanned after placement into standard cavity powder mounts. Other mounting procedures, including sedimentation onto low-background quartz crystal mounts or glass slides, were used to accommodate various residue fractions for which there was low sample mass. Identification of expandible phyllosilicates required special cation saturation and heat treatments.

Results and Discussion

Bulk Rock Mineralogy (SEM/EPMA)

Bulk rock elemental concentrations are given in Appendix D. The EPMA metals results are given in Appendix E and carbonate results are given in Appendix F. SEM/EPMA images are found in Appendix G. Summary statistics by mineral phase for metals and carbonate analyses are shown in Appendix H. Analyte abbreviations are defined in Appendix D. A summary of the findings of interest is provided below.

All 14 samples were from the Suwannee Limestone within the depth range of 274-289 ft BLS (Table 3-1). All samples were a peloidal packstone to grainstone with a traces of quartz grains and clay. There were also sparse grains of pyrite, ilmenite, rutile, iron oxide, chalcopyrite (copper iron sulfide) and possible pentlandite (nickel iron sulfide) as well as a few unidentified grains with higher concentrations of the rare earth elements as analyzed by EDS. Sparry calcite lined many of the small vugs and molds and overall recrystallization was low to medium with micrite envelopes of some of the foraminifera. Allochems consisted of peloids, foraminifera, echinoid fragments, miliolids, bryozoa and coralline algae.

Since all 14 samples were taken from within a 15 ft section of continuous core, much of the bulk rock major elemental analytical results were very similar between samples. Total iron (Fe_2O_3) ranged from 0.03 to 0.07 percent, SiO_2 ranged from 0.2 to 0.68 percent, P_2O_5 ranged from below detection to 0.02 percent, while Al_2O_3 , Na_2O and K_2O were all well below 0.1 percent (Appendix D). This is consistent with the Suwannee Limestone lithology, a limestone with a scattering of quartz grains throughout, an occasional phosphate grain and a trace amount of clay present in some of the vugs. All

sulfate measurements were below the detection limit of 0.3 percent. Total sulfur ranged from 0.02 to 0.03 percent (Appendix D).

Bulk rock trace metal results were, for the most part, similar with a few exceptions (Appendix D). Arsenic and molybdenum showed little variance in the 14 samples ranging from below detection to 2 ppm and below detection to 3 ppm, respectively. Bulk rock Chromium values ranged from 6.9 to 11.1 ppm. The greatest variances were noted in copper, lead and zinc; copper varied from below detection to 9 ppm, only one lead value (24 ppm) was above the detection limit and it coincided with the highest copper value. Zinc ranged from 1 to 22 ppm with all but one value less than 5 ppm. The 22 ppm value belonged to the same sample with the high copper and lead, it was the unleached core sample with a depth of 278-279 ft BLS.

Trace Mineralogy and Mineral Chemistry

Characterization of trace minerals was accomplished by SEM and EPMA (Appendices E and F). The goal was to determine the various mineral phases present in the rock matrix and their associated trace metals. This information could be useful in determining possible metals of concern for water quality during AR activities. Presence or absence of the various minerals may also be used in future hydrogeochemical modeling with respect to water-rock interaction during AR activities. Detailed assessment of mineralogy and mineral chemistry facilitates achieving this goal.

Mineral Composition

During AR the aqueous concentrations of arsenic in the aquifer are controlled by source and sink reactions, which act to release and remove metals to and from solution. Potential source reactions: include oxidative dissolution of pyrite, reductive dissolution of iron oxides and ion-exchange reactions. Possible sink reactions include: ion-

exchange reactions and sorption to oxide surfaces as well as co-precipitation with sulfides. An important consideration is the presence or absence of relevant solid phases, pyrite being one of the most important in reference to arsenic concentrations. While pyrite mineral abundance was not directly measured in any of the samples, the maximum pyrite abundance is constrained by the total concentration of iron or sulfur, whichever is limiting. Maximum pyrite abundances were calculated using the bulk rock iron and sulfur concentrations based on the limiting stoichiometric element (i.e. iron or sulfur), recognizing that these elements can also be associated with other minerals or organic matter. Calculated maximum pyrite abundances ranged from 0.04 to 0.06 weight percent (Table 3-3).

Polished thin sections were examined by EPMA (EDS and WDS) to identify trace minerals and determine qualitative or quantitative trace-metal compositions. The EDS is a more qualitative analysis, as compared to WDS, in that the technology does not discern elemental compositions less than approximately 1-2 weight percent. EDS analyses, therefore, focused on identifying minerals of high-average atomic number, as revealed by BSE imaging, with an emphasis on locating pyrite grains and their morphology.

For our discussion, iron sulfide minerals are collectively referred to as pyrite (FeS_2) unless otherwise specified (includes the metastable minerals mackinawite (FeS), pyrrhotite ($\text{Fe}_{(0.8-1.0)}\text{S}$), and greigite (Fe_3S_4)). Pyrite may host a variety of metals at trace concentrations (arsenic, molybdenum, antimony, copper, nickel, cobalt, lead, bismuth and thallium). Conditions surrounding pyrite formation (including the above metastable minerals), plus the depositional environment, will affect which trace metals are

incorporated into the pyrite structure (Berner et al., 2013; Dippold, 2009). These metals are incorporated into the pyrite by different processes, including precipitation, coprecipitation, chemical or physical adsorption, ionic replacement, as well as redox reactions between dissolved species and the pyrite surface or its precursors (Berner et al., 2013; Kornicker and Morse, 1991; Morse and Arakaki, 1993; Abraitis et al., 2004).

Table 3-3. Summarized findings.

Column Test ID	Sample Depth (ft BLS)	[As] _{Pyrite} Mean* (ppm)	Pyrite percent estimate in bulk rock***	Calculated [As] _{Bulk Rock} (ppm)	Measured [As] _{Bulk Rock} (ppm)	# of pyrite analyses
CT-1b	274-275.5	350±100	0.06	0.14 - 0.25	2	7
CT-5	276-277	BDL	0.06	0.02 - 0.08	2	6
CT-3	277-278	1000±300	0.06	0.39 - 0.73	<1	6
CT-6	281-282	900±400	0.04	0.19 - 0.48	<1	5
CT-4	282.5-283.5	1700**	0.04	NA	<1	1
CT-7	285-286	450±130	0.04	0.12 - 0.22	<1	11
CT-2b	286-287	No Pyrite observed	0.04	NA	<1	0
-	274	300±100	0.04	0.075 - 0.15	2	9
-	275-276	950±200	0.04	0.28 - 0.43	2	10
-	278-279	1350±300	0.05	0.47 - 0.74	2	6
-	279-280	200±100	0.05	BDL - 0.14	<1	7
-	280-281	1400±350	0.04	0.38 - 0.65	<1	9
-	284-285	BDL	0.06	NA	2	2
-	288-289	BDL	0.06	NA	<1	3

* Uncertainty = standard error of the mean
** Only one analysis; no statistics performed
*** Percent pyrite estimate based on limiting stoichiometric element
BDL = Mean arsenic in pyrite was below detection limit; NA = not applicable

Concentrating on the trace metals associated with pyrite combined with the trace metal analysis from the bulk rock, the following constituents were chosen for EPMA metals analyses: iron, sulfur, arsenic, molybdenum, selenium, thallium, nickel, copper, cobalt, titanium, antimony and calcium (Appendix E). These were metals of concern with respect to water quality and water/rock interactions. Calcium was included to help determine if the point of analysis was focused on the mineral of interest, since the

carbonate matrix would contain calcium and should not be present in a pyrite analysis. The WDS element maps revealed an association of arsenic, nickel, copper and, in some instances, thallium with the pyrite (Figure 3-4 and Appendix G).

While antimony was one of the metals measured, once the analyses were completed a problem was discovered with the antimony results. There is a known interference on the standard Sb_2Te_3 (Antimony Telluride). The tellurium peaks are very close to the antimony peak. With a small peak shift, the background can end up being measured on the flank of the tellurium peak. This means that the measurement of the antimony peak will be lower than it should be, so that measurements on the unknown will be higher than they actually are (k-ratio is too high; personal communication Mike Spilde, UNM, Institute of Meteoritics). For this reason, the antimony data should be disregarded as the results are unrealistically high, by at least 0.05 weight percent.

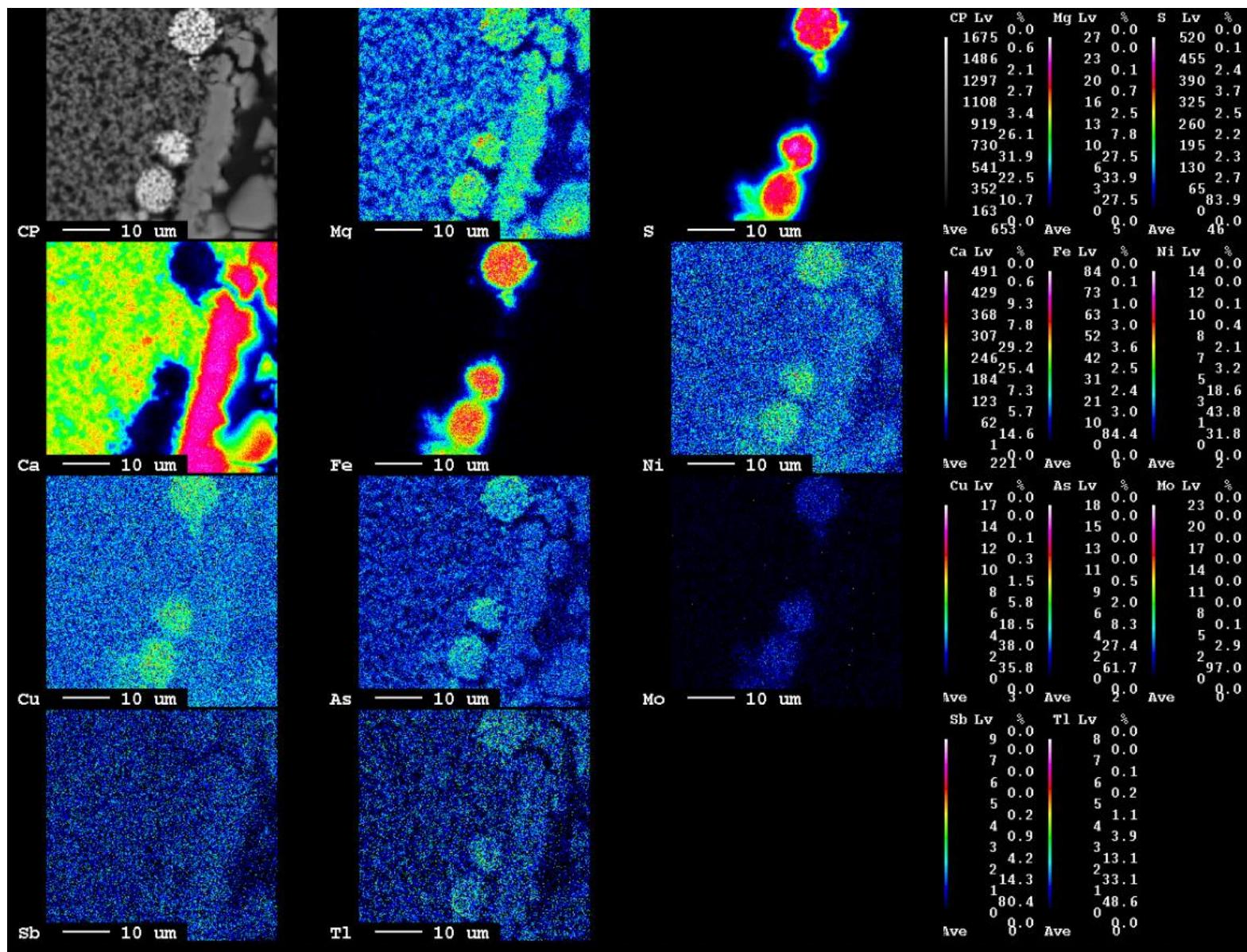


Figure 3-4. Element map, pyrite framboids in carbonate matrix, unleached 275-276 ft sample.

In addition to pyrite and carbonate investigations, EDS microprobe analyses detected other minor mineral phases including ilmenite (FeTiO_2), Rutile (TiO_2), zircon (ZrSiO_4), chalcopyrite (CuFeS_2), and possibly some pentlandite ($(\text{Fe}, \text{Ni})_9\text{S}_8$). Grains of quartz were scattered throughout, as were calcite rhombs and sparry calcite, iron oxide and an occasional grain of phosphate. Pyrite was observed in all but one thin section, (CT-2b, 286-287 ft BLS). While the presence of pyrite was observed in the other thin sections it was not common and in some cases was sparse at best as very few pyrite grains were seen in thin sections (CT-4 282.5-283.5 ft, 284-285 ft, 288-289 ft). While a few grains of chalcopyrite were observed in several thin sections, arsenic did not appear to be associated with the chalcopyrite in the WDS analyses. Pentlandite (iron, nickel sulfide) was observed in one thin section and did not show an association with arsenic in the WDS analysis (Appendix E). Since the amount of arsenic associated with pyrite is known to vary broadly, even within the same grain (Skinner et al., 1964, Kolker, 2012, Lazareva and Pichler, 2007; Price and Pichler, 2006), the possible association of arsenic with chalcopyrite and pentlandite should not be ruled out and should be explored further with a larger sample size. Additional SEM/BSE images and pyrite element maps are compiled in Appendix G.

Pyrite Oxidation

The arsenic leaching potential by pyrite oxidation depends upon several factors: the amount of pyrite in the rock, the amount of arsenic contained in the pyrite and transport of a suitable oxidant to the pyrite mineral. Concerning the first factor, the amount of arsenic contained in pyrite was determined by microprobe analyses (WDS). The average arsenic concentrations in pyrite for the 14 thin sections ranged from below the detection limit (BDL) to 1400 (± 350) ppm, which is near the lower end of the range

of 100 to 11,200 ppm (average = 2300 ppm), as presented by Price and Pichler (2006), for arsenic in pyrite from Suwannee Limestone samples.

With regard to the second factor, to date little research has been done to accurately quantify pyrite abundance in a bulk rock sample. Abundance estimates are frequently qualitative, based on visual core descriptions or on bulk iron or sulfur concentrations, which are rough estimates. Using the total concentration of iron or sulfur, whichever was the limiting stoichiometric element, maximum pyrite abundances for each core sample were calculated and ranged from 0.04 to 0.06 percent (Table 3-3). Table 3-3 also depicts bulk rock arsenic concentrations that were estimated using the calculated maximum pyrite abundance and mean pyrite arsenic concentration for each thin section. These estimated values are often less than the measured bulk rock concentrations of arsenic, suggesting that pyrite is not the only arsenic host mineral. Although we did not specifically attempt to identify iron oxide mineral(s), they are known to sequester arsenic by surface sorption (Appelo, 2006) and a few small iron oxide grains were observed in the thin sections (Appendix F); however, the numbers were so few that no conclusions can be drawn as to whether or not they are acting as an arsenic sink in these samples. Their presence would tend to indicate that some degree of oxidation has occurred in the core, either during core collection and storage or during sample preparation and analysis.

The final factor, oxidant availability, requires the oxidant to come in contact with the mineral surface. Pyrite is not stable under oxidizing conditions and the introduction of highly oxygenated water into the aquifer during AR may result in pyrite oxidation, with the release of iron, sulfate and associated arsenic and other trace metals. The iron can

quickly precipitate out of solution as iron oxides (Fe(OH)_3) and the arsenic may sorb to the iron oxides. When the aquifer returns to the more reducing conditions, at some distance from the recharge well, the iron oxides may undergo reductive dissolution and arsenic could again be released.

There appears to be some evidence of pyrite oxidation based on the WDS analyses. When comparing the mean WDS analyses of the pyrite grains for the seven leached samples to the seven unleached samples, the leached samples appear to have lower mean concentrations of some of the trace metals (arsenic, molybdenum and cobalt; see Appendix H). The differences are slight and, while it could be attributed to pyrite oxidation, there is not enough evidence to be certain that the differences are due to the leaching and not natural variance in the samples (Figure 3-5). The leached samples used seven different water types for the leaching and not all water types would be expected to have resulted in pyrite oxidation (Table 3-1). While the high dissolved oxygen leachate would be expected to leach metals, iron would likely be precipitated as iron oxide with absorption of the other metals to the iron oxide, in which case any change in bulk rock chemistry would be minor or non-detectable. To make this determination with more confidence, it is suggested that future studies use fewer water types along with duplicate samples and a longer leaching period. The total water volumes used for the column leaching tests were relatively small (one liter) over a 4-6 hour time period.

Nickel and copper showed a higher WDS mean concentration in the leached samples than in the unleached samples. While WDS analyses and element maps showed an association of copper and nickel with the pyrite, the minerals chalcopyrite

and pentlandite were also present. The chalcopyrite and pentlandite were present more often in the leached thin sections than the unleached thin sections. The analyses of the leached mean bulk rock samples had higher nickel concentrations than the unleached bulk rock samples. As with the other trace metals the differences are slight and could also be attributed to sample variation (Figure 3-5).

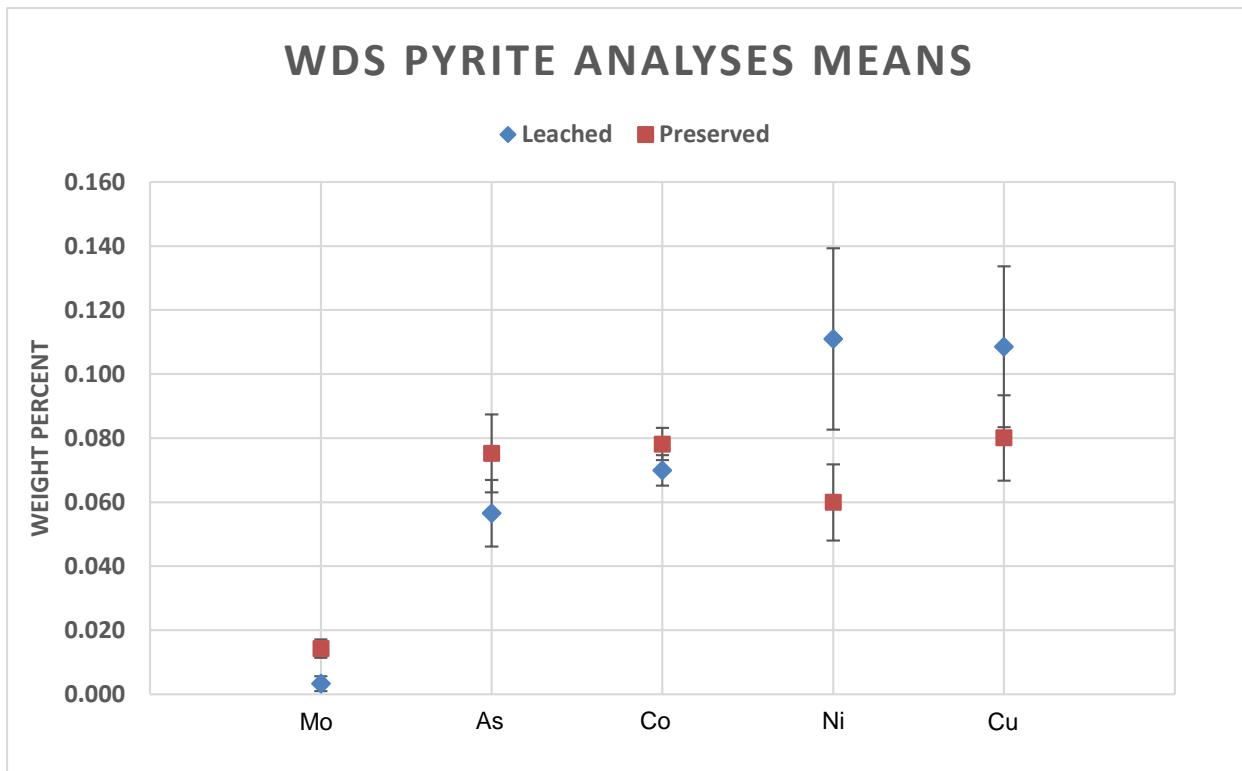


Figure 3-5. Pyrite means for selected trace metals with the standard error of the mean.

Carbonate

The WDS analyses suggested that some carbonates contained detectable arsenic (Appendix F). Based on calibrations completed with the spiked basalt glass (Table 3-3), 13 out of 117 carbonate grains analyzed contained arsenic in concentrations above the analytical detection limit of 0.023 percent As₂O₅ (Appendix H). For samples with detectable arsenic, the mean arsenic concentration equaled 0.04 percent, the median concentration equaled 0.036 percent and the maximum was 0.08 percent as As₂O₅.

These arsenic values appear deceptively high when one considers the bulk rock was greater than 95 percent carbonate. There are a number of possible reasons for the discrepancy between the total bulk rock and the total WDS analyses. Part of the difference may be related to the carbonate matrix being very different than the basalt glass used for the calibration. Ideally, the calibration standards should be similar to the material being analyzed and at the same concentrations expected in the unknown samples. Suitable low-arsenic standards, other than the basalt glass reference material utilized in this analysis, are not available. Another consideration is the possibility that there may be interferences in the carbonate matrix that affect the detection limits for arsenic. The set-up of the element conditions in the instrument is important in quantifying elements with peak overlaps. There are known peak overlaps involving arsenic and magnesium (Goldstein et al., 2007). Setting the instrument element conditions to minimize the overlap of these peaks during WDS analysis is critical when quantifying low concentrations of these metals (Goldstein et al., 2007). Other factors such as grain size, grain type and proximity to pyrite can also have an effect on the observed trace metal concentrations. Some of the grain types analyzed as carbonate included sparry calcite, foraminifera, algal material, bryozoa, calcite rhombs, calcilutite, peloids, etc. It is a reasonable assumption that these different grains could have different propensities for arsenic adsorption (Mirlean et al., 2011, 2012; So et al., 2008). Given these uncertainties, the arsenic detection limit for the carbonates may be higher than the 0.023 percent reported. If the detection limit is higher, then the arsenic concentrations for the carbonates may not be significant. Further investigation is needed to clarify whether arsenic is present in the carbonates (calcite and dolomite).

There is, however, general support in the literature for arsenic sorption on carbonates, though the arsenic concentrations used in some of those experiments were higher than what was usually encountered in our analyses. Román-Ross et al. (2006) investigated As(III) sorption on calcite. In their co-precipitation experiments, As(III) was readily taken up in solid solution with calcite, and arsenic availability was the limiting factor rather than the calcite structure. In a system where calcite was precipitating in the presence of high As(III) concentrations, an average of 30 ± 6 mM/kg arsenic (~0.2 percent arsenic) could be incorporated into the calcite structure (Román-Ross et al., 2006). Studies by Mirlean et al., (2011, 2012) showed arsenic bound to fragments of calcareous red algae had the highest concentrations, with the highest values associated with the finer grain sizes. Mirlean et al., (2011, 2012) determined that living specimens of calcareous red algae had much lower concentrations of arsenic than the non-living material. They also found that not all calcareous material retained arsenic as effectively as the calcareous red algae. Thus, if arsenic was not uniformly distributed within the different carbonate grain types, it could explain the difference between the total bulk rock and WDS analyses. There is also some debate about the mechanism responsible for the arsenic retention whether it is by sorption, co-precipitation or calcium arsenate formation (Mirlean et al., 2012). So et al., (2008) worked with lower arsenic concentrations commonly observed in groundwater. They found that arsenate could sorb strongly on calcite while arsenite did not and the adsorption was affected by the solution chemistry and pH. Maher and Butler (1988) report average arsenic concentrations in modern open oceans on the order of 1-2 µg/L. Although further investigation is needed, the ambient arsenic concentrations in paleo-ocean water during

deposition of these Upper Floridan aquifer rocks may have been the source of the arsenic.

Bulk Rock Mineralogy (XRD)

The bulk rock of all cores, based on both thin-section (Figure 3-6) and powder analysis (Figure 3-7), was dominated by calcite (CaCO_3) with some samples showing minor amounts of quartz (Table 3-4). This core rock composition is comparable to that of other Florida Suwannee Limestone specimens analyzed via XRD (Arthur, et al., 2007b) except that pyrite and iron oxides identified in trace amounts by these authors were not evident from XRD patterns of bulk rock material in this study. The most striking revelation from the bulk rock analyses, both for powders and thin sections, was the extreme mineralogical uniformity of the cores, as evident from the stacked XRD patterns (Figures 3-6 and 3-7). No carbonate mineral other than calcite was detectable in the bulk rock, but the trace presence of dolomite was revealed after selective dissolution (as discussed in the next section).

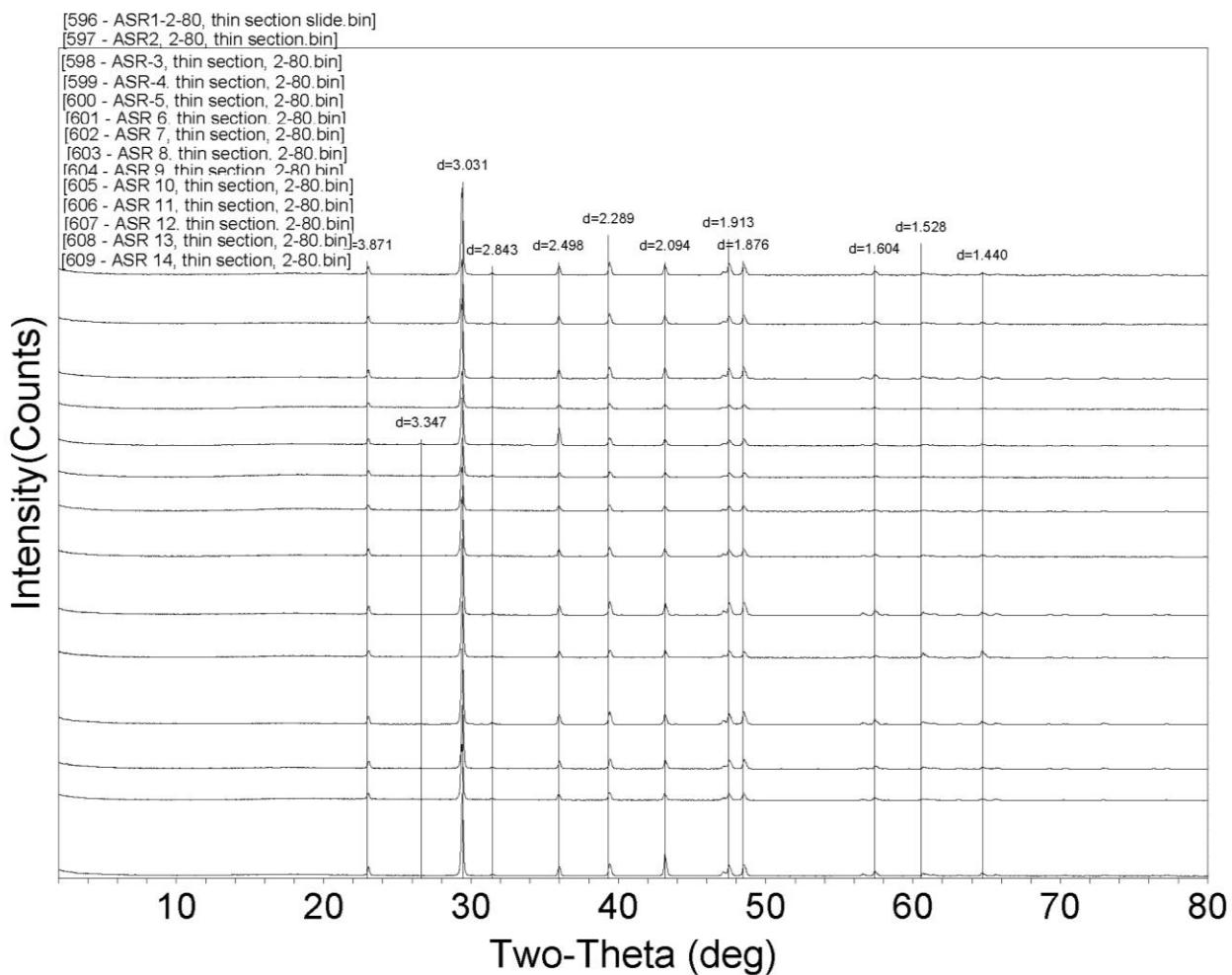


Figure 3-6. Diffraction patterns of the 14 rock thin sections sampled for this study. Peaks are labeled by d-spacing (\AA). All peaks shown except small peaks at 3.347 \AA (quartz; $d = 3.343 \text{ \AA}$) can be attributed to calcite (CaCO_3). Sample patterns are stacked such that lab numbers (as assigned to sample ID in Table 3-4) increase from bottom to top.

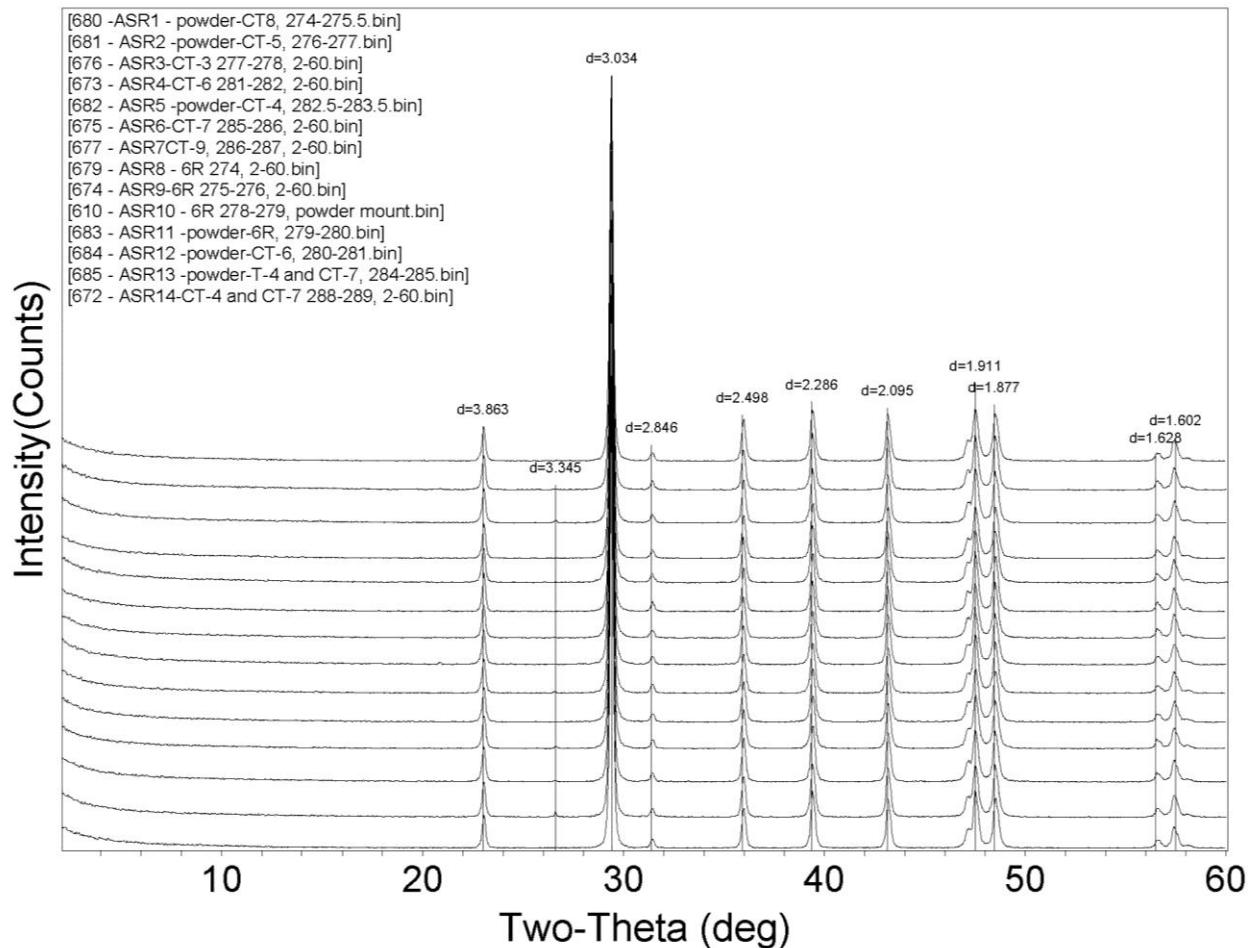


Figure 3-7. Powder diffraction patterns of the 14 ground rock cores sampled for this study. Peaks are labeled by d-spacing (\AA). All peaks shown except small peaks at 3.345 \AA (quartz; $d = 3.343 \text{ \AA}$) can be attributed to calcite (CaCO_3). Sample patterns are stacked such that lab numbers (as assigned to sample ID in Table 3-4) increase from bottom to top.

Mineralogical Composition of Rock Residues (XRD)

The rock residues obtained by selective dissolution of carbonates were dominated by quartz (Figures 3-8, 3-9 and 3-10; Table 3-4). However, they also contained additional (trace) minerals that were not detectable in the bulk rock. The trace minerals that could be identified with reasonable certainty from XRD in one or more of the residue samples include smectite (with possible mixed layering of illite), vermiculite, amphibole (most likely hornblende and/or actinolite), feldspar, and dolomite. Complete

CaCO_3 removal was verified for all but one sample (#9) which still showed a calcite peak. However, the presence of dolomite [$\text{CaMg}(\text{CO}_3)_2$], another carbonate mineral that was not delectable in the bulk rock analyses, was revealed in 6 samples of the residue (Table 3-4). Ironically, the persistence of dolomite under the buffered carbonate dissolution procedure enabled its detection.

Small diffraction peaks for most major reflections of pyrite were also present for some samples, particularly the heavy mineral fraction of sample #13. However, identification of pyrite is tentative from XRD alone in the residue as well as the residue density- and size-fraction separates since (i) only some of its prospective highest intensity reflections were present (i.e., less intense reflections couldn't be assessed) and (ii) even some of its prospective major peaks could also be attributable to other minerals. Others have reported pyrite (in euhedral and framboidal forms) in Florida Limestone (e.g., Price and Pichler, 2006; Arthur et al., 2007). Arthur and others (2007) detected pyrite by XRD in only 10 of 52 insoluble residues of Florida limestone specimens analyzed even though it was identified in thin section for over half the specimens. He pointed out that the quantities of pyrite are likely to be below XRD detection limits for most residue samples.

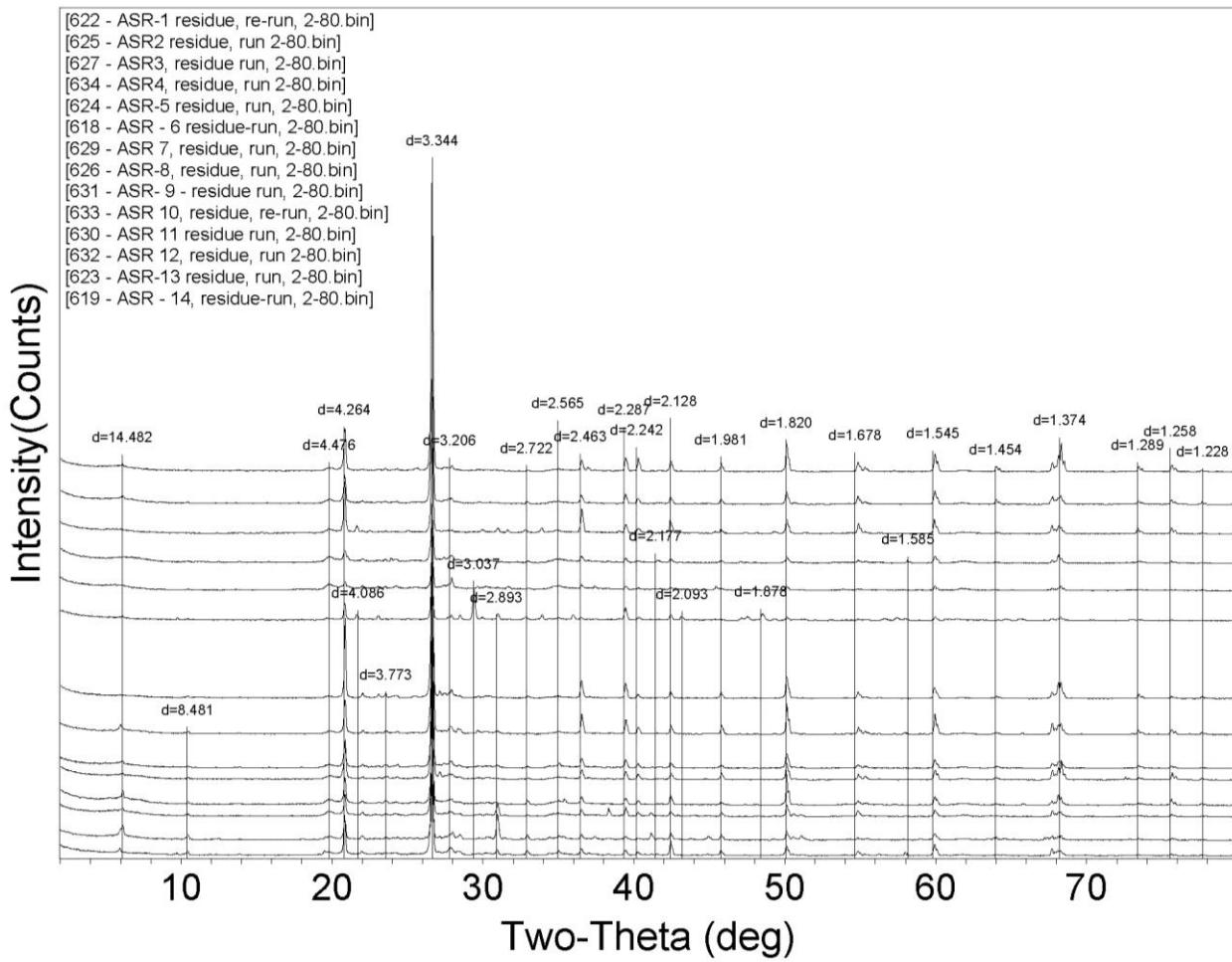


Figure 3-8. Powder diffraction patterns of limestone residues following carbonate dissolution. Peaks are labeled by d-spacing (\AA). Most prominent peaks are attributable to quartz ($d = 3.34$ and 4.26 being the most prominent). However, numerous minor peaks attributable to other minerals are also present, as discussed in the text and reported in Table 3-4. Sample patterns are stacked such that lab numbers (as assigned to sample ID in Table 3-4) increase from bottom to top.

Peaks that likely arise from a mineral, or minerals, of the amphibole group were present for all of the whole residues samples except CT-6 280-281 (lab #12), and for all density samples as reported below. The relative abundance of amphibole seems to roughly parallel that of vermiculite. However, depth or location trends for either mineral are not readily apparent. Neither vermiculite nor amphiboles were reported by Arthur and others (2007) for limestone samples of the upper Florida aquifer.

Minerals in addition to those specified in Tables 3-4 and 3-5 are present in at least trace amounts (based on numerous small unassigned peaks) but could not be confidently identified due to insufficient XRD evidence and/or lack of complementary corroborating data. Other mineral suspected to be present include iron oxides (magnetite or maghemite; no indication of hematite or goethite), anatase, kaolinite, aragonite, and pyrite. The uncertainties related to unidentified minor phases, structural substitutions, solid solution series and mixed layering preclude confident mineral quantification for these or similar samples.

Figures 3-9 and 3-10 are provided to enable a closer comparison between the limestone thin section XRD scans and corresponding residue following calcite dissolution. The comparisons were selected based on showing end-members with respect to mineralogical composition. Each comparison shows absence of a detectable calcite peak ($d = 3.04 \text{ \AA}$) for the residue and absent of detectible quartz ($d = 3.34 \text{ \AA}$) in the original limestone sample. However, the residue of sample CT-6 281-282 (lab #4) had a significant peak for vermiculite while 279-280 ft sample (lab #11) showed no detectible vermiculite. Both residues showed a broad peak attributable to smectite.

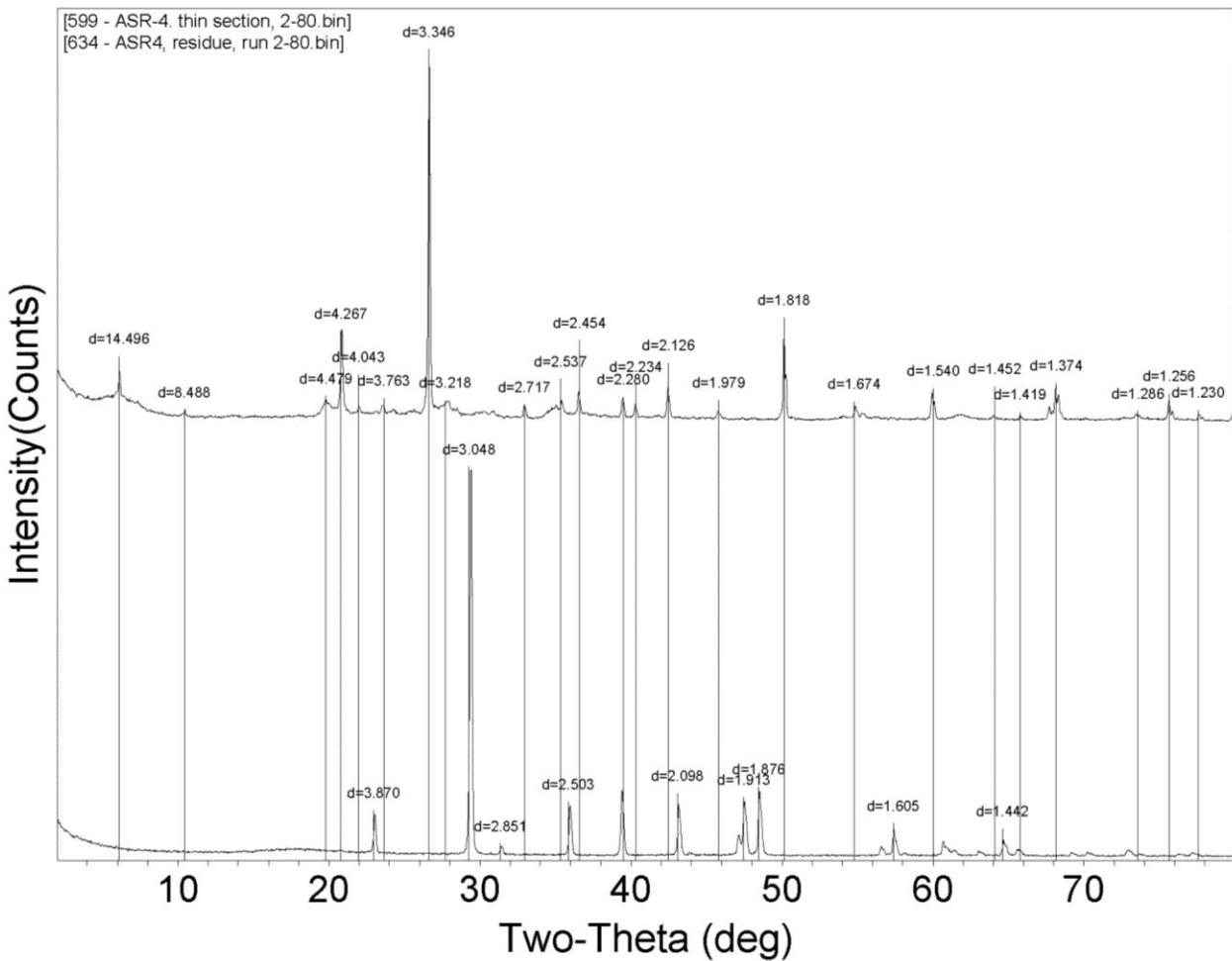


Figure 3-9. Powder diffraction patterns of thin section (bottom) and residue (top) of sample CT-6 281-282 (lab #4). Peaks are labeled by d-spacing (\AA). This figure provides more XRD detail for a sample containing significant vermiculite (sharp peak at $d \approx 14.5 \text{ \AA}$), as indicated via Mg saturation and reversible d-spacing shifts with dehydration from heat treatment and rehydration (Figure 3-11). Most prominent peaks in the residue are attributable to quartz ($d = 3.34$ and 4.26 being the most prominent). However, numerous minor peaks attributable to other minerals are also present, as discussed in the text and reported in Table 3-4.

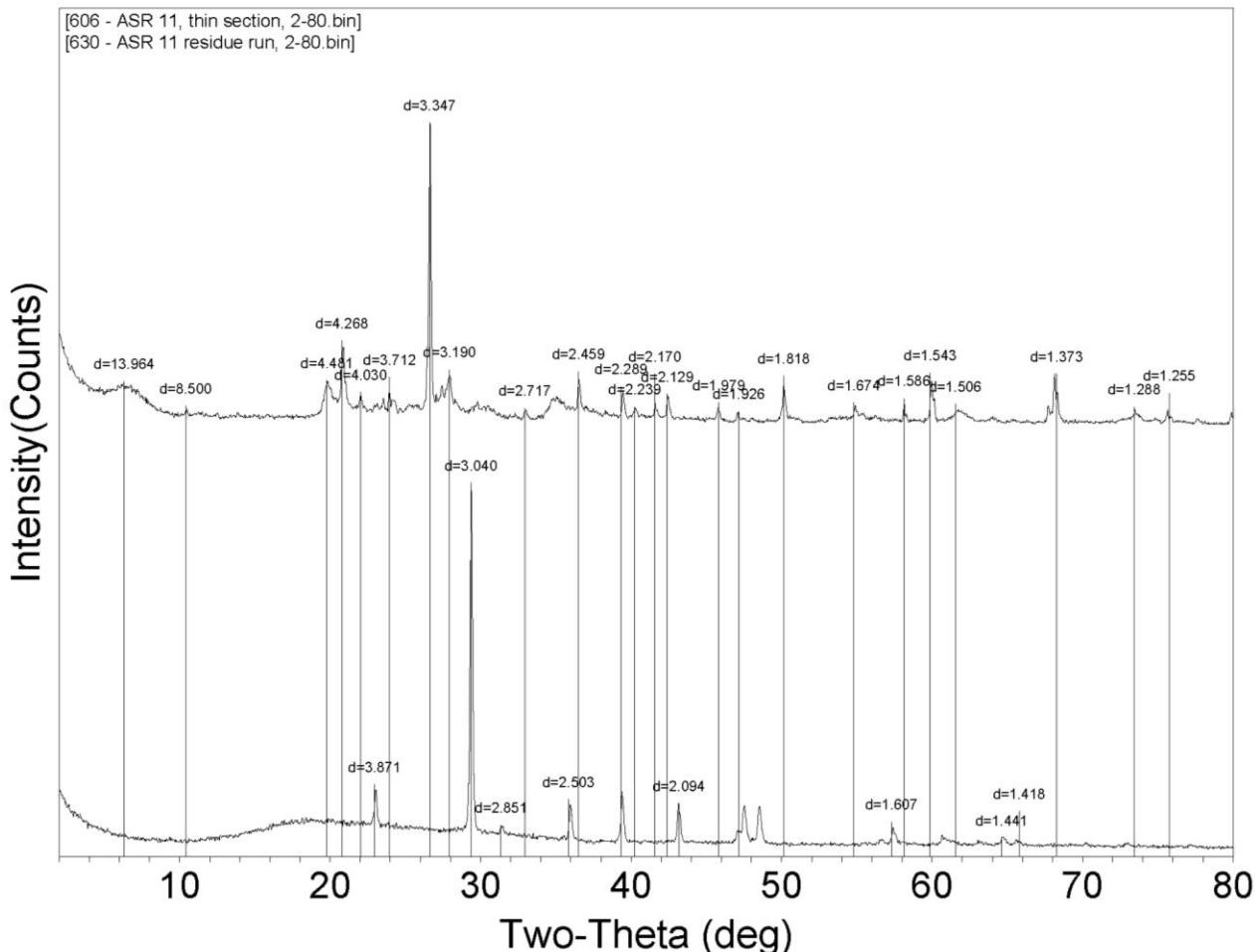


Figure 3-10. Powder diffraction patterns of thin section (bottom) and residue (top) of sample 279-280 (lab #11). Peaks are labeled by d-spacing (\AA). This figure provides more XRD detail for a sample containing significant smectite (with possible mixed layering; broad peak centered at $d \approx 14 \text{ \AA}$), as indicated via Mg saturation and reversible d-spacing shifts with dehydration from heat treatment and rehydration (Figure 3-11). Most prominent peaks in the residue are attributable to quartz ($d = 3.34 \text{ \AA}$ and 4.26 \AA being the most prominent). However, numerous minor peaks attributable to other minerals are also present, as discussed in the text and reported in Table 3-4.

Table 3-4. Summary of mineralogical analyses for limestone cores and residues¹. Approximate ranges of weight fractions based on relative XRD peak intensities. **** = dominant (>95%); *** = high abundance; ** = low abundance; * = barely detectable (<5%)

Lab #	Sample ID	----- Bulk rock -----				----- Residue after limestone dissolution -----							
		Thin Section		Powder Mount		Amphi-				Verm-			
		Calcite	Quartz	Calcite	Quartz	Quartz	Feldspar	bole ²	Smectite	miculite	Dolomite	Calcite	
1	CT-1b 274-275.5	****		****		****	**	**		**		**	
2	CT-5 276-277	****		****	*	****	**	**	*	***		***	
3	CT-3 277-278	****		****	*	****	*	*	**			**	
4	CT-6 281-282	****		****	*	****	*	*	**	***			
5	CT-4 282.5-283.5	****		****	*	****	*	*	**	*			
6	CT-7 285-286	****		****	*	****	*	*	**	*		*	
7	CT-2b 286-287	****		****		****	*	*	*	**		*	
8	274	****		****		****	*	*	*	*			
9	275-276	****	*	****		****	**	*	*	*		**	***
10	278-279	****	*	****		****	**	*	**				
11	279-280	****		****		****	**	*	**				
12	280-281	****		****	*	****	*		**				
13	284-285	****		****		****	*	*	**	*			
14	288-289	****		****		****	*	*	**	*			

¹Minerals in addition to those tabulated are present in at least trace amounts (based on numerous small unassigned peaks) but could not be confidently identified due to insufficient XRD evidence and/or lack of complementary corroborating data. Other mineral suspected to be present include iron oxides (magnetite or maghemite; no indication of hematite or goethite), anatase, kaolinite, aragonite, and pyrite.

² Identification of amphiboles is relatively confident despite lack of complementary corroborating data. Species could not be specified but hornblende and actinolite are the most likely prospects.

Identification of two expandable phyllosilicates, vermiculite and smectite, was based reversible variations in d-spacings (distance between basal 001 planes) in response to temperature and hydration. The sharpness of the vermiculite peak ($d \approx 14.4$ Å) (Figure 3-11) denotes relatively high charge density, resulting in high degree of ordering for layer stacking and for configurations of interlayer components. The broad peak (ranging between about 11–18 Å) over which the 14.4-Å peak of vermiculite is superimposed most likely arises from a mineral of the smectite group, as characterized by relatively lower charge density and less constraints on layer stacking and ordering of interlayer components. The smectite could have some random mixed layering, but that is difficult to assess given the small mass fraction and superposition of vermiculite. Both minerals show reversible responses to hydration-dehydration, as indicated by the d-spacing shifts under the conditions specified.

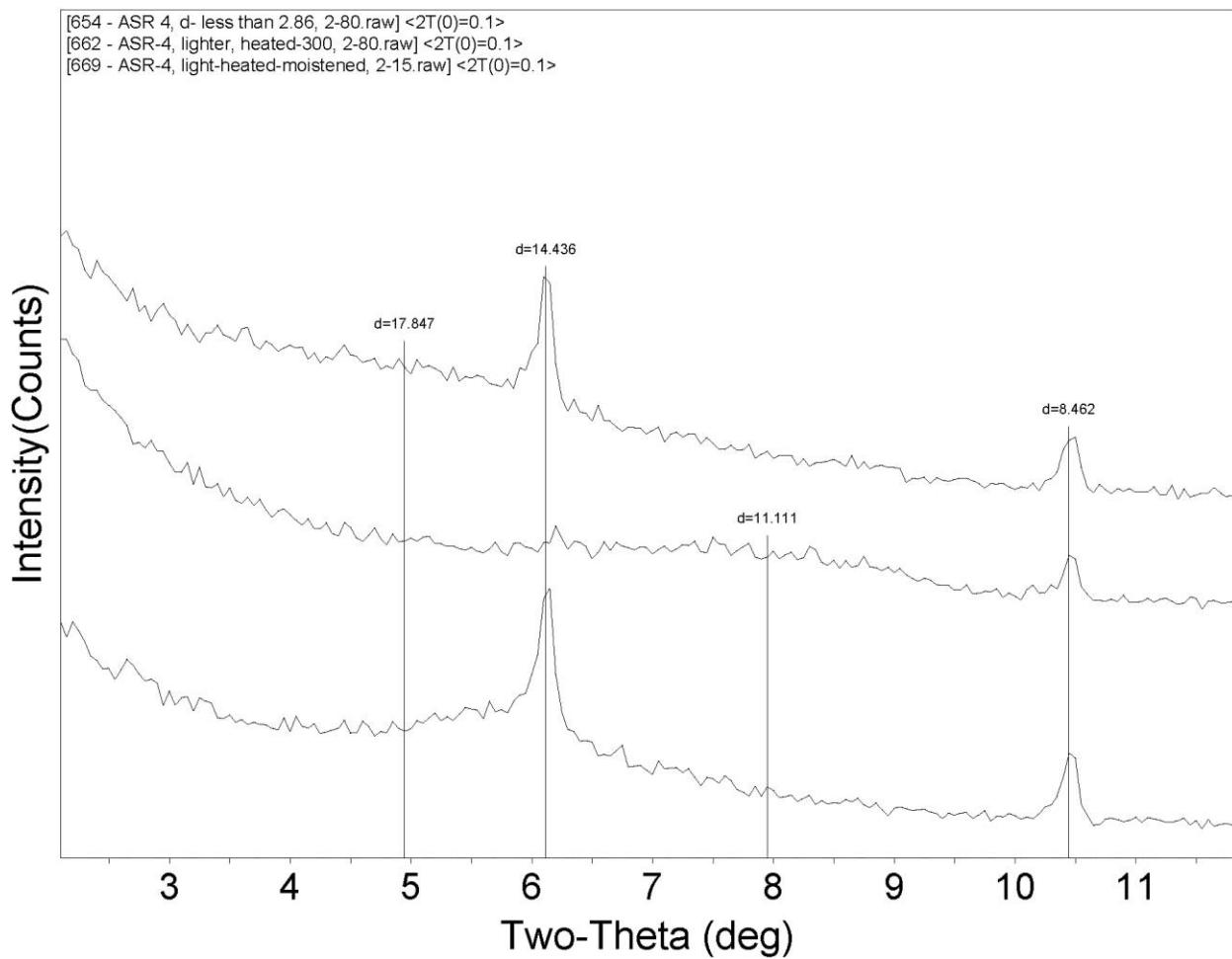


Figure 3-11. Powder diffraction patterns of sample CT-6 281-282 (lab #4) residue under conditions of Mg saturation and room temperature (bottom), 300 °C (middle), and rehydrated at room temperature. Peaks are labeled by d-spacing (Å). This figure documents the presence of two contrasting expandible phyllosilicates. The 14-Å mineral, though its interlayers dehydrate and rehydrate reversibly, does not expand above ~14-Å d001 spacing even with glycerol solvation. This behavior and the sharpness of the peak are diagnostic for vermiculite.

Separation of the finer fraction of the residue was attempted for 3 of the residues via repeated collection of suspensions following 30 seconds of settling. This approach greatly reduced the quartz content and increased vermiculite content (Figure 3-12 as an example), suggesting quartz to be mainly in the coarser fraction of the residues. However, the elutriation didn't aid further in identification or confirmation of minerals. A conundrum in the approach is that settling rate is dependent on both particle size and density, with one property potentially offsetting the other. For example, pyrite is quite dense (about 5 g cm^{-3}), fostering faster settling, but is also likely to occur as small particles (as indicated by SEM images of framboids), favoring slower settling. Hence density fractionation was the tack taken to focus on pre-concentrating pyrite (see discussion and data below). Another factor influencing settling rate is particle shape, with the platy nature of vermiculite slowing the rate relative to what it would be as a spherical particle of equivalent mass. Hence both the shape and likely low density of vermiculite would favor slow settling.

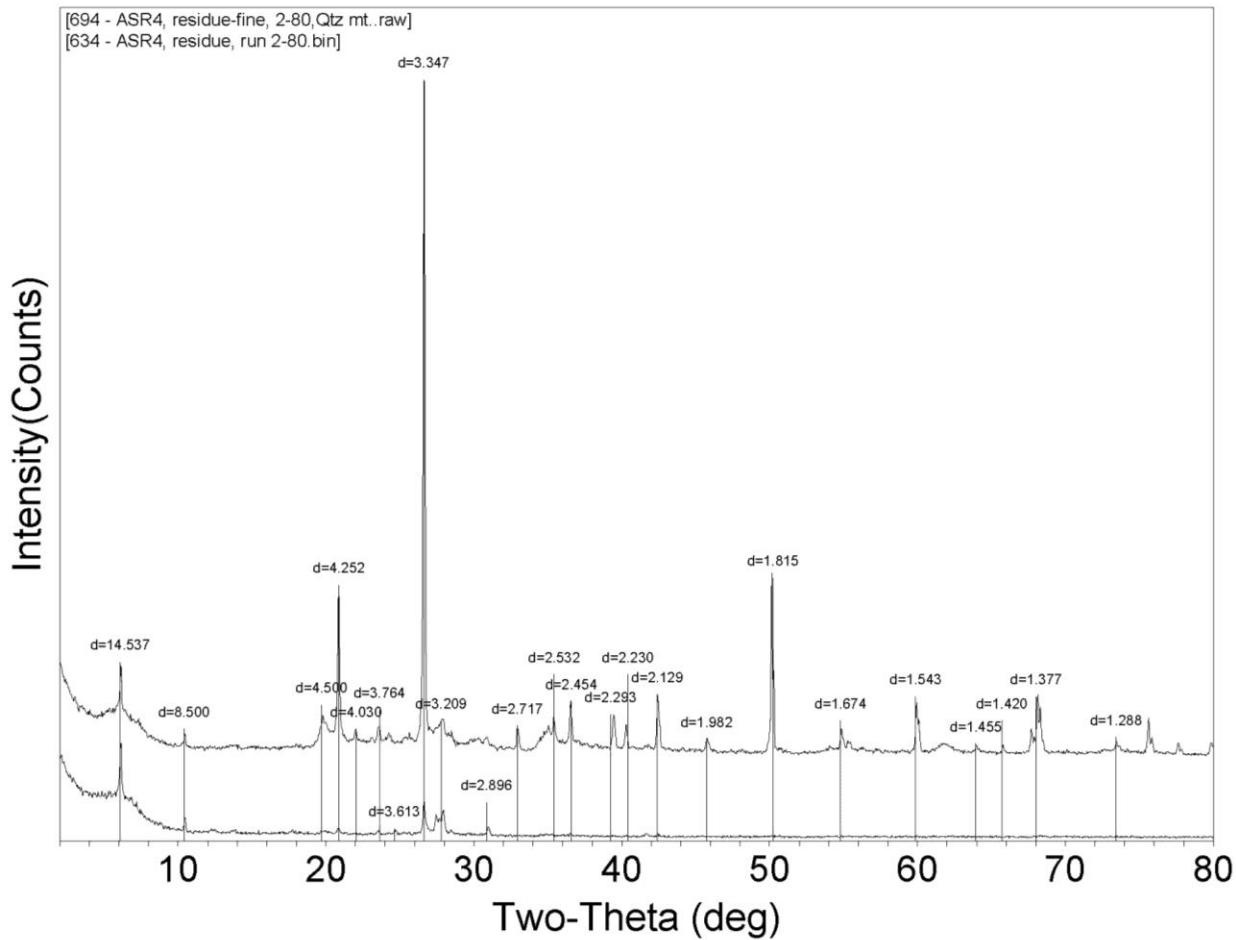


Figure 3-12. Powder diffraction patterns for the finer fraction of sample CT-6 281-282 (lab #4) (bottom) as compared to the original residue (top). Peaks are labeled by d-spacing (\AA). Quartz ($d = 3.343$) was largely depleted by elutriation whereas the relative abundance of vermiculite was much higher in the supernatant suspension.

Confidence in amphibole identification was enhanced by its further pre-concentration in the heavy mineral fractions ($>2.86 \text{ g cm}^{-3}$) collected via density separation (Table 3-5; Figure 3-13). The density separation was successful in removing or significantly reducing the mass fraction of quartz (the major diluents with respect to minerals of possibly greater geochemical interest) but there were still detectible minerals of density $<2.86 \text{ g cm}^{-3}$ in the "heavy" fraction that was separated. This is likely attributable to aggregation whereby the density of some aggregates was greater than 2.88 g cm^{-3} despite containing some light minerals.

Density fractionation (Figure 3-13) did not result in unequivocal identification of additional phases in the residue. Sample 284-285 (Lab # 13; top plot in Figure 3-13) had relatively prominent peaks for the major reflections of pyrite. However, the absence of the $2.21\text{-}\text{\AA}$ pyrite peak (I/I_0 relative intensity of 50%) cast at least some doubt on pyrite identification.

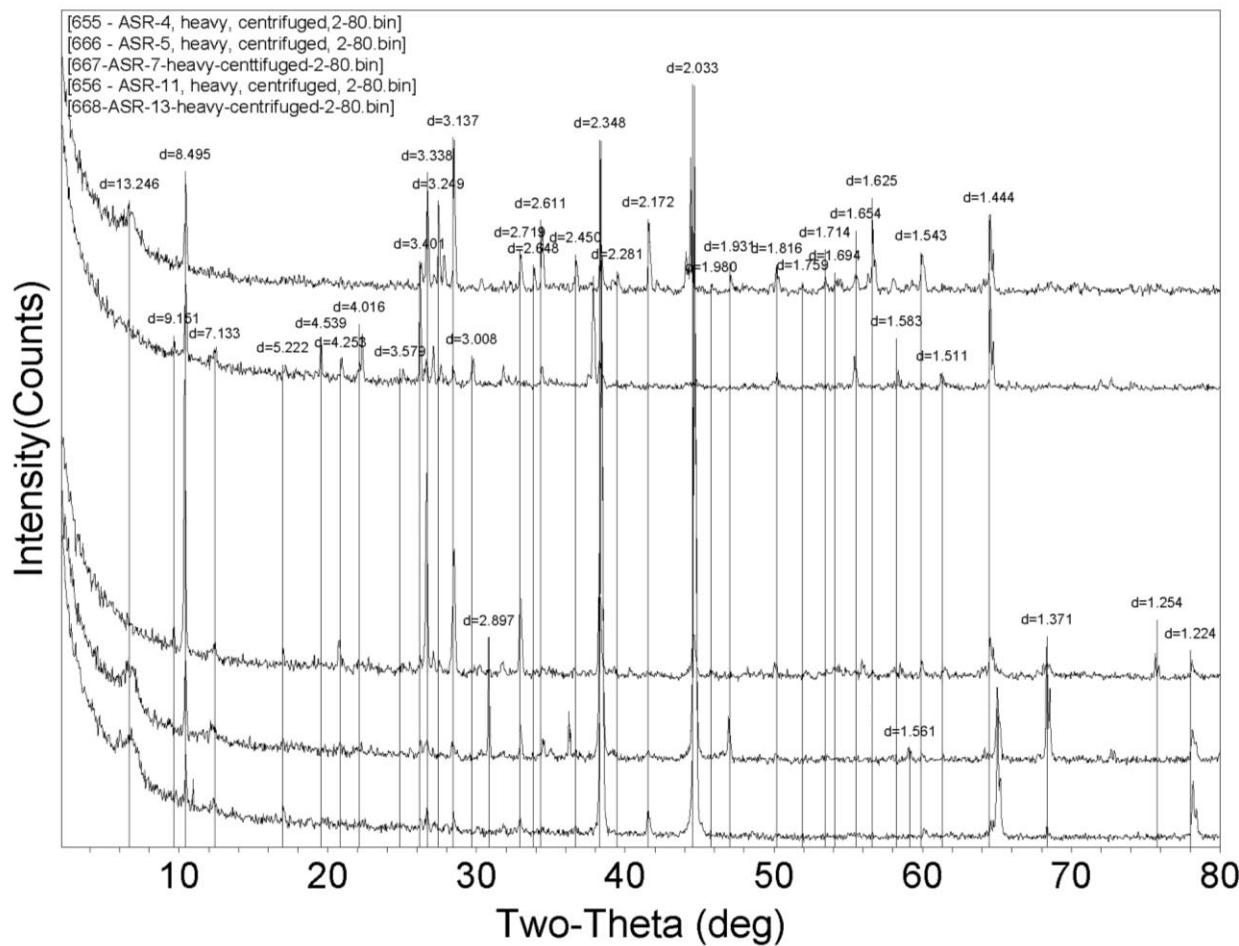


Figure 3-13. Powder diffraction patterns of the high specific gravity ($>2.86 \text{ g cm}^{-3}$) limestone residues following carbonate dissolution. Peaks are labeled by d-spacing (\AA). Peaks at $d=2.34$, 2.03 , 1.43 , and 1.22 were derived from the low-background quartz crystal mounts used to accommodate the low sample quantity. The density separation removed or significantly reducing the mass fraction of quartz. The prominent peak at $d=8.5$ is assigned to the amphibole group. Numerous minor peaks attributable to other minerals are also present (Table 3-4). Sample patterns are stacked such that lab numbers (as assigned to sample ID in Table 3-4) increase from bottom to top.

Table 3-5. Summary of mineralogical analyses of the dense fraction¹ of selected residues. This is the fraction that sank in a liquid of specific gravity 2.86 as accelerated by centrifugation.

Lab #	Sample ID	Amphi-					
		bole	Dolomite	Smectite ²	Kaolinite ²	Feldspar ²	Quartz ²
4	CT-6 281-282	***		**	*	*	
5	CT-4 282.5-283.5	***	*	**	*	*	
7	CT-2b 286-287	****			*	*	**
11	279-280	***			*	*	*
13	284-285	***		**		**	

¹The density separation was successful in removing or significantly reducing the mass fraction of quartz but there were still detectable minerals of density <2.86 specific gravity in the "heavy" fraction that was separated. This is likely attributable to aggregation whereby the density of some aggregates was greater than 2.88 g cm⁻³ despite containing some light minerals.

²Minerals in addition to those tabulated are present in at least trace amounts (based on numerous small unassigned peaks) but could not be confidently identified due to insufficient XRD evidence and/or lack of complementary corroborating data. Other mineral suspected to be present include iron oxides (magnetite or maghemite; no indication of hematite or goethite), anatase, aragonite, and pyrite.

Optical crystallographic analyses were not among the specified tasks of this project. However, the multiple small unassigned XRD peaks prompted a cursory petrographic microscopic assessment of the whole sand and high density fractions of sample 284-285 (Lab #13). The whole sand contained low-density minerals that conformed to the XRD data, including quartz, feldspar, and a phyllosilicate suspected to be vermiculite. There were also additional minerals covering a range of relative refractive indices (based on relief in the medium), including "heavy mineral" grains of very high relief.

Heavy minerals were examined more closely on the mount of the high density fraction. There were numerous grains exhibiting optical properties that could fall within the range of amphiboles. However, their unequivocal identification is hampered by the breadth of that range (overlapping other minerals) and a high degree of opacity likely

due to surface alteration (Figure 3-14). The alteration in itself is consistent with amphiboles which, as weatherable ferromagnesian silicate minerals, are prone to becoming coated with ferruginous weathering products (Velbel, 1989). Hence, the grain alterations suggest the presence of secondary Fe oxides which would have a high affinity for As. Thus far XRD evidence of Fe oxide minerals is too tentative for confident identification.

One heavy mineral that could be confidently identified petrographically was zircon, which is highly resistant to weathering (in contrast to amphiboles). The surfaces of zircon grains were not altered, permitting less impeded optical assessment. Detrital grains of zircon have a characteristic appearance and high relief (high refractive index relative to the mounting medium used). Zircon is a ubiquitous mineral in the very fine sand of weathered soils and sediments derived from them. Only a few grains of zircon were observed in the samples and it was not detected by XRD even in the high density fraction of the residue. Zircon is of little geochemical consequence given its minimal reactivity. However, its presence is a relevant consideration given that it is not likely to be the only mineral present in amounts too low to be captured by common means of pre-concentration and XRD analysis. Such phases could cumulatively amount to a significant mass fraction of the residue.

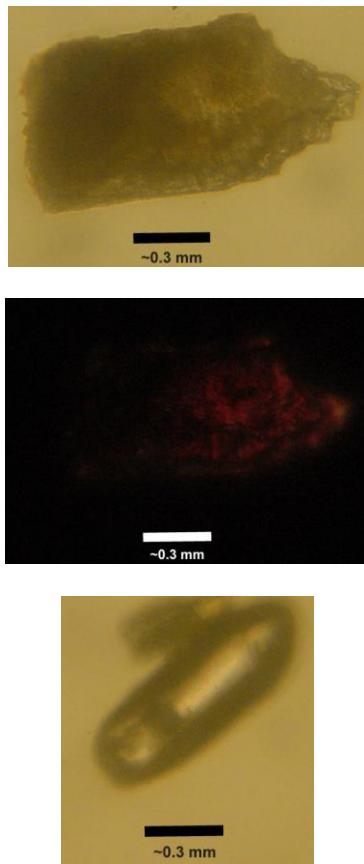


Figure 3-14. Micrographs of sand grains from the high density fraction of sample 284-285 ft (Lab #13) as mounted in a medium of 1.52 refractive index. Top image: a grain viewed under plain polarized light that could be amphibole with significant surface alterations and accumulations of secondary opaque reaction products. Grains such as this, including alterations, were numerous on the mount. Middle image: the same grain under crossed polarized light, confirming its anisotropy. Bottom image: zircon grain, showing characteristic high relief (thick outline).

Magnetic fractionation was also performed on selected samples, though it was not specified as a task for this project. It yielded no significant additional information other than confirmation that most of the high density fraction of residues is magnetic.

A lot more could likely be concluded with confidence on the mineralogy of residues and their density separates if they were subjected to scanning electron microscopic analyses in conjunction with energy-dispersive x-ray fluorescence micro-elemental

analysis (SEM-EDX). The morphology and elemental composition of particles would likely constitute useful complementary data to XRD. The presence of ferruginous weathering products, regardless of the specific mineral identity, might also be confirmed via SEM-EDS.

CHAPTER 4 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

Arsenic was detected above the 10 µg/L MCL in water samples collected from 5 of the 9 column tests completed in this study. Unless there is adequate removal of oxidizers (primarily DO) from the AR source water prior to recharge, arsenic mobilization at concentrations exceeding the 10 µg/L MCL during AR at the City's NEWRF is, therefore, likely.

There is a significant correlation between the measured peak arsenic concentrations, the mass of arsenic mobilized during the tests, and source water DO concentrations up to 60 ppb. Arsenic mobilization occurred rapidly, with the peak arsenic concentration measured in the columns occurring between 0.76 and 1.76 pore volumes. It is likely that arsenic precipitated out of solution, either as a co-precipitate with iron-oxides or by sorption onto iron-oxides, where source water DO concentrations exceeded 60 ppb.

There does not appear to be a correlation between the concentration of other potential oxidizers, such as nitrate, chlorine, peroxide and sulfate, in the source water and the mass of arsenic released from the core.

While the focus of this study was on arsenic mobilization, there is also interest in investigating the behavior of other trace metals. There is a significant correlation between source water DO concentrations and other redox sensitive elements (e.g., molybdenum and cadmium) within these tests. Iron concentrations did not, however, respond to source water DO concentrations. This is possibly due to the low solubility of

iron over the redox conditions investigated herein. It is also possible that the analytical (sample digestion) method utilized in this study affected the iron results.

Fourteen samples underwent mineralogical analysis, seven preserved core pieces with no experimentation and seven core pieces leached with seven different water treatment processes. All core pieces were from a continuous 15 ft section (274 to 289 ft bls) of core from nearby well TRW-1 from the Suwannee Limestone. Leached and unleached core samples were taken adjacent to each other whenever possible. There were no duplicate core samples included in this analysis. From analysis of these samples, the following conclusions can be made:

- The arsenic concentrations of the rock samples reviewed herein were relatively low. The lithogeochemical analyses indicated that arsenic concentrations ranged from BDL to 2 ppm in the 14 bulk rock samples. Microprobe analyses (WDS) indicated that the average arsenic concentrations in pyrite for the 14 thin sections ranged from BDL to 1400 (± 350) ppm, which was near the lower end of the range of 100 to 11,200 ppm (average = 2300 ppm), as presented by Price and Pichler (2006), for arsenic in pyrite from the Suwannee Limestone.
- There was minor geochemical variation between the 14 samples. Given that there were no duplicate samples analyzed and leaching consisted of one liter of each of the seven different source waters, it is not possible to determine whether the minor differences were attributable to the natural core variation or to the leaching of the core.

- Pyrite was not common in most of the thin sections. In fact, it was sparsely distributed in many, and was not observed at all in one, of the thin sections.
- Some small grains of chalcopyrite were observed in several thin sections. There was no apparent arsenic associated with the WDS analyses of these few chalcopyrite grains.
- An iron nickel sulfide (pentlandite) was observed in one sample with no apparent arsenic associated with its WDS analysis.
- Given the limited sample size, the seven different source water types for leaching made it difficult to compare with the unleached core. Not all of the water types would be expected to leach metals. The high dissolved oxygen leachate would be expected to leach metals but the metals may re-precipitate along with, or complex with, iron oxides, in which case any change in bulk rock chemistry would be minor. .

This project presented several unique challenges. Foremost, intact core-column studies for evaluating the trace metal leaching potential of limestone cores have not, to the authors' knowledge, been completed at other sites. Beyond being the first of its kind, this study also utilized source waters generated by a field-scale Pilot System, unlike other leaching studies which utilized waters derived in a laboratory. The operation of the Pilot System, in a manner conducive to completing core-column studies, was, at times, unpredictable and challenging. Other constraints, more typical of field operations, such as logistical considerations and geological considerations (e.g., vertically variable rock induration, cementation and permeability, and the heterogeneous distribution of arsenic within the core, etc.) likely affected test results. Finally, project

constraints (e.g., schedule and budget) typical of a preliminary (initial) evaluation limited the number of tests that could be completed and the effort assigned to analyzing the test results. This report, therefore, represents a summation of work completed to date and includes an initial analysis of the column test and mineralogical test results. Further analysis, as recommended below, may be considered as part of future project phases.

Recommendations

As the results from this preliminary study cannot be used to predict arsenic concentrations during AR, under various Pilot System operation regimes, at the City's NEWRF, we suggested the City consider the results from tests completed at other pretreatment systems (e.g., City of Bradenton, City of Sanford) when finalizing the design of the full-scale system.

Additional column tests should be considered to further understand the relationship between source water DO concentrations and arsenic released from rock cores, where source water DO concentrations range from 60 ppb to 7,000 ppb.

Additional tests should be conducted to determine the effects of sample filtration on column test results. In the absence of such tests, filtration of core column effluent water should only be performed as a split of an unfiltered sample in future column studies.

For all future column tests, analytical methods should be chosen carefully with respect to the parameter under consideration in order to avoid introducing bias in the test results, such as with respect to arsenic and iron. One possible solution is to complete analysis for total recoverable (digestible) metals (e.g., iron, manganese, cadmium, etc.) via ICP-MS and analysis for arsenic by SM-3113B.

Sulfide should be included in the sampling regime of future column tests. This would require a larger sample volume, which may require reducing the frequency of analysis for other parameters or extending the leach time (leach volume).

When trying to determine the effect of the different source water treatments on the leached bulk rock chemistry verses the unleached bulk rock chemistry, a longer leach time with more water flushed through the core, as well as an increased sample count and duplicate sampling, would help support findings and possibly discern between sample variance and actual differences due to leaching.

As the report presented herein represents a preliminary (initial) evaluation of the core column study results, further analysis of the core column test and mineralogical results should be considered under future project phases.

LIST OF REFERENCES

- Abrailis, P.K., Patrck, R.A.D., and Vaughan, D. J., 2004, Variations in the compositional, textural and electrical properties of natural pyrite: a review: International Journal of Mineral Processing, v. 74, p. 41-59.
- Appelo, C. A. J., 2006, Geochemical experimentation and modeling are tools for understanding the origin of arsenic in groundwater in Bangladesh and elsewhere, in Appelo, C.A.J., ed., Arsenic in groundwater: a world problem: Proceedings Seminar Utrecht, p. 33-50.
- Arthur, J. D.; Dabous, A. A.; Cowart, J. B., 2002, Mobilization of arsenic and other trace elements during aquifer storage and recovery, southwest Florida: Open-File Report 02-89; U.S. Geological Survey:
<http://water.usgs.gov/ogw/pubs/ofr0289/>(May, 2014)
- Arthur, J. D.; Dabous, A. A.; Cowart, J. B., 2005, Water rock geochemical considerations for aquifer storage and recovery; Florida case studies: in Tsang, C.F., and Apps, J.A., eds.: Underground Injection Science and Technology, Developments in Water Science: Amsterdam, Elsevier, v. 52, 327-339.
- Arthur, J.D., Dabous, A.A., and Fischler, C., 2007a, Aquifer storage and recovery in Florida: Geochemical assessment of potential storage zones, in Fox, P., ed., Management of aquifer recharge for sustainability: Phoenix, Acacia Publishing, p. 185-197.
- Arthur, J.D., Fischler, C., Dabous, A.A., Budd, D.A., and Katz, B.G., 2007b, Geochemical and mineralogical characterization of potential aquifer storage and recovery storage zones in the Floridan Aquifer System, Comprehensive Everglades Restoration Plan: unpublished project deliverable reference agreement OT040175 and FDEP- FC343, 134 p.
- Arthur, J.D., and Fischler, C., 2008, Bench-scale geochemical assessment of water-rock interactions: Rome Avenue aquifer storage and recovery facility: unpublished Florida Geological Survey Final Report submitted to the South Florida Water Management District, 37 p.:
http://publicfiles.dep.state.fl.us/FGS/Hydrogeology/SWF_ROME_AVE/SWF_RomeASR_Bench.pdf (May 2014)
- Berner, Z.A., Puchelt, H., Noltner, T., and Kramar, U., 2013, Pyrite geochemistry in the Toarcian Posidonia Shale of south-west Germany: Evidence for contrasting trace-element patterns of diagenetic and syngenetic pyrites: Sedimentology, v. 60, p. 548-573.
- Bowell, R.J. 2003. Sorption of arsenic by iron oxides and oxyhydroxides in soils. Applied Geochem. 9:279-286. Budd, D.A. 2007. Mineralogical abundances as determined by x-ray diffraction in select samples of the upper Floridan Aquifer. Appendix 15 In Geochemical and mineralogical characterization in potential aquifer storage and recovery storage zones in the Florida Aquifer system. Comprehensive Everglades Restoration Plan Report, Reference Agreement OT040175.
- Dippold, A.C., 2009, Detailed geochemical investigation of the mineralogic associations of arsenic and antimony within the Avon Park Formation, central Florida: Implications for aquifer storage and recovery [Master's Thesis]: Tampa, University of South Florida, 101 p.

- Fischler, C., Hansard, P., Norton, S. B., and Arthur, A. D., 2010, Geochemical Testing Program for the Cape Coral Aquifer Storage and Recovery System Pilot, Florida Geological Survey, Final Report dated April 15, 2010, 54 p.
- Gimenez, J., M. Martinez, J. de Pablo, M. Rovira, and L. Doro. 2007. Arsenic sorption onto natural hematite, magnetite, and goethite. *J. Hazardous Materials*. 141:575-580.
- Goldstein, J.I., Newbury, D.E., Joy, D.C., Lyman, C.E., Echlin, P., Lifshin, E., Sawyer, L., Michael, J.R., 2007, Scanning electron Microscopy and X-ray microanalysis, third edition: New York, Springer, 690 p.
- Harris, W.G. and G.N. White. 2008. X-ray diffraction techniques for soil mineral identification. p. 81-115. In A. Ulery and R. Drees (eds.) *Methods of soil analysis: Part 5 – mineralogical methods*. Soil Sci. Soc. Am. Madison, WI.
- Jones, G. W.; Pichler, T., 2007, Relationship between pyrite stability and arsenic mobility during aquifer storage and recovery in southwest central Florida: *Environmental Science Technology*, v. 41, 723-730.
- Kolker, A, 2012, Minor element distribution in iron disulfides in coal: A geochemical review: *International Journal of Coal Geology*, v. 94, p. 32-43.
- Kornicker, W. A., and Morse, J.W., 1991, Interactions of divalent cations with the surface of pyrite: *Geochimica et Cosmochimica Acta*, v. 55, p. 2159-2171.
- Lazareva, O., and Pichler, T., 2007, Naturally occurring arsenic in the Miocene Hawthorn Group, southwestern Florida: potential implication for phosphate mining: *Applied Geochemistry*, v.22, p. 953-973.
- Maher, W., and Butler, E., 1988, Arsenic in the marine environment: *Applied Organometallic Chemistry*, v. 2, p. 191-214.
- Manning, B.A, S.E. Fendorf, and S. Goldberg. 1988. Surface structures and stability of arsenic (III) on goethite: spectroscopic evidence for inner-sphere complexes, *Environ. Sci. Technol.* 32 (1998) 2383–2388.
- Mirecki, J. E., 2006, Geochemical models of water-quality changes during aquifer storage recovery (ASR) cycle tests, phase I: *Geochemical Models Using Existing Data*: Vicksburg, U.S. Army Engineer Research and Development Center, Environmental Laboratory Technical Report 06-8: 76 p.
- Mirlean, N., Baisch, P., Travassos, M.P., and Nassar, C., 2011, Calcareous algae bioclasts contribution to sediment enrichment by arsenic on the Brazilian subtropical coast: *Geo-Marine Letters* 31, p. 65-73.
- Mirlean, N., Medeanic, F.A., Garcia, M.P., Travassos, M.P., and Baisch, P., 2012, Arsenic enrichment in shelf and coastal sediment of the Brazilian subtropics: *Continental Shelf Research*, v. 35, p. 129-136.
- Morse, J.W., and Arakaki, T., 1993, Adsorption and coprecipitation of divalent metals with mackinawite (FeS): *Geochimica et Cosmochimica Acta*, v. 57, p. 3635-3640.
- National Research Council, 1999, Arsenic in drinking water: Washington, National Academy Press, 310 p.
- Norton, Stuart B., 2007, Quantifying the Near-Borehole Geochemical Response During Aquifer Storage and Recovery: Application of “Push-Pull” Analytical Techniques to ASR Cycle Testing, Master’s Thesis, University of Florida, Gainesville, FL
- Norton, Stuart B., 2011. Evaluating trace metal mobilization during Managed Aquifer Recharge, Ph.D. Dissertation, University of Florida, Gainesville, FL

- Norton, S.B., Ellison, D.L., Khon, S.M. 2014 (in draft), Pretreatment techniques for controlling arsenic mobilization during aquifer storage and recovery.
- Price, R.E. 2003. Abundance and mineralogical associations of naturally-occurrng arsenic in the upper Floridan aquifer, Suwannee Limestone. M.S. Thesis, Dept. of Geology, Univ. S. FL.
- Price, R. E., and Pichler, T., 2006, Abundance and mineralogical association of arsenic in the Suwannee Limestone (Florida): Implications for arsenic release during water-rock interaction: *Chemical Geology*, v. 228, p. 44-56.
- Railsback, B.L., 2003, Earth's Scientist Periodic Table of the Elements and Their Ions. *Geology*, Geological Society of America, assessed on March 25, 2011, available for download at: <http://www.gly.uga.edu/railsback/PT.html>
- Rabenhorst, M. P., and L.P. Wilding. 1984. Rapid method to obtain carbonate-free residues from limestone and petrocalcic horizons. *Soil Sci. Soc. Am J.* 48: 216-219.
- Román-Ross, G., Cuello, G.J., Turrillas, X., Fernandez-Martinez A., and Charlet, L., 2006, Arsenite sorption and co-precipitation with calcite: *Chemical Geology*, v. 233, p. 328-336.
- Shelley, D. 1985. Optical mineralogy. 2nd ed. Elsevier Sci. Publ. Co., NY, NY.
- Skinner, B.J., Erd, R.C., and Grimaldi, F.S., 1964, Griegite, the thio-spinal of iron; a new mineral: *American Mineralogist*, v. 49, p. 482-489.
- So, H.U., Postma, D., Jakobsen, R., and Larsen, F., 2008, Sorption and desorption of arsenate and arsenite on calcite: *Geochimica et Cosmochimica Acta*, v. 72, p. 5871-5884.
- Velbel, M.A. 1989. Weathering of hornblende to ferruginous products by a dissolution-reprecipitation mechanism: petrography and stoichiometry. *Clays Clay Min.* 37:515-524.

APPENDIX A
GEOLOGIC LOG

GEOLOGIC LOG		OWNER	City of Clearwater		
LEGGETTE, BRASHEARS & GRAHAM, INC.		WELL NO. TP-1			
TAMPA, FLORIDA		PAGE	90	OF	2
LOCATION	Clearwater, FL				PAGE(S)
Northeast WWTP					
DATE COMPLETED	4/23/13				
DRILLING COMPANY	Huss Drilling Dade City, FL				
DRILLING METHOD	Core Drilling - HQ core				
SAMPLING METHOD	Wire line-inner core barrel (5 ft to 10 ft sample runs)				
OBSERVER	Richard Cofer				
REFERENCE POINT (RP)	Land surface				
ELEVATION OF RP					
REMARKS	Borehole located 11 ft north of Well TP-1. Core drilling starts at 80 ft bls.				
DEPTH (FEET)		DESCRIPTION			
FROM	TO				
0	80	Driller installs 4-inch diameter steel casing to 80 ft bls prior to start of core drilling.			
80	90	Limestone, fine to coarse-grained, fossiliferous, vuggy, abundant molds and casts (< 2-inches), moderate hardness, yellowish gray 5Y 8/1. Full recovery -(10 ft).			
90	100	Limestone, fine to medium-grained, fossiliferous, clayey, minor molds and casts (< 1-inches), moderate hardness, yellowish gray 5Y 8/1. Full recovery (10 ft).			
100	110	Limestone, fine to medium-grained, clayey, moderate hardness, yellowish gray 5Y 8/1. Full recovery (10 ft).			
110	120	Limestone, fine to medium-grained, clayey, hard to moderate hardness, minor molds and casts (< 1-inch), minor vugs, pinkish gray 5YR 8/2 to very light gray N8. Partial recovery (8 ft).			
120	130	Limestone, fine-grained, clayey, moderate hardness, trace molds and casts (< 0.5-inch), minor vugs, light gray N7 to very light gray N8. Partial recovery (9 ft).			
130	140	Limestone, fine-grained, hard to moderate hardness, fossiliferous, minor molds and casts (< 1-inch), minor vugs, pinkish gray 5YR 8/2 to very light gray N8. Partial recovery (8.5 ft).			
140	150	Limestone, fine-grained, clayey, weak to moderate hardness, trace molds and casts (< 0.51-inch), light gray N7 to very light gray N8. Partial recovery (8.5 ft).			
150	160	Limestone, fine-grained, hard to moderate hardness, yellowish gray 5Y 8/2 to very light gray N8. Only partial recovery (2.5 ft). Core samples < 2-inches.			
160	162	Limestone, fine to medium-grained, moderate hardness, fossiliferous, minor molds and casts (< 1-inch), vuggy, yellowish gray 5Y 8/2 to light gray N8.			
162	170	Limestone, fine-grained, clayey, moderate to weak hardness, minor vugs, very light gray N7. Full recovery (10 ft).			
170	180	Limestone, fine-grained, clayey, weak hardness, minor vugs, very light gray N7. Full recovery (10 ft).			
180	190	Limestone, fine-grained, clayey, weak hardness, vuggy, yellowish gray 5Y 8/2 to very light gray N8. Only partial recovery (2.5 ft). Core samples < 4-inches.			
190	200	Limestone, fine-grained, friable, clayey, weak hardness, yellowish gray 5Y 8/2 to light gray N7. Partial recovery (5.0 ft). Core samples < 6-inches.			
200	210	Limestone, fine-grained, sandy, clayey, weak to moderate hardness, yellowish gray 5Y 8/2 to light gray N7. Only partial recovery (2.5 ft). Core samples < 2-inches.			
210	220	Limestone, fine to medium-grained, sandy, clayey, soft to weak hardness, fossiliferous, molds and casts (< 1-inch), greenish gray 5GY 7/1 to very light gray N8. Full recovery (10 ft).			

OWNER	City of Clearwater	
WELL NO.	TP-1	DATE 4/23/13
PAGE	2	OF 2 PAGES
DEPTH (FEET)	DESCRIPTION	
FROM	TO	
220	230	Limestone, fine to medium-grained, sandy, minor chert fragments, weak to moderate hardness, fossiliferous, vuggy, yellowish gray 5Y 8/1 to light gray N8. Partial recovery (3.2 ft).
230	235	Limestone, fine-grained, weak to moderate hardness, fossiliferous, molds and casts (< 1.5-inch), vuggy, yellowish gray 5Y 8/1 to very light gray N8. Full recovery (5 ft).
235	240	Limestone, fine-grained, moderate hardness, fossiliferous, abundant molds and casts (< 2.0-inch), porous, vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
240	245	Limestone, fine-grained, moderate hardness, fossiliferous, abundant molds and casts (< 1.5-inch), porous, vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
245	250	Limestone, fine-grained, moderate hardness, fossiliferous, abundant molds and casts (< 1.5-inch), porous, vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
250	255	Limestone, fine-grained, moderate hardness, fossiliferous, abundant molds and casts (< 1.5-inch), porous, vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
255	260	Limestone, fine-grained, moderate hardness, fossiliferous, abundant molds and casts (< 1.5-inch), porous, vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
260	265	Limestone, fine-grained, moderate hardness, fossiliferous, abundant molds and casts (< 1.5-inch), very porous, vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
265	270	Limestone, medium to coarse-grained, moderate to weak hardness, fossiliferous, minor clay, trace vugs, yellowish gray 5Y 8/1. Full recovery (5 ft).
270	275	Limestone, medium to coarse-grained, moderate to weak hardness, fossiliferous, minor clay, trace vugs, yellowish gray 5Y 8/1. Full recovery (5 ft).
275	280	Limestone, medium to coarse-grained, moderate to weak hardness, fossiliferous, minor clay, trace vugs, yellowish gray 5Y 8/1. Full recovery (5 ft).
280	285	Limestone, medium to coarse-grained, clayey, soft to moderate hardness, fossiliferous, minor molds and casts (< 0.5-inch), minor vugs, yellowish gray 5Y 8/1. Partial recovery (4.0 ft).
285	290	Limestone, medium to coarse-grained, clayey, weak to moderate hardness, fossiliferous, trace molds and casts (< 0.5-inch), minor vugs, yellowish gray 5Y 8/1. Partial recovery (4.0 ft).
290	300	Limestone, medium to fine-grained, clayey, friable, soft to weak hardness, minor molds and casts (< 0.25-inch), core samples < 4-inches, yellowish gray 5Y 8/1. Only partial recovery (2.0 ft).
300	306	Limestone, medium-grained, fossiliferous, minor clay, soft to weak hardness, yellowish gray 5Y 8/1. Full recovery (6.0 ft).
306	310	Limestone, medium-grained, fossiliferous, moderate hardness, yellowish gray 5Y 8/1. Full recovery (4.0 ft).
310	315	Limestone, medium to coarse-grained, moderate to weak hardness, fossiliferous, abundant molds and casts (< 1.0-inch), porous, vuggy, yellowish gray 5Y 8/1. Partial recovery (4.0 ft).
315	320	Limestone, medium to coarse-grained, fossiliferous, soft to weak hardness, friable, clayey, minor molds and casts (< 1.0-inch), porous, vuggy, yellowish gray 5Y 8/1. Partial recovery (3.5 ft).
320	321	Limestone, medium-grained, moderate to weak hardness, clayey, yellowish gray 5Y 8/1. Full recovery (1.0 ft).
321	325	Limestone, fine to coarse-grained, moderate hardness, fossiliferous, abundant molds and casts (< 2.0-inch), very porous, vuggy, yellowish gray 5Y 8/1. Full recovery (4 ft).
325	330	Limestone, fine to coarse-grained, moderate hardness, fossiliferous, very porous, abundant molds and casts (< 2.0-inch), vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
330	335	Limestone, medium-grained, moderate hardness, minor clay, minor fossils, yellowish gray 5Y 8/1. Full recovery (5 ft).
335	340	Limestone, fine to coarse-grained, moderate hardness, fossiliferous, minor molds and casts (< 1.0-inch), vuggy, yellowish gray 5Y 8/1. Full recovery (5 ft).
	TD	

APPENDIX B CORE HYDRAULIC TESTS

Falling Head Test

Falling head tests were conducted to determine the vertical hydraulic conductivity (K) of the rock cores.

Columns were assembled as described in the methods and materials section above and positioned vertically.

However, in place of the solid PVC piece on the top end of the column, a 1.5-inch clear Sch. 40 PVC pipe of about 48-inches in length was inserted. This acted as the water reservoir to conduct the falling head test and determine how quickly water passed through the rock core based on the varying elevation head of the water.

The bottom solid PVC piece remained in place and acted as the outlet for the water. Each test was conducted in triplicate. Change in water elevation was measured over ten second intervals and plotted on a graph. The vertical conductivity was calculated using equations found below.

Salt Water Pulse and Step Tests

Salt water pulse and step input tests were conducted to determine the porosity of the rock core. The salt water was prepared using de-ionized water and salt (KCl). The salt concentration was chosen to be 1000 mg/L, and was produced by mixing 4 g of potassium chloride in 4 L of water. This was an arbitrary concentration used as a tracer for the test. Tap water was prepared by sparging it with N₂ to ensure low dissolved oxygen content. Two constant head containers with outlets at equal elevations were used, one filled with the salt water solution and the other with the tap water. Heights of water containers were positioned at equal elevations to ensure equal flow rates of salt and tap waters. Each container, a Marriott bottle, was capped with a plug that had a tube fixed through it. The tube extended down near the bottom of the container and enabled constant ambient pressure at the container bottom even as the water height decreased. The temperatures of the waters were brought to room temperature overnight. Plastic tubing channeled water from each container outlet to a series of valves which connected to the inlet line leading into the column assembly. The valves enabled easy control over which water was allowed to pass through the rock core.

In line with the water flow, pH and conductivity probes were set up to measure and record the characteristics of the water. Using the valves, the probes were able to measure either the water passing through or bypassing the

column. Before any tests, initial pH and conductivity values were established for the tap water bypassing the column and passing through the column. These initial values served as comparisons for subsequent readings. Additionally, a steady flow rate between 2 and 4 ml/min was achieved for both water types by adjusting the water container elevations, with the exception of one trial with a flow of 0.41 ml/min.

Pulse Test

After getting steady pH and conductivity readings from the tap water flowing through the column, a pulse test was performed. The inlet switches were changed and roughly a 40 ml pulse of salt water was allowed to pass through the column. The switches were then changed again to allow tap water flow. Conductivity and pH were recorded at varying intervals until the readings reached pre-salt water values.

Step Test

Starting from equilibrium tap water values, a step test was performed. The valves were changed and salt water was allowed to pass through the column. When steady pH and conductivity values were reached, the salt water flow was replaced with tap water. Conductivity and pH were recorded at varying intervals until the readings reached pre-salt water values.

Both pulse and step tests were used to calculate the average pore volumes and porosities. This was accomplished by calculating the zeroth and first moments. Estimated dead space for each core was subtracted from calculated pore volume values. Equations can be found below. All of these tests were conducted on each rock core using thick rubber sleeves. They were repeated with thin rubber sleeves for roughly half of the tests to confirm results and compare methods. Data extrapolation or interpolation was conducted to produce standard breakthrough curves when necessary.

Falling Head Test: Hydraulic Conductivity

Equation based on Darcy's Law

$$K = \frac{-\ln H_t/H_o}{t} \times L \times \frac{A_t}{A_c}$$

H_o = Height at time 0

H_t = Height at recorded time

t = Time

L = Length of rock core

A_c = Cross section area of rock core

A_t = Cross section area of tubing

Pulse and Step Tests: Pore volume and porosity

$$M_0 = \sum_i^{\infty} \frac{C}{C_i} dV$$

$$M_1 = \sum_i^{\infty} V \times \frac{C}{C_i} dV$$

$$\text{Pore Volume}_{\text{pulse}} = \frac{M_1}{M_0}$$

$$\text{Pore Volume}_{\text{Step}} = M_0$$

$$\text{Porosity}(\%) = \frac{\text{PoreVolume}}{\text{TotalVolume}} \times 100\%$$

M_0 = Zeroth Moment (ml)

M_1 = First Moment (ml^2)

dV = Change in volume (ml)

C = Conductivity (or concentration) $\mu S/cm$

C_o = Initial conductivity (or concentration) $\mu S/cm$

Core 235 Lab Analysis

Table A 1: Core 235 Initial Analysis

Length =	22.5 cm
Diam =	6.35 cm
Tot. Volume =	712.1962 ml
Dead Space* =	20 ml

*Estimate

Based on the equations provided above, hydraulic conductivity values were calculated for each test. Figure 2 shows the falling head plot for Core 235. Hydraulic conductivity values for core 260 and 275 were extracted from their respective graphs.

Core 235 Thick Rubber: Falling Head

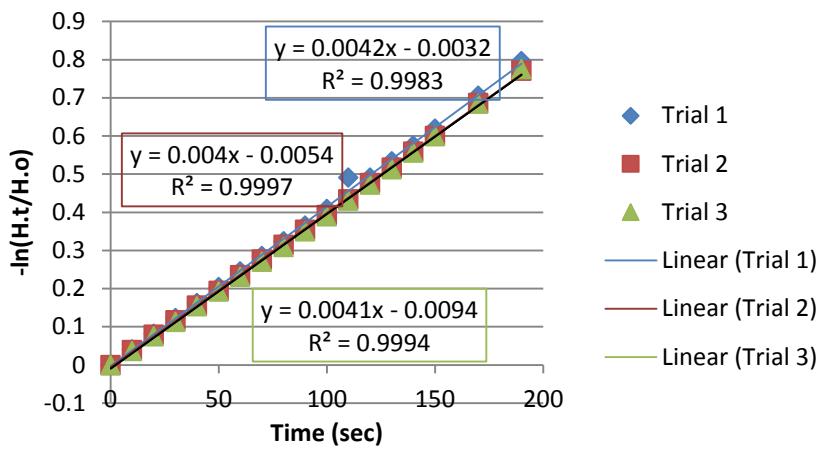


Figure A 1: Core 235 Falling Head Test using Thick Rubber

Table A 2: Core 235 Hydraulic Conductivity using Thick Rubber

Thick K Values			
K = Slope * A.t * L/A.c			
	Slope	K (cm/s)	K (m/day)
Trial 1:	0.0042	0.064603	55.81713
Trial 2:	0.004	0.061527	53.15917
Trial 3:	0.0041	0.063065	54.48815
Average:	0.0041	0.063065	54.49

A cumulative breakthrough curve for Core 235 can be seen in the following figure. This curve includes data from both thick and thin rubber sleeves and provides a comparison between the two methods. Small spikes in the data necessitated extrapolation, as can be seen.

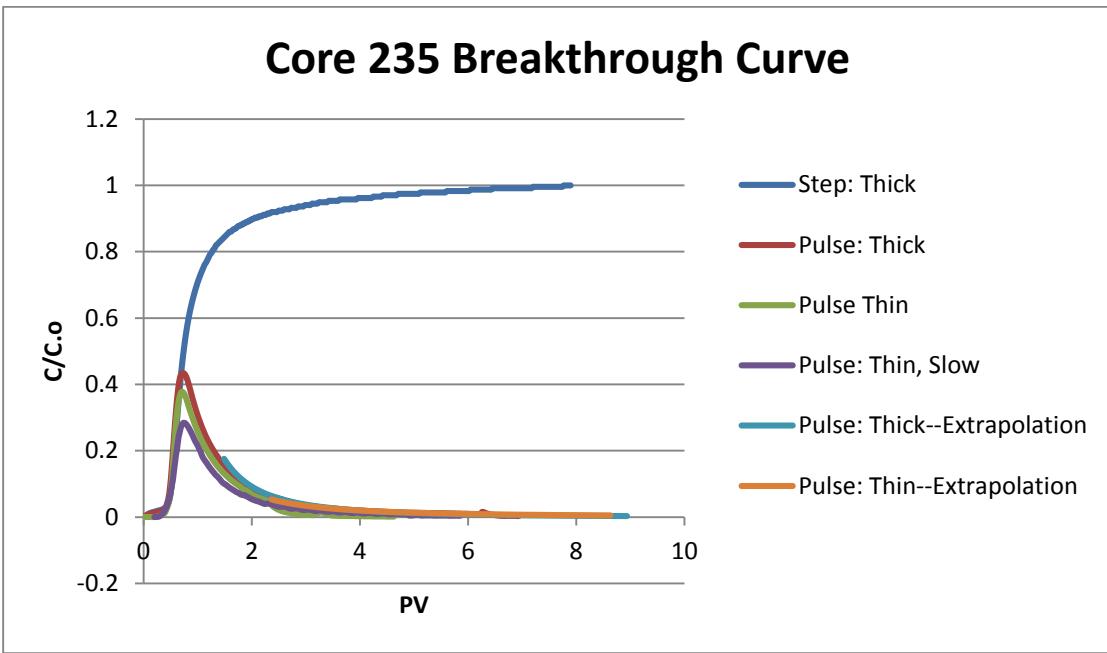


Figure A 2: Core 235 Breakthrough Curve

The following table depicts calculated values from the pulse and tracer tests. Front and back steps make up the step tests. The mean pore volume (PV) is based on the average of the front step, the fast flow pulse, and the slow flow pulse.

Table A 3: Core 235 Pulse and Step Test Results using Thin and Thick Rubber

	Thick			Thin Pulse	
	FrontStep	BackStep	Pulse	FastFlow	SlowFlow
Q (ml/min)	3.24	3.5	3.3	3.07	0.41
Mean Vol. (ml)	139.461	205.6109	182.9988	127.1416	171.2733
Pore Vol. (ml)	119.461	185.6109	162.9988	107.1416	151.2733
Porosity (%)	16.77362	26.06177	22.88679	15.04384	21.24039
Mean Porosity (%):	Thick = 21.91		Thin = 18.14		

Core 260 Lab Analysis

Table A 4: Core 260 Initial Analysis

Length =	23 cm
Diam =	6.35 cm
Tot. Volume =	728.0227 ml
Dead Space* =	20 ml

*Estimate

Table A 5: Core 260 Hydraulic Conductivity using Thick Rubber

<u>Thick Rubber K Values</u>			
K = Slope * A.t * L/A.c			
	Slope	K (cm/min)	K (m/day)
Trial 1	0.0703	1.0813338	15.57121
Trial 2	0.0491	0.7552416	10.87548
Trial 3	0.0471	0.7244782	10.43249
Average	0.0555	0.8536845	12.29

Table A 6: Core 260 Hydraulic Conductivity using Thick Rubber

<u>Thin Rubber K Values</u>			
K = Slope * A.t * L/A.c			
	Slope	K (cm/min)	K (m/day)
Trial 1	0.0648	0.9967344	14.35298
Trial 2	0.0541	0.8321502	11.98296
Average	0.05945	0.9144423	13.17

Table A 7: Core 260 Pulse and Step Test Results using Thick and Thin Rubber

	Thin	Thick
	Pulse	Pulse
Q (ml/min)	3	3.4
Mean Vol (ml)	184.8136	130.895
Pore Vol (ml)	164.8136	110.895
Porosity (%)	22.64	15.23

Core 275 Lab Analysis

Table A 8: Core 275 Initial Analysis

Length =	22.5 cm
Diam =	6 cm
Tot. Volume =	635.85 ml
Dead Space* =	20 ml

*Estimate

Table A 9: Core 275 Hydraulic Conductivity using Thick Rubber

<u>Thick Rubber K Values</u>			
K = Slope * A.t * L/A.c			
	Slope	K (cm/s)	K (m/day)

Trial 1	0.0078	0.117369	101.4069
Trial 2	0.0072	0.108341	93.60636
Trial 3	0.0058	0.087274	75.40512
Average	0.006933	0.104328	90.14

Table A 10: Core 275 Hydraulic Conductivity using Thick Rubber

	Pulse	Front Step	Back Step
Q (ml/min)	3.4	2.7	2.9
Mean Vol (ml)	147.0431	108.6081	122.3994
Pore Vol (ml)	125.8697	87.43472	101.226
Porosity (%)	19.79551	13.75084	15.9198

Mean PV (ml)	
=	104.84
Mean Porosity (%) =	16.49

Thin versus Thick Rubber Material

Based on the breakthrough curves for Core 235, it can be seen that the peak concentrations for each trial, regardless of rubber thickness, occurs at roughly the same number of pore volumes (Figure 4). The specific peak concentrations for the three trials are 0.61, 0.63, 0.65 PVs for the thin pulse, thick pulse, and slow flow thin pulse, respectively. These values are within 5% of each other. This shows that roughly the same amount of water passes through the column before concentrations reach maximum values, indicating the thick and thin rubber behave in much the same way. Based on this, thin rubber does not increase or decrease the chances of short circuiting as was anticipated.

Core 235: Comparing Rubber Thicknesses

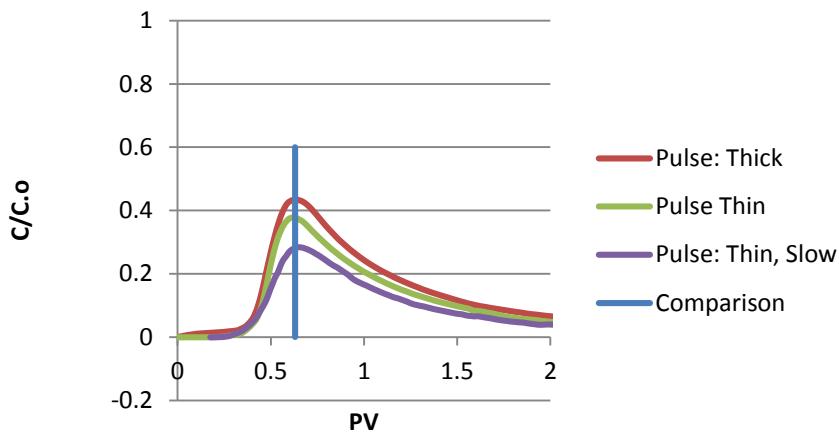


Figure A 3: Comparing Pore Volume at Peak Concentration

For Core 235, the average porosities of the thick and thin rubbers are 22% and 18% ml, respectively. These values are slightly more than 15% different, which is significant; however, within the thick rubber tests, a 35% variance occurred. Therefore, the 15% difference doesn't necessarily point to thick and thin rubbers returning different results—rather it indicates further testing must be done to make an accurate comparison.

Based on the falling head results for Core 260, it can be seen that the thick and thin rubber tests returned very similar hydraulic conductivity values. Thick and thin K values were 12.29 and 13.17 m/day, respectively. These values are roughly 6% different, which is satisfactory considering the variation within each test: the K values for thick rubber alone range from 13 to 20—a 33% difference.

The tracer tests show more sensitivity based on the rubber used. The thin rubber returned a porosity that was 33% different than that of the thick rubber. However, for Core 260 only one test was conducted for each rubber thickness. More tests must be made to accurately compare rubber material.

Core 275 was analyzed using only thick rubber. Therefore no rubber comparison can be made. However, it can be noted that the calculated porosity is similar to that of the other cores.

Field Tests: Porosity Calculation Method

Conductivity data was collected during each column test. This data was plotted against time to get a breakthrough curve for each column. Breakthrough curves for all of the columns are shown below. Moment analysis was used to determine a pore volume for each column. The pore volume was then divided by the core volume to get a porosity.

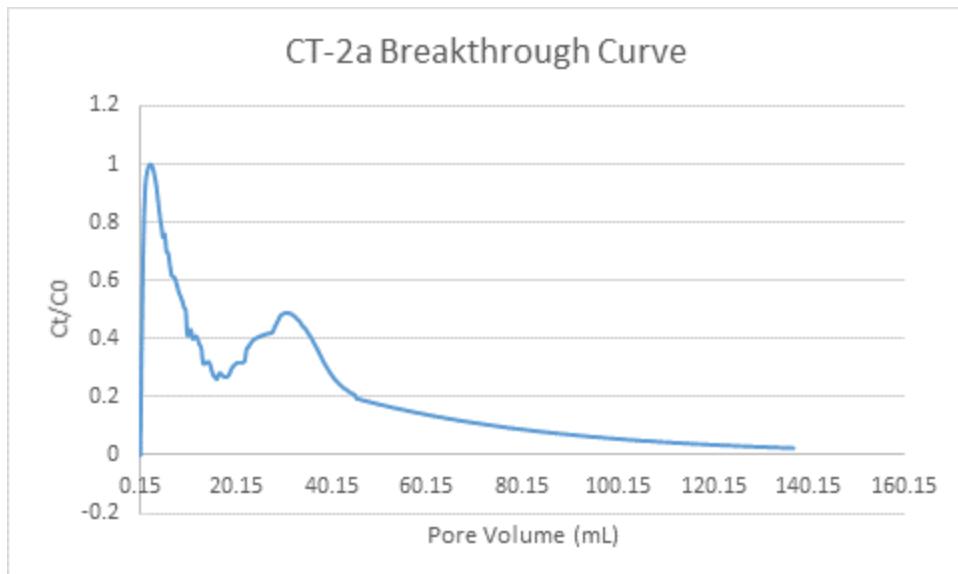


Figure A 4: Breakthrough Curve for CT-2a

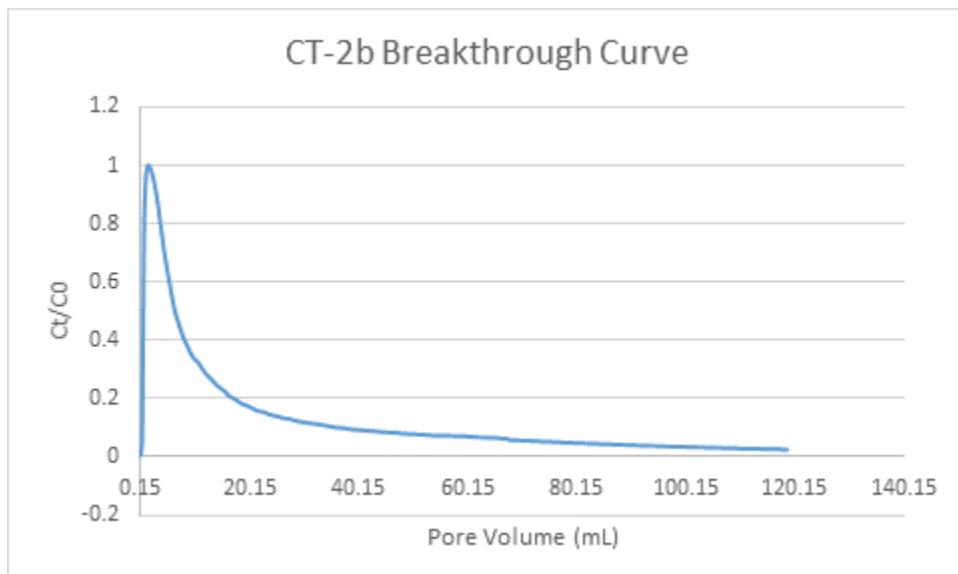


Figure A 5: Breakthrough Cuvre for CT-2b

CT-3 Breakthrough Curve

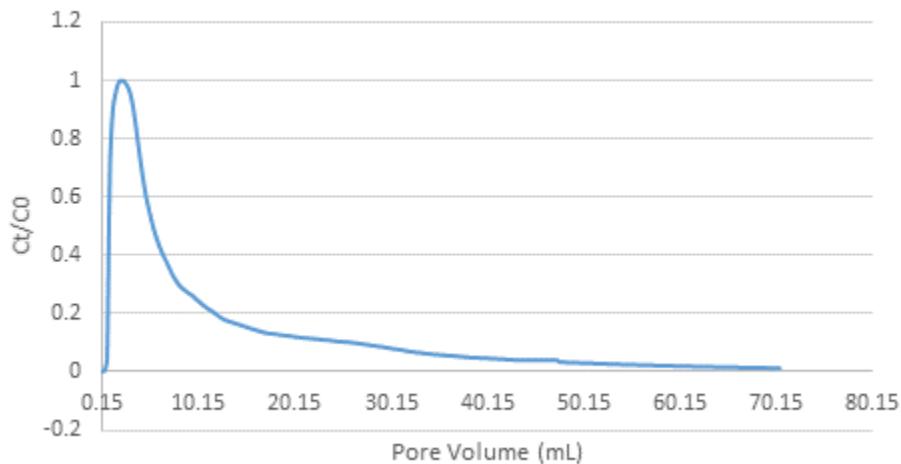


Figure A 6: Breakthrough curve for CT-3

CT-4 Breakthrough Curve

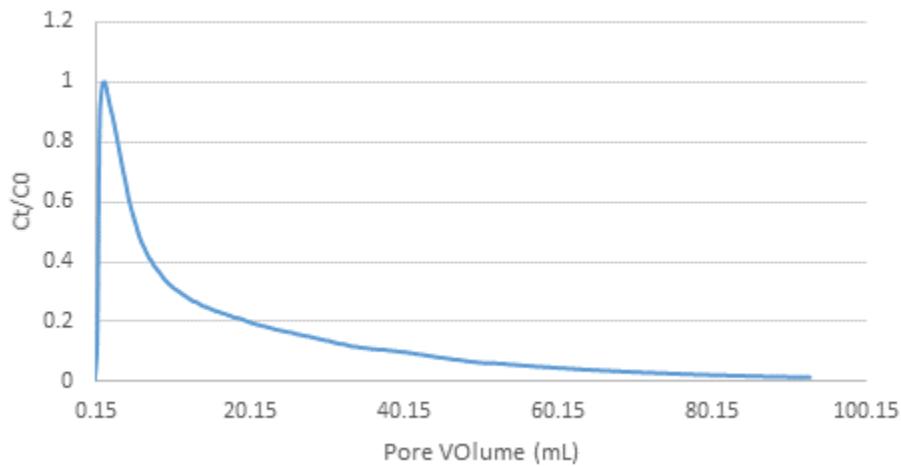


Figure A 7: Breakthrough Curve for CT-4

CT-5 Breakthrough Curve

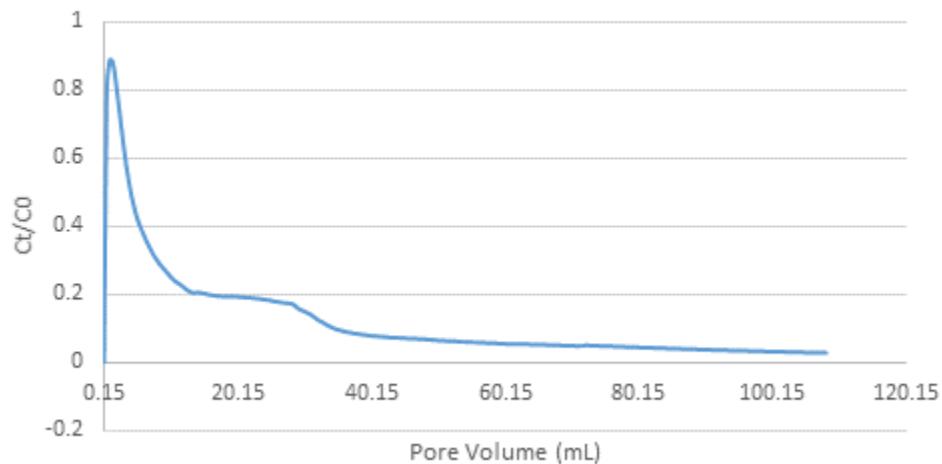


Figure A 8: Breakthrough Curve for CT-5

CT-6 Breakthrough Curve

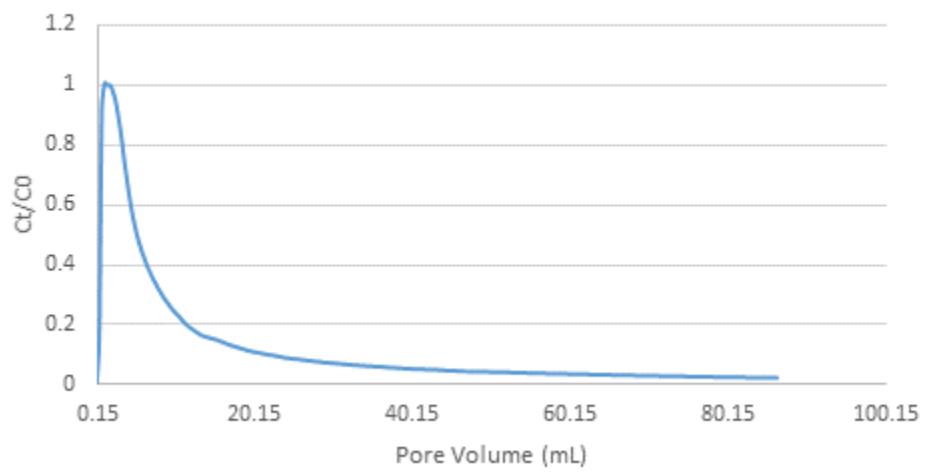


Figure A 9: Breakthrough Curve for CT-6

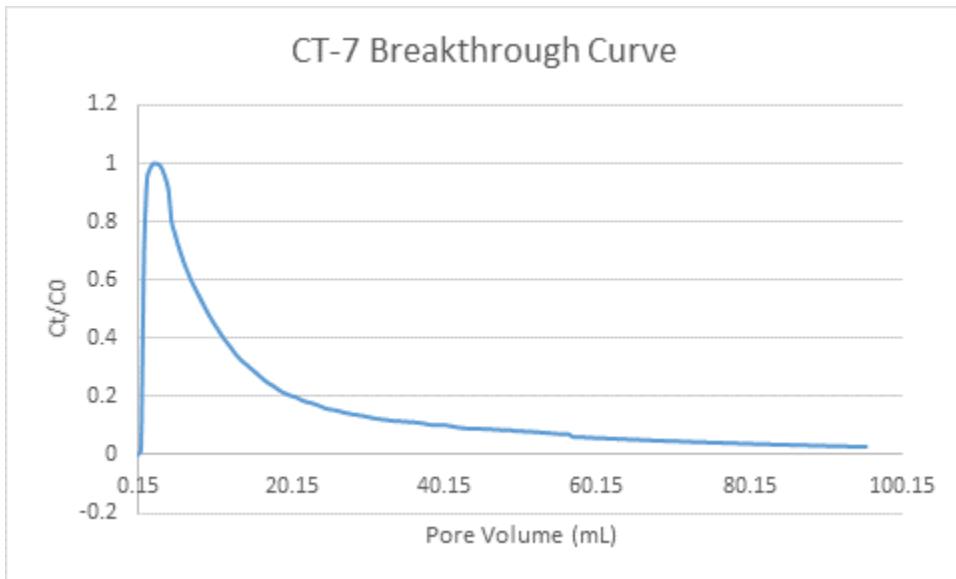


Figure A 10: Breakthrough Curve for CT-7

$$\text{Zeroth moment} = M_0 = \sum_i^{\infty} \left(\frac{c_t}{C_0} \right) dt$$

$$\text{First moment} = M_1 = \sum_i^{\infty} t \times \left(\frac{c_t}{C_0} \right) dt$$

$$\text{Normalized First Moment} = \frac{M_1}{M_0}$$

$$\text{Mean travel time} = \frac{M_1}{M_0} - \frac{t_d}{2}$$

Where t_d is the time period over which the tracer mass was injected

Pore Volume = Mean travel time * Flow rate

Porosity = Pore Volume/Core Volume

Arsenic Mass Calculation Method

The mass of the arsenic leached from each core was calculated by plotting the arsenic concentration in the samples against the volume of water passed through the column and finding the area under the curve.

$$\text{Mass of arsenic} = \sum_i^{\infty} C_i dV$$

APPENDIX C
HYDROGEOCHEMISTRY RESULTS

Analyte Symbol	Ca	Na	Sr	Zn	Na	Li	Be	Mg	Al	Si	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As
Unit Symbol	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Detection Limit	0.1	0.1	10	5	5	1	0.1	2	2	200	30	700	1	0.1	0.1	0.5	0.1	10	0.005	0.3	0.2	0.5	0.01	0.01	0.03
Analysis Method	CP-OES	CP-OES	CP-OES	CP-OES	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	
NGW-1-1																									
NGW-1-2																									
SW-2-1																									
SW-2-2																									
NGW-1-1	117	326	880		> 70000	8	< 0.2	30900	21	13100	8780	> 40000	4	2.6	< 0.2	< 1	10.6	120	< 0.01	< 0.6	1	21.7	0.04	0.1	< 0.06
NGW-1-1F	115	321	870		> 70000	8	< 0.2	30600	24	12800	8480	> 40000	4	2.9	< 0.2	< 1	10.1	130	< 0.01	0.9	1.6	26.2	0.04	0.12	< 0.06
NGW-1-2	119	330	900		> 70000	8	< 0.2	31500	23	13400	8670	> 40000	5	2.6	< 0.2	< 1	9.4	160	< 0.01	0.6	0.5	32	0.04	0.12	< 0.06
NGW-1-2F	119	327	900		> 70000	8	< 0.2	31800	25	13900	8640	> 40000	5	3	< 0.2	< 1	9.2	170	< 0.01	0.7	< 0.4	24.5	0.04	0.12	< 0.06
CT-1-5	106				> 70000	13	< 0.2	9450	25	3600	2560	39000	< 2	1.1	< 0.2	< 1	2.8	70	0.045	0.9	1.3	29.3	0.05	0.08	< 0.06
CT-1-10	40.7	107			> 70000	12	< 0.2	9640	19	3800	2680	> 40000	< 2	1.2	< 0.2	< 1	2.7	80	0.061	1	1.4	36	0.06	0.08	< 0.06
CT-1-15	55.4	152	430		> 70000	11	< 0.2	12700	31	5300	3550	> 40000	3	1.5	< 0.2	< 1	3.6	110	0.051	1.4	1	33.4	0.06	0.1	< 0.06
CT-1-20	56.6	155	440		> 70000	9	< 0.2	12800	8	5400	3540	> 40000	3	1.5	< 0.2	< 1	3.5	100	0.056	1.4	0.6	31.2	0.06	0.12	< 0.06
CT-1-25	114	317	870		> 70000	17	< 0.2	25800	34	11000	7260	> 40000	5	2.9	< 0.2	< 1	7.1	180	0.058	2.5	0.9	50.7	0.08	0.14	< 0.06
CT-1-30	112	318	860		> 70000	16	< 0.2	26000	25	11000	7300	> 40000	5	2.9	< 0.2	< 1	7	170	0.047	2.1	0.8	32.4	0.08	0.14	< 0.06
CT-1-35	114	323	870		> 70000	15	< 0.2	25900	28	11100	7250	> 40000	5	2.7	< 0.2	< 1	7	170	0.038	2	1	29.5	0.07	0.12	< 0.06
CT-1-40	51.2	139	410		> 70000	6	< 0.2	11800	18	5000	3290	> 40000	2	1.3	< 0.2	< 1	3.8	110	0.054	7.6	0.9	31.4	0.07	0.1	< 0.06
CT-1-45	112	317	860		> 70000	16	< 0.2	26100	21	10900	7420	> 40000	5	2.7	< 0.2	< 1	6.9	180	0.058	1.9	0.8	35.4	0.07	0.12	< 0.06
SW-2-1					9110	< 2	< 0.2	512	130	700	1040	33200	< 2	1.4	< 0.2	< 1	1.7	80	0.044	0.9	2.7	71.5	0.11	0.1	< 0.06
SW-2-1F					8530	< 2	< 0.2	198	48	500	970	30600	< 2	0.5	< 0.2	< 1	1.3	60	0.04	0.7	1.4	64.2	0.1	0.1	< 0.06
SW-2-2					7570	< 2	< 0.2	57	12	< 400	760	34300	< 2	0.4	< 0.2	< 1	2.8	70	0.03	0.7	5.2	58	0.09	0.1	< 0.06
SW-2-2F					7280	< 2	< 0.2	50	24	< 400	760	33400	< 2	0.5	< 0.2	< 1	2.4	60	0.041	0.9	0.9	64.8	0.1	0.1	< 0.06
CT-2-5	98.7				> 70000	6	< 0.2	7320	10	3100	2150	33100	< 2	1	< 0.2	< 1	2.8	60	0.046	0.8	2.8	38.6	0.08	0.1	< 0.06
CT-2-10					42900	3	< 0.2	3920	14	1700	1480	21400	< 2	0.6	< 0.2	< 1	1.9	40	0.049	1	4.1	48	0.08	0.08	< 0.06
CT-2-15					41100	3	< 0.2	3760	14	1600	1530	23900	< 2	0.5	< 0.2	< 1	2.6	70	0.048	0.6	3.3	59.6	0.08	0.1	< 0.06
CT-2-20					29500	3	< 0.2	3430	22	1300	1180	29900	< 2	0.5	< 0.2	< 1	3.2	50	0.042	0.8	3	151	0.08	0.1	< 0.06
CT-2-25	150		420	816	57800	6	< 0.2	9970	11	2600	2430	> 40000	< 2	0.9	< 0.2	< 1	16.5	190	0.06	1.2	4.6	> 500	0.08	0.14	< 0.06
CT-2-30	156				35900	328	< 0.2	32300	17	2400	20500	> 40000	< 2	1.2	< 0.2	< 1	84.4	200	0.71	2.1	7.7	293	0.05	0.24	< 0.06
CT-2-35	95				23200	4	< 0.2	3100	12	800	1440	> 40000	< 2	0.5	< 0.2	< 1	12.5	110	0.025	1.1	2	313	0.05	0.04	< 0.06
CT-2-40	80.2				19000	3	< 0.2	2250	28	700	1280	> 40000	< 2	0.4	< 0.2	< 1	9								

Analyte Symbol	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sn	Sb	Te	Cs	Ba	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	
Unit Symbol	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Detection Limit	0.2	0.005	0.04	0.003	0.01	0.005	0.1	0.2	0.01	0.001	0.1	0.01	0.1	0.001	0.1	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Analysis Method	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	
NGW-1-1																										
NGW-1-2																										
SW-2-1																										
SW-2-2																										
NGW-1-1	< 0.4	4.66	> 400	0.008	0.03	< 0.01	3.1	< 0.4	< 0.02	< 0.002	< 0.2	< 0.02	< 0.2	0.078	46.2	0.087	0.023	< 0.002	0.009	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.002	
NGW-1-1F	< 0.4	4.59	> 400	0.006	0.03	< 0.01	2.8	< 0.4	0.03	< 0.002	0.3	< 0.02	< 0.2	0.078	46.6	0.092	0.026	< 0.002	0.005	0.004	0.002	< 0.002	< 0.002	< 0.002	< 0.002	
NGW-1-2	< 0.4	4.83	> 400	< 0.006	0.03	0.01	4.1	< 0.4	0.04	< 0.002	< 0.2	< 0.02	< 0.2	0.042	46.8	0.153	0.025	< 0.002	0.005	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	
NGW-1-2F	< 0.4	4.91	> 400	0.008	0.02	< 0.01	3.6	< 0.4	0.04	< 0.002	0.4	< 0.02	< 0.2	0.047	47	0.059	0.018	< 0.002	0.009	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-5	< 0.4	1.59	327	< 0.006	0.06	< 0.01	65.8	< 0.4	0.22	< 0.002	1.4	0.16	< 0.2	0.014	19.1	0.065	0.008	< 0.002	0.007	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-10	< 0.4	1.72	343	< 0.006	0.03	< 0.01	84.3	< 0.4	0.27	< 0.002	0.3	0.17	< 0.2	0.017	23.8	0.095	0.011	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-15	< 0.4	2.34	> 400	< 0.006	0.03	< 0.01	76.1	< 0.4	0.27	< 0.002	0.9	0.13	< 0.2	0.033	28.6	0.095	0.007	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-20	< 0.4	2.31	> 400	< 0.006	0.04	< 0.01	56.4	< 0.4	0.21	< 0.002	< 0.2	0.13	< 0.2	0.037	29	0.075	0.019	< 0.002	0.008	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-25	< 0.4	4.71	> 400	0.016	0.07	0.012	96.7	< 0.4	0.28	< 0.002	0.3	0.18	< 0.2	0.087	67.6	0.108	0.039	0.002	0.014	< 0.002	0.003	< 0.002	< 0.002	0.002	< 0.002	
CT-1-30	< 0.4	4.75	> 400	0.008	0.04	0.01	83.4	< 0.4	0.25	< 0.002	< 0.2	0.16	< 0.2	0.099	56	0.101	0.021	< 0.002	0.007	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-35	< 0.4	4.81	> 400	0.008	0.42	< 0.01	77.3	0.9	0.27	< 0.002	0.3	0.16	< 0.2	0.088	53.6	0.051	0.018	< 0.002	0.003	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-40	< 0.4	2.15	> 400	< 0.006	0.03	< 0.01	31	< 0.4	0.15	< 0.002	0.3	0.04	< 0.2	0.029	24.8	0.06	0.01	< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-1-45	< 0.4	4.89	> 400	0.01	0.04	0.01	63.2	< 0.4	0.2	< 0.002	< 0.2	0.12	< 0.2	0.088	50.8	0.082	0.012	< 0.002	0.004	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	
SW-2-1	< 0.4	0.872	25.2	0.073	0.08	< 0.01	< 0.2	3.3	0.04	< 0.002	< 0.2	< 0.02	< 0.2	0.004	4.8	0.129	0.078	0.01	0.05	0.008	0.003	0.008	< 0.002	0.009	< 0.002	
SW-2-1F	< 0.4	0.83	22.3	0.012	0.03	< 0.01	< 0.2	< 0.4	0.04	< 0.002	0.2	< 0.02	< 0.2	0.004	2.8	0.475	0.025	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
SW-2-2	< 0.4	0.757	12	0.019	< 0.02	< 0.01	< 0.2	< 0.4	0.06	< 0.002	0.3	< 0.02	< 0.2	< 0.002	2.6	0.278	0.01	< 0.002	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
SW-2-2F	< 0.4	0.78	11.9	0.015	0.05	0.01	< 0.2	< 0.4	0.04	< 0.002	< 0.2	< 0.02	< 0.2	< 0.002	5.9	0.044	0.016	< 0.002	0.009	< 0.002	< 0.002	< 0.002	< 0.002	0.003	< 0.002	
CT-2-5	< 0.4	1.37	293	< 0.006	< 0.02	< 0.01	18.1	< 0.4	0.1	< 0.002	< 0.2	< 0.02	< 0.2	0.015	15.6	0.32	0.006	< 0.002	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-2-10	< 0.4	0.968	171	< 0.006	0.07	< 0.01	9.8	< 0.4	0.08	< 0.002	0.3	< 0.02	< 0.2	0.014	14	0.03	0.006	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	
CT-2-15	< 0.4	1.11	174	< 0.006	0.03	< 0.01	11.7	< 0.4	0.08	< 0.002	0.2	< 0.02</td														

Analyte Symbol	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Bi	Th	U	F	Cl	IO2 (as N)	Br	IO3 (as N)	NO4 (as F)	SO4	Alk.	CO3(2-)	HCO3(-)	OH(-)		
Unit Symbol	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	CaCO3	CaCO3	CaCO3	CaCO3	
Detection Limit	0.001	0.001	0.001	0.001	0.001	0.001	0.02	0.2	0.001	0.01	0.3	0.001	0.001	0.01	0.03	0.01	0.03	0.01	0.02	0.03	2	1	1	1		
Analysis Method	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	IC	IC	IC	IC	IC	IC	IC	TITR	TITR	TITR	TITR		
NGW-1-1														< 0.01	55.6	< 0.01	0.13	0.67	< 0.02	4.24	155	< 1	155	< 1		
NGW-1-2														< 0.01	56.3	< 0.01	0.13	0.2	< 0.02	4.26	165	< 1	165	< 1		
SW-2-1														0.12	4.82	< 0.01	< 0.03	0.28	< 0.02	0.57	95	< 1	95	< 1		
SW-2-2														0.02	4.73	0.07	< 0.03	0.34	< 0.02	0.44	100	< 1	100	< 1		
NGW-1-1	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	0.462													
NGW-1-1F	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	0.468													
NGW-1-2	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	0.516													
NGW-1-2F	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	0.531													
CT-1-5	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	0.002	2.57													
CT-1-10	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	0.56	< 0.6	< 0.002	3.1													
CT-1-15	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	3.12													
CT-1-20	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	2.48													
CT-1-25	< 0.002	< 0.002	0.003	< 0.002	0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	4.26													
CT-1-30	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	3.72													
CT-1-35	< 0.002	< 0.002	< 0.002	< 0.002	0.008	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	3.4													
CT-1-40	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	< 0.002	1.33													
CT-1-45	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	< 0.02	< 0.6	0.003	2.7													
SW-2-1	0.006	< 0.002	0.005	< 0.002	< 0.002	0.024	< 0.04	< 0.4	< 0.002	0.02	< 0.6	< 0.002	0.1													
SW-2-1F	< 0.002	< 0.002	0.002	< 0.002	< 0.002	0.018	< 0.04	< 0.4	< 0.002	0.71	< 0.6	< 0.002	0.056													
SW-2-2	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.008	< 0.04	< 0.4	< 0.002	0.52	< 0.6	< 0.002	0.016													
SW-2-2F	< 0.002	< 0.002	< 0.002	< 0.002	0.004	0.006	< 0.04	< 0.4	< 0.002	0.26	< 0.6	< 0.002	0.013													
CT-2-5	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	0.43	< 0.6	< 0.002	1.21													
CT-2-10	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	0.79	< 0.6	< 0.002	0.922													
CT-2-15	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.04	< 0.4	< 0.002	1.4	< 0.6	< 0.002	1.22													
CT-2-20	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.04	< 0.4	< 0.002	1.91	< 0.6	< 0.002	1.18													
CT-2-25	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.014	< 0.04	< 0.4	< 0.002	4.43	< 0.6	< 0.002	2.99													
CT-2-30	0.008	< 0.002	0.008	< 0.002	< 0.002	0.006	< 0.04	< 0.4	0.118	2.29	< 0.6	< 0.002	2.49													
CT-2-35	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.008	< 0.04	< 0.4	< 0.002	2.62	< 0.6	< 0.002	1.85													
CT-2-40	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.014	< 0.04	< 0.4	< 0.002	2.1	< 0.6	< 0.002	1.78	</td												

Analyte Symbol	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sn	Sb	Te	Cs	Ba	La	Ce
Unit Symbol	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Detection Limit	10	0.005	0.3	0.2	0.5	0.01	0.01	0.03	0.2	0.005	0.04	0.003	0.01	0.005	0.1	0.2	0.01	0.001	0.1	0.01	0.1	0.001	0.1	0.001	0.001
Analysis Method	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	
CT-3-A																									
CT-3-B																									
CT-3-27																									
CT-3-37																									
CT-3-A1	< 10	< 0.005	< 0.3	< 0.2	74.1	< 0.01	0.02	0.04	< 0.2	0.728	18.6	< 0.003	0.21	0.005	< 0.1	< 0.2	< 0.01	< 0.001	< 0.1	0.01	< 0.1	0.004	1	0.039	0.058
CT-3-B1	< 10	< 0.005	< 0.3	< 0.2	2.9	< 0.01	0.01	0.08	< 0.2	0.681	19.2	< 0.003	< 0.01	< 0.005	< 0.1	< 0.2	< 0.01	< 0.001	< 0.1	< 0.01	< 0.1	< 0.001	0.8	< 0.001	< 0.001
CT-3-5	< 10	< 0.005	< 0.3	0.6	8.5	< 0.01	0.05	14.8	< 0.2	1.17	272	< 0.003	< 0.01	< 0.005	203	< 0.2	0.35	< 0.001	0.3	0.35	< 0.1	0.015	12.8	< 0.001	< 0.001
CT-3-10	< 10	< 0.005	< 0.3	0.4	4	< 0.01	0.02	7.4	< 0.2	0.843	148	< 0.003	< 0.01	< 0.005	76	< 0.2	0.11	< 0.001	0.2	0.19	< 0.1	0.008	7.3	< 0.001	< 0.001
CT-3-15	< 10	< 0.005	< 0.3	0.3	5.6	< 0.01	0.02	7.36	< 0.2	0.902	130	< 0.003	< 0.01	< 0.005	64.8	< 0.2	0.1	< 0.001	0.2	0.2	< 0.1	0.011	6.8	< 0.001	< 0.001
CT-3-20	< 10	< 0.005	< 0.3	0.3	6.4	< 0.01	0.02	5.82	< 0.2	0.708	94.1	< 0.003	0.01	< 0.005	45.7	< 0.2	0.07	< 0.001	0.2	0.15	< 0.1	0.007	5.2	< 0.001	< 0.001
CT-3-25	< 10	< 0.005	< 0.3	0.5	11.9	0.01	0.03	10.3	0.3	1.32	148	< 0.003	< 0.01	< 0.005	76.8	< 0.2	0.14	< 0.001	0.3	0.28	< 0.1	0.02	8.6	< 0.001	< 0.001
CT-3-30	< 10	< 0.005	< 0.3	0.4	17.2	0.01	0.02	8.87	0.3	1.15	115	< 0.003	< 0.01	< 0.005	65.1	< 0.2	0.12	< 0.001	0.3	0.25	< 0.1	0.021	6.7	< 0.001	< 0.001
CT-3-35	< 10	< 0.005	< 0.3	0.3	8.2	< 0.01	0.02	7.82	< 0.2	1.01	89.4	< 0.003	< 0.01	< 0.005	53	< 0.2	0.08	< 0.001	0.3	0.21	< 0.1	0.015	5.1	< 0.001	< 0.001
CT-3-40	< 10	< 0.005	< 0.3	0.4	7.9	< 0.01	0.02	7.12	< 0.2	0.954	74.8	< 0.003	0.09	< 0.005	49.8	< 0.2	0.08	< 0.001	0.2	0.18	< 0.1	0.013	4.2	< 0.001	< 0.001
CT-3-45	< 10	< 0.005	< 0.3	0.2	9	0.01	0.02	6.92	< 0.2	0.916	68.4	< 0.003	< 0.01	< 0.005	48.5	< 0.2	0.08	< 0.001	0.2	0.18	< 0.1	0.012	3.8	< 0.001	< 0.001
CT-4-A																									
CT-4-B																									
CT-4-27																									
CT-4-37																									
CT-4-A1	< 10	< 0.005	< 0.3	< 0.2	8.3	< 0.01	0.01	0.05	< 0.2	0.7	17.8	< 0.003	< 0.01	< 0.005	< 0.1	< 0.2	< 0.01	< 0.001	< 0.1	0.01	< 0.1	0.003	0.7	< 0.001	< 0.001
CT-4-B1	< 10	< 0.005	< 0.3	1.7	7.5	< 0.01	0.01	0.06	< 0.2	0.703	17.5	< 0.003	0.02	< 0.005	< 0.1	< 0.2	< 0.01	< 0.001	< 0.1	< 0.01	< 0.1	< 0.001	1	< 0.001	< 0.001
CT-4-5	< 10	< 0.005	< 0.3	0.8	20.6	< 0.01	0.03	6.13	< 0.2	1.05	223	< 0.003	< 0.01	< 0.005	49.6	< 0.2	0.1	< 0.001	0.4	0.14	< 0.1	0.014	10.2	< 0.001	< 0.001
CT-4-10	< 10	< 0.005	< 0.3	0.8	31.2	< 0.01	0.02	3.96	< 0.2	0.772	132	< 0.003	< 0.01	< 0.005	25.6	< 0.2	0.03	< 0.001	0.2	0.08	< 0.1	0.01	6.4	< 0.001	< 0.001
CT-4-15	< 10	< 0.005	< 0.3	0.8	51.9	< 0.01	0.02	4.18	< 0.2	0.928	134	< 0.003	< 0.01	< 0.005	22	< 0.2	0.03	< 0.001	0.2	0.08	< 0.1	0.013	6.6	< 0.001	< 0.001
CT-4-20	< 10	< 0.005	< 0.3	1.3	69.5	< 0.01	0.02	3.17	< 0.2	0.783	101	< 0.003	< 0.01	< 0.005	15.5	< 0.2	0.01	< 0.001	0.1	0.06	< 0.1	0.011	5.2	< 0.001	< 0.001
CT-4-25	< 10	< 0.005	< 0.3	0.7	157	< 0.01	0.03	5.65	< 0.2	1.42	171	< 0.003	< 0.01	< 0.005	26.3	< 0.2	0.05	< 0.001	0.3	0.12	< 0.1	0.026	9	< 0.001	< 0.001
CT-4-30	< 10	< 0.005	< 0.3	0.6	198	0.01	0.02	5	< 0.2	1.22	134	< 0.003	< 0.01	< 0.005	20.8	< 0.2	0.03	< 0.001	0.2	0.1</					

Analyte Symbol	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Rb	Sr	Y	Zr	Nb	Mo	Ag	Cd	In	Sn	Sb	Te	Cs	Ba	La	Ce
Unit Symbol	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Detection Limit	10	0.005	0.3	0.2	0.5	0.01	0.01	0.03	0.2	0.005	0.04	0.003	0.01	0.005	0.1	0.2	0.01	0.001	0.1	0.01	0.1	0.001	0.1	0.001	0.001
Analysis Method	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	
CT-7-A																									
CT-7-B																									
CT-7-27																									
CT-7-37																									
CT-7-A1	< 10	< 0.005	< 0.3	0.3	5.5 < 0.01	0.04	0.05	7.1	0.659	13.1	0.017	0.02 < 0.005	< 0.1	< 0.2	< 0.01	< 0.001	< 0.1	< 0.01	< 0.1	< 0.1	0.017	0.6	0.007	0.004	
CT-7-B1	< 10	< 0.005	< 0.3	< 0.2	3.6	0.01	0.03	0.05	4.7	0.679	13.1	0.014 < 0.01	< 0.005	< 0.1	< 0.2	< 0.01	< 0.001	< 0.1	< 0.01	< 0.1	0.021	0.4	0.006	0.007	
CT-7-5	< 10	< 0.005	< 0.3	0.3	6.3 < 0.01	0.03	1.87	0.7	1.05	242	0.005	0.01 < 0.005	9 < 0.2	< 0.02	< 0.001	0.1	0.06 < 0.1	0.025	10.5	0.002	0.002				
CT-7-10	< 10	< 0.005	< 0.3	0.3	4.8 < 0.01	0.02	1.44	0.7	0.761	135	0.003 < 0.01	< 0.005	4.6 < 0.2	< 0.01	< 0.001	< 0.1	0.04 < 0.1	0.019	6.3 < 0.001	< 0.001					
CT-7-15	< 10	< 0.005	< 0.3	0.3	3.7 < 0.01	0.01	1.01	0.3	0.562	83.1 < 0.003	< 0.01	< 0.005	3.2 < 0.2	< 0.01	< 0.001	< 0.1	0.03 < 0.1	0.016	4.1	0.009	0.007				
CT-7-20	< 10	< 0.005	< 0.3	0.2	3.3 < 0.01	0.01	1.2	0.7	0.643	81.8	0.003 < 0.01	< 0.005	3.5 < 0.2	< 0.01	< 0.001	< 0.1	0.03 < 0.1	0.02	4.2 < 0.001	< 0.001					
CT-7-25	< 10	< 0.005	< 0.3	< 0.2	5.3	0.01	0.02	2.16	1.3	1.14	125	0.007 < 0.01	< 0.005	5.9 < 0.2	< 0.01	< 0.001	0.1	0.05 < 0.1	0.036	6.6	0.002	0.002			
CT-7-30	20 < 0.005	< 0.3	< 0.2	5.5	0.01	0.02	1.76	1.3	0.989	89	0.007 < 0.01	< 0.005	4.6 < 0.2	< 0.01	< 0.001	0.1	0.04 < 0.1	0.034	5	0.003	0.002				
CT-7-35	< 10	< 0.005	< 0.3	< 0.2	1.7 < 0.01	0.03	1.56	1.2	0.964	78.5 < 0.003	0.03 < 0.005	4.2 < 0.2	< 0.01	< 0.001	0.1	0.03 < 0.1	0.025	4.4 < 0.001	< 0.001						
CT-7-40	< 10	< 0.005	< 0.3	< 0.2	2.8 < 0.01	0.02	1.39	0.9	0.898	66.7 < 0.003	0.01 < 0.005	3.5 < 0.2	< 0.01	< 0.001	0.1	0.03 < 0.1	0.02	4 < 0.001	< 0.001						
CT-7-45	< 10	< 0.005	< 0.3	< 0.2	3.5 < 0.01	0.02	1.35	0.5	0.908	62.5 < 0.003	0.01 < 0.005	3.5 < 0.2	< 0.01	< 0.001	0.1	0.03 < 0.1	0.026	3.8 < 0.001	< 0.001						
CT-8-B																									
CT-8-27																									
CT-8-37																									
CT-8-B1	40 < 0.005	< 0.3	< 0.2	5.4 < 0.01	0.06	1.72	3.5	3.91	839 < 0.003	0.01 < 0.005	2.3 < 0.2	< 0.01	< 0.001	< 0.1	< 0.01	< 0.1	0.042	35.4 < 0.001	< 0.001						
CT-8-5	20 < 0.005	< 0.3	< 0.2	1.3 < 0.01	0.03	2.65	0.5	1.19	253 < 0.003	< 0.01	< 0.005	42.1 < 0.2	< 0.07	< 0.001	0.1 < 0.01	< 0.1	0.017	11.8 < 0.001	< 0.001						
CT-8-10	30 < 0.005	0.4 < 0.2	7.5 < 0.01	0.04	5.56	0.8	1.37	285 < 0.003	0.68 < 0.005	74.2 < 0.2	< 0.15	< 0.001	0.1	0.04 < 0.1	0.023	15.6 < 0.001	< 0.001								
CT-8-15	20 < 0.005	0.5	0.3	0.8 < 0.01	0.03	5.05	0.6	1.37	283 < 0.003	0.01 < 0.005	50.1 < 0.2	< 0.08	< 0.001	0.2	0.02 < 0.1	0.021	12.8 < 0.001	< 0.001							
CT-8-20	20 < 0.005	0.6 < 0.2	< 0.5	< 0.01	0.05	6.47	0.8	1.9	412 < 0.003	< 0.01	< 0.005	58 < 0.2	< 0.11	< 0.001	0.1	0.02 < 0.1	0.033	18.6 < 0.001	< 0.001						
CT-8-25	30 < 0.005	0.6	0.5	8.2 < 0.01	0.04	6.26	0.9	1.99	422 < 0.003	< 0.01	< 0.005	53.8 < 0.2	< 0.1	< 0.001	0.1	0.02 < 0.1	0.033	19.3 < 0.001	< 0.001						
CT-8-30	30 < 0.005	1 < 0.2	0.9 < 0.01	0.08	11.1	2.3	3.94	852 < 0.003	0.01 < 0.005	95.4 < 0.2	< 0.17	< 0.001	0.1	0.03 < 0.1	0.067	37	0.003 < 0.001								
CT-8-35	20 < 0.005	0.9 < 0.2	3.7 < 0.01	0.08	10.6	2.6	3.99	852 < 0.003	< 0.01	< 0.005	87.3 < 0.2	< 0.17	< 0.001	0.1	0.03 < 0.1	0.066	36.5	0.003 < 0.001							
CT-8-40	10 < 0.005	0.9	0.3	3 < 0.01	0.08	10.6	2	4.07	868 < 0.003	< 0.01	< 0.005	85.1 < 0.2	< 0.15	< 0.001	0.1	0.03 < 0.1	0.071	37							

Analyte Symbol	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Hf	Ta	W	Hg	Tl	Pb	Bi	Th	U
Unit Symbol	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Detection Limit	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	
Analysis Method	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	ICP-MS	
CT-3-A																					
CT-3-B																					
CT-3-27																					
CT-3-37																					
CT-3-A1	0.004	0.017	0.002	< 0.001		0.003	< 0.001	0.002	< 0.001	< 0.001	< 0.001	< 0.001	0.004	0.002	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	0.006	0.02
CT-3-B1	< 0.001	< 0.001	< 0.001	< 0.001		0.097	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.007
CT-3-5	< 0.001	< 0.001	< 0.001	< 0.001		0.523	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.005	< 0.001	0.002	0.05	< 0.2	< 0.001	0.18	< 0.3	< 0.001	1.13
CT-3-10	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.548
CT-3-15	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.575
CT-3-20	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.003	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.513
CT-3-25	< 0.001	< 0.001	< 0.001	< 0.001		0.012	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.007	0.02	< 0.2	< 0.001	0.23	< 0.3	< 0.001	0.993
CT-3-30	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.008	0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.973
CT-3-35	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.006	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.862
CT-3-40	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.007	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.828
CT-3-45	< 0.001	< 0.001	< 0.001	< 0.001		0.026	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.006	0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.852
CT-4-A																					
CT-4-B																					
CT-4-27																					
CT-4-37																					
CT-4-A1	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	< 0.001
CT-4-B1	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	< 0.02	< 0.2	< 0.001	< 0.01	< 0.3	< 0.001	0.006
CT-4-5	< 0.001	< 0.001	< 0.001	< 0.001		0.147	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.04	< 0.2	< 0.001	0.62	< 0.3	< 0.001	1.74
CT-4-10	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.001	0.02	< 0.2	< 0.001	0.44	< 0.3	< 0.001	1
CT-4-15	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.02	< 0.2	< 0.001	0.59	< 0.3	< 0.001	0.99
CT-4-20	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	< 0.02	< 0.2	< 0.001	0.54	< 0.3	< 0.001	0.809
CT-4-25	< 0.001	< 0.001	< 0.001	< 0.001		0.444	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.003	< 0.001	0.004	0.05	< 0.2	< 0.001	1.15	< 0.3	< 0.001	1.43
CT-4-30	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.004	< 0.02	< 0.2	< 0.001	1.12	< 0.3	< 0.001	1.31
CT-4-35	< 0.001	0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.004	< 0.02	< 0.2	< 0.001	1.02	< 0.3	< 0.001	1.09
CT-4-40	< 0.001	< 0.001	< 0.001	< 0.001		< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.004	< 0.02	< 0.2	< 0.001	1	< 0.3	0.004	1.05
CT-4-45	< 0.001	&																			

SUBMISSION	SAMPDESC	SAMPLEDATE	SAMPLETIME	METHOD	COMPOUND	QUALI	RESULTN	RESULTC	UNITS	MDL	ANALYSDATE	ANALYSTIME	ANALYST	SUBMISSION	SAMPDESC	SAMPLEDATE	SAMPLETIME	METHOD	COMPOUND	QUAL	RESULTC	RESULTC	UNITS	MDL	ANALYSDAT	ANALYSTIMI	ANALYST
13080438	CT-1-1	8/8/2013	1059	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	8/20/2013	12:36	JSM	13100291	CT-7-A2	10/3/2013	943	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	20:50	JSM
13080438	CT-1-2	8/8/2013	1101	SM3113B	ARSENIC	I	0.793	0.793 I	UG/L	0.689	8/20/2013	12:42	JSM	13100291	CT-7-1	10/3/2013	951	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	20:56	JSM
13080438	CT-1-3	8/8/2013	1104	SM3113B	ARSENIC		3.38	3.38	UG/L	0.689	8/20/2013	12:49	JSM	13100291	CT-7-2	10/3/2013	953	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	21:02	JSM
13080438	CT-1-4	8/8/2013	1107	SM3113B	ARSENIC		5.41	5.41	UG/L	0.689	8/20/2013	12:55	JSM	13100291	CT-7-3	10/3/2013	955	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	21:08	JSM
13080438	CT-1-6	8/8/2013	1112	SM3113B	ARSENIC		7.26	7.26	UG/L	0.689	8/20/2013	13:01	JSM	13100291	CT-7-4	10/3/2013	957	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	21:14	JSM
13080438	CT-1-7	8/8/2013	1114	SM3113B	ARSENIC		7.51	7.51	UG/L	0.689	8/20/2013	13:07	JSM	13100291	CT-7-6	10/3/2013	1001	SM3113B	ARSENIC	I	0.831	0.831 I	UG/L	0.689	11/7/2013	21:21	JSM
13080438	CT-1-8	8/8/2013	1117	SM3113B	ARSENIC		8.53	8.53	UG/L	0.689	8/20/2013	13:13	JSM	13100291	CT-7-7	10/3/2013	1003	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	21:27	JSM
13080438	CT-1-9	8/8/2013	1120	SM3113B	ARSENIC		8.59	8.59	UG/L	0.689	8/20/2013	13:20	JSM	13100291	CT-7-8	10/3/2013	1005	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	21:33	JSM
13080438	CT-1-11	8/8/2013	1125	SM3113B	ARSENIC		8.57	8.57	UG/L	0.689	8/20/2013	13:26	JSM	13100291	CT-7-9	10/3/2013	1007	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	21:55	JSM
13080438	CT-1-12	8/8/2013	1128	SM3113B	ARSENIC		8.09	8.09	UG/L	0.689	8/20/2013	13:32	JSM	13100291	CT-7-11	10/3/2013	1011	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:01	JSM
13080438	CT-1-13	8/8/2013	1130	SM3113B	ARSENIC		7.31	7.31	UG/L	0.689	8/20/2013	13:57	JSM	13100291	CT-7-12	10/3/2013	1013	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:19	JSM
13080438	CT-1-14	8/8/2013	1133	SM3113B	ARSENIC		6.64	6.64	UG/L	0.689	8/20/2013	14:03	JSM	13100291	CT-7-13	10/3/2013	1015	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:25	JSM
13080438	CT-1-16	8/8/2013	1141	SM3113B	ARSENIC		8.83	8.83	UG/L	0.689	8/20/2013	14:09	JSM	13100291	CT-7-14	10/3/2013	1017	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:31	JSM
13080438	CT-1-17	8/8/2013	1144	SM3113B	ARSENIC		10.1	10.1	UG/L	0.689	8/20/2013	14:15	JSM	13100291	CT-7-16	10/3/2013	1022	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:37	JSM
13080438	CT-1-18	8/8/2013	1148	SM3113B	ARSENIC		9.30	9.30	UG/L	0.689	8/20/2013	14:21	JSM	13100291	CT-7-17	10/3/2013	1025	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:43	JSM
13080438	CT-1-19	8/8/2013	1151	SM3113B	ARSENIC		8.87	8.87	UG/L	0.689	8/20/2013	14:27	JSM	13100291	CT-7-18	10/3/2013	1028	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:49	JSM
13080438	CT-1-21	8/8/2013	1159	SM3113B	ARSENIC		8.96	8.96	UG/L	0.689	8/20/2013	14:34	JSM	13100291	CT-7-19	10/3/2013	1030	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	22:55	JSM
13080438	CT-1-22	8/8/2013	1203	SM3113B	ARSENIC		9.35	9.35	UG/L	0.689	8/20/2013	14:40	JSM	13100291	CT-7-21	10/3/2013	1036	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	23:01	JSM
13080438	CT-1-23	8/8/2013	1206	SM3113B	ARSENIC		8.60	8.60	UG/L	0.689	8/20/2013	14:46	JSM	13100291	CT-7-22	10/3/2013	1039	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	23:22	JSM
13080438	CT-1-24	8/8/2013	1210	SM3113B	ARSENIC		8.34	8.34	UG/L	0.689	8/20/2013	14:52	JSM	13100291	CT-7-23	10/3/2013	1042	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	23:29	JSM
13080438	CT-1-26	8/8/2013	1224	SM3113B	ARSENIC		16.2	16.2	UG/L	0.689	8/20/2013	15:17	JSM	13100291	CT-7-24	10/3/2013	1045	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/7/2013	23:46	JSM
13080438	CT-1-27	8/8/2013	1232	SM3113B	ARSENIC		17.0	17.0	UG/L	0.689	8/20/2013	15:23	JSM	13100291	CT-7-26	10/3/2013	1051	SM3113B	ARSENIC	I	0.94	0.940 I	UG/L	0.689	11/7/2013	23:52	JSM
13080438	CT-1-28	8/8/2013	1239	SM3113B	ARSENIC		16.7	16.7	UG/L	0.689	8/20/2013	15:30	JSM	13100291	CT-7-28	10/3/2013	1110	SM3113B	ARSENIC	I	0.983	0.983 I	UG/L	0.689	11/7/2013	23:58	JSM
13080438	CT-1-29	8/8/2013	1246	SM3113B	ARSENIC		16.0	16.0	UG/L	0.689	8/20/2013	15:35	JSM	13100291	CT-7-29	10/3/2013	1116	SM3113B	ARSENIC	I	0.701	0.701 I	UG/L	0.689	11/8/2013	12:04	JSM
13080438	CT-1-31	8/8/2013	1301	SM3113B	ARSENIC		17.0	17.0	UG/L	0.689	8/20/2013	15:42	JSM	13100291	CT-7-31	10/3/2013	1127	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/8/2013	12:10	JSM
13080438	CT-1-32	8/8/2013	1309	SM3113B	ARSENIC		17.5	17.5	UG/L	0.689	8/20/2013	15:48	JSM	13100291	CT-7-32	10/3/201											

SUBMISSION	SAMPDESC	SAMPLEDATE	SAMPLETIME	METHOD	COMPOUND	QUALI	RESULTN	RESULTC	UNITS	MDL	ANALYSDATE	ANALYSTIME	ANALYST
13100289	CT-3-A2	10/1/2013	1613	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	10/31/2013	14:06	JSM
13100289	CT-3-1	10/1/2013	1625	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	10/31/2013	14:37	JSM
13100289	CT-3-2	10/1/2013	1627	SM3113B	ARSENIC	I	2.54	2.54 I	UG/L	0.689	10/31/2013	14:44	JSM
13100289	CT-3-3	10/1/2013	1629	SM3113B	ARSENIC		9.01	9.01	UG/L	0.689	10/31/2013	14:50	JSM
13100289	CT-3-4	10/1/2013	1631	SM3113B	ARSENIC		13.7	13.7	UG/L	0.689	10/31/2013	14:56	JSM
13100289	CT-3-6	10/1/2013	1634	SM3113B	ARSENIC		14.3	14.3	UG/L	0.689	10/31/2013	15:03	JSM
13100289	CT-3-7	10/1/2013	1636	SM3113B	ARSENIC		11.3	11.3	UG/L	0.689	10/31/2013	15:09	JSM
13100289	CT-3-8	10/1/2013	1638	SM3113B	ARSENIC		9.21	9.21	UG/L	0.689	10/31/2013	15:15	JSM
13100289	CT-3-9	10/1/2013	1640	SM3113B	ARSENIC		8.57	8.57	UG/L	0.689	10/31/2013	15:21	JSM
13100289	CT-3-11	10/1/2013	1643	SM3113B	ARSENIC		6.25	6.25	UG/L	0.689	10/31/2013	15:27	JSM
13100289	CT-3-12	10/1/2013	1645	SM3113B	ARSENIC		6.06	6.06	UG/L	0.689	10/31/2013	15:39	JSM
13100289	CT-3-13	10/1/2013	1647	SM3113B	ARSENIC		5.39	5.39	UG/L	0.689	10/31/2013	15:58	JSM
13100289	CT-3-14	10/1/2013	1649	SM3113B	ARSENIC		5.19	5.19	UG/L	0.689	10/31/2013	16:04	JSM
13100289	CT-3-16	10/1/2013	1654	SM3113B	ARSENIC		6.46	6.46	UG/L	0.689	10/31/2013	16:10	JSM
13100289	CT-3-17	10/1/2013	1657	SM3113B	ARSENIC		5.71	5.71	UG/L	0.689	10/31/2013	16:16	JSM
13100289	CT-3-18	10/1/2013	1700	SM3113B	ARSENIC		5.81	5.81	UG/L	0.689	10/31/2013	16:22	JSM
13100289	CT-3-19	10/1/2013	1702	SM3113B	ARSENIC		5.79	5.79	UG/L	0.689	10/31/2013	16:29	JSM
13100289	CT-3-21	10/1/2013	1707	SM3113B	ARSENIC		5.03	5.03	UG/L	0.689	10/31/2013	16:35	JSM
13100289	CT-3-22	10/1/2013	1710	SM3113B	ARSENIC		4.95	4.95	UG/L	0.689	10/31/2013	16:41	JSM
13100289	CT-3-23	10/1/2013	1712	SM3113B	ARSENIC		4.80	4.80	UG/L	0.689	10/31/2013	16:48	JSM
13100289	CT-3-24	10/1/2013	1715	SM3113B	ARSENIC		4.41	4.41	UG/L	0.689	10/31/2013	17:00	JSM
13100289	CT-3-26	10/1/2013	1726	SM3113B	ARSENIC		9.04	9.04	UG/L	0.689	10/31/2013	17:19	JSM
13100289	CT-3-28	10/1/2013	1740	SM3113B	ARSENIC		8.45	8.45	UG/L	0.689	10/31/2013	17:25	JSM
13100289	CT-3-29	10/1/2013	1745	SM3113B	ARSENIC		8.29	8.29	UG/L	0.689	10/31/2013	17:31	JSM
13100289	CT-3-31	10/1/2013	1756	SM3113B	ARSENIC		8.69	8.69	UG/L	0.689	10/31/2013	17:38	JSM
13100289	CT-3-32	10/1/2013	1802	SM3113B	ARSENIC		8.17	8.17	UG/L	0.689	10/31/2013	17:44	JSM
13100289	CT-3-33	10/1/2013	1807	SM3113B	ARSENIC		8.09	8.09	UG/L	0.689	10/31/2013	17:50	JSM
13100289	CT-3-34	10/1/2013	1812	SM3113B	ARSENIC		7.67	7.67	UG/L	0.689	10/31/2013	17:56	JSM
13100289	CT-3-36	10/1/2013	1823	SM3113B	ARSENIC		7.01	7.01	UG/L	0.689	10/31/2013	18:02	JSM
13100289	CT-3-38	10/1/2013	1835	SM3113B	ARSENIC		6.44	6.44	UG/L	0.689	10/31/2013	18:08	JSM
13100289	CT-3-39	10/1/2013	1840	SM3113B	ARSENIC		7.13	7.13	UG/L	0.689	10/31/2013	18:20	JSM
13100289	CT-3-41	10/1/2013	1850	SM3113B	ARSENIC		6.65	6.65	UG/L	0.689	10/31/2013	18:38	JSM
13100289	CT-3-42	10/1/2013	1856	SM3113B	ARSENIC		6.59	6.59	UG/L	0.689	10/31/2013	18:44	JSM
13100289	CT-3-43	10/1/2013	1901	SM3113B	ARSENIC		6.24	6.24	UG/L	0.689	10/31/2013	18:50	JSM
13100289	CT-3-44	10/1/2013	1906	SM3113B	ARSENIC	U	6.40	6.40	UG/L	0.689	10/31/2013	18:56	JSM
13100289	CT-3-B2	10/1/2013	1925	SM3113B	ARSENIC		0.689	0.689 U	UG/L	0.689	10/31/2013	19:02	JSM

SUBMISSION	SAMPDESC	SAMPLEDATE	SAMPLETIME	METHOD	COMPOUND	QUAL	RESULTN	RESULTC	UNITS	MDL	ANALYSDATE	ANALYSTIME	ANALYST	SUBMISSION	SAMPDESC	SAMPLEDATE	SAMPLETIME	METHOD	COMPOUND	QUAL	RESULTN	RESULTC	UNITS	MDL	ANALYSDATE	ANALYSTIME	ANALYST
13100287	CT-8-1	9/30/2013	1350	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	10/29/2013	18:38	JSM	13100290	CT-4-1	10/2/2013	1556	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/1/2013	18:21	JSM
13100287	CT-8-2	9/30/2013	1353	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	10/29/2013	18:56	JSM	13100290	CT-4-2	10/2/2013	1508	SM3113B	ARSENIC	U	0.689	0.689 U	UG/L	0.689	11/1/2013	18:27	JSM
13100287	CT-8-3	9/30/2013	1354	SM3113B	ARSENIC	I	1.31	1.31 I	UG/L	0.689	10/29/2013	19:03	JSM	13100290	CT-4-3	10/2/2013	1509	SM3113B	ARSENIC		3.00	3.00	UG/L	0.689	11/1/2013	18:33	JSM
13100287	CT-8-4	9/30/2013	1356	SM3113B	ARSENIC	I	1.99	1.99 I	UG/L	0.689	10/29/2013	19:09	JSM	13100290	CT-4-4	10/2/2013	1511	SM3113B	ARSENIC		5.13	5.13	UG/L	0.689	11/1/2013	18:39	JSM
13100287	CT-8-6	9/30/2013	1403	SM3113B	ARSENIC	3.88	3.88	UG/L	0.689	10/29/2013	19:15	JSM	13100290	CT-4-6	10/2/2013	1516	SM3113B	ARSENIC		5.36	5.36	UG/L	0.689	11/1/2013	18:45	JSM	
13100287	CT-8-7	9/30/2013	1401	SM3113B	ARSENIC	5.29	5.29	UG/L	0.689	10/29/2013	19:21	JSM	13100290	CT-4-7	10/2/2013	1518	SM3113B	ARSENIC		5.04	5.04	UG/L	0.689	11/1/2013	18:51	JSM	
13100287	CT-8-8	9/30/2013	1403	SM3113B	ARSENIC	5.43	5.43	UG/L	0.689	10/29/2013	19:27	JSM	13100290	CT-4-8	10/2/2013	1520	SM3113B	ARSENIC		4.52	4.52	UG/L	0.689	11/1/2013	19:03	JSM	
13100287	CT-8-9	9/30/2013	1405	SM3113B	ARSENIC	5.64	5.64	UG/L	0.689	10/29/2013	19:33	JSM	13100290	CT-4-9	10/2/2013	1521	SM3113B	ARSENIC		4.12	4.12	UG/L	0.689	11/1/2013	19:09	JSM	
13100287	CT-8-11	9/30/2013	1410	SM3113B	ARSENIC	8.76	8.76	UG/L	0.689	10/29/2013	19:39	JSM	13100290	CT-4-11	10/2/2013	1525	SM3113B	ARSENIC		3.40	3.40	UG/L	0.689	11/1/2013	19:15	JSM	
13100287	CT-8-12	9/30/2013	1412	SM3113B	ARSENIC	5.45	5.45	UG/L	0.689	10/29/2013	19:45	JSM	13100290	CT-4-12	10/2/2013	1527	SM3113B	ARSENIC	I	2.70	2.70 I	UG/L	0.689	11/1/2013	19:21	JSM	
13100287	CT-8-13	9/30/2013	1414	SM3113B	ARSENIC	5.13	5.13	UG/L	0.689	10/29/2013	19:57	JSM	13100290	CT-4-13	10/2/2013	1528	SM3113B	ARSENIC	I	2.66	2.66 I	UG/L	0.689	11/1/2013	19:27	JSM	
13100287	CT-8-14	9/30/2013	1416	SM3113B	ARSENIC	5.46	5.46	UG/L	0.689	10/29/2013	20:15	JSM	13100290	CT-4-14	10/2/2013	1530	SM3113B	ARSENIC	I	2.32	2.32 I	UG/L	0.689	11/1/2013	19:45	JSM	
13100287	CT-8-16	9/30/2013	1421	SM3113B	ARSENIC	7.79	7.79	UG/L	0.689	10/29/2013	20:22	JSM	13100290	CT-4-16	10/2/2013	1535	SM3113B	ARSENIC		3.04	3.04	UG/L	0.689	11/1/2013	19:51	JSM	
13100287	CT-8-17	9/30/2013	1424	SM3113B	ARSENIC	7.37	7.37	UG/L	0.689	10/29/2013	20:28	JSM	13100290	CT-4-17	10/2/2013	1538	SM3113B	ARSENIC		3.03	3.03	UG/L	0.689	11/1/2013	19:57	JSM	
13100287	CT-8-18	9/30/2013	1427	SM3113B	ARSENIC	7.26	7.26	UG/L	0.689	10/29/2013	20:34	JSM	13100290	CT-4-18	10/2/2013	1540	SM3113B	ARSENIC	I	2.51	2.51 I	UG/L	0.689	11/1/2013	20:03	JSM	
13100287	CT-8-19	9/30/2013	1429	SM3113B	ARSENIC	7.15	7.15	UG/L	0.689	10/29/2013	20:40	JSM	13100290	CT-4-19	10/2/2013	1543	SM3113B	ARSENIC	I	2.74	2.74 I	UG/L	0.689	11/1/2013	20:09	JSM	
13100287	CT-8-21	9/30/2013	1435	SM3113B	ARSENIC	6.74	6.74	UG/L	0.689	10/29/2013	20:46	JSM	13100290	CT-4-21	10/2/2013	1548	SM3113B	ARSENIC	I	2.63	2.63 I	UG/L	0.689	11/1/2013	20:22	JSM	
13100287	CT-8-22	9/30/2013	1438	SM3113B	ARSENIC	7.01	7.01	UG/L	0.689	10/29/2013	20:52	JSM	13100290	CT-4-22	10/2/2013	1550	SM3113B	ARSENIC	I	2.19	2.19 I	UG/L	0.689	11/1/2013	20:28	JSM	
13100287	CT-8-23	9/30/2013	1441	SM3113B	ARSENIC	6.86	6.86	UG/L	0.689	10/29/2013	20:58	JSM	13100290	CT-4-23	10/2/2013	1553	SM3113B	ARSENIC	I	2.45	2.45 I	UG/L	0.689	11/1/2013	20:34	JSM	
13100287	CT-8-24	9/30/2013	1443	SM3113B	ARSENIC	6.75	6.75	UG/L	0.689	10/29/2013	21:04	JSM	13100290	CT-4-24	10/2/2013	1555	SM3113B	ARSENIC	I	2.51	2.51 I	UG/L	0.689	11/1/2013	20:40	JSM	
13100287	CT-8-26	9/30/2013	1452	SM3113B	ARSENIC	12.7	12.7	UG/L	0.689	10/29/2013	21:16	JSM	13100290	CT-4-26	10/2/2013	1605	SM3113B	ARSENIC		5.18	5.18	UG/L	0.689	11/1/2013	20:46	JSM	
13100287	CT-8-28	9/30/2013	1506	SM3113B	ARSENIC	12.8	12.8	UG/L	0.689	10/29/2013	21:34	JSM	13100290	CT-4-28	10/2/2013	1617	SM3113B	ARSENIC		4.97	4.97	UG/L	0.689	11/1/2013	21:04	JSM	
13100287	CT-8-29	9/30/2013	1511	SM3113B	ARSENIC	12.0	12.0	UG/L	0.689	10/29/2013	21:40	JSM	13100290	CT-4-29	10/2/2013	1622	SM3113B	ARSENIC		4.51	4.51	UG/L	0.689	11/1/2013	21:10	JSM	
13100287	CT-8-31	9/30/2013	1522	SM3113B	ARSENIC	11.3	11.3	UG/L	0.689	10/29/2013	21:46	JSM	13100290	CT-4-31	10/2/2013	1632	SM3113B	ARSENIC		4.36	4.36	UG/L	0.689	11/1/2013	21:16	JSM	
13100287	CT-8-32	9/30/2013	1528	SM3113B	ARSENIC	11.3	11.3	UG/L	0.689	10/29/2013	21:52	JSM	13100290	CT-4-32	10/2/2013	1638	SM3113B	ARSENIC		4.03	4.03	UG/L	0.689	11/1/2013	21:22	JSM	
13100287	CT-8-33	9/30/2013	1533	SM3113B	ARSENIC	11.6	11.6	UG/L	0.689	10/29/2013	21:58	JSM	13100290	CT-4-33	10/2/2013	1642	SM3113B	ARSENIC		3.99	3.99	UG/L	0.689	11/1/2013	21:28	JSM	
13100287	CT																										

APPENDIX D
BULK ROCK ELEMENTAL ANALYSIS

Instrument methods for bulk rock analyses.

Symbol	Compound	Unit of Measure	Detection Limit	Method of Analysis
Hg	Mercury	ppb	5	Hg-FIMS
SiO ₂	Silica	%	0.01	FUS-ICP
Al ₂ O ₃	Aluminum	%	0.01	FUS-ICP
Fe ₂ O ₃ (T)	Iron	%	0.01	FUS-ICP
MnO	Manganese	%	0.001	FUS-ICP
MgO	Magnesium	%	0.01	FUS-ICP
CaO	Calcium	%	0.01	FUS-ICP
Na ₂ O	Sodium	%	0.01	FUS-ICP
K ₂ O	Potassium	%	0.01	FUS-ICP
TiO ₂	Titanium	%	0.001	FUS-ICP
P ₂ O ₅	Phosphate	%	0.01	FUS-ICP
LOI	Loss on ignition	%		FUS-ICP
Au	Gold	ppb	1	INAA
Ag	Silver	ppm	0.5	MULT INAA / TD-ICP
As	Arsenic	ppm	1	INAA
Ba	Barium	ppm	1	FUS-ICP
Be	Beryllium	ppm	1	FUS-ICP
Bi	Bismuth	ppm	0.1	FUS-MS
Br	Bromine	ppm	0.5	INAA
Cd	Cadmium	ppm	0.5	TD-ICP
Co	Cobalt	ppm	0.1	INAA
Cr	Chromium	ppm	0.5	INAA
Cs	Cesium	ppm	0.1	FUS-MS
Cu	Copper	ppm	1	TD-ICP
Ga	Gallium	ppm	1	FUS-MS
Ge	Germanium	ppm	0.5	FUS-MS
Hf	Hafnium	ppm	0.1	FUS-MS
Hg	Mercury	ppm	1	INAA
In	Indium	ppm	0.1	FUS-MS
Ir	Iridium	ppb	1	INAA
Mo	Molybdenum	ppm	2	FUS-MS
Nb	Niobium	ppm	0.2	FUS-MS
Ni	Nickel	ppm	1	TD-ICP
Pb	Lead	ppm	5	TD-ICP
Rb	Rubidium	ppm	1	FUS-MS
S	Sulfur	%	0.001	TD-ICP
Sb	Antimony	ppm	0.1	INAA
Sc	Scandium	ppm	0.01	INAA
Se	Selenium	ppm	0.5	INAA
Sn	Tin	ppm	1	FUS-MS
Sr	Strontium	ppm	2	FUS-ICP
Ta	Tantalum	ppm	0.01	FUS-MS
Th	Thorium	ppm	0.05	FUS-MS
U	Uranium	ppm	0.01	FUS-MS
V	Vanadium	ppm	5	FUS-ICP
W	Tungsten	ppm	1	INAA
Y	Yttrium	ppm	1	FUS-ICP
Zn	Zinc	ppm	1	MULT INAA / TD-ICP
Zr	Zirconium	ppm	1	FUS-MS
La	Lanthanum	ppm	0.05	FUS-MS
Ce	Cerium	ppm	0.05	FUS-MS
Pr	Praseodymium	ppm	0.01	FUS-MS
Nd	Neodymium	ppm	0.05	FUS-MS
Sm	Samarium	ppm	0.01	FUS-MS
Eu	Europium	ppm	0.005	FUS-MS
Gd	Gadolinium	ppm	0.01	FUS-MS
Tb	Terbium	ppm	0.01	FUS-MS
Dy	Dysprosium	ppm	0.01	FUS-MS
Ho	Holmium	ppm	0.01	FUS-MS
Er	Erbium	ppm	0.01	FUS-MS
Tl	Thallium	ppm	0.05	FUS-MS
Tm	Thulium	ppm	0.005	FUS-MS
Yb	Ytterbium	ppm	0.01	FUS-MS
Lu	Lutetium	ppm	0.002	FUS-MS
Mass	Sample Mass	g		INAA
C-Total	Total Carbon	%	0.01	IR
C-Graph	Graphitic Carbon	%	0.05	IR
C-Organ	Organic Carbon	%	0.05	IR
CO ₂	Carbon Dioxide	%	0.01	COUL
Total S	Total Sulfur	%	0.01	IR
SO ₄	Sulfate	%	0.3	IR

Analyte Symbol	SiO2	Al2O3	Fe2O3(T)	MnO	MgO	CaO	Na2O	K2O	TiO2	P2O5	LOI	Total	Au	Ag	As
Unit Symbol	%	%	%	%	%	%	%	%	%	%	%	%	ppb	ppm	ppm
Detection Limit	0.01	0.01	0.01	0.001	0.01	0.01	0.01	0.01	0.001	0.01	0.01	0.01	1	0.5	1
Analysis Method	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	FUS-ICP	INAA	MULT INAA TD-ICP	INAA
CT-8 274-275.5	0.23	0.04	0.04	0.004	0.33	55.39	0.02	< 0.01	0.002	0.01	43.65	99.72	< 1	< 0.5	2
CT-5 276-277	0.5	0.1	0.07	0.004	0.38	55.22	0.03	0.01	0.006	0.02	43.52	99.87	< 1	< 0.5	2
CT-3 277-278	0.47	0.08	0.04	0.004	0.35	55.45	0.02	0.01	0.004	0.01	43.61	100.1	< 1	< 0.5	< 1
CT-6 281-282	0.43	0.07	0.04	0.004	0.33	55.54	0.02	< 0.01	0.003	< 0.01	43.62	100.1	< 1	< 0.5	< 1
CT-4 282.5-283.5	0.4	0.05	0.03	0.004	0.32	54.64	0.02	< 0.01	0.003	0.01	43.61	99.11	< 1	< 0.5	< 1
CT-7 285-286	0.68	0.08	0.04	0.004	0.33	54.97	0.03	0.01	0.005	0.02	43.56	99.72	< 1	< 0.5	< 1
CT-9 286-287	0.55	0.06	0.04	0.004	0.33	55.14	0.02	< 0.01	0.003	< 0.01	43.46	99.63	< 1	< 0.5	< 1
6R 274	0.23	0.03	0.03	0.003	0.31	54.95	0.02	< 0.01	0.001	0.01	43.33	98.93	< 1	< 0.5	2
6R 275-276	0.6	0.06	0.04	0.004	0.32	54.22	0.03	< 0.01	0.003	< 0.01	43.51	98.81	< 1	< 0.5	2
6R 278-279	0.29	0.07	0.03	0.004	0.34	54.71	0.03	< 0.01	0.003	0.01	43.54	99.03	< 1	< 0.5	2
6R 279-280	0.24	0.06	0.03	0.004	0.34	54.13	0.03	< 0.01	0.002	0.02	43.59	98.44	< 1	< 0.5	< 1
CT-6 280-281	0.43	0.06	0.03	0.004	0.32	53.71	0.03	< 0.01	0.002	0.01	43.56	98.16	< 1	< 0.5	< 1
CT-4 284-285	0.44	0.06	0.04	0.004	0.33	54.93	0.03	< 0.01	0.003	< 0.01	43.67	99.51	< 1	< 0.5	2
CT-4 & CT-7 288-289	0.68	0.06	0.04	0.004	0.34	55.3	0.03	< 0.01	0.005	0.01	43.51	99.99	< 1	< 0.5	< 1
Analyte Symbol	Ba	Be	Bi	Br	Cd	Co	Cr	Cs	Cu	Ga	Ge	Hf	Hg	In	Ir
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppb
Detection Limit	1	1	0.1	0.5	0.5	0.1	0.5	0.1	1	0.5	0.1	1	0.1	0.1	1
Analysis Method	FUS-ICP	FUS-ICP	FUS-MS	INAA	TD-ICP	INAA	INAA	FUS-MS	TD-ICP	FUS-MS	FUS-MS	FUS-MS	INAA	FUS-MS	INAA
CT-8 274-275.5	4	< 1	< 0.1	3.1	< 0.5	< 0.1	6.9	< 0.1	5	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-5 276-277	5	< 1	< 0.1	2.7	< 0.5	< 0.1	9.1	< 0.1	2	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-3 277-278	4	< 1	< 0.1	2.1	< 0.5	< 0.1	9.1	< 0.1	< 1	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-6 281-282	4	< 1	< 0.1	1.7	< 0.5	< 0.1	8	< 0.1	< 1	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-4 282.5-283.5	4	< 1	< 0.1	2.1	< 0.5	< 0.1	7.4	< 0.1	< 1	< 1	< 0.5	0.2	< 1	< 0.1	< 1
CT-7 285-286	4	< 1	< 0.1	2.6	< 0.5	< 0.1	12	< 0.1	< 1	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-9 286-287	4	< 1	< 0.1	1.8	< 0.5	0.3	9.6	< 0.1	2	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
6R 274	3	< 1	< 0.1	1.8	< 0.5	< 0.1	6.4	< 0.1	1	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
6R 275-276	4	< 1	< 0.1	2.4	< 0.5	< 0.1	8.9	< 0.1	< 1	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
6R 278-279	4	< 1	< 0.1	2	< 0.5	< 0.1	8.9	< 0.1	9	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
6R 279-280	4	< 1	< 0.1	2.1	< 0.5	< 0.1	9.5	< 0.1	3	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-6 280-281	4	< 1	< 0.1	2.7	< 0.5	< 0.1	7.4	< 0.1	2	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-4 284-285	5	< 1	< 0.1	2.7	< 0.5	< 0.1	9.1	< 0.1	< 1	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1
CT-4 & CT-7 288-289	4	< 1	< 0.1	2.5	0.7	< 0.1	11.1	< 0.1	5	< 1	< 0.5	< 0.1	< 1	< 0.1	< 1

Analyte Symbol	Mo	Nb	Ni	Pb	Rb	S	Sb	Sc	Se	Sn	Sr	Ta	Th	U
Unit Symbol	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	2	0.2	1	5	1	0.001	0.1	0.01	0.5	1	2	0.01	0.05	0.01
Analysis Method	FUS-MS	FUS-MS	TD-ICP	TD-ICP	FUS-MS	TD-ICP	INAA	INAA	INAA	FUS-MS	FUS-ICP	FUS-MS	FUS-MS	FUS-MS
CT-8 274-275.5	2	0.3	1	< 5	< 1	0.036	< 0.1	0.16	< 0.5	< 1	529	< 0.01	0.17	2.8
CT-5 276-277	3	0.4	2	< 5	< 1	0.03	0.1	0.24	< 0.5	< 1	496	< 0.01	0.31	2.56
CT-3 277-278	3	0.4	1	< 5	< 1	0.031	< 0.1	0.15	< 0.5	< 1	511	0.01	0.28	2.47
CT-6 281-282	< 2	< 0.2	1	< 5	< 1	0.024	< 0.1	0.1	< 0.5	< 1	566	< 0.01	0.17	2.31
CT-4 282.5-283.5	< 2	< 0.2	2	< 5	< 1	0.028	< 0.1	0.13	< 0.5	< 1	552	0.01	0.17	2.43
CT-7 285-286	< 2	< 0.2	2	< 5	< 1	0.03	< 0.1	0.2	< 0.5	< 1	578	0.02	0.32	2.48
CT-9 286-287	< 2	< 0.2	2	< 5	< 1	0.048	< 0.1	0.15	< 0.5	< 1	593	< 0.01	0.26	2.26
6R 274	2	< 0.2	< 1	< 5	< 1	0.029	< 0.1	0.1	< 0.5	< 1	525	< 0.01	0.12	4.1
6R 275-276	3	< 0.2	1	< 5	< 1	0.031	< 0.1	0.15	< 0.5	< 1	493	< 0.01	0.19	2.6
6R 278-279	2	< 0.2	2	24	< 1	0.031	0.1	0.1	< 0.5	< 1	553	0.01	0.19	2.35
6R 279-280	3	< 0.2	2	< 5	< 1	0.034	0.2	0.13	< 0.5	< 1	523	< 0.01	0.2	2.36
CT-6 280-281	3	< 0.2	1	< 5	< 1	0.028	< 0.1	0.11	< 0.5	< 1	519	< 0.01	0.15	2.37
CT-4 284-285	< 2	< 0.2	< 1	< 5	< 1	0.029	< 0.1	0.14	< 0.5	< 1	604	< 0.01	0.2	2.36
CT-4 & CT-7 288-289	< 2	< 0.2	1	< 5	< 1	0.033	< 0.1	0.14	< 0.5	< 1	554	< 0.01	0.27	2.09
Analyte Symbol	V	W	Y	Zn	Zr	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	5	1	1	1	1	0.05	0.05	0.01	0.05	0.01	0.005	0.01	0.01	0.01
Analysis Method	FUS-ICP	INAA	FUS-ICP	MULT INAA	TD-ICP	FUS-ICP	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS
CT-8 274-275.5	10	< 1	2	5	5	0.63	0.89	0.15	0.65	0.1	0.023	0.12	0.02	0.14
CT-5 276-277	10	< 1	2	4	5	1.73	2.39	0.27	1.12	0.16	0.026	0.15	0.03	0.18
CT-3 277-278	11	< 1	2	2	6	0.8	1.19	0.19	0.82	0.14	0.035	0.16	0.03	0.22
CT-6 281-282	8	< 1	2	2	5	0.83	1.05	0.16	0.79	0.07	0.016	0.1	0.02	0.11
CT-4 282.5-283.5	8	< 1	2	3	11	0.68	0.88	0.15	0.56	0.1	0.022	0.2	0.03	0.16
CT-7 285-286	10	< 1	2	3	5	1.02	1.27	0.23	0.97	0.16	0.026	0.27	0.05	0.29
CT-9 286-287	9	< 1	2	3	6	0.93	1.14	0.18	0.81	0.14	0.018	0.2	0.03	0.21
6R 274	10	< 1	2	1	4	0.56	0.69	0.12	0.59	0.07	< 0.005	0.07	0.02	0.13
6R 275-276	9	< 1	2	2	4	0.73	0.99	0.16	0.7	0.07	< 0.005	0.14	0.02	0.15
6R 278-279	9	< 1	2	22	5	0.78	1.03	0.16	0.69	0.05	0.024	0.18	0.02	0.14
6R 279-280	8	< 1	2	2	4	0.83	1.13	0.17	0.81	0.09	0.017	0.18	0.02	0.13
CT-6 280-281	11	< 1	1	1	5	0.52	0.75	0.13	0.42	0.04	0.012	0.1	0.02	0.1
CT-4 284-285	8	< 1	2	2	7	0.77	0.92	0.16	0.78	0.09	0.027	0.21	0.03	0.15
CT-4 & CT-7 288-289	9	< 1	2	4	6	0.95	1.16	0.22	0.95	0.13	0.025	0.19	0.03	0.2

Analyte Symbol	Ho	Er	Tl	Tm	Yb	Lu	Mass	C-Graph	C-Organ	CO2	Total S	SO4	C-Total
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	g	%	%	%	%	%	%
Detection Limit	0.01	0.01	0.05	0.005	0.01	0.002		0.05	0.05	0.01	0.01	0.3	0.01
Analysis Method	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	FUS-MS	INAA	IR	IR	IR	IR	IR	IR
CT-8 274-275.5	0.03	0.12	< 0.05	0.018	0.11	0.014	1.105	0.94	< 0.05	42.9	0.03	< 0.3	12.7
CT-5 276-277	0.04	0.11	< 0.05	0.016	0.09	0.015	1.092	0.85	< 0.05	42.8	0.03	< 0.3	12.6
CT-3 277-278	0.04	0.11	< 0.05	0.015	0.09	0.011	1.219	0.92	< 0.05	42.9	0.03	< 0.3	12.6
CT-6 281-282	0.03	0.1	< 0.05	0.014	0.08	0.011	1.22	0.91	< 0.05	42.7	0.02	< 0.3	12.6
CT-4 282.5-283.5	0.04	0.11	< 0.05	0.017	0.11	0.016	1.2	0.92	< 0.05	42.9	0.02	< 0.3	12.6
CT-7 285-286	0.06	0.14	< 0.05	0.019	0.11	0.016	1.309	0.86	0.21	42.5	0.02	< 0.3	12.7
CT-9 286-287	0.04	0.13	< 0.05	0.021	0.13	0.016	1.197	0.92	< 0.05	42.7	0.02	< 0.3	12.6
6R 274	0.03	0.08	< 0.05	0.013	0.08	0.014	1.455	0.86	< 0.05	43.1	0.02	< 0.3	12.6
6R 275-276	0.03	0.09	< 0.05	0.016	0.1	0.014	1.389	0.88	< 0.05	42.8	0.02	< 0.3	12.6
6R 278-279	0.03	0.11	< 0.05	0.017	0.1	0.012	1.511	0.93	0.06	42.9	0.03	< 0.3	12.7
6R 279-280	0.03	0.11	< 0.05	0.016	0.11	0.015	1.19	0.87	< 0.05	43.1	0.03	< 0.3	12.7
CT-6 280-281	0.02	0.04	< 0.05	< 0.005	0.03	< 0.002	1.263	0.84	< 0.05	42.9	0.02	< 0.3	12.6
CT-4 284-285	0.03	0.13	< 0.05	0.028	0.19	0.025	1.179	0.83	0.06	42.8	0.03	< 0.3	12.6
CT-4 & CT-7 288-289	0.04	0.14	< 0.05	0.02	0.13	0.017	1.229	0.87	0.11	42.6	0.03	< 0.3	12.6

APPENDIX E
EPA METALS

Sample ID	Mo	As	Fe	Sb	S	Se	Co	Ca	Tl	Ni	Ti	Cu	Total	Comments
Leached (Pyrite)														
CT-8 274-274.5 ft.	0.000	0.000	44.618	0.000	52.601	0.000	0.022	0.646	0.000	0.007	0.000	0.022	97.92	Large pyrite
CT-8 274-274.5 ft.	0.000	0.095	43.787	0.015	48.623	0.030	0.049	0.584	0.000	0.042	0.000	0.020	93.25	Pyrite framboid
CT-8 274-274.5 ft.	0.000	0.034	40.986	0.000	42.851	0.022	0.087	0.600	0.000	0.038	0.000	0.151	84.77	Pyrite framboid
CT-8 274-274.5 ft.	0.000	0.040	30.782	0.024	34.351	0.000	0.068	1.703	0.000	0.011	0.000	0.064	67.04	Pyrite framboid
CT-8 274-274.5 ft.	0.000	0.023	38.380	0.000	43.264	0.000	0.074	0.967	0.006	0.009	0.016	0.065	82.80	Large pyrite
CT-8 274-274.5 ft.	0.012	0.017	37.350	0.009	41.472	0.008	0.044	0.980	0.000	0.051	0.041	0.023	80.01	Large pyrite
CT-8 274-274.5 ft.	0.010	0.037	44.138	0.032	51.123	0.128	0.087	0.357	0.000	0.117	0.011	0.153	96.19	Large pyrite
CT-5 276-277 ft.	0.000	0.000	43.849	0.000	50.899	0.017	0.139	0.262	0.000	0.137	0.015	0.000	95.32	Large pyrite
CT-5 276-277 ft.	0.000	0.023	43.241	0.000	50.105	0.004	0.067	0.737	0.010	0.000	0.035	0.038	94.26	Large pyrite
CT-5 276-277 ft.	0.000	0.000	43.828	0.027	50.177	0.030	0.050	0.724	0.230	0.000	0.000	0.549	95.62	Large pyrite framboid
CT-5 276-277 ft.	0.000	0.000	45.089	0.003	52.909	0.000	0.065	0.898	0.000	0.010	0.000	0.017	98.99	Twinned pyrite crystals
CT-5 276-277 ft.	0.084	0.033	43.888	0.016	52.066	0.010	0.101	0.790	0.027	0.084	0.008	0.062	97.17	Pyrite
CT-5 276-277 ft.	0.000	0.010	44.425	0.031	51.977	0.000	0.044	0.467	0.000	0.000	0.000	0.000	96.95	Pyrite framboid
CT-5 277-278 ft.	0.000	0.200	41.140	0.000	43.583	0.035	0.044	1.168	0.000	0.198	0.000	0.189	86.56	Pyrite framboid
CT-5 277-278 ft.	0.000	0.090	39.667	0.000	42.800	0.000	0.079	0.907	0.010	0.007	0.002	0.002	83.56	Pyrite
CT-5 277-278 ft.	0.000	0.010	44.179	0.000	51.493	0.029	0.072	0.898	0.000	0.009	0.000	0.013	96.70	Pyrite
CT-5 277-278 ft.	0.000	0.006	39.046	0.000	43.558	0.035	0.133	1.084	0.008	0.139	0.000	0.000	84.01	Pyrite
CT-5 277-278 ft.	0.000	0.156	36.931	0.000	39.380	0.000	0.020	3.372	0.032	0.006	0.007	0.039	79.94	Pyrite rerun low total
CT-6 281-282 ft.	0.000	0.138	39.498	0.009	42.281	0.034	0.100	0.932	0.000	0.167	0.000	0.155	83.31	Pyrite framboid
CT-6 281-282 ft.	0.000	0.187	42.002	0.000	44.130	0.085	0.114	1.001	0.000	0.414	0.017	0.428	88.38	Pyrite framboid
CT-6 281-282 ft.	0.000	0.078	40.935	0.034	44.112	0.070	0.078	0.423	0.000	0.337	0.000	0.293	86.36	Pyrite framboid
CT-6 281-282 ft.	0.000	0.000	44.938	0.000	51.512	0.019	0.064	1.356	0.001	0.003	0.000	0.018	97.91	Pyrite
CT-6 281-282 ft.	0.002	0.000	56.721	0.000	36.081	0.022	0.109	1.180	0.000	0.000	0.003	0.032	94.15	Very small pyrite
CT-6 281-282 ft.	0.000	0.179	40.254	0.000	44.595	0.086	0.069	1.314	0.012	0.359	0.000	0.613	87.48	Very small pyrite
CT-4 282.5-283.5 ft.	0.001	0.167	39.508	0.020	43.273	0.086	0.087	0.997	0.029	0.235	0.000	0.244	84.65	Pyrite framboid
CT-7 285-286 ft.	0.000	0.109	41.944	0.033	43.784	0.066	0.067	1.170	0.000	0.392	0.000	0.164	87.73	Pyrite framboid
CT-7 285-286 ft.	0.000	0.044	51.968	0.000	36.339	0.006	0.053	1.708	0.000	0.071	0.009	0.013	90.21	Small pyrite
CT-7 285-286 ft.	0.000	0.107	42.257	0.000	44.248	0.029	0.046	0.874	0.000	0.070	0.000	0.031	87.66	Small pyrite framboid
CT-7 285-286 ft.	0.000	0.008	38.774	0.020	44.377	0.000	0.050	1.903	0.000	0.057	0.000	0.059	85.25	Small framboid
CT-7 285-286 ft.	0.000	0.000	43.766	0.000	51.352	0.024	0.026	0.639	0.000	0.000	0.000	0.014	95.82	Ragged pyrite framboid
CT-7 285-286 ft.	0.000	0.014	41.590	0.031	47.334	0.028	0.088	0.945	0.006	0.000	0.021	0.048	90.11	Pyrite framboid
CT-7 285-286 ft.	0.000	0.048	40.284	0.000	45.358	0.000	0.062	0.732	0.000	0.047	0.000	0.065	86.60	Small framboid
CT-7 285-286 ft.	0.009	0.026	45.578	0.000	52.816	0.000	0.079	0.883	0.000	0.000	0.009	0.007	99.41	Pyrite framboid
CT-7 285-286 ft.	0.000	0.008	40.769	0.008	45.722	0.018	0.027	1.142	0.000	0.039	0.007	0.063	87.80	Pyrite framboid
CT-7 285-286 ft.	0.000	0.123	42.624	0.033	52.738	0.150	0.083	0.845	0.017	0.816	0.000	0.219	97.65	Pyrite framboid
CT-7 285-286 ft.	0.000	0.025	45.009	0.019	52.660	0.014	0.068	1.064	0.000	0.122	0.000	0.035	99.02	Pyrite framboid
Preserved (Pyrite)														
6R 274 ft.	0.018	0.035	40.859	0.000	47.877	0.009	0.045	0.616	0.000	0.000	0.000	0.043	89.50	Pyrite
6R 274 ft.	0.024	0.093	41.229	0.000	42.379	0.041	0.075	1.262	0.001	0.072	0.006	0.160	85.34	Pyrite
6R 274 ft.	0.050	0.058	41.420	0.015	44.206	0.000	0.079	0.951	0.000	0.021	0.004	0.054	86.86	Very small pyrite
6R 274 ft.	0.039	0.000	44.435	0.000	51.655	0.000	0.061	0.953	0.021	0.000	0.037	0.000	97.20	Very small pyrite
6R 274 ft.	0.021	0.005	44.402	0.034	51.852	0.037	0.114	1.391	0.000	0.000	0.005	0.000	97.86	Very small pyrite
6R 274 ft.	0.018	0.000	43.528	0.000	50.062	0.001	0.098	0.590	0.000	0.017	0.008	0.024	94.35	Pyrite framboid
6R 274 ft.	0.025	0.069	37.355	0.000	37.892	0.014	0.083	0.906	0.000	0.022	0.009	0.025	76.40	Pyrite framboid

Sample ID	Mo	As	Fe	Sb	S	Se	Co	Ca	Tl	Ni	Ti	Cu	Total	Comments
6R 274 ft.	0.067	0.000	57.114	0.003	36.615	0.003	0.089	1.200	0.000	0.001	0.000	0.039	95.13	Very small pyrite
6R 274 ft.	0.025	0.019	41.784	0.000	44.797	0.027	0.183	0.483	0.000	0.037	0.000	0.027	87.38	Pyrite
6R 275-276 ft.	0.056	0.179	37.562	0.000	38.971	0.000	0.066	0.643	0.009	0.000	0.008	0.031	77.53	Pyrite
6R 275-276 ft.	0.013	0.003	45.183	0.025	52.107	0.020	0.068	0.686	0.000	0.003	0.018	0.041	98.17	Pyrite crystal
6R 275-276 ft.	0.027	0.051	39.663	0.024	42.038	0.000	0.028	2.168	0.000	0.002	0.000	0.059	84.06	Cluster of framboids
6R 275-276 ft.	0.033	0.159	41.219	0.002	43.691	0.042	0.071	1.148	0.000	0.024	0.000	0.062	86.45	Cluster of framboids
6R 275-276 ft.	0.035	0.115	42.273	0.041	46.127	0.029	0.086	0.785	0.000	0.000	0.015	0.000	89.51	Cluster of framboids
6R 275-276 ft.	0.067	0.123	40.281	0.010	43.095	0.028	0.080	0.778	0.000	0.000	0.000	0.059	84.52	Cluster of framboids
6R 275-276 ft.	0.041	0.080	40.377	0.025	43.779	0.015	0.067	0.690	0.014	0.001	0.000	0.073	85.16	Cluster of framboids
6R 275-276 ft.	0.036	0.021	45.094	0.000	52.935	0.006	0.051	0.635	0.048	0.004	0.000	0.000	98.83	Large pyrite framboid
6R 275-276 ft.	0.000	0.059	44.273	0.014	49.725	0.024	0.056	0.710	0.000	0.031	0.000	0.068	94.96	Pyrite framboid
6R 275-276 ft.	0.000	0.155	40.373	0.043	43.884	0.000	0.110	0.694	0.000	0.000	0.002	0.033	85.29	Pyrite framboid
6R 278-279 ft.	0.000	0.238	39.059	0.016	38.819	0.083	0.080	1.568	0.000	0.338	0.007	0.301	80.51	Very small pyrite
6R 278-279 ft.	0.000	0.117	40.172	0.043	40.966	0.000	0.063	0.871	0.000	0.040	0.000	0.040	82.31	Very small pyrite
6R 278-279 ft.	0.000	0.083	45.049	0.033	49.154	0.026	0.068	0.612	0.000	0.053	0.000	0.084	95.16	Large pyrite framboid
6R 278-279 ft.	0.000	0.187	40.396	0.045	41.767	0.062	0.057	1.523	0.000	0.146	0.000	0.237	84.42	Small pyrite framboid
6R 278-279 ft.	0.000	0.170	42.102	0.024	44.229	0.020	0.062	1.051	0.000	0.052	0.000	0.067	87.78	Very small pyrite
6R 278-279 ft.	0.000	0.024	45.142	0.000	52.123	0.000	0.076	0.858	0.000	0.001	0.011	0.031	98.27	Very small pyrite
6R 279-280 ft.	0.000	0.000	44.699	0.011	51.470	0.020	0.075	0.404	0.000	0.039	0.000	0.032	96.75	Pyrite framboid
6R 279-280 ft.	0.000	0.063	33.410	0.010	33.186	0.005	0.050	0.711	0.000	0.083	0.000	0.162	67.68	Large pyrite framboid
6R 279-280 ft.	0.000	0.052	39.340	0.009	42.008	0.021	0.063	0.593	0.000	0.109	0.002	0.238	82.44	Large pyrite framboid
6R 279-280 ft.	0.000	0.035	37.082	0.013	38.851	0.056	0.055	0.630	0.014	0.037	0.001	0.131	76.91	Very small pyrite ~1-2μ
6R 279-280 ft.	0.000	0.000	45.138	0.000	51.708	0.028	0.094	0.385	0.000	0.016	0.000	0.000	97.37	Pyrite crystal
6R 279-280 ft.	0.000	0.000	44.755	0.023	52.283	0.033	0.046	0.875	0.020	0.000	0.000	0.017	98.05	Small pyrite
6R 279-280 ft.	0.000	0.000	43.999	0.002	48.967	0.000	0.091	1.150	0.000	0.028	0.000	0.016	94.25	Very small pyrite
CT-6 280-281 ft.	0.000	0.000	51.136	0.012	29.337	0.000	0.039	2.693	0.023	0.092	0.010	0.007	83.35	Very small pyrite
CT-6 280-281 ft.	0.000	0.274	41.177	0.000	43.390	0.047	0.070	1.831	0.000	0.203	0.007	0.210	87.21	Pyrite framboid
CT-6 280-281 ft.	0.000	0.272	42.380	0.009	44.187	0.070	0.081	1.986	0.025	0.176	0.000	0.238	89.42	Pyrite framboid
CT-6 280-281 ft.	0.000	0.165	43.938	0.000	47.694	0.004	0.076	1.056	0.000	0.154	0.000	0.172	93.26	Pyrite framboid
CT-6 280-281 ft.	0.000	0.001	44.499	0.008	51.721	0.000	0.223	0.894	0.000	0.117	0.009	0.035	97.51	Small pyrite
CT-6 280-281 ft.	0.013	0.234	41.862	0.000	45.837	0.049	0.066	1.661	0.000	0.302	0.000	0.375	90.40	Pyrite framboid
CT-6 280-281 ft.	0.000	0.147	43.273	0.000	47.340	0.043	0.060	1.264	0.024	0.202	0.014	0.244	92.61	Pyrite framboid
CT-6 280-281 ft.	0.000	0.152	40.530	0.034	43.908	0.007	0.057	1.403	0.000	0.000	0.006	0.030	86.13	Pyrite framboid
CT-6 280-281 ft.	0.000	0.015	45.031	0.035	52.210	0.014	0.105	0.893	0.012	0.062	0.003	0.035	98.42	Pyrite framboid
CT-4 284-285 ft.	0.000	0.000	45.228	0.000	31.027	0.022	0.097	1.429	0.005	0.078	0.000	0.088	77.97	Pyrite framboid fragment?
CT-4 284-285 ft.	0.020	0.000	42.601	0.003	20.277	0.022	0.126	2.041	0.022	0.154	0.000	0.042	65.31	Pyrite framboid fragment?
CT-4 & CT-7 288-289 ft.	0.000	0.000	56.169	0.022	36.875	0.000	0.047	0.947	0.000	0.000	0.000	0.000	94.06	Small pyrite
CT-4 & CT-7 288-289 ft.	0.026	0.000	53.245	0.000	34.412	0.054	0.100	0.553	0.000	0.027	0.000	0.030	88.45	Pyrite framboid fragment?
CT-4 & CT-7 288-289 ft.	0.000	0.005	45.185	0.014	52.004	0.000	0.058	1.034	0.000	0.012	0.102	0.022	98.44	Pyrite framboid
Chalcopyrite														
CT-5 276-277 ft.	0.008	0	27.631	0.035	32.221	0	0.056	0.416	0	0	0.003	32.213	92.583	Chalcopyrite
CT-5 276-284 ft.	0.058	0	24.447	0.024	24.625	0	0.029	4.512	0	0.079	0.025	26.774	80.573	Chalcopyrite
CT-5 276-285 ft.	0.031	0	28.469	0	33.946	0	0.023	0.95	0	0	0	32.675	96.094	Chalcopyrite
CT-5 276-282 ft.	0.015	0	22.256	0.063	25.974	0	0.001	1.155	0.038	0.047	0.025	26.845	76.419	Chalcopyrite
CT-6 281-286 ft.	0.005	0	28.01	0	31.993	0.028	0.027	1.36	0	0.098	0.002	30.374	91.897	Chalcopyrite

Sample ID	Mo	As	Fe	Sb	S	Se	Co	Ca	Tl	Ni	Ti	Cu	Total	Comments
CT-6 281-288 ft.	0.015	0	27.881	0.005	31.197	0.039	0.046	1.181	0	0.054	0.017	32.807	93.242	Small chalcopyrite
CT-9 286-287 ft.	0.002	0	28.135	0	34.346	0.046	0.025	0.503	0	0.078	0.021	33.338	96.494	Very small chalcopyrite
6R 274 ft.	0.058	0.035	28.299	0.012	33.342	0.046	0.052	0.258	0	0.121	0	32.254	94.477	Chalcopyrite
CT-6 280-281 ft.	0.017	0	28.854	0.07	22.265	0	0.031	2.991	0	0	0.251	18.161	72.64	Very small chalcopyrite
CT-6 280-281 ft.	0.016	0	29.437	0.013	34.934	0.074	0.033	0.827	0	0.099	0.002	34.398	99.833	Crystal chalcopyrite
CT-4 284-285 ft.	0.009	0	17.478	0.025	19.072	0.008	0.006	12.681	0	0.05	0.002	24.872	74.203	Very small chalcopyrite
CT-4 284-285 ft.	0.03	0	28.956	0.003	34.14	0.004	0.008	0.733	0	0.024	0	33.667	97.565	Chalcopyrite
Nickel Iron Sulfide														
CT-9 286-287 ft.	0	0	33.657	0	32.96	0.037	0.159	0.936	0	29.09	0	0.051	96.893	Pentlandite?
CT-9 286-287 ft.	0.025	0	31.487	0	29.634	0	0.176	1.588	0.017	27.59	0	0.035	90.55	Pentlandite?

APPENDIX F
CARBONATES

Sample ID	Al2O3	SrO	Na2O	FeO	Sb2O5	SiO2	P2O5	MgO	CaO	MoO3	As2O5	BaO	SO3	TiO2	UO2	CO2	Total	Comment
Leached																		
CT-8 274-274.5 ft.	0.000	0.030	0.000	0.000	0.088	0.000	0.008	0.210	58.421	0.000	0.004	0.046	0.020	0.010	0.006	41.155	99.998	Spar
CT-8 274-274.5 ft.	0.016	0.448	0.028	0.011	0.150	0.000	0.001	0.093	62.858	0.019	0.084	0.000	0.002	0.008	0.009	36.272	99.999	Spar
CT-8 274-274.5 ft.	0.012	0.017	0.000	0.033	0.135	0.000	0.000	0.264	61.706	0.006	0.011	0.000	0.053	0.000	0.006	37.758	100.001	Carbonate
CT-8 274-274.5 ft.	0.041	0.097	0.028	0.022	0.108	0.000	0.011	0.330	62.309	0.000	0.017	0.005	0.130	0.004	0.000	36.898	100.000	Spar
CT-8 274-274.5 ft.	0.080	0.052	0.026	0.000	0.119	0.237	0.018	0.345	60.239	0.008	0.005	0.000	0.080	0.023	0.014	38.753	99.999	Carbonate
CT-8 274-274.5 ft.	0.031	0.042	0.033	0.000	0.114	0.000	0.000	0.687	59.638	0.036	0.060	0.012	0.025	0.000	0.000	39.321	99.999	Miliolid
CT-8 274-274.5 ft.	0.017	0.115	0.005	0.000	0.145	0.000	0.017	0.409	62.444	0.007	0.000	0.019	0.111	0.000	0.011	36.699	99.999	Spar around miliolid
CT-8 274-274.5 ft.	0.078	0.052	0.037	0.054	0.115	0.167	0.007	0.360	60.832	0.000	0.020	0.000	0.129	0.037	0.044	38.066	99.998	Peloid
CT-8 274-274.5 ft.	0.015	0.052	0.044	0.013	0.096	0.001	0.010	0.251	59.940	0.000	0.000	0.048	0.077	0.000	0.036	39.416	99.999	Coral or bryozoa?
CT-5 276-277 ft.	0.247	0.228	0.036	0.237	0.117	1.194	0.007	0.520	56.886	0.023	0.021	0.000	0.076	0.010	0.051	40.348	100.001	Carbonate
CT-5 276-277 ft.	0.012	0.022	0.012	0.088	0.157	0.039	0.000	0.032	59.645	0.000	0.005	0.000	0.256	0.000	0.007	39.726	100.001	Spar
CT-5 276-277 ft.	0.027	0.049	0.047	0.002	0.162	0.006	0.014	0.333	62.080	0.000	0.025	0.023	0.153	0.053	0.000	37.025	99.999	Spar
CT-5 276-277 ft.	0.018	0.152	0.003	0.003	0.109	0.000	0.000	0.162	58.689	0.017	0.000	0.005	0.022	0.010	0.028	40.782	100.000	Calcite rhomb
CT-5 276-277 ft.	0.020	0.042	0.026	0.000	0.080	0.001	0.001	0.230	60.891	0.006	0.000	0.000	0.171	0.000	0.000	38.533	100.001	"Dog tooth" spar
CT-5 276-277 ft.	0.006	0.050	0.014	0.000	0.054	0.000	0.009	0.458	56.642	0.000	0.000	0.000	0.138	0.000	0.000	42.628	99.999	Carbonate fragment
CT-5 276-277 ft.	0.000	0.512	0.009	0.023	0.161	0.001	0.009	0.093	56.413	0.000	0.014	0.037	0.001	0.000	0.014	42.713	100.000	Calcite rhomb
CT-5 276-277 ft.	0.019	0.018	0.030	0.000	0.079	0.054	0.001	0.191	56.292	0.027	0.008	0.003	0.070	0.012	0.000	43.197	100.001	Carbonate fragment
CT-5 277-278 ft.	0.000	0.000	0.000	0.003	0.126	0.000	0.000	0.000	60.080	0.028	0.000	0.000	0.032	0.000	0.000	39.728	100.000	Carbonate fragment
CT-5 277-278 ft.	0.000	0.000	0.000	0.028	0.146	0.000	0.000	0.000	66.468	0.000	0.000	0.000	0.000	0.000	0.000	33.316	100.000	Spar
CT-5 277-278 ft.	0.000	0.000	0.000	0.008	0.143	0.000	0.000	0.000	65.961	0.000	0.000	0.000	0.036	0.010	0.000	33.813	99.998	Carbopnate
CT-5 277-278 ft.	0.000	0.000	0.000	0.043	0.098	0.000	0.000	0.000	48.499	0.001	0.000	0.000	0.097	0.000	0.000	51.181	99.999	Bryozoa
CT-5 277-278 ft.	0.000	0.000	0.000	0.035	0.000	0.000	0.000	0.000	61.349	0.000	0.016	0.000	0.037	0.034	0.000	38.512	100.000	Foraminifer
CT-5 277-278 ft.	0.000	0.000	0.031	0.069	0.000	0.000	0.000	0.000	59.769	0.000	0.006	0.000	0.145	0.000	0.000	39.966	100.000	Possible algal framgent
CT-6 281-282 ft.	0.007	0.043	0.002	0.002	0.111	0.000	0.024	0.263	64.184	0.008	0.000	0.003	0.068	0.012	0.017	35.242	100.001	Foraminifer
CT-6 281-282 ft.	0.000	0.090	0.010	0.000	0.072	0.000	0.000	0.281	64.008	0.000	0.051	0.000	0.028	0.000	0.007	35.432	100.001	Carbonate
CT-6 281-282 ft.	0.000	0.071	0.022	0.000	0.126	0.017	0.020	0.514	62.629	0.022	0.008	0.001	0.135	0.009	0.000	36.399	100.001	Carbonate fragment
CT-6 281-282 ft.	0.010	0.043	0.020	0.000	0.097	0.018	0.000	0.209	65.800	0.013	0.003	0.000	0.008	0.016	0.024	33.722	99.999	Carbonate
CT-6 281-282 ft.	0.002	0.088	0.014	0.003	0.082	0.003	0.006	0.395	61.699	0.000	0.000	0.042	0.113	0.000	0.000	37.531	100.000	Carbonate
CT-6 281-282 ft.	0.001	0.056	0.000	0.000	0.079	0.000	0.002	0.558	65.132	0.000	0.000	0.072	0.107	0.026	0.034	33.917	99.999	Calcite rhomb
CT-6 281-282 ft.	0.001	0.066	0.010	0.032	0.128	0.000	0.012	0.233	66.418	0.000	0.000	0.039	0.065	0.000	0.000	32.966	100.001	Micrite envelope
CT-6 281-282 ft.	0.000	0.056	0.000	0.008	0.093	0.000	0.009	0.382	65.802	0.021	0.004	0.022	0.040	0.002	0.008	33.536	100.000	Coral or bryozoa?
CT-4 282.5-283.5 ft.	0.006	0.045	0.012	0.000	0.053	0.001	0.014	0.414	66.766	0.000	0.000	0.000	0.170	0.000	0.045	32.475	100.001	Carbonate
CT-4 282.5-283.5 ft.	0.000	0.072	0.029	0.016	0.082	0.000	0.000	0.302	65.023	0.004	0.046	0.000	0.059	0.000	0.000	34.369	100.002	Coral or bryozoa?
CT-4 282.5-283.5 ft.	0.000	0.051	0.004	0.000	0.093	0.000	0.001	0.411	68.417	0.009	0.017	0.000	0.009	0.000	0.000	30.988	100.000	Carbonate
CT-4 282.5-283.5 ft.	0.000	0.063	0.040	0.035	0.100	0.000	0.000	0.236	57.758	0.000	0.000	0.039	0.046	0.014	0.008	41.663	100.002	Foraminifer with spar
CT-4 282.5-283.5 ft.	0.000	0.020	0.009	0.038	0.093	0.000	0.000	0.244	64.575	0.000	0.021	0.027	0.136	0.000	0.000	34.838	100.001	Spar
CT-4 282.5-283.5 ft.	0.007	0.092	0.000	0.000	0.057	0.008	0.000	0.572	64.764	0.010	0.000	0.000	0.049	0.000	0.010	34.428	99.997	Spar filled miliolid
CT-4 282.5-283.5 ft.	0.005	0.024	0.020	0.000	0.090	0.000	0.008	0.192	63.972	0.000	0.000	0.041	0.000	0.000	0.000	35.648	100.000	Carbonate
CT-4 282.5-283.5 ft.	0.000	0.050	0.032	0.001	0.123	0.000	0.006	0.305	56.016	0.000	0.000	0.000	0.160	0.000	0.000	43.305	99.998	Possible agal material
CT-4 282.5-283.5 ft.	0.004	0.276	0.016	0.000	0.073	0.000	0.000	0.384	65.601	0.030	0.021	0.051	0.044	0.013	0.002	33.485	100.000	Carbonate
CT-7 285-286 ft.	0.000	0.053	0.007	0.021	0.127	0.000	0.000	0.341	63.898	0.030	0.014	0.000	0.091	0.049	0.000	35.367	99.998	Carbonate
CT-7 285-286 ft.	0.037	0.219	0.025	0.011	0.104	0.000	0.011	0.186	56.917	0.000	0.000	0.001	0.053	0.017	0.023	42.397	100.001	Coral or bryozoa?
CT-7 285-286 ft.	0.000	0.088	0.014	0.000	0.095	0.009	0.008	0.274	61.763	0.000	0.000	0.077	0.000	0.000	0.000	37.673	100.001	Foraminifer
CT-7 285-286 ft.	0.006	0.060	0.039	0.014	0.076	0.082	0.000	0.197	61.904	0.000	0.000	0.071	0.058	0.017	0.038	37.438	100.000	Carbonate
CT-9 286-287 ft.	0.019	0.234	0.008	0.016	0.096	0.003	0.028	0.189	59.985	0.000	0.000	0.067	0.072	0.004	0.011	39.328	99.999	Spar
CT-9 286-287 ft.	0.003	0.003	0.011	0.021	0.066	0.004	0.029	0.437	59.738	0.000	0.000	0.046	0.087	0.004	0.000	39.549	99.998	Possible algal fragment
CT-9 286-287 ft.	0.018	0.039	0.015	0.000	0.063	0.000	0.014	0.197	61.788	0.000	0.043	0.000	0.155	0.009	0.000	37.660	100.001	Spar
CT-9 286-287 ft.	0.010	0.032	0.015	0.000	0.043	0.000	0.017	0.283	62.424	0.017	0.003	0.000	0.040	0.001	0.000	37.119	100.004	Carbonate
CT-9 286-287 ft.	0.022	0.195	0.014	0.000	0.077	0.000	0.020	0.153	57.511	0.000	0.019	0.035	0.024	0.000	0.019	41.913	100.002	Carbonate
CT-9 286-287 ft.	0.000	0.340	0.015	0.008	0.143	0.000	0.000	0.311	70.462	0.000	0.027	0.000	0.040	0.019	0.000	28.634	99.999	Carbonate
CT-9 286-287 ft.	0.000	0.003	0.024	0.012	0.126	0.009	0.000	0.220	60.674	0.000	0.007	0.000	0.069	0.031	0.011	38.814	100.000	Foraminifer
CT-9 286-287 ft.	0.000	0.066	0.049	0.040	0.083	0.093	0.016	0.311	69.225	0.013	0.000	0.048	0.010	0.011	0.001	30.034	100.000	Carbonate
Unleached																		
6R 274 ft.	0.011	0.054	0.049	0.005	0.149	0.047	0.026	0.279	59.724	0.000	0.036	0.000	0.000	0.000	0.000	60.412	Carbonate	
6R 274 ft.	0.011	0.055	0.049	0.005	0.149	0.047	0.026	0.279	62.214	0.000	0.029	0.000	0.051	0.029	0.013	37.041	99.998	Carbonate
6R 274 ft.	0.011	0.046	0.016	0.018	0.117	0.002	0.013	0.221	62.166	0.000	0.000	0.023	0.154	0.022	0.002	37.188	99.999	Foraminifer
6R 274 ft.	0.023	0.055	0.028	0.012	0.171	0.000	0.006	0.195	62.103	0.000	0.000	0.029	0.036	0.000	0.000	37.344	100.002	Carbonate

Sample ID	Al2O3	SrO	Na2O	FeO	Sb2O5	SiO2	P2O5	MgO	CaO	MoO3	As2O5	BaO	SO3	TiO2	UO2	CO2	Total	Comment
GR 274 ft.	0.018	0.271	0.042	0.000	0.087	0.027	0.000	0.218	62.697	0.010	0.000	0.049	0.090	0.000	0.020	36.471	100.000	Foraminifer
GR 274 ft.	0.020	0.234	0.003	0.020	0.073	0.000	0.003	0.104	65.054	0.008	0.007	0.016	0.023	0.011	0.001	34.422	99.999	Calcite rhomb
GR 274 ft.	0.000	0.421	0.017	0.011	0.111	0.000	0.000	0.093	64.090	0.015	0.009	0.000	0.007	0.005	0.053	35.169	100.001	Spar
GR 274 ft.	0.016	0.327	0.017	0.000	0.122	0.013	0.014	0.188	64.850	0.008	0.000	0.012	0.001	0.018	0.000	34.415	100.001	Spar
GR 274 ft.	0.026	0.054	0.027	0.033	0.058	0.006	0.000	0.000	63.419	0.005	0.000	0.000	0.000	0.000	0.045	36.327	100.000	Carbonate
GR 274 ft.	0.021	0.057	0.023	0.011	0.064	0.014	0.000	0.000	63.359	0.017	0.000	0.000	0.000	0.002	0.018	36.417	100.003	Carbonate
GR 274 ft.	0.051	0.034	0.076	0.122	0.083	3.212	0.000	0.000	44.985	0.005	0.000	0.032	0.000	0.009	0.000	51.391	100.000	Carbonate
GR 275-276 ft.	0.000	0.143	0.000	0.000	0.078	0.000	0.000	0.000	60.803	0.032	0.000	0.048	0.000	0.022	0.000	38.872	99.998	Carbonate
GR 275-276 ft.	0.004	0.016	0.000	0.019	0.081	0.005	0.010	0.343	57.470	0.000	0.000	0.007	0.163	0.000	0.000	41.881	99.999	Carbonate
GR 275-276 ft.	0.000	0.044	0.000	0.000	0.124	0.000	0.004	0.246	57.706	0.009	0.002	0.041	0.053	0.000	0.000	41.771	100.000	Carbonate
GR 275-276 ft.	0.000	0.082	0.003	0.024	0.157	0.000	0.012	0.355	64.455	0.000	0.000	0.000	0.034	0.000	0.004	34.877	100.003	Carbonate
GR 275-276 ft.	0.009	0.003	0.030	0.000	0.067	0.033	0.000	0.456	64.621	0.000	0.000	0.000	0.102	0.000	0.000	34.680	100.001	Spar
GR 275-276 ft.	0.095	0.046	0.019	0.002	0.124	0.168	0.010	0.500	62.653	0.000	0.000	0.005	0.054	0.000	0.026	36.298	100.000	Spar surrounding foraminifer
GR 275-276 ft.	0.002	0.038	0.010	0.008	0.144	0.000	0.005	0.340	63.274	0.022	0.026	0.025	0.092	0.006	0.048	35.959	99.999	Foraminifer
GR 275-276 ft.	0.005	0.031	0.028	0.009	0.016	0.001	0.019	0.290	67.922	0.000	0.000	0.026	0.063	0.026	0.000	31.561	99.997	Carbonate
GR 275-276 ft.	0.020	0.024	0.014	0.005	0.080	0.061	0.023	0.641	66.384	0.019	0.012	0.000	0.115	0.000	0.043	32.559	100.000	Foraminifer
GR 275-276 ft.	0.020	0.011	0.033	0.004	0.119	0.000	0.022	0.248	63.040	0.000	0.000	0.000	0.135	0.000	0.000	36.368	100.000	"Dog tooth"spar
GR 275-276 ft.	0.013	0.000	0.031	0.060	0.050	0.029	0.017	0.117	42.291	0.014	0.000	0.000	0.218	0.002	0.012	57.146	100.000	Dark area of carbonate
GR 275-276 ft.	0.037	0.062	0.005	0.025	0.016	0.065	0.000	0.257	68.120	0.033	0.044	0.027	0.063	0.000	0.008	31.238	100.000	Carbonate
GR 275-276 ft.	0.001	0.003	0.037	0.000	0.095	0.000	0.016	0.467	65.927	0.004	0.000	0.048	0.094	0.000	0.021	33.286	99.999	Coral or bryozoa?
GR 275-276 ft.	0.001	0.052	0.020	0.003	0.068	0.000	0.000	0.393	64.522	0.000	0.000	0.004	0.126	0.000	0.000	34.810	99.999	Micrite envelope
GR 278-279 ft.	0.009	0.000	0.015	0.000	0.149	0.000	0.001	0.145	57.925	0.006	0.000	0.009	0.096	0.000	0.000	41.646	100.001	Spar
GR 278-279 ft.	0.006	0.000	0.019	0.021	0.124	0.000	0.005	0.207	51.865	0.019	0.000	0.008	0.073	0.000	0.000	47.655	100.002	Carbonate
GR 278-279 ft.	0.000	0.000	0.022	0.000	0.155	0.000	0.000	0.113	56.783	0.008	0.000	0.000	0.058	0.000	0.000	42.861	100.000	Carbonate
GR 278-279 ft.	0.000	0.000	0.028	0.024	0.124	0.000	0.012	0.156	56.727	0.000	0.000	0.000	0.078	0.000	0.000	42.852	100.001	Carbonate
GR 278-279 ft.	0.009	0.000	0.020	0.002	0.091	0.000	0.004	0.121	45.071	0.002	0.000	0.008	0.097	0.000	0.000	54.575	100.000	Carbonate
GR 278-279 ft.	0.018	0.000	0.005	0.012	0.110	0.032	0.006	0.242	55.736	0.000	0.000	0.029	0.124	0.017	0.000	43.669	100.000	Carbonate
GR 278-279 ft.	0.012	0.000	0.003	0.001	0.128	0.000	0.015	0.105	56.760	0.000	0.000	0.000	0.007	0.000	0.000	42.968	99.999	Carbonate
GR 278-279 ft.	0.014	0.000	0.006	0.001	0.132	0.049	0.011	0.254	53.882	0.002	0.000	0.000	0.065	0.000	0.000	45.583	99.999	Foraminifer
GR 278-279 ft.	0.027	0.000	0.061	0.005	0.112	0.027	0.018	0.457	57.354	0.001	0.012	0.000	0.104	0.002	0.000	41.820	100.000	Carbonate
GR 278-279 ft.	0.007	0.000	0.000	0.004	0.124	0.016	0.027	0.142	52.893	0.000	0.000	0.021	0.074	0.000	0.000	46.690	99.998	Carbonate
GR 278-279 ft.	0.007	0.019	0.002	0.035	0.119	0.013	0.000	0.440	54.210	0.013	0.000	0.000	0.163	0.018	0.069	44.889	99.997	Peloids
GR 279-280 ft.	0.153	0.000	0.012	0.028	0.141	0.339	0.001	0.305	51.571	0.004	0.000	0.013	0.083	0.000	0.000	47.350	100.000	Carbonate
GR 279-280 ft.	0.005	0.000	0.013	0.009	0.173	0.000	0.025	0.163	54.491	0.000	0.000	0.032	0.043	0.000	0.000	45.045	99.999	Micrite envelope
GR 279-280 ft.	0.020	0.000	0.000	0.007	0.116	0.000	0.008	0.227	56.131	0.000	0.000	0.000	0.062	0.000	0.000	43.430	100.001	Carbonate
GR 279-280 ft.	0.024	0.000	0.006	0.001	0.164	0.000	0.006	0.504	57.618	0.016	0.088	0.022	0.026	0.005	0.000	41.521	100.001	Foraminifer
GR 279-280 ft.	0.100	0.000	0.047	0.006	0.112	0.273	0.002	0.262	52.511	0.019	0.006	0.023	0.077	0.100	0.000	46.460	99.998	Carbonate
GR 279-280 ft.	0.002	0.000	0.011	0.015	0.120	0.022	0.015	0.357	55.068	0.000	0.000	0.000	0.057	0.022	0.000	44.312	100.001	Carbonate
CT-6 280-281 ft.	0.008	0.036	0.000	0.031	0.117	0.010	0.000	0.308	52.030	0.000	0.013	0.022	0.128	0.000	0.000	47.299	100.002	Bryozoa
CT-6 280-281 ft.	0.024	0.008	0.010	0.016	0.062	0.071	0.022	0.100	49.691	0.028	0.002	0.062	0.158	0.000	0.000	49.748	100.002	Possibly agal material
CT-6 280-281 ft.	0.000	0.040	0.019	0.013	0.056	0.009	0.000	0.219	63.329	0.032	0.030	0.000	0.056	0.000	0.016	36.179	99.998	Carbonate
CT-6 280-281 ft.	0.000	0.080	0.022	0.000	0.110	0.000	0.005	0.332	64.371	0.014	0.020	0.000	0.063	0.000	0.000	34.983	100.000	Carbonate
CT-6 280-281 ft.	0.010	0.053	0.020	0.035	0.070	0.000	0.001	0.225	62.693	0.010	0.000	0.000	0.067	0.000	0.011	36.806	100.001	Peloid
CT-6 280-281 ft.	0.003	0.220	0.025	0.011	0.124	0.039	0.007	0.221	62.025	0.008	0.009	0.000	0.084	0.018	0.017	37.188	99.999	Carbonate
CT-6 280-281 ft.	0.001	0.458	0.000	0.004	0.109	0.003	0.032	0.120	61.742	0.011	0.002	0.059	0.004	0.000	0.006	37.450	100.001	Carbonate
CT-4 284-285 ft.	0.019	0.031	0.018	0.013	0.055	0.000	0.014	0.083	62.624	0.000	0.000	0.000	0.000	0.000	0.008	37.135	100.000	Carbonate
CT-4 284-285 ft.	0.004	0.052	0.004	0.023	0.088	0.016	0.008	0.245	61.636	0.010	0.000	0.007	0.054	0.000	0.000	37.851	99.998	Carbonate
CT-4 284-285 ft.	0.011	0.072	0.039	0.032	0.096	0.032	0.000	0.327	63.344	0.000	0.000	0.062	0.145	0.034	0.000	35.806	100.000	Carbonate
CT-4 284-285 ft.	0.029	0.033	0.017	0.004	0.054	0.018	0.004	0.095	40.983	0.006	0.000	0.029	0.192	0.000	0.000	58.536	100.000	Bryozoa
CT-4 284-285 ft.	0.011	0.232	0.031	0.018	0.063	0.000	0.000	0.188	61.536	0.000	0.000	0.041	0.055	0.000	0.034	37.792	100.001	Calcite rhomb
CT-4 284-285 ft.	0.002	0.054	0.001	0.019	0.112	0.000	0.001	0.421	62.454	0.000	0.000	0.006	0.151	0.003	0.019	36.758	100.001	Miliolid
CT-4 284-285 ft.	0.014	0.093	0.026	0.009	0.110	0.014	0.007	0.250	60.613	0.004	0.000	0.037	0.144	0.013	0.000	38.665	99.999	Peloid
CT-4 & CT-7 288-289 ft.	0.017	0.215	0.028	0.000	0.084	0.000	0.009	0.288	61.929	0.000	0.036	0.000	0.094	0.019	0.021	37.261	100.001	Carbonate
CT-4 & CT-7 288-289 ft.	0.023	0.064	0.023	0.000	0.106	0.004	0.025	0.204	60.421	0.008	0.000	0.001	0.055	0.000	0.000	39.065	99.999	Carbonate
CT-4 & CT-7 288-289 ft.	0.000	0.031	0.0															

Sample ID	Al2O3	SrO	Na2O	FeO	Sb2O5	SiO2	P2O5	MgO	CaO	MoO3	As2O5	BaO	SO3	TiO2	UO2	CO2	Total	Comment
Other																		
CT-7 285-286 ft.	0.000	0.001	0.000	0.026	0.000	96.642	0.000	0.000	0.086	0.022	0.000	0.000	0.022	0.001	0.000	96.800	Quartz	
CT-4 282.5-283.5 ft.	0.120	0.020	0.004	0.126	0.002	98.560	0.017	0.000	0.329	0.000	0.000	0.011	0.203	0.000	0.000	99.392	Quartz	
CT-7 285-286 ft.	0.001	0.000	0.233	0.158	0.097	0.102	38.878	0.031	56.579	0.000	0.000	0.051	0.029	0.021	0.020	96.200	Phosphate	
CT-4 282.5-283.5 ft.	0.104	0.069	0.983	80.937	0.031	7.700	0.040	0.340	1.943	0.007	0.018	0.016	1.270	0.011	0.009	93.478	Unknown	
CT-4 282.5-283.5 ft.	0.137	0.025	0.429	66.258	0.035	3.543	0.146	0.368	4.086	0.000	0.000	0.004	0.263	0.012	0.025	75.331	Unknown	
CT-6 281-282 ft.	0.019	0.000	0.664	65.003	0.014	4.149	0.879	0.255	2.898	0.000	0.020	0.081	0.320	0.000	0.000	74.366	Unknown	
CT-3 277-278 ft.	0.000	0.000	0.000	69.871	0.000	0.000	0.000	1.033	0.000	0.000	0.000	0.719	0.020	0.000	0.000	71.924	Iron oxide	
CT-3 277-278 ft.	0.000	0.000	0.000	50.880	0.046	0.000	0.000	0.000	0.758	0.000	0.131	0.000	0.006	0.022	0.000	51.970	Iron oxide	
CT-7 285-286 ft.	19.630	0.044	0.529	0.016	0.860	68.363	0.049	0.000	0.140	0.039	0.000	0.300	0.000	0.035	0.000	90.005	Al Silicate	
CT-7 285-286 ft.	19.725	0.062	1.003	0.025	0.844	66.233	0.043	0.000	0.174	0.000	0.000	0.492	0.002	0.000	0.000	88.603	Al Silicate	

APPENDIX G
SEM/EPMA IMAGES

Leached Samples

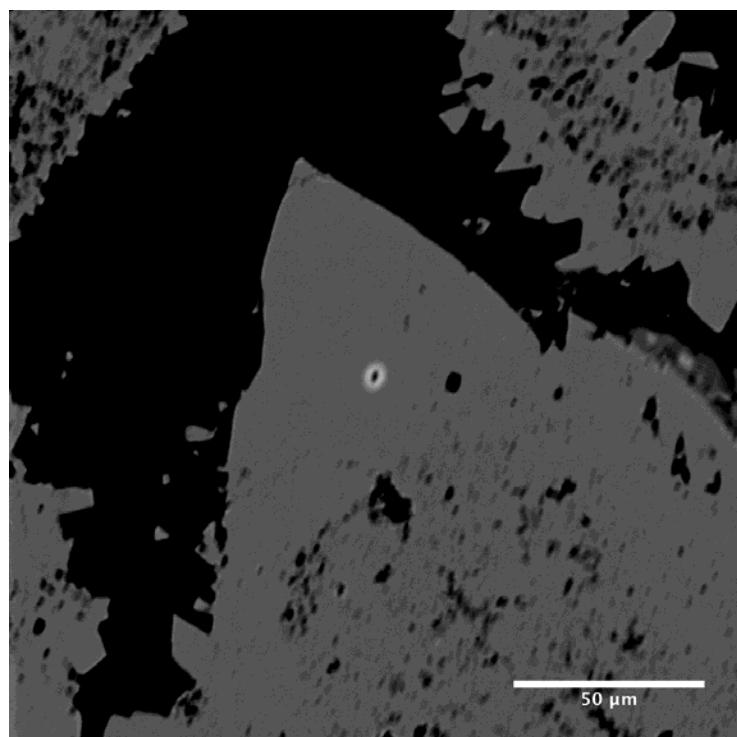


Figure 1. CT-8, 274-275.5 ft BLS. BSE image. Spar on carbonate.

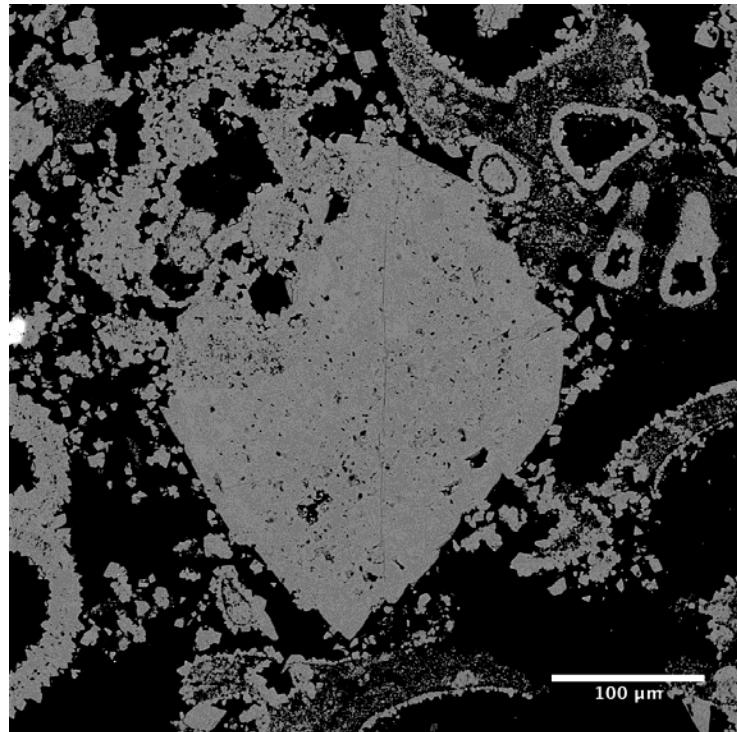


Figure 2. CT-8, 274-275.5 ft BLS. BSE image. Carbonate grain.

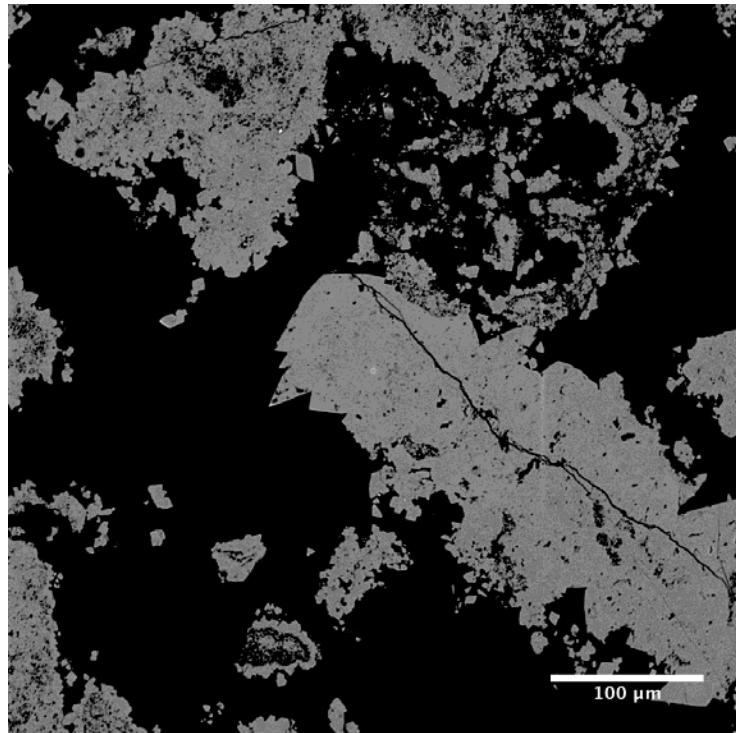


Figure 3. CT-8, 274-275.5 ft BLS. BSE image. Spar.

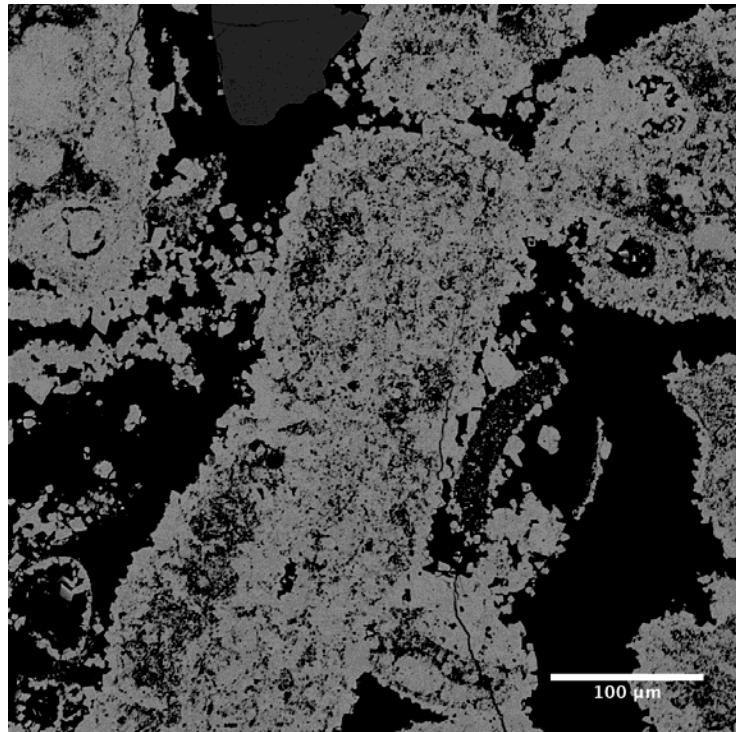


Figure 4. CT-8, 274-275.5 ft BLS. BSE image. Carbonate.

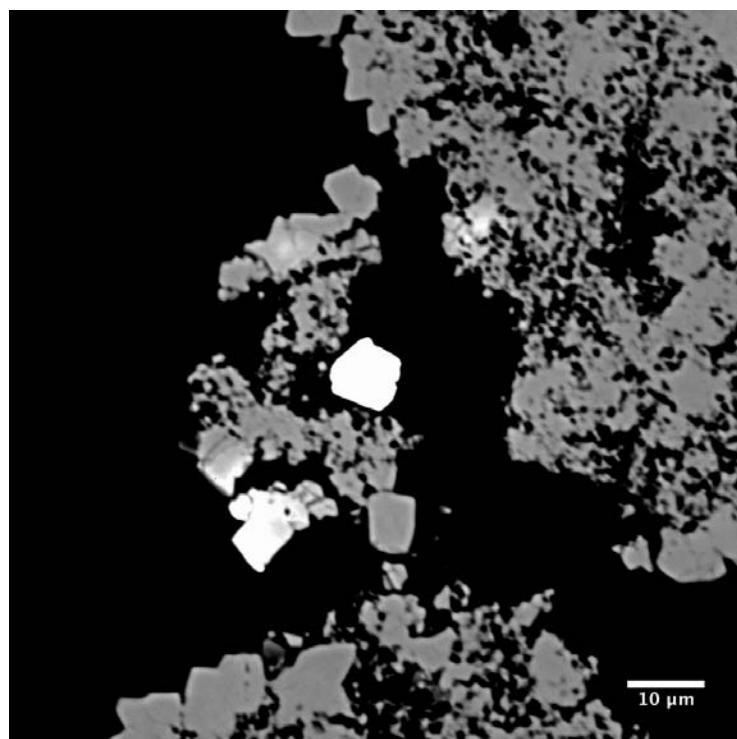


Figure 5. CT-8, 274-275.5 ft BLS. BSE image. Pyrite.

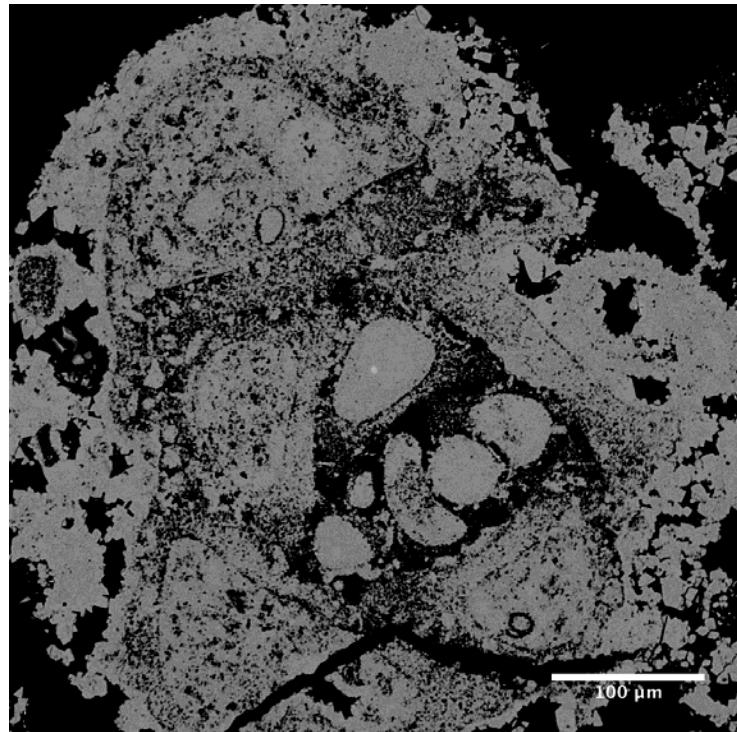


Figure 6. CT-8, 274-275.5 ft BLS. BSE image. Miliolid.

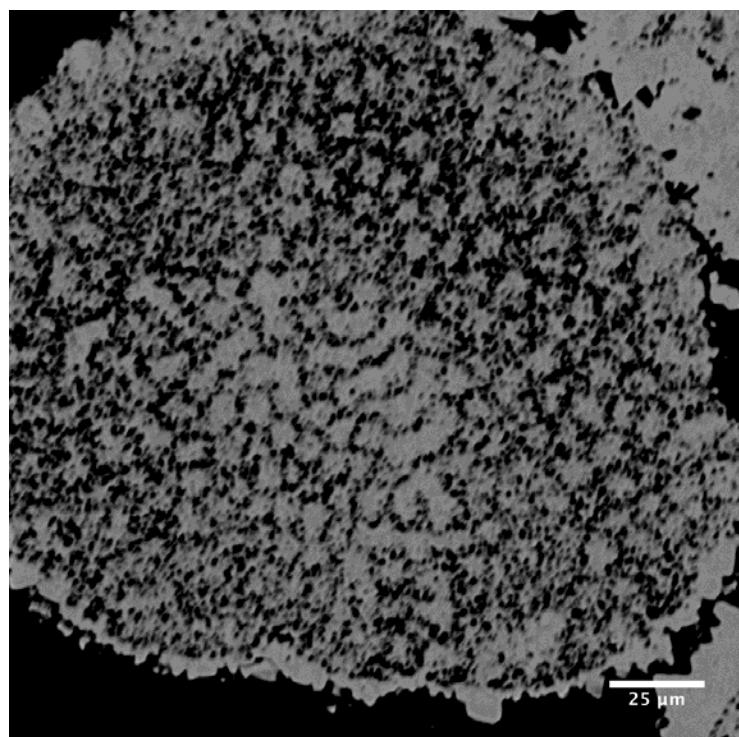


Figure 7. CT-8, 274-275.5 ft BLS. BSE image. Bryozoa.

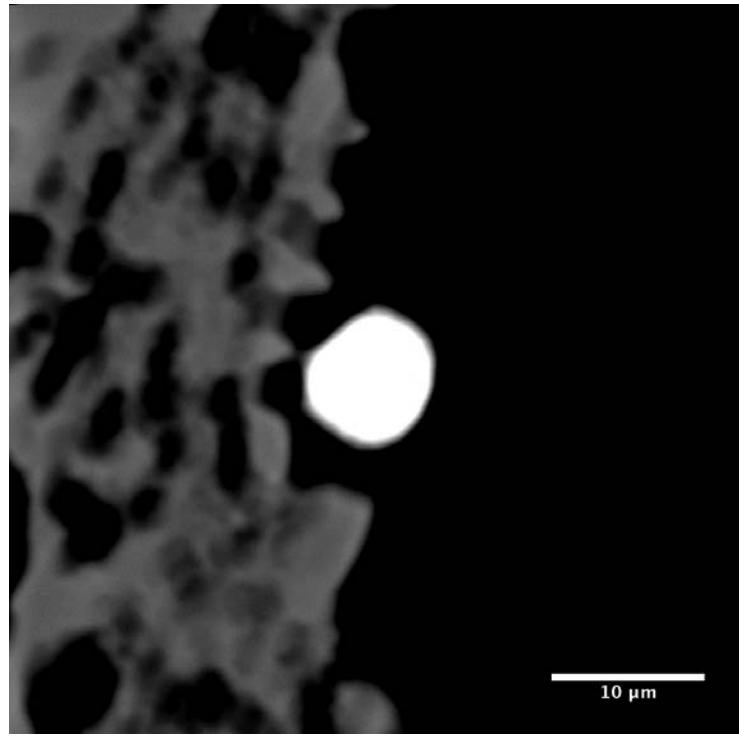


Figure 8. CT-8, 274-275.5 ft BLS. BSE image. Pyrite framboid.

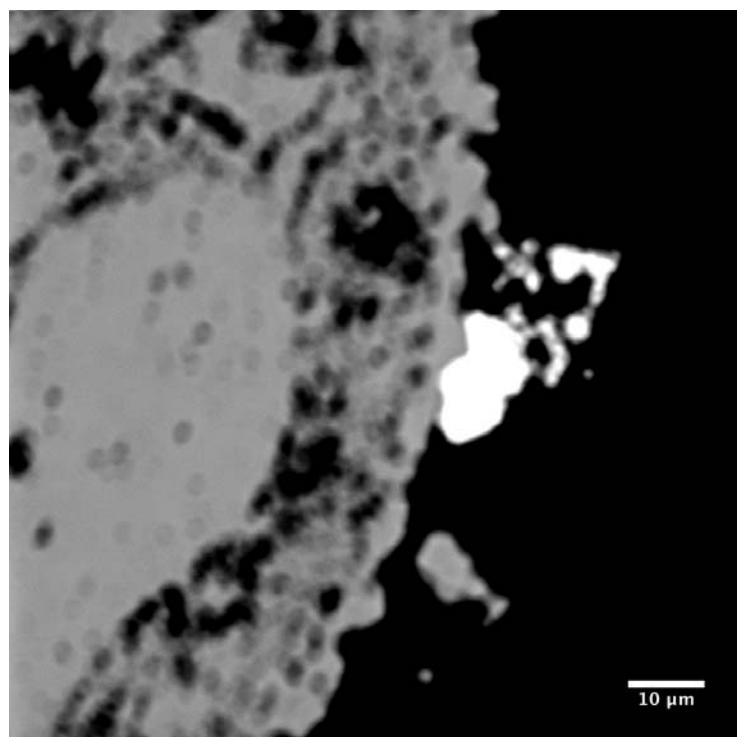


Figure 9. CT-8, 274-275.5 ft BLS. BSE image. Pyrite.

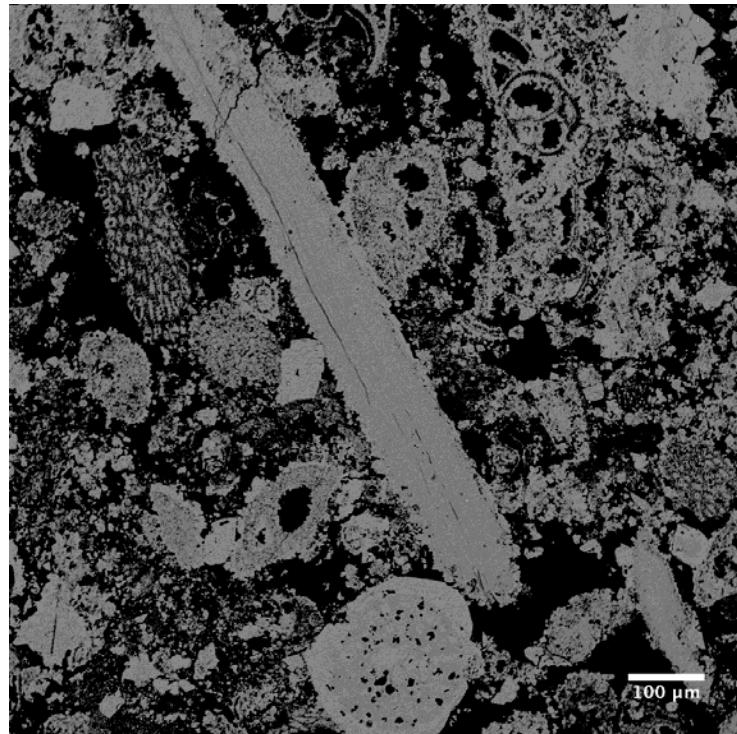


Figure 10. CT-5, 276-277 ft BLS. BSE image. Fossiliferous limestone.

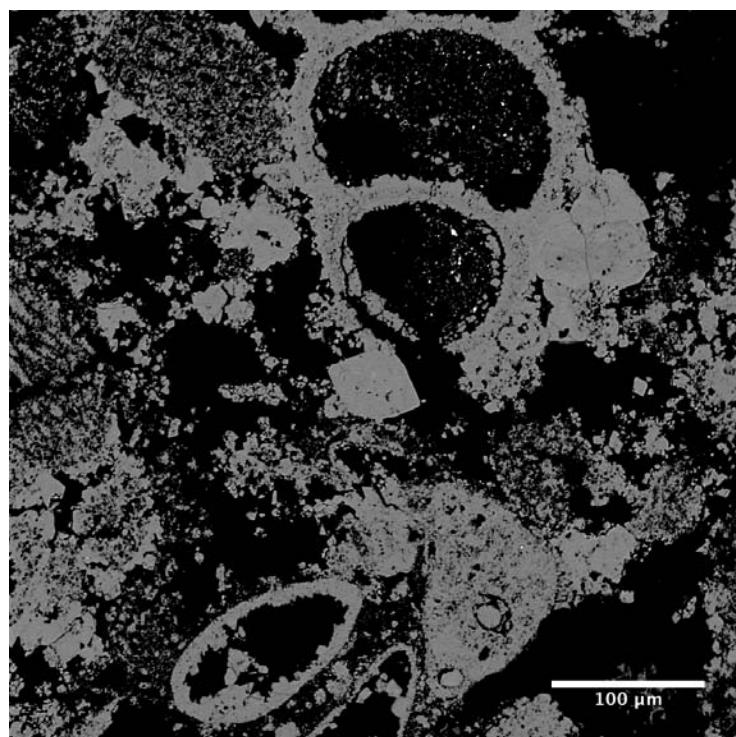


Figure 11. CT-5, 276-277 ft BLS. BSE image. Foraminifer.

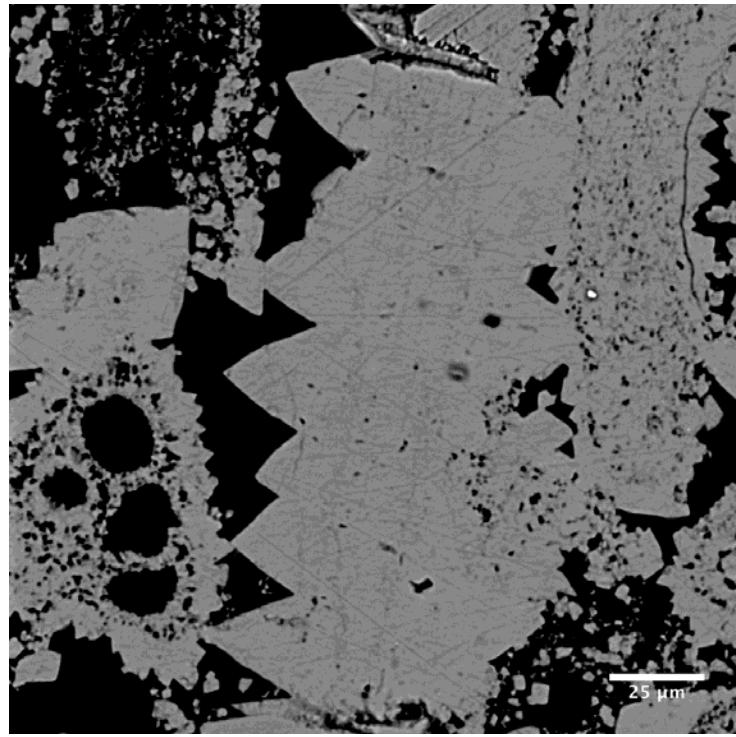


Figure 12. CT-5, 276-277 ft BLS. BSE image. Dog tooth spar.

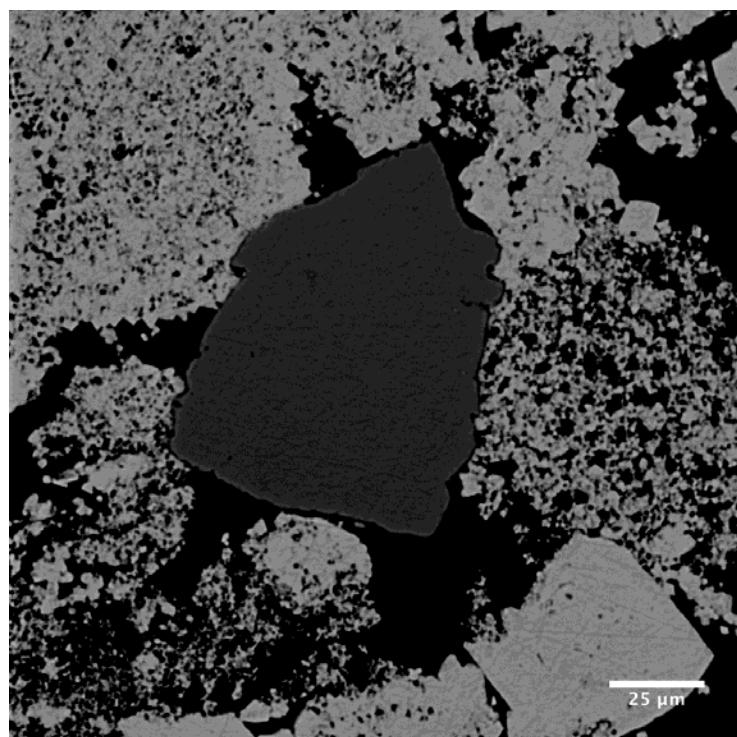


Figure 13. CT-5, 276-277 ft BLS. BSE image. Quartz grain in carbonate matrix.

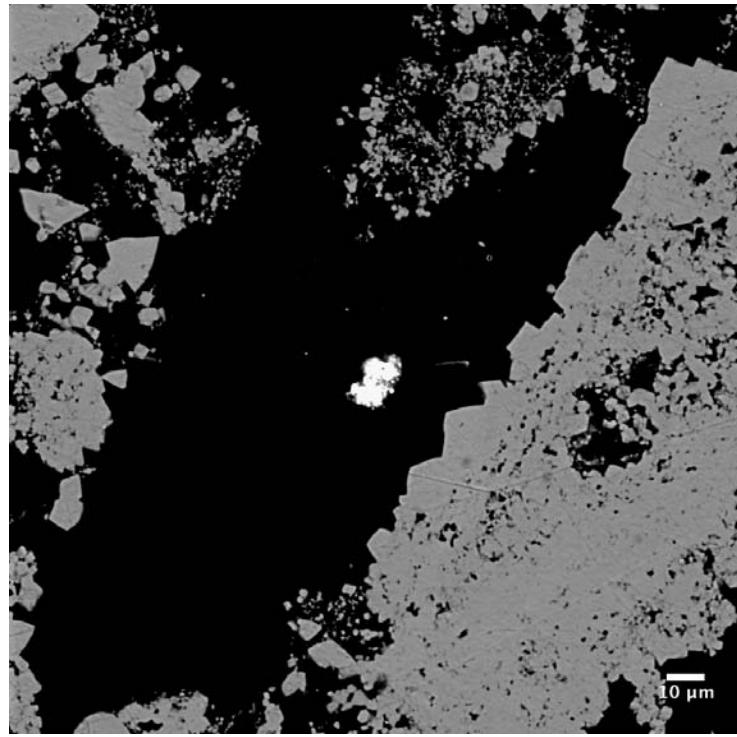


Figure 14. CT-5, 276-277 ft BLS. BSE image. Iron oxide grain.

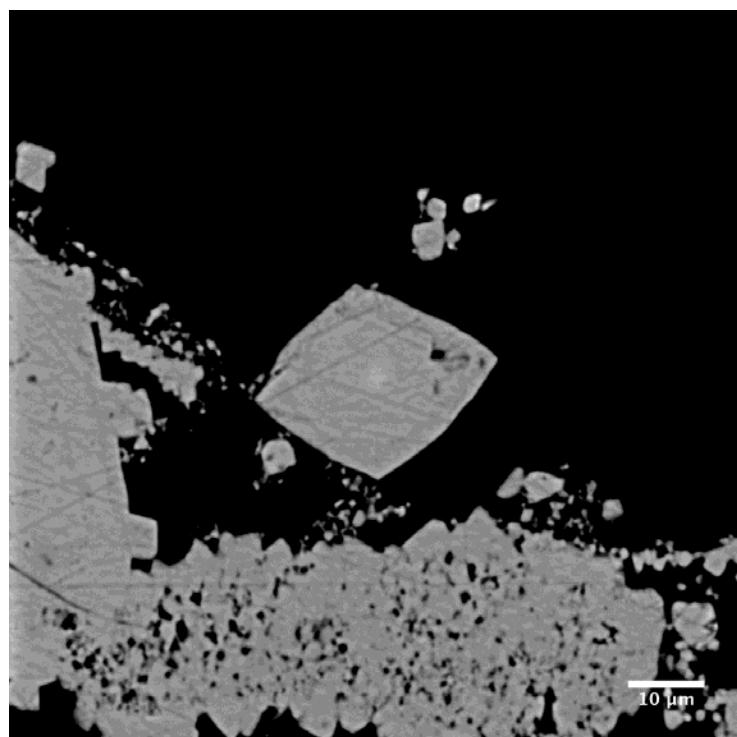


Figure 15. CT-5, 276-277 ft BLS. BSE image. Calcite rhomb.

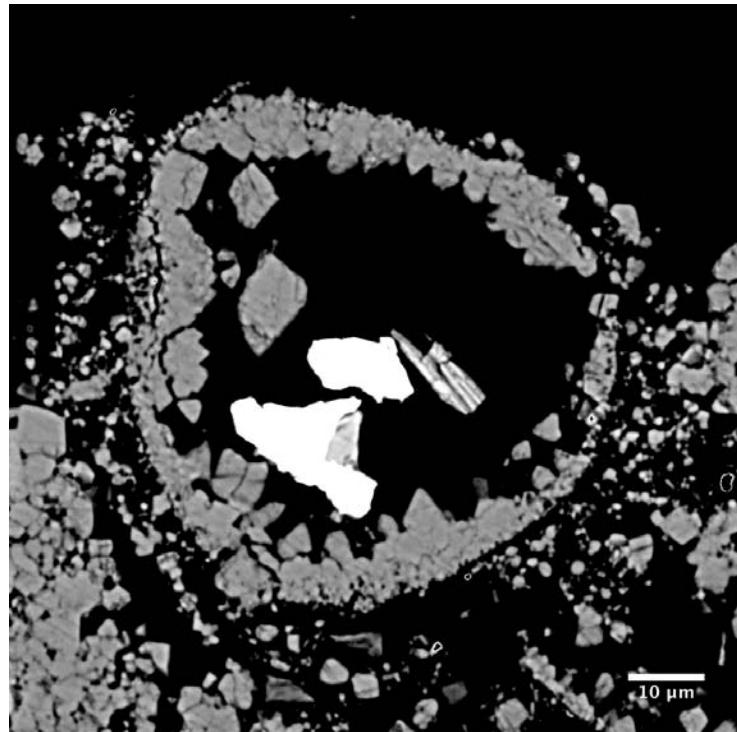


Figure 16. CT-5, 276-277 ft BLS. BSE image. Pyrite grains in a micrite envelope.

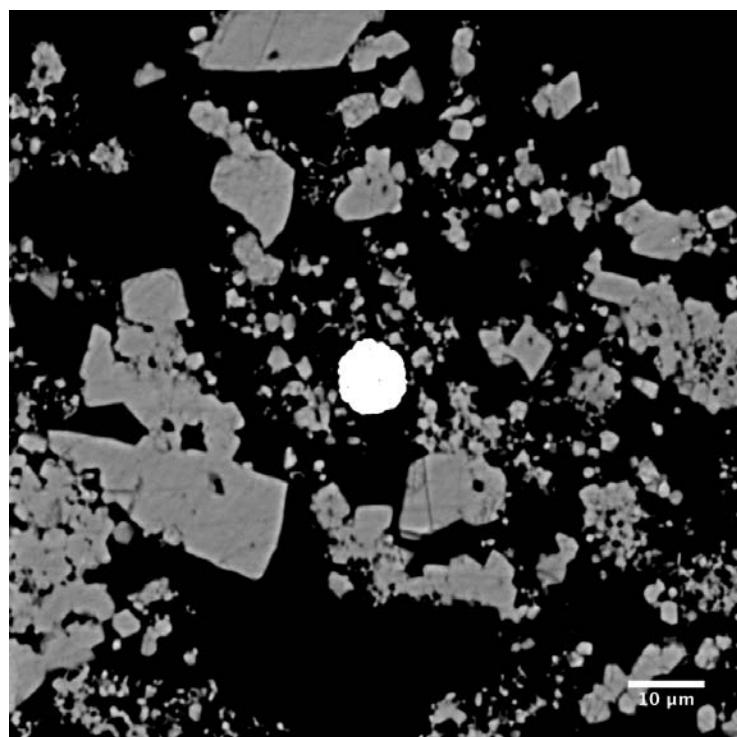


Figure 17. CT-5, 276-277 ft BLS. BSE image. Pyrite framboid.

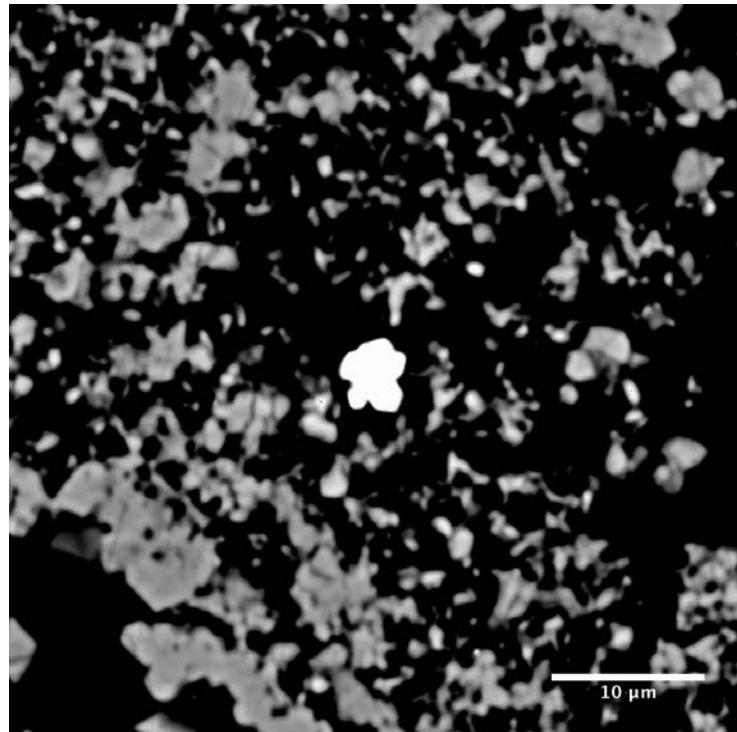


Figure 18. CT-5, 276-277 ft BLS. BSE image. Twinned pyrite crystal.

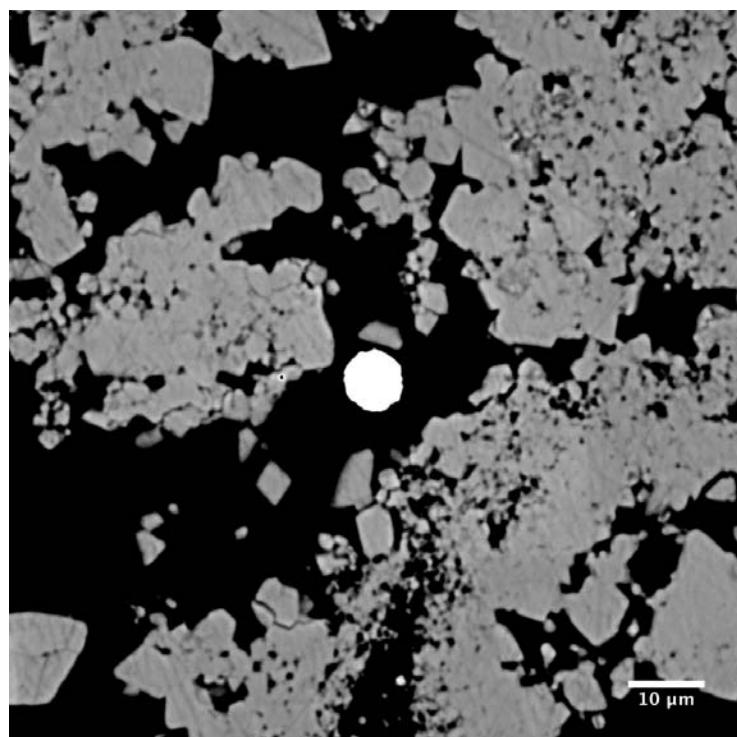


Figure 19. CT-5, 276-277 ft BLS. BSE image. Pyrite framboid.

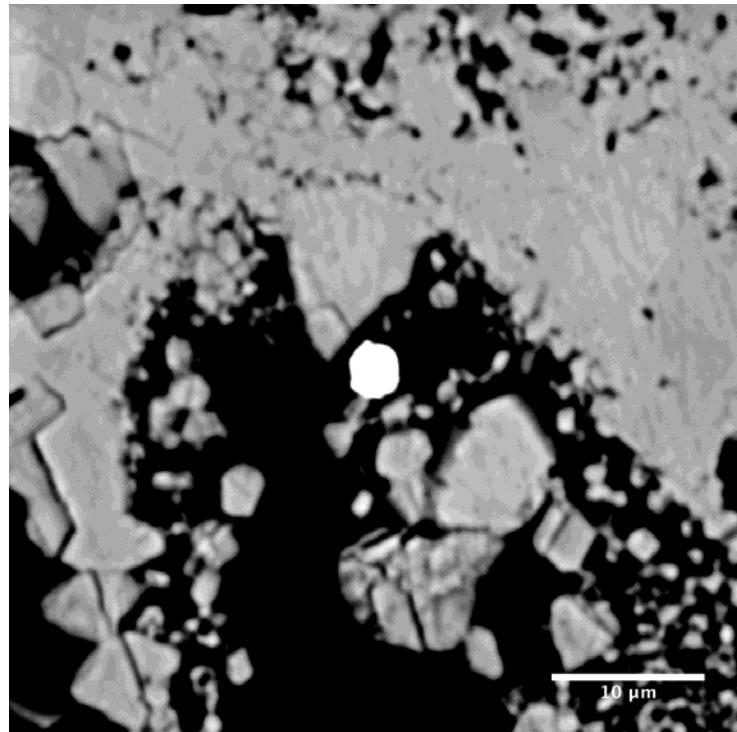


Figure 20. CT-5, 276-277 ft BLS. BSE image. Chalcopyrite.

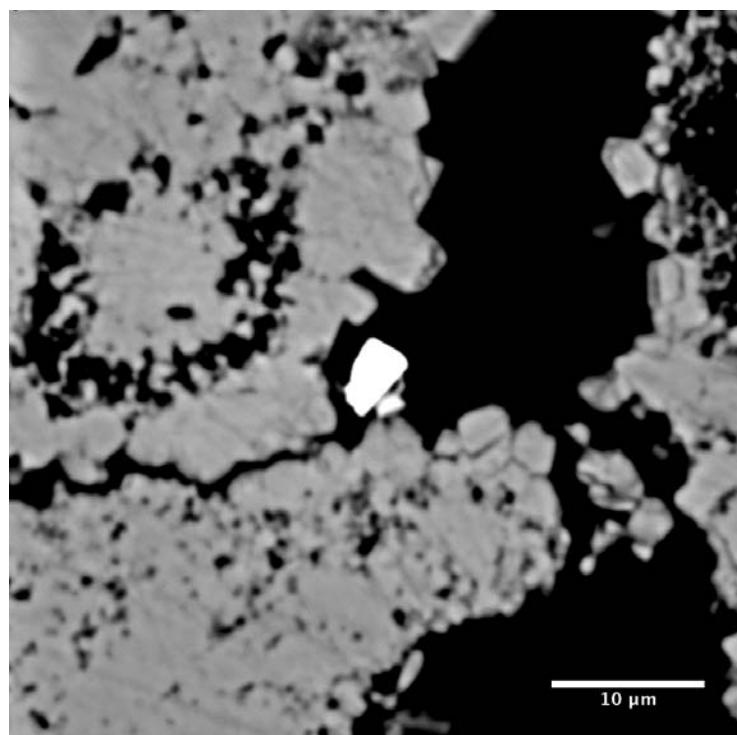


Figure 21. CT-5, 276-277 ft BLS. BSE image. Chalcopyrite.

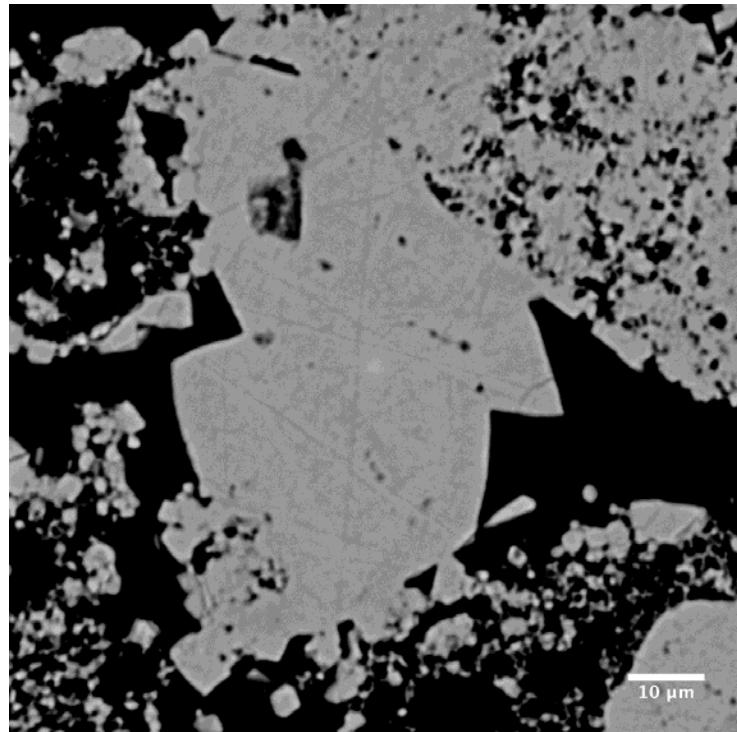


Figure 22. CT-3, 277-278 ft BLS. BSE image. Spar.

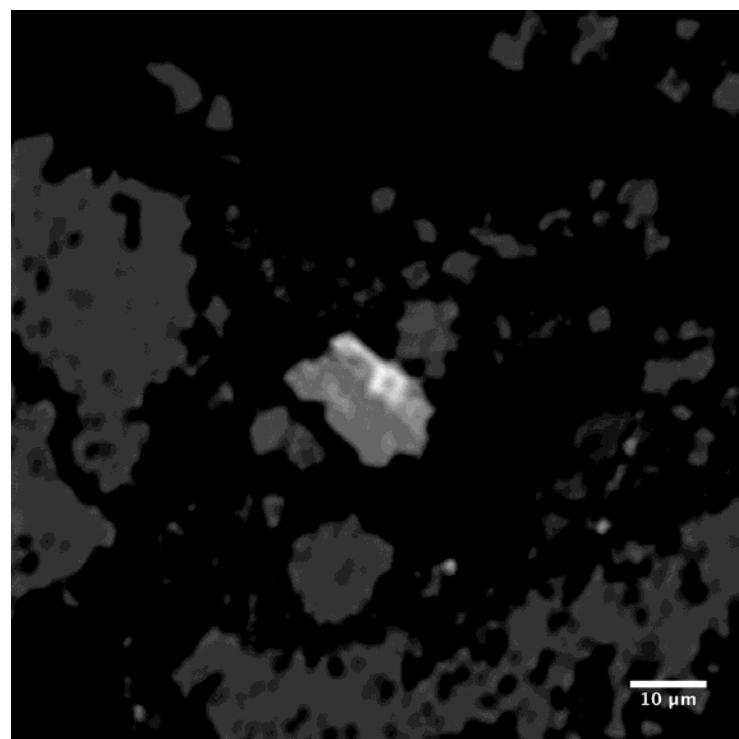


Figure 23. CT-3, 277-278 ft BLS. BSE image. Iron oxide.

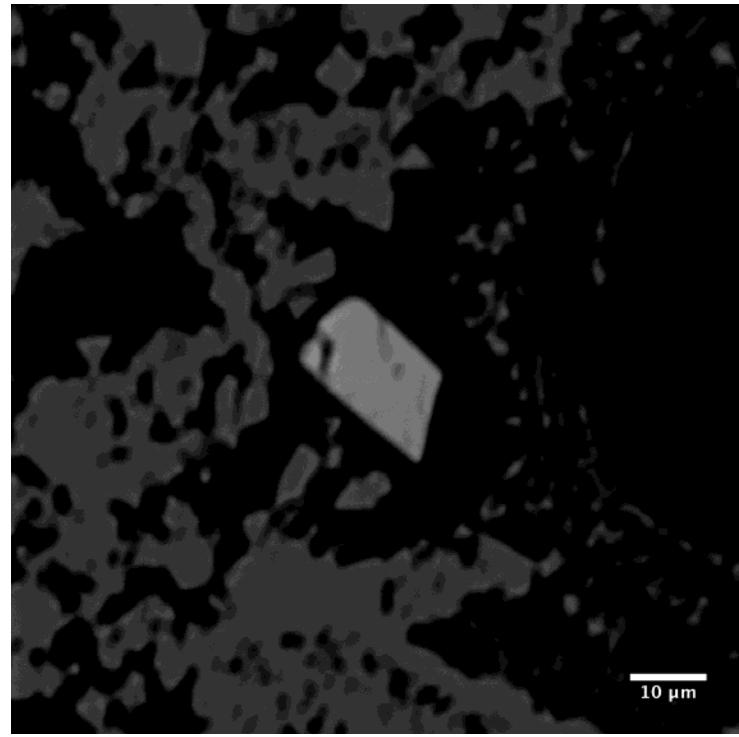


Figure 24. CT-3, 277-278 ft BLS. BSE image. Iron oxide.

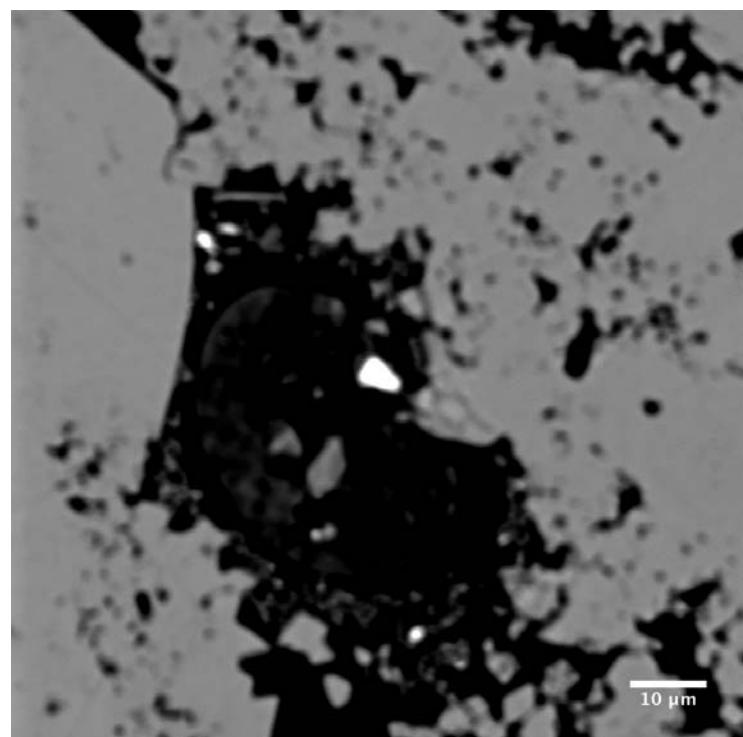


Figure 25. CT-3, 277-278 ft BLS. BSE image. Zn Sulfide by EDS analysis.

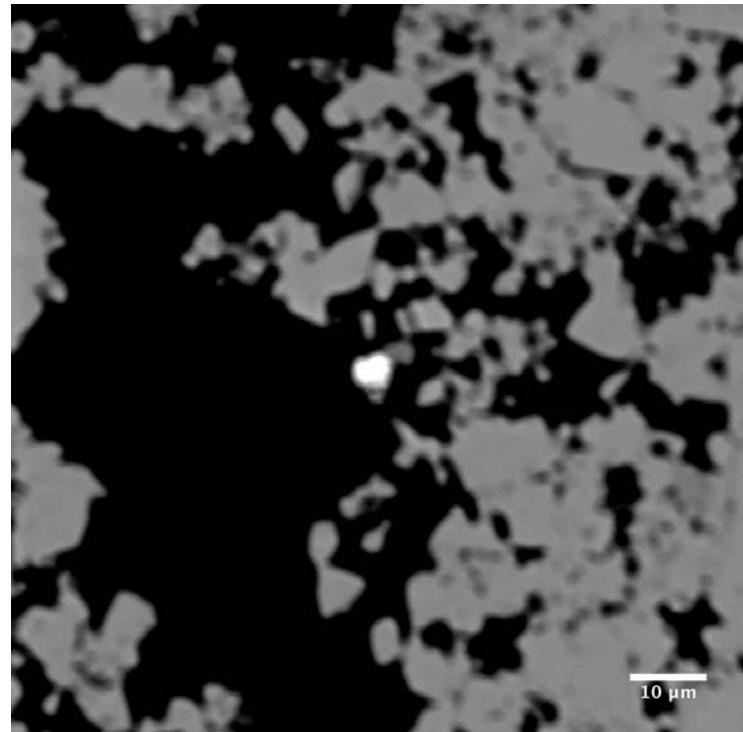


Figure 26. CT-3, 277-278 ft BLS. BSE image. Small pyrite.

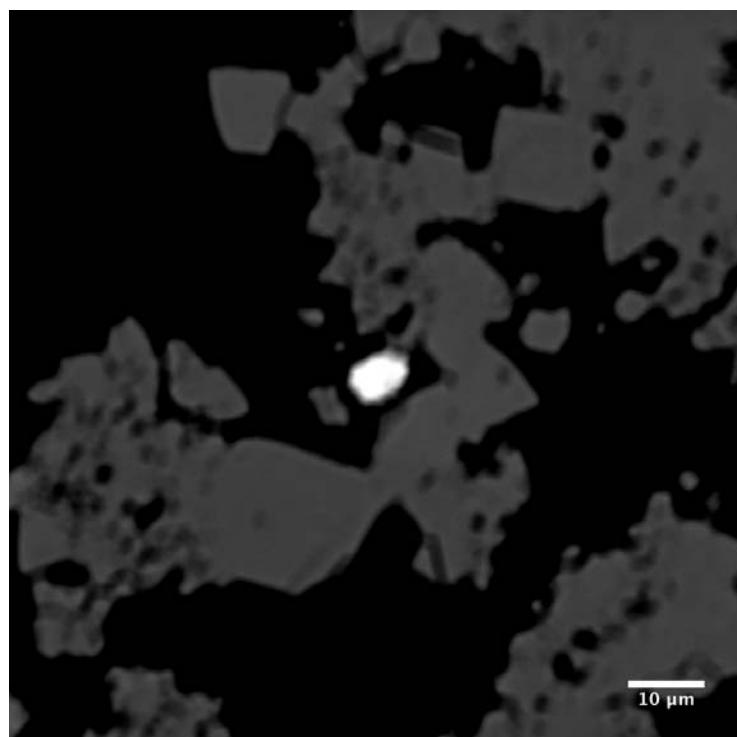


Figure 27. CT-3, 277-278 ft BLS. BSE image. Small pyrite framboid.

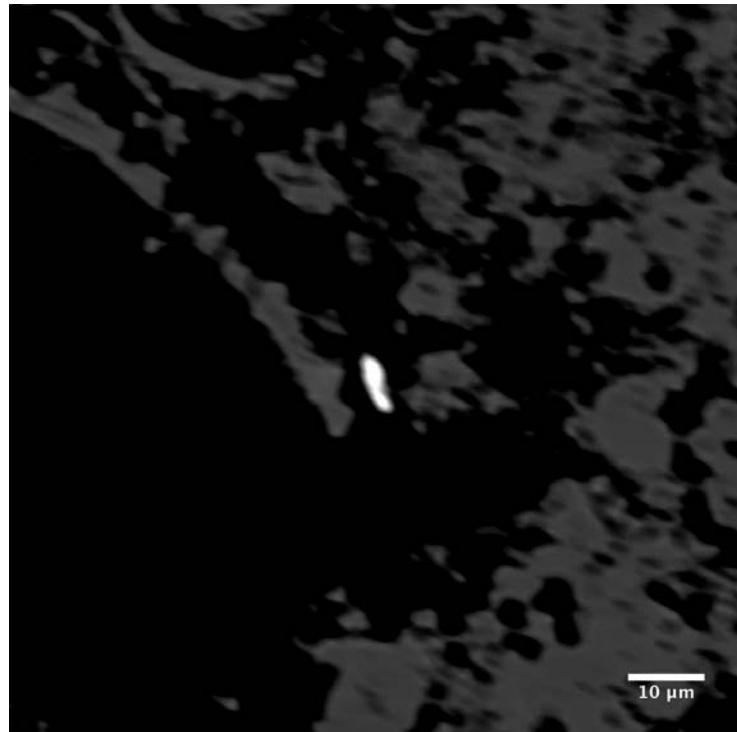


Figure 28. CT-3, 277-278 ft BLS. BSE image. Chalcopyrite.

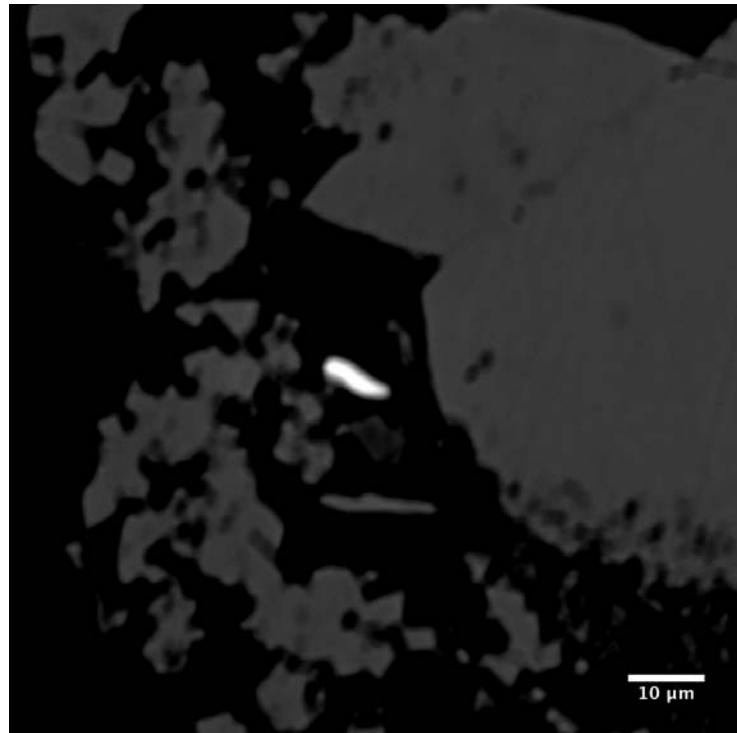


Figure 29. CT-3 277-278 ft BLS. BSE image. Pyrite.

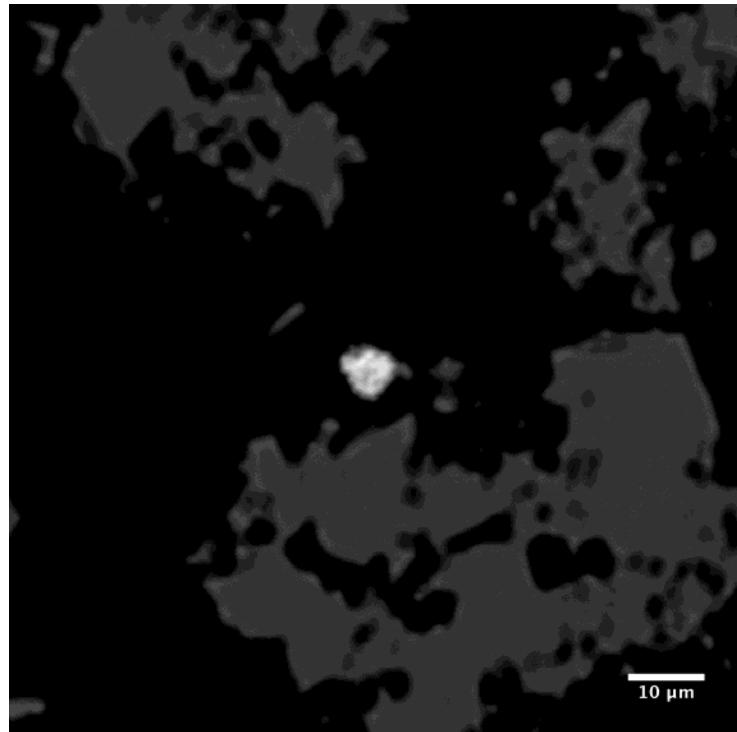


Figure 30. CT-3 277-278 ft BLS. BSE image. Pyrite.

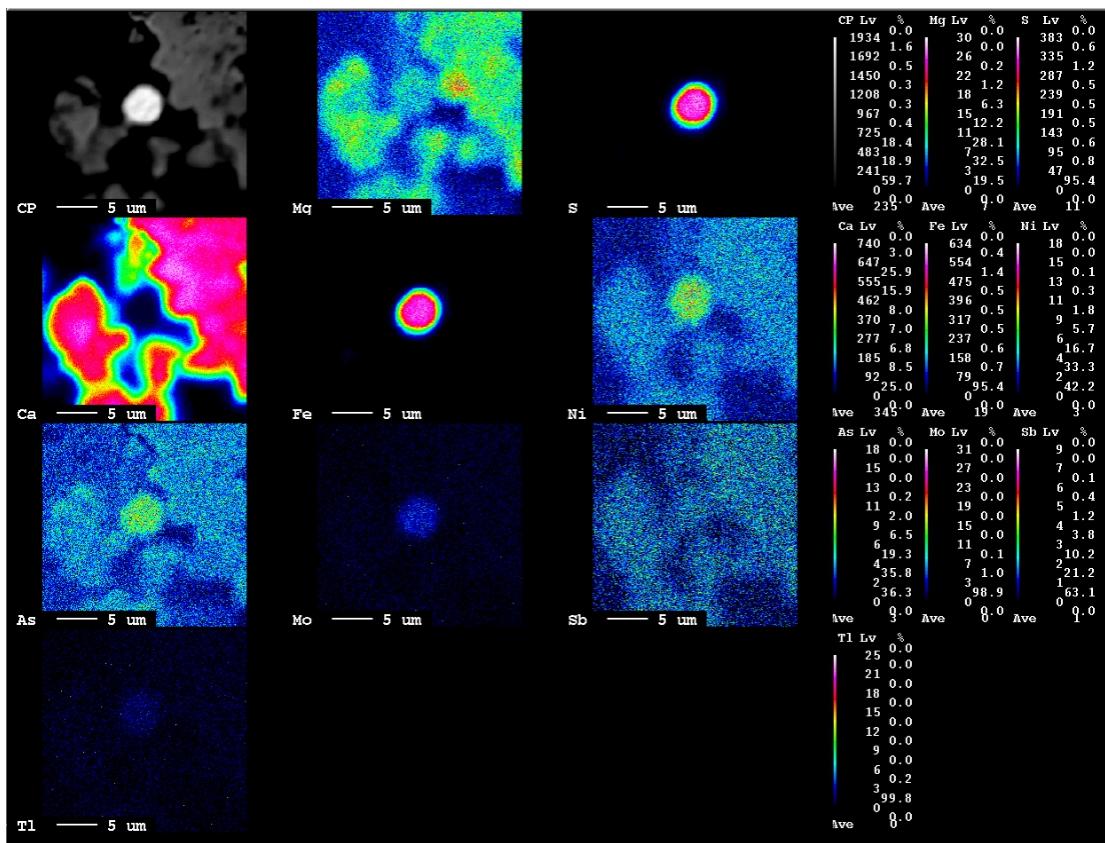


Figure 31. CT-3, 277-278 ft BLS. Element map of pyrite framboid. Note pyrite association with arsenic, nickel and molybdenum.

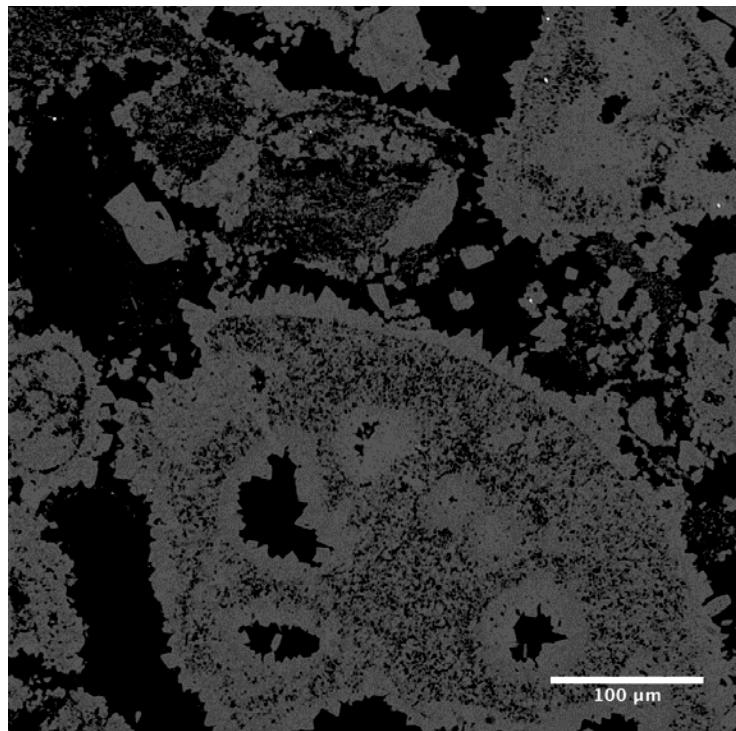


Figure 32. CT-6, 281-282 ft BLS. BSE image. Foraminifera with spar.

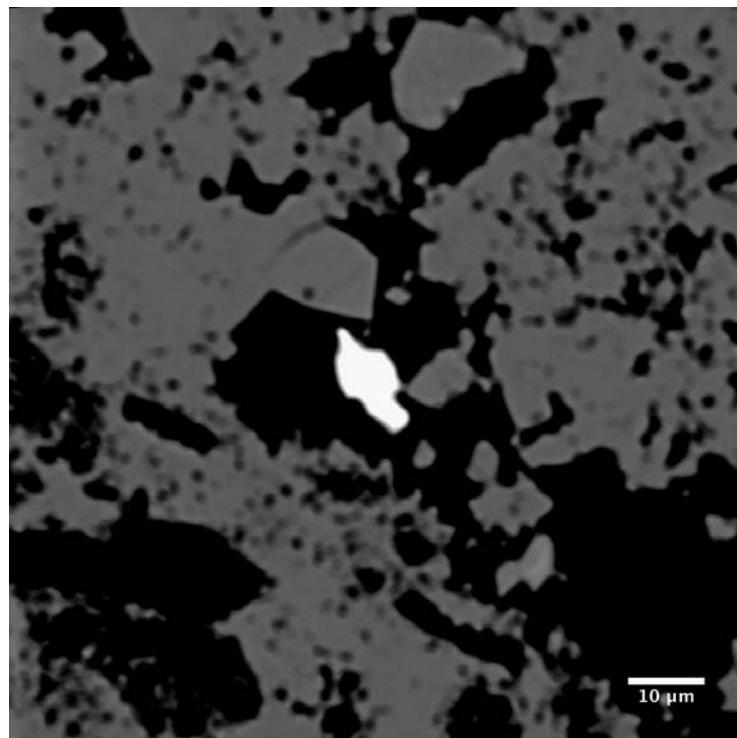


Figure 33. CT-6, 281-282 ft BLS. BSE image. Iron oxide.

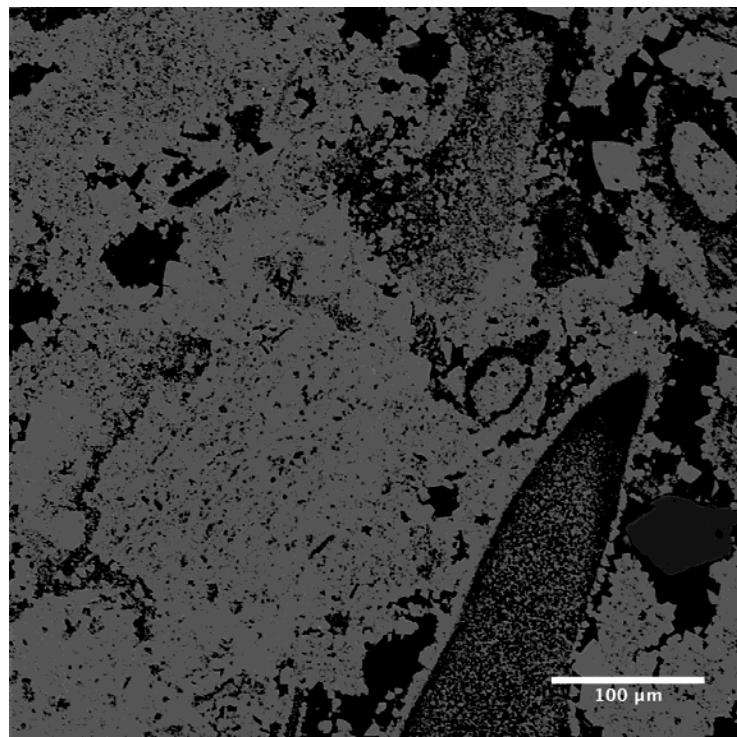


Figure 34. CT-6, 281-282 ft BLS. BSE image. Carbonate.

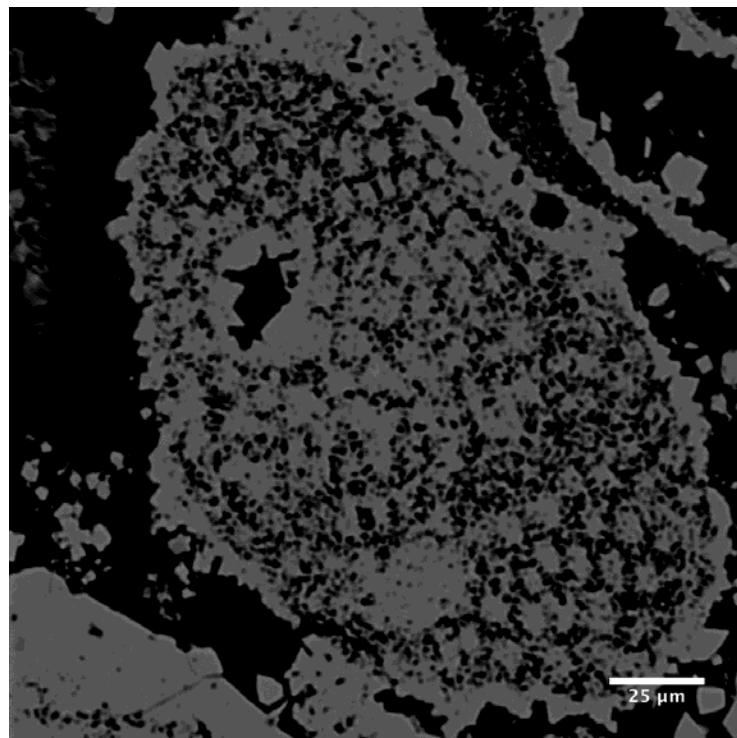


Figure 35. CT-6, 281-282 ft BLS. BSE image. Bryozoa.

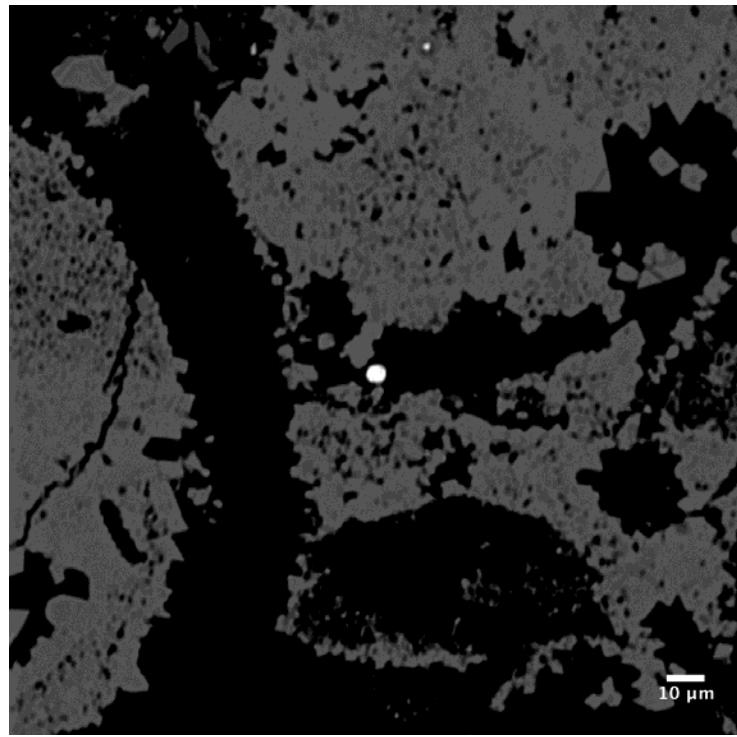


Figure 36. CT-6, 281-282 ft BLS. BSE image. Very small pyrite framboid.

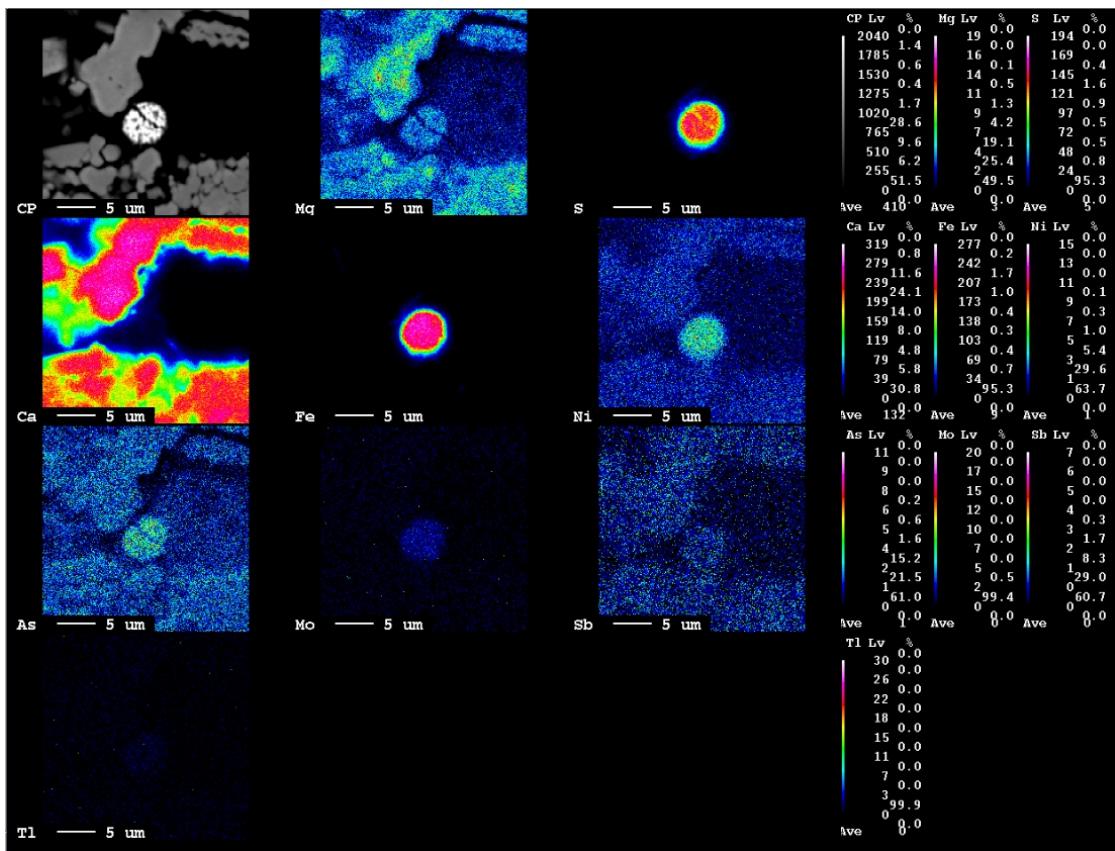


Figure 37. CT-6, 281-282 ft BLS. Element map of pyrite framboid. Note pyrite association with nickel and arsenic.

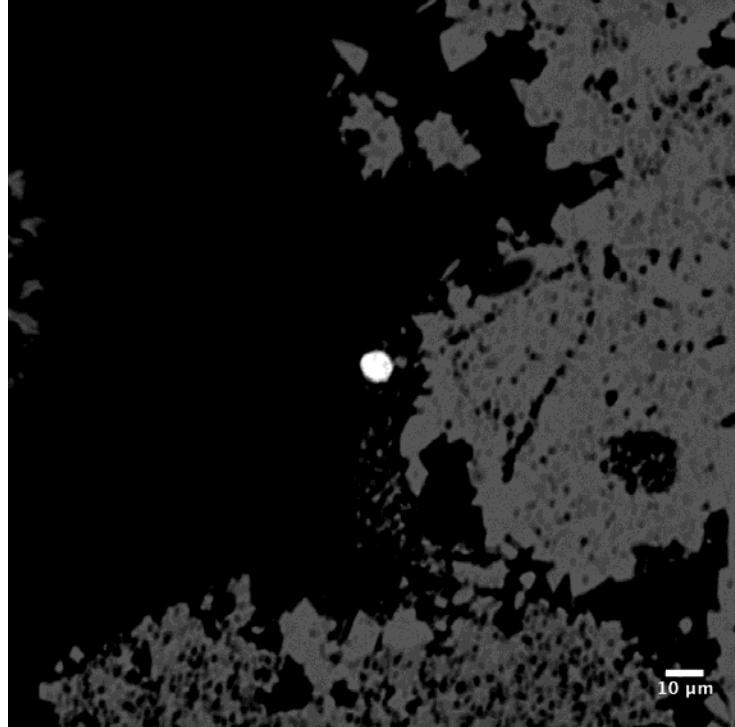


Figure 38. CT-6, 281-282 ft BLS. BSE image. Pyrite framboid.

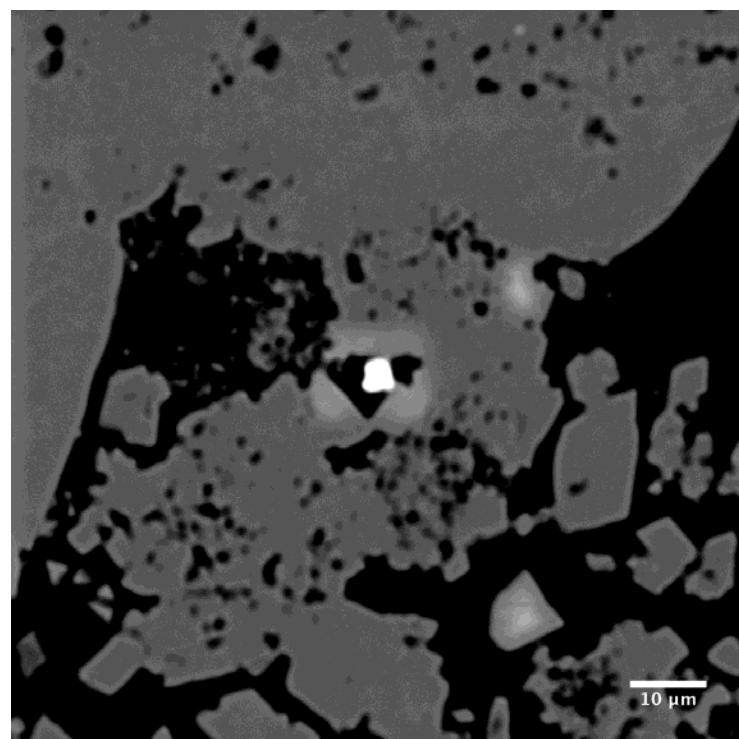


Figure 39. CT-6, 281-282 ft BLS. BSE image. Pyrite.

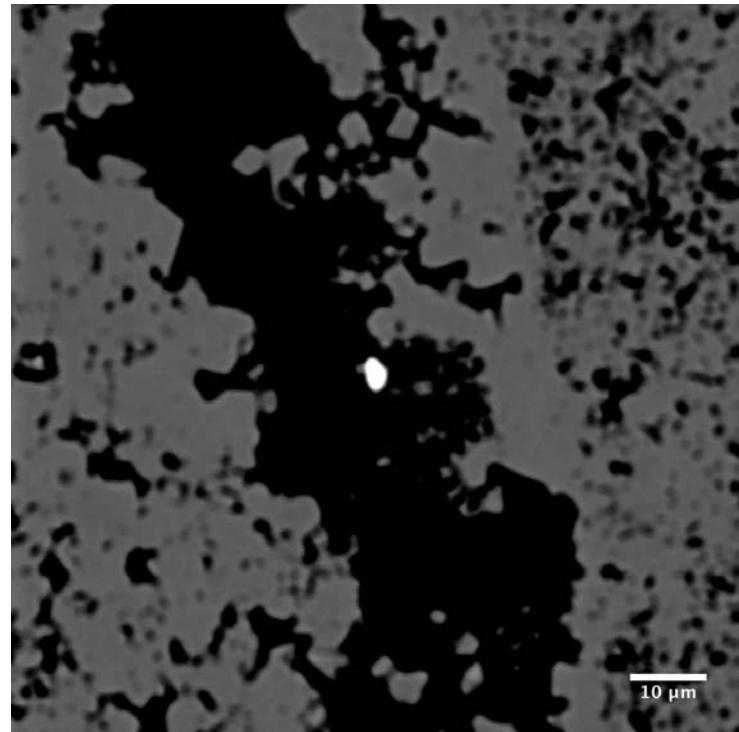


Figure 40. CT-6, 281-282 ft BLS. BSE image. Pyrite.

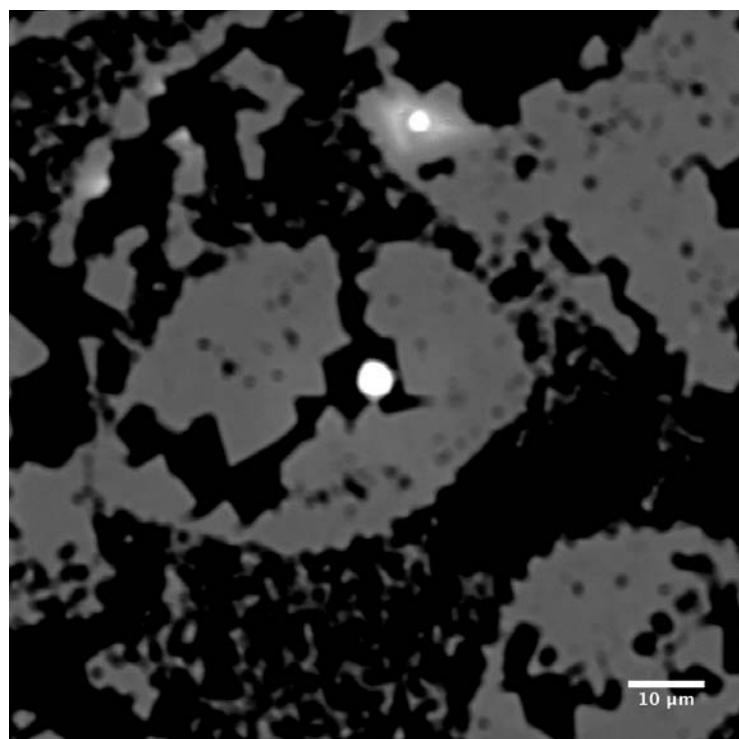


Figure 41. CT-6, 281-282 ft BLS. BSE image. Pyrite framboid.

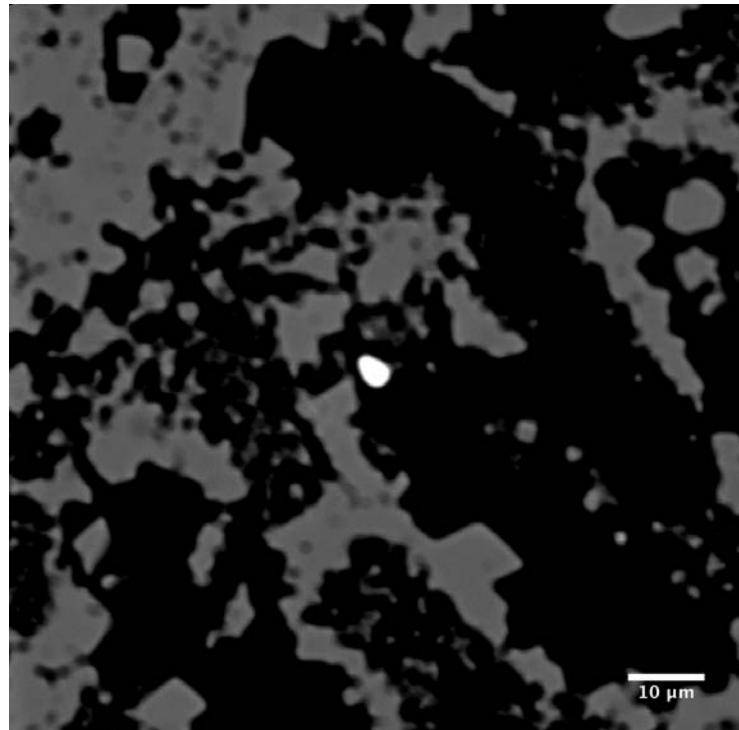


Figure 42. CT-6, 281-282 ft BLS. BSE image. Chalcopyrite.

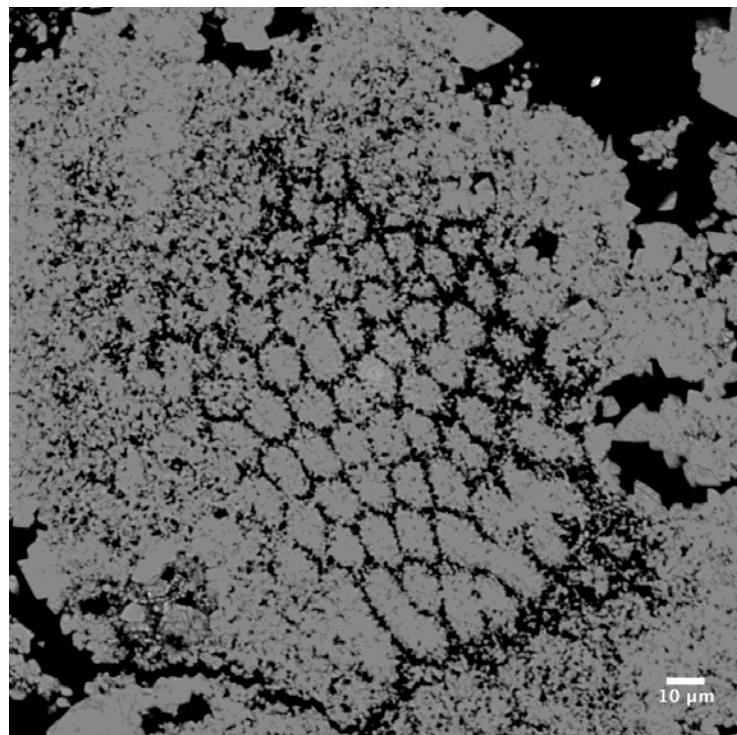


Figure 43. CT-4, 282.5-283.5 ft BLS. BSE image. Bryozoa.

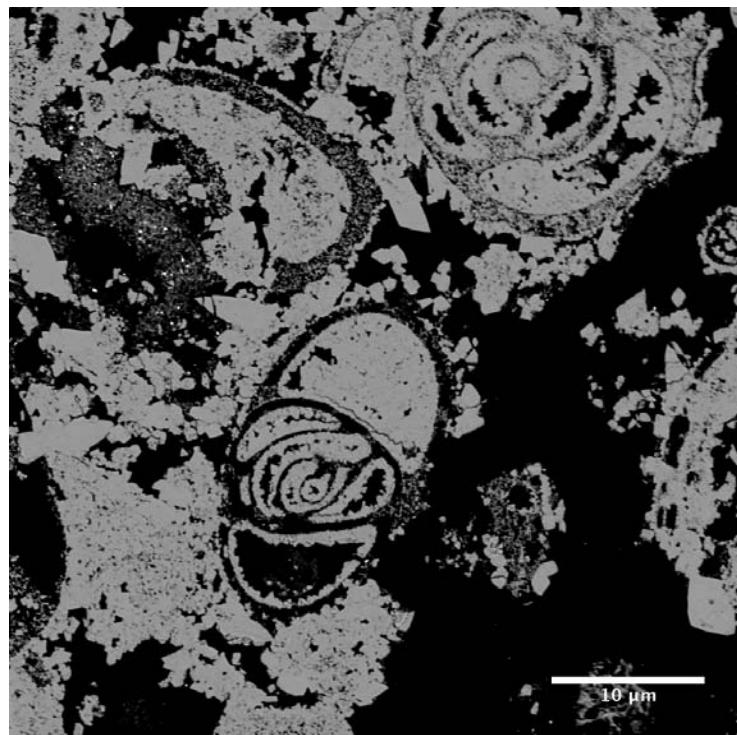


Figure 44. CT-4, 282.5-283.5 ft BLS. BSE image. Spar filled miliolid.

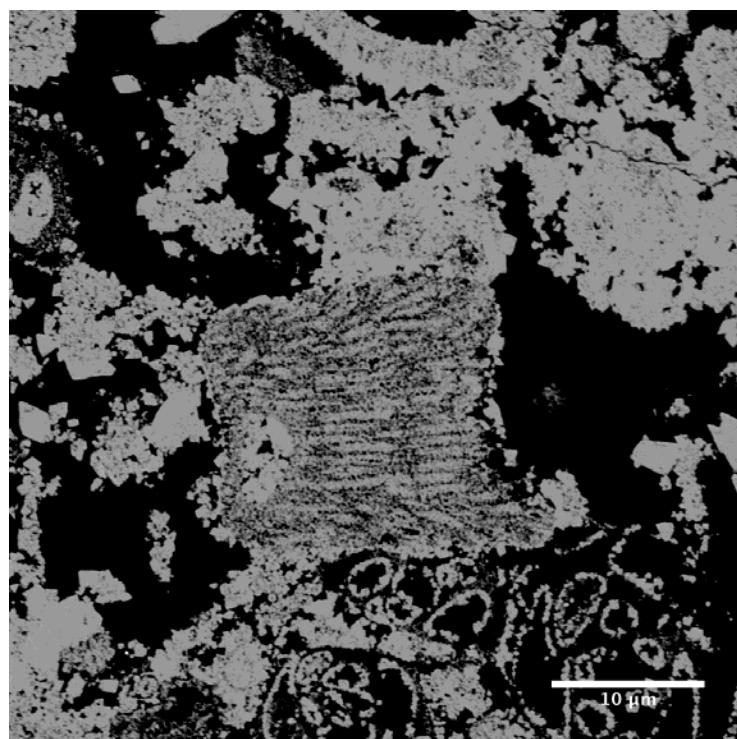


Figure 45. CT-4, 282.5-283.5 ft BLS. BSE image. Algal fragment.

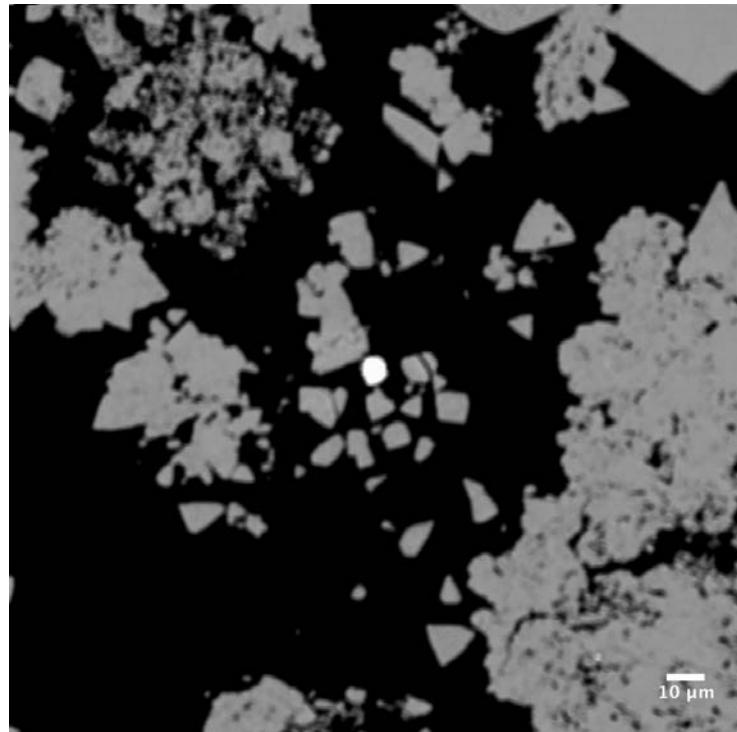


Figure 46. CT-4, 282.5-283.5 ft BLS. BSE image. Pyrite framboid.

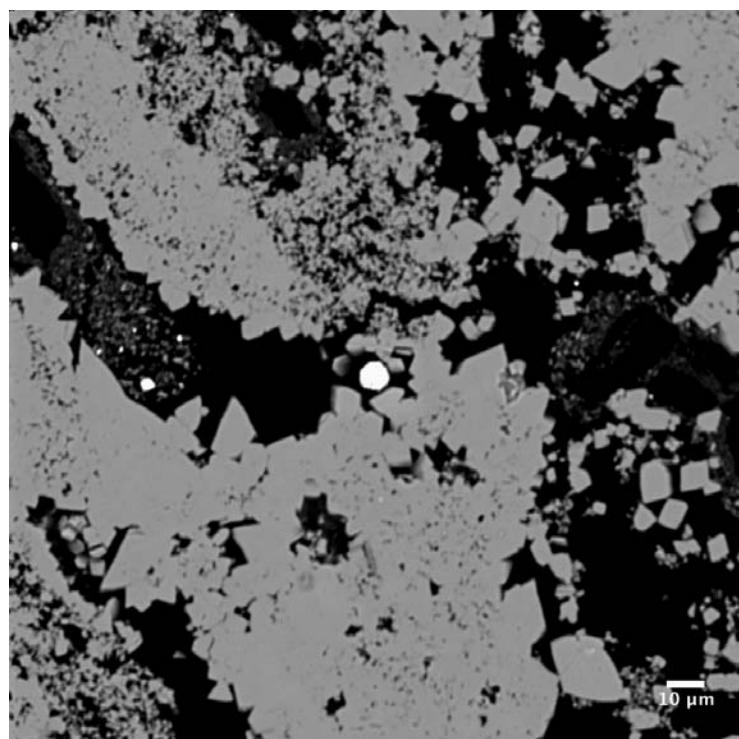


Figure 47. CT-7, 285-286 ft BLS. BSE image. Pyrite framboid.

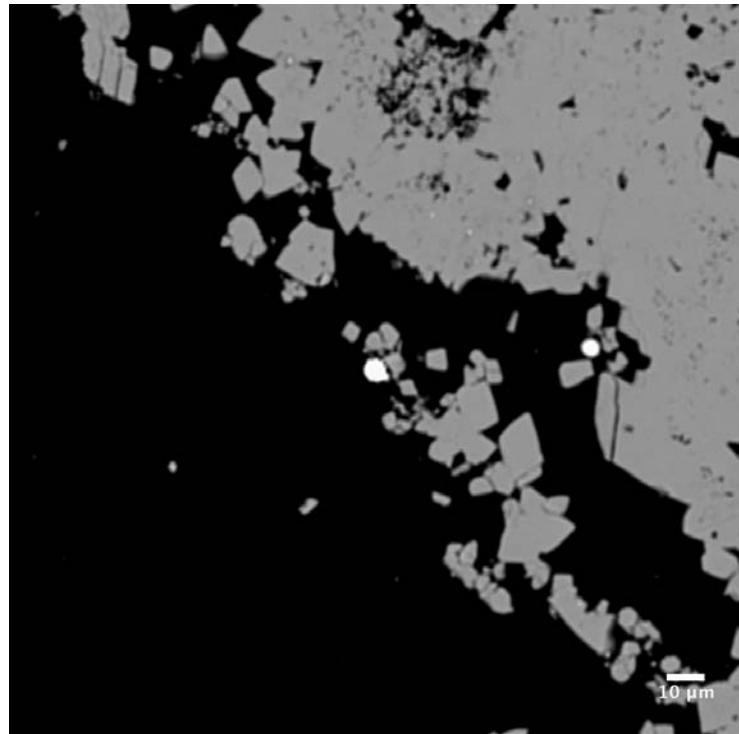


Figure 48. CT-7, 285-286 ft BLS. BSE image. Pyrite framboids.

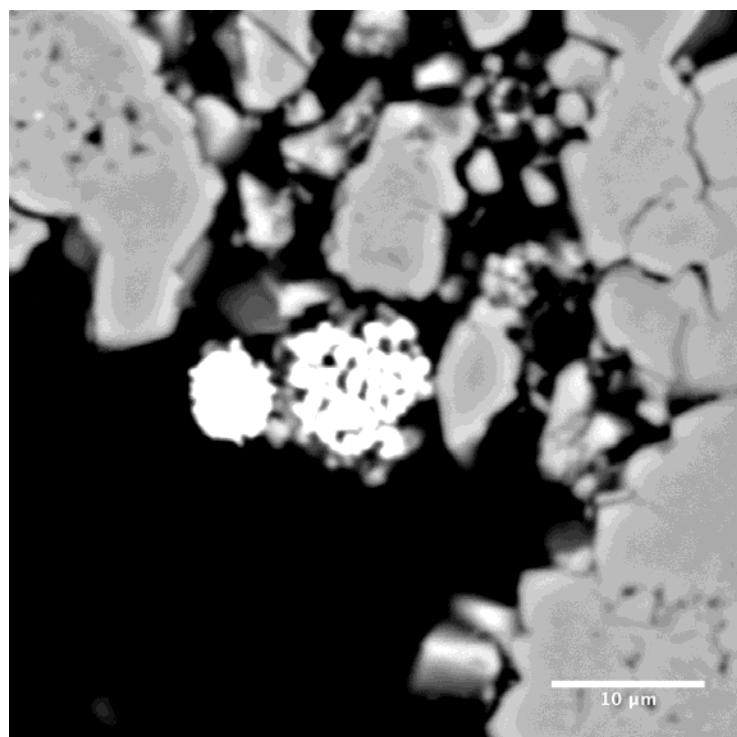


Figure 49. CT-7, 285-286 ft BLS. BSE image. Pyrite framboids.

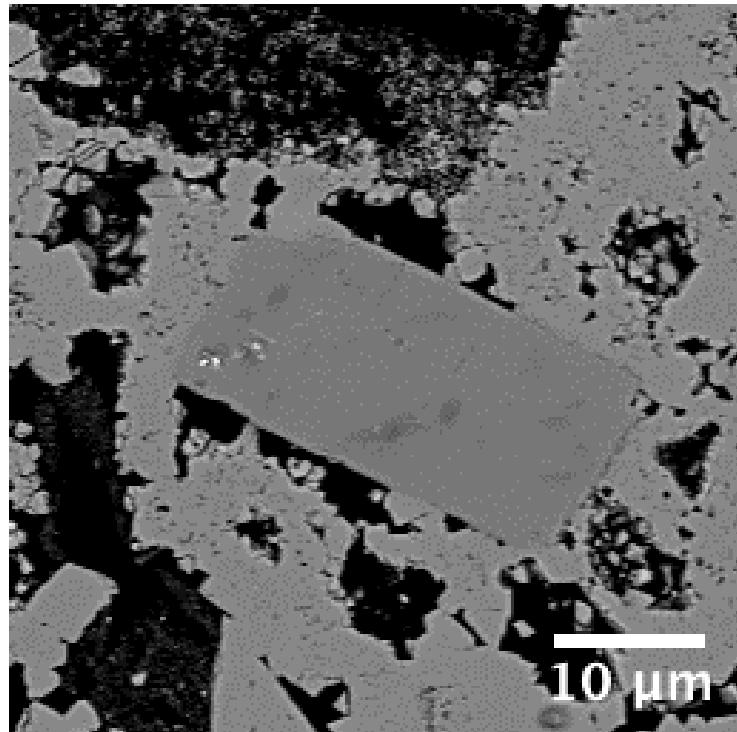


Figure 50. CT-7, 285-286 ft BLS. BSE image. Carbonate.

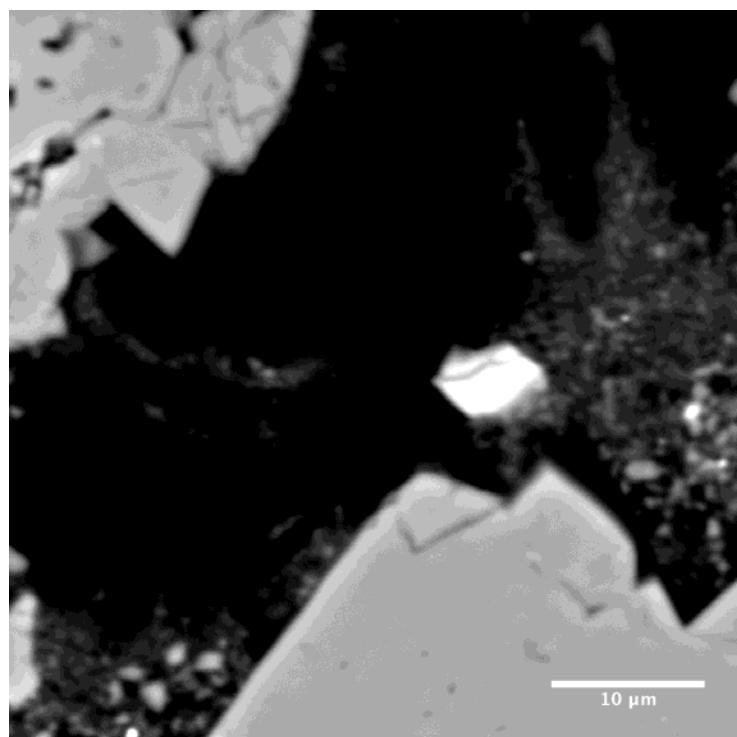


Figure 51. CT-7, 285-286 ft BLS. BSE image. Phosphate grain.

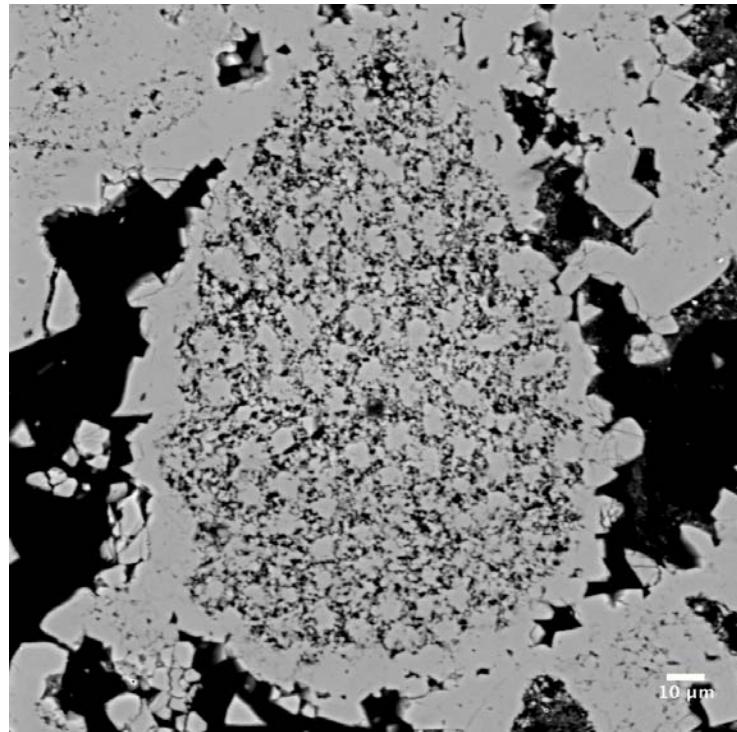


Figure 52. CT-7, 285-286 ft BLS. BSE image. Bryozoa surrounded by spar.

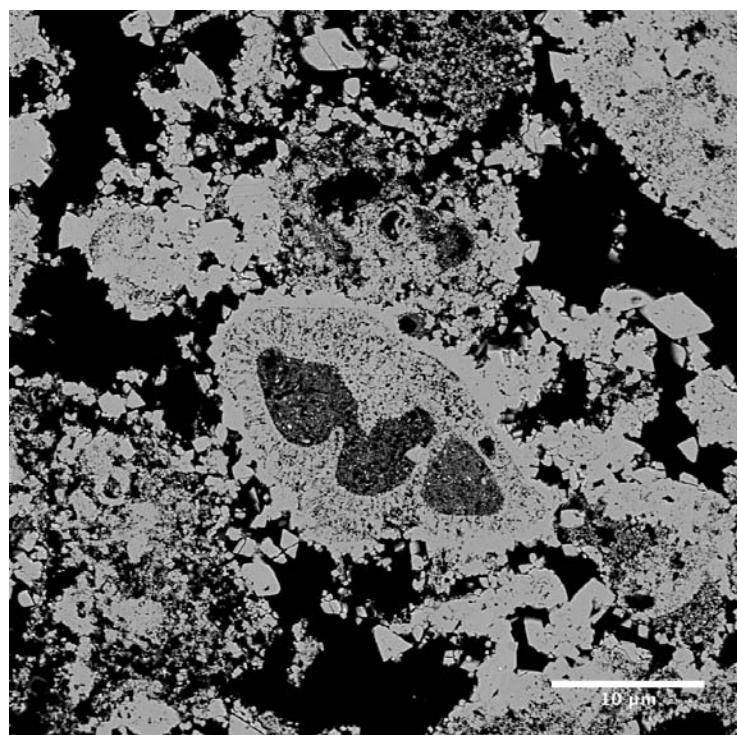


Figure 53. CT-7, 285-286 ft BLS. BSE image. Recrystallized foraminifera.

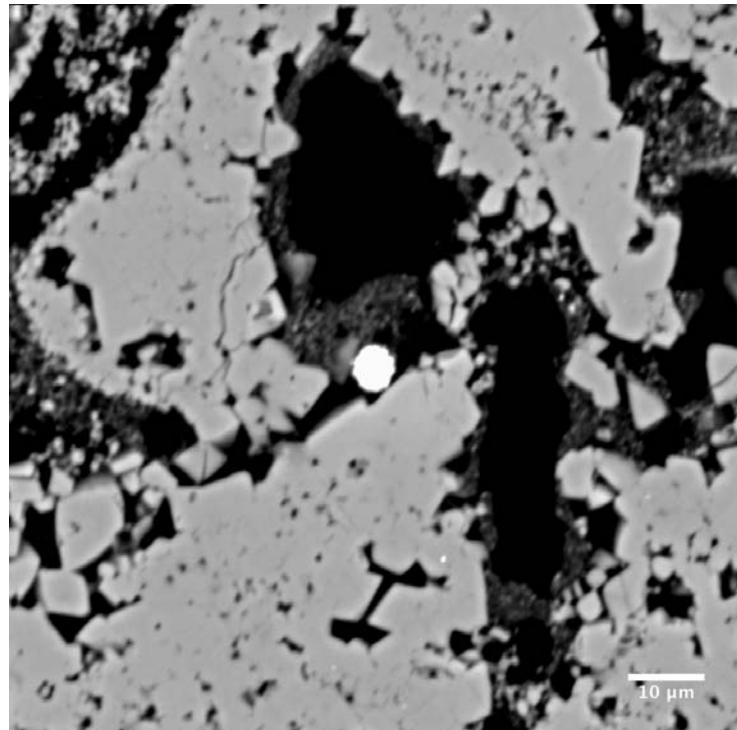


Figure 54. CT-7, 285-286 ft BLS. BSE image. Pyrite framboid.

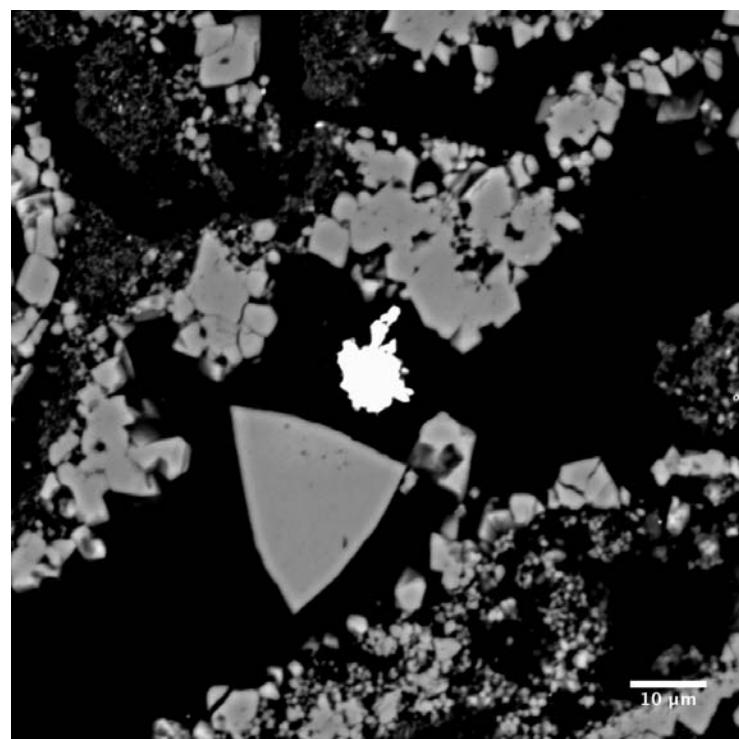


Figure 55. CT-7, 285-286 ft BLS. BSE image. Pyrite framboid.

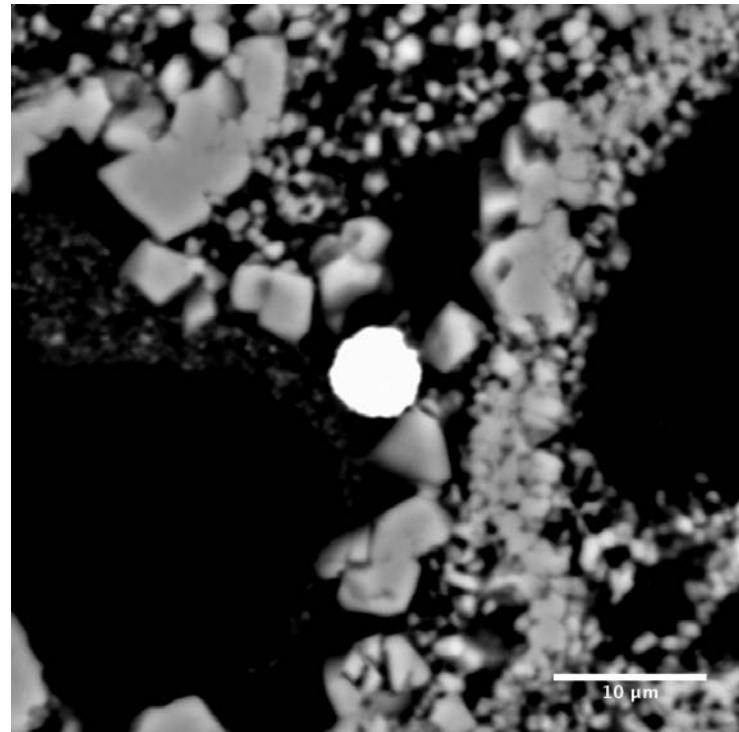


Figure 56. CT-7, 285-286 ft BLS. BSE image. Pyrite framboid.

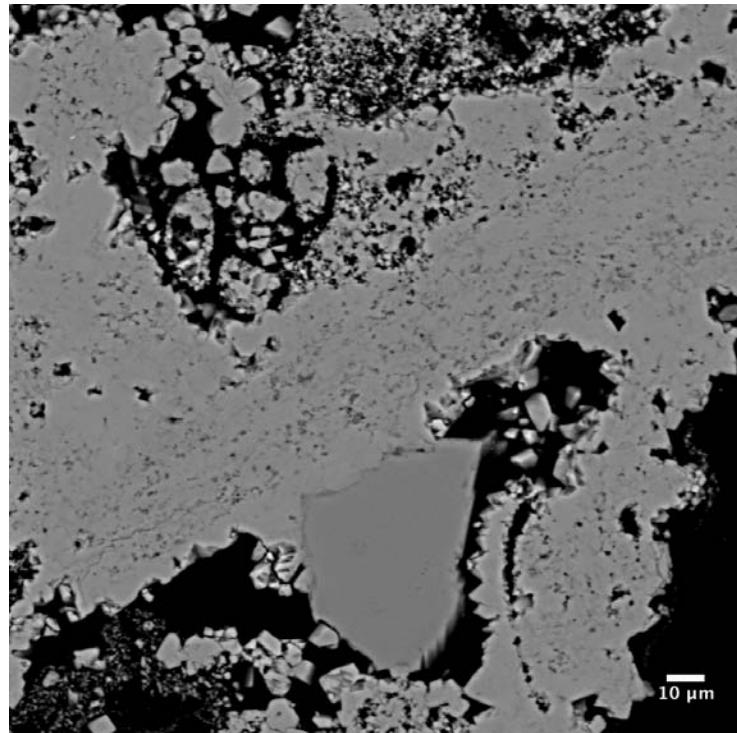


Figure 57. CT-7, 285-286 ft BLS. BSE image. Quartz grain in carbonate.

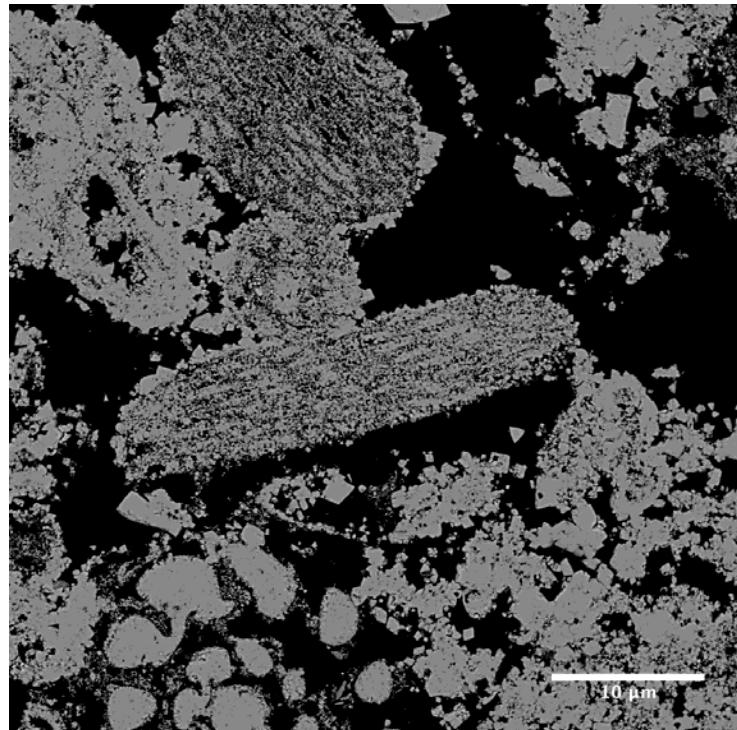


Figure 58. CT-9, 286-287 ft BLS. BSE image. Possible algal fragments.

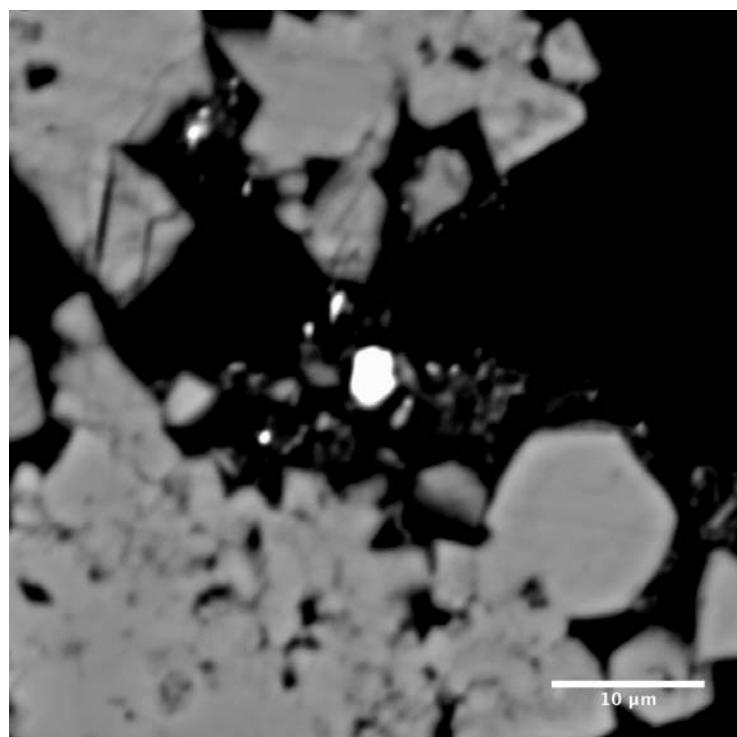


Figure 59. CT-9, 286-287 ft BLS. BSE image. Pyrite.

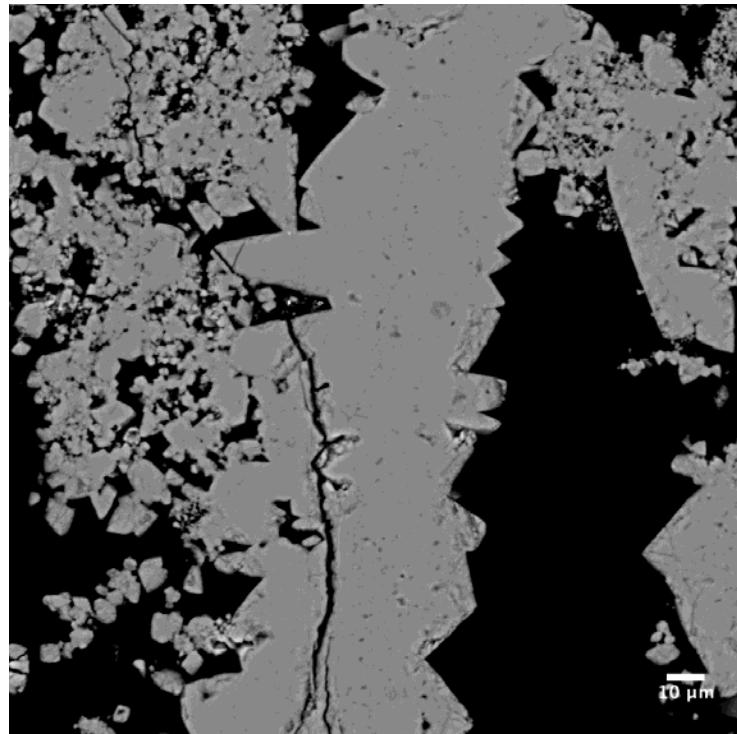


Figure 60. CT-9, 286-287 ft BLS. BSE image. Spar.

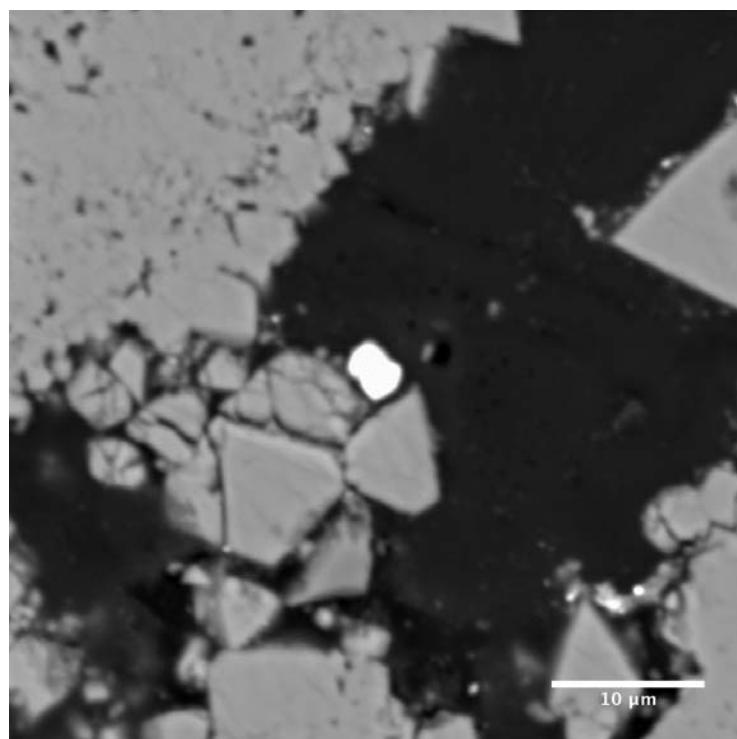


Figure 61. CT-9, 286-287 ft BLS. BSE image. Nickel iron sulfide, possible pentlandite.

Unleached samples

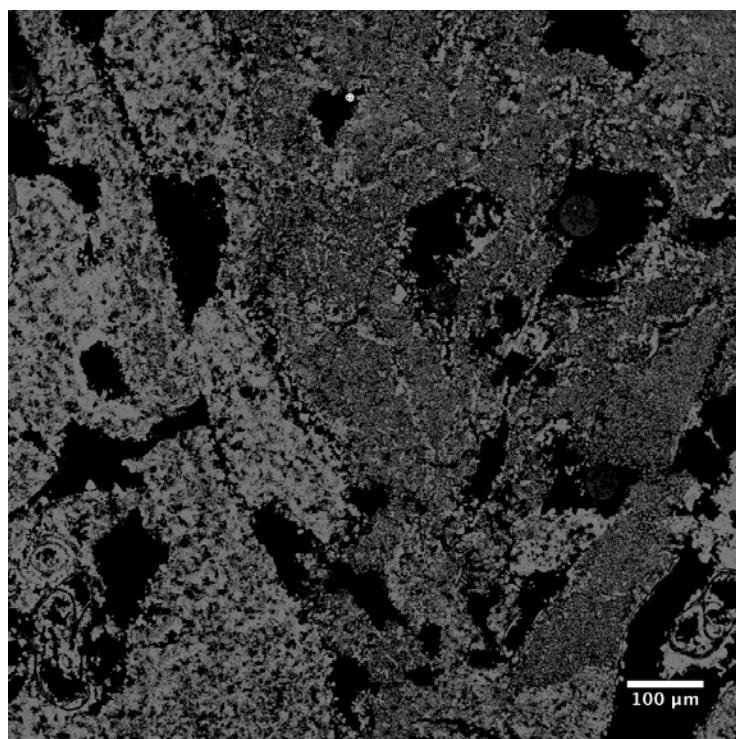


Figure 62. 6R, 274 ft BLS. BSE image. Carbonate.

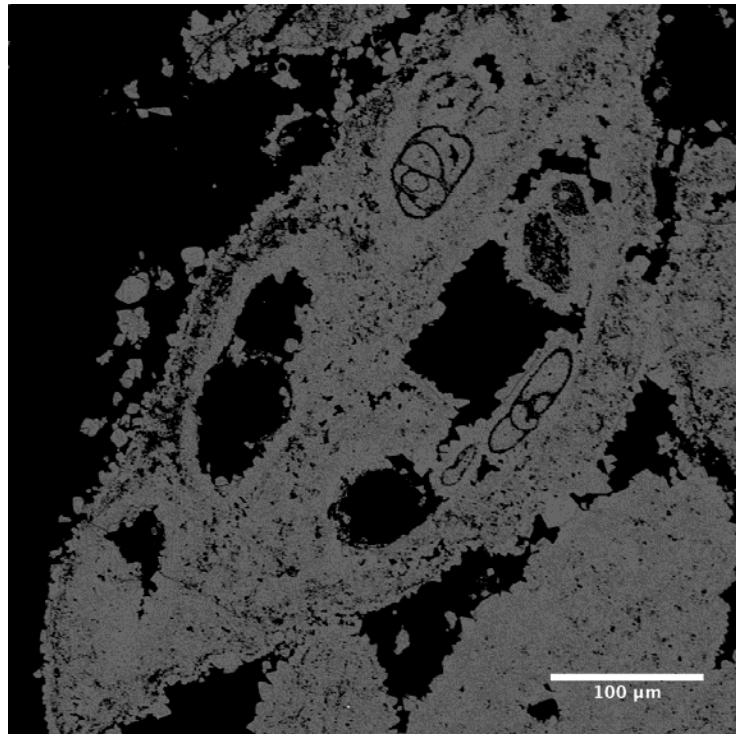


Figure 63. 6R, 274 ft BLS. BSE image. Foraminifer.

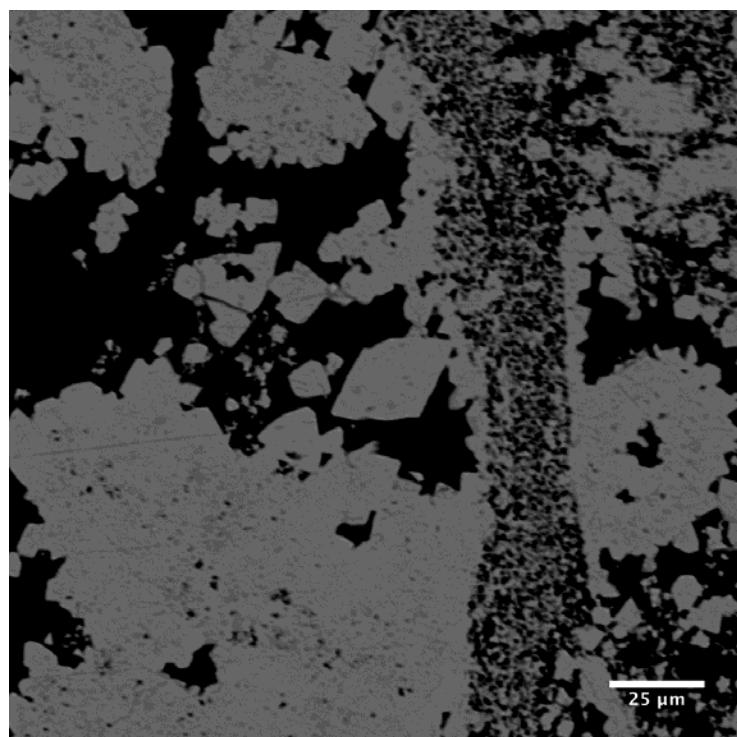


Figure 64. 6R, 274 ft BLS. BSE image. Carbonate.

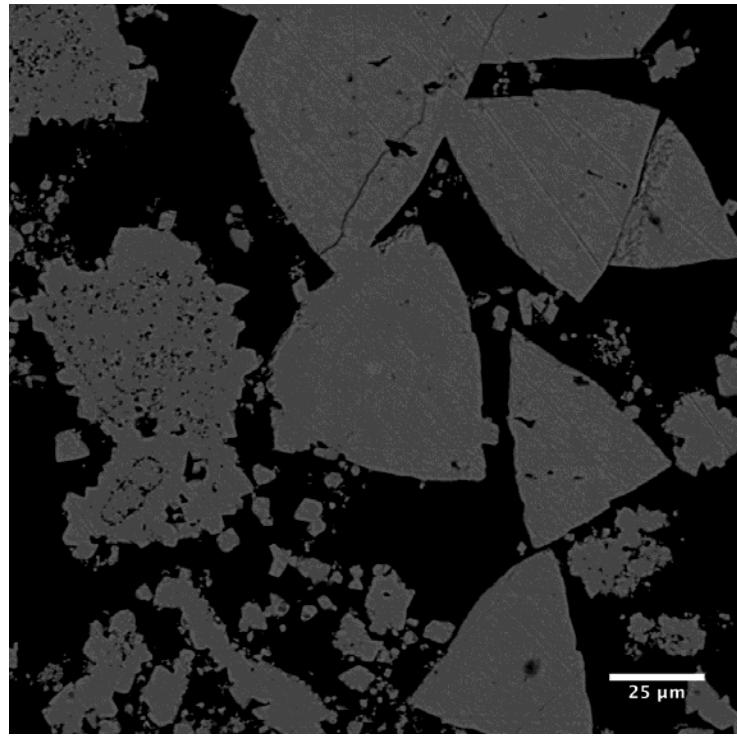


Figure 65. 6R, 274 ft BLS. BSE image. Spar.

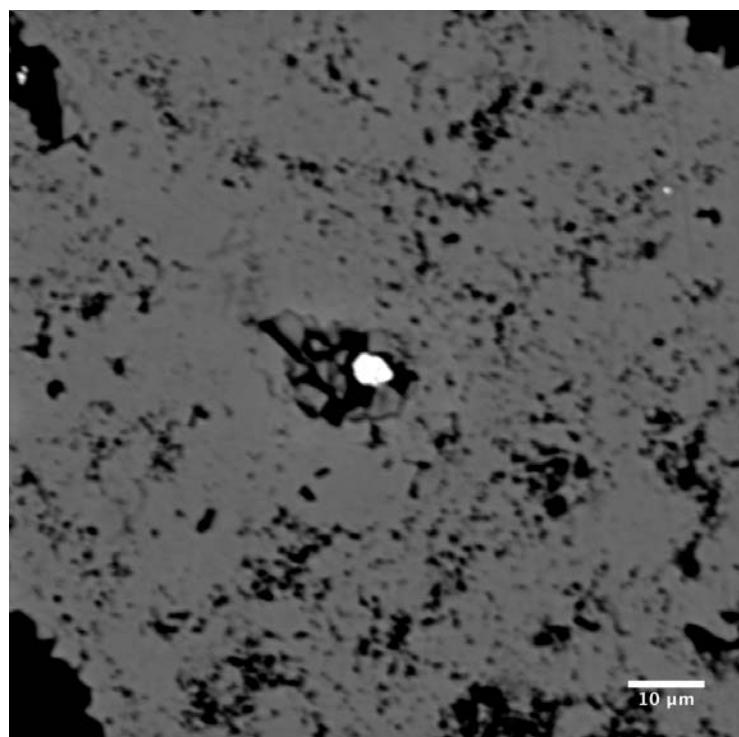


Figure 66. 6R, 274 ft BLS. BSE image. Pyrite.

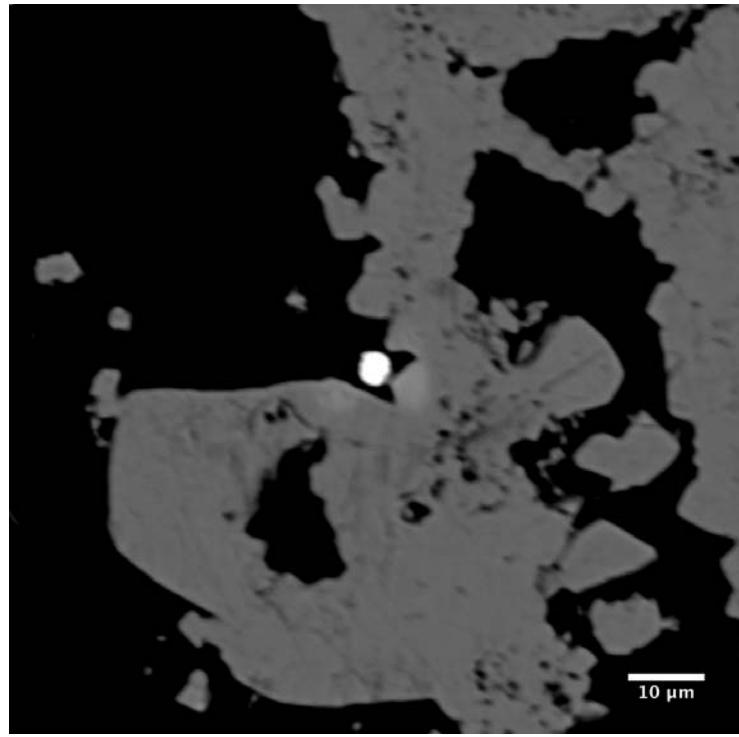


Figure 67. 6R, 274 ft BLS. BSE image. Pyrite framboid.

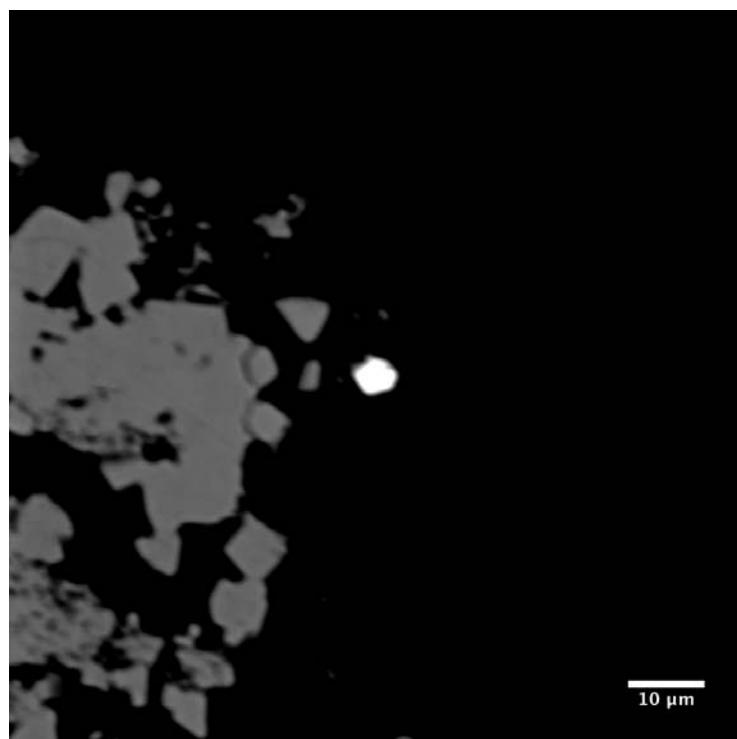


Figure 68. 6R, 274 ft BLS. BSE image. Chalcopyrite.

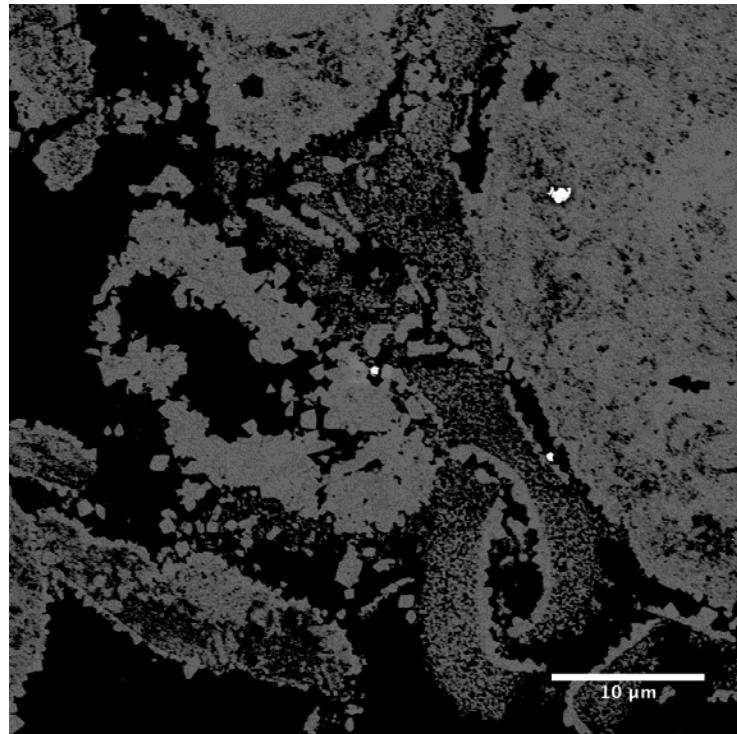


Figure 69. 6R, 274 ft BLS. BSE image. Carbonate and pyrite frambooids.

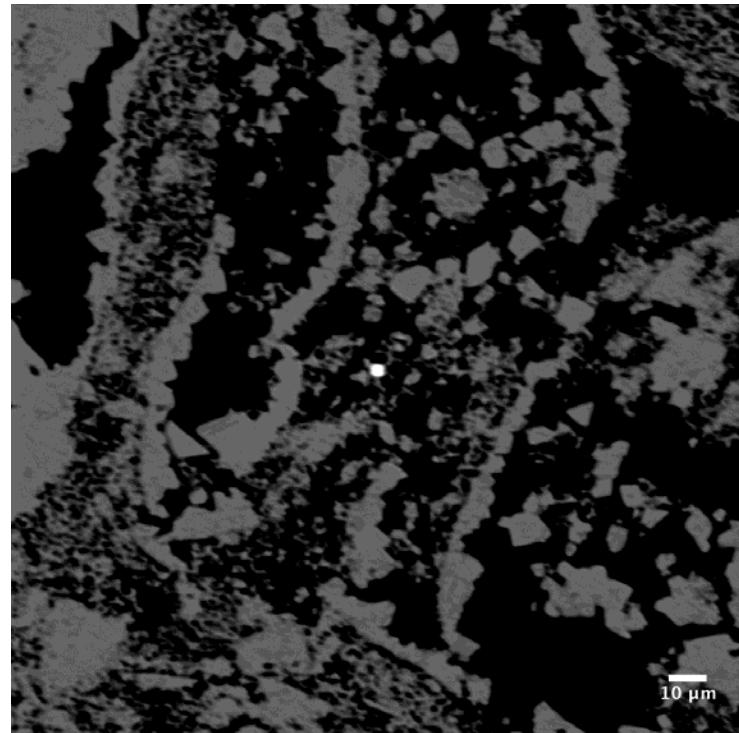


Figure 70. 6R, 274 ft BLS. BSE image. Pyrite framboid.

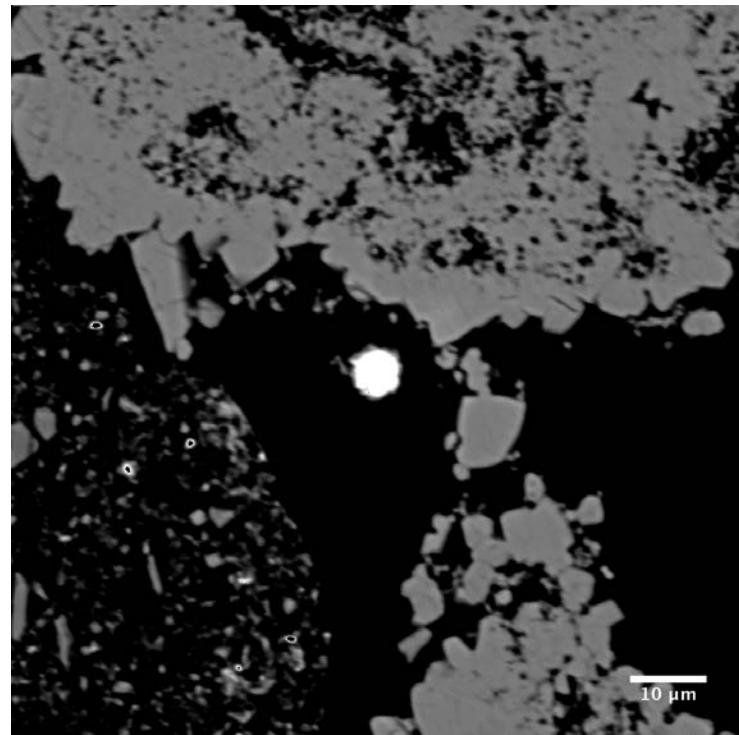


Figure 71. 6R, 274 ft BLS. BSE image. Pyrite framboid.

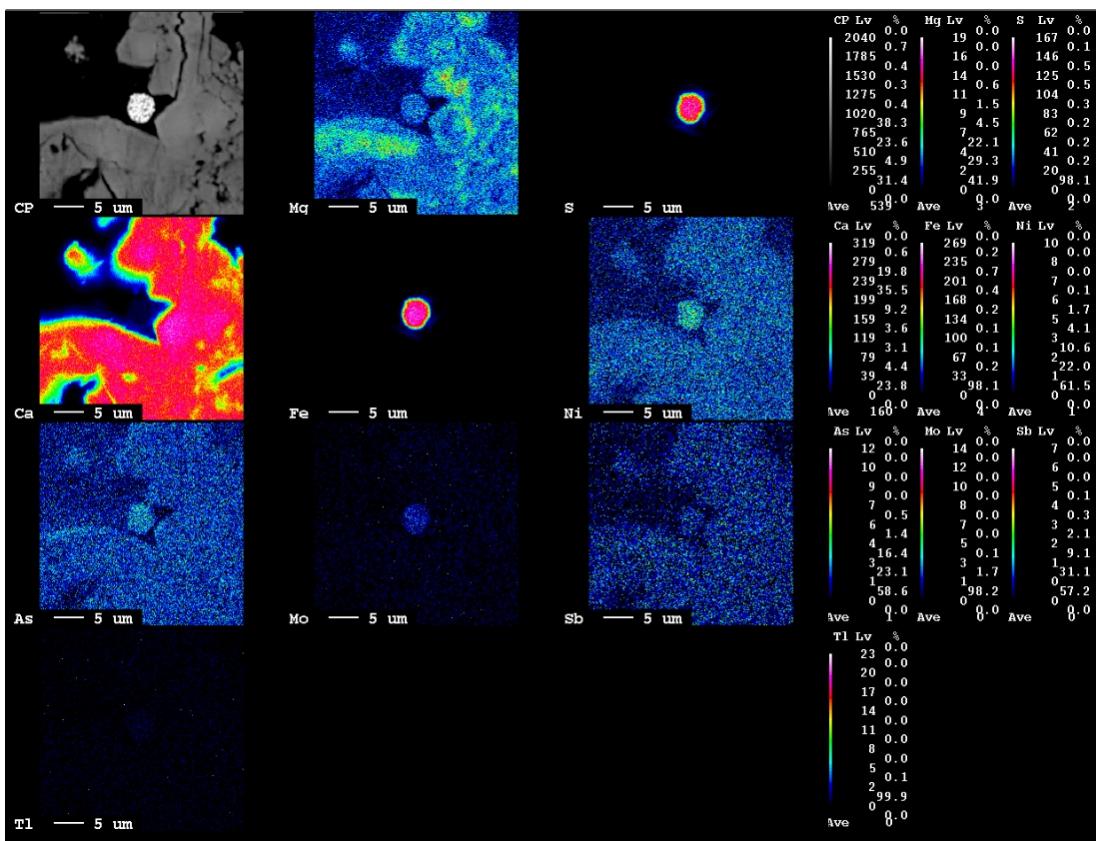


Figure 72. 6R, 274 ft BLS. Element map of pyrite framboid in carbonate matrix. Note pyrite association with nickel and arsenic.

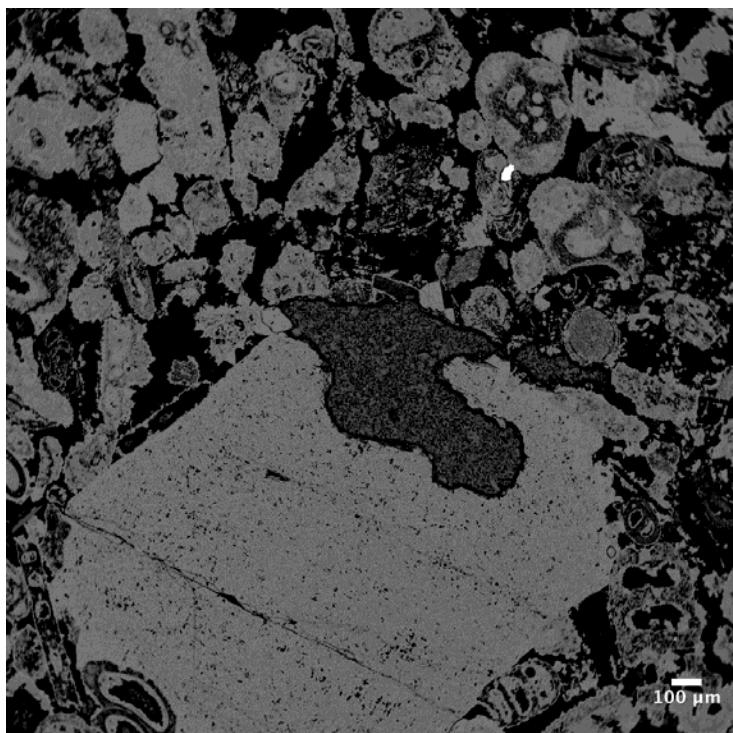


Figure 73. 6R, 275-276 ft BLS. BSE image. Carbonate.

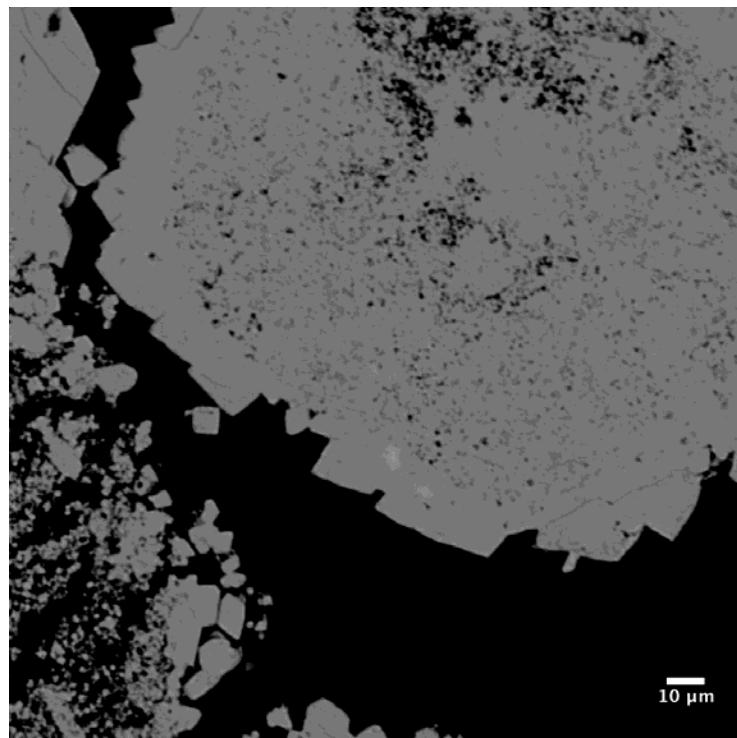


Figure 74. 6R, 275-276 ft BLS. BSE image. Carbonate grain surrounded with spar.

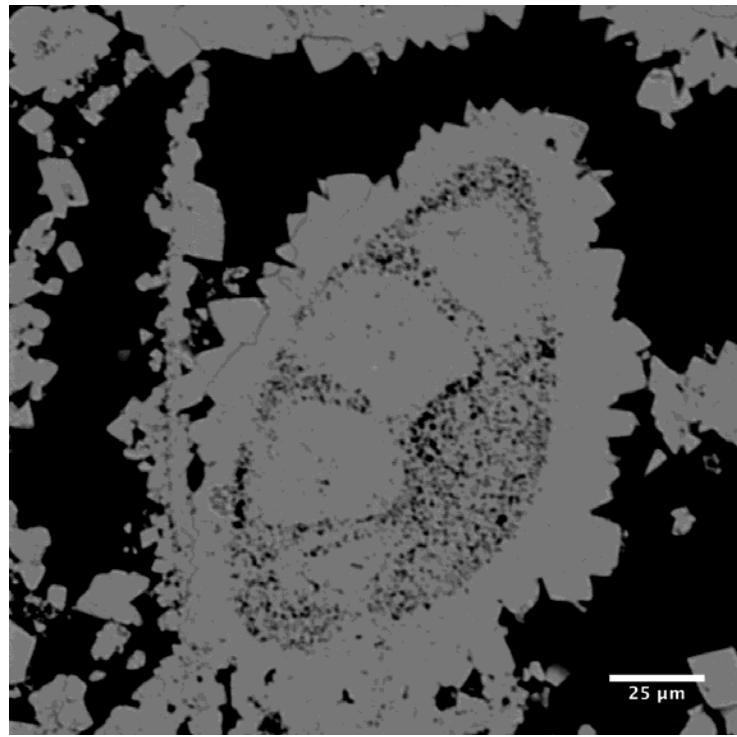


Figure 75. 6R, 275-276 ft BLS. BSE image. Recrystallized foraminifera.

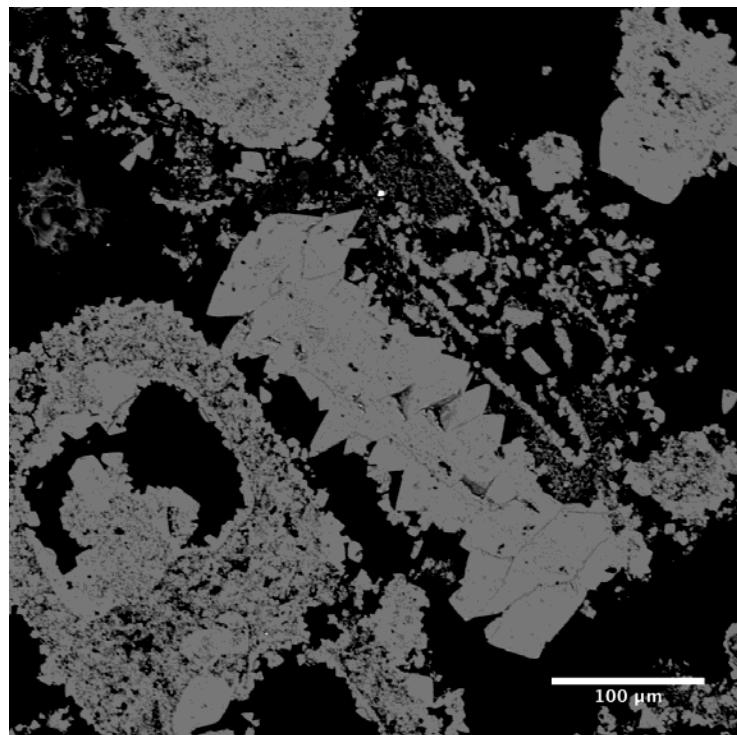


Figure 76. 6R, 275-276 ft BLS. BSE image. Dog tooth spar.

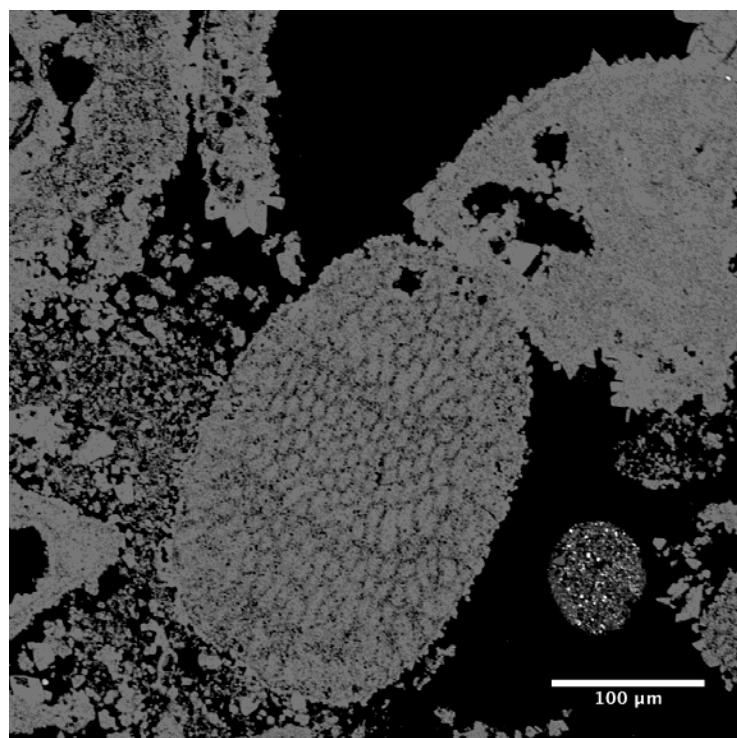


Figure 77. 6R, 275-276 ft BLS. BSE image. Bryozoa.

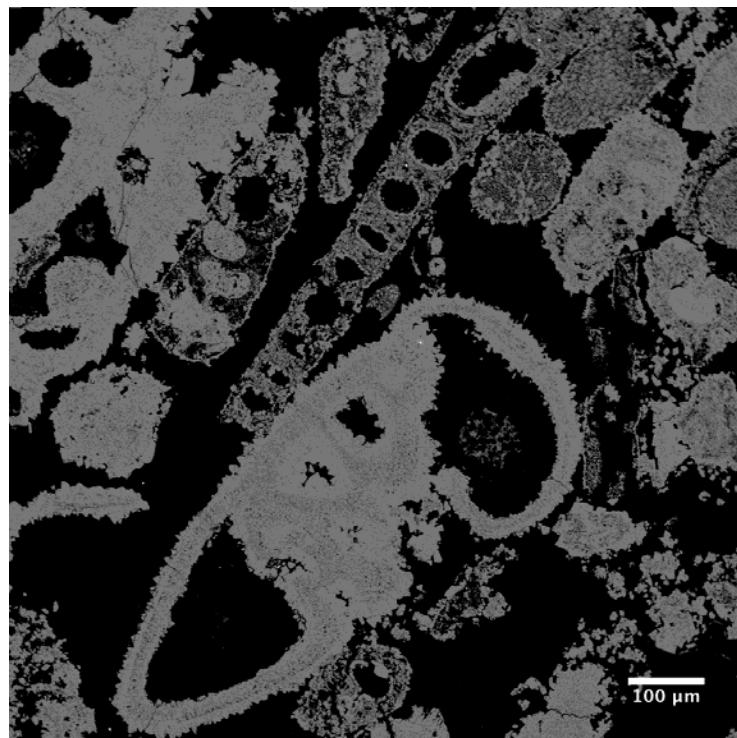


Figure 78. 6R, 275-276 ft BLS. BSE image. Foraminifer.

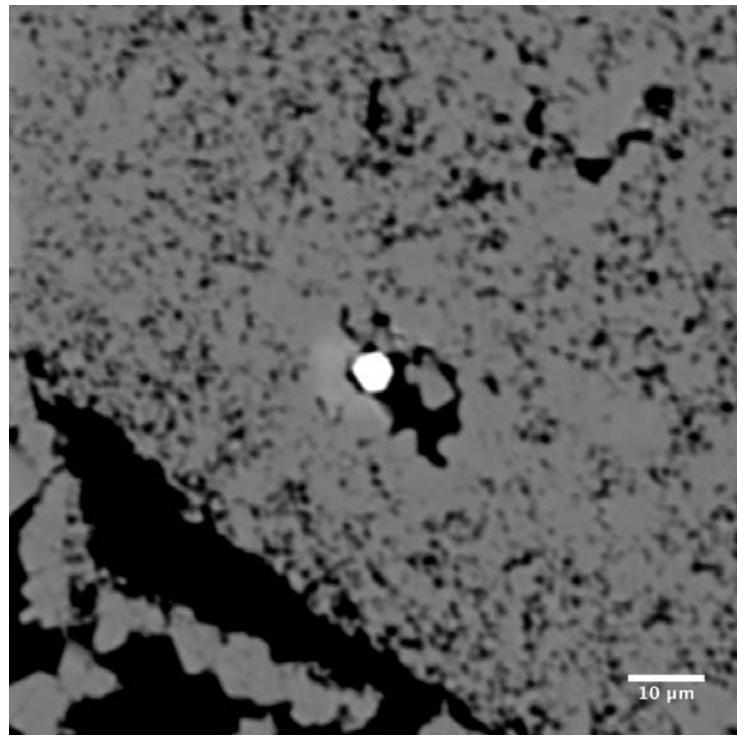


Figure 79. 6R, 275-276 ft BLS. BSE image. Pyrite crystal.

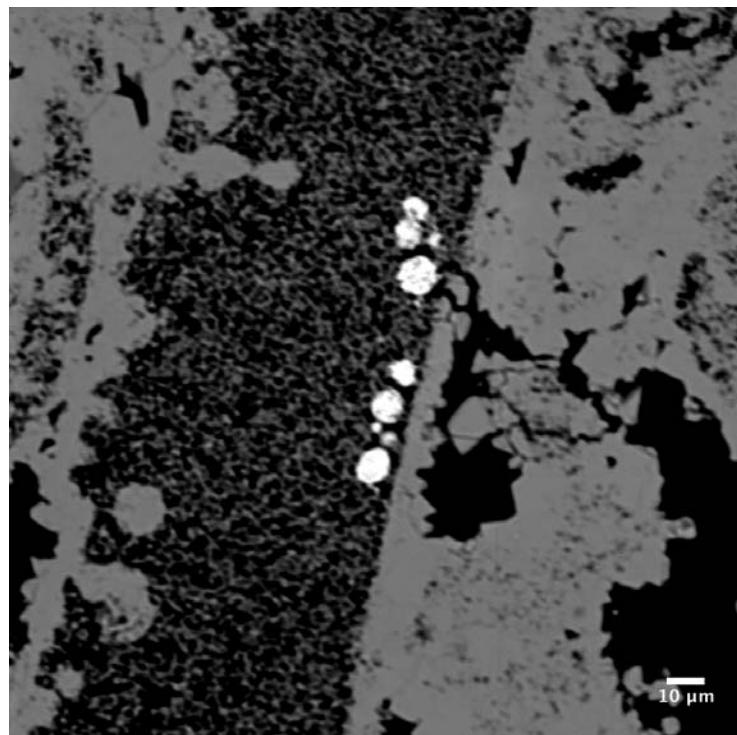


Figure 80. 6R, 275-276 ft BLS. BSE image. Pyrite framboids.

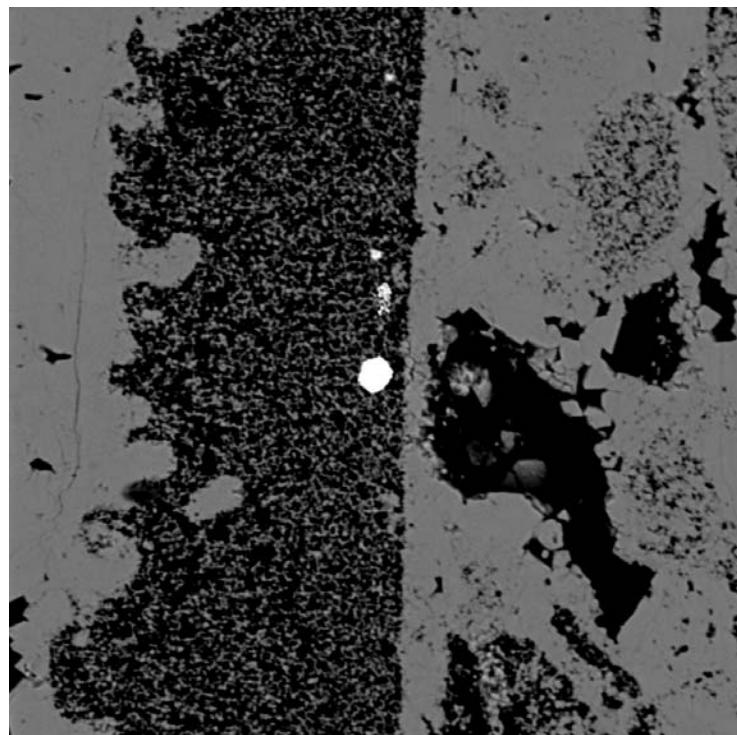


Figure 81. 6R, 275-276 ft BLS. BSE image. Pyrite framboid.

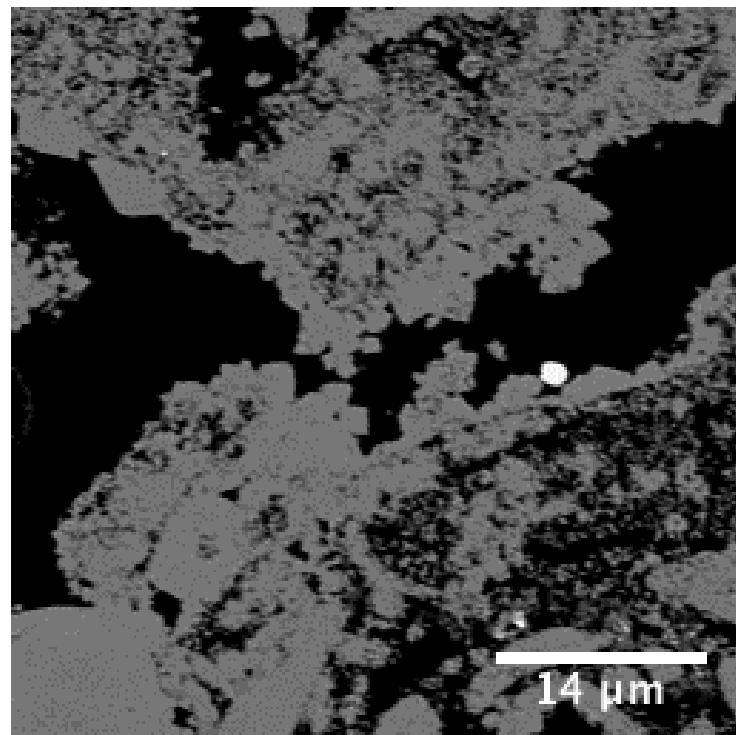


Figure 82. 6R, 275-276 ft BLS. BSE image. Pyrite framboid.

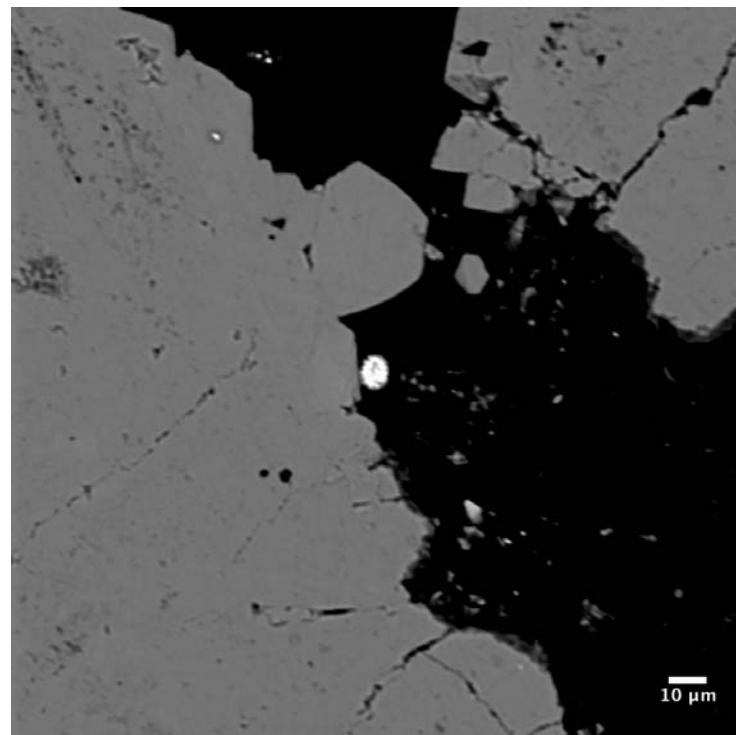


Figure 83. 6R, 275-276 ft BLS. BSE image. Pyrite Framboid.

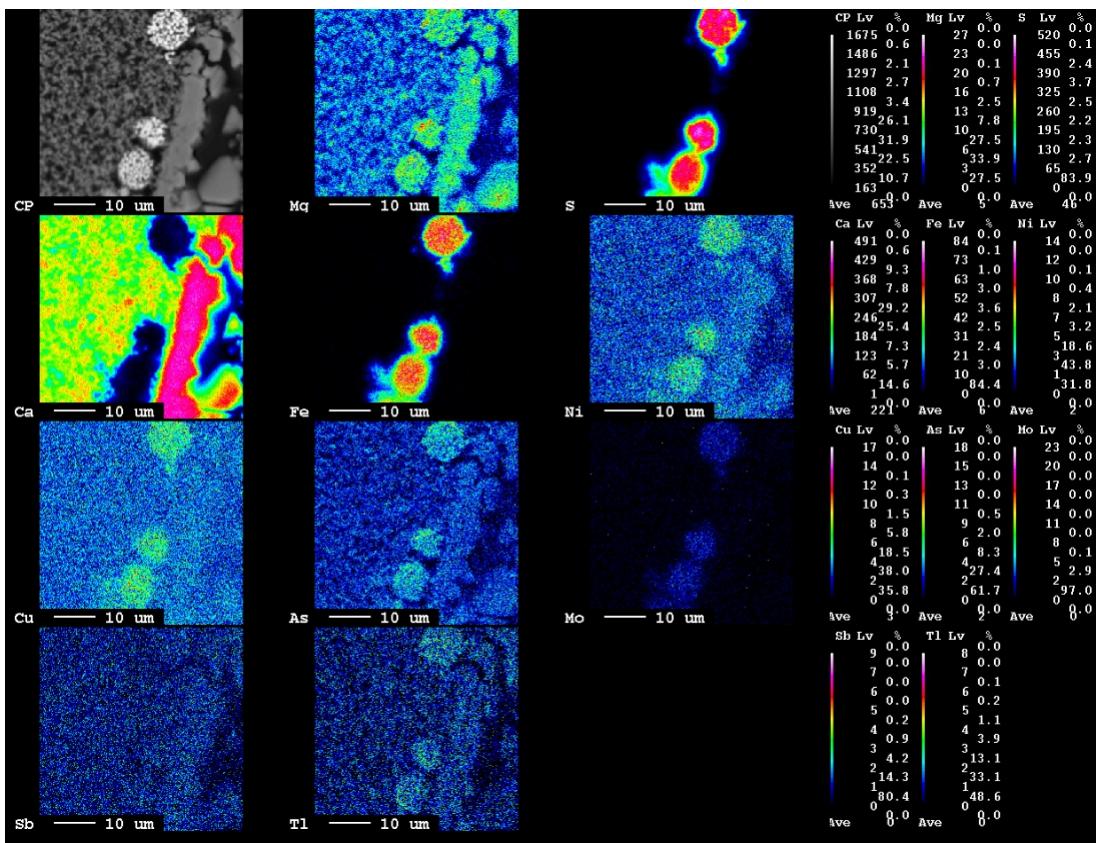


Figure 84. 6R, 275-276 ft BLS. Element map of pyrite framboids. Note pyrite association with cooper, nickel, arsenic and thallium.

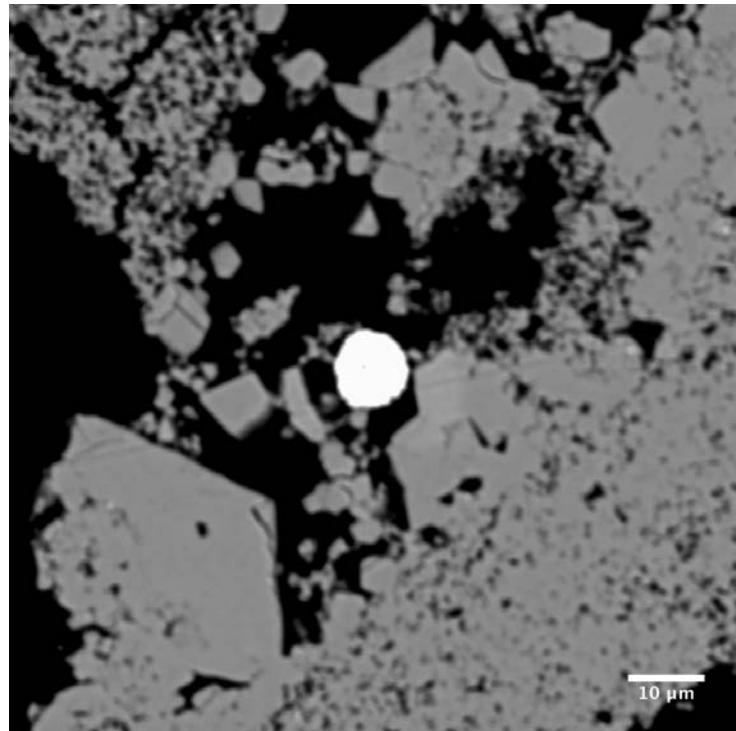


Figure 85. 6R, 278-279 ft BLS. BSE image. Pyrite.

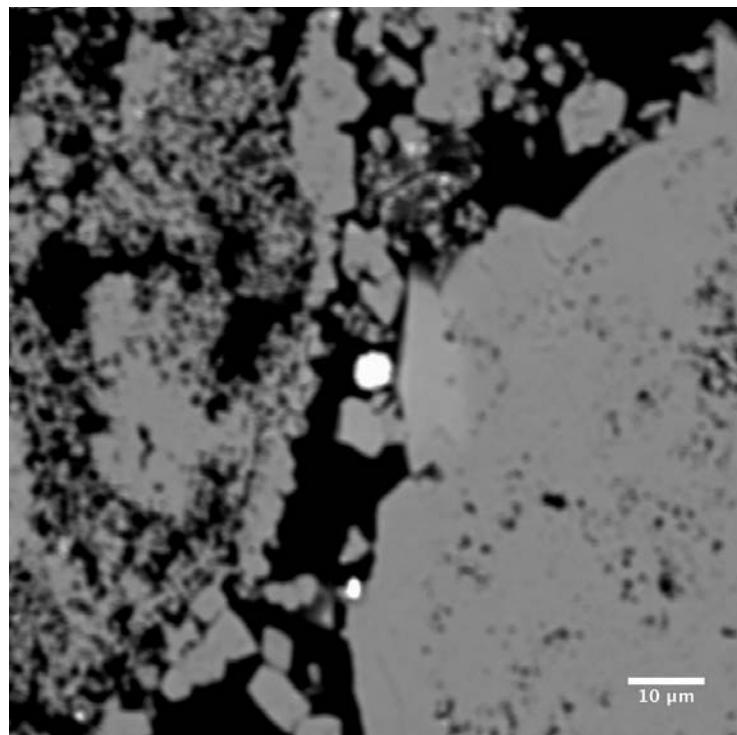


Figure 86. 6R, 278-279 ft BLS. BSE image. Pyrite.

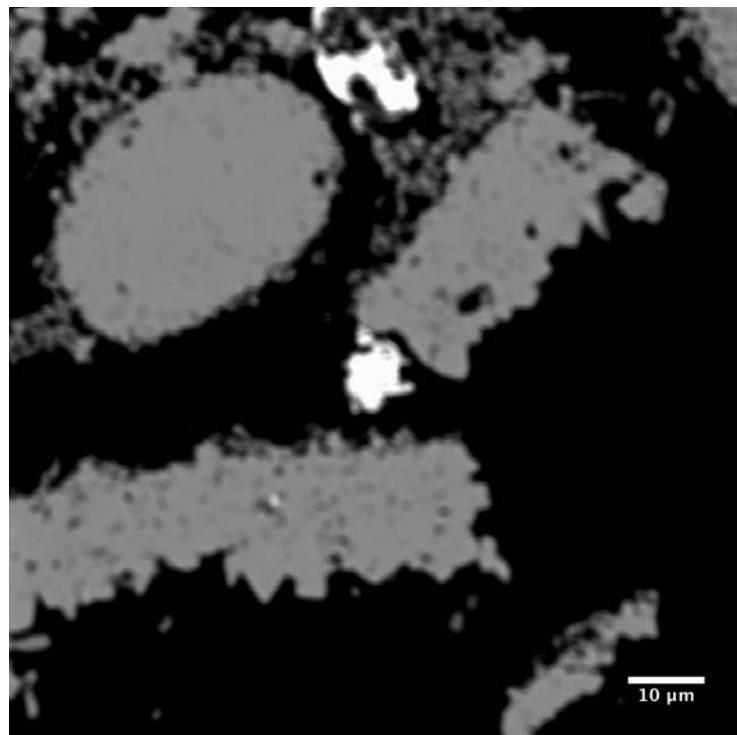


Figure 87. 6R, 278-279 ft BLS. BSE image. Peloid, spar and pyrite.

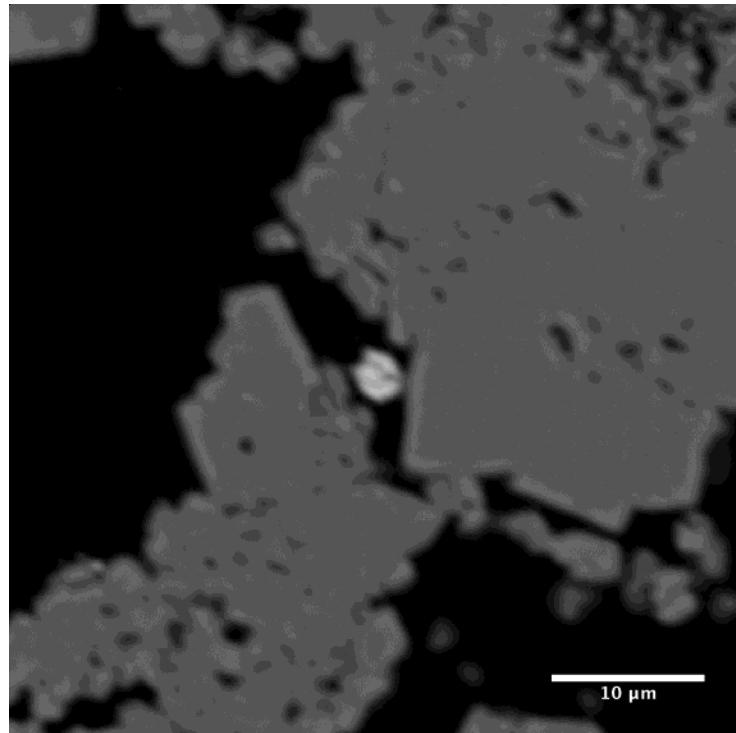


Figure 88. 6R, 278-279 ft BLS. BSE image. Pyrite in spar with carbonate.

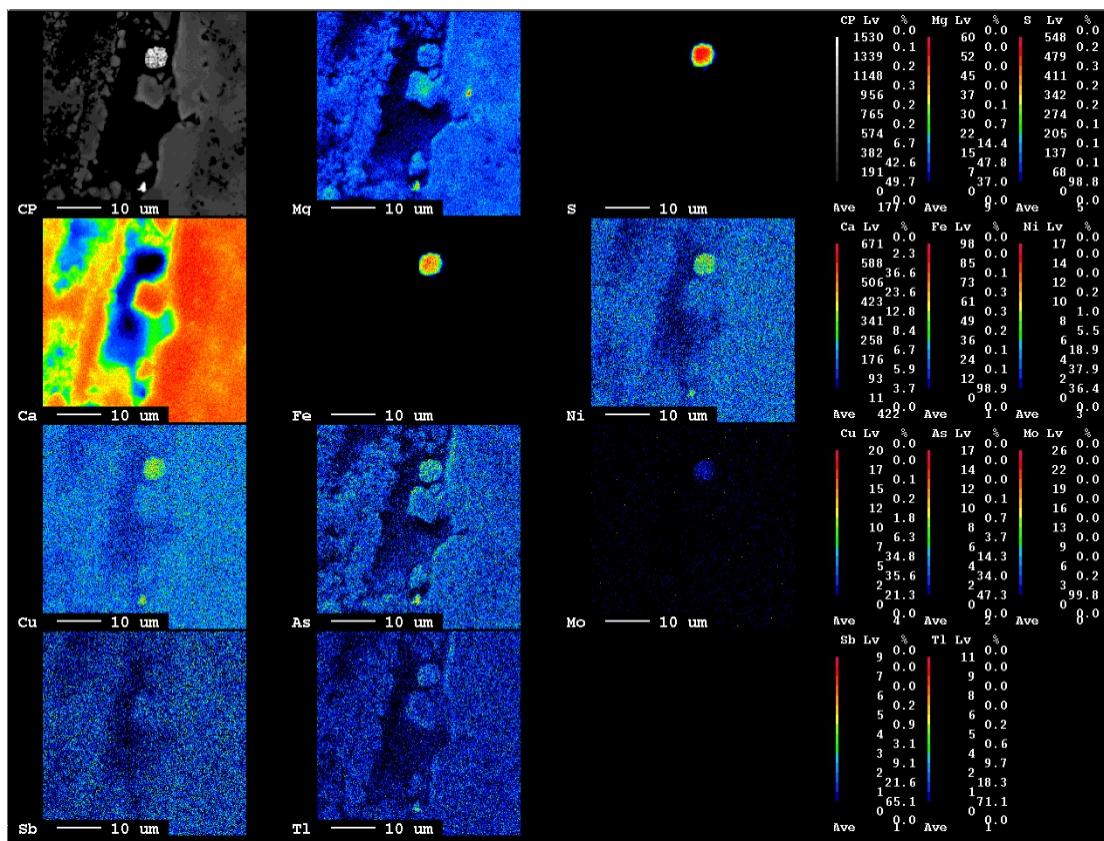


Figure 89. CT-6, 280-281 ft BLS. Element map of pyrite framboid. Note pyrite association with copper, nickel and arsenic.

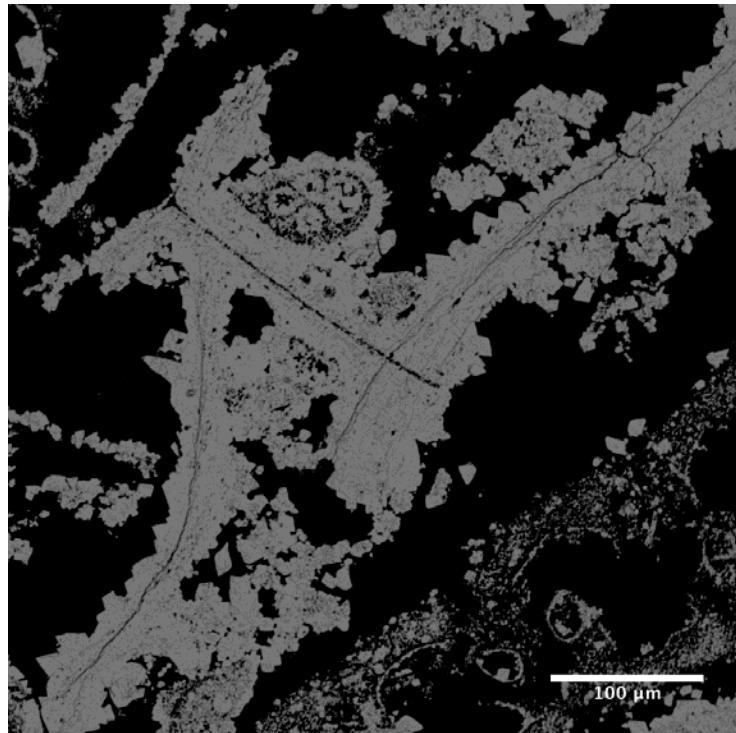


Figure 90. 6R, 279-280 ft BLS. BSE image. Micrite envelope.

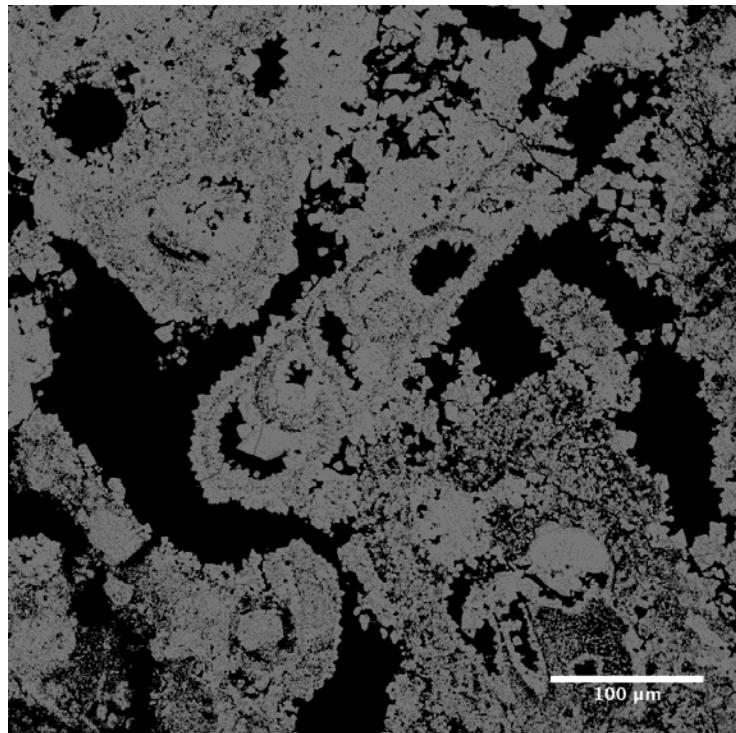


Figure 91. 6R, 279-280 ft BLS. BSE image. Foraminifera.

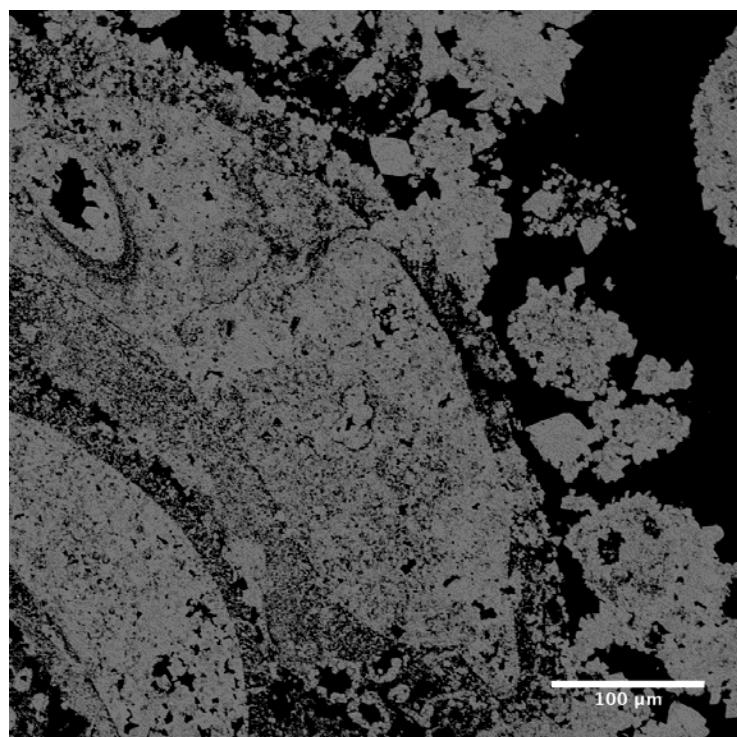


Figure 92. 6R, 279-280 ft BLS. BSE image. Carbonate.

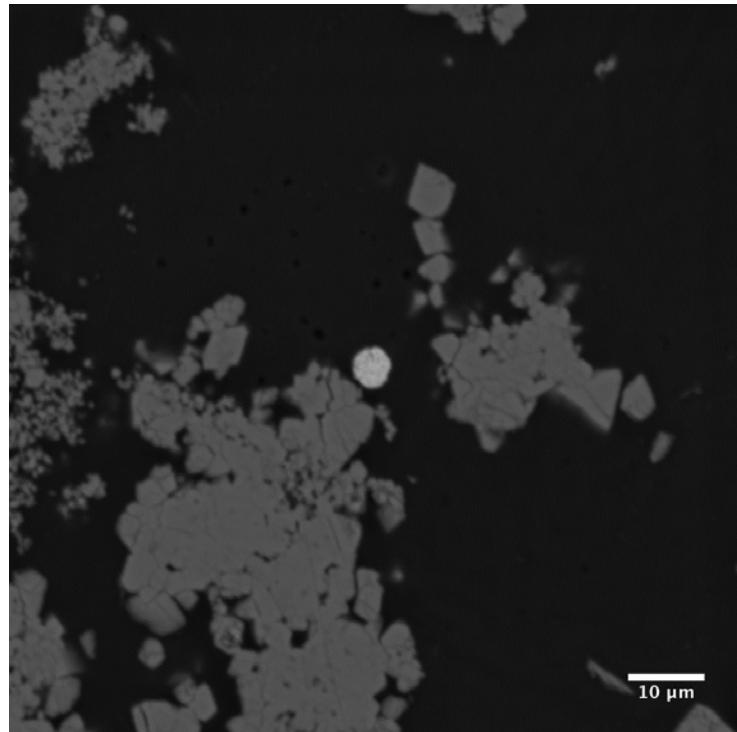


Figure 93. 6R, 279-280 ft BLS. BSE image. Pyrite framboid.

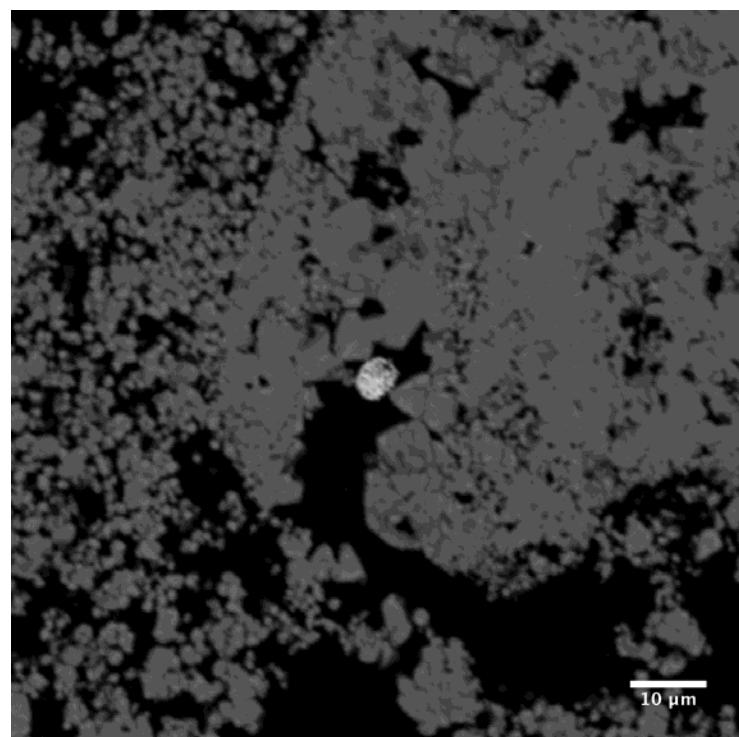


Figure 94. 6R, 279-280 ft BLS. BSE image. Pyrite framboid.

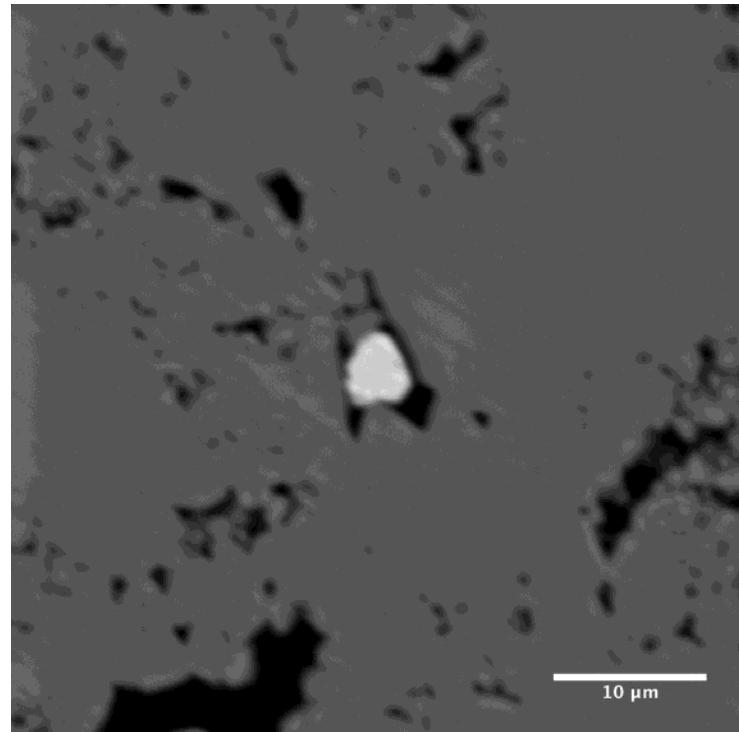


Figure 95. 6R, 279-280 ft BLS. BSE image. Pyrite framboid in vug.

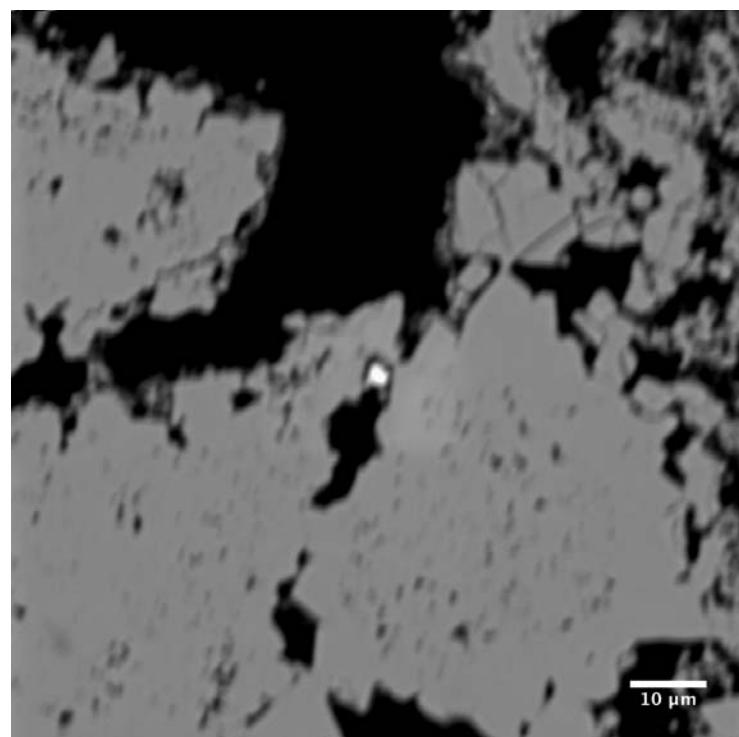


Figure 96. CT-6, 280-281 ft BLS. BSE image. Pyrite in vug.

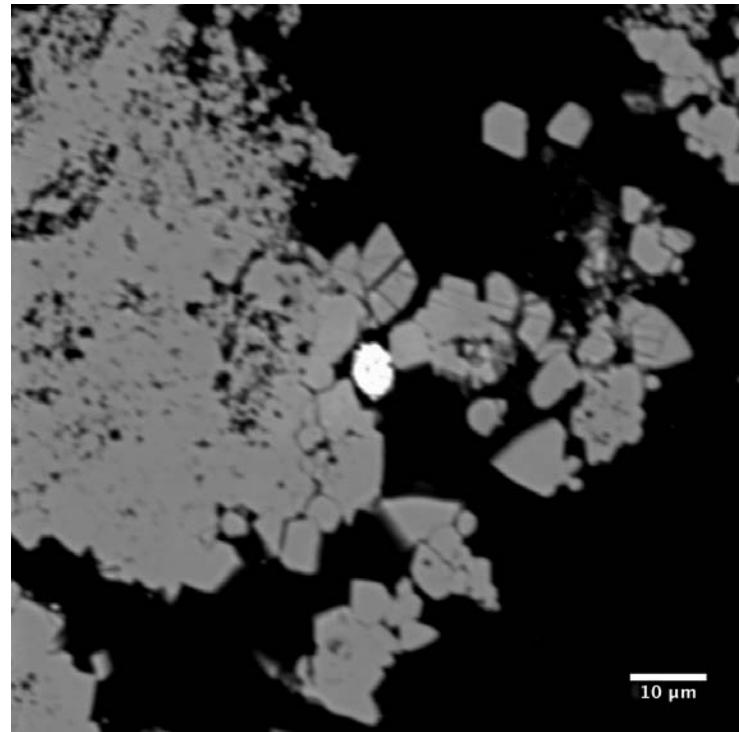


Figure 97. CT-6, 280-281 ft BLS. BSE image. Pyrite framboid.

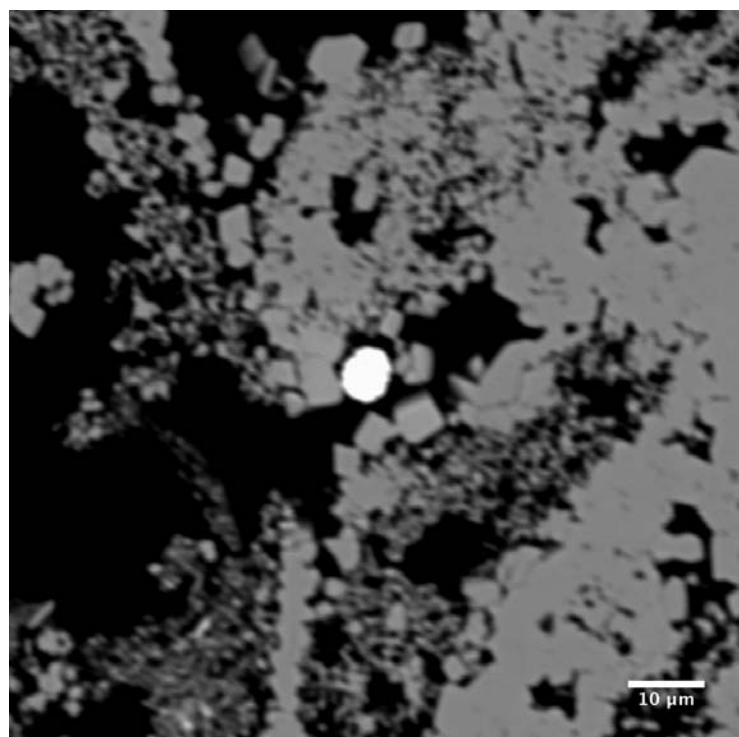


Figure 98. CT-6, 280-281 ft BLS. BSE image. Pyrite framboid.

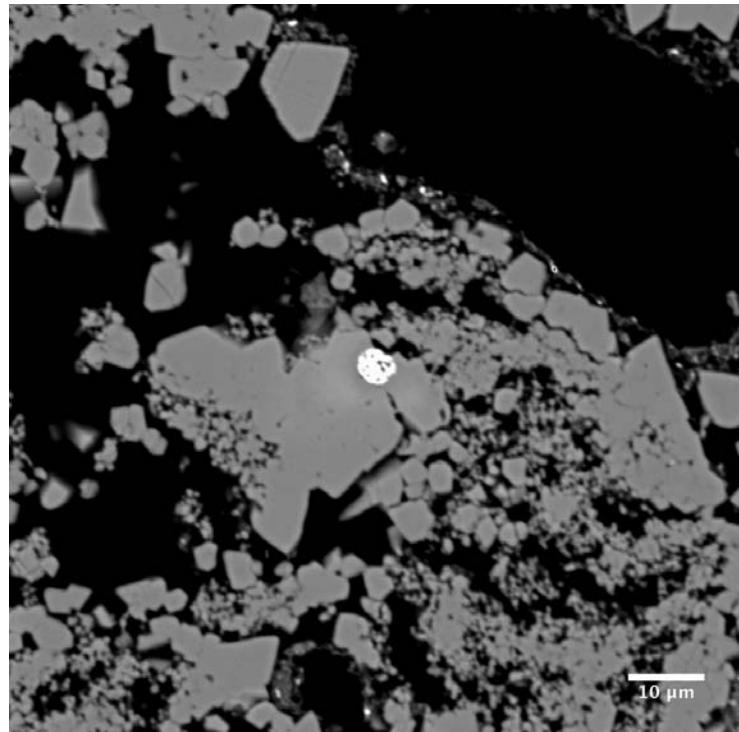


Figure 99. CT-6, 280-281 ft BLS. BSE image. Pyrite framboid.

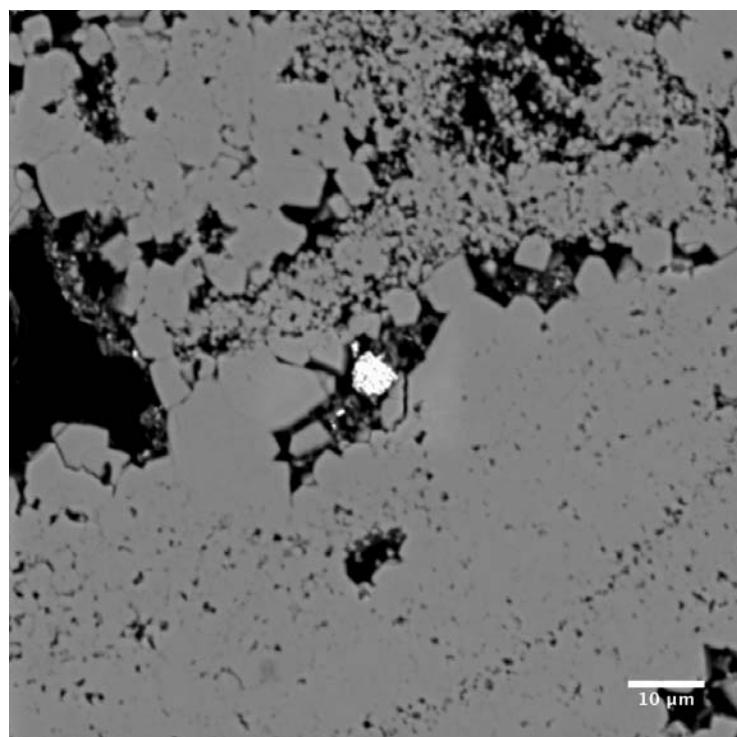


Figure 100. CT-6, 280-281 ft BLS. BSE image. Pyrite framboid in vug.

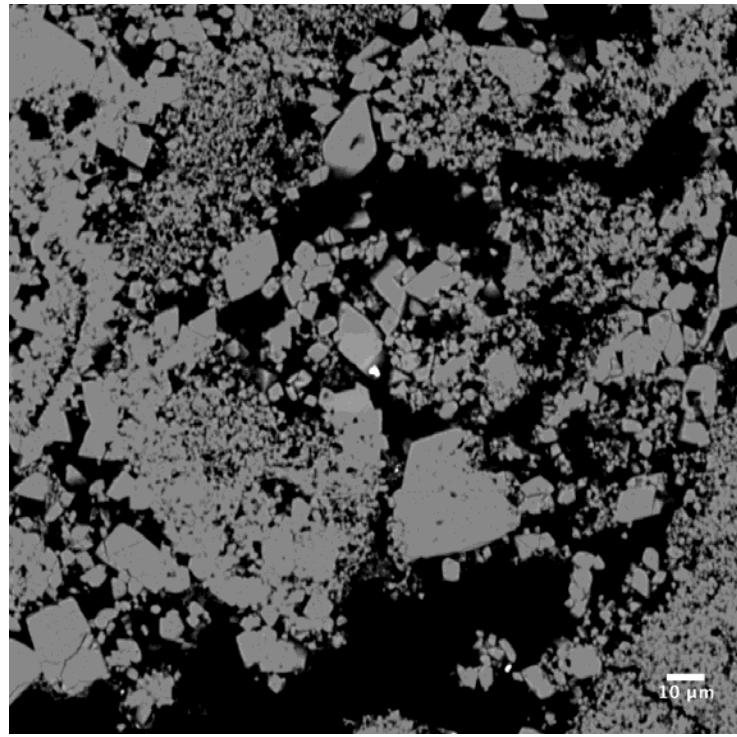


Figure 101. CT-4, 284-285 ft BLS. BSE image. Very small pyrite.

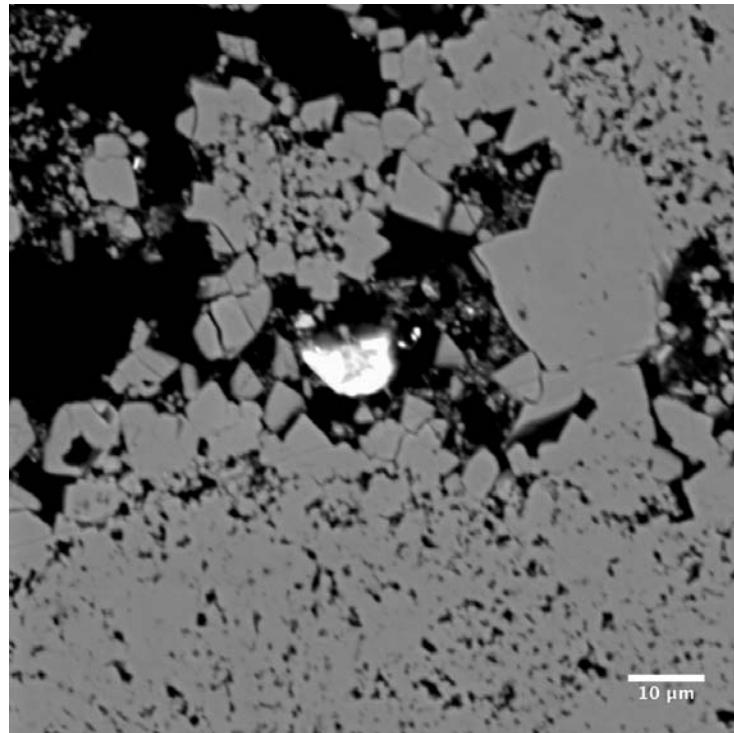


Figure 102. CT-4, 284-285 ft BLS. BSE image. Broken pyrite framboid.

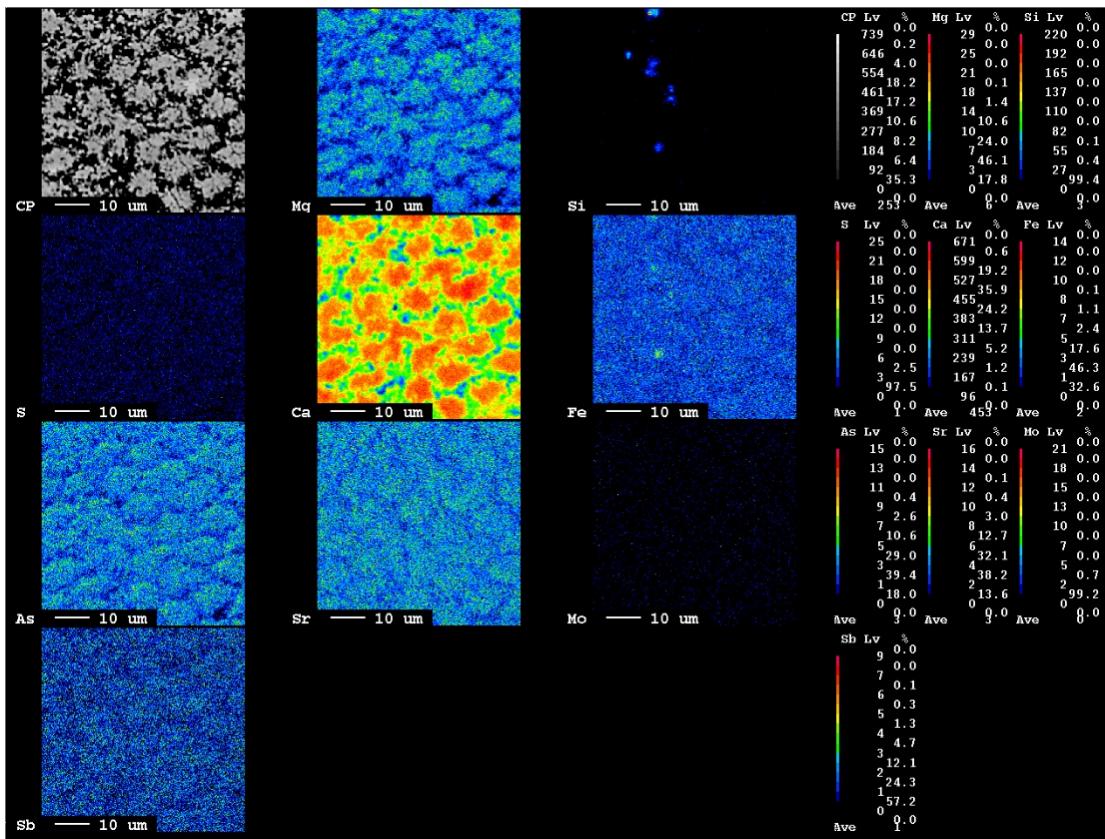


Figure 103. CT-4, 284-285 ft BLS. Bryozoa. Note trace of silica and iron within the material and possible low levels of arsenic.

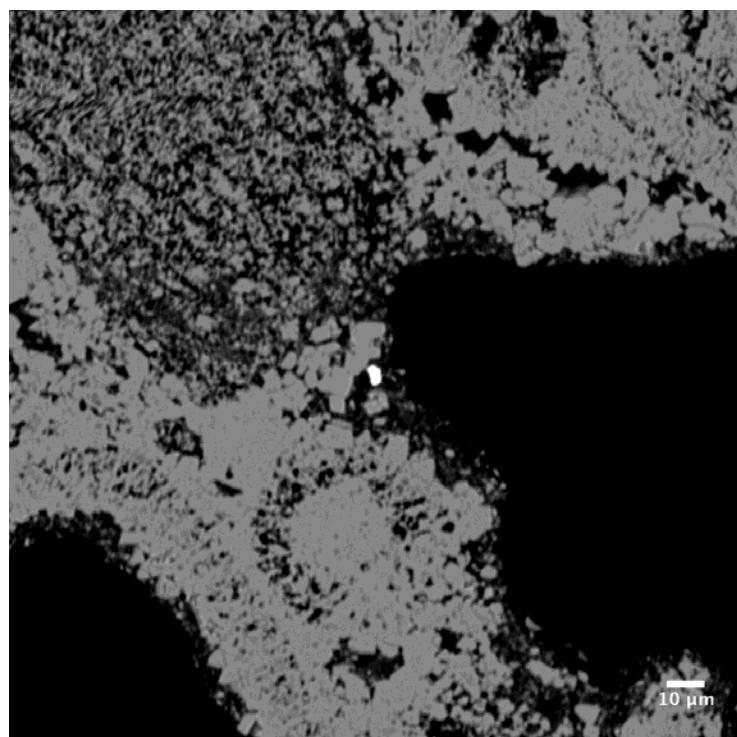


Figure 104. CT-7, 288-289 ft BLS. BSE image. Very small pyrite.

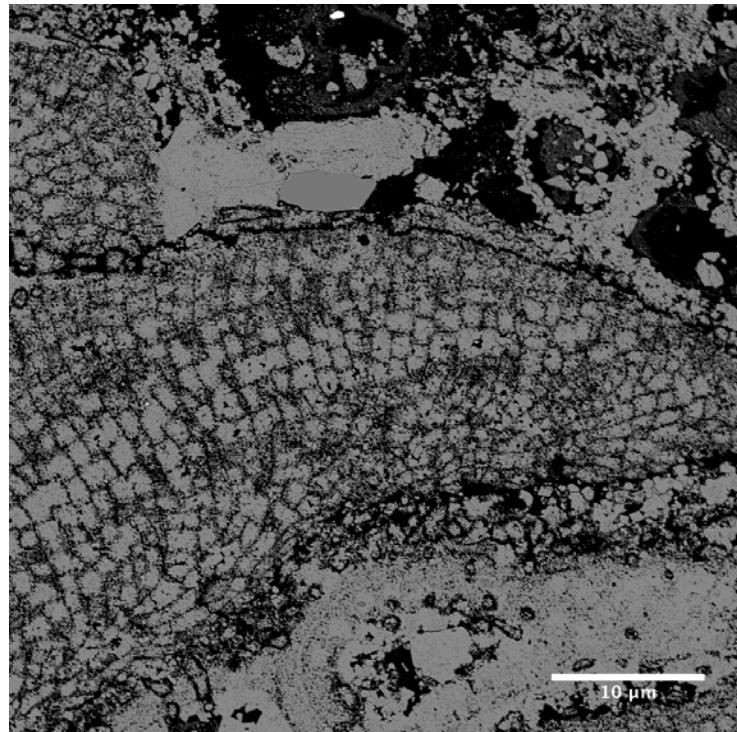


Figure 105. CT-7, 288-289 ft BLS. BSE image. Algal material.

APPENDIX H
SUMMARY STATISTICS

APPENDIX E

GeoSyntec Geochemical Modeling Analysis Report



engineers | scientists | innovators



Geochemical Modeling Investigation

City of Clearwater Groundwater Replenishment Project

Prepared for

Leggette, Brashears & Graham, Inc.

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Prepared by

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Project Number TXW0416

September 11, 2014

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1. INTRODUCTION

Geosyntec Consultants (Geosyntec) conducted this geochemical modeling investigation as part of the Clearwater Groundwater Replenishment Project (Project) to evaluate the suitability of the Suwannee Limestone of the Upper Floridan aquifer to be an injection zone for up to 3 million gallons per day (MGD) of purified reclaimed water from the City of Clearwater Northeast Water Reclamation Facility (NEWRF). The work was conducted for Leggett, Brashears & Graham, Inc. (LBG) as part of the hydrogeologic services they are conducting for the Project on behalf of the City of Clearwater, Florida (City). The Southwest Florida Water Management District (SWFWMD) is a source of co-operative funding for the Project.

The principal geochemical matters of concern to the City and SWFWMD are the potential for dissolution of the carbonate aquifer matrix, and mobilization of arsenic (and other metals) within the injection zone. The objectives of this geochemical modeling investigation are to (1) describe the major ion chemistry and hydrochemical facies of the groundwater system at the Project site, (2) ascertain whether arsenic is a naturally occurring solute in groundwater, (3) identify probable mineralogical associations and geochemical controls on the occurrence of arsenic, and (4) model the effects of mixing purified reclaimed water with native groundwater on mineral saturation states and redox conditions within the aquifer. Geochemical components of the Project that are being addressed by others are (1) a mineralogical assessment of rock cores to describe the bulk mineralogical makeup of the aquifer matrix and to identify associated metals that might be released to groundwater through rock-water interactions, and (2) a series of bench-scale column tests to determine whether arsenic and other metals can be leached from the matrix and associated minerals under variable pH and reduction-oxidation (redox) conditions (Norton and others, 2014).

2. COLLECTION OF GROUNDWATER SAMPLES

2.1 Sampling Locations

This investigation began with the collection of samples of groundwater from four monitor wells and one water supply well at the City's NEWRF. The four monitor wells are divided into two upper zone (UZAMW-1 and UZAMW-2) and two lower zone (LZAMW-1 and LZAMW-2) wells, all of which are located within the southern half of the Project area (**Figure 1**). The depth of each upper zone well is approximately 150 feet below land surface (ft BLS), and the depth of each lower zone well is approximately 340 ft BLS (Trommer, 2014). The source well drilled to supply water for a long-term injection test is a lower zone well located near the northeast corner of the property (**Figure 1**). The source well is also completed in the lower zone, but at a depth of approximately 360 ft BLS. Water from that well is pumped through a pipeline to a recharge well (RW-1) located north of the UZAMW-1/LZAMW-1 monitor wells (**Figure 1**). The injection zone is the lower zone of the Suwannee Limestone. The generalized local stratigraphy and hydrostratigraphy are illustrated in **Figure 2**. In this report, the upper zone wells are referred to as UZA1 and UZA2, and the lower zone wells as LZA1, LZA2, and RW1. Well RW1 was sampled at its wellhead after its fluoride feed, and thus Well RW1 samples represent water from the source water well.

2.2 Geochemical Data

Between April 9 and July 2, 2014, 13 sets of samples were collected from Wells UZA1, UZA2, LZA1, LZA2, and RW1, for a total of 65 samples. The sampling method involved the recording of temperature, conductivity, pH, dissolved oxygen, and oxidation-reduction potential (ORP), along with the time these variables were recorded. At each well, water was diverted through a flow line to a closed flow cell with probes attached to a calibrated water quality meter. The above variables were recorded on field data sheets at five-minute intervals until the measurements became stable (that is, until the variables changed by five percent (plus or minus) over two consecutive five-minute intervals). The groundwater samples were collected by representatives of LBG, based on directions specified by Geosyntec.

After the field parameter values were determined to be stable, the flow line was removed from the flow cell and the flow of water to the line was shut off at the outflow valve to which the flow line was attached at the wellhead. A 0.45-micron filter was attached to the end of the flow line and the outflow valve was reopened, allowing water to flow through the line again and to fill (charge) the 0.45-micron filter. Filtered water was then discharged to a 0.5-L Nalgene bottle to which nitric acid preservative had been added by the analytical laboratory. That sample was designated for analysis of metals. A second 0.5-L Nalgene bottle without nitric acid was also filled. That sample was designed for analysis of nonmetals.

Field measurements and the list of analytes were as follows:

- Temperature
- pH
- ORP
- Dissolved Oxygen
- Total Dissolved Solids (TDS)
- Calcium
- Magnesium
- Sodium
- Potassium
- Iron
- Arsenic
- Sulfate
- Sulfide
- Alkalinity (Bicarbonate)
- Fluoride

The field measurements and the results of the laboratory analyses are recorded in the spreadsheet compiled by LBG and provided in **Attachment A**.

3. REVIEW OF LABORATORY ANALYSES

3.1 Evaluation of Charge Balances

All laboratory analyses were checked for internal consistency by means of electrical charge imbalance, the percent difference between the ionic charges calculated in milliequivalents per liter (meq/L) for the major cations and major anions (Mazor, 1997):

$$\% \text{Charge Imbalance} = ((\Sigma \text{cations} - \Sigma \text{anions}) / (\Sigma \text{cations} + \Sigma \text{anions})) * 100\%$$

Charge imbalances (in decimal fraction of 1.0) for the 26 upper zone monitor well samples, 26 lower zone monitor well samples and 13 recharge well test samples are shown as dotplots in **Figure 3**. The errors are dominantly positive – an indication that the laboratories reported an excess of cations over anions for most groundwater samples. The absolute values of the charge balance errors are also plotted as box-and-whisker diagrams in **Figure 4**.

The errors call into question the reliability of the analyses for geochemical modeling, without first correcting the imbalances. Charge imbalances greater than +/-0.05 decimal fraction (+/-5%) create problems with interpretation of data, calculation of mineral saturation states, and attempts to model reactions and the mixing of waters. The uncertainty increases with the percentage of the imbalance.

Charge imbalances can be adjusted by increasing or decreasing the concentration of a solute. This is often accomplished by adjusting the concentration of a conservative anion such as chloride. Unless one has sufficient reason to adjust the concentration of a less conservative solute such as calcium, sodium or bicarbonate, Geosyntec advises defaulting to chloride. The adjustments were made by specifying, within the SpecE8 module of The Geochemist's Workbench® (GWB), the integrated suite of geochemical modeling programs developed by Aqueous Solutions, LLC, that all groundwater analyses were to be balanced on the basis of chloride concentrations. The data in **Attachment A** include two rows for concentrations of chloride. The highlighted row lists the concentrations, calculated by SpecE8, needed to reduce the errors to zero. For most samples, this required increasing the concentration of chloride.

3.2 Major Ion Chemistry

The major-ion chemistry of all samples is represented by a Durov diagram (**Figure 5**). The basis of a Durov diagram (Zaporozec, 1972) is percentage plotting, in separate trilinear diagrams of cations and anions in units of meq/L. Lines from each pair of points in the cation and anion triangles are projected into the central rectangle to form a common point, which represents the composition of the samples with respect to cations and anions. The points in the central rectangle are projected into the TDS and pH fields. The Durov diagram is an effective format for comparing the hydrochemical compositions of samples from two or more wells.

Laboratory analysis of the groundwater samples form distinct clusters on a Durov diagram (**Figure 5**), with hydrochemical compositions that range from calcium-sodium-chloride for the upper zone wells (UZA1 and UZA2) to sodium-chloride for the lower zone wells (RW1, LZA1 and LZA2). The clusters are further distinguished from each other with respect to TDS, as illustrated by the loci of points within the TDS field. Water from the lower zone wells has a higher TDS than water from upper zone wells, and the RW-1 samples exhibited the highest TDS. On a plot of sodium versus chloride (**Figure 6**), the clusters lie along a line with a sodium concentration to chloride concentration ratio that is representative of the mixing of fresh groundwater and seawater.

3.3 Arsenic Concentrations

With regard to the occurrence of arsenic in groundwater, **Figure 7** illustrates that there are four distinct arsenic clusters formed by the water from the five wells. The figure is not intended to indicate a causal link between arsenic and chloride. In this figure, chloride is used as a proxy for major-ion chemistry. **Figure 7** shows different ranges of arsenic for each group of samples. Arsenic concentrations decrease in the following order: UZA2 > RW1 > UZA1 > LZA1 = LZA2 (**Figure 7**). Because arsenic concentrations among the LZA1 and LZA2 samples overlap, LZA1 and LZA2 are regarded as a single group in the report.

Arsenic concentrations among the UZA1 samples and the LZA1 and LZA2 samples are less than the Federal Maximum Contaminant Level (MCL) for

arsenic in drinking water of 10 µg/L. The concentrations for the UZA1 samples are greater than 5 µg/L but less than 10 µg/L, and the concentrations among the LZA1 and LZA2 samples are less than 5 µg/L (**Figure 7**). Arsenic concentrations among the 13 RW1 samples are distributed around a mean of approximately 14 µg/L.

4. OVERVIEW OF ARSENIC OCCURRENCE

4.1 Arsenic Chemistry

Arsenic (atomic number 33; atomic mass, 74.92 grams/mole) is a redox sensitive element with chemical properties that are intermediate to those of metals and nonmetals. The stable forms in water are the arsenate ($\text{As}(5)$) and arsenite ($\text{As}(3)$) oxyanions. **Figure 8**, after Hem (1977), shows the dominant arsenic species in aqueous systems at 25 °C, with pH values ranging from 0 to 14 and redox conditions ranging from oxidizing to reducing. Under oxidizing conditions, uncharged and monovalent arsenate oxides predominate at pH 7 or less, and divalent and trivalent oxides of arsenate predominant at pH values greater than 7. Reducing conditions favor the uncharged arsenite hydroxide species at pH values 9 and less. Monovalent and divalent arsenite oxyanions form when pH is greater than 9. Adsorption by hydrous iron oxide and coprecipitation or combination with sulfide are major factors that can maintain concentrations of arsenic at very low levels in water (Arthur and others, 2002; Jones and Pichler, 2007).

4.2 Arsenic in ASR Systems in Florida

Arsenic concentrations greater than MCL of 10 µg/L have been detected in recovery water at aquifer storage and recovery (ASR) sites in Florida (Arthur and others, 2002; Jones and Pichler, 2007). Arsenic is most commonly associated with euhedral to subhedral pyrite crystals, often averaging less than one micron in size. The crystals are intergranular and intragranular with respect to calcite grains (Arthur and others, 2002). Framboidal masses are also common (Arthur and others, 2002). Investigations of the association of arsenic and pyrite have consistently identified oxidation of iron sulfides, specifically pyrite (FeS_2), as the principal factor accounting for the occurrence of arsenic in recovery water (Arthur and others, 2002; Jones and Pichler, 2007).

Jones and Pichler (2007) studied this association in the Suwannee Limestone of the Upper Floridan Aquifer. They summarize their findings as follows:

“Geochemical modeling was employed to examine pyrite stability in limestone during simulated injections of surface water into wells open only to the Suwannee Limestone with known mineralogy and water chemistry. The goal was to determine if aquifer redox conditions could

be altered to the degree of pyrite instability. Increasing amounts of injection water were added to native storage-zone water, and resulting reaction paths were plotted on pyrite stability diagrams. Native storage-zone water plotted within the pyrite stability field, indicating that conditions were sufficiently reducing to allow for pyrite stability. Thus, arsenic is immobilized in pyrite, and its groundwater concentration should be low. This was corroborated by analysis of water samples, none of which had arsenic concentrations above 0.036 µg/L. During simulation, however, as injection/native storage-zone water ratios increased, conditions became less reducing and pyrite became unstable. The result would be release of arsenic from limestone into storage-zone water.”

4.3 Arsenic in Lower Suwannee Limestone at Project Site

In conjunction with the investigation conducted by Geosyntec for the Project, Norton and others (2014) examined petrographic thin sections taken from 14 core samples collected from the Lower Suwannee Limestone at the Project site. The core samples were collected approximately 12 ft north of Well RW1 at a depth range of 274-289 ft BLS, which is within the intended recharge interval at the site. Norton and others (2014) describe the core samples as “peloidal packstone to grainstone with traces of quartz grains and clay.” They comment that the specimens include “sparse grains of pyrite, ilmenite, rutile, iron oxide, chalcopyrite (copper iron oxide) and possible pentlandite (nickel iron sulfide) as well as a few unidentified grains with higher concentrations of the rare earth elements... Sparry calcite lined many of the small vugs and molds and overall recrystallization was low to medium with micrite envelopes of some of the foraminifera.”

Norton and others (2014) note that much of the bulk rock major elemental analyses are very similar between samples. Total iron (Fe_2O_3) is 0.03 to 0.07 percent, SiO_2 is 0.2 to 0.68 percent, P_2O_5 is below detection to 0.02 percent, and Al_2O_3 , Na_2O and K_2O are all less than 0.1 percent. They describe the composition as “consistent with the Suwannee Limestone lithology, a limestone with a scattering of quartz grains throughout, an occasional phosphate grain and a trace amount of clay present in some of the vugs.”

With regard to bulk rock trace elements, Norton and others (2014) observe that arsenic and molybdenum manifest “little variance in the 14 samples

ranging from below detection to 2 ppm and below detection to 3 ppm, respectively.”

In the report, Norton and others (2014) refer to iron sulfide minerals collectively “as pyrite (FeS_2) unless otherwise specified.” This designation includes the metastable minerals mackinawite (FeS), pyrrhotite ($\text{Fe}_{0.8-1.0}\text{S}$), and greigite (Fe_3S_4). They observe that pyrite is an important sulfide mineral because it “may host a variety of metals at trace concentrations (arsenic, molybdenum, antimony, copper, nickel, lead, bismuth and thallium).” The above metals “are incorporated into the pyrite by different processes, including precipitation, co-precipitation, chemical or physical adsorption, ionic replacement, as well as redox reactions between dissolved species and the pyrite surface or its precursors (... , Morse and Arakaki, 1993; Abraitis et al., 2004).”

Norton and others (2014) identify pyrite framboids embedded within the carbonate matrix, along with evidence of pyrite oxidation. Average arsenic concentrations in pyrite, based on analysis of the thin sections, range from below detection limits to 1400 (± 350) ppm. They observe that this concentration is “near the lower end of the range of 100 to 11,200 ppm (average = 2300 ppm), as presented by Price and Pichler (2006), for arsenic in pyrite from Suwannee Limestone samples.”

They also comment that estimated values of arsenic in bulk rock, based on calculated maximum pyrite abundance and mean pyrite arsenic concentration from 14 thin sections, “are often less than the measured bulk rock concentrations of arsenic, suggesting that pyrite is not the only arsenic host mineral.” Norton and others (2014) do not attempt, however, to identify iron oxide minerals, which are known to sequester arsenic by adsorption because oxide grains observed in thin sections are “so few that no conclusions can be drawn as to whether or not they are acting as an arsenic sink in these samples.”

Leaching tests (Norton and others, 2014) conducted in association with the study of bulk rock mineralogy yielded arsenic and other metals at low concentrations of dissolved oxygen (DO). The leaching tests document arsenic concentrations (as micrograms (μg) of leached arsenic) increasing from approximately 2 to 13 μg in source water with DO concentrations ranging from less than 10 to 60 ppb ($\mu\text{g/L}$) and sharply lower concentrations

of arsenic at DO greater than 600 ppb. Arsenic was detected in solution above 10 µg/L in five of nine leaching tests.

Norton and others (2014) found a coefficient of determination (R^2) between source water DO concentration up to 60 ppb and leached arsenic mass of 0.914. This coefficient of determination means that 91.4 percent of the variability of the dependent variable (µg of leached arsenic) over that range is explained by the specified linear association with the independent variable (source water DO concentration). The leaching tests also establish a high correlation between mass of leached arsenic and mass of leached molybdenum ($R^2 = 0.943$) and leached cadmium ($R^2 = 0.880$). From the above, it is clear that arsenic, molybdenum and cadmium occur in common mineralogical association(s) and that all are released to solution by processes that control the stability of the mineral species in which the three metals are sequestered.

Conclusions from the bulk rock and leaching studies with particular significance for this investigation are the following:

- Arsenic concentrations in the bulk rock samples are “relatively low”, ranging from below detection limits (< 1 ppm) to 2 ppm, and pyrite is sparsely distributed in many thin sections.
- Arsenic concentrations in pyrite, based on analyses of 14 petrographic thin sections range from below detection limits to 1400 (± 350) ppm – or near the lower end of the range of 100 to 11,200 ppm (average = 2300 ppm) reported by others for the Suwannee Limestone.
- Although a high DO water would be expected to leach arsenic and other metals, the leached metals would be expected to re-precipitate or form complexes with iron oxides.
- There is a strong correlation ($R^2 = 0.914$) between leached arsenic mass and source water DO concentration up to 60 ppb. The higher DO concentrations indicate that arsenic is removed from solution by complexation or reprecipitation with iron oxides.
- The mass of arsenic released to groundwater is highly correlated with other redox-sensitive metals, especially molybdenum ($R^2 = 0.943$) and cadmium ($R^2 = 0.880$).

5. GEOCHEMISTRY OF ARSENIC IN GROUNDWATER

The association of dissolved arsenic and iron in groundwater samples from the Project site is illustrated by **Figure 9**. In samples with iron concentrations less than 0.05 mg/L, arsenic forms three distinct clusters defined by (1) the 26 LZA1 and LZA2 samples, (2) the 13 UZA1 samples, and (3) the 13 RW1 samples. A fourth group is formed by the 13 UZA2 samples. Iron concentrations for the latter group range from 0.05 to 0.19 mg/L. Descriptive statistics for the above groups of samples are listed in **Table 1**.

The highest arsenic concentrations are associated with the UZA2 samples, the group with the largest concentrations of dissolved iron. **Figure 10** illustrates that the highest iron concentrations are generally associated with the highest ORP measurements. This is a direct indication that reducing conditions predominate within the lower zone and within the area of the upper zone in the vicinity of UZA1. Around UZA2, however, the ORP measurements indicate that conditions are more oxidizing and thus more likely to lead to the dissolution of pyrite and to the release of arsenic.

The predominance of reducing conditions is also found in figures of the concentration of sulfide with respect to ORP (**Figure 11**), dissolved oxygen and iron (**Figure 12**), dissolved oxygen and sulfide (**Figure 13**), sulfide and arsenic (**Figure 14**) and dissolved oxygen and arsenic (**Figure 15**). These figures together indicate that reductive processes are the principal reactions controlling the stability of iron minerals and the occurrence of arsenic within the groundwater system.

More specifically, all of the above figures show that anoxic conditions predominate with respect to RW1, UZA1, LZA1 and LZA2. Anoxic conditions are most pronounced with respect to LZA1 and LZA2, and slightly less so with regard to UZA1 and RW1. Slight differences in ORP might account for much of the difference in arsenic concentrations among these wells, although the higher TDS and chloride concentrations (i.e., higher ionic strength) of RW1 might indicate the potential for a combination of reductive dissolution and competitive desorption as factors controlling the occurrence of arsenic in higher-TDS groundwaters of the area (Liu and others, 2014).

By any objective set of geochemical criteria, the local groundwater system, exclusive of UZA2, is anoxic. Where DO concentrations are reported as 0.50 mg/L or lower, iron concentrations are typically less than 0.04 mg/L, ORP is negative, and sulfide concentrations range from 2 to 7 mg/L. It is noted that DO measurements at concentrations less than 0.5 mg/L in the presence of sulfide may not be that reliable. Such reported low measurements should be considered only with caution because the presence of sulfide is an indicator of the exhaustion of dissolved oxygen. However, the ORP measurements and other redox-related data indicate that geochemical conditions are moderately to strongly anoxic, and that conditions as represented by data from LZA1 and LZA2 underscore the high probability that pyrite, the mineral with which arsenic is most commonly associated in the Lower Suwannee Limestone, is stable and unlikely to yield arsenic at concentrations greater than 3 µg/L.

Additional support for the dominance of anoxic (hence, reducing) conditions is found in Eh-pH diagrams on which data from the wells are plotted (**Figures 16 and 17**). Eh is an electrochemical description of the oxidation state for a system in equilibrium (Bethke, 2008). It can be derived from the ORP measurement by adding a correction factor (typically an average of 200 millivolts (mV)) to ORP. The correction factor is an empirical adjustment to account for the difference between measured and theoretical voltages of electrodes and electrode solutions at different temperatures.

Figures 16 and 17 show the stability fields of ferrous iron (Fe(2)) and ferric iron (Fe(3)) under different combinations of redox and pH, within the stability boundaries of water. The figures were constructed with the Act2 module of GWB, assuming a system temperature of 25 °C. Eh-pH diagrams can be constructed to include different solid mineral phases, such as pyrite and hematite. Solid phases are not included here because the figures are intended to show only the combinations of Eh and pH under which dissolved iron species predominate in aqueous systems at 25 °C.

In **Figure 16**, the data from UZA1 plot within the Fe(2) field – an indication that ferrous iron is the dominant species of dissolved iron. Data from UZA2, however, lie within the Fe(2) and Fe(OH)₃ fields – a response to conditions that vary between oxidizing (Fe(OH)₃) and reducing (Fe(2)) over the narrow pH range for those samples.

With regard to **Figure 17**, the points from RW1, LZA1 and LZA2 all lie within the Fe(2) stability field, over approximately the same narrow range of

pH measurements. This indicates that redox conditions within the lower zone are reducing and relatively uniform between the LZA1/LZA2 locations and the slighter deeper zone represented by the supply well that provides water for RW1.

6. MIXING EVALUATION

6.1 Overview

A principal objective of this investigation was to evaluate the effects of the mixing of purified reclaimed water with native groundwater of the lower zone. This involved (1) calculation of the saturation states of key mineral species for the treated waters and native groundwater, and (2) modeling the effects on overall hydrochemical composition and the effects on mineral saturation indices of different mixtures of treated waters and native groundwater as a basis for assessing the likelihood of dissolution of the aquifer matrix and dissolution/precipitation of pyrite, the mineral with which arsenic is most commonly associated in the Floridan aquifer system. As with the bulk rock study of Norton and others (2014), pyrite is regarded as a proxy for other (more metastable) iron sulfides that might be found within the Suwannee Limestone.

6.2 Geochemistry of Purified Reclaimed Water

Tetra Tech, a member of the Project team, provided Geosyntec with three estimated expected compositions of purified reclaimed water, based on total dissolved solids and overall composition (**Attachment B**). The purified waters were classified as (1) Low-TDS, (2) Typical-TDS, and (3) High-TDS. The three compositions are plotted on a Durov diagram, along with points representing groundwater samples from the upper and lower zones of the site (**Figure 18**). The purified reclaimed waters, all of which are calcium-bicarbonate in composition, were also plotted on a simple iron system Eh-pH diagram, based on ORP estimates provided by Tetra Tech (**Figure 19**). All of the points lie within the ferrous iron (Fe(2)) field on the diagram.

6.3 Mixing Model Process

Geosyntec selected GWB, along with the thermodynamic database developed by the Lawrence Livermore National Laboratories (LLNL). The selection of GWB and the LLNL database was based on Geosyntec's experience with the software and the LLNL database in many other modeling projects. The LLNL thermodynamic database, one of several included with the speciation (SpecE8) and reaction path (React) modules of GWB, includes data on 624 mineral species.

Each mixing model was developed with two endmembers: (1) a purified reclaimed water, and (2) a mixture of water representative of LZA1 and LZA2. The composition of the LZA endmember was based on the last four groundwater samples from LZA1 and the last four from LZA2. The decision to blend the LZA1 and LZA2 samples was based on Geosyntec's observation that the overlapping compositions indicate a high degree of geochemical homogeneity between the wells with respect to major-ion chemistry, along with measurements of pH and ORP.

A binary (two-component) model consists of two samples that are mixed according to the following linear equation (Faure, 1991):

$$(X)_m = (X)_a f_a + (X)_b (1 - f_a)$$

where:

- (X)_m = concentration of component X in the mixture,
- (X)_a = concentration of component X in endmember a,
- (X)_b = concentration of component X in endmember b,
- f_a = fraction of component X in endmember a, and
- (1 - f_a) = fraction of component X in endmember b.

The straightforward mixing equation above can be solved for any unknown if all other variables are either known or specified. Hence, if the concentration of a dissolved solid is known for each endmember, then the concentration of that solute in any mixture can be calculated from the percentage of each endmember in the mixture.

Geosyntec calculated mixing models based on the following endmember percentages:

- 25 percent LZA groundwater, 75 percent purified reclaimed water (Low, Typical and High) [25:75],
- 50 percent LZA groundwater, 50 percent purified reclaimed water (Low, Typical and High) [50:50], and
- 75 percent LZA groundwater, 25 percent purified reclaimed water (Low, Typical and High) [75:25].

6.4 Mixing Model Results

The results of each set of mixing models are listed **Attachment C**, and also plotted on Durov diagrams (**Figures 20 - 22**).

All binary mixtures begin and terminate at the endmembers. As such, each endmember represents a water that is composed 100 percent of that endmember. Within the trilinear fields and the rectangular cross-plot field connecting the trilinear diagrams, binary compositions fall along straight lines (mixing paths) between endmembers, with the locations of points depending on the percentage of one endmember or the other. With regard to the TDS field, a binary mixing path tends to be nonlinear with greater differences between the TDS concentrations of endmembers and hydrochemical composition. There is no particular pattern with regard to the scatter of points within the pH field.

For each pairing of endmembers, the mixing paths shift in predictable patterns. With regard to the lower zone and treated waters, the points within the trilinear fields and the square cross-plot field shift sharply toward the higher-TDS endmember, even at the 25:75 ratio of high-TDS formation water to low-TDS purified reclaimed water. At the lower mixing ratios, the higher TDS water dominates overall hydrochemical composition, and this dominance causes a pronounced shift toward the composition of the sodium-chloride dominant endmember. Endmember ratios should be expected to reflect greater influence of native groundwater with increasing distance from the injection well.

The effect of each mixture on the saturation states of calcite and pyrite are illustrated by **Figures 23 - 25**. A saturation index of 0 indicates a mineral is in equilibrium with a solution. Positive saturation indices indicate an oversaturated solution, and negative indices an undersaturated solution. For all mixtures, the calcite saturation indices (Si-Cal) indicate equilibrium or a low state of saturation or undersaturation. Hence, there is no apparent significant potential for dissolution of the carbonate matrix. While the LZA groundwater is slightly oversaturated with respect to calcite, the low TDS purified reclaimed water is unsaturated with respect to calcite and the typical TDS water is slightly undersaturated. All of the pyrite indices (Si-Pyr) indicate a high degree of oversaturation for any mixture and endmember. Under such conditions, pyrite (or other metastable iron sulfide minerals) might be expected to precipitate.

Saturation indices cannot be interpreted to mean that a mineral phase will form or dissolve, but only that conditions are such that that phase has the potential for precipitation or dissolution. Saturation indices also do not yield

information on the rate(s) at which precipitation and dissolution of different mineral species might occur. As this is a matter of geochemical thermodynamics, saturation indices yield information only on what is possible and not on potential reaction rates.

Because lower-zone groundwater and the purified reclaimed water are both anoxic, redox conditions should not lead toward the development of an oxidizing state within the lower zone. **Figures 26 - 28** trace the likely mixing pathways on basic iron-system Eh-pH diagrams. All of the pathways lie within the ferrous iron (Fe(2)) field. Based on this representation, it is reasonable to infer that mixtures of waters depleted in/stripped of oxygen should not be expected to cause the lower zone of the Suwannee Limestone to become oxic.

7. CONCLUSIONS AND RECOMMENDATIONS

This investigation was conducted to address a narrow range of questions related to the suitability of the Suwannee Limestone to be an injection zone for purified reclaimed water. The principal geochemical matters of concern are the potential for dissolution of the aquifer matrix and the dissolution of minerals in which arsenic and related metals are sequestered either by precipitation/co-precipitation or adsorption. The iron sulfide mineral pyrite has been shown to be the most common source of arsenic in the Floridan aquifer system, and it is considered as such in this report. Conclusions are summarized below:

- Upper and lower zone groundwaters are calcium-sodium-chloride and sodium-chloride in composition, and all appear to be mixtures of freshwater and seawater. TDS and chloride concentrations are higher in lower zone groundwaters than in upper zone groundwaters.
- The lower zone of the Suwannee Limestone is anoxic. This is clearly indicated by negative ORP measurements and DO concentrations less than 0.5 mg/L, sulfide concentrations ranging from 2 to 7 mg/L, and iron concentrations less than 0.04 mg/L.
- Sulfide concentrations greater than 2 mg/L in samples of lower zone groundwater indicate that the lower zone is anoxic and that DO has probably been exhausted within that part of the groundwater system.
- The upper zone is anoxic in the vicinity of UZA1, but positive ORP measurements and DO concentrations ranging from 1.4 to 3.9 mg/L in samples from UZA2 indicate oxidizing conditions in the vicinity of that well.
- Arsenic occurs naturally in groundwaters of the upper and lower zones. The lowest concentrations of arsenic (0.93 to 2.5 µg/L) are associated with LZA1 and LZA2, wells with consistently negative ORP measurements, elevated sulfide concentrations, and low concentrations of iron. The highest arsenic concentrations (26 to 28 µg/L) are found in samples from UZA2.
- The low iron concentrations (0.020 to 0.046 µg/L) of LZA1 and LZA2 indicate that pyrite, the iron sulfide mineral with which arsenic

is most commonly associated in the Suwannee Limestone, is stable in the anoxic environment of the lower zone.

- The low arsenic concentrations associated with LZA1 and LZA2 are probably related to the sequestration of arsenic by pyrite, and the high arsenic concentrations associated with UZA2 are probably related to the release of arsenic through the dissolution of pyrite in that part of the upper zone.
- The arsenic concentrations of approximately 14 µg/L associated with RW1 could be related to a combination of reductive dissolution and competitive desorption in the higher TDS groundwater produced by the source water well. The TDS of this water ranged from 1100 to 1300 mg/L and was higher than the TDS for other lower zone wells (690 to 860 mg/L).
- Purified reclaimed waters are expected to be calcium-bicarbonate in composition and to be anoxic. Modeled mixtures of wastewaters and lower zone groundwater are dominated by the composition of the higher-TDS native groundwater, even at ratios as low as 25:75 (25 percent lower zone groundwater and 75 percent purified reclaimed water). All mixtures should remain anoxic, and there should be little potential for the release of arsenic through the dissolution of pyrite.

8. REFERENCES

- Abratis, P.K., Pattrick, R.A.D. and Vaughn, D.J. (2004), Variations in the Compositional, Textural and Electrical Property of Natural Pyrite: A Review. *Internat. Jour. Of Min. Process.*, V. 74, p. 41-59.
- Arthur, J.D., Dabous, A.A., and Cowart, J.B. (2002), Mobilization of Arsenic and Other Trace Elements During Aquifer Storage and Recovery, Southwest Florida. *U.S. Geological Survey Artificial Recharge Workshop Proceedings* (Ed. G.R. Aiken and E.L. Kuniansky), Sacramento, California, April 2-4, USGS Open-File Report 02-89, pp. 47-50.
- Bethke, C.M. (2008), *Geochemical and Biogeochemical Reaction Modeling*, 2nd ed. Cambridge Univ. Press, 543 p.
- Faure, G. (1991), *Principles and Applications of Inorganic Geochemistry*, 2nd ed. Prentice-Hall, Inc., New Jersey, 600 p.
- Hem, J.D. (1977), Reactions of metal ions at surfaces of hydrous iron oxide. *Geochimica et Cosmochimica Acta*, V. 41, pp. 527-538.
- Jones, G.W. and Pichler, T. (2007), Relationship between Pyrite Stability and Arsenic Mobility During Aquifer Storage and Recovery in Southwest Central Florida. *Environ. Sci. Techol.*, V. 41, p. 723-730.
- Liu, C.W., Lu, K.L., Kao, Y.H., Wang, C.J., Maji, S.K., and Lee, J.F. (2014), Identifying Sources and Controlling Factors of Arsenic Release in Saline Groundwater Aquifers. *Hydrol. Earth Syst. Sci.*, V. 18, pp. 1089-1103 (www.hydrol-earth-syst-sci.net/18/1089/2014).
- Mazor, E. (1997), *Chemical and Isotopic Groundwater Hydrology: The Applied Approach*, 2nd edition. Marcel Dekker, Inc., New York, 413 p.
- Morse, J.W. and Arakaki, T. (1993), Adsorption and Coprecipitation of Divalent Metals with Mackinawite (FeS). *Geochimica et Cosmochimica Acta*, V. 57, pp. 3635-3640.
- Norton, S., Annable, M., Cho, J., Miller, M., Harris, J., Harris, W., Arthur, J., and Fischler, C. (July 2014), Preliminary Evaluation of the Trace Metal Leaching Potential of Source Water from the Clearwater Groundwater Replenishment Project. Contract report prepared by Indewater, LLC, University of Florida, and Florida Geological Survey for the City of Clearwater, Florida.

Price, R.E. and Pichler, T. (2006), Abundance and Mineralogical Association of Arsenic in the Suwannee Limestone (Florida): Implications for Arsenic Release During Water-Rock Interaction. *Chemical Geology*, V. 228, pp. 44-56.

Trommer, J. (March 2014), City of Clearwater Groundwater Replenishment Test Recharge and Monitoring Well Construction and Testing Report. Consulting report prepared by Leggette, Brashears & Graham, Inc. for City of Clearwater Engineering Department.

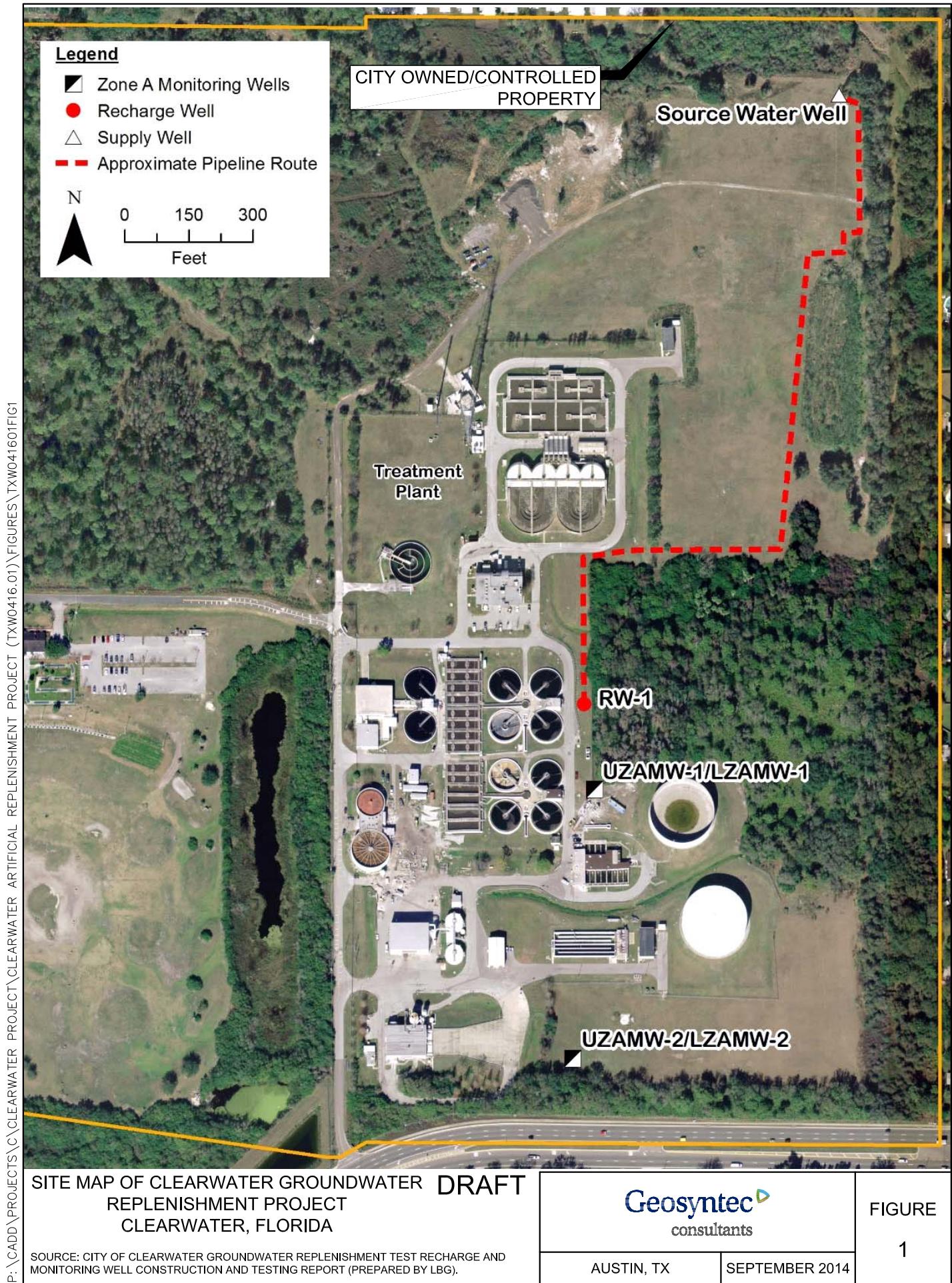
Zaporozec, A. (1972), Graphical Interpretation of Water Quality Data. *Ground Water*, V. 10, pp. 32-43.

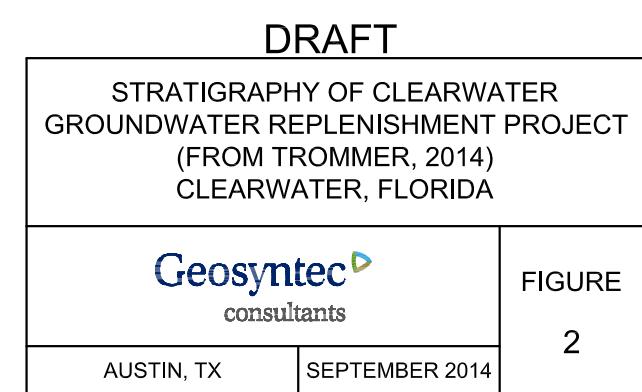
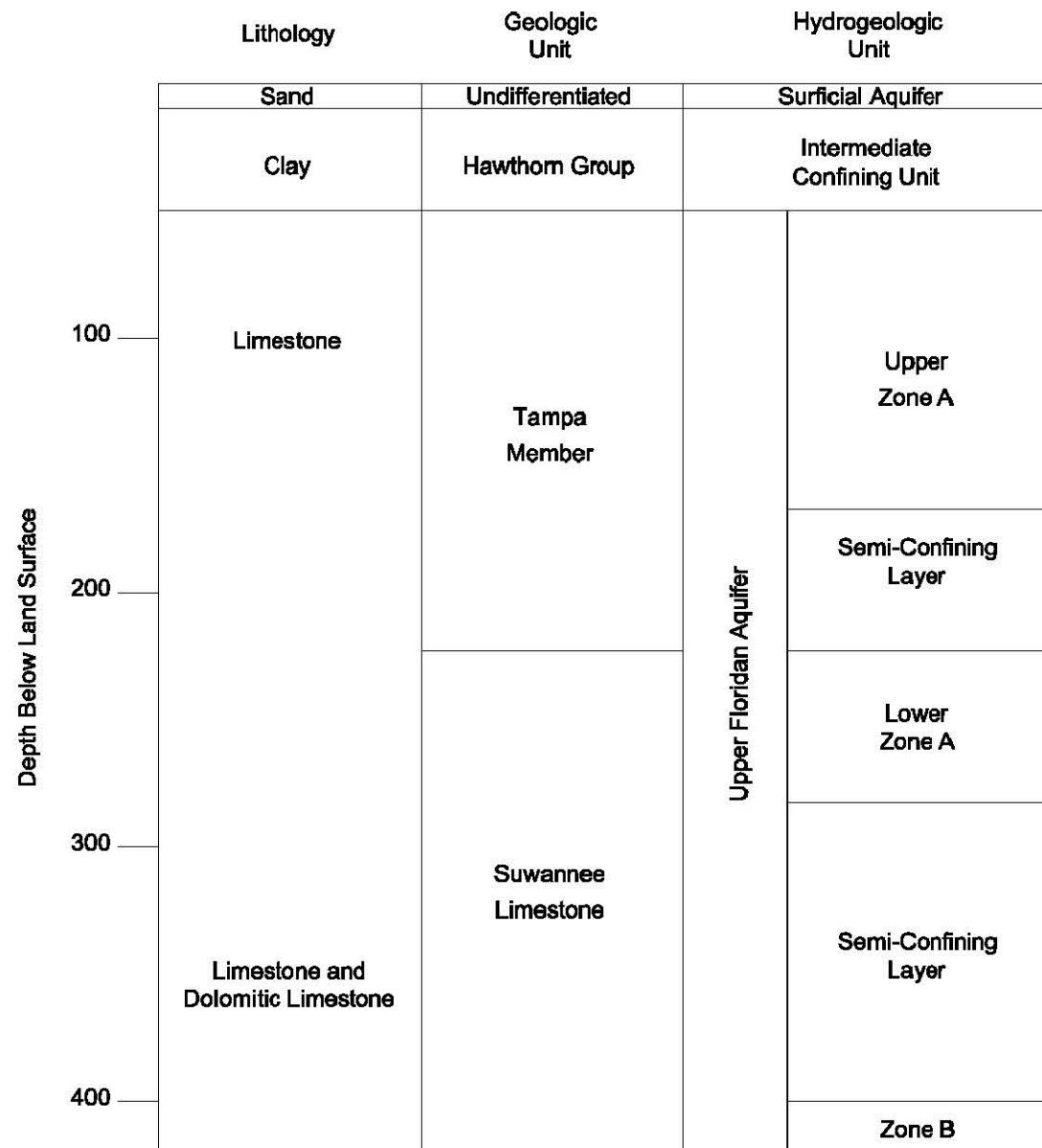
TABLES

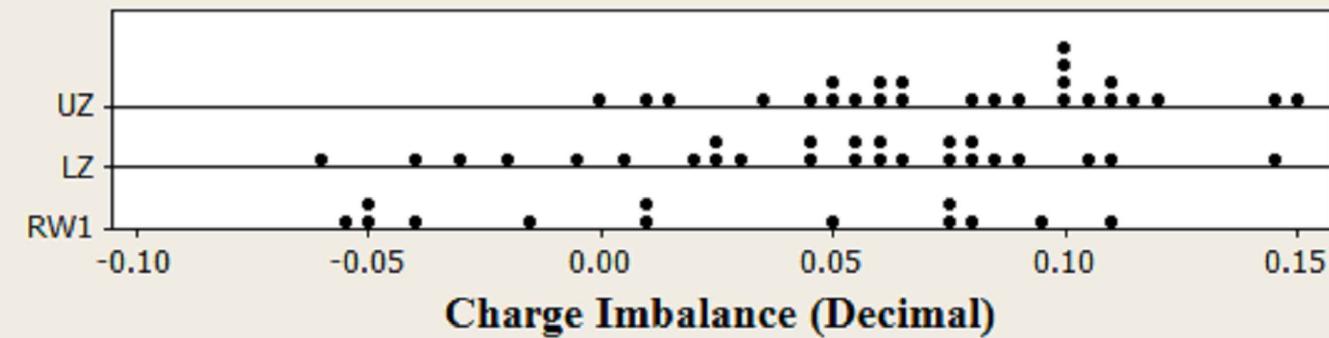
Table 1: Distribution of Iron and Arsenic in Groundwater

Iron (mg/L)						
Well	Mean	Min	Q1	Median	Q3	Max
RW1	0.024	0.020	0.020	0.020	0.033	0.033
UZA1	0.030	0.020	0.020	0.020	0.033	0.095
UZA2	0.106	0.050	0.072	0.097	0.140	0.190
LZA1&2	0.030	0.020	0.020	0.033	0.034	0.046
Arsenic ($\mu\text{g}/\text{L}$)						
Well	Mean	Min	Q1	Median	Q3	Max
RW1	14.462	13.000	14.000	14.000	15.000	17.000
UZA1	7.054	6.300	6.600	7.000	7.350	8.200
UZA2	26.769	26.000	26.000	26.000	28.000	28.000
LZA1&2	1.651	0.930	1.300	1.650	1.925	2.500

FIGURES







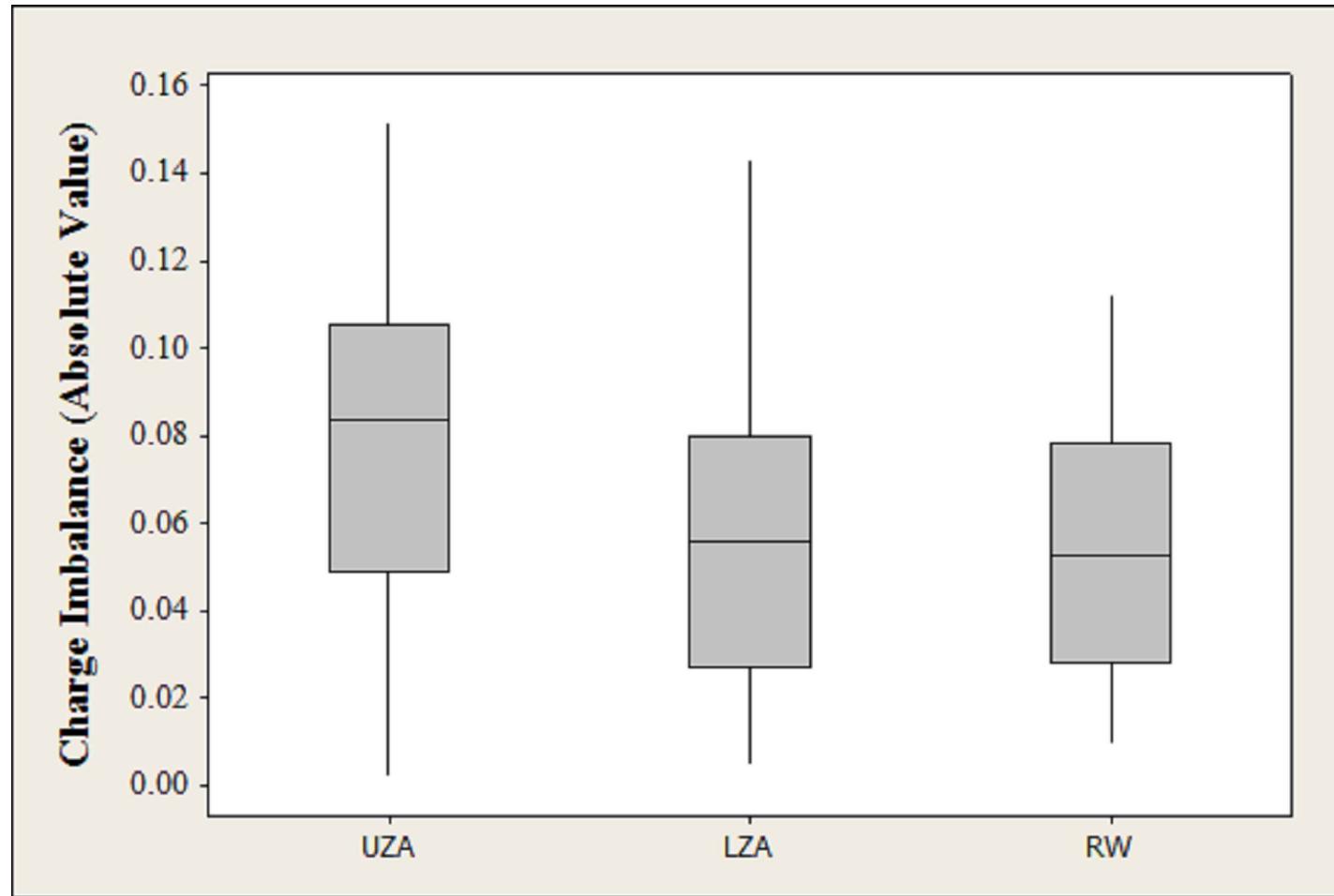
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DOTPLOTS OF ELECTRICAL CHARGE
IMBALANCES FOR LABORATORY ANALYSES
CLEARWATER, FLORIDA

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FIGURE
3

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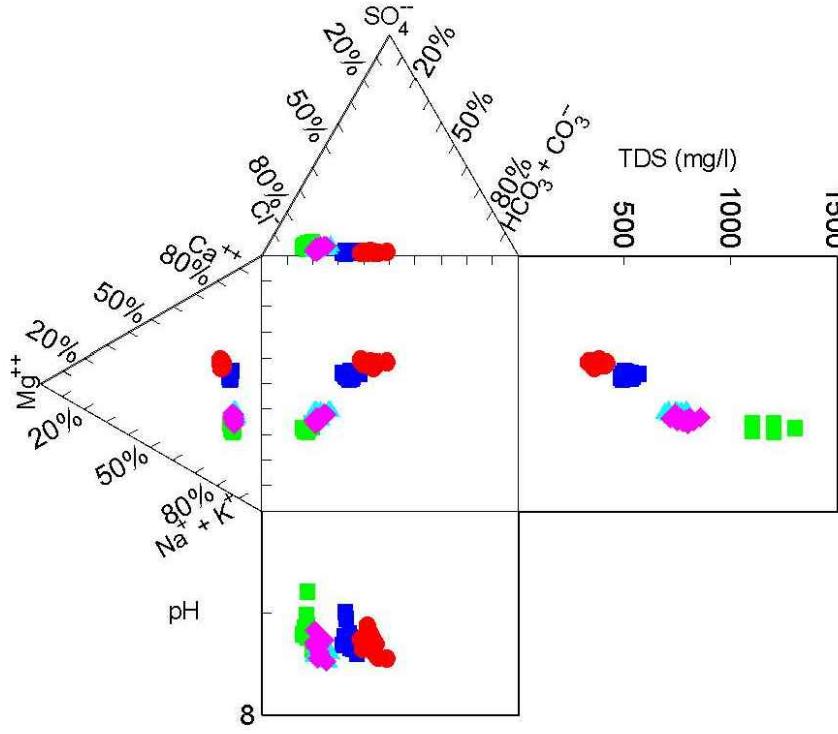
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BOX-AND-WHISKERS DIAGRAMS OF
ELECTRICAL CHARGE IMBALANCES FOR
LABORATORY ANALYSES
CLEARWATER, FLORIDA

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FIGURE
4

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Symbol	Well ID
■	RW-1
■	UZA-1
●	UZA-2
◆	LZA-1
◆	LZA-2

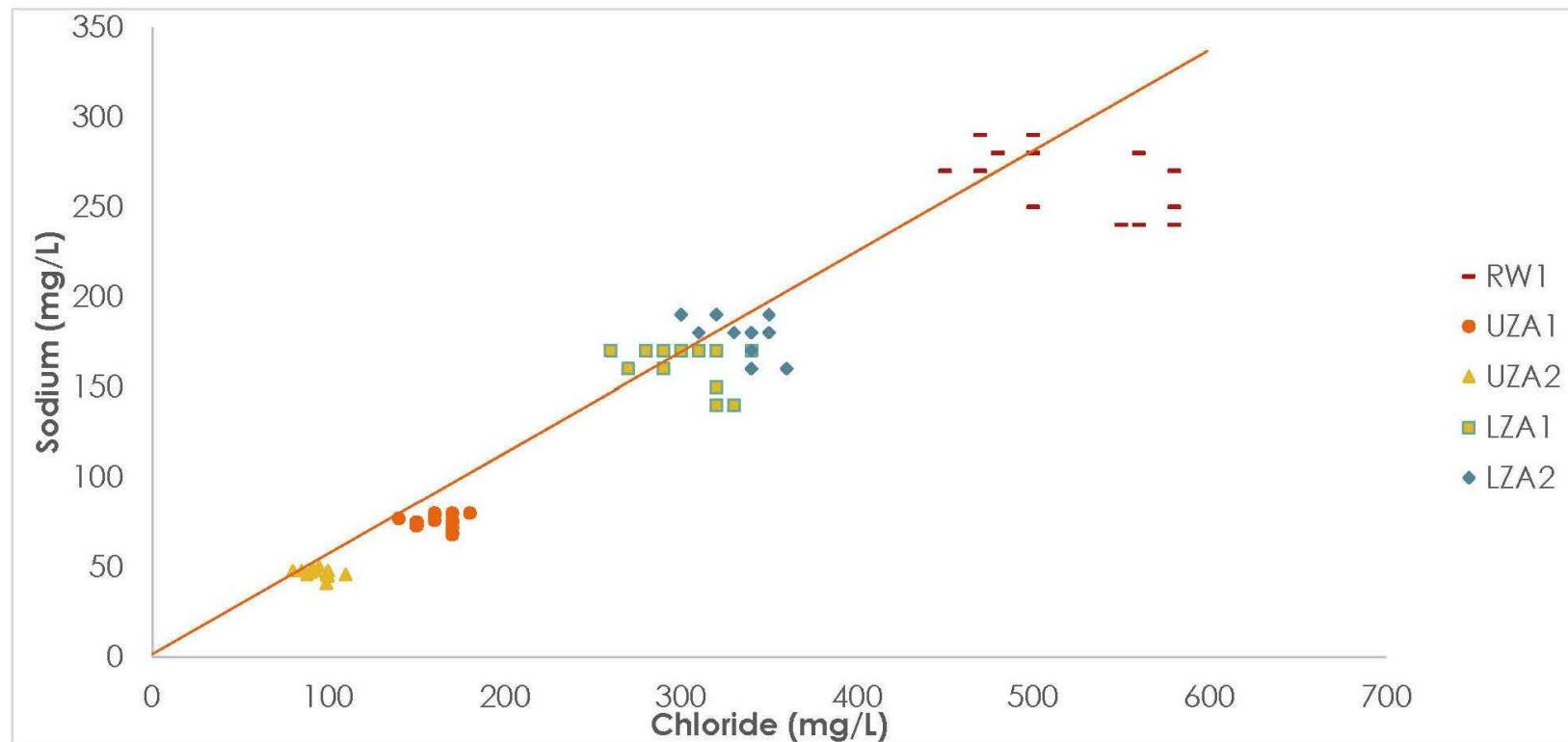
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DUROV DIAGRAM OF GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
5

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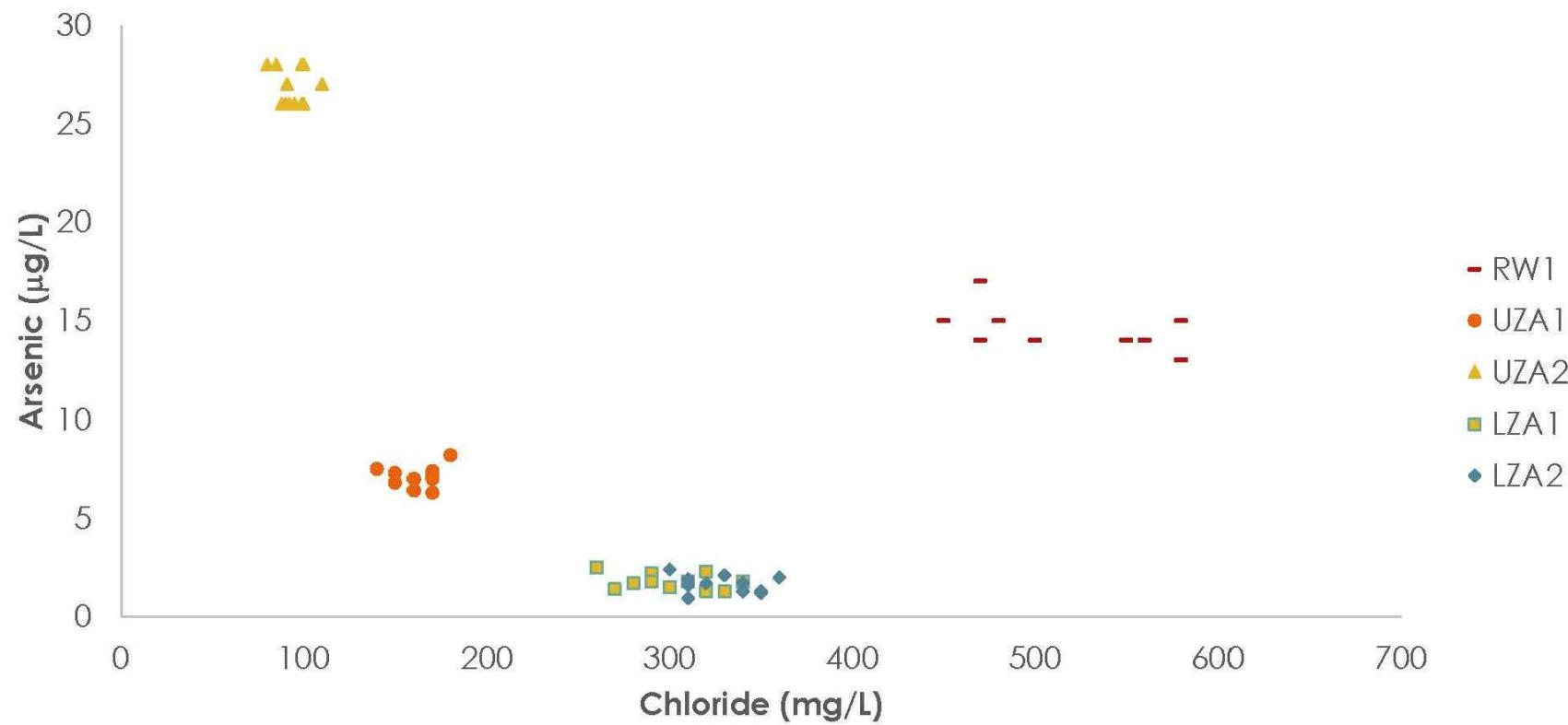
CHLORIDE VS. SODIUM FOR GROUNDWATERS CLEARWATER, FLORIDA

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SEPTEMBER 2014

FIGURE 6



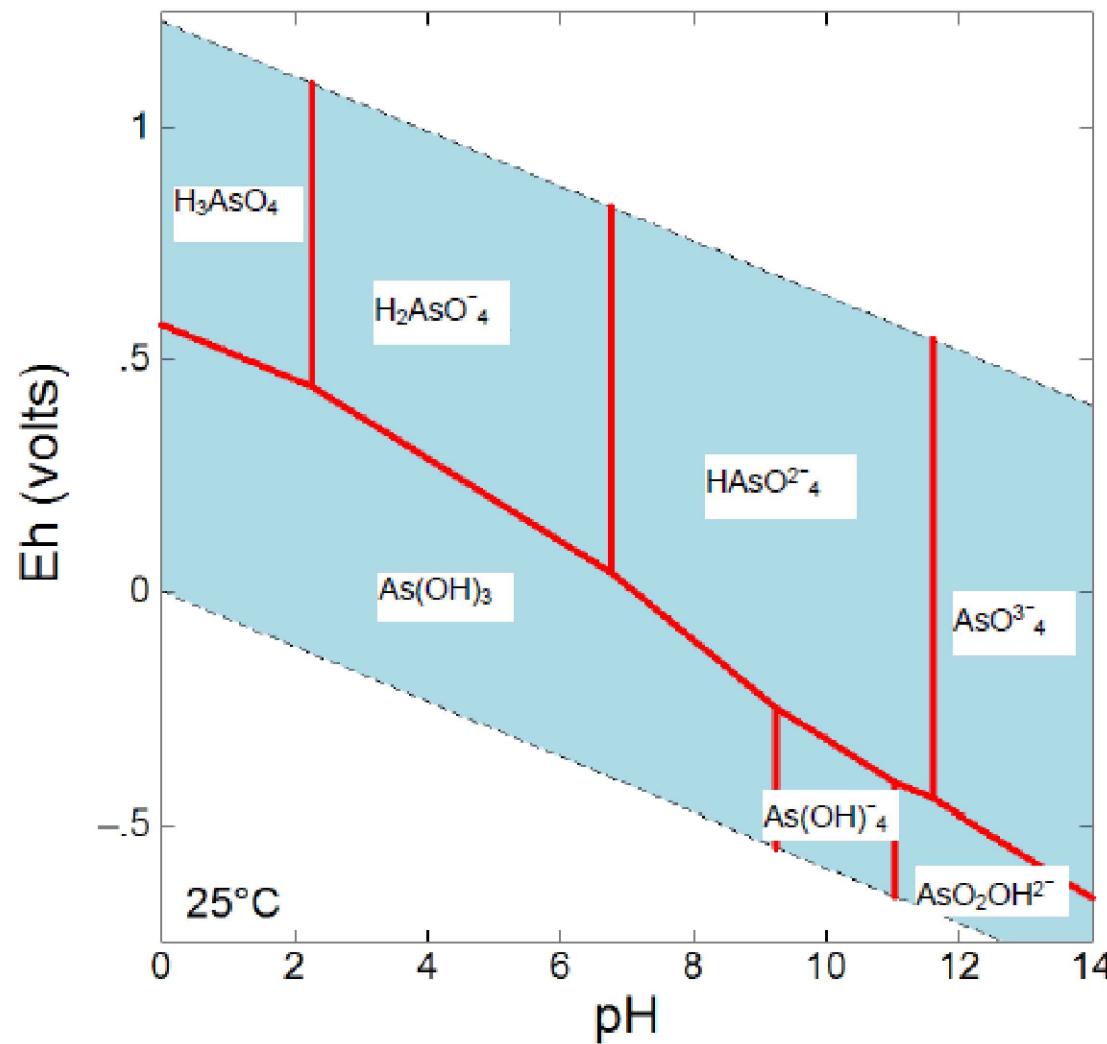
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ARSENIC CLUSTERS FOR GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
7

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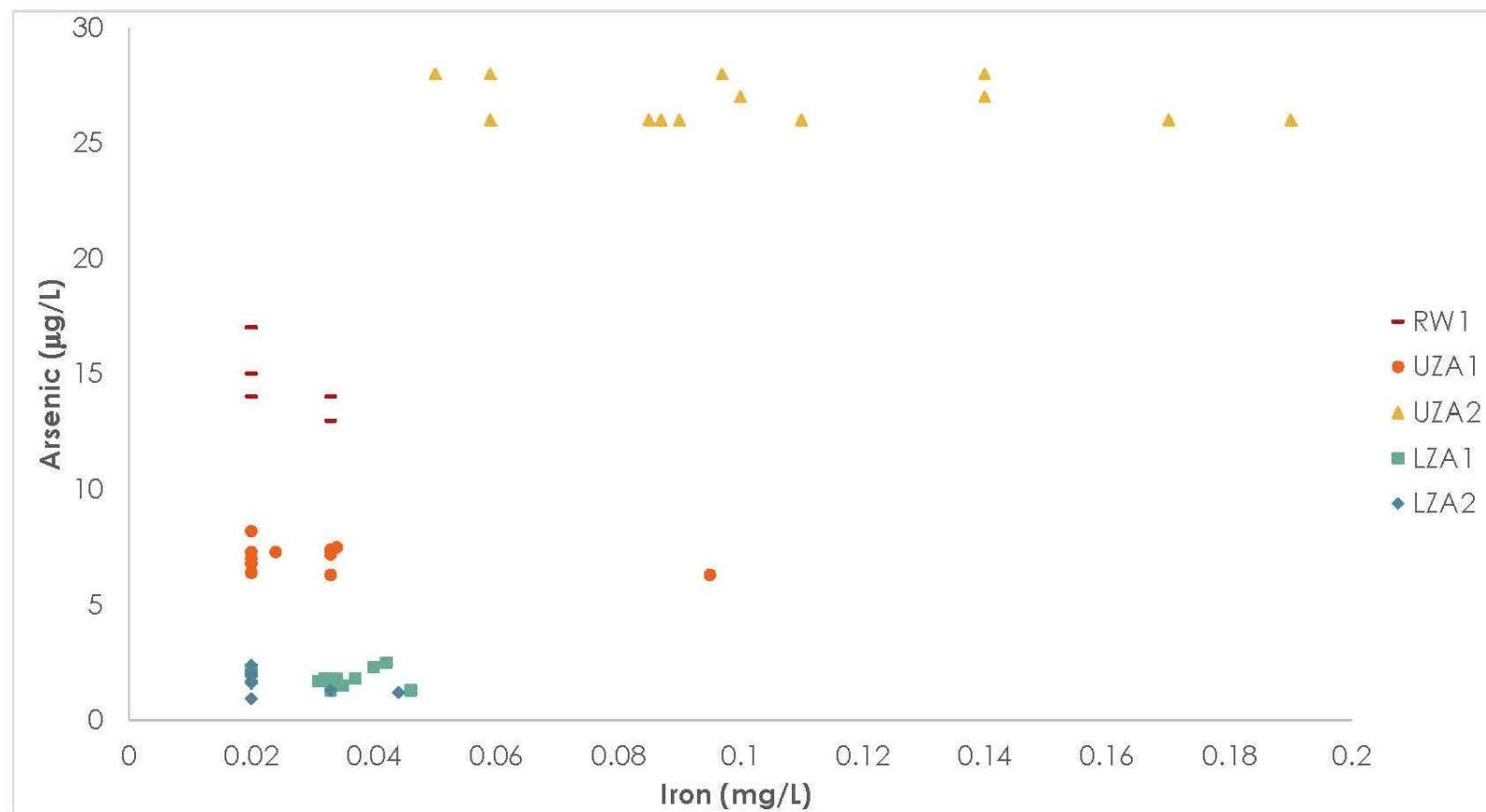
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EH-PH DIAGRAM OF ARSENIC-OXYGEN
SYSTEM (BASED ON HEM, 1985)
CLEARWATER, FLORIDA

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FIGURE
8

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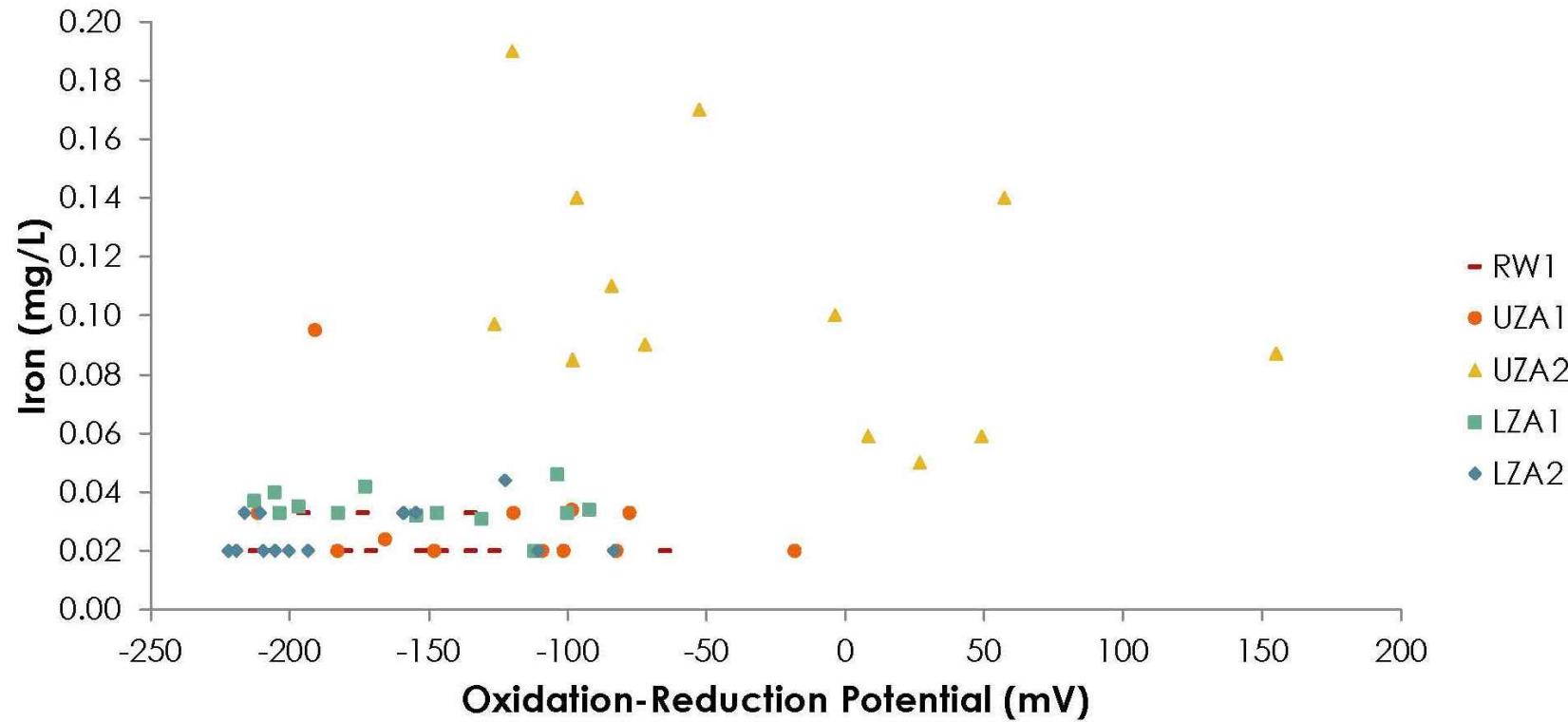
IRON VS. ARSENIC FOR GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
9

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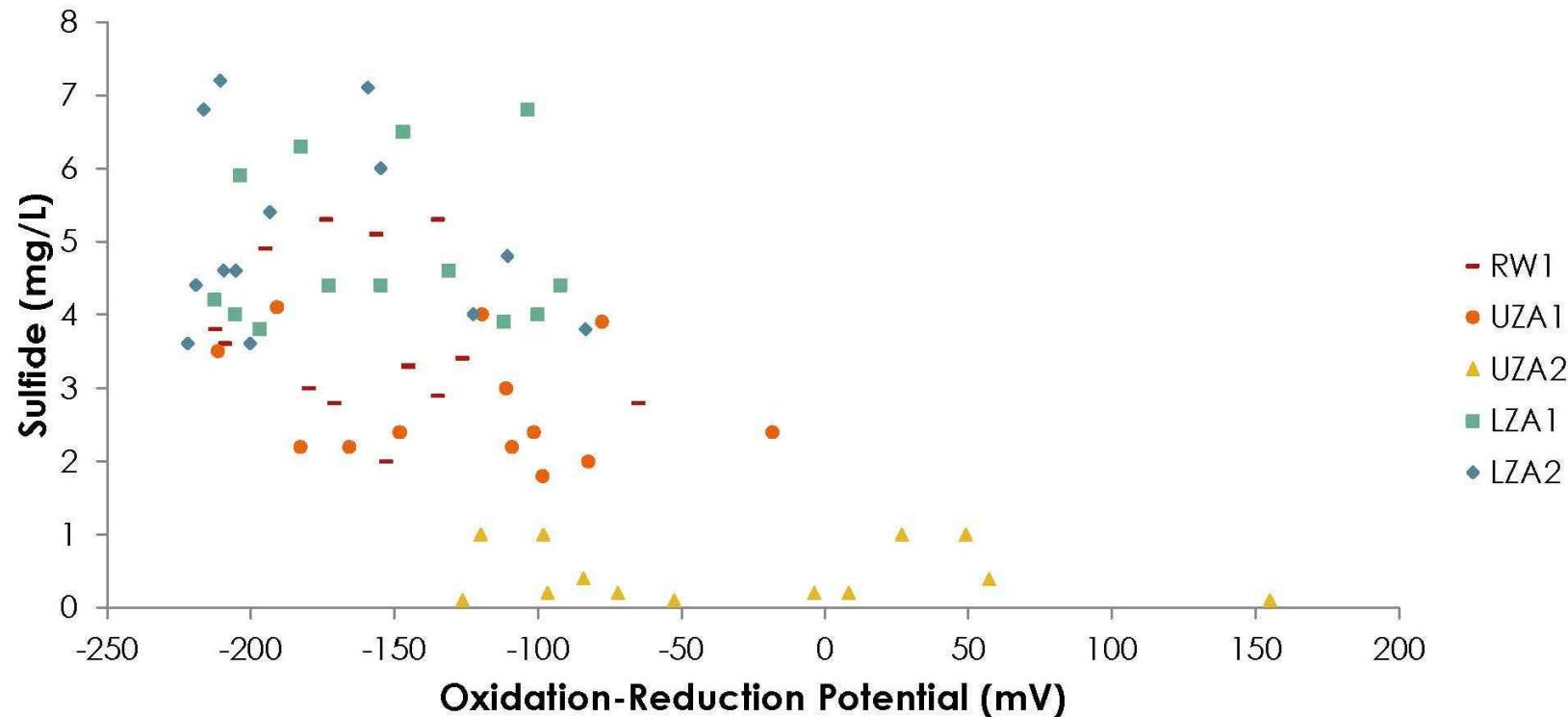
ORP VS. IRON FOR GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
10

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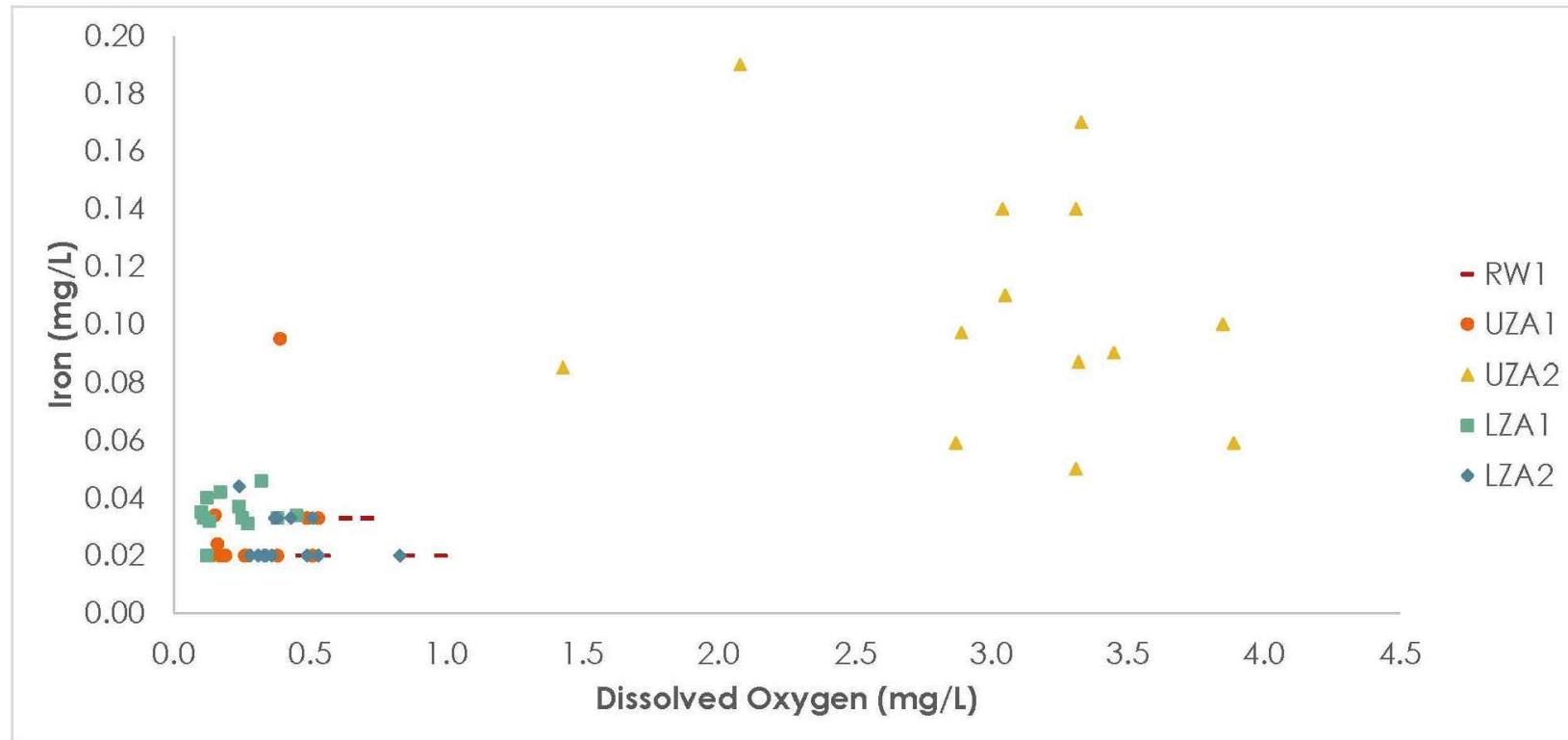
ORP VS. SULFIDE IN GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
11

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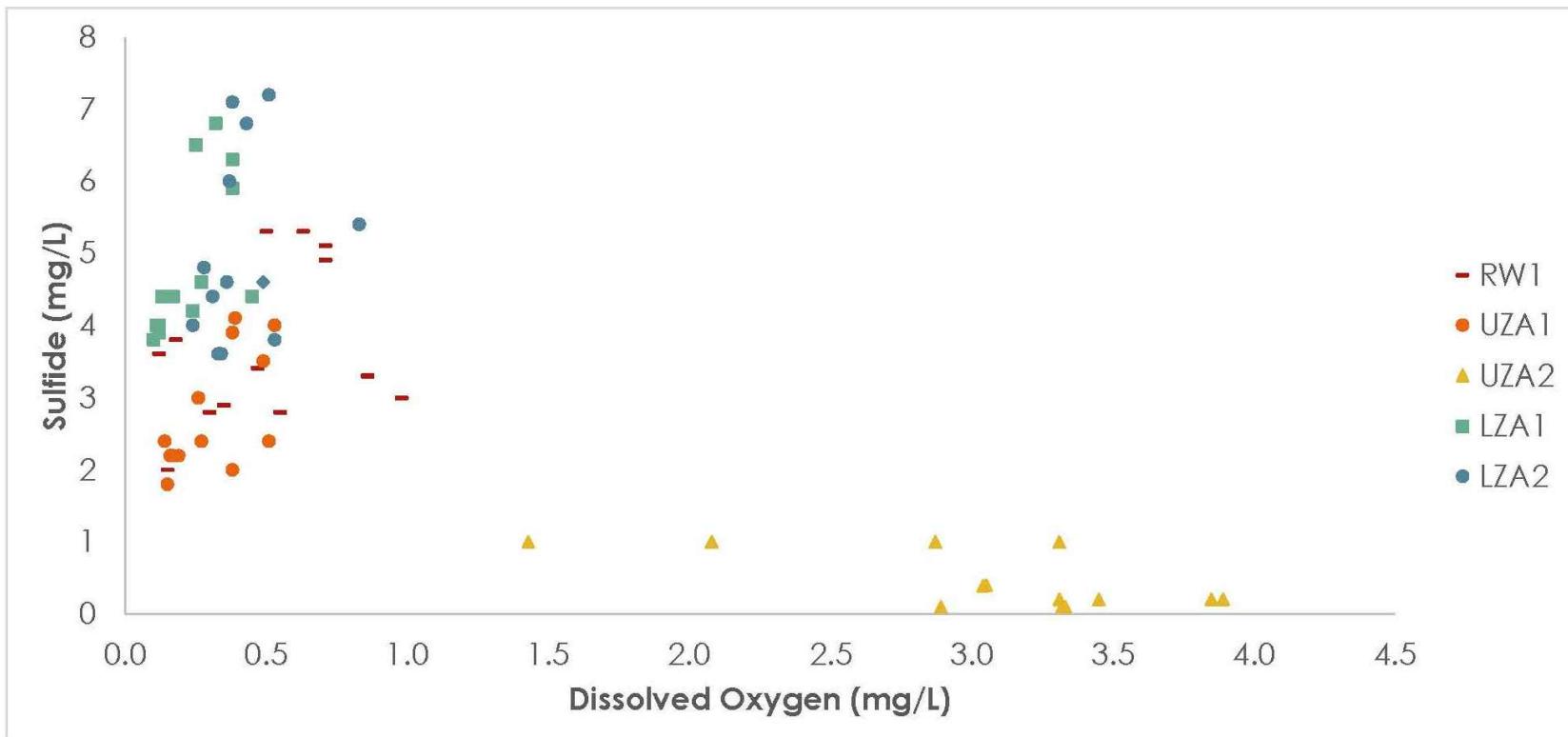
DISSOLVED OXYGEN VS. IRON FOR
GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
12

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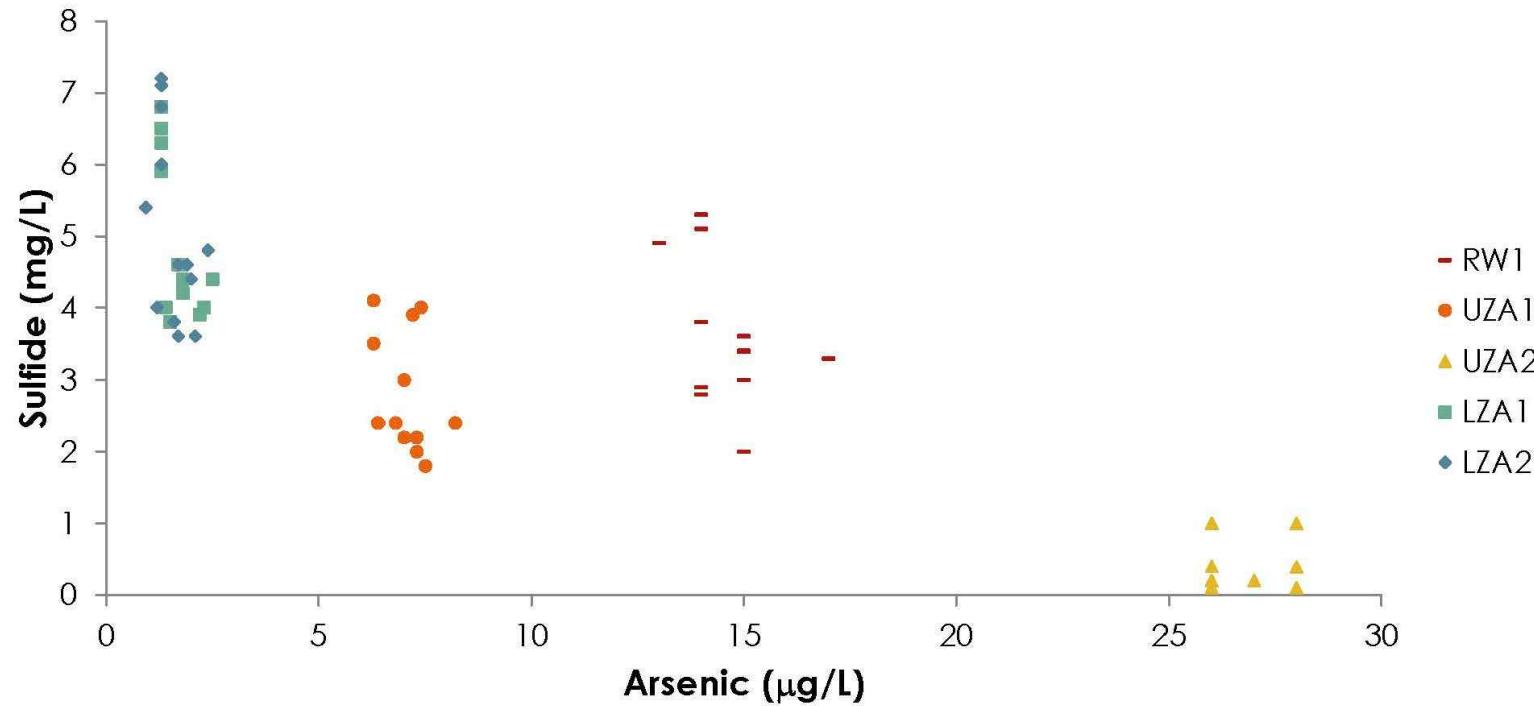
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DISSOLVED OXYGEN VS. SULFIDE FOR
GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
13

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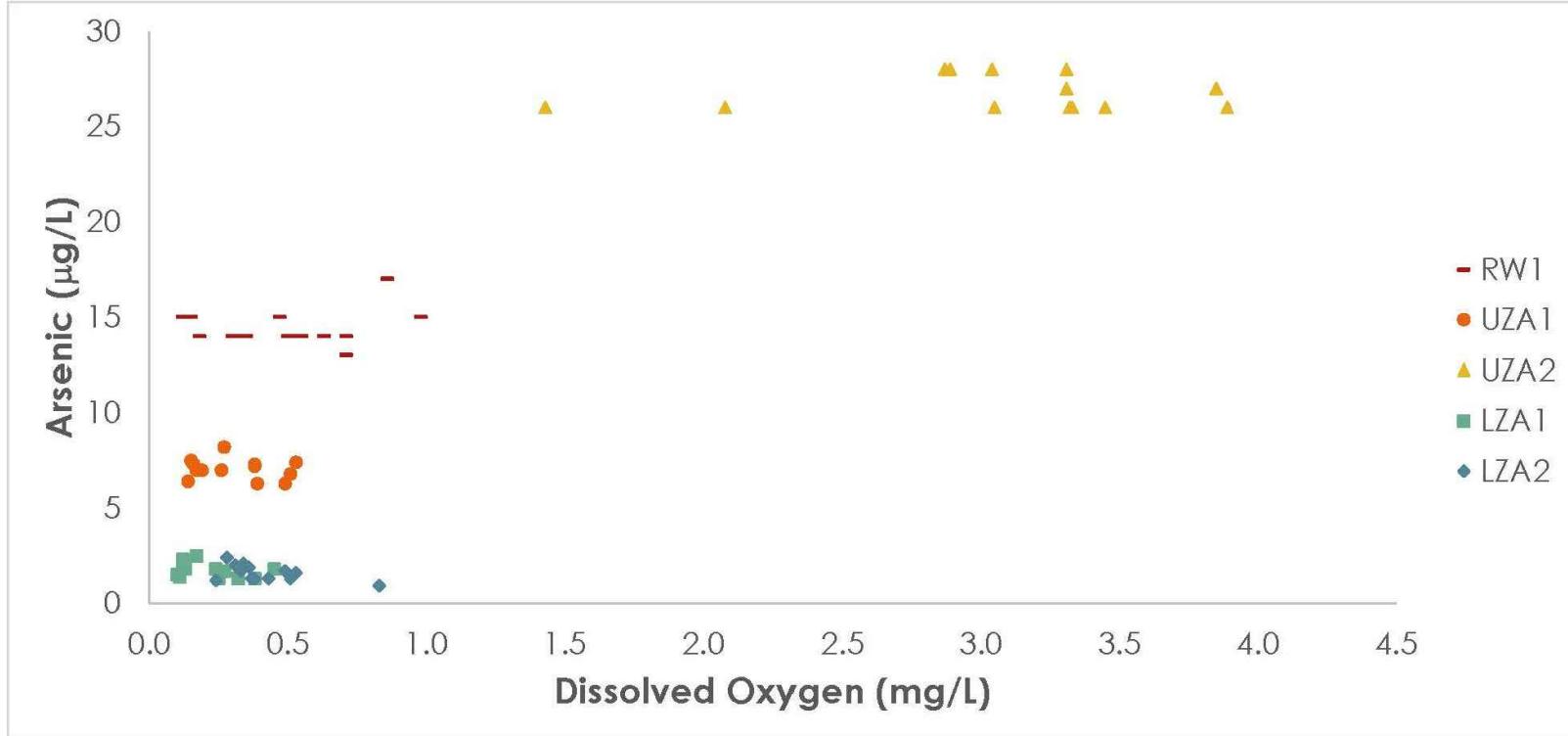
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ARSENIC VS. SULFIDE FOR
GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
14

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DISSOLVED OXYGEN VS. ARSENIC FOR
GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
15

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UZA-1

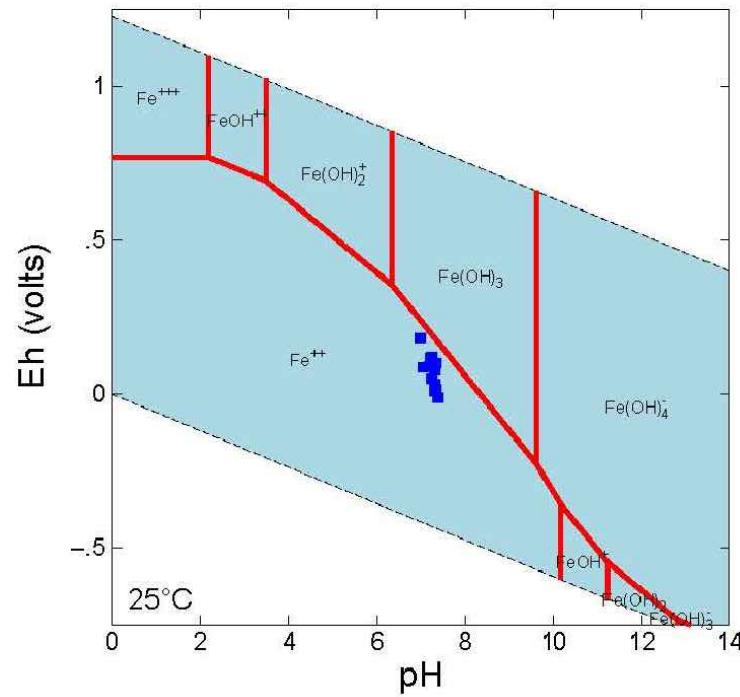


Diagram $\text{Fe}^{++}, T = 25^\circ\text{C}$, $P = 1013 \text{ bars}$, $a(\text{H}_2\text{O}) = 10^{-2.3}$, $a(\text{H}_2\text{O}_2) = 1$

UZA-2

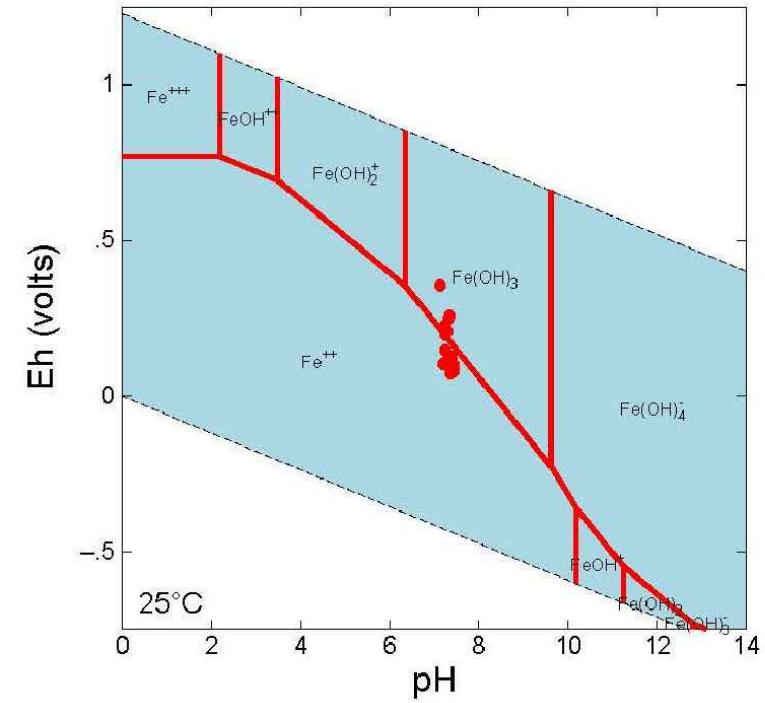


Diagram $\text{Fe}^{++}, T = 25^\circ\text{C}$, $P = 1013 \text{ bars}$, $a(\text{H}_2\text{O}) = 10^{-2.3}$, $a(\text{H}_2\text{O}_2) = 1$

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EH-PH DIAGRAMS OF IRON-OXYGEN
SYSTEM FOR UPPER ZONE
GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
16

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RW-1

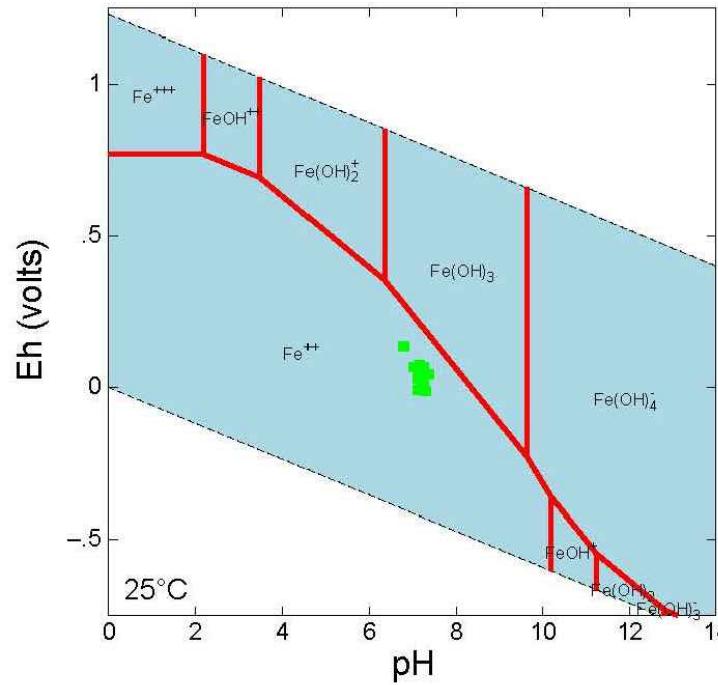


Diagram Fe⁺⁺, T = 25 °C, P = 1013 bars, a [madv] = 10^{-12} a [H₂O] = 1

LZA-1 and LZA-2

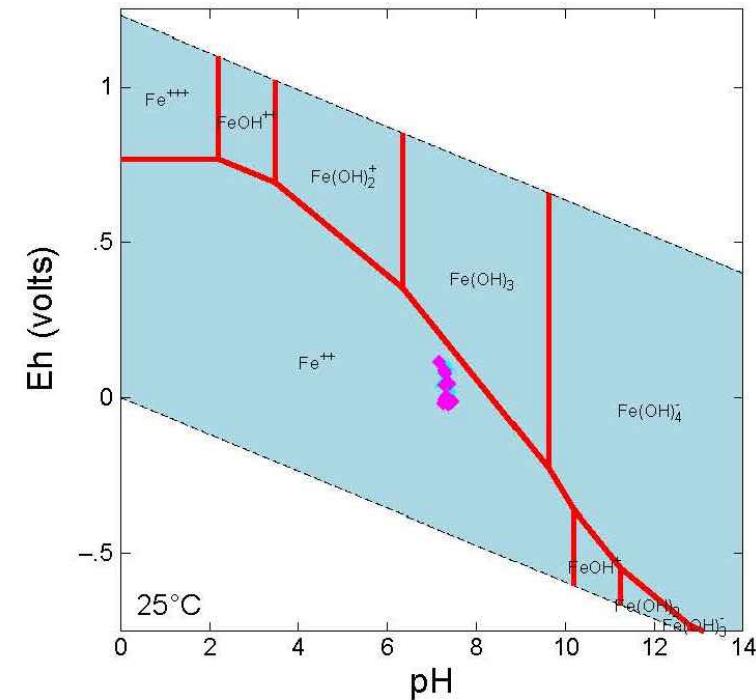


Diagram Fe⁺⁺, T = 25 °C, P = 1013 bars, a [madv] = 10^{-12} a [H₂O] = 1

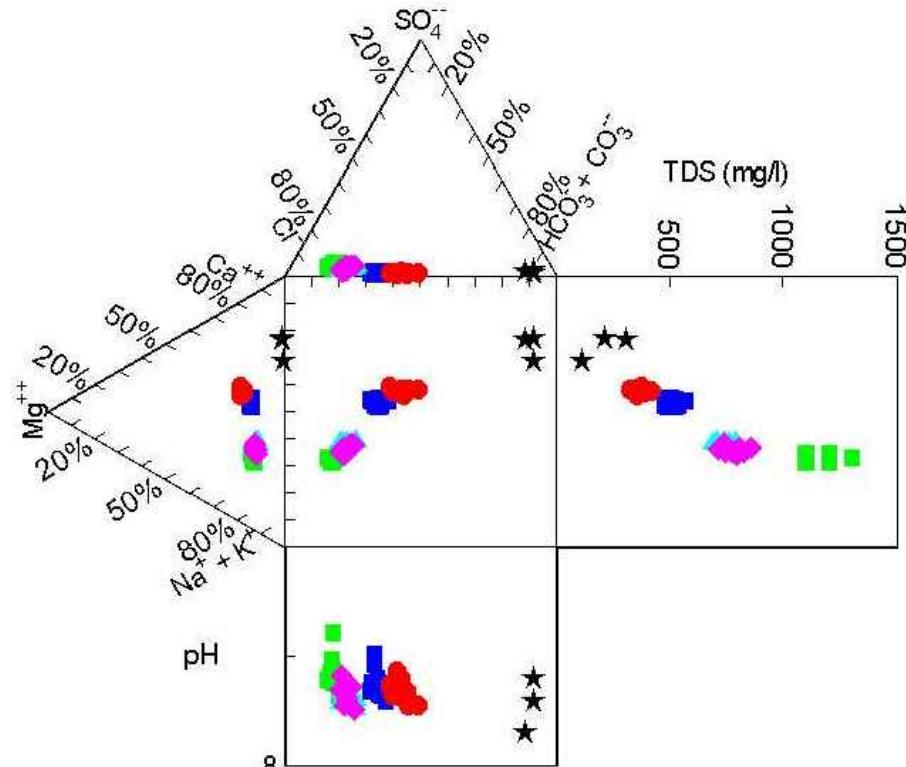
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EH-PH DIAGRAMS OF IRON-OXYGEN
SYSTEM FOR LOWER ZONE
GROUNDWATERS
CLEARWATER, FLORIDA

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FIGURE
17

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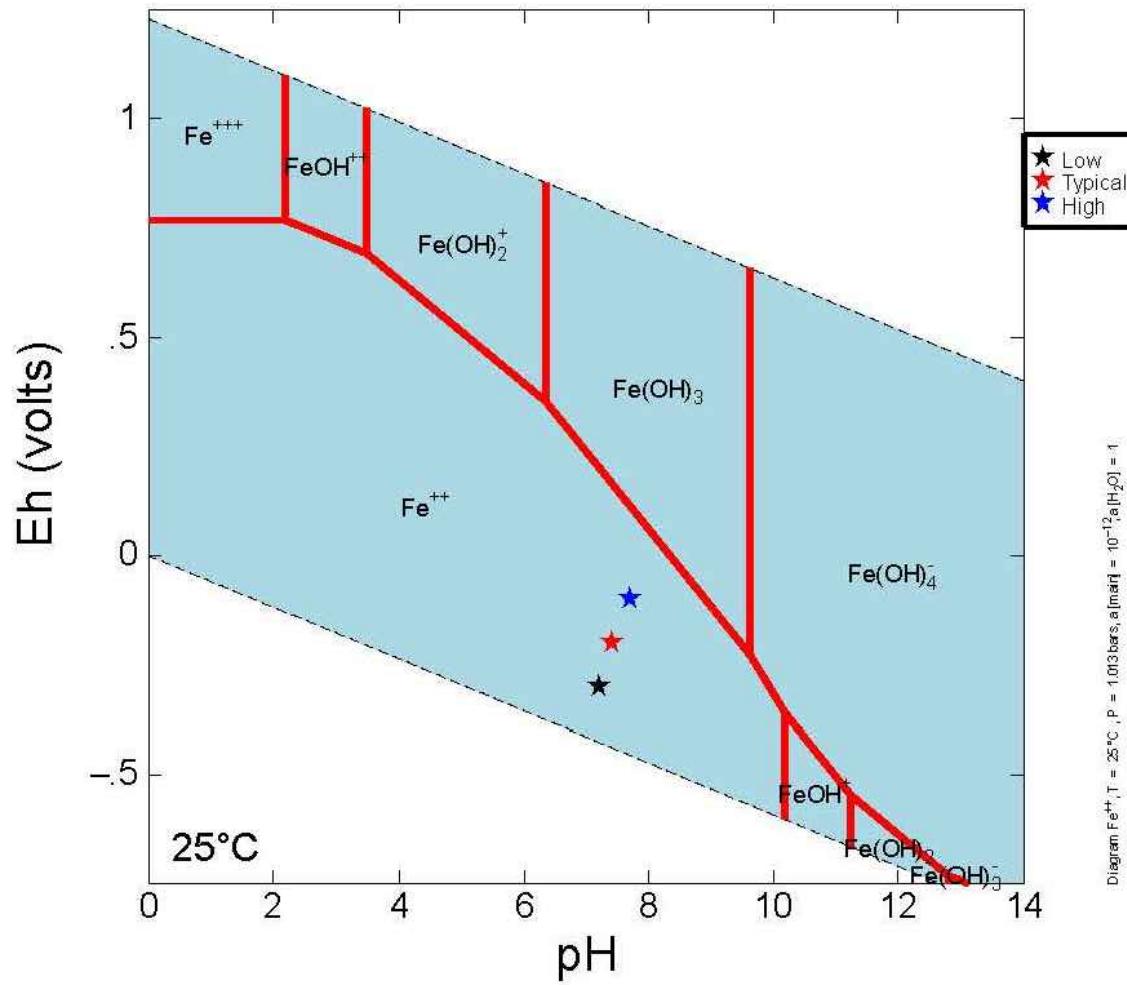
Symbol	Well ID
■	RW1
■	UZA1
●	UZA2
◆	LZA1
◆	LZA2
★	Purified
★	Reclaimed Waters

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DUROV DIAGRAM OF GROUNDWATERS AND
PURIFIED RECLAIMED WATERS
CLEARWATER, FLORIDA

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FIGURE
18

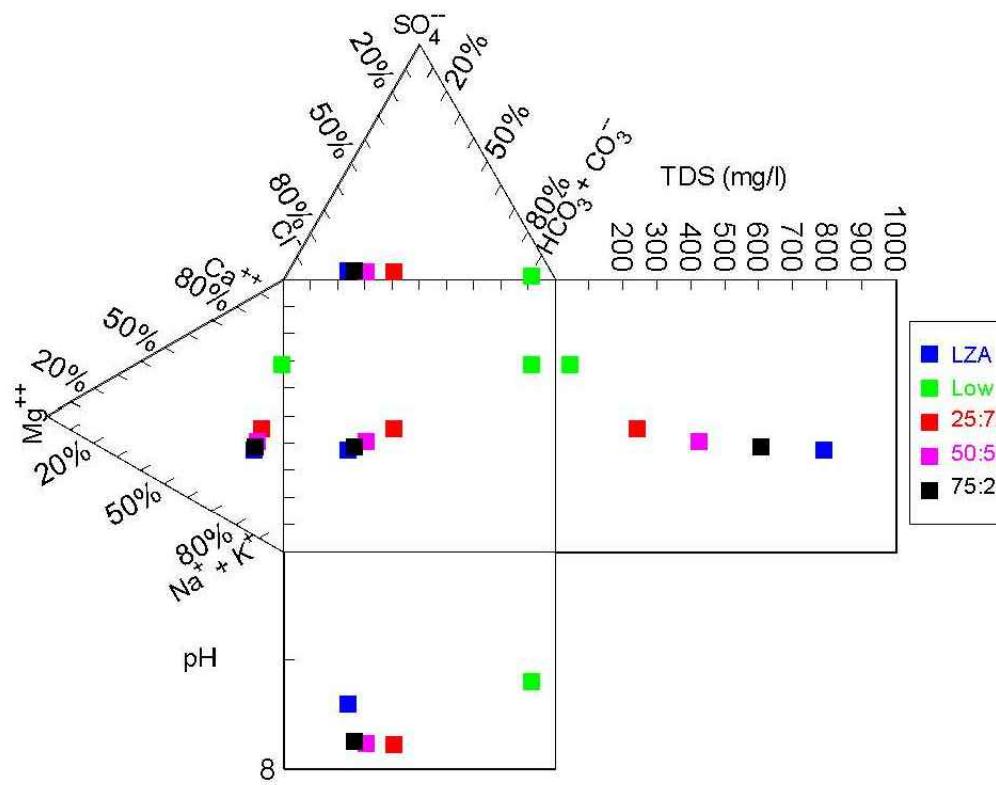


EH-PH DIAGRAM OF IRON-OXYGEN SYSTEM
FOR PURIFIED RECLAIMED WATERS
CLEARWATER, FLORIDA

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FIGURE
19

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DUROV DIAGRAM OF MIXTURES OF LOWER
ZONE GROUNDWATER AND LOW-TDS
PURIFIED RECLAIMED WATER
CLEARWATER, FLORIDA

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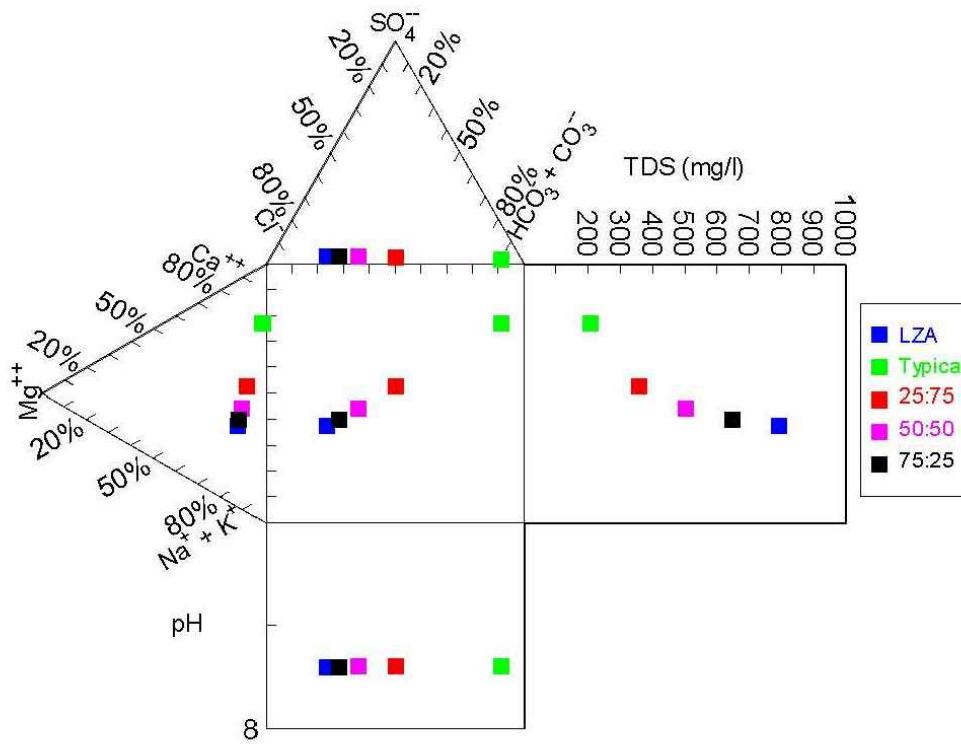
FIGURE
20

NOTE:

- GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

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DUROV DIAGRAM OF MIXTURES OF LOWER
ZONE GROUNDWATER AND TYPICAL-TDS
PURIFIED RECLAIMED WATER
CLEARWATER, FLORIDA

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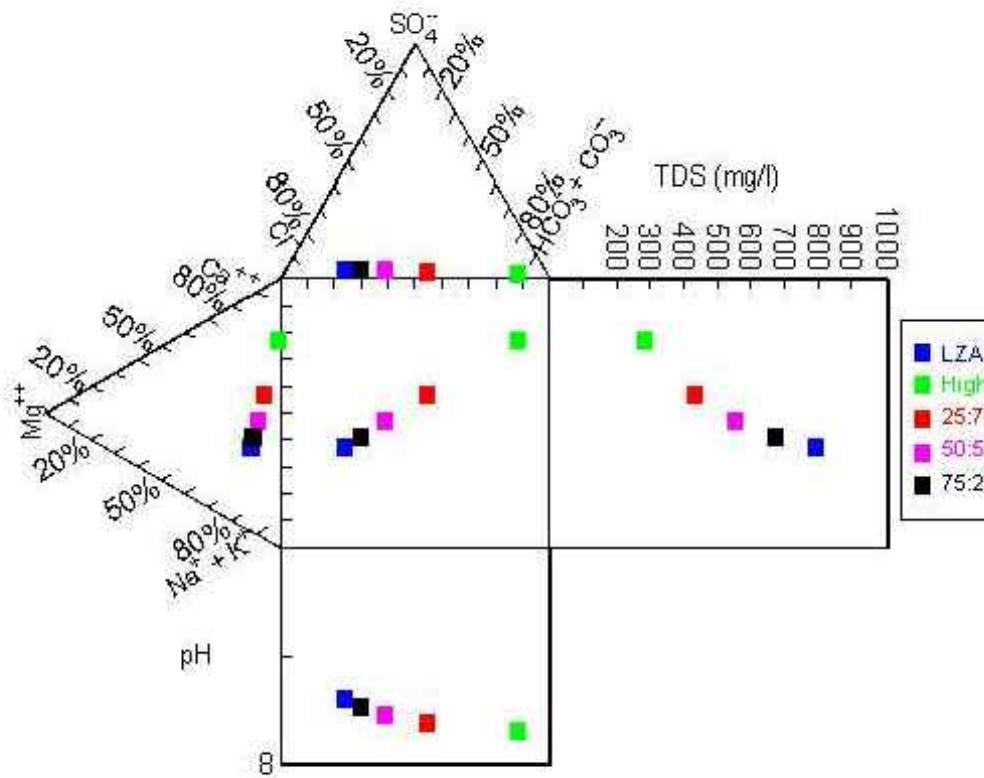
FIGURE
21

NOTE:

- GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

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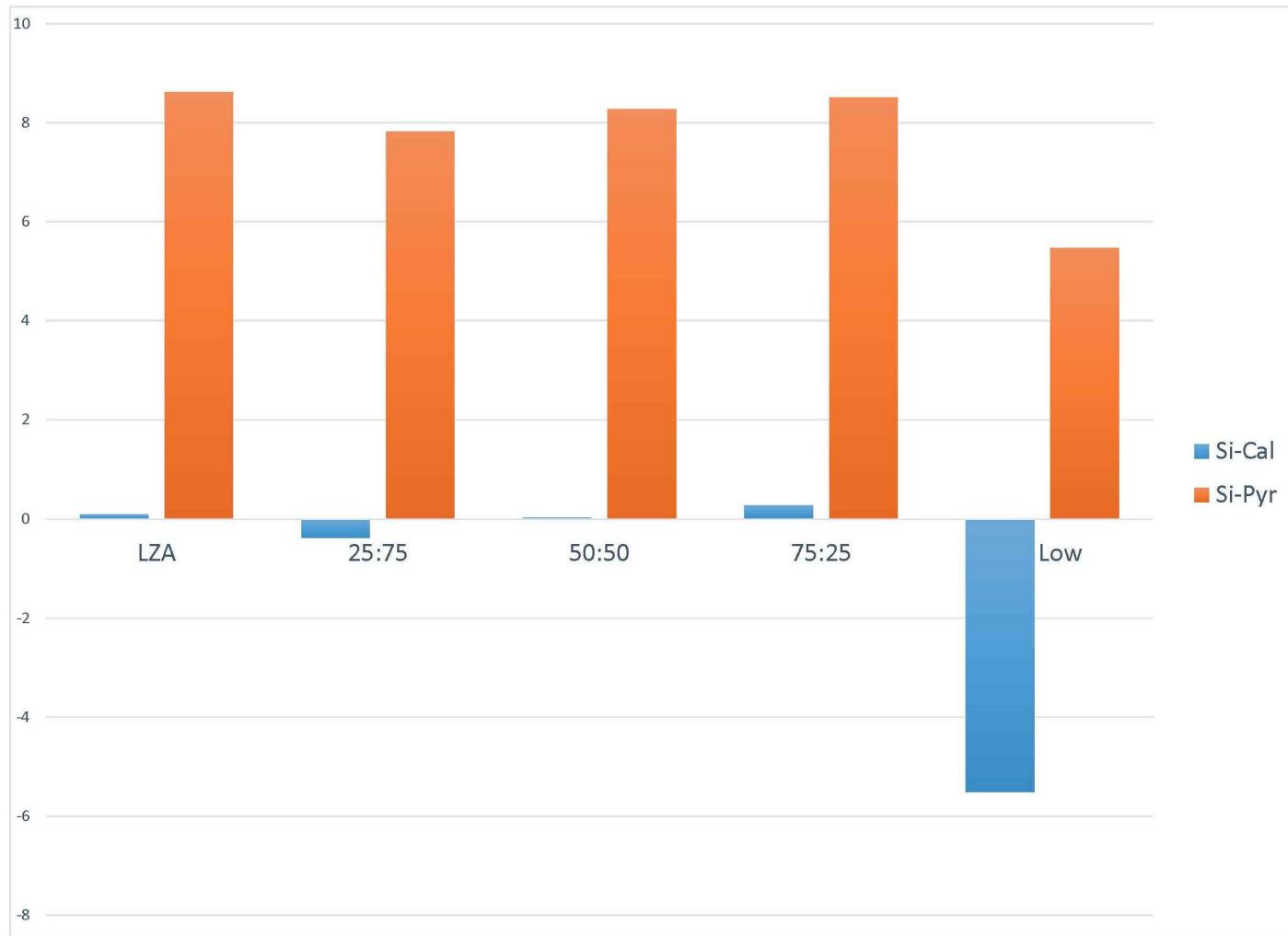
DUROV DIAGRAM OF MIXTURES OF LOWER
ZONE GROUNDWATER AND HIGH-TDS
PURIFIED RECLAIMED WATER
CLEARWATER, FLORIDA

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FIGURE
22

NOTE:

- GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.



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CALCITE AND PYRITE SATURATION INDICES
OF MIXTURES OF LOWER ZONE
GROUNDWATER AND LOW-TDS PURIFIED
RECLAIMED WATER
CLEARWATER, FLORIDA

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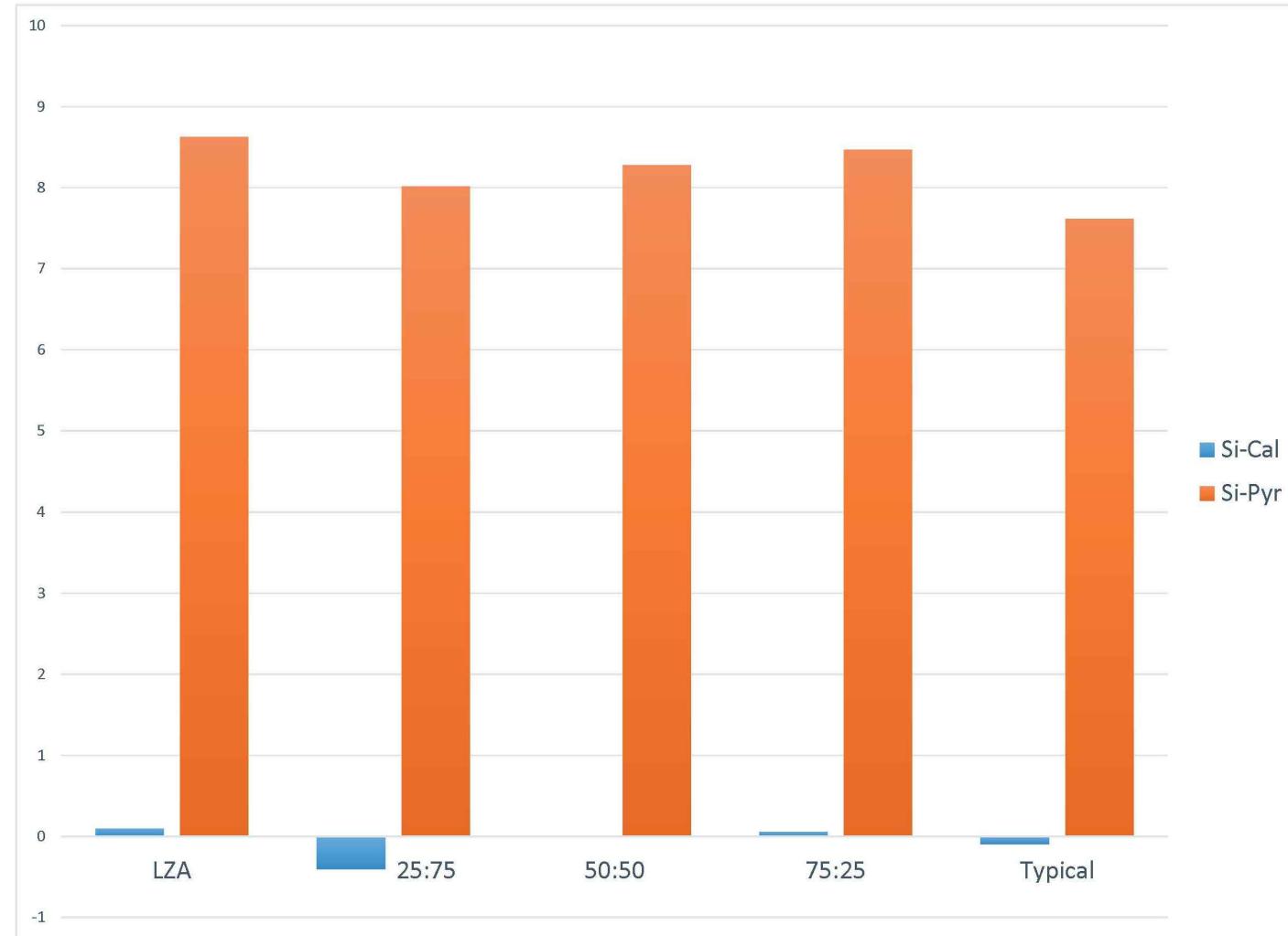
FIGURE
23

NOTE:

1. GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

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CALCITE AND PYRITE SATURATION INDICES
OF MIXTURES OF LOWER ZONE
GROUNDWATER AND TYPICAL-TDS
PURIFIED RECLAIMED WATER
CLEARWATER, FLORIDA

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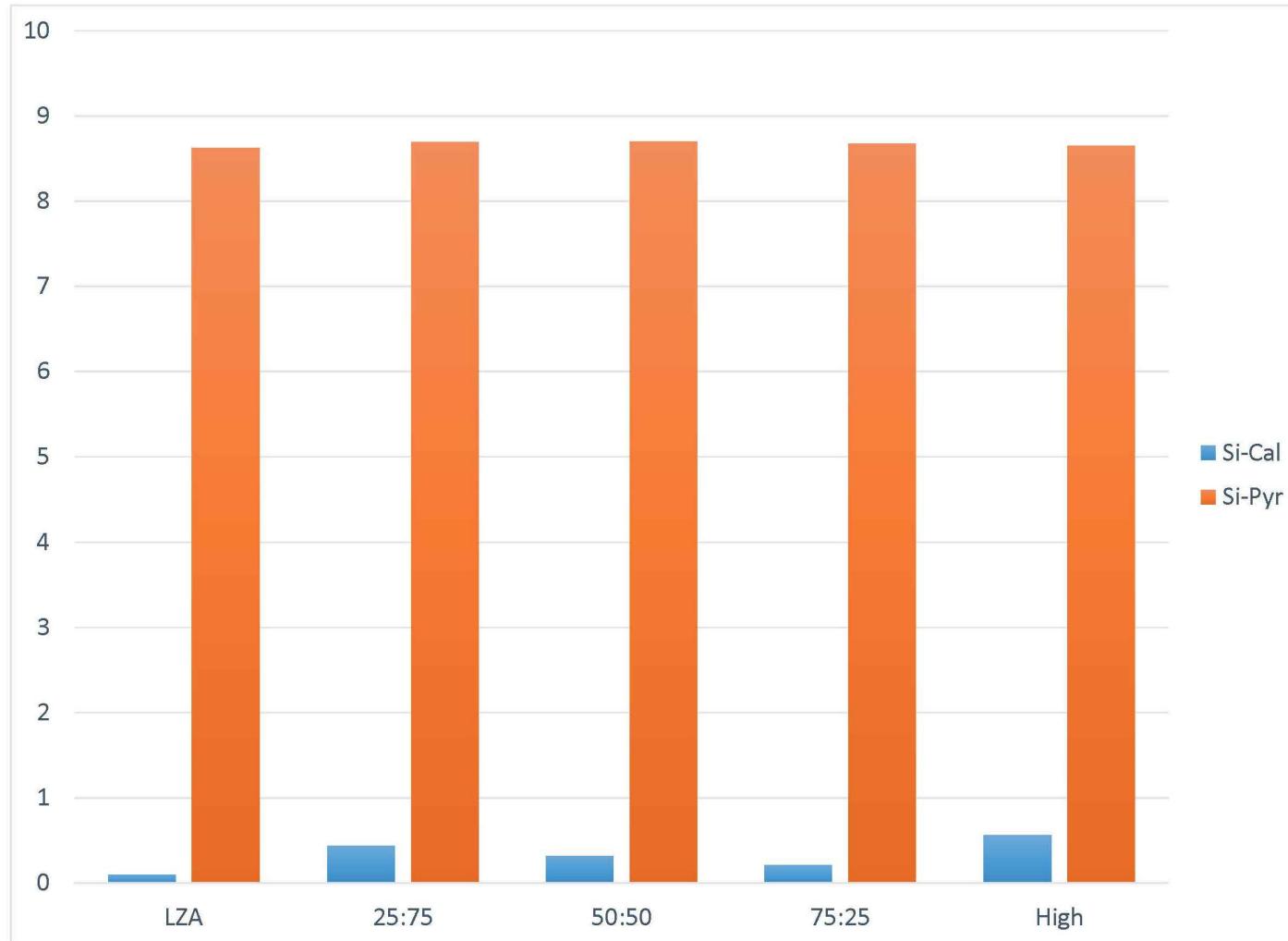
FIGURE
24

NOTE:

1. GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

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CALCITE AND PYRITE SATURATION INDICES
OF MIXTURES OF LOWER ZONE
GROUNDWATER AND HIGH-TDS PURIFIED
RECLAIMED WATER
CLEARWATER, FLORIDA

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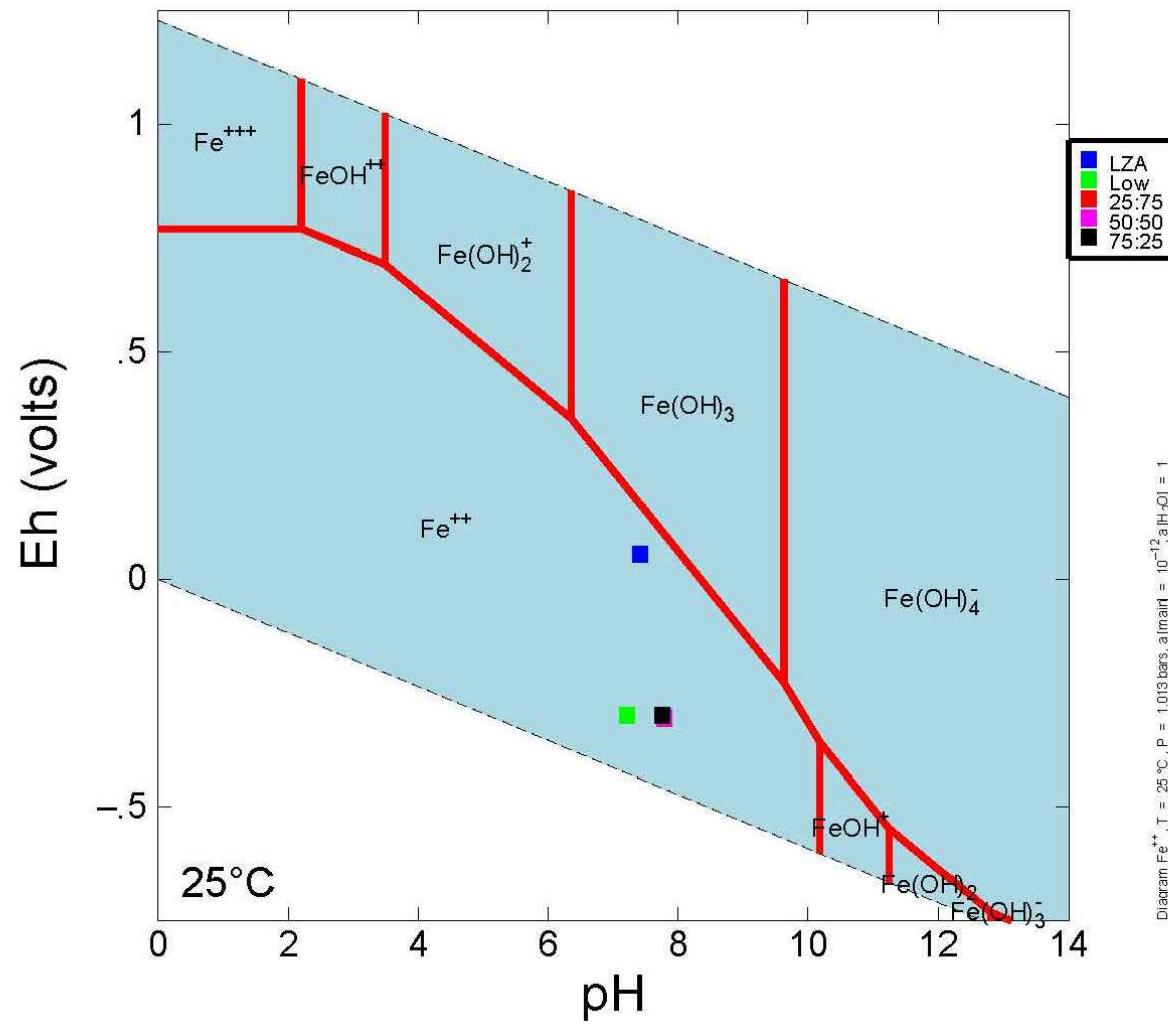
FIGURE
25

NOTE:

1. GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

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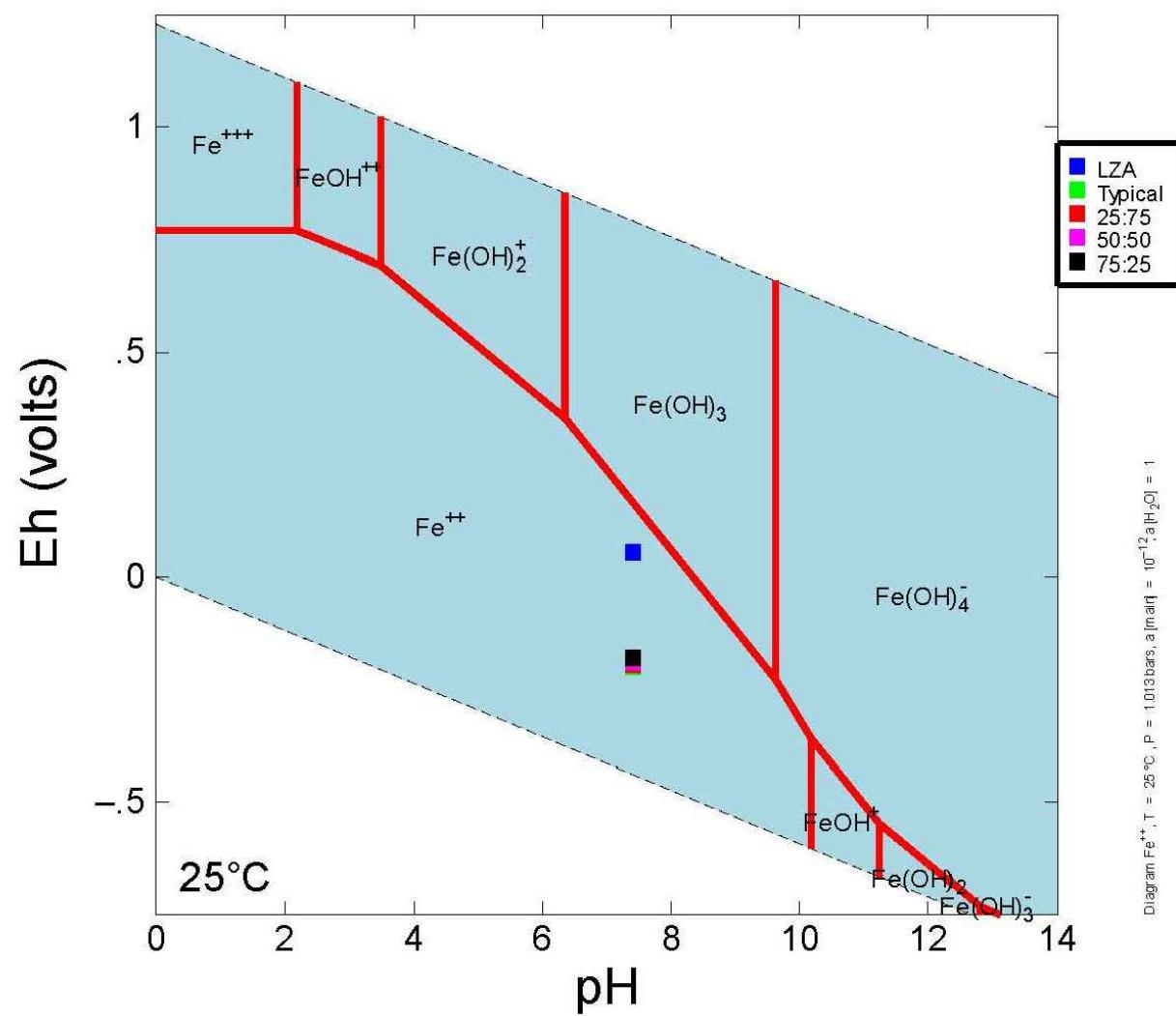
EH-PH DIAGRAMS OF IRON-OXYGEN
SYSTEM OF MIXTURES OF LOWER ZONE
GROUNDWATER AND LOW-TDS PURIFIED
RECLAIMED WATER
CLEARWATER, FLORIDA

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FIGURE
26

NOTE:

1. GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.



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EH-PH DIAGRAMS OF IRON-OXYGEN
SYSTEM OF MIXTURES OF LOWER ZONE
GROUNDWATER AND TYPICAL-TDS
PURIFIED RECLAIMED WATER
CLEARWATER, FLORIDA

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FIGURE
27

NOTE:

1. GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

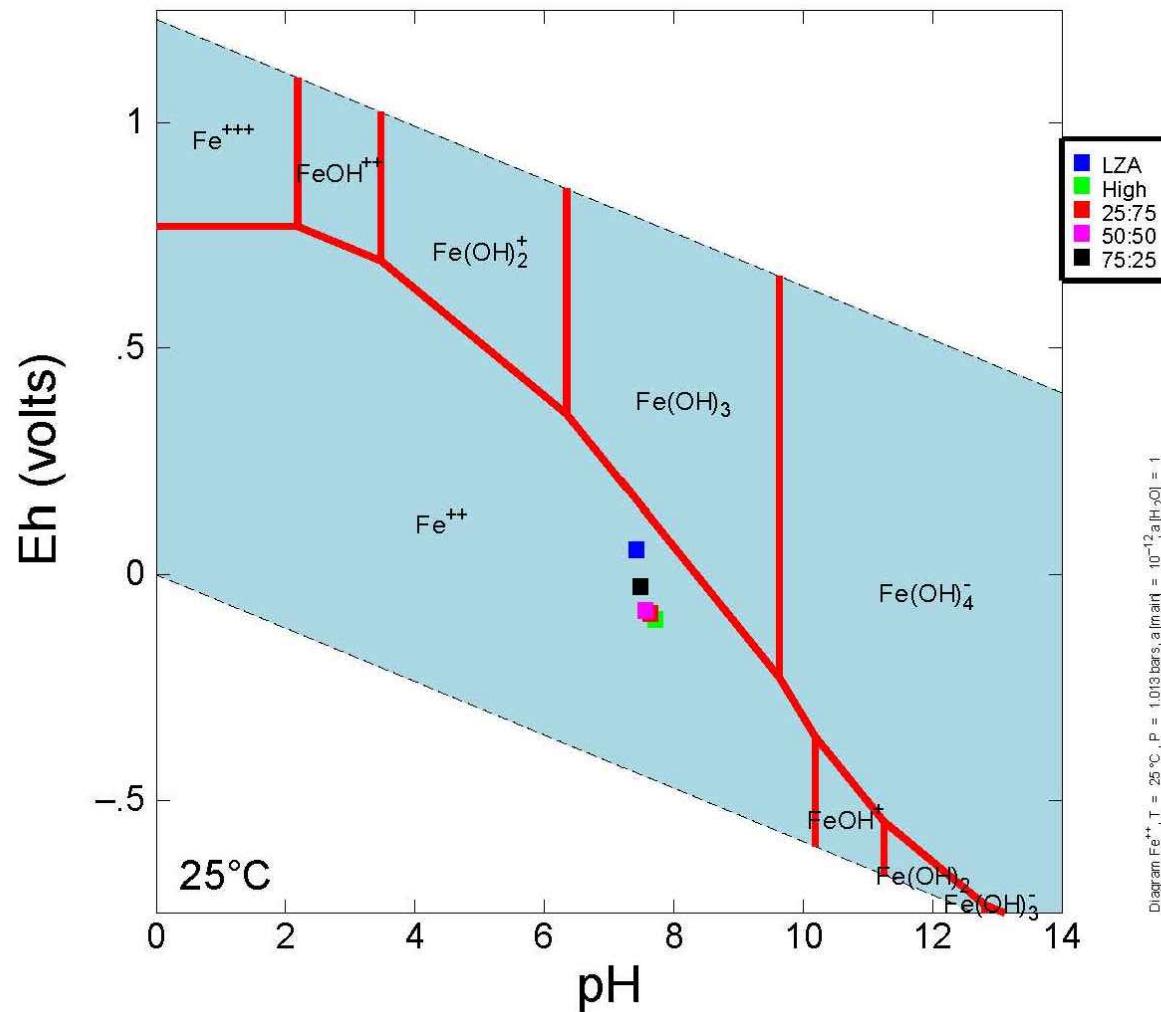


Diagram Fe^{++} , $T = 25^\circ\text{C}$, $P = 1.013 \text{ bars}$, $a[\text{air}] = 10^{-12} a[\text{H}_2\text{O}] = 1$

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EH-PH DIAGRAMS OF IRON-OXYGEN
SYSTEM OF MIXTURES OF LOWER ZONE
GROUNDWATER AND HIGH-TDS PURIFIED
RECLAIMED WATER
CLEARWATER, FLORIDA

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FIGURE
28

NOTE:

- GROUNDWATER: PURIFIED RECLAIMED WATER MIX PERCENTAGES SHOWN.

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ATTACHMENT A

Field and Laboratory Data

Provided by LBG

Attachment A
Summary of Laboratory Analyses and Field Measurements

Well ID	RW1	RW1	RW1	RW1	RW1	RW1	RW1	RW1	RW1	RW1	RW1	RW1
Parameter (units)\Date	4/9/2014	4/16/2014	4/23/2014	5/1/2014	5/6/2014	5/14/2014	5/21/2014	5/30/2014	6/4/2014	6/12/2014	6/18/2014	6/25/2014
Calcium (mg/L)	99	100	96	98	100	110	100	110	100	100	100	98
Mg (mg/L)	30	33	31	31	32	33	32	35	32	29	33	29
Sodium (mg/L)	270	270	250	280	270	290	240	290	280	240	280	240
K (mg/L)	5.8	6.3	6.1	6	6.2	6.8	6.3	6.6	6.5	5.7	6	6
HCO ₃ (mg/L)	190	190	200	190	190	200	190	180	180	190	190	190
Sulfate (mg/L)	29	34	37	44	44	54	52	42	45	40	40	43
Sulfide (mg/L)	2.9	3.6	3.8	2.8	2	2.8	3	3.3	3.4	5.3	5.3	5.1
Arsenic (µg/L)	14	15	14	14	15	14	15	17	15	14	14	14
Iron (mg/L)	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.033	0.033	0.033
Chloride (mg/L)	470	450	500	500	580	500	580	470	480	550	560	560
Chloride* (mg/L)	565	568	515	566	556	610	506	619	577	499	574	491
Fluoride (mg/L)	1.6	1.7	0.15	1.6	2	1.9	0.24	1.8	1.9	2.2	2.2	2.3
pH (SU)	7.02	7.13	7.28	7.12	7.17	6.79	7.22	7.21	7.14	7.25	7.22	7.36
ORP (mV)	-135.1	-209	-212.4	-170.8	-152.7	-65	-179.7	-145.3	-126.5	-135.1	-173.7	-156.2
DO (mg/L)	0.35	0.12	0.18	0.3	0.15	0.55	0.98	0.86	0.47	0.5	0.63	0.71
TDS (mg/L)	1100	1100	1100	1200	1200	1200	1100	1200	1100	1200	1200	1200
Temp. (deg. C)	23.9	24.6	24.8	25.2	25.1	25.4	24.1	24.9	25.2	25.8	24.9	25.5

Note:

1. * indicates chloride values have been corrected for charge balance.

Attachment A
Summary of Laboratory Analyses and Field Measurements

Well ID	RW1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1	UZA1
Parameter (units)\Date	7/2/2014	4/9/2014	4/16/2014	4/23/2014	5/1/2014	5/6/2014	5/14/2014	5/21/2014	5/30/2014	6/4/2014	6/12/2014	6/18/2014	
Calcium (mg/L)	95	77	88	75	75	77	81	80	80	76	81	81	
Mg (mg/L)	30	15	17	15	14	15	15	15	15	14	15	14	
Sodium (mg/L)	250	79	80	74	76	77	80	80	75	73	76	72	
K (mg/L)	6	3.7	3.8	3.7	3.4	3.5	3.6	3.5	3.2	3	3.1	2.8	
HCO ₃ (mg/L)	170	180	180	180	180	180	180	180	170	170	170	180	
Sulfate (mg/L)	48	7.3	5.2	6.3	5.5	5.3	8.5	9.8	5.2	3.7	8.8	4.3	
Sulfide (mg/L)	4.9	2.2	2.2	2.2	2.4	1.8	3	2.4	2	2.4	4	3.9	
Arsenic (µg/L)	13	7	7.3	7	6.4	7.5	7	8.2	7.3	6.8	7.4	7.2	
Iron (mg/L)	0.033	0.02	0.024	0.02	0.02	0.034	0.02	0.02	0.02	0.02	0.033	0.033	
Chloride (mg/L)	580	160	170	170	160	140	160	180	150	150	170	170	
Chloride* (mg/L)	514	205	230	191	194	200	216	209	210	204	207	198	
Fluoride (mg/L)	2.5	0.27	0.24	0.2	0.23	0.16	0.24	0.16	0.2	0.16	0.28	0.28	
pH (SU)	7.24	7.2	7.32	7.35	7.25	7.34	7.06	7.23	7.23	6.99	7.31	7.24	
ORP (mV)	-194.9	-109.2	-165.6	-182.7	-148.2	-98.5	-111.2	-101.6	-82.5	-18.3	-119.6	-77.8	
DO (mg/L)	0.71	0.19	0.16	0.17	0.14	0.15	0.26	0.27	0.38	0.51	0.53	0.38	
TDS (mg/L)	1300	490	530	480	530	530	540	480	550	530	570	500	
Temp. (deg. C)	25.9	24.4	24.2	24.5	24.6	24.4	24.5	24.6	24.6	24.5	24.5	24.8	

Note:

1. * indicates chloride values have been corrected for charge balance.

Attachment A
Summary of Laboratory Analyses and Field Measurements

Well ID	UZA1	UZA1	UZA2	UZA2	UZA2	UZA2	UZA2	UZA2	UZA2	UZA2	UZA2	UZA2	UZA2
Parameter (units)\Date	6/25/2014	7/2/2014	4/9/2014	4/16/2014	4/23/2014	5/1/2014	5/6/2014	5/14/2014	5/21/2014	5/30/2014	6/4/2014	6/12/2014	
Calcium (mg/L)	77	73	59	70	60	62	59	65	63	64	59	63	
Mg (mg/L)	14	13	13	16	14	14	14	14	14	15	13	14	
Sodium (mg/L)	69	68	47	49	47	48	48	50	46	48	46	48	
K (mg/L)	2.7	2.6	2.8	3	3	2.9	2.8	3.1	2.8	2.6	2.6	2.7	
HCO ₃ (mg/L)	180	180	170	170	170	180	170	180	170	160	160	160	
Sulfate (mg/L)	8.9	8.6	3.4	4.4	4.8	3.4	5.2	5	6.4	5.6	3.1	4.1	
Sulfide (mg/L)	3.5	4.1	0.2	0.2	0.2	0.4	0.1	0.1	0.2	0.39	0.1	1	
Arsenic (µg/L)	6.3	6.3	26	27	26	26	28	26	27	28	26	28	
Iron (mg/L)	0.033	0.095	0.059	0.1	0.09	0.11	0.097	0.17	0.14	0.14	0.087	0.05	
Chloride (mg/L)	170	170	90	91	99	92	80	95	110	85	88	100	
Chloride* (mg/L)	178	169	125	156	127	129	127	138	133	143	132	141	
Fluoride (mg/L)	0.28	0.29	0.34	0.32	0.29	0.31	0.34	0.31	0.34	0.29	0.24	0.39	
pH (SU)	7.4	7.31	7.29	7.26	7.38	7.31	7.36	7.24	7.2	7.35	7.13	7.26	
ORP (mV)	-211.4	-190.8	8.3	-3.7	-72.2	-84.2	-126.4	-52.6	-96.7	57.3	155	26.9	
DO (mg/L)	0.49	0.39	3.89	3.85	3.45	3.05	2.89	3.33	3.31	3.04	3.32	3.31	
TDS (mg/L)	510	490	360	380	360	390	360	410	330	420	390	370	
Temp. (deg. C)	24.7	24.6	23.7	23.6	23.8	24.1	24	24	24	24.2	24.1	24	

Note:

1. * indicates chloride values have been corrected for charge balance.

Attachment A
Summary of Laboratory Analyses and Field Measurements

Well ID	UZA2	UZA2	UZA2	LZA1	LZA1	LZA1	LZA1	LZA1	LZA1	LZA1	LZA1	LZA1	LZA1
Parameter (units)\Date	6/18/2014	6/25/2014	7/2/2014	4/9/2014	4/16/2014	4/23/2014	5/1/2014	5/6/2014	5/14/2014	5/21/2014	5/30/2014	6/4/2014	
Calcium (mg/L)	61	56	60	79	88	76	80	83	84	85	85	85	82
Mg (mg/L)	13	12	13	18	21	18	19	19	19	19	19	19	18
Sodium (mg/L)	46	41	45	170	170	170	170	160	170	170	170	160	170
K (mg/L)	2.6	2.5	2.5	4.2	4.5	4.3	4.2	4.4	4.5	4.6	4.2	4.2	4.3
HCO ₃ (mg/L)	170	170	170	160	160	170	170	170	170	170	160	160	160
Sulfate (mg/L)	4	4.1	4	19	17	17	22	20	19	22	14	11	
Sulfide (mg/L)	1	1	1	3.9	4.4	4	3.8	4	4.4	4.2	4.4	4.6	
Arsenic (µg/L)	28	26	26	2.2	2.5	2.3	1.5	1.4	1.8	1.8	1.8	1.8	1.7
Iron (mg/L)	0.059	0.085	0.19	0.02	0.042	0.04	0.035	0.033	0.032	0.037	0.034	0.031	
Chloride (mg/L)	99	99	100	290	260	320	300	270	310	340	290	280	
Chloride* (mg/L)	125	102	119	357	380	345	352	343	365	363	358	366	
Fluoride (mg/L)	0.39	0.39	0.41	0.25	0.18	0.16	0.17	0.18	0.18	0.17	0.13	0.093	
pH (SU)	7.33	7.45	7.44	7.27	7.43	7.45	7.38	7.39	7.21	7.29	7.27	7.33	
ORP (mV)	49.1	-98.2	-120	-112.1	-172.8	-205.5	-196.9	-100.2	-154.7	-212.7	-92.4	-131.3	
DO (mg/L)	2.87	1.43	2.08	0.12	0.17	0.12	0.1	0.11	0.13	0.24	0.45	0.27	
TDS (mg/L)	350	360	340	730	770	750	760	750	790	710	790	740	
Temp. (deg. C)	24.1	24.2	24.2	24.4	24.3	24.5	24.8	24.6	24.5	24.8	24.7	24.6	

Note:

1. * indicates chloride values have been corrected for charge balance.

Attachment A
Summary of Laboratory Analyses and Field Measurements

Well ID	LZA1	LZA1	LZA1	LZA1	LZA2	LZA2	LZA2	LZA2	LZA2	LZA2	LZA2	LZA2	LZA2
Parameter (units)\Date	6/12/2014	6/18/2014	6/25/2014	7/2/2014	4/9/2014	4/16/2014	4/23/2014	5/1/2014	5/6/2014	5/14/2014	5/21/2014	5/30/2014	
Calcium (mg/L)	88	77	75	74	78	86	80	79	80	85	81	84	
Mg (mg/L)	19	18	16	16	20	22	21	21	21	21	20	21	
Sodium (mg/L)	170	150	140	140	180	180	180	190	180	180	160	190	
K (mg/L)	4.4	3.9	3.8	3.8	4.6	4.8	4.8	4.8	4.8	5.2	4.7	5	
HCO ₃ (mg/L)	160	170	170	170	170	180	180	170	180	180	180	170	
Sulfate (mg/L)	23	15	17	24	21	12	19	23	19	21	27	16	
Sulfide (mg/L)	6.5	6.8	5.9	6.3	4.6	4.6	3.6	3.6	4	5.4	4.4	4.8	
Arsenic (µg/L)	1.3	1.3	1.3	1.3	1.9	1.7	2.1	1.7	1.2	0.93	2	2.4	
Iron (mg/L)	0.033	0.046	0.033	0.033	0.02	0.02	0.02	0.02	0.044	0.02	0.02	0.02	
Chloride (mg/L)	320	320	320	330	310	340	330	320	350	310	360	300	
Chloride* (mg/L)	368	316	288	282	368	390	370	387	372	378	334	386	
Fluoride (mg/L)	0.2	0.2	0.21	0.22	0.23	0.14	0.16	0.17	0.2	0.18	0.19	0.13	
pH (SU)	7.4	7.34	7.49	7.4	7.32	7.3	7.38	7.33	7.31	7.33	7.27	7.3	
ORP (mV)	-147.1	-103.8	-203.7	-182.6	-209.4	-205.2	-222	-200.2	-122.6	-193.3	-219.1	-110.7	
DO (mg/L)	0.25	0.32	0.38	0.38	0.36	0.49	0.34	0.33	0.24	0.83	0.31	0.28	
TDS (mg/L)	800	690	710	740	780	810	770	800	800	860	740	830	
Temp. (deg. C)	24.6	24.7	24.7	24.7	24.3	24.3	24.5	24.6	24.6	24.7	24.7	24.7	

Note:

1. * indicates chloride values have been corrected for charge balance.

Attachment A
Summary of Laboratory Analyses and Field Measurements

Well ID	LZA2	LZA2	LZA2	LZA2	LZA2
Parameter (units)\Date	6/4/2014	6/12/2014	6/18/2014	6/25/2014	7/2/2014
Calcium (mg/L)	82	79	78	80	88
Mg (mg/L)	20	19	21	19	22
Sodium (mg/L)	180	170	180	160	190
K (mg/L)	4.9	4.6	4.7	4.7	5.2
HCO ₃ (mg/L)	170	170	180	180	180
Sulfate (mg/L)	13	26	16	27	27
Sulfide (mg/L)	3.8	7.1	6	7.2	6.8
Arsenic (µg/L)	1.6	1.3	1.3	1.3	1.3
Iron (mg/L)	0.02	0.033	0.033	0.033	0.033
Chloride (mg/L)	310	340	350	340	350
Chloride* (mg/L)	401	347	367	323	393
Fluoride (mg/L)	0.077	0.2	0.2	0.21	0.21
pH (SU)	7.17	7.3	7.4	7.48	7.45
ORP (mV)	-83.5	-159.1	-154.7	-210.6	-216.3
DO (mg/L)	0.53	0.38	0.37	0.51	0.43
TDS (mg/L)	790	770	750	740	720
Temp. (deg. C)	24.8	24.9	24.8	24.7	24.8

Note:

1. * indicates chloride values have been corrected for charge balance.

ATTACHMENT B

**Estimated Concentrations of Purified
Reclaimed Waters
Provided by Tetra Tech**

Attachment B
Estimated Compositions of Purified Reclaimed Waters Provided by Tetra Tech

Parameter	Units	Low	Typical	High
Calcium	mg/l	20	40	60
Magnesium	mg/l	0.05	0.36	0.49
Sodium	mg/l	10	13	20
Potassium	mg/l	0.75	1	1.3
Bicarbonate	mg/l	80	150	201
Sulfate	mg/l	1	3	4
Sulfide	mg/l	0.1	2	8
Chloride	mg/l	4	7	14
Iron	mg/l	0.03	0.04	0.07
Fluoride	mg/l	0.04	0.09	0.25
ORP	mV	-500	-400	-300
pH	pH	7.2	7.4	7.7

Note:

1. Values provided by Tetra Tech.

ATTACHMENT C

Geosyntec Mixing Model Results

Attachment C-1
 Geosyntec Mixing Model Results
 Mixtures of Lower Zone Groundwater and Low-TDS Purified Reclaimed Water

Parameter	Units	Sample ID				
		LZA	Low	25:75	50:50	75:25
Ca	mg/l	79.87	20	35	49.98	64.93
Mg	mg/l	18.75	0.05	4.735	9.412	14.08
Na	mg/l	162.5	10	48.21	86.35	124.5
K	mg/l	4.387	0.75	1.661	2.571	3.48
HCO ₃	mg/l	172.5	80	103.2	126.3	149.4
SO ₄	mg/l	21.87	1	6.229	11.45	16.66
HS	mg/l	6.575	0.1	1.722	3.342	4.959
Cl	mg/l	335.4	4	87.02	169.9	252.7
Fe	mg/l (as Fe)	0.03462	0.03	0.03116	0.03231	0.03347
F	mg/l	0.2062	0.04	0.08164	0.1232	0.1647
pH	pH	7.405	7.2	7.781	7.771	7.748
Eh	mV	54.96	-300	-307	-304.5	-300.1
TDS	mg/l	793.7	44.91	243.1	425.2	607.4
Temp.	°C	24.74	20	21.18	22.37	23.56
Water type		Na-Cl	Ca-Cl	Na-Cl	Na-Cl	Na-Cl
Calcite	log Q/K	0.0989	-5.518	-0.3809	0.03465	0.2811
Pyrite	log Q/K	8.625	5.472	7.83	8.278	8.512
O ₂ (aq)	log activity	-52.76	-79.29	-77.02	-76.46	-75.83

Note:

1. Groundwater:Purified Reclaimed Water mix percentages shown.

Attachment C

Geochemical Modeling Investigation

City of Clearwater Groundwater Replenishment Project

Attachment C-2
 Geosyntec Mixing Model Results
 Mixtures of Lower Zone Groundwater and Typical-TDS Purified Reclaimed Water

Parameter	Units	Sample ID				
		LZA	Typical	25:75	50:50	75:25
Ca	mg/l	79.87	40	49.95	59.91	69.88
Mg	mg/l	18.75	0.36	4.951	9.545	14.15
Na	mg/l	162.5	13	50.32	87.67	125.1
K	mg/l	4.387	1	1.845	2.692	3.539
HCO ₃	mg/l	172.5	150	155.6	161.2	166.9
SO ₄	mg/l	21.87	3	7.711	12.43	17.15
HS	mg/l	6.575	2	3.142	4.285	5.429
Cl	mg/l	335.4	7	88.97	171	253.2
Fe	mg/l (as Fe)	0.03462	0.04	0.03865	0.03731	0.03596
F	mg/l	0.2062	0.09	0.119	0.148	0.1771
pH	pH	7.405	7.4	7.399	7.4	7.402
Eh	mV	54.96	-200	-195.6	-189.9	-180.5
TDS	mg/l	793.7	207.6	360.8	505	649.5
Temp.	°C	24.74	27	26.43	25.87	25.31
Water type		Na-Cl	Ca-HCO ₃	Ca-Cl	Na-Cl	Na-Cl
Calcite	log Q/K	0.0989	-0.09595	-0.04015	0.01108	0.05753
Pyrite	log Q/K	8.625	7.615	8.018	8.278	8.472
O ₂ (aq)	log activity	-52.76	-69.29	-69.19	-68.98	-68.52

Note:

1. Groundwater:Purified Reclaimed Water mix percentages shown.

Attachment C

Attachment C-3
 Geosyntec Mixing Model Results
 Mixtures of Lower Zone Groundwater and High-TDS Purified Reclaimed Water

Parameter	Units	Sample ID				
		LZA	High	25:75	50:50	75:25
Ca	mg/l	79.87	60	64.94	69.91	74.88
Mg	mg/l	18.75	0.49	5.037	9.595	14.17
Na	mg/l	162.5	20	55.48	91.05	126.7
K	mg/l	4.387	1.3	2.069	2.839	3.612
HCO ₃	mg/l	172.5	201	193.9	186.8	179.6
SO ₄	mg/l	21.87	4	8.448	12.91	17.38
HS	mg/l	6.575	8	7.645	7.289	6.932
Cl	mg/l	335.4	14	94.02	174.3	254.7
Fe	mg/l (as Fe)	0.03462	0.07	0.06119	0.05235	0.0435
F	mg/l	0.2062	0.25	0.2391	0.2281	0.2172
pH	pH	7.405	7.7	7.619	7.544	7.472
Eh	mV	54.96	-100	-87.44	-80.39	-26.54
TDS	mg/l	793.7	281.1	431.1	552	672.7
Temp.	°C	24.74	32	30.18	28.37	26.56
Water type		Na-Cl	Ca-HCO ₃	Ca-HCO ₃	Na-Cl	Na-Cl
Calcite	log Q/K	0.0989	0.5608	0.4372	0.3206	0.208
Pyrite	log Q/K	8.625	8.651	8.698	8.703	8.68
O ₂ (aq)	log activity	-52.76	-59.89	-59.91	-60.28	-57.48

Note:

1. Groundwater:Purified Reclaimed Water mix percentages shown.

Attachment C

Geochemical Modeling Investigation

City of Clearwater Groundwater Replenishment Project