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Z-AREA SALTSTONE DISPOSAL FACILITY GROUNDWATER MONITORING MIDYEAR REPORT FOR 2018 (U)

Class 3 Landfill Permit #025500-1603

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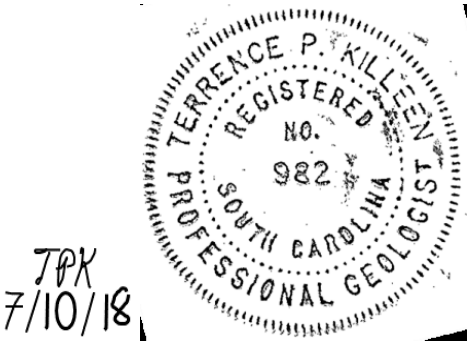

SAVANNAH RIVER SITE • AIKEN, SOUTH CAROLINA

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LIST OF ACRONYMS AND ABBREVIATIONS

1Q18	first quarter of 2018
2Q17	second quarter of 2017
3Q15	third quarter of 2015
Bi-214	bismuth-214
biennial sampling	1 sample event (which may cross calendar quarters) for Ra-226, Ra-228, benzene, PCE, toluene, and TCE every other year; odd years only.
Cs-137	cesium-137
ft	feet
ft-msl	feet above mean sea level
GSA	General Separations Area
GWPS	groundwater protection standard
I-129	iodine-129
LAZ	Lower Aquifer Zone
µg/L	microgram per liter
µS/cm	microsiemens per centimeter
MDL	method detection limit
mg/L	milligram per liter
mrem	millirem
NTU	nephelometric turbidity units
Pb-214	lead-214
pCi/L	picocuries per liter
pCi/mL	picocuries per milliliter
PDWS	Primary Drinking Water Standard
PQL	Practical Quantitation Limit
Pu-238	plutonium-238
Pu-239	plutonium-239
Ra-226	radium-226
SCDHEC	South Carolina Department of Health and Environmental Control
SDF	Saltstone Disposal Facility
SDU	Saltstone Disposal Unit
semiannual sampling	2 sample events per year (conductivity, pH, water elevation, nitrates, gross alpha, gross beta, gamma spectroscopy, I-129, Tc-99, and tritium); 1 sample event may cross calendar quarters.
SPF	Saltstone Production Facility
SRNS	Savannah River Nuclear Solutions, LLC
SRR	Savannah River Remediation LLC
SRS	Savannah River Site
SDWS	Secondary Drinking Water Standard
Sr-90	strontium-90
Tc-99	technetium-99
TCCZ	Tan Clay Confining Zone
Th-228	thorium-228
Th-230	thorium-230
Th-232	thorium-232
UAZ	Upper Aquifer Zone
U-234	uranium-234
U-235	uranium-235
U-238	uranium-238
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
UTRA	Upper Three Runs Aquifer
WSRC	Washington Savannah River Company LLC (Oct. 2005 through Aug. 2008)
WSRC	Westinghouse Savannah River Company (before Oct. 2005)

1.0 SITE DESCRIPTION AND BACKGROUND

The Savannah River Site (SRS) Saltstone Facility is located within Z-Area (238 acres) on the SRS in Aiken County, and is operated by Savannah River Remediation LLC (SRR) for the U.S. Department of Energy (USDOE) (Figure 1). The Saltstone Facility consists of two facility segments: the Saltstone Production Facility (SPF), which receives and treats salt solution to produce solidified saltstone, and the Saltstone Disposal Facility (SDF), which consists of Saltstone Disposal Units (SDUs) used for the final disposal of the solidified saltstone. The SPF is permitted as a wastewater treatment facility per South Carolina Department of Health and Environmental Control (SCDHEC) regulations (SCDHEC 2011). The SDF is permitted as a Class 3 Landfill per SCDHEC regulations (SCDHEC 2011). The SDF currently contains two rectangular SDUs, formerly referred to as vaults, six circular SDUs, and one large circular SDU (SDU 6) (Figure 2).

2.0 GROUNDWATER MONITORING

In accordance with the SDF Class 3 Landfill permit (SCDHEC 2011), a groundwater monitoring plan is in place to monitor groundwater in the vicinity of the SDF (WSRC 2005). Currently, twenty-two wells located up-gradient and down-gradient of the SDF (Figure 2) are sampled semiannually and biennially for the constituents and parameters listed in Table 1.

In 1987, wells ZBG 1 and ZBG 2 were installed to determine baseline groundwater chemistry in Z-Area. Construction of SDUs 1 and 4 was completed in February 1986 and July 1988, respectively. The SPF started radioactive operations in June 1990, and disposal into SDU 1 occurred between June 1990 and September 1996. Disposal into SDU 4 began in January 1997 and was discontinued in 2012. Wells ZBG 3, ZBG 4, and ZBG 5 were installed in 2003 to monitor SDUs 1 and 4. Wells ZBG 6, ZBG 7, and ZBG 8 were installed in 2007 to provide improved groundwater monitoring for SDU 1.

In 2012, six wells (ZBG009D thru ZBG014D) were installed to monitor SDUs 2, 3, and 5. A seventh well (ZBG015D) was also installed to provide an additional background well (Figure 2). SDU 2 was put into service in September 2012, and was completely filled in 2014. SDU 5 was

put into service in December 2013, and was completely filled in January 2017. SDU 3 was put into service in February 2017, and is actively being filled.

In 2014 and 2015, three additional wells and one replacement well were added to the SDF monitoring network, and one well was abandoned.

- Surface water and sediment contamination (i.e. plutonium-239 [Pu-239], plutonium-238 [Pu-238], uranium-238 [U-238], uranium-235 [U-235], uranium-234 [U-234], thorium-232 [Th-232], thorium-230 [Th-230], thorium-228 [Th-228], cesium-137 [Cs-137], iodine-129 [I-129], technetium-99 [Tc-99], tritium, nonvolatile beta, and gross alpha) was detected in 2011 in Sedimentation Basin #4 (SRNS 2012). Concerns of potential groundwater contamination from Sedimentation Basin #4 initiated the installation of a shallow well (ZBG016D) and a deeper well (ZBG016C) to monitor perched water in the vadose zone and the groundwater.
- Deeper well ZBG002C was installed in the Lower Aquifer Zone (LAZ) adjacent to shallow well ZBG 2, when contaminated water was observed at ZBG 2.
- Ultimately, well ZBG 2 was abandoned due to its potential as a pathway for contamination from the Upper Aquifer Zone (UAZ) into the LAZ in the Upper Three Runs Aquifer (UTRA). Well ZBG 2 was replaced by well ZBG002D, which is screened entirely in the UAZ, and does not dissect through the Tan Clay Confining Zone (TCCZ).

In the second quarter of 2017 (2Q17), four additional wells (ZBG017D, ZBG018D, ZBG019D, and ZBG020D) were added to the SDF monitoring network (Figure 2). Wells ZBG017D, ZBG018D and ZBG019D were installed to monitor SDU 6 and in the future SDU 7 and SDU 8. Well ZBG020D provides additional downgradient groundwater monitoring of SDU 4.

The monitoring well network and monitoring plan for the SDF are designed to effectively detect any release associated with the SDUs. As additional SDUs are constructed, or as conditions change at the facility, the monitoring network will be expanded accordingly.

Groundwater samples were collected during the first quarter of 2018 (1Q18) in accordance with the *Hydrogeologic Data Collection Procedures and Specifications* (SRNS 2010), and the samples were sent to SCDHEC certified labs for analyses. Two thresholds (8 picocuries/liter

[pCi/L] and 30 pCi/L) are established for gross beta (i.e. nonvolatile beta) analyses as part of the *Groundwater Monitoring Plan for the Z-Area Saltstone Disposal Facility* (WSRC 2005). If the 8 pCi/L threshold is exceeded by a well sample, then the same well is to be resampled within 30 days for the Contingent Analysis 1 (Strontium-90 [Sr-90]) listed in Table 1. If the contingent Sr-90 analysis is above detection, then it will be added to the list of semiannual analytes. If the 30 pCi/L threshold is exceeded by a well sample, then the same well and the applicable background well (ZBG 1 or ZBG015D) are resampled within 30 days for the constituents listed as Contingent Analyses 2 in Table 1. If any contingent analyte is above maximum background well concentrations, then it will be added to the list of semiannual analytes. If the following sample event confirms the exceedance results for a constituent(s), then a characterization plan to determine plume extent will be developed and submitted to SCDHEC within 60 days (WSRC 2005).

3.0 GROUNDWATER FLOW DIRECTION AND RATE

Water level data collected for 1Q18 are presented in Figure 3. Groundwater flow is radial in this area of SRS. The water table elevation at SDU 1 is approximately 235 feet above mean sea level (ft-msl) and is approximately 230 ft-msl at SDU 4. The water table at SDU 1 and SDU 4 indicate groundwater flow is to the northeast, groundwater flow at SDU 2 is to the north, and groundwater flow at SDUs 3 and 5 is to the northwest (Figure 3). Flow rates can be estimated using the distance and head difference between wells with the following equation:

$$Q = \frac{K}{n} \times \frac{dh}{dl}$$

Where:

- Q = Flow (feet [ft]/day);
- K = Hydraulic Conductivity (ft/day) = 13 ft/day[a];
- n = Effective Porosity = 0.25[a];
- dh = Difference in Head (ft) = 9.70 ft; and
- dl = Distance between Wells (ft) = 1,085 ft[b].

a) In 2013 these parameters were changed to be consistent with the Performance Assessment modeling data in the SRS General Separations Area (GSA) (WSRC 2007).
b) Replacement well ZBG002D provides a better flow estimate for the water table, and is now used for the distance (dl) between ZBG 7 and ZBG002D, as recommended by the U.S. Nuclear Regulatory Commission.

The hydraulic conductivity (K) is 13 ft/day, and the effective porosity (n) value is 25 percent (WSRC 2007). The head difference (dh) between wells ZBG 7 and ZBG002D was 9.70 ft for 1Q18. The horizontal distance (dl) is 1,085 ft, which is the distance between wells ZBG 7 and ZBG002D (Figure 2). The first quarter groundwater flow rates are calculated as follows:

First Quarter: $Q = \frac{13\ ft/day}{0.25} \times \frac{9.70\ ft}{1{,}085\ ft}$

$$Q = 0.464885\ ft/day\ or\ 169.7\ ft/year$$

The 1Q18 groundwater flow rate (169.7 ft/yr) is slightly lower than the 3Q17 flow rate (190.7 ft/yr) (SRNS 2018).

Wells ZBG 1 and ZBG 2 depict the long-term fluctuations in the water table elevation (Figure 4). The water table in the GSA is located in the UAZ. However, as the water table approaches McQueens Branch and Upper Three Runs, the water table drops into the underlying LAZ (Figure 5). The TCCZ separates the LAZ from the overlying UAZ.

4.0 GROUNDWATER CONSTITUENTS AND PARAMETERS

In accordance with the Z-Area SDF Class 3 Landfill Permit (SCDHEC 2011), the monitoring wells were sampled during 1Q18 for the semiannual analytes and the parameters listed in Table 1.

5.0 RESULTS

Groundwater samples were collected during 1Q18 from the ten wells monitoring SDUs 1 and 4 (Figure 2). Groundwater samples were collected during 1Q18 from the seven wells monitoring SDUs 2, 3, 5, and 6. Wells ZBG017D, ZBG018D, ZBG019D will help establish background groundwater chemistry as SDU 6 has not been placed into service. Groundwater samples were collected during 1Q18 for well ZBG016C that monitors Sedimentation Basin #4 (Figure 2). Data collected to date at well ZBG016C indicate there have been no impacts to the groundwater at Sedimentation Basin #4. Well ZBG016D, also installed downgradient of Sedimentation Basin #4, is positioned on top of the TCCZ to monitor for potentially contaminated perched water in the vadose zone. Well ZBG016D was dry when sampling was conducted in 1Q18. The

laboratory results are presented in Table 2, the field measurements are presented in Table 3, and the water elevation data are presented in Table 4.

Groundwater monitoring results are compared to Practical Quantitation Limits (PQLs), background concentrations, and Groundwater Protection Standards (GWPSs). PQLs are indicators of laboratory instrument sensitivity, but are not regulatory limits, nor are they risk-based. The PQL is the lowest concentration of an analyte which can be reliably quantified in a given sample. In contrast, the method detection limit (MDL) is the lowest concentration of an analyte which can be detected, but not quantified, in a given sample. Background concentrations are based on historical data from wells (ZBG 1 and ZBG015D) upgradient of the SDF. Comparison with background is important because several SRS facilities are upgradient of the SDF. The GWPSs for the SDF are based on the Primary Drinking Water Standards (PDWSs), proposed Primary Drinking Water Standards (PPDWSs), or Secondary Drinking Water Standards (SDWSs), and are listed in Table 1 (WSRC 2005). Unlike PQLs and background concentrations, GWPSs are regulatory limits, and exceedances are relevant to water quality.

6.0 DISCUSSION

The following constituents exceeded the PQL in one or more wells monitoring the SDF and are discussed in further detail below (Table 2):

- Gross Alpha;
- Radium-226 (Ra-226)
- Bismuth-214 (Bi-214);
- Lead-214 (Pb-214);
- Nonvolatile Beta*;
- Tc-99;
- Nitrate-Nitrite as Nitrogen; and
- Tritium.

* Results exceeded the 8 pCi/L and 30 pCi/L thresholds for nonvolatile beta (gross beta) requiring Sr-90 and all the other contingent analyses for some wells.

Well ZBG015D was sampled independently for four quarters in 2012 to establish initial background concentrations as required by the monitoring plan (WSRC 2005). Data from well ZBG015D is currently used for background comparisons to monitoring data collected at wells downgradient of SDUs 1 and 4. Data from well ZBG 1 is used for background comparisons to monitoring data collected at wells downgradient of SDUs 2, 3, 5, and 6 (Figures 2 and 3).

Gross Alpha

Gross alpha results have been detected above the MDL in 15 of the 22 wells since January 2004 and in the background wells. No gross alpha results exceeded their PQL in 1Q18, but gross alpha results did exceed the MDL at 8 wells (ZBG 6, ZBG 7, ZBG 8, ZBG010D, ZBG011D, ZBG012D, ZBG013D, ZBG014D and ZBG019D) and are briefly discussed because historical results have been above the PQL. In 1Q18, the maximum gross alpha concentration (J 1.98 pCi/L) at well ZBG 6 exceeds the historic maximum (1.48 pCi/L) at background well ZBG015D, but it is below the GWPS (15 pCi/L). The historic well data indicate the gross alpha concentrations are naturally-occurring in origin, not related to SDF operations.

Radium-226

Ra-226 results have been detected above the MDL in 22 of the 22 wells since January 2004 including the background wells. No Ra-226 results exceeded the PQL at in 1Q18, but Ra-226 results did exceed the MDL at 2 wells (ZBG002D and ZBG015D) and are briefly discussed below. Ra-226 contributes to the gross alpha activity in groundwater. The maximum Ra-226 concentration (0.28 pCi/L) sample was from background well ZBG015D in 1Q18. The 1Q18 Ra-226 maximum groundwater concentration is less than the historic maximum (1.10 pCi/L) for background well ZBG015D and less than the SDF GWPS (5 pCi/L). Ra-226 is commonly detected in the groundwater (UGA 2005). Collectively, the ZBG well data indicate the Ra-226 concentrations are naturally-occurring in origin, not related to SDF operations.

Bismuth-214 and Lead-214

The maximum Bi-214 concentration (475 pCi/L) sample was collected at well ZBG020D in 1Q18. The 1Q18 Bi-214 maximum groundwater concentration is greater than the historic maximum (160 pCi/L) for background well ZBG015D, but below the 4 millirem (mrem) GWPS for Bi-214 (18,900 pCi/L) (USEPA 2000).

The 1Q18 maximum Pb-214 groundwater concentration (530 pCi/L) sample was collected at well ZBG020D. The 1Q18 maximum Pb-214 groundwater concentration (530 pCi/L) is above the historic maximum (171 pCi/L) for background well ZBG015D, but below the 4 mrem GWPS for Pb-214 (11,800 pCi/L) (USEPA 2000). Since January 2004, Bi-214 and Pb-214 results have been detected above the PQL in 18 of the 22 wells, including the background wells. Pb-214 and

Bi-214 are short-lived daughter products in the naturally-occurring uranium-238 decay series, and are supported by the relatively long-lived (half-life 1,599 years) Ra-226 intermediary radionuclide. Bi-214, Pb-214 and Radium-226 appear to be of natural origin, not related to SDF operations.

Nonvolatile Beta

Samples from well ZBG002D, which replaced well ZBG 2, continue to have elevated groundwater concentrations for nonvolatile beta and Tc-99. The 1Q18 maximum nonvolatile beta groundwater concentration (58.0 pCi/L) was at well ZBG002D. The 1Q18 maximum nonvolatile beta groundwater concentration (58.0 pCi/L) is lower than the 1Q15 maximum nonvolatile beta groundwater concentration (158 pCi/L) at well ZBG 2 (Figure 6). Figure 7 depicts the approximate area of the Z-Area nonvolatile beta groundwater plume (1Q18).

The 1Q18 nonvolatile beta results for ZBG002D, ZBG002C and ZBG020D exceeded the 8 pCi/L threshold for nonvolatile beta initiating Sr-90 analyses for these well samples. All the Sr-90 sample results were below their MDLs indicating that Sr-90 was not detected in these samples. The ZBG002D and ZBG020D nonvolatile beta results (58.0 and 51.8 pCi/L) exceeded the 30 pCi/L threshold for nonvolatile beta, so the Contingent Analyses Group 2 from Table 1 were required for this sample and the background well ZBG015D sample.

In 1Q18, LAZ wells ZBG002C, ZBG 4, ZBG016C had levels of nonvolatile beta groundwater concentrations (3.22 – 13.3 pCi/L) that exceed the maximum nonvolatile beta value (2.17 pCi/L) for background well ZBG015D. The nonvolatile beta data, in conjunction with the nitrate and Tc-99 data, for wells ZBG002C and ZBG 4 indicate contamination below the TCCZ. In contrast, the slight increase in nonvolatile beta activity (3.22 pCi/L) in the groundwater at ZBG016C was not accompanied by other contaminants. Cs-137, Tc-99, I-129, and nitrates were below detection limits for the 1Q18 sample from the ZBG016C, but naturally-occurring Pb-214 and Bi-214 were above their PQLs for that sample. The nonvolatile beta activity in the groundwater at ZBG016C appears to be naturally-occurring, and not from contaminants in Sedimentation Basin #4.

In 1Q18, well ZBG020D had the highest sum of beta-emitting radionuclides greater than their PQLs (non-qualified results in Table 2), but the sum of beta-emitting activity level (0.80 mrem) for ZBG020D is below the GWPS (4 mrem). The radionuclides, including all the contingent

analyses, above their PQLs at well ZBG020D were Bi-214 (475 pCi/L), Pb-214 (530 pCi/L), Tc-99 (116 pCi/L) and tritium (3.03 picocuries per milliliter [pCi/mL]) in 1Q18 (Table 2).

Technetium-99

In 1Q18, the Tc-99 groundwater concentration (104 pCi/mL) increased at well ZBG002D (Figure 6). However, the 1Q18 sample from well ZBG020D had the maximum Tc-99 result (116 pCi/L), but the concentration did not exceed the GWPS (900 pCi/L). Wells ZBG002D and ZBG020D indicate the location of the highest concentration of the Tc-99 groundwater plume (Figure 8). The changing concentrations of Tc-99, nonvolatile beta, nitrate and specific conductance in the UAZ may, in part, be due to dilution and concentration from increased and decreased rainwater infiltration, as these constituents tend to inversely correlate with water elevation measurements at wells ZBG 2 and ZBG002D (Figures 4 and 6). Figure 8 depicts the approximate area of the Z-Area Tc-99 groundwater plume in 1Q17.

The sample from well ZBG002C also had a Tc-99 result above detection in 1Q18, which is consistent with the nonvolatile beta result from the same well sample and historical data. Previous and 1Q18 Tc-99 data from wells ZBG002C and ZBG 4 indicate Tc-99 contamination has migrated through the TCCZ, but at low concentrations (SRNS 2018).

As demonstrated by the 2017 and 2018 data at wells ZBG002D and ZBG020D, it is not uncommon for the Tc-99 results to be higher than the nonvolatile beta results for the same samples, as some Tc-99 is volatilized by the drying step in the nonvolatile beta analytical method. In contrast, the Tc-99 analytical method does not include a drying step, thus avoiding any volatilization of Tc-99.

Nitrate

Nitrates in the groundwater are determined using Nitrate – Nitrite as Nitrogen EPA methods 353.1 or 353.2. At SRS nitrogen in the groundwater is primarily in the form of nitrate, because the groundwater is typically well oxygenated, especially in the UAZ. In 1Q18, the sample from well ZBG019D had the highest nitrate groundwater concentration (5.42 milligrams/liter [mg/L]), while the sample from well ZBG002D had the second highest groundwater concentration (4.15 mg/L) for nitrates in 1Q18. The ZBG019D nitrate sample result and the ZBG002D nitrate

sample result did not exceed the GWPS (10 mg/L). However, the results for ZBG019D and ZBG002D samples did exceed the PQLs and maximum concentrations from background wells ZBG 1 and ZBG015D (2.03 and 1.30 mg/L, respectively). In 1Q18, the nitrate sample concentration for well ZBG002D increased to 4.15 mg/L from 2.11 mg/L in 3Q17 (Figure 6). The elevated nitrate groundwater concentration at well ZBG019D is most likely from an upgradient source because SDU 6 has not been placed in service yet, and the upgradient well ZBG 1 has a history of elevated nitrate concentrations (Figure 9). Alternatively, the elevated groundwater nitrate concentrations at well ZBG019D could be, in part, from the release of the NSF approved dye (Rhodamine WT) after the leak test SUD-6, as the dye contains nitrogen. The 2017 and 2018 samples from ZBG019D did not have detectable levels of nonvolatile beta or Tc-99, which also indicates the source of the nitrates is not from saltstone material. In 1Q18, nitrate groundwater concentrations increased to 2.99 mg/L at well ZBG 6, which is greater than the PQL and maximum nitrate background value (1.30 mg/L) but less than the GWPS (10 mg/L). The groundwater conductivity measurements at well ZBG 6 have also been gradually increasing since 2015. The nonvolatile beta groundwater concentrations remain low (estimated value 2.51 pCi/L) and Tc-99 remains below the detection limit at ZBG 6. The nitrate and conductivity results at ZBG 6 may be early indicators of contamination from historic spills. Figure 9 depicts the approximate area of the Z-Area nitrate groundwater plume in 1Q18.

Tritium

The maximum tritium concentration was 2.51 pCi/mL at background well ZBG0015D in 1Q18. This concentration is below the historic maximum (4.02 pCi/mL) for well ZBG015D. The older background well ZBG 1 has indicated steadily decreasing tritium concentration trends from 19.0 pCi/mL in 1987 to 1.26 pCi/mL in 1Q18. All of the SDF monitoring wells appear to be following this trend. Data from the background wells ZBG 1 and ZBG015D indicate the tritium in Z-Area is from an up-gradient source (Figure 10).

Field Measurements

It has been observed that nonvolatile beta, Tc-99, nitrates and specific conductance correlate well with each other (Figure 6). In 1Q18, an overall decrease in groundwater specific conductance (48 microsiemens per centimeter [µS/cm]) was observed at well ZBG002D, relative to the groundwater specific conductance high of 211 µS/cm in 2015 at well ZBG002D (Figure 6).

In 1Q18, wells ZBG012D, ZBG013D, and ZBG014D continue to have the highest specific conductance (157-171 µS/cm), alkalinity (68-78 mg/L), and pH (7.9-10.1) measurements. These elevated field measurements are consistent for these wells and appear to be related to the geologic formation as calcium carbonate material was identified in the lithology cores during well installation. Wells ZBG012D, ZBG013D, and ZBG014D monitor the groundwater near SDU 3 and SDU 5, which began receiving saltstone material in December 2013. Therefore, the elevated field measurements are the baseline groundwater conditions for these wells.

7.0 CONCLUSIONS

1) Concentrations of contaminants at well ZBG002D, where the highest concentrations have historically been measured, have decreased since 3Q15.

In 1Q18, groundwater at well ZBG002D showed increases in nonvolatile beta activity (58 pCi/L), Tc-99 activity (104 pCi/L), nitrate concentration (4.15 mg/L), and specific conductance (48 µS/cm) relative to the 3Q17 concentrations for nonvolatile beta activity (21.1 pCi/L), Tc-99 activity (54.7 pCi/L), nitrate concentration (2.11 mg/L), and specific conductance (38.0 µS/cm). However, the 1Q18 results for ZBG002D are lower than the maximum ZBG002D concentrations in 2015 for nonvolatile beta activity (132 pCi/L), Tc-99 activity (230 pCi/L), nitrate concentration (6.8 mg/L), and specific conductance (211 µS/cm). In 1Q18, the ZBG020D well sample had similar concentrations of nonvolatile beta activity (51.8 pCi/L), Tc-99 activity (116 pCi/L), nitrate concentration (0.49 mg/L), and specific conductance (35.0 µS/cm) to the 1Q18 ZBG002D sample. These data indicate the highest concentration portion of the groundwater plume is located around wells ZBG002D and ZBG020D. In 1Q18, Tc-99 and nitrate groundwater concentrations at wells ZBG002D and ZBG020D remained below their respective GWPS.

2) Contaminants have moved downward into the LAZ at well ZBG002C and ZBG 4, but concentrations of contaminants remain below their respective GWPS.

Well ZBG002C was installed adjacent to ZBG002D in 2014 with a screen zone below the TCCZ to monitor groundwater in the LAZ. In 1Q18, samples collected in the LAZ at wells ZBG002C and ZBG 4 indicate contamination has migrated through the TCCZ and into the LAZ, consistent with monitoring results from previous years. However, all contaminants in the LAZ are below

their respective GWPS. The SDF groundwater monitoring well network is adequately monitoring contaminants above and below the TCCZ.

3) There have been no impacts to groundwater from Sedimentation Basin #4.

In 2011 and 2012, surface water and sediment contamination (i.e. Pu-239, Pu-238, U-238, U-235, U-234, Th-232, Th-230, Th-228, Cs-137, I-129, Tc-99, tritium, nonvolatile beta, and gross alpha) was detected in Sedimentation Basin #4 (SRNS 2012) (Figure 2). In 2014, two groundwater monitoring wells (ZBG016C and ZBG016D) were installed downgradient of Sedimentation Basin #4 in the UAZ and LAZ (Figure 2). The data for the samples collected to date at well ZBG016C indicate there have been no impacts to the groundwater from Sedimentation Basin #4. The screen zone for well ZBG016D is positioned on top of the TCCZ to monitor for potentially contaminated perched water in the vadose zone. Well ZBG016D has been dry since installation, indicating there has not been any perched water at this location since installation.

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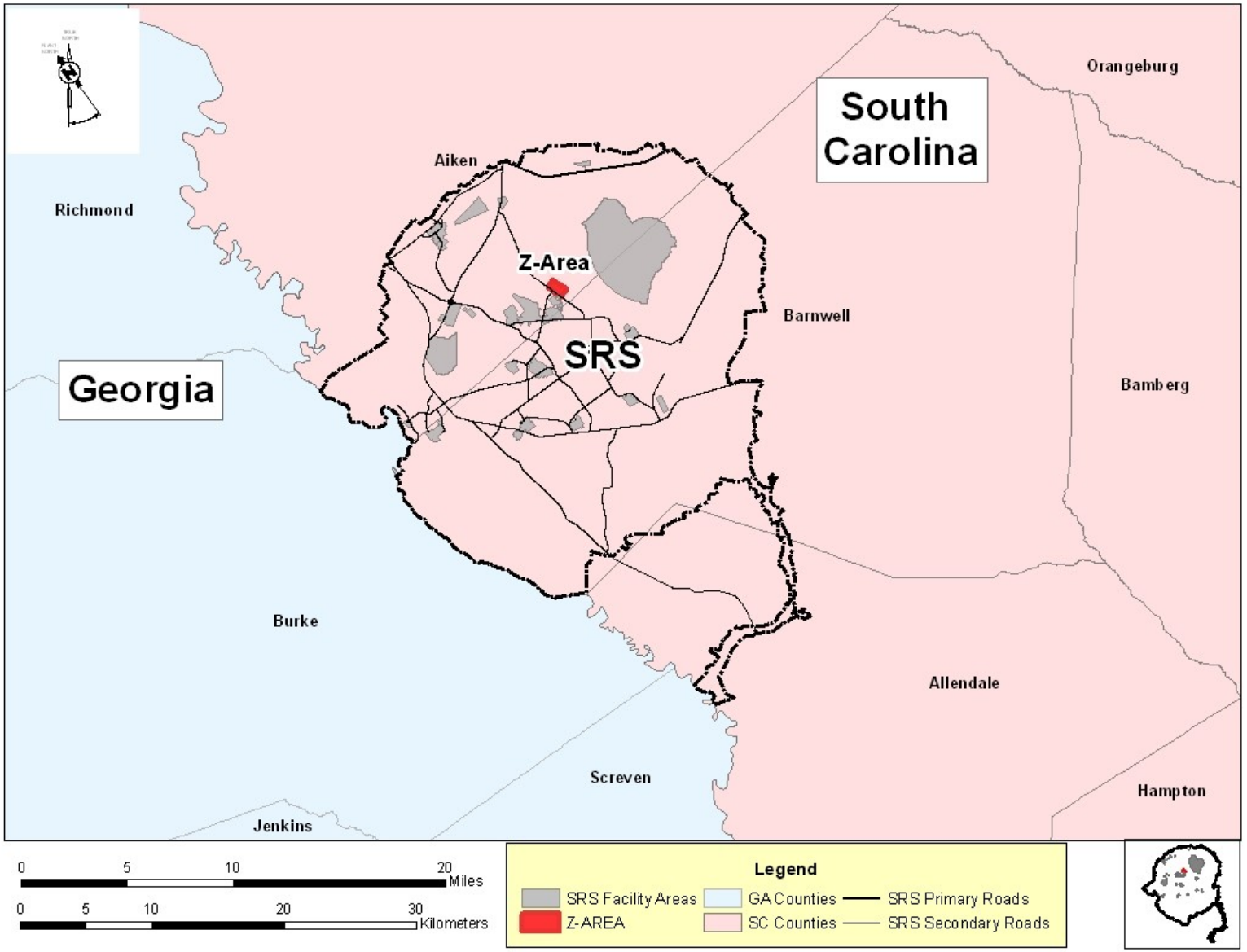

Figure 1. Z-Area Location within the Savannah River Site

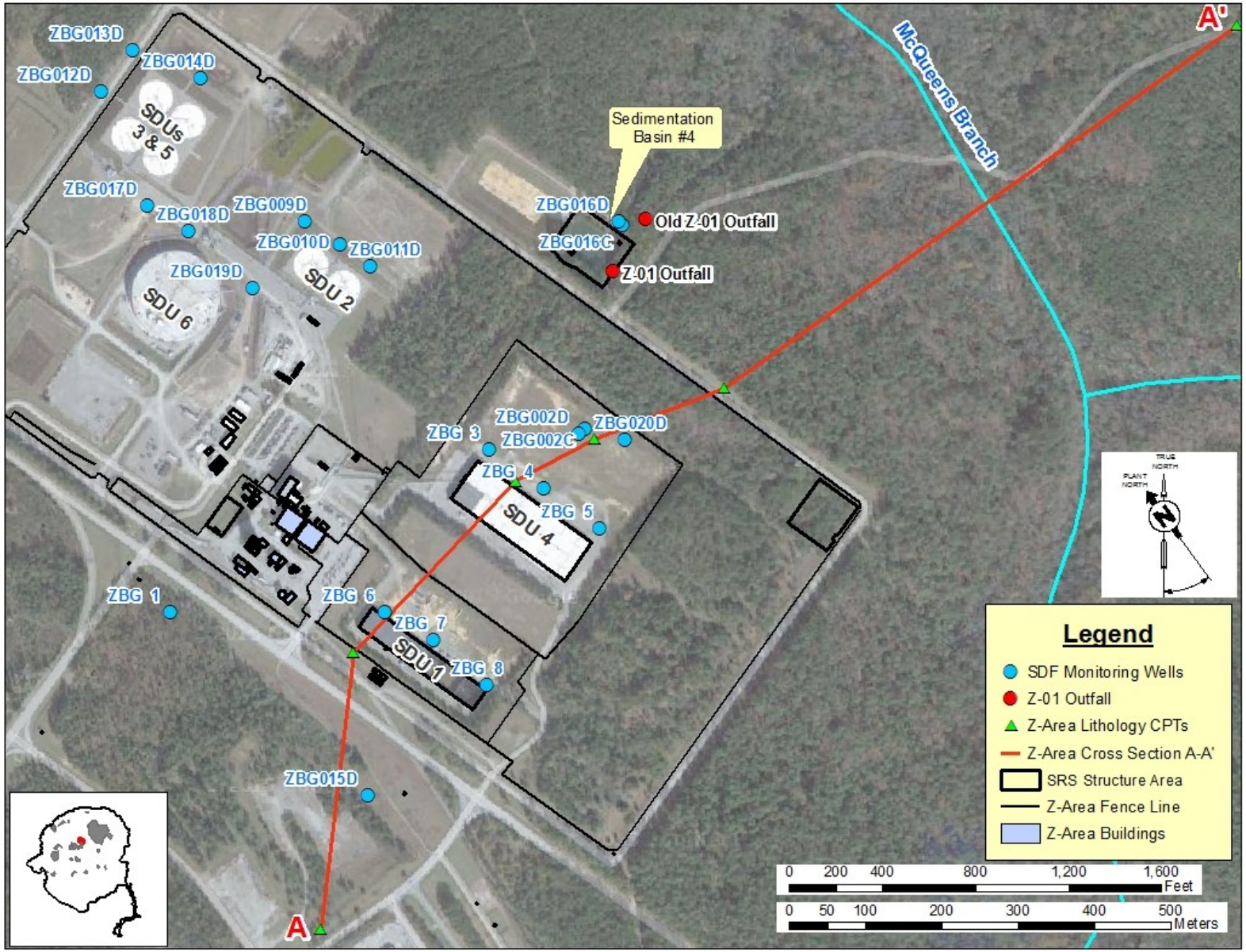

Figure 2. Monitoring Well Locations at the SDF

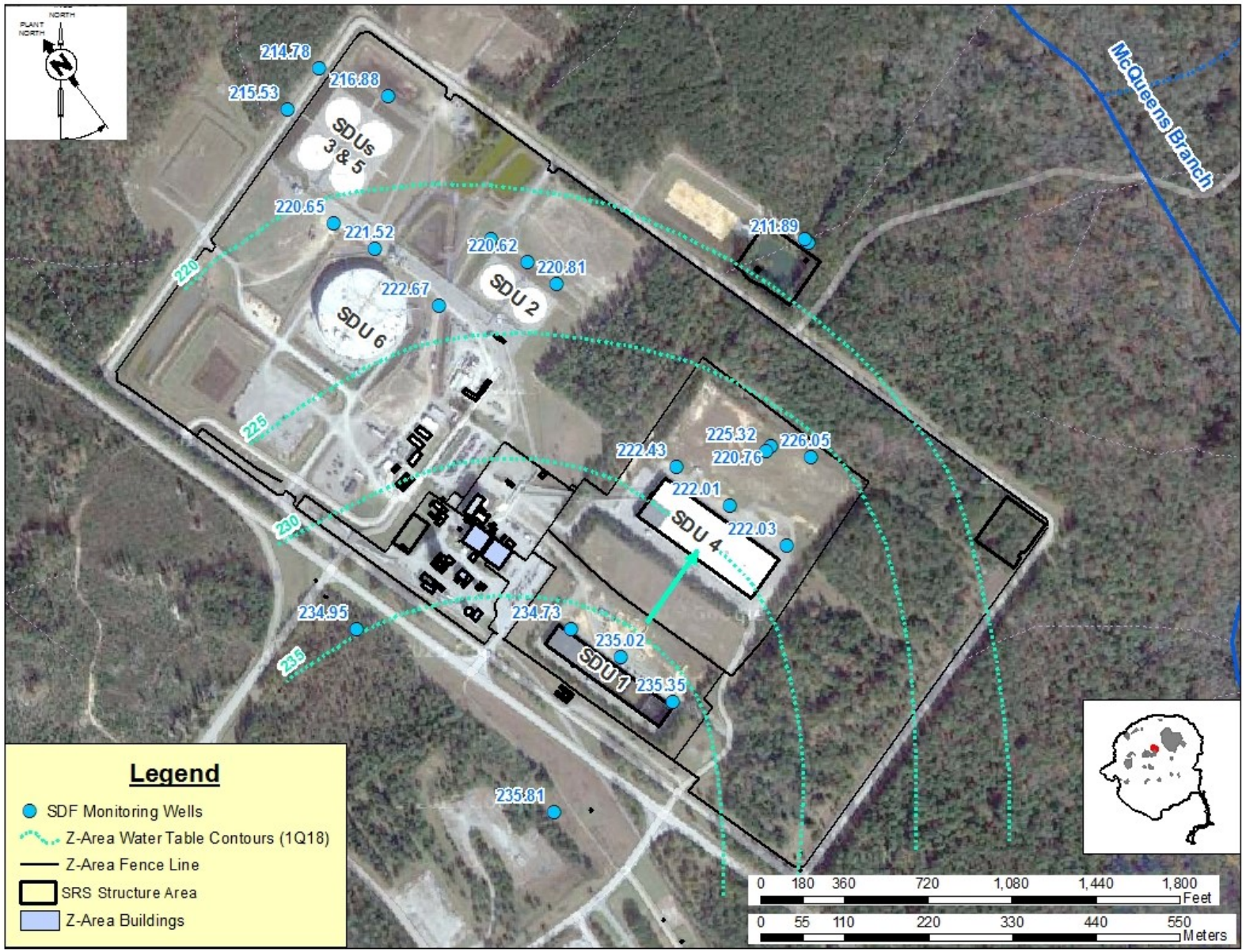

Figure 3. 1Q18 Water Table Elevations (ft-msl)

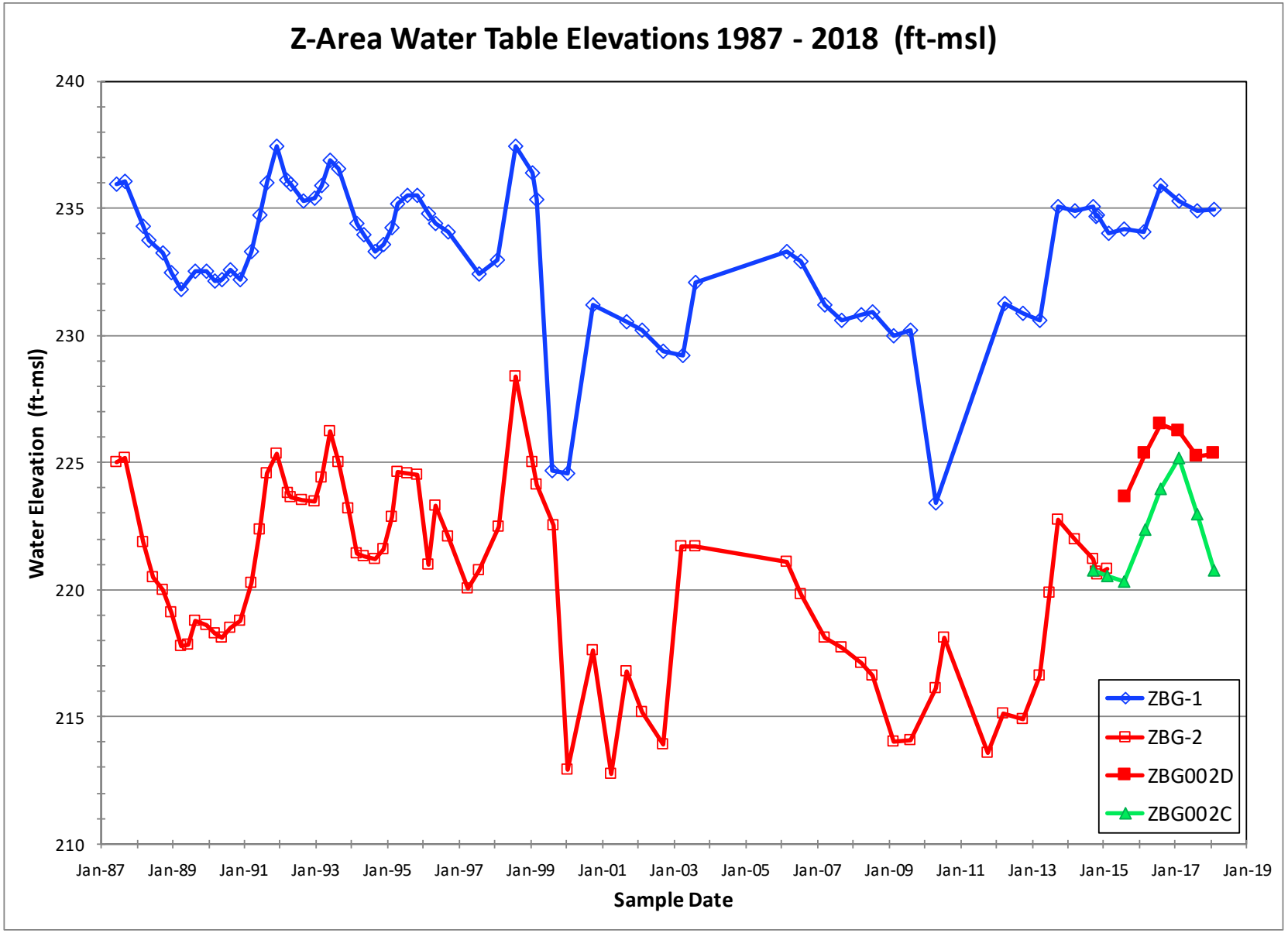

Figure 4. Z-Area Water Table Elevations (ft-msl)

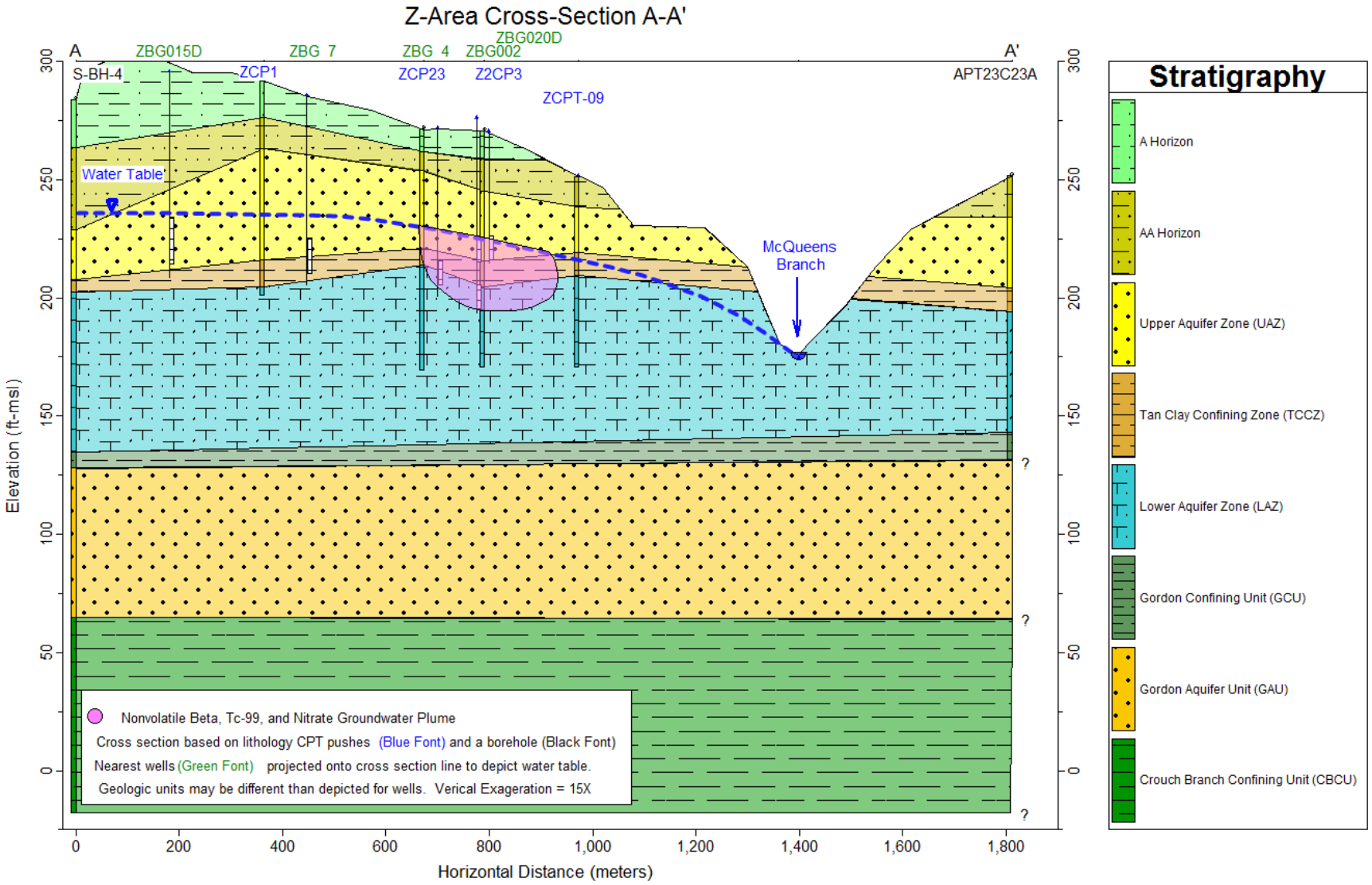

Figure 5. Z-Area Cross Section with 1Q18 Water Table

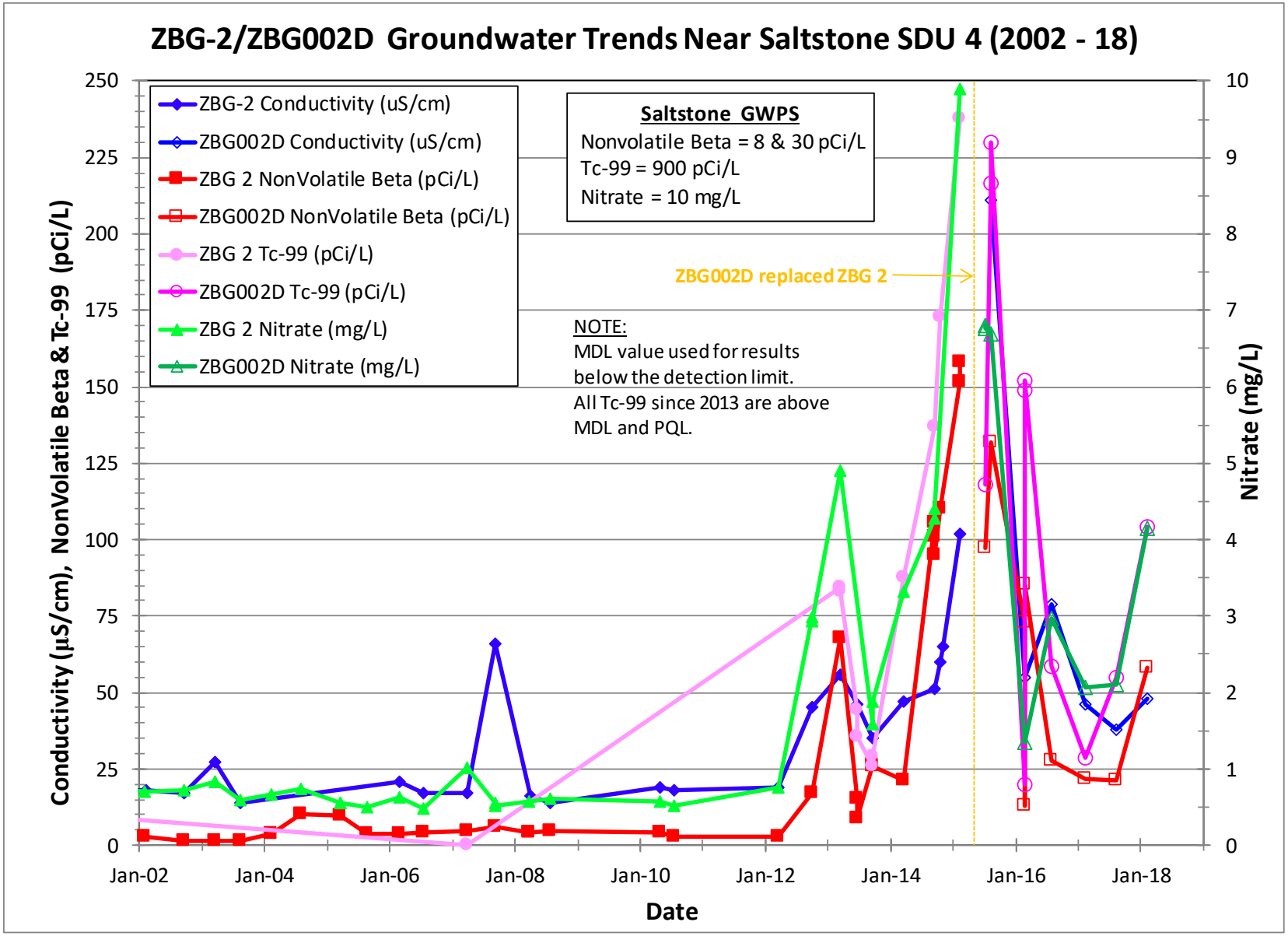

Figure 6. ZBG 2 / ZBG002D Tc-99 Groundwater Trends

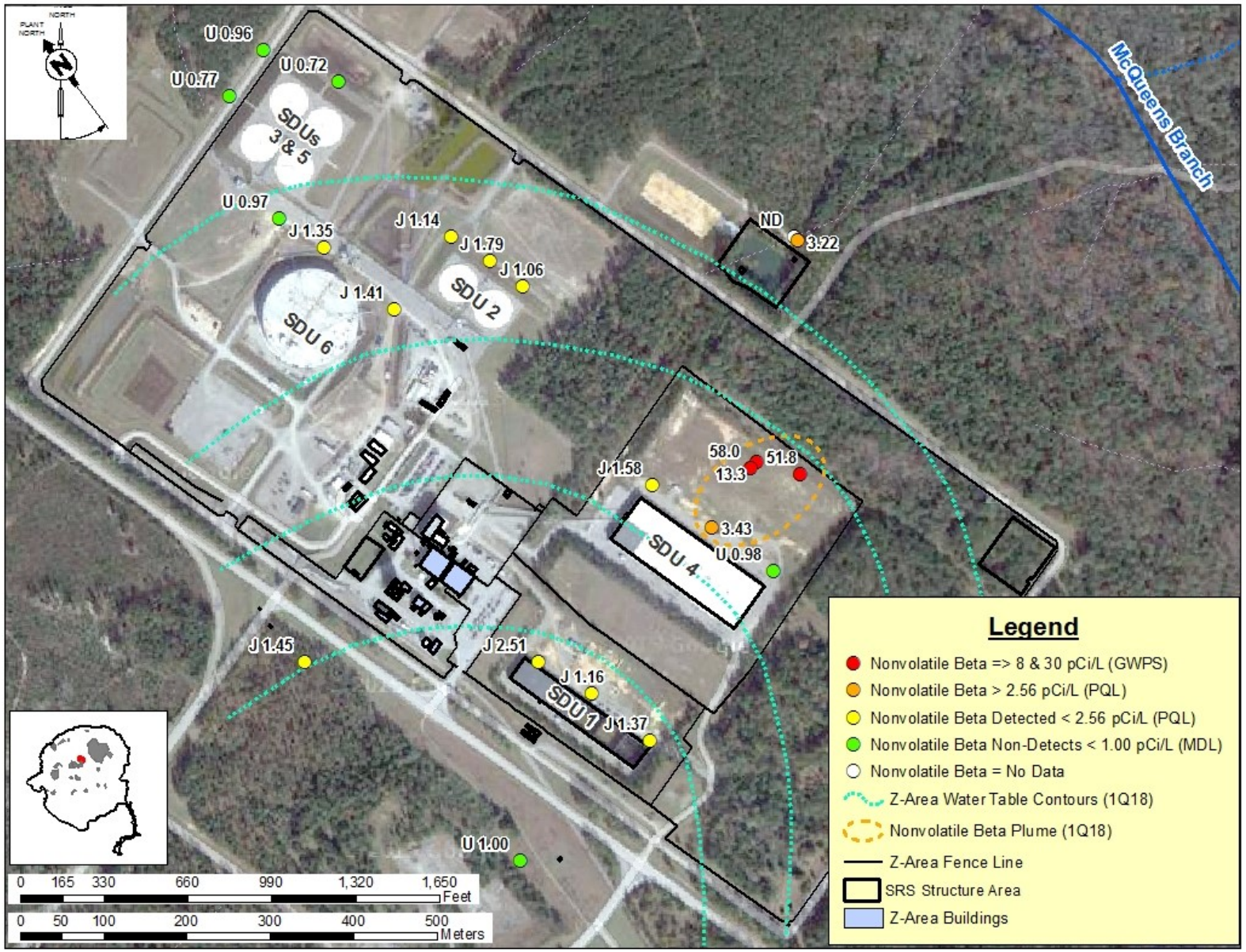

Figure 7. Approximate Nonvolatile Beta Groundwater Plume (1Q18)

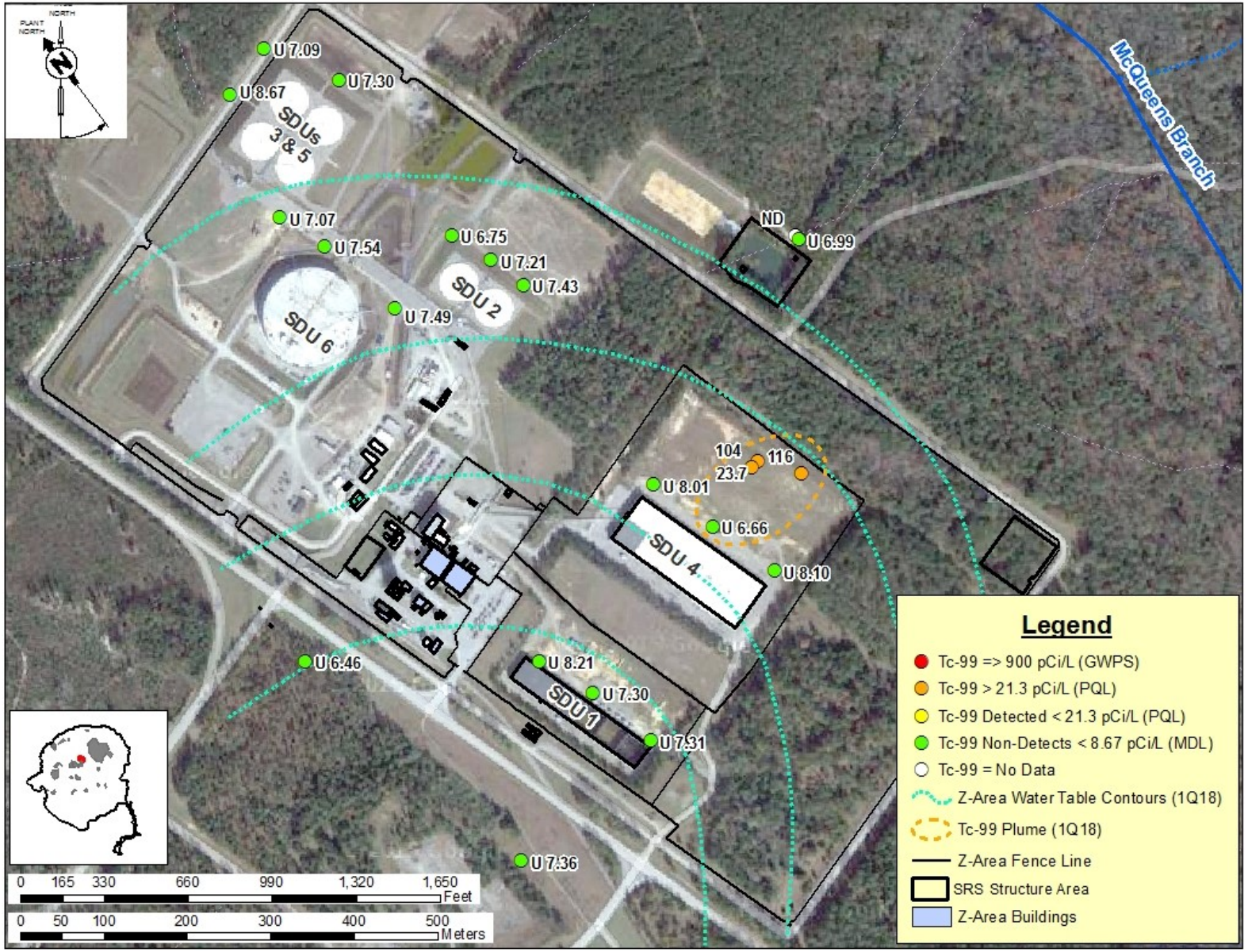

Figure 8. Approximate Tc-99 Groundwater Plume (1Q18)

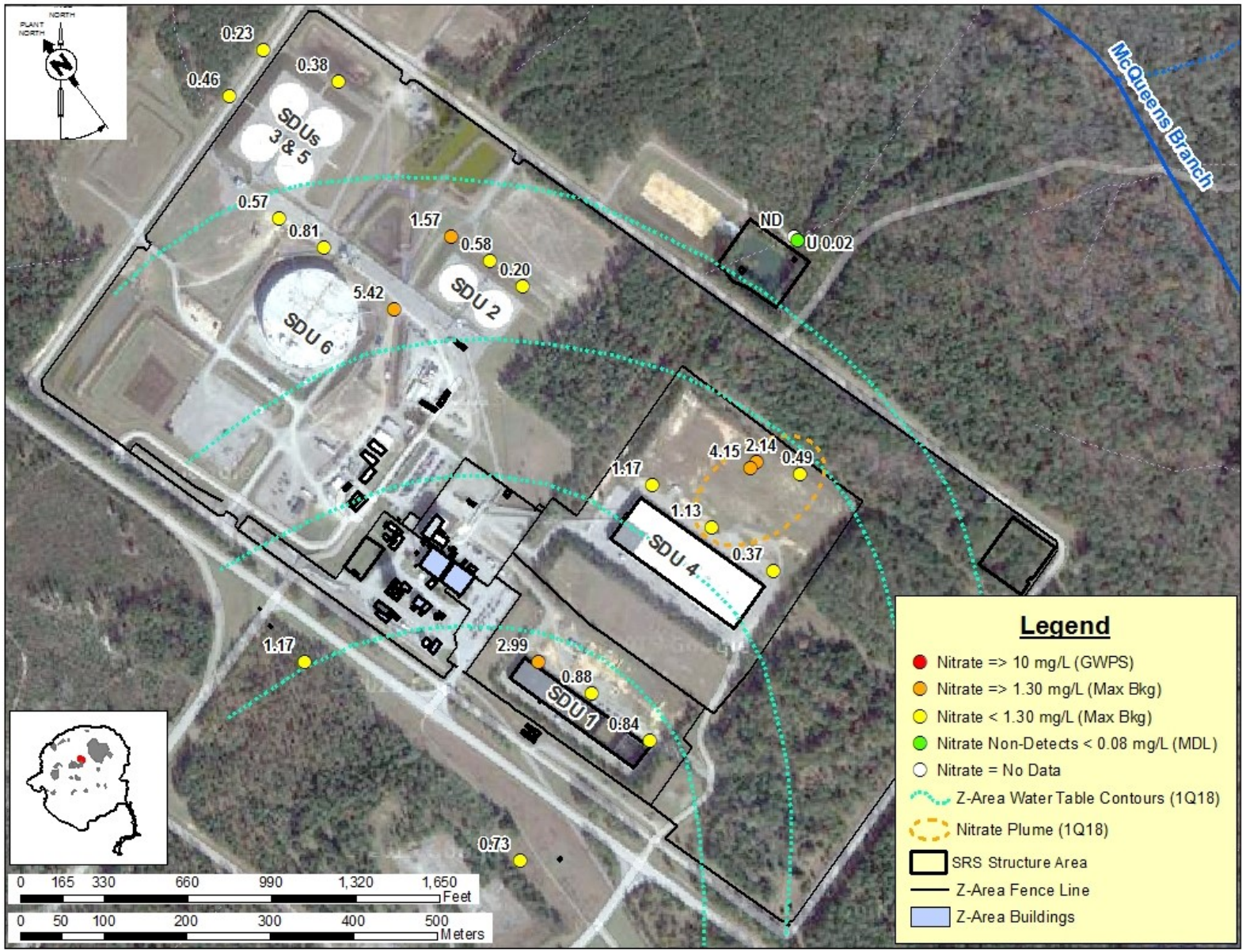

Figure 9. Approximate Nitrate Groundwater Plume (1Q18)

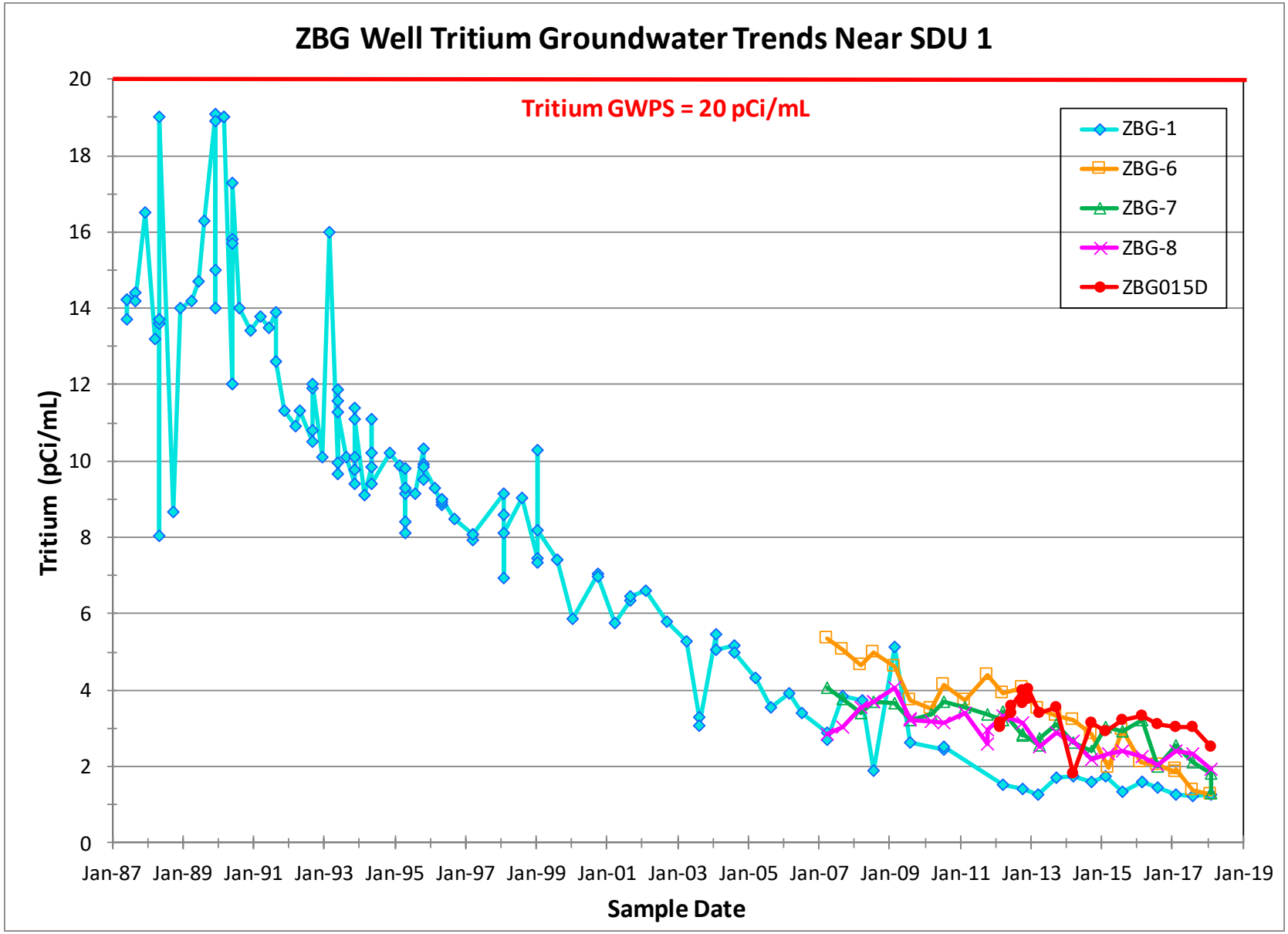

Figure 10. ZBG Well Tritium Groundwater Trends

Table 1. List of Analytes and Parameters for the SDF

Semiannual Constituents	Groundwater Protection Standard	Units
pH	NA	pH
Specific Conductance	NA	µS/cm
Groundwater Elevations	NA	ft-msl
Nitrate (Nitrate/Nitrite)	10	mg/L
Gross Alpha	15	pCi/L
Gross Beta [1,2] (Nonvolatile Beta)	8 / 30	pCi/L
Gamma Spectroscopy-Emitters (Beta-Emitters)	4	mrem
Iodine-129 (I-129)	1	pCi/L
Technetium-99 (Tc-99)	900	pCi/L
Tritium	20	pCi/mL
Biennial Constituents	**Groundwater Protection Standard**	**Units**
Radium-226 (Ra-226)	5 (Ra-226 + Ra-228)	pCi/L
Radium-228 (Ra-228)	5 (Ra-226 + Ra-228)	pCi/L
Benzene	5	µg/L
Tetrachloroethylene	5	µg/L
Toluene	1000	µg/L
Trichloroethylene	5	µg/L
Contingent Analysis 1	**Groundwater Protection Standard**	**Units**
Strontium-90 (Sr-90)	8	pCi/L
Contingent Analyses 2	**Groundwater Protection Standard**	**Units**
Carbon-14 (C-14)	2000	pCi/L
Cobalt-60 (Co-60)	100	pCi/L
Cesium-137 (Cs-137)	200	pCi/L
Gross Beta (Re-analysis)	30	pCi/L
Niobium-94 (Nb-94)	707 [3]	pCi/L
Nickel-59 (Ni-59)	300	pCi/L
Nickel-63 (Ni-63)	50	pCi/L
Plutonium-241 (Pu-241)	62.6 [3]	pCi/L
Ruthenium-106 (Ru-106)	30	pCi/L
Antimony (Sb-125)	300	pCi/L
Technetium-99 (Tc-99)	900	pCi/L

[1] If Gross Beta is equal to or exceeds 8 pCi/L then Contingent Analysis 1 is analyzed for that sample.

[2] If Gross Beta is equal to or exceeds 30 pCi/L then all Contingent Analyses 2 are analyzed for that well and the background well.

[3] Proposed Primary Drinking Water Standard.
NA = Not Applicable.

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Table 2. Laboratory Results for Saltstone Wells (1Q18)

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG 1	2/5/18	ACTINIUM-228	10.50	32.70	U	6.56	pCi/L	REG	REG
ZBG 1	2/5/18	ACTINIUM-228	13.20	30.20	U	-3.50	pCi/L	REG	LD
ZBG 1	2/5/18	ANTIMONY-125	8.87	18.30	U	1.54	pCi/L	REG	REG
ZBG 1	2/5/18	ANTIMONY-125	9.50	19.50	U	3.72	pCi/L	REG	LD
ZBG 1	2/5/18	BARIUM-133	4.30	10.60	U	0.91	pCi/L	REG	REG
ZBG 1	2/5/18	BARIUM-133	3.79	8.53	U	-0.63	pCi/L	REG	LD
ZBG 1	2/5/18	BISMUTH-214	5.91	29.30		134.00	pCi/L	REG	REG
ZBG 1	2/5/18	BISMUTH-214	6.74	31.50		95.50	pCi/L	REG	LD
ZBG 1	2/5/18	CESIUM-134	3.67	7.49	U	1.09	pCi/L	REG	REG
ZBG 1	2/5/18	CESIUM-134	3.31	7.09	U	1.09	pCi/L	REG	LD
ZBG 1	2/5/18	CESIUM-137	2.98	7.94	U	-2.87	pCi/L	REG	LD
ZBG 1	2/5/18	CESIUM-137	2.47	5.65	U	-0.55	pCi/L	REG	REG
ZBG 1	2/5/18	COBALT-60	3.47	6.97	U	0.36	pCi/L	REG	REG
ZBG 1	2/5/18	COBALT-60	3.32	6.90	U	-0.20	pCi/L	REG	LD
ZBG 1	2/5/18	EUROPIUM-152	9.92	20.70	U	0.96	pCi/L	REG	LD
ZBG 1	2/5/18	EUROPIUM-152	10.10	21.00	U	0.90	pCi/L	REG	REG
ZBG 1	2/5/18	EUROPIUM-154	10.20	21.50	U	-1.28	pCi/L	REG	LD
ZBG 1	2/5/18	EUROPIUM-154	9.74	19.20	U	2.18	pCi/L	REG	REG
ZBG 1	2/5/18	EUROPIUM-155	11.60	24.50	U	4.06	pCi/L	REG	LD
ZBG 1	2/5/18	EUROPIUM-155	12.70	31.60	U	-7.50	pCi/L	REG	REG
ZBG 1	2/5/18	GROSS ALPHA	0.96	2.08	U	0.43	pCi/L	REG	REG
ZBG 1	2/5/18	IODINE-129	0.72	1.60	U	-0.34	pCi/L	REG	REG
ZBG 1	2/5/18	IODINE-129	0.74	1.61	U	0.14	pCi/L	REG	LD
ZBG 1	2/5/18	LEAD-212	5.50	17.40	J	6.59	pCi/L	REG	REG
ZBG 1	2/5/18	LEAD-212	6.31	18.10	U	1.33	pCi/L	REG	LD
ZBG 1	2/5/18	LEAD-214	7.36	32.40		132.00	pCi/L	REG	REG
ZBG 1	2/5/18	LEAD-214	7.04	31.00		116.00	pCi/L	REG	LD
ZBG 1	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG 1	2/5/18	NIOBIUM-94	3.14	6.54	U	0.75	pCi/L	REG	LD
ZBG 1	2/5/18	NIOBIUM-94	2.84	5.86	U	0.51	pCi/L	REG	REG
ZBG 1	2/5/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		1.17	mg/L	REG	REG

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG 1	2/5/18	NONVOLATILE BETA	0.88	2.18	J	1.45	pCi/L	REG	REG
ZBG 1	2/5/18	POTASSIUM-40	48.30	106.00	U	6.19	pCi/L	REG	LD
ZBG 1	2/5/18	POTASSIUM-40	43.80	93.80	U	-12.40	pCi/L	REG	REG
ZBG 1	2/5/18	PROMETHIUM-146	4.23	8.65	U	1.29	pCi/L	REG	REG
ZBG 1	2/5/18	PROMETHIUM-146	3.68	8.10	U	-2.02	pCi/L	REG	LD
ZBG 1	2/5/18	RUTHENIUM-106	28.20	59.80	U	-1.77	pCi/L	REG	REG
ZBG 1	2/5/18	RUTHENIUM-106	26.60	57.00	U	-3.93	pCi/L	REG	LD
ZBG 1	2/5/18	SODIUM-22	3.46	6.80	U	0.85	pCi/L	REG	REG
ZBG 1	2/5/18	SODIUM-22	3.57	7.51	U	-0.45	pCi/L	REG	LD
ZBG 1	2/5/18	STRONTIUM-90	0.82	1.84	U	0.54	pCi/L	REG	REG
ZBG 1	2/5/18	TECHNETIUM-99	6.46	13.90	U	-1.37	pCi/L	REG	REG
ZBG 1	2/5/18	THALLIUM-208	3.97	8.71	U	0.75	pCi/L	REG	REG
ZBG 1	2/5/18	THALLIUM-208	3.24	9.64	U	1.01	pCi/L	REG	LD
ZBG 1	2/5/18	TRITIUM	0.46	1.13		1.26	pCi/mL	REG	REG
ZBG 3	2/5/18	ACTINIUM-228	15.50	34.20	U	0.85	pCi/L	REG	REG
ZBG 3	2/5/18	ANTIMONY-125	9.51	19.90	U	1.59	pCi/L	REG	REG
ZBG 3	2/5/18	BARIUM-133	4.42	10.80	U	2.86	pCi/L	REG	REG
ZBG 3	2/5/18	BISMUTH-214	6.49	32.70		227.00	pCi/L	REG	REG
ZBG 3	2/5/18	CESIUM-134	3.64	7.84	U	-0.34	pCi/L	REG	REG
ZBG 3	2/5/18	CESIUM-137	3.33	10.80	U	0.42	pCi/L	REG	REG
ZBG 3	2/5/18	COBALT-60	3.50	7.42	U	-0.66	pCi/L	REG	REG
ZBG 3	2/5/18	EUROPIUM-152	10.20	21.60	U	-2.08	pCi/L	REG	REG
ZBG 3	2/5/18	EUROPIUM-154	9.72	19.60	U	1.82	pCi/L	REG	REG
ZBG 3	2/5/18	EUROPIUM-155	12.70	28.80	U	-2.98	pCi/L	REG	REG
ZBG 3	2/5/18	GROSS ALPHA	0.70	1.53	U	0.31	pCi/L	REG	REG
ZBG 3	2/5/18	IODINE-129	0.74	1.63	U	-0.06	pCi/L	REG	REG
ZBG 3	2/5/18	LEAD-212	6.18	18.90	U	4.25	pCi/L	REG	REG
ZBG 3	2/5/18	LEAD-214	7.48	33.30		246.00	pCi/L	REG	REG
ZBG 3	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG 3	2/5/18	NIOBIUM-94	3.35	7.35	U	1.15	pCi/L	REG	REG
ZBG 3	2/5/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		1.17	mg/L	REG	REG
ZBG 3	2/5/18	NONVOLATILE BETA	0.99	2.29	J	1.58	pCi/L	REG	REG
ZBG 3	2/5/18	POTASSIUM-40	42.40	93.20	U	5.10	pCi/L	REG	REG

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG 3	2/5/18	PROMETHIUM-146	3.87	8.41	U	-1.97	pCi/L	REG	REG
ZBG 3	2/5/18	RUTHENIUM-106	27.70	59.70	U	-5.80	pCi/L	REG	REG
ZBG 3	2/5/18	SODIUM-22	3.47	6.99	U	0.79	pCi/L	REG	REG
ZBG 3	2/5/18	STRONTIUM-90	0.68	1.48	U	0.32	pCi/L	REG	REG
ZBG 3	2/5/18	TECHNETIUM-99	8.01	17.30	U	-2.75	pCi/L	REG	REG
ZBG 3	2/5/18	THALLIUM-208	3.12	8.64	U	2.12	pCi/L	REG	REG
ZBG 3	2/5/18	TRITIUM	0.45	1.16		1.83	pCi/mL	REG	REG
ZBG 4	2/5/18	ACTINIUM-228	14.10	39.10	U	1.07	pCi/L	REG	REG
ZBG 4	2/5/18	ANTIMONY-125	11.40	23.40	U	3.68	pCi/L	REG	REG
ZBG 4	2/5/18	BARIUM-133	4.83	11.30	U	-2.18	pCi/L	REG	REG
ZBG 4	2/5/18	BISMUTH-214	7.56	36.80		204.00	pCi/L	REG	REG
ZBG 4	2/5/18	CESIUM-134	3.99	7.99	U	1.54	pCi/L	REG	REG
ZBG 4	2/5/18	CESIUM-137	3.48	7.98	U	-1.00	pCi/L	REG	REG
ZBG 4	2/5/18	COBALT-60	4.05	7.99	U	0.73	pCi/L	REG	REG
ZBG 4	2/5/18	EUROPIUM-152	12.00	24.80	U	2.08	pCi/L	REG	REG
ZBG 4	2/5/18	EUROPIUM-154	10.40	23.80	U	-1.43	pCi/L	REG	REG
ZBG 4	2/5/18	EUROPIUM-155	15.10	33.70	U	-6.89	pCi/L	REG	REG
ZBG 4	2/5/18	GROSS ALPHA	0.68	1.51	U	0.36	pCi/L	REG	REG
ZBG 4	2/5/18	IODINE-129	0.70	1.56	U	-0.28	pCi/L	REG	REG
ZBG 4	2/5/18	LEAD-212	7.72	18.20	U	-2.80	pCi/L	REG	REG
ZBG 4	2/5/18	LEAD-214	31.00	61.60		223.00	pCi/L	REG	REG
ZBG 4	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG 4	2/5/18	NIOBIUM-94	3.61	7.49	U	0.53	pCi/L	REG	REG
ZBG 4	2/5/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		1.13	mg/L	REG	REG
ZBG 4	2/5/18	NONVOLATILE BETA	1.00	2.54		3.43	pCi/L	REG	REG
ZBG 4	2/5/18	POTASSIUM-40	55.30	114.00	U	-3.21	pCi/L	REG	REG
ZBG 4	2/5/18	PROMETHIUM-146	4.53	9.55	U	-0.78	pCi/L	REG	REG
ZBG 4	2/5/18	RUTHENIUM-106	29.90	61.10	U	5.19	pCi/L	REG	REG
ZBG 4	2/5/18	SODIUM-22	3.71	8.57	U	-0.65	pCi/L	REG	REG
ZBG 4	2/5/18	STRONTIUM-90	0.74	1.44	U	-0.14	pCi/L	REG	REG
ZBG 4	2/5/18	TECHNETIUM-99	6.66	14.70	U	5.78	pCi/L	REG	REG
ZBG 4	2/5/18	THALLIUM-208	3.91	8.73	U	-1.78	pCi/L	REG	REG
ZBG 4	2/5/18	TRITIUM	0.44	1.08		1.21	pCi/mL	REG	REG

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG 5	2/5/18	ACTINIUM-228	13.60	29.20	U	3.91	pCi/L	REG	REG
ZBG 5	2/5/18	ANTIMONY-125	7.52	15.60	U	1.92	pCi/L	REG	REG
ZBG 5	2/5/18	BARIUM-133	3.38	8.62	U	-0.82	pCi/L	REG	REG
ZBG 5	2/5/18	BISMUTH-214	6.51	22.60		36.90	pCi/L	REG	REG
ZBG 5	2/5/18	CESIUM-134	2.97	6.21	U	-0.54	pCi/L	REG	REG
ZBG 5	2/5/18	CESIUM-137	3.01	6.29	U	0.50	pCi/L	REG	REG
ZBG 5	2/5/18	COBALT-60	3.17	6.43	U	0.33	pCi/L	REG	REG
ZBG 5	2/5/18	EUROPIUM-152	8.52	17.80	U	2.35	pCi/L	REG	REG
ZBG 5	2/5/18	EUROPIUM-154	8.94	18.90	U	-1.96	pCi/L	REG	REG
ZBG 5	2/5/18	EUROPIUM-155	12.40	26.30	U	-0.83	pCi/L	REG	REG
ZBG 5	2/5/18	GROSS ALPHA	0.75	1.78	U	0.61	pCi/L	REG	REG
ZBG 5	2/5/18	IODINE-129	0.73	1.59	U	-0.13	pCi/L	REG	REG
ZBG 5	2/5/18	LEAD-212	4.76	13.20	U	4.42	pCi/L	REG	REG
ZBG 5	2/5/18	LEAD-214	5.98	24.80		39.70	pCi/L	REG	REG
ZBG 5	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG 5	2/5/18	NIOBIUM-94	2.73	5.85	U	-0.08	pCi/L	REG	REG
ZBG 5	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.37	mg/L	REG	REG
ZBG 5	2/5/18	NONVOLATILE BETA	0.98	2.11	U	0.27	pCi/L	REG	REG
ZBG 5	2/5/18	POTASSIUM-40	35.40	88.40	U	-27.90	pCi/L	REG	REG
ZBG 5	2/5/18	PROMETHIUM-146	3.50	7.56	U	-0.65	pCi/L	REG	REG
ZBG 5	2/5/18	RUTHENIUM-106	25.20	58.00	U	8.46	pCi/L	REG	REG
ZBG 5	2/5/18	SODIUM-22	3.18	6.70	U	-0.59	pCi/L	REG	REG
ZBG 5	2/5/18	STRONTIUM-90	0.97	1.87	U	-0.32	pCi/L	REG	REG
ZBG 5	2/5/18	TECHNETIUM-99	8.10	17.40	U	-3.17	pCi/L	REG	REG
ZBG 5	2/5/18	THALLIUM-208	3.18	7.56	U	-0.73	pCi/L	REG	REG
ZBG 5	2/5/18	TRITIUM	0.44	1.03	J	0.62	pCi/mL	REG	REG
ZBG 6	2/6/18	ACTINIUM-228	10.50	33.30	U	1.37	pCi/L	REG	REG
ZBG 6	2/6/18	ANTIMONY-125	6.24	13.30	U	-1.56	pCi/L	REG	REG
ZBG 6	2/6/18	BARIUM-133	3.13	6.69	U	1.56	pCi/L	REG	REG
ZBG 6	2/6/18	BISMUTH-214	5.39	20.30		43.60	pCi/L	REG	REG
ZBG 6	2/6/18	CESIUM-134	2.69	5.79	U	-0.46	pCi/L	REG	REG
ZBG 6	2/6/18	CESIUM-137	2.50	5.34	U	-0.28	pCi/L	REG	REG
ZBG 6	2/6/18	COBALT-60	2.70	5.32	U	0.77	pCi/L	REG	REG

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG 6	2/6/18	EUROPIUM-152	7.40	15.50	U	0.07	pCi/L	REG	REG
ZBG 6	2/6/18	EUROPIUM-154	8.06	16.10	U	2.00	pCi/L	REG	REG
ZBG 6	2/6/18	EUROPIUM-155	9.84	21.60	U	-1.33	pCi/L	REG	REG
ZBG 6	2/6/18	GROSS ALPHA	0.99	2.86	J	1.98	pCi/L	REG	REG
ZBG 6	2/6/18	IODINE-129	0.71	1.58	U	-0.40	pCi/L	REG	LD
ZBG 6	2/6/18	IODINE-129	0.72	1.74	U	-0.05	pCi/L	REG	REG
ZBG 6	2/6/18	LEAD-212	5.04	11.80	U	-1.21	pCi/L	REG	REG
ZBG 6	2/6/18	LEAD-214	12.00	27.80		44.70	pCi/L	REG	REG
ZBG 6	2/6/18	NIOBIUM-94	2.29	4.77	U	0.48	pCi/L	REG	REG
ZBG 6	2/6/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		2.99	mg/L	REG	REG
ZBG 6	2/6/18	NONVOLATILE BETA	0.89	2.56	J	2.51	pCi/L	REG	REG
ZBG 6	2/6/18	POTASSIUM-40	35.40	78.20	U	-8.99	pCi/L	REG	REG
ZBG 6	2/6/18	PROMETHIUM-146	2.98	6.16	U	0.64	pCi/L	REG	REG
ZBG 6	2/6/18	RUTHENIUM-106	21.00	42.80	U	7.42	pCi/L	REG	REG
ZBG 6	2/6/18	SODIUM-22	2.810	5.61	U	0.64	pCi/L	REG	REG
ZBG 6	2/6/18	TECHNETIUM-99	8.21	17.80	U	0.35	pCi/L	REG	REG
ZBG 6	2/6/18	THALLIUM-208	2.65	6.41	U	-1.15	pCi/L	REG	REG
ZBG 6	2/6/18	TRITIUM	0.45	1.10		1.28	pCi/mL	REG	REG
ZBG 7	2/6/18	ACTINIUM-228	10.10	22.80	U	0.85	pCi/L	REG	REG
ZBG 7	2/6/18	ANTIMONY-125	4.83	10.80	U	3.19	pCi/L	REG	REG
ZBG 7	2/6/18	BARIUM-133	2.41	5.39	U	-0.55	pCi/L	REG	REG
ZBG 7	2/6/18	BISMUTH-214	3.80	18.30		47.40	pCi/L	REG	REG
ZBG 7	2/6/18	CESIUM-134	2.32	4.78	U	0.46	pCi/L	REG	REG
ZBG 7	2/6/18	CESIUM-137	2.00	4.26	U	-0.37	pCi/L	REG	REG
ZBG 7	2/6/18	COBALT-60	2.31	4.59	U	0.50	pCi/L	REG	REG
ZBG 7	2/6/18	EUROPIUM-152	6.01	12.20	U	2.28	pCi/L	REG	REG
ZBG 7	2/6/18	EUROPIUM-154	5.21	10.90	U	-1.45	pCi/L	REG	REG
ZBG 7	2/6/18	EUROPIUM-155	6.88	17.30	U	-4.26	pCi/L	REG	REG
ZBG 7	2/6/18	GROSS ALPHA	0.80	2.04	J	1.03	pCi/L	REG	REG
ZBG 7	2/6/18	IODINE-129	0.71	1.57	U	-0.18	pCi/L	REG	REG
ZBG 7	2/6/18	LEAD-212	4.61	11.00	U	0.92	pCi/L	REG	REG
ZBG 7	2/6/18	LEAD-214	4.58	19.10		46.30	pCi/L	REG	REG
ZBG 7	2/6/18	NIOBIUM-94	1.81	3.79	U	0.05	pCi/L	REG	REG

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ZBG 7	2/6/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		0.88	mg/L	REG	REG
ZBG 7	2/6/18	NONVOLATILE BETA	0.95	2.23	J	1.16	pCi/L	REG	REG
ZBG 7	2/6/18	POTASSIUM-40	30.40	70.20	U	-7.93	pCi/L	REG	REG
ZBG 7	2/6/18	PROMETHIUM-146	2.36	5.14	U	-1.43	pCi/L	REG	REG
ZBG 7	2/6/18	RUTHENIUM-106	17.60	37.30	U	-2.88	pCi/L	REG	REG
ZBG 7	2/6/18	SODIUM-22	1.83	3.85	U	-0.52	pCi/L	REG	REG
ZBG 7	2/6/18	TECHNETIUM-99	7.30	15.80	U	-0.60	pCi/L	REG	REG
ZBG 7	2/6/18	THALLIUM-208	2.46	6.26	U	-0.35	pCi/L	REG	REG
ZBG 7	2/6/18	TRITIUM	0.43	1.08		1.29	pCi/mL	REG	LD
ZBG 7	2/6/18	TRITIUM	0.43	1.13		1.83	pCi/mL	REG	REG
ZBG 8	2/6/18	ACTINIUM-228	14.70	34.10	U	-2.71	pCi/L	REG	REG
ZBG 8	2/6/18	ANTIMONY-125	8.34	18.20	U	-1.15	pCi/L	REG	REG
ZBG 8	2/6/18	BARIUM-133	3.76	8.58	U	0.07	pCi/L	REG	REG
ZBG 8	2/6/18	BISMUTH-214	5.86	29.70		108.00	pCi/L	REG	REG
ZBG 8	2/6/18	CESIUM-134	3.10	6.68	U	-0.69	pCi/L	REG	REG
ZBG 8	2/6/18	CESIUM-137	3.61	7.57	U	0.42	pCi/L	REG	REG
ZBG 8	2/6/18	COBALT-60	3.23	6.89	U	-0.69	pCi/L	REG	REG
ZBG 8	2/6/18	EUROPIUM-152	9.74	20.50	U	3.40	pCi/L	REG	REG
ZBG 8	2/6/18	EUROPIUM-154	9.38	19.50	U	-0.35	pCi/L	REG	REG
ZBG 8	2/6/18	EUROPIUM-155	11.10	26.70	U	-10.30	pCi/L	REG	REG
ZBG 8	2/6/18	GROSS ALPHA	0.97	2.64	J	1.97	pCi/L	REG	REG
ZBG 8	2/6/18	IODINE-129	0.73	1.63	U	-0.37	pCi/L	REG	REG
ZBG 8	2/6/18	LEAD-212	5.35	16.60	U	0.50	pCi/L	REG	REG
ZBG 8	2/6/18	LEAD-214	6.87	27.90		106.00	pCi/L	REG	REG
ZBG 8	2/6/18	NIOBIUM-94	3.21	7.09	U	0.90	pCi/L	REG	REG
ZBG 8	2/6/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		0.84	mg/L	REG	REG
ZBG 8	2/6/18	NONVOLATILE BETA	0.81	2.03	J	1.37	pCi/L	REG	REG
ZBG 8	2/6/18	POTASSIUM-40	44.90	96.70	U	-5.33	pCi/L	REG	REG
ZBG 8	2/6/18	PROMETHIUM-146	3.85	8.21	U	0.81	pCi/L	REG	REG
ZBG 8	2/6/18	RUTHENIUM-106	28.60	58.80	U	8.26	pCi/L	REG	REG
ZBG 8	2/6/18	SODIUM-22	3.30	6.86	U	-0.12	pCi/L	REG	REG
ZBG 8	2/6/18	TECHNETIUM-99	7.31	15.90	U	0.85	pCi/L	REG	REG
ZBG 8	2/6/18	THALLIUM-208	3.49	8.11	U	-0.65	pCi/L	REG	REG

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ZBG 8	2/6/18	TRITIUM	0.44	1.15		1.91	pCi/mL	REG	REG
ZBG002C	2/5/18	ACTINIUM-228	12.80	32.20	U	-5.86	pCi/L	REG	REG
ZBG002C	2/5/18	ANTIMONY-125	8.59	18.10	U	-0.98	pCi/L	REG	REG
ZBG002C	2/5/18	BARIUM-133	4.47	10.00	U	-0.87	pCi/L	REG	REG
ZBG002C	2/5/18	BISMUTH-214	6.64	31.80		142.00	pCi/L	REG	REG
ZBG002C	2/5/18	CESIUM-134	3.28	6.78	U	0.36	pCi/L	REG	REG
ZBG002C	2/5/18	CESIUM-137	3.21	7.57	U	-1.41	pCi/L	REG	REG
ZBG002C	2/5/18	COBALT-60	4.00	8.20	U	0.04	pCi/L	REG	REG
ZBG002C	2/5/18	EUROPIUM-152	9.24	19.60	U	-2.26	pCi/L	REG	REG
ZBG002C	2/5/18	EUROPIUM-154	10.60	21.00	U	4.09	pCi/L	REG	REG
ZBG002C	2/5/18	EUROPIUM-155	13.00	27.90	U	0.60	pCi/L	REG	REG
ZBG002C	2/5/18	GROSS ALPHA	0.68	1.38	U	0.11	pCi/L	REG	REG
ZBG002C	2/5/18	IODINE-129	0.72	1.58	U	-0.16	pCi/L	REG	REG
ZBG002C	2/5/18	LEAD-212	5.83	18.70	U	4.51	pCi/L	REG	REG
ZBG002C	2/5/18	LEAD-214	7.91	34.30		134.00	pCi/L	REG	REG
ZBG002C	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG002C	2/5/18	NIOBIUM-94	3.24	6.72	U	0.61	pCi/L	REG	REG
ZBG002C	2/5/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		2.14	mg/L	REG	REG
ZBG002C	2/5/18	NONVOLATILE BETA	0.96	3.56		13.30	pCi/L	REG	REG
ZBG002C	2/5/18	POTASSIUM-40	40.40	93.20	U	-20.70	pCi/L	REG	REG
ZBG002C	2/5/18	PROMETHIUM-146	4.26	8.72	U	1.28	pCi/L	REG	REG
ZBG002C	2/5/18	RUTHENIUM-106	29.20	59.00	U	11.00	pCi/L	REG	REG
ZBG002C	2/5/18	SODIUM-22	3.78	7.48	U	1.59	pCi/L	REG	REG
ZBG002C	2/5/18	STRONTIUM-90	0.66	1.18	U	-0.34	pCi/L	REG	REG
ZBG002C	2/5/18	TECHNETIUM-99	7.20	16.60		23.70	pCi/L	REG	REG
ZBG002C	2/5/18	THALLIUM-208	3.79	8.35	U	-0.66	pCi/L	REG	REG
ZBG002C	2/5/18	TRITIUM	0.45	1.05	J	0.79	pCi/mL	REG	REG
ZBG002D	2/5/18	ACTINIUM-228	17.80	37.80	U	1.87	pCi/L	REG	REG
ZBG002D	2/5/18	ANTIMONY-125	10.60	22.30	U	-1.70	pCi/L	REG	REG
ZBG002D	2/5/18	BARIUM-133	5.00	10.80	U	1.26	pCi/L	REG	REG
ZBG002D	2/5/18	BISMUTH-214	7.18	40.00		214.00	pCi/L	REG	REG
ZBG002D	2/5/18	CARBON-14	8.02	17.30	U	-1.13	pCi/L	REG	REG
ZBG002D	2/5/18	CESIUM-134	4.22	8.38	U	1.88	pCi/L	REG	REG

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ZBG002D	2/5/18	CESIUM-137	3.69	7.43	U	1.09	pCi/L	REG	REG
ZBG002D	2/5/18	COBALT-60	4.44	8.58	U	1.63	pCi/L	REG	REG
ZBG002D	2/5/18	EUROPIUM-152	11.50	23.80	U	0.58	pCi/L	REG	REG
ZBG002D	2/5/18	EUROPIUM-154	9.01	19.10	U	-3.32	pCi/L	REG	REG
ZBG002D	2/5/18	EUROPIUM-155	14.10	30.20	U	0.50	pCi/L	REG	REG
ZBG002D	2/5/18	GROSS ALPHA	0.61	1.39	U	0.31	pCi/L	REG	REG
ZBG002D	2/5/18	IODINE-129	0.70	2.12	U	0.41	pCi/L	REG	REG
ZBG002D	2/5/18	LEAD-212	6.01	19.20	J	9.45	pCi/L	REG	REG
ZBG002D	2/5/18	LEAD-214	9.05	43.10		245.00	pCi/L	REG	REG
ZBG002D	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG002D	2/5/18	NICKEL-59	5.15	11.60	U	-4.50	pCi/L	REG	REG
ZBG002D	2/5/18	NICKEL-63	2.98	6.48	U	-0.27	pCi/L	REG	REG
ZBG002D	2/5/18	NIOBIUM-94	2.98	7.62	U	1.67	pCi/L	REG	REG
ZBG002D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		4.15	mg/L	REG	REG
ZBG002D	2/5/18	NONVOLATILE BETA	0.96	6.28		58.00	pCi/L	REG	REG
ZBG002D	2/5/18	PLUTONIUM-241	7.34	16.00	U	2.29	pCi/L	REG	REG
ZBG002D	2/5/18	POTASSIUM-40	41.80	89.60	U	-21.40	pCi/L	REG	REG
ZBG002D	2/5/18	PROMETHIUM-146	5.37	12.80	U	4.68	pCi/L	REG	REG
ZBG002D	2/5/18	RADIUM-226	0.08	0.29	J	0.20	pCi/L	REG	REG
ZBG002D	2/5/18	RADIUM-228	0.57	1.21	U	0.41	pCi/L	REG	REG
ZBG002D	2/5/18	RUTHENIUM-106	29.90	61.30	U	3.55	pCi/L	REG	REG
ZBG002D	2/5/18	SODIUM-22	3.18	6.62	U	-0.82	pCi/L	REG	REG
ZBG002D	2/5/18	STRONTIUM-90	0.93	2.04	U	0.48	pCi/L	REG	REG
ZBG002D	2/5/18	TECHNETIUM-99	8.03	21.20		104.00	pCi/L	REG	REG
ZBG002D	2/5/18	THALLIUM-208	4.15	9.29	U	-0.42	pCi/L	REG	REG
ZBG002D	2/5/18	TRITIUM	0.44	1.05	J	0.85	pCi/mL	REG	REG
ZBG009D	2/6/18	ACTINIUM-228	9.68	29.90	R	18.50	pCi/L	REG	REG
ZBG009D	2/6/18	ANTIMONY-125	5.52	12.00	U	1.37	pCi/L	REG	REG
ZBG009D	2/6/18	BARIUM-133	2.71	5.93	U	0.44	pCi/L	REG	REG
ZBG009D	2/6/18	BISMUTH-214	3.79	15.00		21.60	pCi/L	REG	REG
ZBG009D	2/6/18	CESIUM-134	2.25	4.67	U	0.39	pCi/L	REG	REG
ZBG009D	2/6/18	CESIUM-137	2.33	4.73	U	1.08	pCi/L	REG	REG
ZBG009D	2/6/18	COBALT-60	2.15	4.43	U	-0.07	pCi/L	REG	REG

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ZBG009D	2/6/18	EUROPIUM-152	6.17	13.20	U	-2.08	pCi/L	REG	REG
ZBG009D	2/6/18	EUROPIUM-154	5.76	13.00	U	-0.94	pCi/L	REG	REG
ZBG009D	2/6/18	EUROPIUM-155	7.61	16.30	U	1.07	pCi/L	REG	REG
ZBG009D	2/6/18	GROSS ALPHA	0.78	1.74	U	0.47	pCi/L	REG	REG
ZBG009D	2/6/18	IODINE-129	0.75	1.64	U	0.06	pCi/L	REG	REG
ZBG009D	2/6/18	LEAD-212	3.60	12.30	U	2.49	pCi/L	REG	REG
ZBG009D	2/6/18	LEAD-214	4.60	16.40		18.90	pCi/L	REG	REG
ZBG009D	2/6/18	NIOBIUM-94	1.99	4.23	U	0.02	pCi/L	REG	REG
ZBG009D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		1.57	mg/L	REG	REG
ZBG009D	2/6/18	NONVOLATILE BETA	0.96	2.24	J	1.14	pCi/L	REG	REG
ZBG009D	2/6/18	POTASSIUM-40	31.30	66.10	U	-19.20	pCi/L	REG	REG
ZBG009D	2/6/18	PROMETHIUM-146	2.73	5.75	U	0.03	pCi/L	REG	REG
ZBG009D	2/6/18	RUTHENIUM-106	18.30	37.70	U	4.81	pCi/L	REG	REG
ZBG009D	2/6/18	SODIUM-22	2.02	4.56	U	-0.35	pCi/L	REG	REG
ZBG009D	2/6/18	TECHNETIUM-99	6.75	14.60	U	0.13	pCi/L	REG	REG
ZBG009D	2/6/18	THALLIUM-208	2.530	6.11	U	0.12	pCi/L	REG	REG
ZBG009D	2/6/18	TRITIUM	0.43	1.11		1.66	pCi/mL	REG	REG
ZBG010D	2/6/18	ACTINIUM-228	13.50	30.90	U	-7.49	pCi/L	REG	REG
ZBG010D	2/6/18	ANTIMONY-125	7.95	16.30	U	3.75	pCi/L	REG	REG
ZBG010D	2/6/18	BARIUM-133	3.65	8.27	U	-0.51	pCi/L	REG	REG
ZBG010D	2/6/18	BISMUTH-214	5.87	28.90		87.70	pCi/L	REG	REG
ZBG010D	2/6/18	CESIUM-134	2.97	6.91	U	-0.77	pCi/L	REG	REG
ZBG010D	2/6/18	CESIUM-137	3.00	6.50	U	-0.80	pCi/L	REG	REG
ZBG010D	2/6/18	COBALT-60	3.49	6.83	U	1.37	pCi/L	REG	REG
ZBG010D	2/6/18	EUROPIUM-152	8.68	18.40	U	-0.58	pCi/L	REG	REG
ZBG010D	2/6/18	EUROPIUM-154	9.14	21.30	U	-5.01	pCi/L	REG	REG
ZBG010D	2/6/18	EUROPIUM-155	11.70	26.10	U	-1.78	pCi/L	REG	REG
ZBG010D	2/6/18	GROSS ALPHA	0.73	1.89	J	1.09	pCi/L	REG	REG
ZBG010D	2/6/18	IODINE-129	0.77	1.66	U	0.24	pCi/L	REG	REG
ZBG010D	2/6/18	LEAD-212	5.20	18.30	U	1.45	pCi/L	REG	REG
ZBG010D	2/6/18	LEAD-214	18.20	40.60		99.30	pCi/L	REG	REG
ZBG010D	2/6/18	NIOBIUM-94	2.85	5.91	U	0.71	pCi/L	REG	REG
ZBG010D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		0.58	mg/L	REG	REG

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ZBG010D	2/6/18	NONVOLATILE BETA	0.99	2.39	J	1.79	pCi/L	REG	REG
ZBG010D	2/6/18	POTASSIUM-40	32.10	120.00	U	17.50	pCi/L	REG	REG
ZBG010D	2/6/18	PROMETHIUM-146	3.83	8.07	U	0.32	pCi/L	REG	REG
ZBG010D	2/6/18	RUTHENIUM-106	23.20	48.60	U	1.21	pCi/L	REG	REG
ZBG010D	2/6/18	SODIUM-22	3.19	7.45	U	-1.83	pCi/L	REG	REG
ZBG010D	2/6/18	TECHNETIUM-99	7.21	15.60	U	-1.11	pCi/L	REG	REG
ZBG010D	2/6/18	THALLIUM-208	3.58	8.38	U	-1.28	pCi/L	REG	REG
ZBG010D	2/6/18	TRITIUM	0.43	1.07		1.20	pCi/mL	REG	REG
ZBG011D	2/6/18	ACTINIUM-228	11.40	22.20	U	6.52	pCi/L	REG	REG
ZBG011D	2/6/18	ANTIMONY-125	6.92	15.80	U	1.13	pCi/L	REG	REG
ZBG011D	2/6/18	BARIUM-133	3.07	6.65	U	0.67	pCi/L	REG	REG
ZBG011D	2/6/18	BISMUTH-214	6.28	18.90	U	3.70	pCi/L	REG	REG
ZBG011D	2/6/18	CESIUM-134	2.87	5.81	U	1.16	pCi/L	REG	REG
ZBG011D	2/6/18	CESIUM-137	2.83	5.83	U	0.84	pCi/L	REG	REG
ZBG011D	2/6/18	COBALT-60	2.94	5.96	U	0.34	pCi/L	REG	REG
ZBG011D	2/6/18	EUROPIUM-152	7.36	15.00	U	2.82	pCi/L	REG	REG
ZBG011D	2/6/18	EUROPIUM-154	8.41	17.30	U	0.38	pCi/L	REG	REG
ZBG011D	2/6/18	EUROPIUM-155	8.54	18.10	U	1.92	pCi/L	REG	REG
ZBG011D	2/6/18	GROSS ALPHA	0.72	2.45	J	1.83	pCi/L	REG	REG
ZBG011D	2/6/18	IODINE-129	0.76	2.59	U	0.71	pCi/L	REG	REG
ZBG011D	2/6/18	LEAD-212	5.06	13.80	U	0.28	pCi/L	REG	REG
ZBG011D	2/6/18	LEAD-214	7.23	21.10	U	0.49	pCi/L	REG	REG
ZBG011D	2/6/18	NIOBIUM-94	2.29	4.95	U	-0.46	pCi/L	REG	REG
ZBG011D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.20	mg/L	REG	REG
ZBG011D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.20	mg/L	REG	LD
ZBG011D	2/6/18	NONVOLATILE BETA	0.95	2.26	J	1.06	pCi/L	REG	REG
ZBG011D	2/6/18	POTASSIUM-40	26.00	93.60	R	54.20	pCi/L	REG	REG
ZBG011D	2/6/18	PROMETHIUM-146	3.12	6.46	U	0.52	pCi/L	REG	REG
ZBG011D	2/6/18	RUTHENIUM-106	23.70	48.90	U	6.84	pCi/L	REG	REG
ZBG011D	2/6/18	SODIUM-22	2.93	6.21	U	-0.62	pCi/L	REG	REG
ZBG011D	2/6/18	TECHNETIUM-99	7.43	16.10	U	-0.18	pCi/L	REG	REG
ZBG011D	2/6/18	THALLIUM-208	2.86	7.00	U	-0.87	pCi/L	REG	REG
ZBG011D	2/6/18	TRITIUM	0.44	0.99	U	0.33	pCi/mL	REG	REG

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ZBG012D	2/5/18	ACTINIUM-228	16.70	37.50	U	-2.56	pCi/L	REG	REG
ZBG012D	2/5/18	ANTIMONY-125	12.30	24.20	U	5.35	pCi/L	REG	REG
ZBG012D	2/5/18	BARIUM-133	5.75	12.30	U	1.03	pCi/L	REG	REG
ZBG012D	2/5/18	BISMUTH-214	13.00	32.10	U	5.30	pCi/L	REG	REG
ZBG012D	2/5/18	CESIUM-134	4.45	9.49	U	-0.72	pCi/L	REG	REG
ZBG012D	2/5/18	CESIUM-137	3.47	7.79	U	-0.83	pCi/L	REG	REG
ZBG012D	2/5/18	COBALT-60	4.41	9.09	U	-0.67	pCi/L	REG	REG
ZBG012D	2/5/18	EUROPIUM-152	12.80	25.90	U	2.51	pCi/L	REG	REG
ZBG012D	2/5/18	EUROPIUM-154	13.00	24.60	U	2.47	pCi/L	REG	REG
ZBG012D	2/5/18	EUROPIUM-155	13.40	30.90	U	11.60	pCi/L	REG	REG
ZBG012D	2/5/18	GROSS ALPHA	0.96	2.59	J	1.42	pCi/L	REG	REG
ZBG012D	2/5/18	IODINE-129	0.72	1.71	U	0.31	pCi/L	REG	REG
ZBG012D	2/5/18	LEAD-212	8.43	20.50	U	0.29	pCi/L	REG	REG
ZBG012D	2/5/18	LEAD-214	13.40	35.40	U	11.60	pCi/L	REG	REG
ZBG012D	2/5/18	NIOBIUM-94	3.87	9.57	U	2.90	pCi/L	REG	REG
ZBG012D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.46	mg/L	REG	REG
ZBG012D	2/5/18	NONVOLATILE BETA	0.77	1.74	U	0.55	pCi/L	REG	REG
ZBG012D	2/5/18	POTASSIUM-40	45.30	128.00	U	33.90	pCi/L	REG	REG
ZBG012D	2/5/18	PROMETHIUM-146	4.30	9.44	U	-2.20	pCi/L	REG	REG
ZBG012D	2/5/18	RUTHENIUM-106	29.20	62.00	U	1.65	pCi/L	REG	REG
ZBG012D	2/5/18	SODIUM-22	4.54	8.60	U	0.87	pCi/L	REG	REG
ZBG012D	2/5/18	STRONTIUM-90	0.97	2.15	U	0.62	pCi/L	REG	REG
ZBG012D	2/5/18	TECHNETIUM-99	8.67	18.80	U	-0.34	pCi/L	REG	REG
ZBG012D	2/5/18	THALLIUM-208	3.49	10.10	U	2.27	pCi/L	REG	REG
ZBG012D	2/5/18	TRITIUM	0.44	1.05	J	0.95	pCi/mL	REG	REG
ZBG013D	2/5/18	ACTINIUM-228	16.20	35.60	U	-9.52	pCi/L	REG	REG
ZBG013D	2/5/18	ANTIMONY-125	9.80	19.90	U	1.31	pCi/L	REG	REG
ZBG013D	2/5/18	BARIUM-133	4.22	10.80	U	3.43	pCi/L	REG	REG
ZBG013D	2/5/18	BISMUTH-214	10.40	25.10	U	1.85	pCi/L	REG	REG
ZBG013D	2/5/18	CESIUM-134	3.83	7.33	U	1.19	pCi/L	REG	REG
ZBG013D	2/5/18	CESIUM-137	4.37	8.51	U	1.84	pCi/L	REG	REG
ZBG013D	2/5/18	COBALT-60	3.84	7.28	U	0.56	pCi/L	REG	REG
ZBG013D	2/5/18	EUROPIUM-152	11.70	23.50	U	3.23	pCi/L	REG	REG

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ZBG013D	2/5/18	EUROPIUM-154	9.90	19.60	U	-0.53	pCi/L	REG	REG
ZBG013D	2/5/18	EUROPIUM-155	12.60	27.40	U	-0.48	pCi/L	REG	REG
ZBG013D	2/5/18	GROSS ALPHA	0.97	2.13	U	0.44	pCi/L	REG	REG
ZBG013D	2/5/18	IODINE-129	0.74	1.73	U	0.31	pCi/L	REG	REG
ZBG013D	2/5/18	IODINE-129	0.67	1.49	U	-0.38	pCi/L	REG	LD
ZBG013D	2/5/18	LEAD-212	7.51	15.90	U	-0.01	pCi/L	REG	REG
ZBG013D	2/5/18	LEAD-214	8.80	21.20	U	6.67	pCi/L	REG	REG
ZBG013D	2/5/18	NIOBIUM-94	3.82	7.76	U	0.61	pCi/L	REG	REG
ZBG013D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.23	mg/L	REG	LD
ZBG013D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.23	mg/L	REG	REG
ZBG013D	2/5/18	NONVOLATILE BETA	0.96	2.22	U	0.95	pCi/L	REG	REG
ZBG013D	2/5/18	POTASSIUM-40	51.00	110.00	U	-38.80	pCi/L	REG	REG
ZBG013D	2/5/18	PROMETHIUM-146	4.76	9.40	U	1.63	pCi/L	REG	REG
ZBG013D	2/5/18	RUTHENIUM-106	29.40	65.00	U	-13.20	pCi/L	REG	REG
ZBG013D	2/5/18	SODIUM-22	3.47	6.75	U	0.05	pCi/L	REG	REG
ZBG013D	2/5/18	STRONTIUM-90	0.89	1.69	U	-0.25	pCi/L	REG	REG
ZBG013D	2/5/18	TECHNETIUM-99	7.09	15.30	U	-2.68	pCi/L	REG	REG
ZBG013D	2/5/18	THALLIUM-208	4.17	8.79	U	-0.28	pCi/L	REG	REG
ZBG013D	2/5/18	TRITIUM	0.44	0.95	U	0.04	pCi/mL	REG	REG
ZBG014D	2/6/18	ACTINIUM-228	9.80	22.10	U	-1.39	pCi/L	REG	REG
ZBG014D	2/6/18	ANTIMONY-125	6.05	12.70	U	-0.07	pCi/L	REG	REG
ZBG014D	2/6/18	BARIUM-133	2.63	5.41	U	0.52	pCi/L	REG	REG
ZBG014D	2/6/18	BISMUTH-214	5.11	13.80	U	1.44	pCi/L	REG	REG
ZBG014D	2/6/18	CESIUM-134	2.26	4.56	U	0.68	pCi/L	REG	REG
ZBG014D	2/6/18	CESIUM-137	2.00	4.28	U	-0.40	pCi/L	REG	REG
ZBG014D	2/6/18	COBALT-60	2.08	4.52	U	-0.05	pCi/L	REG	REG
ZBG014D	2/6/18	EUROPIUM-152	6.33	13.50	U	-2.19	pCi/L	REG	REG
ZBG014D	2/6/18	EUROPIUM-154	7.05	14.40	U	0.16	pCi/L	REG	REG
ZBG014D	2/6/18	EUROPIUM-155	7.75	16.60	U	1.19	pCi/L	REG	REG
ZBG014D	2/6/18	GROSS ALPHA	0.95	2.40	J	1.04	pCi/L	REG	REG
ZBG014D	2/6/18	IODINE-129	0.71	1.73	U	-0.28	pCi/L	REG	REG
ZBG014D	2/6/18	IODINE-129	0.68	1.50	U	-0.26	pCi/L	REG	LD
ZBG014D	2/6/18	LEAD-212	4.74	11.40	U	0.39	pCi/L	REG	REG

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ZBG014D	2/6/18	LEAD-214	4.56	9.38	U	0.84	pCi/L	REG	REG
ZBG014D	2/6/18	NIOBIUM-94	2.12	4.48	U	0.03	pCi/L	REG	REG
ZBG014D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.38	mg/L	REG	REG
ZBG014D	2/6/18	NONVOLATILE BETA	0.72	1.64	U	0.58	pCi/L	REG	REG
ZBG014D	2/6/18	POTASSIUM-40	27.50	76.10	U	-29.60	pCi/L	REG	REG
ZBG014D	2/6/18	PROMETHIUM-146	2.54	5.36	U	-0.24	pCi/L	REG	REG
ZBG014D	2/6/18	RUTHENIUM-106	20.90	48.50	U	12.00	pCi/L	REG	REG
ZBG014D	2/6/18	SODIUM-22	2.46	5.00	U	0.11	pCi/L	REG	REG
ZBG014D	2/6/18	TECHNETIUM-99	7.30	15.80	U	-0.24	pCi/L	REG	REG
ZBG014D	2/6/18	THALLIUM-208	2.54	5.92	U	-0.92	pCi/L	REG	REG
ZBG014D	2/6/18	TRITIUM	0.44	1.01	J	0.51	pCi/mL	REG	REG
ZBG015D	2/5/18	ACTINIUM-228	15.50	34.20	U	5.90	pCi/L	REG	REG
ZBG015D	2/5/18	ANTIMONY-125	8.32	17.70	U	-1.16	pCi/L	REG	REG
ZBG015D	2/5/18	BARIUM-133	3.66	8.12	U	0.17	pCi/L	REG	REG
ZBG015D	2/5/18	BISMUTH-214	6.17	26.00		60.30	pCi/L	REG	REG
ZBG015D	2/5/18	CARBON-14	8.04	17.30	U	-2.41	pCi/L	REG	REG
ZBG015D	2/5/18	CESIUM-134	3.45	6.97	U	0.56	pCi/L	REG	REG
ZBG015D	2/5/18	CESIUM-137	3.19	6.87	U	0.39	pCi/L	REG	REG
ZBG015D	2/5/18	COBALT-60	2.95	6.43	U	-1.00	pCi/L	REG	REG
ZBG015D	2/5/18	EUROPIUM-152	9.48	19.50	U	3.23	pCi/L	REG	REG
ZBG015D	2/5/18	EUROPIUM-154	9.76	20.70	U	-1.44	pCi/L	REG	REG
ZBG015D	2/5/18	EUROPIUM-155	9.40	19.60	U	6.91	pCi/L	REG	REG
ZBG015D	2/5/18	GROSS ALPHA	0.65	1.53	U	0.61	pCi/L	REG	REG
ZBG015D	2/5/18	IODINE-129	0.70	2.18	J	0.84	pCi/L	REG	REG
ZBG015D	2/5/18	LEAD-212	5.19	17.80	U	0.48	pCi/L	REG	REG
ZBG015D	2/5/18	LEAD-214	6.75	28.80		66.80	pCi/L	REG	REG
ZBG015D	2/5/18	MERCURY	0.02	0.20	J	0.18	ug/L	REG	REG
ZBG015D	2/5/18	NICKEL-59	4.20	8.58	U	0.82	pCi/L	REG	REG
ZBG015D	2/5/18	NICKEL-63	3.30	7.20	U	0.72	pCi/L	REG	REG
ZBG015D	2/5/18	NIOBIUM-94	3.56	7.42	U	1.28	pCi/L	REG	REG
ZBG015D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.73	mg/L	REG	REG
ZBG015D	2/5/18	NONVOLATILE BETA	1.00	2.19	U	0.54	pCi/L	REG	REG
ZBG015D	2/5/18	PLUTONIUM-241	5.09	11.10	U	0.58	pCi/L	REG	REG

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ZBG015D	2/5/18	POTASSIUM-40	33.20	102.00	U	30.50	pCi/L	REG	REG
ZBG015D	2/5/18	PROMETHIUM-146	3.67	8.03	U	-1.63	pCi/L	REG	REG
ZBG015D	2/5/18	RADIUM-226	0.19	0.54	J	0.27	pCi/L	REG	LD
ZBG015D	2/5/18	RADIUM-226	0.05	0.32	J	0.28	pCi/L	REG	REG
ZBG015D	2/5/18	RADIUM-228	0.59	1.37	U	0.30	pCi/L	REG	REG
ZBG015D	2/5/18	RADIUM-228	0.57	1.28	U	0.50	pCi/L	REG	LD
ZBG015D	2/5/18	RUTHENIUM-106	29.30	60.70	U	8.13	pCi/L	REG	REG
ZBG015D	2/5/18	SODIUM-22	3.48	7.36	U	-0.39	pCi/L	REG	REG
ZBG015D	2/5/18	STRONTIUM-90	0.86	1.85	U	0.32	pCi/L	REG	REG
ZBG015D	2/5/18	TECHNETIUM-99	7.36	15.90	U	-1.00	pCi/L	REG	REG
ZBG015D	2/5/18	THALLIUM-208	3.70	8.64	U	-1.82	pCi/L	REG	REG
ZBG015D	2/5/18	TRITIUM	0.44	1.21		2.51	pCi/mL	REG	REG
ZBG016C	2/5/18	ACTINIUM-228	14.50	34.90	U	-5.63	pCi/L	REG	REG
ZBG016C	2/5/18	ANTIMONY-125	8.32	18.70	U	1.38	pCi/L	REG	REG
ZBG016C	2/5/18	BARIUM-133	3.60	8.16	U	-0.15	pCi/L	REG	REG
ZBG016C	2/5/18	BISMUTH-214	6.57	31.60		211.00	pCi/L	REG	REG
ZBG016C	2/5/18	CESIUM-134	3.50	7.30	U	0.09	pCi/L	REG	REG
ZBG016C	2/5/18	CESIUM-137	3.08	7.08	U	0.06	pCi/L	REG	REG
ZBG016C	2/5/18	COBALT-60	3.92	8.42	U	1.64	pCi/L	REG	REG
ZBG016C	2/5/18	EUROPIUM-152	9.14	19.50	U	-0.35	pCi/L	REG	REG
ZBG016C	2/5/18	EUROPIUM-154	9.97	21.90	U	-3.81	pCi/L	REG	REG
ZBG016C	2/5/18	EUROPIUM-155	9.33	20.10	U	4.49	pCi/L	REG	REG
ZBG016C	2/5/18	GROSS ALPHA	0.73	1.55	U	0.26	pCi/L	REG	REG
ZBG016C	2/5/18	IODINE-129	0.73	1.70	U	0.38	pCi/L	REG	REG
ZBG016C	2/5/18	LEAD-212	5.17	14.50	U	2.76	pCi/L	REG	REG
ZBG016C	2/5/18	LEAD-214	6.49	32.90		222.00	pCi/L	REG	REG
ZBG016C	2/5/18	NIOBIUM-94	3.12	6.38	U	0.90	pCi/L	REG	REG
ZBG016C	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02	U	0.02	mg/L	REG	REG
ZBG016C	2/5/18	NONVOLATILE BETA	1.00	2.61		3.22	pCi/L	REG	REG
ZBG016C	2/5/18	POTASSIUM-40	48.00	105.00	U	18.20	pCi/L	REG	REG
ZBG016C	2/5/18	PROMETHIUM-146	3.73	7.93	U	0.44	pCi/L	REG	REG
ZBG016C	2/5/18	RUTHENIUM-106	27.50	60.30	U	-6.23	pCi/L	REG	REG
ZBG016C	2/5/18	SODIUM-22	3.50	7.70	U	-1.46	pCi/L	REG	REG

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ZBG016C	2/5/18	STRONTIUM-90	0.93	1.93	U	0.14	pCi/L	REG	REG
ZBG016C	2/5/18	TECHNETIUM-99	6.99	15.10	U	-1.77	pCi/L	REG	REG
ZBG016C	2/5/18	THALLIUM-208	3.56	8.38	U	-0.63	pCi/L	REG	REG
ZBG016C	2/5/18	TRITIUM	0.44	1.06	J	1.04	pCi/mL	REG	REG
ZBG017D	2/5/18	ACTINIUM-228	15.60	35.80	U	-0.12	pCi/L	REG	REG
ZBG017D	2/5/18	ANTIMONY-125	10.20	21.40	U	1.11	pCi/L	REG	REG
ZBG017D	2/5/18	BARIUM-133	4.46	9.84	U	0.60	pCi/L	REG	REG
ZBG017D	2/5/18	BISMUTH-214	6.55	34.00		167.00	pCi/L	REG	REG
ZBG017D	2/5/18	CESIUM-134	3.50	7.06	U	1.50	pCi/L	REG	REG
ZBG017D	2/5/18	CESIUM-137	3.51	7.75	U	0.65	pCi/L	REG	REG
ZBG017D	2/5/18	COBALT-60	3.41	7.03	U	-0.16	pCi/L	REG	REG
ZBG017D	2/5/18	EUROPIUM-152	9.89	21.10	U	-3.06	pCi/L	REG	REG
ZBG017D	2/5/18	EUROPIUM-154	8.81	18.40	U	-1.50	pCi/L	REG	REG
ZBG017D	2/5/18	EUROPIUM-155	14.40	31.90	U	-6.80	pCi/L	REG	REG
ZBG017D	2/5/18	GROSS ALPHA	0.91	2.05	U	0.59	pCi/L	REG	REG
ZBG017D	2/5/18	IODINE-129	0.72	1.57	U	0.13	pCi/L	REG	REG
ZBG017D	2/5/18	LEAD-212	6.53	20.10	U	3.20	pCi/L	REG	REG
ZBG017D	2/5/18	LEAD-214	25.40	54.60		196.00	pCi/L	REG	REG
ZBG017D	2/5/18	NIOBIUM-94	3.34	6.92	U	1.14	pCi/L	REG	REG
ZBG017D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.57	mg/L	REG	REG
ZBG017D	2/5/18	NONVOLATILE BETA	0.97	1.94	U	-0.37	pCi/L	REG	REG
ZBG017D	2/5/18	POTASSIUM-40	52.00	115.00	U	-11.00	pCi/L	REG	REG
ZBG017D	2/5/18	PROMETHIUM-146	4.43	9.05	U	2.19	pCi/L	REG	REG
ZBG017D	2/5/18	RUTHENIUM-106	29.50	62.10	U	2.01	pCi/L	REG	REG
ZBG017D	2/5/18	SODIUM-22	3.09	6.43	U	-0.52	pCi/L	REG	REG
ZBG017D	2/5/18	STRONTIUM-90	0.86	1.65	U	-0.42	pCi/L	REG	REG
ZBG017D	2/5/18	TECHNETIUM-99	7.07	15.20	U	-2.81	pCi/L	REG	REG
ZBG017D	2/5/18	THALLIUM-208	4.24	10.10	U	0.23	pCi/L	REG	REG
ZBG017D	2/5/18	TRITIUM	0.45	1.05	J	0.75	pCi/mL	REG	REG
ZBG018D	2/6/18	ACTINIUM-228	11.10	28.10	U	1.27	pCi/L	REG	REG
ZBG018D	2/6/18	ANTIMONY-125	6.84	14.40	U	-0.23	pCi/L	REG	REG
ZBG018D	2/6/18	BARIUM-133	3.04	7.00	U	-1.63	pCi/L	REG	REG
ZBG018D	2/6/18	BISMUTH-214	10.10	23.70	R	21.10	pCi/L	REG	REG

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ZBG018D	2/6/18	CESIUM-134	2.94	5.82	U	1.62	pCi/L	REG	REG
ZBG018D	2/6/18	CESIUM-137	2.39	4.97	U	0.11	pCi/L	REG	REG
ZBG018D	2/6/18	COBALT-60	3.13	6.37	U	0.30	pCi/L	REG	REG
ZBG018D	2/6/18	EUROPIUM-152	7.05	14.70	U	0.14	pCi/L	REG	REG
ZBG018D	2/6/18	EUROPIUM-154	7.95	16.00	U	1.04	pCi/L	REG	REG
ZBG018D	2/6/18	EUROPIUM-155	9.50	20.30	U	1.04	pCi/L	REG	REG
ZBG018D	2/6/18	GROSS ALPHA	0.64	1.46	U	0.43	pCi/L	REG	REG
ZBG018D	2/6/18	IODINE-129	0.70	2.41	U	0.41	pCi/L	REG	REG
ZBG018D	2/6/18	LEAD-212	4.90	11.30	U	-1.27	pCi/L	REG	REG
ZBG018D	2/6/18	LEAD-214	5.51	20.30		22.70	pCi/L	REG	REG
ZBG018D	2/6/18	NIOBIUM-94	2.41	5.23	U	0.60	pCi/L	REG	REG
ZBG018D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.01	0.02		0.81	mg/L	REG	REG
ZBG018D	2/6/18	NONVOLATILE BETA	0.99	2.30	J	1.35	pCi/L	REG	REG
ZBG018D	2/6/18	POTASSIUM-40	34.40	78.80	U	-16.70	pCi/L	REG	REG
ZBG018D	2/6/18	PROMETHIUM-146	2.87	5.93	U	0.29	pCi/L	REG	REG
ZBG018D	2/6/18	RUTHENIUM-106	22.40	45.20	U	8.92	pCi/L	REG	REG
ZBG018D	2/6/18	SODIUM-22	2.80	5.62	U	0.37	pCi/L	REG	REG
ZBG018D	2/6/18	TECHNETIUM-99	7.54	16.40	U	1.88	pCi/L	REG	REG
ZBG018D	2/6/18	THALLIUM-208	3.06	7.32	U	0.37	pCi/L	REG	REG
ZBG018D	2/6/18	TRITIUM	0.44	1.09		1.28	pCi/mL	REG	REG
ZBG019D	2/6/18	ACTINIUM-228	15.30	44.90	U	6.56	pCi/L	REG	REG
ZBG019D	2/6/18	ANTIMONY-125	9.08	19.60	U	-0.81	pCi/L	REG	REG
ZBG019D	2/6/18	BARIUM-133	4.23	9.15	U	4.19	pCi/L	REG	REG
ZBG019D	2/6/18	BISMUTH-214	6.60	26.50		76.00	pCi/L	REG	REG
ZBG019D	2/6/18	CESIUM-134	4.18	9.10	U	1.26	pCi/L	REG	REG
ZBG019D	2/6/18	CESIUM-137	3.60	7.80	U	-0.49	pCi/L	REG	REG
ZBG019D	2/6/18	COBALT-60	3.39	6.89	U	0.28	pCi/L	REG	REG
ZBG019D	2/6/18	EUROPIUM-152	9.49	20.60	U	-1.72	pCi/L	REG	REG
ZBG019D	2/6/18	EUROPIUM-154	10.70	20.80	U	6.07	pCi/L	REG	REG
ZBG019D	2/6/18	EUROPIUM-155	9.09	19.70	U	-1.93	pCi/L	REG	REG
ZBG019D	2/6/18	GROSS ALPHA	0.98	2.49	J	1.44	pCi/L	REG	REG
ZBG019D	2/6/18	IODINE-129	0.72	1.55	U	0.34	pCi/L	REG	REG
ZBG019D	2/6/18	LEAD-212	6.33	15.30	U	-1.76	pCi/L	REG	REG

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG019D	2/6/18	LEAD-214	7.03	26.90		78.70	pCi/L	REG	REG
ZBG019D	2/6/18	NIOBIUM-94	3.16	6.66	U	0.59	pCi/L	REG	REG
ZBG019D	2/6/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		5.42	mg/L	REG	REG
ZBG019D	2/6/18	NONVOLATILE BETA	0.92	2.21	J	1.41	pCi/L	REG	REG
ZBG019D	2/6/18	POTASSIUM-40	33.60	118.00	U	9.84	pCi/L	REG	REG
ZBG019D	2/6/18	PROMETHIUM-146	4.12	8.82	U	0.18	pCi/L	REG	REG
ZBG019D	2/6/18	RUTHENIUM-106	29.50	59.50	U	20.50	pCi/L	REG	REG
ZBG019D	2/6/18	SODIUM-22	3.76	7.30	U	2.11	pCi/L	REG	REG
ZBG019D	2/6/18	TECHNETIUM-99	7.49	16.30	U	1.40	pCi/L	REG	REG
ZBG019D	2/6/18	THALLIUM-208	3.46	9.94	U	2.46	pCi/L	REG	REG
ZBG019D	2/6/18	TRITIUM	0.44	1.10		1.37	pCi/mL	REG	REG
ZBG020D	2/5/18	ACTINIUM-228	14.60	32.20	U	3.56	pCi/L	REG	REG
ZBG020D	2/5/18	ANTIMONY-125	10.30	21.70	U	4.91	pCi/L	REG	REG
ZBG020D	2/5/18	BARIUM-133	4.27	10.10	U	-0.16	pCi/L	REG	REG
ZBG020D	2/5/18	BISMUTH-214	6.46	38.30		475.00	pCi/L	REG	REG
ZBG020D	2/5/18	CARBON-14	8.02	17.30	U	-0.57	pCi/L	REG	REG
ZBG020D	2/5/18	CESIUM-134	3.19	6.79	U	-0.99	pCi/L	REG	REG
ZBG020D	2/5/18	CESIUM-137	3.32	7.66	U	0.05	pCi/L	REG	REG
ZBG020D	2/5/18	COBALT-60	3.29	7.43	U	-1.52	pCi/L	REG	REG
ZBG020D	2/5/18	EUROPIUM-152	10.60	22.90	U	-3.34	pCi/L	REG	REG
ZBG020D	2/5/18	EUROPIUM-154	8.99	19.80	U	2.28	pCi/L	REG	REG
ZBG020D	2/5/18	EUROPIUM-155	13.10	29.90	U	0.06	pCi/L	REG	REG
ZBG020D	2/5/18	GROSS ALPHA	1.00	2.09	U	0.26	pCi/L	REG	REG
ZBG020D	2/5/18	IODINE-129	0.70	1.53	U	-0.15	pCi/L	REG	REG
ZBG020D	2/5/18	LEAD-212	6.99	16.40	U	-5.08	pCi/L	REG	REG
ZBG020D	2/5/18	LEAD-214	7.78	41.60		530.00	pCi/L	REG	REG
ZBG020D	2/5/18	MERCURY	0.02	0.20	U	0.20	ug/L	REG	REG
ZBG020D	2/5/18	NICKEL-59	1.27	2.68	U	-0.57	pCi/L	REG	REG
ZBG020D	2/5/18	NICKEL-63	2.92	6.34	U	-0.55	pCi/L	REG	REG
ZBG020D	2/5/18	NIOBIUM-94	3.40	8.60	R	4.42	pCi/L	REG	REG
ZBG020D	2/5/18	NITRATE-NITRITE AS NITROGEN	0.08	0.20		0.49	mg/L	REG	REG
ZBG020D	2/5/18	NONVOLATILE BETA	0.88	6.80		51.80	pCi/L	REG	REG
ZBG020D	2/5/18	PLUTONIUM-241	6.08	13.30	U	1.36	pCi/L	REG	REG

WELL	DATE	ANALYTE	MDL	PQL	QUALIFIER	RESULT	UNITS	SAMPLE TYPE	ANALYSIS CODE
ZBG020D	2/5/18	POTASSIUM-40	41.30	92.70	U	-9.74	pCi/L	REG	REG
ZBG020D	2/5/18	PROMETHIUM-146	4.54	9.56	U	2.18	pCi/L	REG	REG
ZBG020D	2/5/18	RADIUM-226	0.12	0.33	U	0.15	pCi/L	REG	REG
ZBG020D	2/5/18	RADIUM-228	0.58	1.19	U	0.03	pCi/L	REG	REG
ZBG020D	2/5/18	RUTHENIUM-106	26.00	57.00	U	-6.47	pCi/L	REG	REG
ZBG020D	2/5/18	SODIUM-22	3.14	6.92	U	0.75	pCi/L	REG	REG
ZBG020D	2/5/18	STRONTIUM-90	0.90	1.76	U	-0.14	pCi/L	REG	REG
ZBG020D	2/5/18	TECHNETIUM-99	7.92	21.30		116.00	pCi/L	REG	REG
ZBG020D	2/5/18	THALLIUM-208	3.46	10.40	U	0.01	pCi/L	REG	REG
ZBG020D	2/5/18	TRITIUM	0.44	1.05	J	0.95	pCi/mL	REG	REG

Table 2 Notes:

FD	Field Duplicate Sample
LD	Laboratory Duplicate Quality Control (QC) Analysis
MDL	Method Detection Limit
µg/L	micrograms per liter
mg/L	milligrams per liter
pCi/L	picocuries per liter
pCi/mL	picocuries per milliliter
PQL	Practical Quantitation Limit
QUALIFIER	United States Environmental Protection Agency (USEPA) Functional Guideline Codes applied by labs.
REG	Regular Sample; Regular Laboratory Analysis of Sample
RERUN	Requested Reanalysis of Original Sample

USEPA Functional Guideline Codes

J The detected analyte was positively identified but the result is approximate.
NJ The detected analyte was only tentatively identified and the result is approximate. All usable TIC results receive this code.
U The analyte was analyzed for, but not detected. The sample detection and quantitation limits (MDL & PQL) are valid unless blank contamination is indicated.
UJ The analyte was analyzed for, but not detected. The MDL & PQL are approximate, and may be inaccurate or imprecise.
R The sample result is rejected as unusable due to serious deficiencies in meeting quality control criteria. The analyte may be present or absent.

Table 3. Field Measurements for Saltstone Wells (1Q18)

WELL	DATE	ANALYTE	VALUE	UNITS
ZBG 1	2/5/18	AIR TEMPERATURE	16.70	°C
ZBG 1	2/5/18	FLOW RATE	1.00	gpm
ZBG 1	2/5/18	PH	4.90	pH
ZBG 1	2/5/18	SPECIFIC CONDUCTANCE	28.00	µS/cm
ZBG 1	2/5/18	TOTAL ALKALINITY (AS CACO3)	1.00	mg/L
ZBG 1	2/5/18	TURBIDITY	0.30	NTU
ZBG 1	2/5/18	VOLUME PURGED	20.00	gal
ZBG 1	2/5/18	WATER TEMPERATURE	20.30	°C
ZBG 3	2/5/18	AIR TEMPERATURE	13.80	°C
ZBG 3	2/5/18	FLOW RATE	0.20	gpm
ZBG 3	2/5/18	PH	5.00	pH
ZBG 3	2/5/18	SPECIFIC CONDUCTANCE	24.00	µS/cm
ZBG 3	2/5/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG 3	2/5/18	TURBIDITY	10.40	NTU
ZBG 3	2/5/18	VOLUME PURGED	3.00	gal
ZBG 3	2/5/18	WATER TEMPERATURE	20.40	°C
ZBG 4	2/5/18	AIR TEMPERATURE	13.80	°C
ZBG 4	2/5/18	FLOW RATE	0.20	gpm
ZBG 4	2/5/18	PH	5.60	pH
ZBG 4	2/5/18	SPECIFIC CONDUCTANCE	27.00	µS/cm
ZBG 4	2/5/18	TOTAL ALKALINITY (AS CACO3)	3.00	mg/L
ZBG 4	2/5/18	TURBIDITY	7.00	NTU
ZBG 4	2/5/18	VOLUME PURGED	3.00	gal
ZBG 4	2/5/18	WATER TEMPERATURE	20.50	°C
ZBG 5	2/5/18	AIR TEMPERATURE	13.80	°C
ZBG 5	2/5/18	FLOW RATE	0.20	gpm
ZBG 5	2/5/18	PH	6.50	pH
ZBG 5	2/5/18	SPECIFIC CONDUCTANCE	59.00	µS/cm
ZBG 5	2/5/18	TOTAL ALKALINITY (AS CACO3)	14.00	mg/L
ZBG 5	2/5/18	TURBIDITY	1.00	NTU
ZBG 5	2/5/18	VOLUME PURGED	2.00	gal
ZBG 5	2/5/18	WATER TEMPERATURE	20.60	°C
ZBG 6	2/6/18	AIR TEMPERATURE	4.20	°C
ZBG 6	2/6/18	FLOW RATE	0.20	gpm
ZBG 6	2/6/18	PH	3.80	pH
ZBG 6	2/6/18	SPECIFIC CONDUCTANCE	24.00	µS/cm
ZBG 6	2/6/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG 6	2/6/18	TURBIDITY	0.20	NTU
ZBG 6	2/6/18	VOLUME PURGED	3.00	gal
ZBG 6	2/6/18	WATER TEMPERATURE	19.80	°C
ZBG 7	2/6/18	AIR TEMPERATURE	4.90	°C
ZBG 7	2/6/18	FLOW RATE	0.20	gpm
ZBG 7	2/6/18	PH	3.30	pH
ZBG 7	2/6/18	SPECIFIC CONDUCTANCE	18.00	µS/cm
ZBG 7	2/6/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG 7	2/6/18	TURBIDITY	0.40	NTU

WELL	DATE	ANALYTE	VALUE	UNITS
ZBG 7	2/6/18	VOLUME PURGED	2.00	gal
ZBG 7	2/6/18	WATER TEMPERATURE	19.30	°C
ZBG 8	2/6/18	AIR TEMPERATURE	12.60	°C
ZBG 8	2/6/18	FLOW RATE	0.50	gpm
ZBG 8	2/6/18	PH	3.40	pH
ZBG 8	2/6/18	SPECIFIC CONDUCTANCE	19.00	µS/cm
ZBG 8	2/6/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG 8	2/6/18	TURBIDITY	0.40	NTU
ZBG 8	2/6/18	VOLUME PURGED	2.00	gal
ZBG 8	2/6/18	WATER TEMPERATURE	19.50	°C
ZBG002C	2/5/18	AIR TEMPERATURE	22.10	°C
ZBG002C	2/5/18	FLOW RATE	0.10	gpm
ZBG002C	2/5/18	PH	6.10	pH
ZBG002C	2/5/18	SPECIFIC CONDUCTANCE	47.00	µS/cm
ZBG002C	2/5/18	TOTAL ALKALINITY (AS CACO3)	8.00	mg/L
ZBG002C	2/5/18	TURBIDITY	2.30	NTU
ZBG002C	2/5/18	VOLUME PURGED	2.00	gal
ZBG002C	2/5/18	WATER TEMPERATURE	20.10	°C
ZBG002D	2/5/18	AIR TEMPERATURE	18.80	°C
ZBG002D	2/5/18	FLOW RATE	0.10	gpm
ZBG002D	2/5/18	PH	5.50	pH
ZBG002D	2/5/18	SPECIFIC CONDUCTANCE	48.00	µS/cm
ZBG002D	2/5/18	TOTAL ALKALINITY (AS CACO3)	5.00	mg/L
ZBG002D	2/5/18	TURBIDITY	5.30	NTU
ZBG002D	2/5/18	VOLUME PURGED	2.00	gal
ZBG002D	2/5/18	WATER TEMPERATURE	20.00	°C
ZBG009D	2/6/18	AIR TEMPERATURE	12.60	°C
ZBG009D	2/6/18	FLOW RATE	0.20	gpm
ZBG009D	2/6/18	PH	5.20	pH
ZBG009D	2/6/18	SPECIFIC CONDUCTANCE	29.00	µS/cm
ZBG009D	2/6/18	TOTAL ALKALINITY (AS CACO3)	1.00	mg/L
ZBG009D	2/6/18	TURBIDITY	0.30	NTU
ZBG009D	2/6/18	VOLUME PURGED	1.00	gal
ZBG009D	2/6/18	WATER TEMPERATURE	19.60	°C
ZBG010D	2/6/18	AIR TEMPERATURE	7.80	°C
ZBG010D	2/6/18	FLOW RATE	0.20	gpm
ZBG010D	2/6/18	PH	5.30	pH
ZBG010D	2/6/18	SPECIFIC CONDUCTANCE	18.00	µS/cm
ZBG010D	2/6/18	TOTAL ALKALINITY (AS CACO3)	2.00	mg/L
ZBG010D	2/6/18	TURBIDITY	0.30	NTU
ZBG010D	2/6/18	VOLUME PURGED	2.00	gal
ZBG010D	2/6/18	WATER TEMPERATURE	19.70	°C
ZBG011D	2/6/18	AIR TEMPERATURE	4.60	°C
ZBG011D	2/6/18	FLOW RATE	0.20	gpm
ZBG011D	2/6/18	PH	5.70	pH
ZBG011D	2/6/18	SPECIFIC CONDUCTANCE	42.00	µS/cm
ZBG011D	2/6/18	TOTAL ALKALINITY (AS CACO3)	8.00	mg/L
ZBG011D	2/6/18	TURBIDITY	0.40	NTU

WELL	DATE	ANALYTE	VALUE	UNITS
ZBG011D	2/6/18	VOLUME PURGED	1.00	gal
ZBG011D	2/6/18	WATER TEMPERATURE	19.50	°C
ZBG012D	2/5/18	AIR TEMPERATURE	9.30	°C
ZBG012D	2/5/18	FLOW RATE	0.20	gpm
ZBG012D	2/5/18	PH	10.10	pH
ZBG012D	2/5/18	SPECIFIC CONDUCTANCE	157.00	µS/cm
ZBG012D	2/5/18	TOTAL ALKALINITY (AS CACO3)	68.00	mg/L
ZBG012D	2/5/18	TURBIDITY	0.50	NTU
ZBG012D	2/5/18	VOLUME PURGED	4.00	gal
ZBG012D	2/5/18	WATER TEMPERATURE	19.30	°C
ZBG013D	2/5/18	AIR TEMPERATURE	8.20	°C
ZBG013D	2/5/18	FLOW RATE	0.20	gpm
ZBG013D	2/5/18	PH	9.20	pH
ZBG013D	2/5/18	SPECIFIC CONDUCTANCE	171.00	µS/cm
ZBG013D	2/5/18	TOTAL ALKALINITY (AS CACO3)	70.00	mg/L
ZBG013D	2/5/18	TURBIDITY	0.20	NTU
ZBG013D	2/5/18	VOLUME PURGED	3.00	gal
ZBG013D	2/5/18	WATER TEMPERATURE	19.70	°C
ZBG014D	2/6/18	AIR TEMPERATURE	13.60	°C
ZBG014D	2/6/18	FLOW RATE	0.20	gpm
ZBG014D	2/6/18	PH	7.90	pH
ZBG014D	2/6/18	SPECIFIC CONDUCTANCE	167.00	µS/cm
ZBG014D	2/6/18	TOTAL ALKALINITY (AS CACO3)	78.00	mg/L
ZBG014D	2/6/18	TURBIDITY	0.30	NTU
ZBG014D	2/6/18	VOLUME PURGED	1.00	gal
ZBG014D	2/6/18	WATER TEMPERATURE	19.40	°C
ZBG015D	2/5/18	AIR TEMPERATURE	17.20	°C
ZBG015D	2/5/18	FLOW RATE	0.20	gpm
ZBG015D	2/5/18	PH	5.60	pH
ZBG015D	2/5/18	SPECIFIC CONDUCTANCE	26.00	µS/cm
ZBG015D	2/5/18	TOTAL ALKALINITY (AS CACO3)	4.00	mg/L
ZBG015D	2/5/18	TURBIDITY	0.20	NTU
ZBG015D	2/5/18	VOLUME PURGED	2.00	gal
ZBG015D	2/5/18	WATER TEMPERATURE	19.00	°C
ZBG016C	2/5/18	AIR TEMPERATURE	9.80	°C
ZBG016C	2/5/18	FLOW RATE	0.20	gpm
ZBG016C	2/5/18	PH	7.20	pH
ZBG016C	2/5/18	SPECIFIC CONDUCTANCE	27.00	µS/cm
ZBG016C	2/5/18	TOTAL ALKALINITY (AS CACO3)	8.00	mg/L
ZBG016C	2/5/18	TURBIDITY	0.20	NTU
ZBG016C	2/5/18	VOLUME PURGED	2.00	gal
ZBG016C	2/5/18	WATER TEMPERATURE	19.70	°C
ZBG016D	2/5/18	AIR TEMPERATURE	9.70	°C
ZBG016D	2/5/18	VOLUME PURGED	0.00	gal
ZBG017D	2/5/18	AIR TEMPERATURE	12.30	°C
ZBG017D	2/5/18	FLOW RATE	0.20	gpm
ZBG017D	2/5/18	PH	6.60	pH
ZBG017D	2/5/18	SPECIFIC CONDUCTANCE	16.00	µS/cm

WELL	DATE	ANALYTE	VALUE	UNITS
ZBG017D	2/5/18	TOTAL ALKALINITY (AS CACO3)	8.00	mg/L
ZBG017D	2/5/18	TURBIDITY	3.30	NTU
ZBG017D	2/5/18	VOLUME PURGED	3.00	gal
ZBG017D	2/5/18	WATER TEMPERATURE	19.20	°C
ZBG018D	2/6/18	AIR TEMPERATURE	18.40	°C
ZBG018D	2/6/18	FLOW RATE	0.50	gpm
ZBG018D	2/6/18	PH	3.40	pH
ZBG018D	2/6/18	SPECIFIC CONDUCTANCE	21.00	µS/cm
ZBG018D	2/6/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG018D	2/6/18	TURBIDITY	2.40	NTU
ZBG018D	2/6/18	VOLUME PURGED	2.00	gal
ZBG018D	2/6/18	WATER TEMPERATURE	19.20	°C
ZBG019D	2/6/18	AIR TEMPERATURE	20.70	°C
ZBG019D	2/6/18	FLOW RATE	0.50	gpm
ZBG019D	2/6/18	PH	4.00	pH
ZBG019D	2/6/18	SPECIFIC CONDUCTANCE	78.00	µS/cm
ZBG019D	2/6/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG019D	2/6/18	TURBIDITY	1.40	NTU
ZBG019D	2/6/18	VOLUME PURGED	2.00	gal
ZBG019D	2/6/18	WATER TEMPERATURE	20.60	°C
ZBG020D	2/5/18	AIR TEMPERATURE	12.20	°C
ZBG020D	2/5/18	FLOW RATE	0.10	gpm
ZBG020D	2/5/18	PH	5.00	pH
ZBG020D	2/5/18	SPECIFIC CONDUCTANCE	35.00	µS/cm
ZBG020D	2/5/18	TOTAL ALKALINITY (AS CACO3)	0.00	mg/L
ZBG020D	2/5/18	TURBIDITY	0.40	NTU
ZBG020D	2/5/18	VOLUME PURGED	1.00	gal
ZBG020D	2/5/18	WATER TEMPERATURE	19.90	°C

Table 3 Notes:
°C = Degrees Celsius
gal = gallons
gpm = gallons per minute
µS/cm = microsiemens per centimeter
mg/L = milligrams per liter
NTU = Nephelometric Turbidity Units
pH = negative log of the hydrogen ion concentration (-log[H+])

Table 4. Water Elevations for Saltstone Wells (1Q18)

WELL	REFERENCE ELEVATION (ft-msl)	DATE	DRY	WATER DEPTH (ft-TOC)	WATER ELEVATION (ft-msl)	SCREEN ZONE ELEVATION (ft-msl)	AQUIFER
ZBG 1	291.40	02/05/18	N	56.45	234.95	220 - 240.1	UAZ-UTRA
ZBG 3	272.63	02/05/18	N	50.20	222.43	204 - 214	LAZ-UTRA
ZBG 4	274.11	02/05/18	N	52.10	222.01	205.44 - 215.44	LAZ-UTRA
ZBG 5	272.33	02/05/18	N	50.30	222.03	203.77 - 213.77	LAZ-UTRA
ZBG 6	288.03	02/06/18	N	53.30	234.73	211 - 226	UAZ-UTRA
ZBG 7	287.35	02/06/18	N	52.33	235.02	210.24 - 225.24	UAZ-UTRA
ZBG 8	288.42	02/06/18	N	53.07	235.35	213.02 - 228.02	UAZ-UTRA
ZBG002C	278.56	02/05/18	N	57.80	220.76	195.83 - 205.83	LAZ-UTRA
ZBG002D	278.52	02/05/18	N	53.20	225.32	215.13 - 225.13	UAZ-UTRA
ZBG009D	275.58	02/06/18	N	54.80	220.78	197.7 - 212.7	LAZ-UTRA
ZBG010D	277.32	02/06/18	N	56.70	220.62	199.5 - 214.5	LAZ-UTRA
ZBG011D	280.71	02/06/18	N	59.90	220.81	202.8 - 217.8	LAZ-UTRA
ZBG012D	261.97	02/05/18	N	46.44	215.53	178.7 - 193.7	LAZ-UTRA
ZBG013D	262.48	02/05/18	N	47.70	214.78	179.7 - 194.7	LAZ-UTRA
ZBG014D	267.58	02/06/18	N	50.70	216.88	175.05 - 190.05	LAZ-UTRA
ZBG015D	297.97	02/05/18	N	62.16	235.81	214.31 - 234.31	UAZ-UTRA
ZBG016C	255.53	02/05/18	N	43.64	211.89	197.69 - 207.69	LAZ-UTRA
ZBG016D	256.10	02/05/18	Y	ND	ND	226.25 - 236.25	UAZ-UTRA
ZBG017D	277.79	02/05/18	N	57.14	220.65	222.9 - 212.9	UAZ-UTRA
ZBG018D	273.62	02/06/18	N	52.10	221.52	215.1 - 205.1	UAZ-UTRA
ZBG019D	285.47	02/06/18	N	62.80	222.67	218.3 - 208.3	UAZ-UTRA
ZBG020D	271.85	02/05/18	N	45.80	226.05	226.19 - 216.19	UAZ-UTRA

Table 4 Notes:
ft-TOC = feet – Top of Casing (Reference Elevation)
ft-msl = feet above mean sea level
N = No
ND = No Data
Y = Yes

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