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Scoping Summary For the General Separations Area Western Groundwater Operable Unit (U)

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Key Changes to the Scoping Summary

SECTION	DESCRIPTION OF CHANGE	RATIONALE FOR CHANGE
4.1 and 4.2	Revised sections to include results from 2016 groundwater sampling.	These changes update the Scoping Summary to include results from sampling in 2016.
Figures A-3, A-4, and A-5	Figures were updated based on the results of 2016 groundwater sampling.	These changes update the Scoping Summary with sampling results from 2016.
Appendix C	Data table was updated with the results of 2016 groundwater sampling.	These changes update the Scoping Summary with sampling results from 2016.

Significant Core Team Agreements

Agreement	Meeting
Locations FGW-023 and FGW-024 will be sampled at least 2 more times and results will be discussed in the 2016 scoping summary. Continued monitoring of these locations will be evaluated.	September 2015
Technetium-99 will be added to the analyte list for the South plume.	September 2014
Sampling data (one event) for new locations, FGW-023 and FGW-024, will be included in the final scoping summary for 2014.	September 2014
At the South plume, the Core Team agreed to move forward with installation of one surface water sample station and one shallow seepline piezometer on a tributary to the west of the Biomass Facility. The need for additional monitoring points will be evaluated based on monitoring results.	August 2013
Sampling of established wells will be performed annually. New monitoring locations added to the OU will be sampled semi-annually until a baseline is established.	August 2013
As documented in the GSA Eastern and Western Groundwater OUs Groundwater Monitoring Optimization White Paper, SRNS-RP-2012-00783, Rev. 1, January 2014, the Core Team agreed to discontinue monitoring at wells FNB-3, FNB-12, FBP-13D, FBP-44D, FBP-46D, FBP-47D, BRR-5D and UTR-7.	August 2013

Significant Core Team Agreements (continued)

Agreement	Meeting
As documented in the GSA Eastern and Western Groundwater OUs Groundwater Monitoring Optimization White Paper, SRNS-RP-2012-00783, Rev. 1, January 2014, the Core Team agreed to add alpha and beta/gamma speciation to analyte list for well FGW005C.	August 2013
The Core Team recognized the difficulty of installing a new well down gradient of UTR-18R and agreed that a new well is not needed at this time as long as SRS continues to monitor water at the seep in well UTR-18R.	August 2013
Add one monitoring well in the lower aquifer zone down gradient of FGW-012C, if possible.	August 2012
Add one seepline and one surface water monitoring location down gradient of FGW-012C along unnamed tributary, if surface water is present.	August 2012
Data are being collected and reported for future evaluation of VOC degradation as a remedial alternative.	August 2011
The Core Team agreed to include information on wells FBP 44D, 46D, and 47D in the August 2011 scoping summary instead of submitting the February 2011 white paper that was agreed to during the June 2010 meeting.	August 2011
FBP 44D, FBP 46D, and FBP 47D can be dry during periods of lower water table. This could represent a data gap if the UTR 18R seepline piezometer is also dry (monitors the same aquifer zone). UTR 18R typically contains water. Historical data associated with the dry wells will be evaluated with respect to contaminants to determine if modifications to the well network are necessary to define plume extent. The evaluation will be reported in February 2011 as a white paper.	June 2010

1.0 PROJECT PHASE AND STATUS

The *Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI)/Remedial Investigation (RI) Phase 1 Work Plan for the General Separations Area (GSA) Western Groundwater Operable Unit (OU)*, Revision 1.1, was approved by the United States Environmental Protection Agency (USEPA) and by the South Carolina Department of Health and Environmental Control (SCDHEC) on September 9, 2004. A Field Start was achieved for the OU on September 20, 2004.

In 2007, SRS completed establishment of the groundwater monitoring network. The GSA Western Groundwater OU is currently in a groundwater monitoring program. The purpose of this Scoping Summary is to present the analytical data obtained in 2016 from groundwater monitoring to the Core Team to determine if the monitoring network and analytical suite remain appropriate for continued monitoring. In 2016, concentrations have remained consistent with results from 2015 and continued sampling of the groundwater monitoring network is recommended. Groundwater plumes remain stable with respect to concentrations and extent, and surface waters are not above MCLs.

2.0 BACKGROUND

The GSA is located on a topographic ridge near the center of the SRS. The GSA Western Groundwater OU is located in the northwest portion of the GSA on a groundwater divide. It encompasses the groundwater beneath approximately 485.6 hectares (1,200 acres) in F Area. This OU is bordered to the south by the F-Area Hazardous Waste Management Facility and to the east by the Mixed Waste Management Facility (see Figure A-1). Because the OU is located on a groundwater divide, shallow groundwater flows toward both Fourmile Branch (FMB) and Upper Three Runs Creek (UTRC) (see Figure A-2).

This OU underlies many operating facilities and waste units in and around F Area that are potential sources of contamination. Some of these facilities and units have been investigated during previous Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI)/Remedial Investigation (RI) characterization work. From these investigations and from review of the existing monitoring well networks, three distinct groundwater plumes have been identified in the Upper Three Runs Aquifer (UTRA). The plumes are identified by geographic reference as the North plume, the West plume, and the South plume.

Some of the operating facilities in the area are undergoing decontamination and decommissioning and will be brought to closure in the near term. Because other facilities will remain active into the future, in September 2005, the Core Team determined:

- It is not appropriate to achieve a Record of Decision on the GSA Western GW OU until all sources of potential contamination are brought to closure (including closure of the F-Area High Level Waste Tanks).
- The most appropriate action at this time is continued groundwater monitoring to ensure that surface water resources are adequately protected.
- If contamination in the groundwater is thought to represent a threat to surface water resources, the Core Team will reconvene to determine if early response actions are required.

SRS characterized the nature and extent of groundwater contamination. The primary groundwater contaminants are volatile organic compounds (VOCs), radionuclides, and nitrate. Tritium, iodine-129, and trichloroethylene (TCE) are sporadically above MCLs in groundwater at points of discharge at the seeplines. However, concentrations in adjacent surface water are consistently below MCLs.

3.0 LAND USE

The area encompassed by the GSA Western GW OU is heavily developed with many active industrial facilities. No future residential use of this area is anticipated. Land use of the entire GSA Western GW OU area will be controlled to prevent use of the groundwater that exceeds MCLs. The UTRA and Gordon Aquifer (GA) are not used as a drinking water source at SRS.

4.0 SUBUNITS

The GSA Western GW OU includes the following two subunits:

- Groundwater (i.e., North Plume, West Plume, South Plume), including shallow groundwater discharging to surface at the seeplines
- Surface water

In September 2005, the Core Team determined that soil contamination from the potential source units will be addressed during closure of the individual waste units and operating facilities.

4.1 Groundwater Subunit

The UTRA is the shallow-most aquifer beneath the GSA Western GW OU and consists of two aquifer zones; the Upper Aquifer Zone (UAZ) and the Lower Aquifer Zone (LAZ). The GA underlies the UTRA and is separated from the UTRA by the Gordon Confining Unit (GCU). Contamination is present only in the UTRA. Previous investigations have demonstrated that within the GSA Western GW OU, the GA is protected by a competent confinement unit (GCU) and contamination is not migrating into the aquifer.

In 2016, the GSA Western GW OU was under a groundwater monitoring program that consisted of sampling 33 monitoring wells, 4 shallow sampling points at the seeplines (i.e., seepline piezometers), and 4 surface water sampling stations (Table 1 and Figure A-2). Starting in 2014, sampling of the monitoring network is performed annually for established wells with the exception of the F-Area Retention Basin. The F-Area Retention Basin is sampled semi-annually according to the Record of Decision (ROD). New wells are sampled semi-annually until a baseline is established in accordance with Table 1. The results from the 2016 monitoring of the well network are discussed below for the North, West, and South plumes. The analytical data for 2016 are presented in Appendix C.

Beginning in 2011, all locations in the North and West plumes have been sampled for TCE and degradation products. This is necessary to ensure that sufficient data are available to evaluate natural attenuation as a future remedial action. Currently cis-1,2-dichloroethylene is detected in the groundwater; however, concentrations are very low (0.71 μg/L) and below the laboratory analytical quantitation limit (i.e., 1 μg/L). Vinyl chloride is not detected (less than detection limit 0.3 μg/L).

Groundwater contaminants in the UTRA include VOCs, radionuclides, and nitrate. Tritium, TCE, and nonvolatile beta are recognized as the most widespread contaminants in the groundwater at the OU and thus are mapped each year. Other constituents are co-mingled with these primary contaminants. For example, TCE is the primary chlorinated solvent present yet the plume typically also contains limited quantities of tetrachloroethylene (PCE) and trichlorofluoromethane (TCFM) co-located with the TCE. Tritium and nonvolatile beta are the most widespread radioactive contaminants; however, other radionuclides such as iodine-129, strontium-90, uranium-238, etc., are also co-located within these plumes. Thus, mapping of the primary contaminants is useful to evaluate the distribution and nature of the plumes from year to year.

Beginning with the 2011 annual Core Team meeting, the TCE plume (Figure A-4) was revised. The value of the contour line was changed from 10 µg/L to the MCL of 5 µg/L. Also, the general shape of the plume was modified to reflect the absence of TCE at the wells adjacent to the Old F-Area Seepage Basin (OFASB). This change resulted in two distinct plumes being interpreted (North and West plumes) and the reassignment of well FGW 003C to the West plume monitoring network.

North Plume

The North plume covers an area of approximately 50 acres on the north side of the F-Area industrial facilities. Within this portion of the OU, the water table and the plume are located completely within the LAZ of the UTRA. Groundwater flow in this aquifer is north toward Upper Three Runs Creek and its tributaries. During 2016, groundwater samples were collected from four wells, two seepline piezometers, and two surface water locations. All locations yielded samples in 2016.

Previous investigations have shown that elevated concentrations of TCE, gross alpha, and nonvolatile beta are present to the east and north-east of the OFASB. In 2002, depth discrete samples measured TCE concentrations up to 85 µg/L. Elevated concentrations of gross alpha and nonvolatile beta were also detected. Sample locations from this investigation were shown in the November 2005 Scoping Summary. This area of the plume is likely from sources within the F-Area fence line such as facilities associated with the now decommissioned Naval Fuels and the Fabrication Shop located north of F Canyon.

During the 2016 monitoring period, TCE concentrations were similar to 2015 concentrations and ranged between non-detect and 15.8 µg/L. The maximum concentration was detected at well FNB 13 (15.8 µg/L). At adjacent well FNB

15, TCE was 10.5 µg/L. TCE was not detected at the other two wells adjacent to the OFASB and the seepline piezometers. Both PCE and TCFM were below the MCL in the North plume.

In addition to VOCs, nonvolatile beta, nitrate, iodine-129, strontium-90, and tritium have been present in the UTRA at levels greater than MCLs. In 2016, concentrations were similar to levels measured in 2015 and only slightly greater than respective MCLs at most locations. Near the OFASB at well FNB 2, the concentration of I-129 was 7.7 pCi/L which was slightly lower than the 2015 result. At the same well, Sr-90 was also slightly lower than the previous year at 10.7 pCi/L. Tritium exceeded the MCL (20 pCi/mL) down gradient of the OFASB at wells FNB 13 and FNB 15 (23.3 and 25.1 pCi/mL, respectively). However, tritium concentrations have been decreasing over the past fifteen years and are currently barely above the MCL as shown in Figure 1. The downward concentration trend since monitoring began in year 2000 is indicative of a plume that is shrinking and a tritium source term that is depleted. Nitrate also exceeded the MCL (10 mg/L) at wells (FNB 13 and FNB 15) and the maximum concentration was 14.6 mg/L (FNB 15). Nonvolatile beta only exceeded the MCL (50 pCi/L) at one well (FNB 13) at 68.6 pCi/L in 2016.

In 2016, shallow groundwater discharging at the seepline was monitored by two seepline piezometers (UTR 6 and UTR 16). Historically, primarily tritium has been detected near or slightly above the MCL at location UTR 16. However, I-129 has also been sporadically measured above the MCL in the past. During the 2016 sampling at UTR 16, tritium (7.34 pCi/mL) was below the MCL and iodine-129 was 2.15J pCi/L (laboratory estimated value below the estimated quantitation limit). Levels of tritium and I-129 were both similar to what was measured in 2015.

In accordance with the monitoring strategy, surface water samples are also collected near the points of groundwater discharge. Samples from surface water stations UTR 003 and UTR 004 were both non-detect for I-129 and had very low results for tritium, with the highest being 2.96 pCi/mL (2016).

Overall, the 2016 results were similar to 2015 results. The data continue to indicate that the plume remains stable to decreasing with respect to extent and concentrations. Surface water is not being impacted above MCLs. Continued monitoring is recommended for the North plume. Monitoring results for 2016 are provided in Appendix C.

West Plume

The West plume occupies approximately 65 acres on the western side of F Area. The plume is located within both the UAZ and LAZ of the UTRA. Groundwater flow in this area is generally west toward Upper Three Runs Creek. During 2016, groundwater samples were obtained from 11 of 12 wells. Well FBP 1A (LAZ) was damaged beyond repair by lightning in 2015 and remained out of service for the 2016 sampling event. In September 2017, a replacement well (FBP 1AR) was installed and this well has been added to the sampling matrix in Table 1. At the seepline, surface water station UTR 005 was dry, but a sample was collected from adjacent piezometer UTR 18R. Sampling results from the monitoring network are included in Appendix C.

Overall, the West plume is comprised primarily of VOCs (PCE, TCE, and TCFM), nitrates, and gross alpha/nonvolatile beta constituents. Based on previous sampling, the primary isotopes present include iodine-129, strontium-90, technetium-99, uranium-233/234, and uranium-238. In 2016, the data show MCL exceedances for: PCE, TCE, TCFM, nitrates, gross alpha, nonvolatile beta, iodine-129, radium-228, strontium-90, tritium, uranium 233/234, and uranium-

238. VOCs and nitrates are the most widespread contaminants for the West plume.

VOCs are present beneath the burning rubble pits and up gradient of the pits toward the F-Area facilities. The most prevalent VOCs are TCE and TCFM. The highest concentrations of TCE are located at the northwest edge of the F-Area facilities at wells FGW 003C, FGW 005C, FGW 022C, and FBP43DL. The maximum concentrations of TCE and TCFM were both located at well FBP 43 DL (28.4 µg/L and 32.9 µg/L, respectively). In 2016, TCE at well FGW 005C was non-detect. This result appears to be anomalous as TCE results have historically been above the MCL at FGW 005C. In addition to historical results, the 2017 result for well FGW 005C was 23.2 µg/L which is consistent with past results. TCE concentrations in this part of the plume (wells FGW 003C, FGW 005C, FGW 022C, and FBP 43DL) have been stable to decreasing over time (Figure 2).

In 2016 in the distal part of the plume, TCE concentrations remained steady at 11.7 µg/L (Figure 3). PCE concentrations were also similar to last year's results (2016 maximum result of 7.14 µg/L). TCFM exceeded the MCL at wells FBP 2A and FBP 6D (9.54 and 11.7 µg/L, respectively).

The maximum concentrations of nitrates, gross alpha, and nonvolatile beta are also present adjacent to the F-Area facilities and the Inactive Process Sewer Line (IPSL) at LAZ wells FGW 005C and FGW 022C. In 2016, the maximum nitrate concentration was slightly lower than last year at 44.7 mg/L (FGW 022C). Gross alpha and nonvolatile beta concentrations were similar to results from 2015; gross alpha 1,240 pCi/L (FGW 005C), nonvolatile beta 874 pCi/L (FGW 005C) (2016 results). At well FGW 005C, the specific isotopes associated with the elevated gross alpha are uranium-233/234 (310 pCi/L) and uranium-238 (980 pCi/L) and the beta emitting isotopes present are primarily strontium-90 (114 pCi/L) and

technetium-99 (162 pCi/L). The results of isotopic speciation for FGW 005C are included in Appendix B.

At the West plume, the concentrations of gross alpha and nonvolatile beta attenuate rapidly with distance away from the F-Area facilities. As shown in Figure A-5, the nonvolatile beta plume terminates approximately half-way between the F-Area fence line and the wetlands of Upper Three Runs Creek, and poses no threat to surface water.

Since 2006, PCE, TCE and TCFM have been detected near the seepline at piezometer UTR 18R, however, surface water samples collected down gradient from UTR 18R have historically been non-detect for VOCs. In 2016, the maximum concentration was 4.64 µg/L for TCE and was below the MCL. PCE and TCFM were also below the MCL in 2016 at 3.15 µg/L and 4.55 µg/L, respectively. UTR 018R is located at the base of a slope in an area of localized groundwater seeps. At this area, the rate of groundwater discharge is so low that standing water is not present year round. Also, the seepline sample point is approximately 600 feet from Upper Three Runs Creek and groundwater discharged to the surface typically seeps back into the ground or evaporates before reaching the creek. Downgradient of the seep piezometer, the concentration of all constituents have been below the MCL at surface water location UTR 005. A sample was not able to be collected at UTR 005 due to dry conditions.

Overall, 2016 data continue to indicate that the plumes remain stable with respect to extent and concentrations. Both the VOC and nonvolatile beta plumes terminate prior to discharging at seeps to Upper Three Runs Creek. Surface water is not being impacted above MCLs. Continued monitoring is recommended for the West plume. Monitoring results for 2016 are provided in Appendix C.

<u>South Plume</u>

The South plume covers an area of approximately 55 acres on the south west corner of F Area. The plume is located within the UAZ and LAZ of the UTRA. Groundwater flow in this portion of the OU is generally south west toward Upper Three Runs Creek. During 2016, groundwater samples were collected from 13 wells. The analyte list for monitoring includes nitrates, gross alpha, nonvolatile beta, tritium, iodine-129, radium-226, radium-228, strontium-90, uranium-233/234, uranium-238, and technetium-99. Technetium-99 is a new analyte that was added to the list in 2015. Analytical results are presented in Appendix C.

The South plume consists primarily of tritium and nonvolatile beta constituents. VOCs are not present at the South plume. Specific radionuclides that have been present above MCLs include iodine-129, strontium-90, and radium-226. SRS believes these constituents are sourced from the RCRA permitted F-Area Inactive Process Sewer Line (FIPSL). Potential sources of contamination include historic releases along sections of the FIPSL. A collapsed section of the vitrified clay FIPSL is known to exist down gradient of the Tank Farm. The collapsed section is shown in Figure A-2. Sampling locations near the collapsed section of the FIPSL are not accessible at this time due to interferences with power lines and active steam lines.

In 2016, nonvolatile beta was the most widespread contaminant detected. It was present at levels exceeding 50 pCi/L in five of the thirteen wells with concentrations ranging from 66.7 pCi/L (BRR 6C) to 624 pCi/L (FTF 28). Historically, the elevated concentrations have been detected in the area of wells FTF 28 and FSL 5D near the IPSL collapsed section, and also at down gradient well FGW 12C.

In addition to nonvolatile beta activity, a few wells near the FIPSL have exceeded the MCL for iodine-129, nitrate, strontium-90, radium-226, technetium-99, and tritium. In 2016, all of these analytes, except radium-226, exceeded the MCL in at least one well. The maximum concentrations were: iodine-129 (14.7 pCi/L), nitrate (10.4 mg/L), radium-226 (2.23J pCi/L), strontium-90 (8.84J pCi/L), technetium-99 (1270 pCi/L), and tritium (81.8 pCi/mL). All of these maximum concentrations occurred in wells along or near the FIPSL, except for nitrate which was highest at well FGW 12C. Historically, radium-228 has also exceeded in at least one well. However, concentrations of radium-228 were below the MCL at all sampled locations in the South plume.

Overall, the 2016 data indicate that the plume remains stable with respect to extent and concentrations. Monitoring results are provided in Appendix C.

During the August 2012 Core Team meeting, uncertainties associated with the extent of the South plume in the LAZ and the possibility of the South plume discharging to surface water were discussed. The Core Team recommended investigating a tributary to Upper Three Runs Creek that is located down gradient of well FGW 012C for potential sampling locations. The potential locations investigated included one surface water sample station, one seepline piezometer location, and a location for one new groundwater monitoring well, if needed. A field walk-down was held on April 16, 2013 with representatives from EPA, SCDHEC, and SRS. Based on the walk-down, groundwater discharge to the tributary was determined to begin approximately half-way down its length with the tributary being discharged to the floodplain swamp of Upper Three Runs Creek. The upper reaches of the tributary were dry.

In September 2014, SRS installed a surface water sample station (FGW 024) near the discharge point to the swamp and in August 2014, a shallow piezometer (FGW 023) to sample groundwater discharging to the surface. Six rounds of

samples have been collected for the South plume constituents since 2014. Nitrate-nitrite, radium-226, radium-228, nonvolatile beta, technetium-99 and tritium have all been detected, but all concentrations were very low and below MCLs. During the second quarter 2016 sampling, iodine-129 (1.19J pCi/L) was detected at FGW 023 but the result was “J” qualified meaning the constituent was below the sample quantitation limit (SQL) and thus cannot be accurately quantified. Iodine-129 at FGW 023 was non-detect in fourth quarter 2016 and in second quarter 2017. Based on the sampling results, the South plume is not impacting this tributary to Upper Three Runs Creek. The results are presented in Appendix C.

Six sets of samples have been collected over the past three years and only a few contaminants have been detected. All results have been below MCLs. In the 2015 Core Team meeting, SRS agreed to sample locations FGW-023 and FGW-024 at least two more times followed by an evaluation of the need for ongoing monitoring once a baseline was established. SRS has evaluated the sample results and proposes to reduce the sampling frequency from semi-annual to annual for FGW 023 and FGW 024. The analyte suite will remain the same as for the rest of the South plume.

F-Area Retention Basin

Previously, the Core Team decided to incorporate the monitoring and reporting for the F-Area Retention Basin in this report. The GSA Western Groundwater OU monitoring network includes sampling at four wells for the F-Area Retention Basin (FRB 1 through FRB 4). The monitoring network is shown on Figure A-2 and details are provided in Table 1. Samples were collected from all of the wells. All results except for one were below MCLs at the F-Area Retention Basin. In 2016, TCE at well FRB 2 (23.3 µg/L) was greater than the MCL (5.0 µg/L). This result appears to be anomalous as every other result at FRB 2 from 2014 to 2017

has been non-detect. SRS will continue to monitor TCE at the F-Area Retention Basin. The analytical data are presented in Appendix C.

4.1.1 Problem Warranting Action

- Volatile organic compounds (VOCs), nitrate, and radionuclides in the UTRA are present at levels that exceed the respective MCLs.
- VOCs and radionuclides have been present in groundwater at the seepline at levels above the MCLs.

4.1.2 Remedial Action Objectives

- Ensure that contaminants in groundwater do not impact surface water at levels that exceed MCLs.
- Prevent human exposure to contaminants in groundwater at levels that exceed MCLs.

4.1.3 Scope of Problem

Groundwater contaminants in the UTRA include VOCs, radionuclides, and nitrate. Tritium, TCE, and nonvolatile beta are recognized as the most widespread contaminants in the groundwater at the OU. Figures A-3, A-4, and A-5 show the distribution of these contaminants in the UTRA during 2016.

4.1.4 Likely Response Actions

- Continued monitoring of groundwater in the UTRA and at the seepline on an annual frequency.

4.1.5 Uncertainties

- There is some uncertainty regarding the potential sources of shallow groundwater contamination due to the number of operating facilities and waste units within the boundaries of the GSA Western GW OU. Individually and collectively, these facilities and waste sites have contaminated the shallow aquifer that underlies this groundwater OU. The closure of the F-Area facilities will manage the uncertainties associated with residual sources. The uncertainty regarding source areas will ultimately be addressed by the F-Area OU remedial investigation (prior to Area Closure). Until then, the impact of the combined sources on groundwater will be tracked by continued groundwater monitoring in the GSA Western GW OU. The well network for each plume area, sampling frequency, and specific analyte lists are summarized in Table 1.

4.2 Surface Water

Shallow groundwater within the OU discharges to surface water at the seeplines of Upper Three Runs Creek and Fourmile Branch. The Phase 1 Work Plan specified that if groundwater contamination was detected at the seeplines above the MCLs, then surface water quality in the stream(s) would be evaluated. Four surface water sample locations are used to monitor water quality in the groundwater monitoring plan (see Figure A-2). In June 2010, the Core Team agreed to sample the surface water at the same frequency as the groundwater.

Characterization and monitoring well data show that groundwater contamination exists above MCLs beneath the seepline at a few locations within the OU. At the North and West plumes, groundwater at the seepline has exceeded MCLs for tritium, strontium-90, iodine-129, and VOCs in the past. However, confirmation sampling of the surface water in the streams has demonstrated that contaminant levels are below MCLs in the tributaries to Upper Three Runs Creek.

4.2.1 Problem Warranting Action

- No problems warranting action have been identified for surface water at the OU.

4.2.2 Remedial Action Objectives

- To date there were no MCL exceedances in surface water; therefore remedial action objectives are not applicable at this time.

4.2.3 Surface Water Scope of Problem Warranting Action

The GSA Western GW OU contains three distinct areas of groundwater contamination. Since routine monitoring started in 2005, two of these plumes, the North plume and the West plume, have been above MCLs in groundwater near the discharge zone to the seeplines. In 2016, the North plume groundwater at the seepline was slightly above the MCL for iodine-129 at a concentration of 2.15J pCi/L. The West plume groundwater at the seepline was below the MCLs for all constituents. Historically, confirmation sampling of the surface water has demonstrated that contaminant levels have been and continue to be below MCLs in the tributaries to Upper Three Runs Creek.

4.2.4 Surface Water Likely Response Actions

- Monitoring of surface water per the schedule in Table 1.

4.2.5 Uncertainties

- It is uncertain if surface water of Upper Three Runs Creek and tributaries will be impacted by groundwater discharging from the North and West plumes. At some of the seepline locations contaminants have been detected above the MCL in groundwater. However, the associated streams continue to remain below MCLs for all contaminants. As more data is obtained, trends will be developed as necessary. This uncertainty is managed by monitoring surface water in the

tributaries to Upper Three Runs Creek. Sample locations and analytes are summarized in Table 1.

5.0 OPERABLE UNIT STRATEGY

- SRS will sample the monitoring network annually for contaminants of concern until there is a decision to modify the frequency. New monitoring locations added to the OU will be sampled semi-annually until a baseline is established. Evaluation will be based on data trends. This information is reported in an annual update to this scoping summary.

- SRS will convene the Core Team annually (or as necessary) to review data, re-evaluate the well network, sampling frequency, and analyte list, assess the effectiveness of the OU logic, and decide if the monitoring strategy is still appropriate or if changes are required (including the need for immediate action).

- SRS will notify the Core Team promptly if monitoring data indicate a problem that requires immediate action.

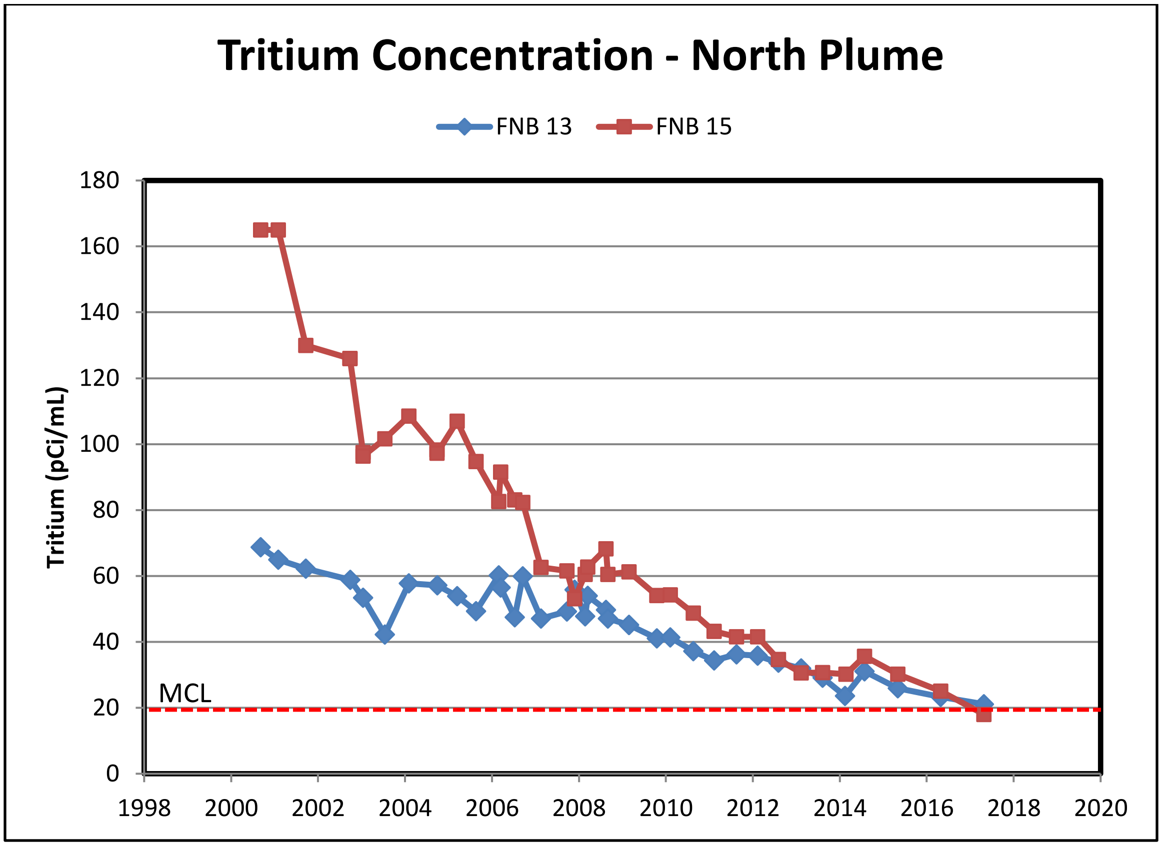


Figure 1. Tritium Concentration in the North Plume

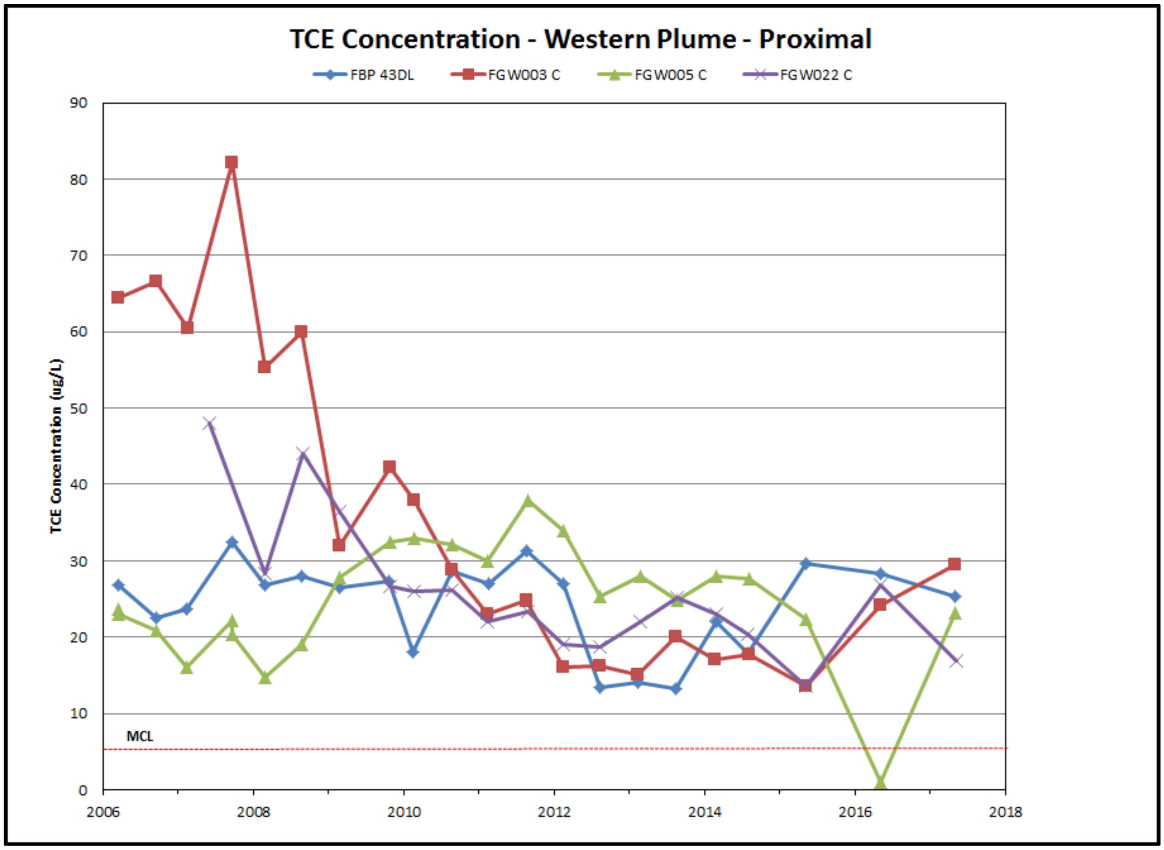


Figure 2. TCE Concentration Near the Source in the West Plume

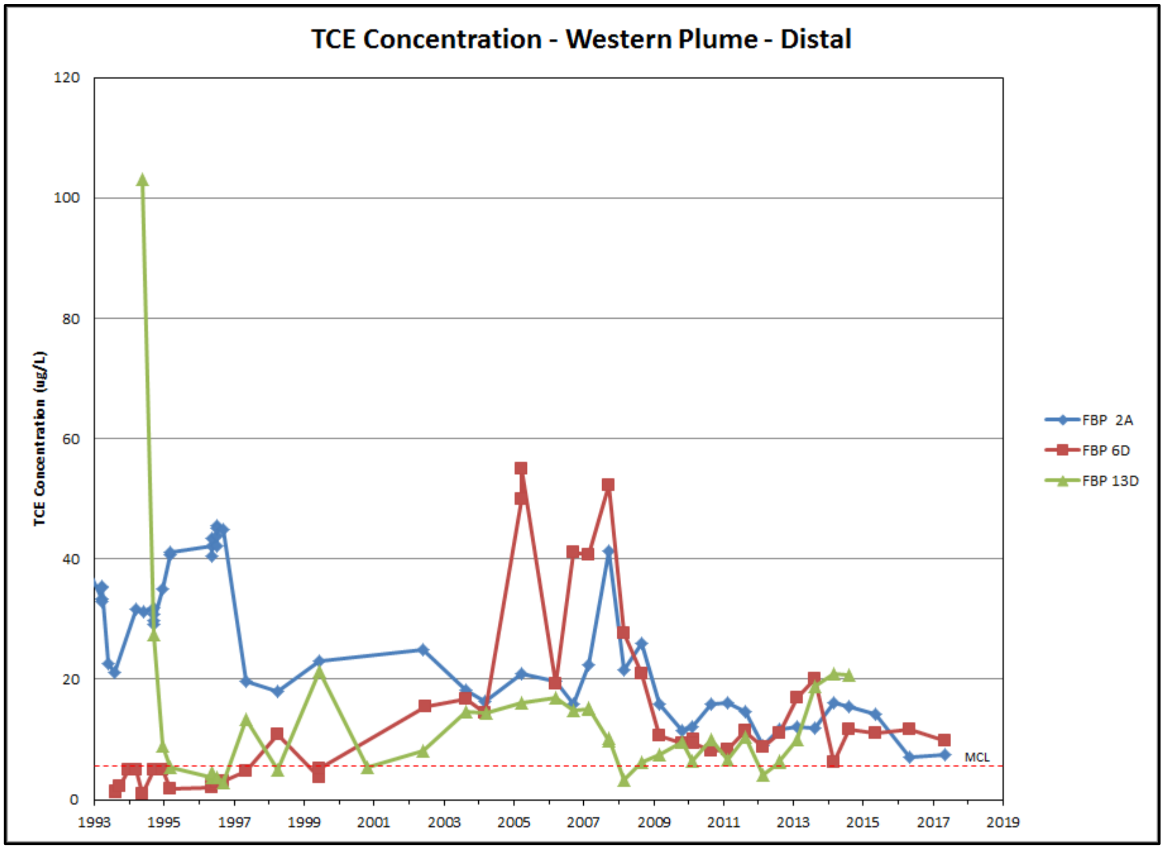


Figure 3. TCE Concentrations in the Distal Part of the West Plume

Table 1. Groundwater Monitoring Network

Plume Description	Aquifer Zone	Well ID	Analyte List
West Plume	UAZ of UTRA	FBP10D, FBP6D, FBP12D, FBP43DL, FSL2D	Nitrate, gross alpha, nonvolatile beta, tritium, and TCL VOCs Alpha and beta/gamma speciation for FGW005C At surface water locations: field parameters for VOC degradation and degradation products
	LAZ of UTRA	FBP 1AR, FBP2A, FBP43C, FGW003C, FGW005C, FGW019C, FGW022C	
	Seepline/Surface Water	UTR18R, UTR005	
North Plume	LAZ of UTRA	FNB2, FNB5, FNB13, FNB15	Nitrate, gross alpha, nonvolatile beta, tritium, iodine-129, strontium-90, and TCL VOCs
	Seepline/Surface Water	UTR16, UTR6, UTR003, UTR004	
South Plume	UAZ of UTRA	BRR1D, BRR6D, FSL4D, FSL5D, FSL6D, FSL7D, FSB76C, FGW012D	Nitrate, gross alpha, nonvolatile beta, tritium, iodine-129, radium-226, 228, strontium-90, technetium-99, uranium-233/234, 238
	LAZ of UTRA	BRR6C, BRR7C, FTF28, FSL11C, FGW012C	
	Seepline/Surface Water	One new surface water location (FGW024) and one new seepline piezometer (FGW023)	
F Area Retention Basin	UAZ of UTRA	FRB1, FRB2, FRB3, FRB4	Gross alpha, nonvolatile beta, cesium-137, strontium-90, radium-226, TCE

- Sampling of the well network is performed annually for existing wells starting in 2014 with the exception of the F Area Retention Basin. The FRB wells are sampled semi-annually according to the ROD. New monitoring locations added to the OU will be sampled semi-annually until a baseline is established. The monitoring network was revised during the August 2013 scoping meeting based on the Monitoring Optimization White Paper, SRNS-RP-2012-00783, Rev. 1, January 2014.
- Sample locations are shown on Figure A-2. FBP-45D was abandoned in 2009.

Appendix A

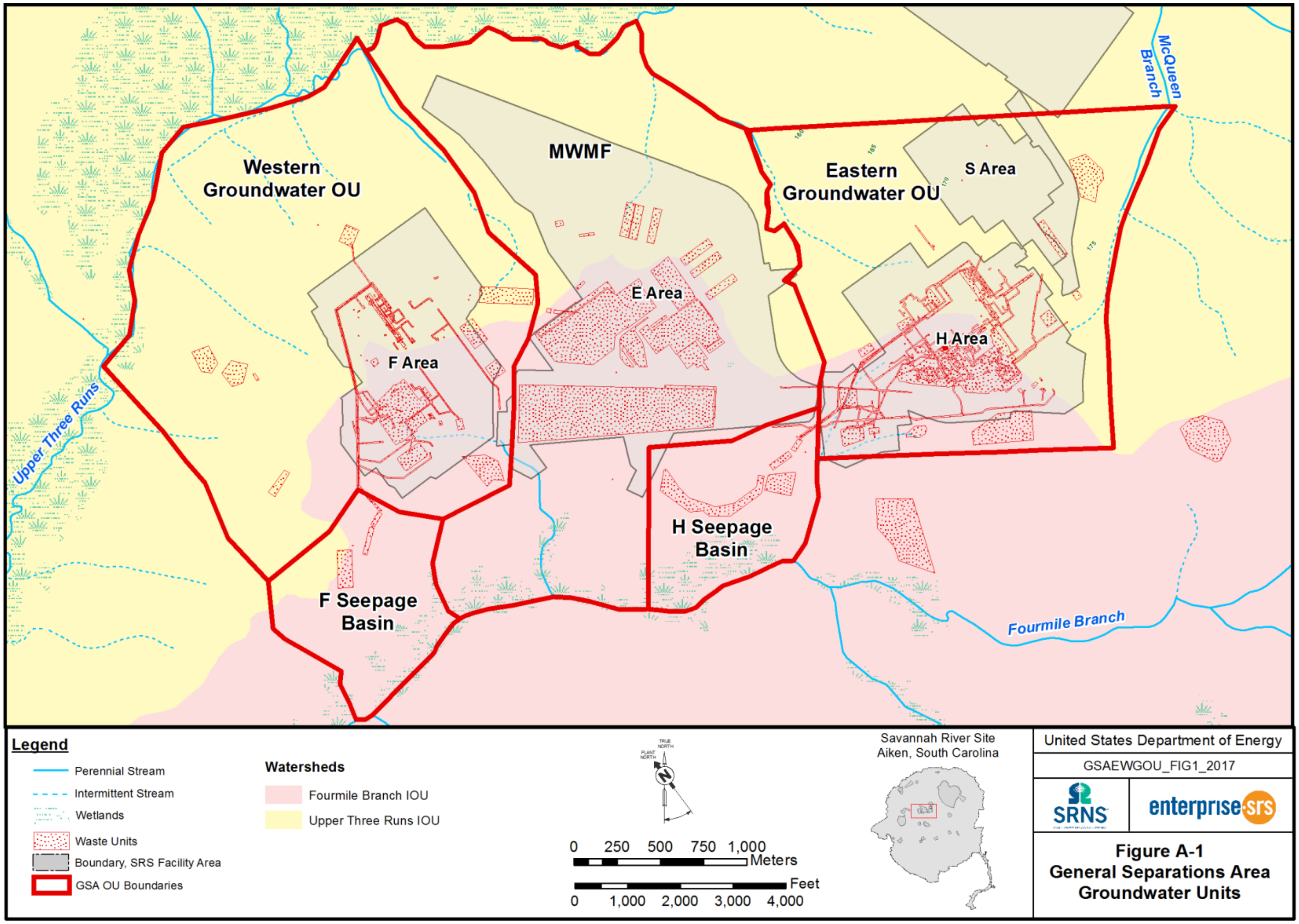


Figure A-1
General Separations Area
Groundwater Units

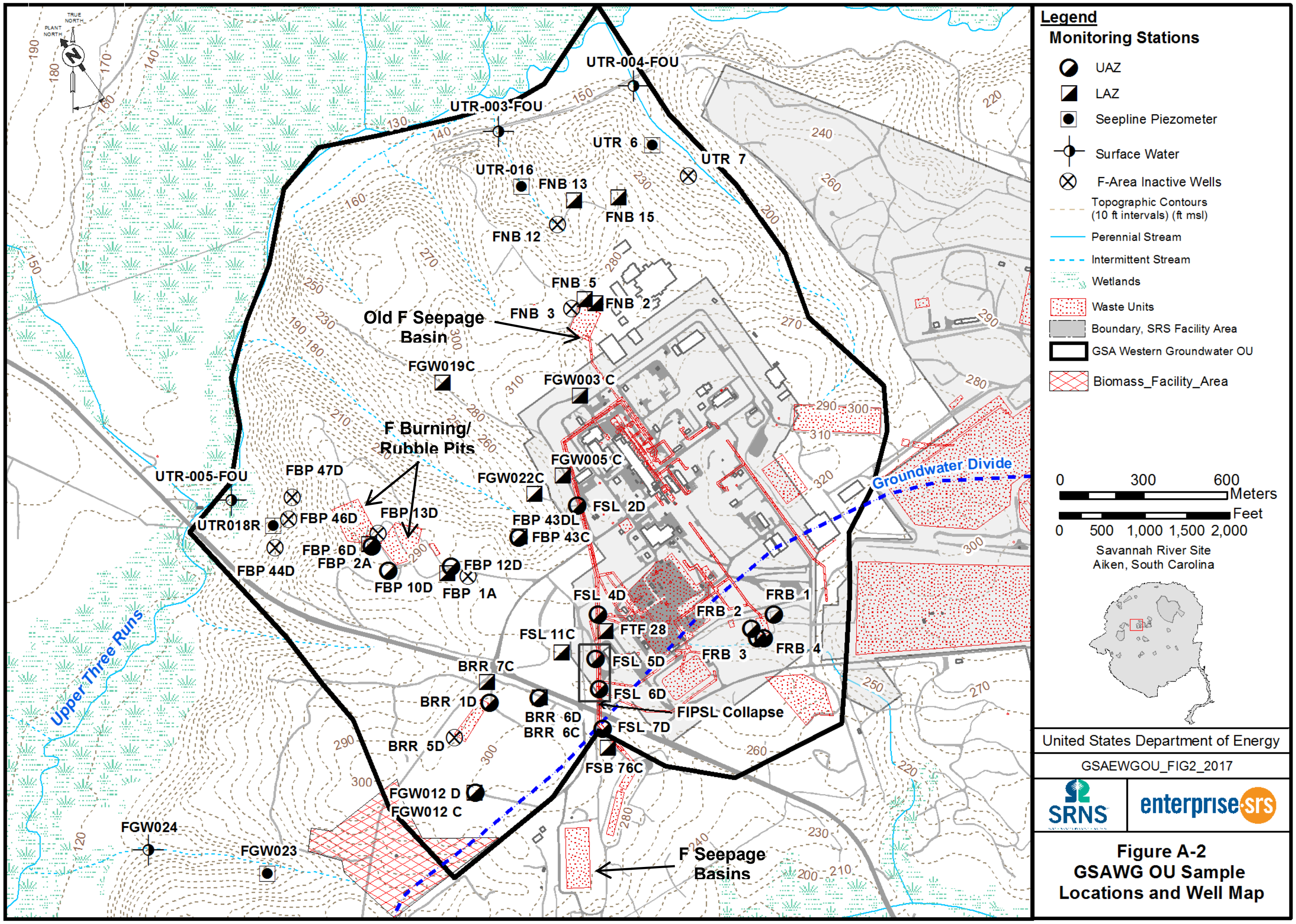
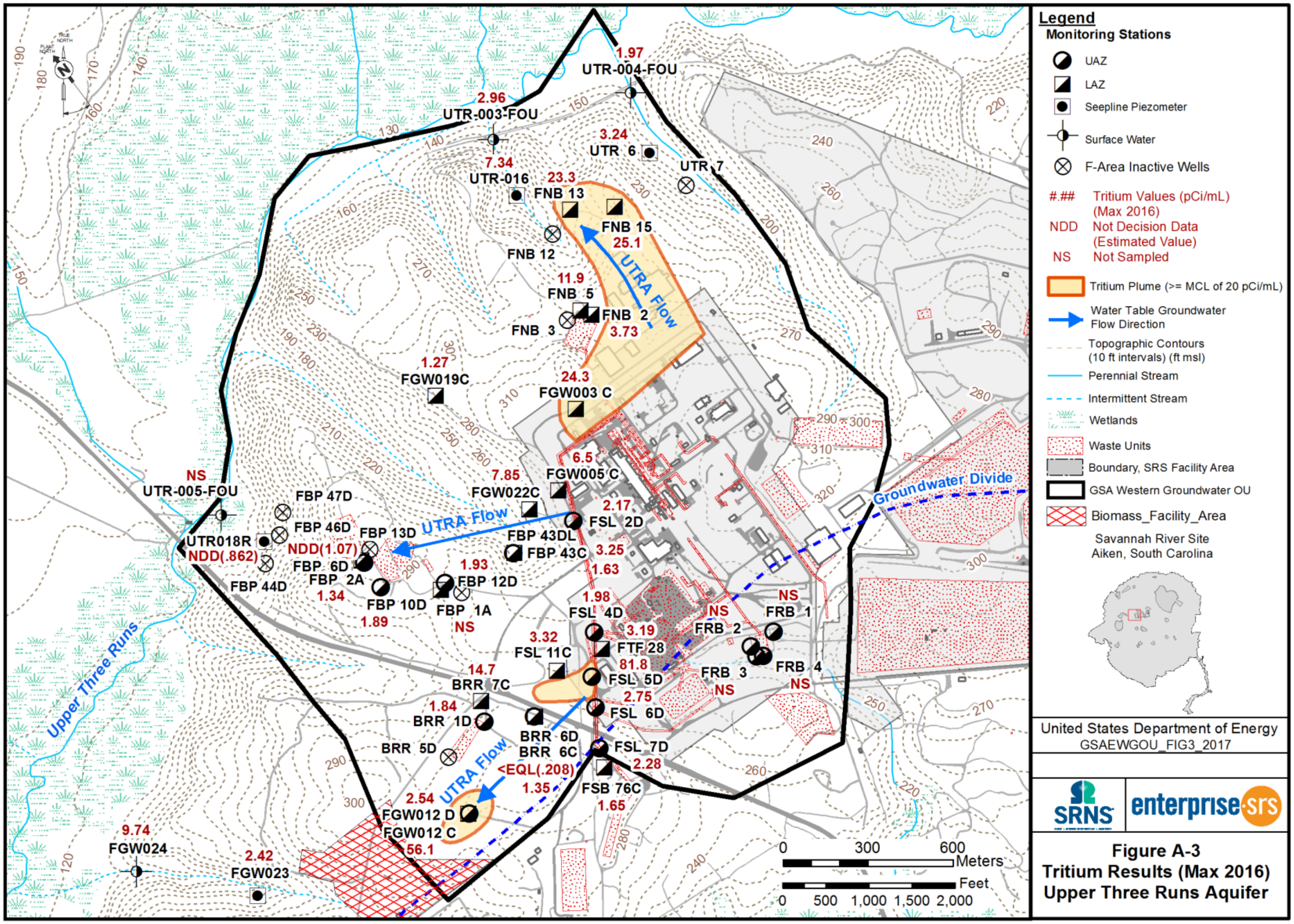
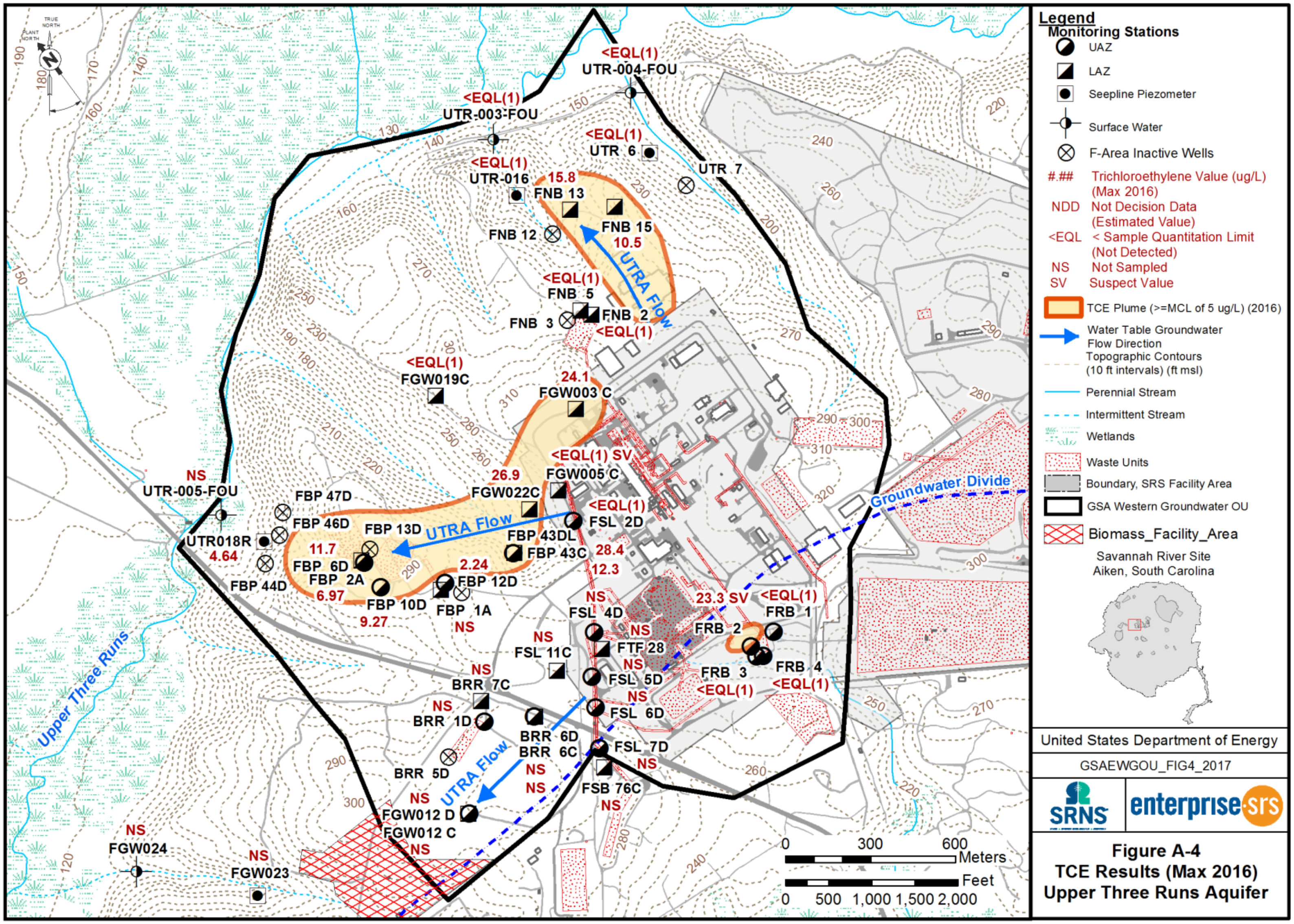


Figure A-2
GSAWG OU Sample Locations and Well Map


Legend
Monitoring Stations
UAZ
LAZ
Seepline Piezometer
Surface Water
F-Area Inactive Wells
#.## Tritium Values (pCi/mL) (Max 2016)
NDD Not Decision Data (Estimated Value)
NS Not Sampled
Tritium Plume (>= MCL of 20 pCi/mL)
Water Table Groundwater Flow Direction
Topographic Contours (10 ft intervals) (ft msl)
Perennial Stream
Intermittent Stream
Wetlands
Waste Units
Boundary, SRS Facility Area
GSA Western Groundwater OU
Biomass_Facility_Area
Savannah River Site
Aiken, South Carolina
United States Department of Energy
GSAEWGOU_FIG3_2017
UTRA Flow
Groundwater Divide
Upper Three Runs
Meters
Feet
Figure A-3
Tritium Results (Max 2016)
Upper Three Runs Aquifer


Legend
Monitoring Stations
UAZ
LAZ
Seepline Piezometer
Surface Water
F-Area Inactive Wells
#.## Trichloroethylene Value (ug/L) (Max 2016)
NDD Not Decision Data (Estimated Value)
<EQL < Sample Quantitation Limit (Not Detected)
NS Not Sampled
SV Suspect Value
TCE Plume (>=MCL of 5 ug/L) (2016)
Water Table Groundwater Flow Direction
Topographic Contours (10 ft intervals) (ft msl)
Perennial Stream
Intermittent Stream
Wetlands
Waste Units
Boundary, SRS Facility Area
GSA Western Groundwater OU
Biomass_Facility_Area
Savannah River Site
Aiken, South Carolina
United States Department of Energy
GSAEWGOU_FIG4_2017
SRNS
enterprise srs
Figure A-4
TCE Results (Max 2016)
Upper Three Runs Aquifer
Meters
0 300 600
Feet
0 500 1,000 1,500 2,000
UTRA Flow
Groundwater Divide
Upper Three Runs
<EQL(1) UTR-004-FOU
<EQL(1) UTR-003-FOU
<EQL(1) UTR 6
UTR 7
<EQL(1) UTR-016
15.8 FNB 13
FNB 15 10.5
FNB 12
<EQL(1) FNB 5
FNB 3
FNB 2 <EQL(1)
<EQL(1) FGW019C
24.1 FGW003 C
<EQL(1) SV FGW005 C
26.9 FGW022C
<EQL(1) FSL 2D
NS UTR-005-FOU
UTR018R 4.64
FBP 47D
FBP 46D
FBP 44D
FBP 13D
11.7 FBP 6D
FBP 2A 6.97
FBP 10D 9.27
FBP 43DL
FBP 43C 28.4
12.3
2.24 FBP 12D
FBP 1A NS
NS FSL 4D
23.3 SV
<EQL(1) FRB 1
NS FRB 2
NS FSL 11C
FTF 28
NS FSL 5D
FRB 3 <EQL(1)
FRB 4 <EQL(1)
NS FSL 6D
NS BRR 7C
NS BRR 1D
BRR 6D
BRR 6C
FSL 7D
NS
BRR 5D
NS
NS
FSB 76C
NS
NS FGW012 D
FGW012 C NS
NS FGW024
NS FGW023

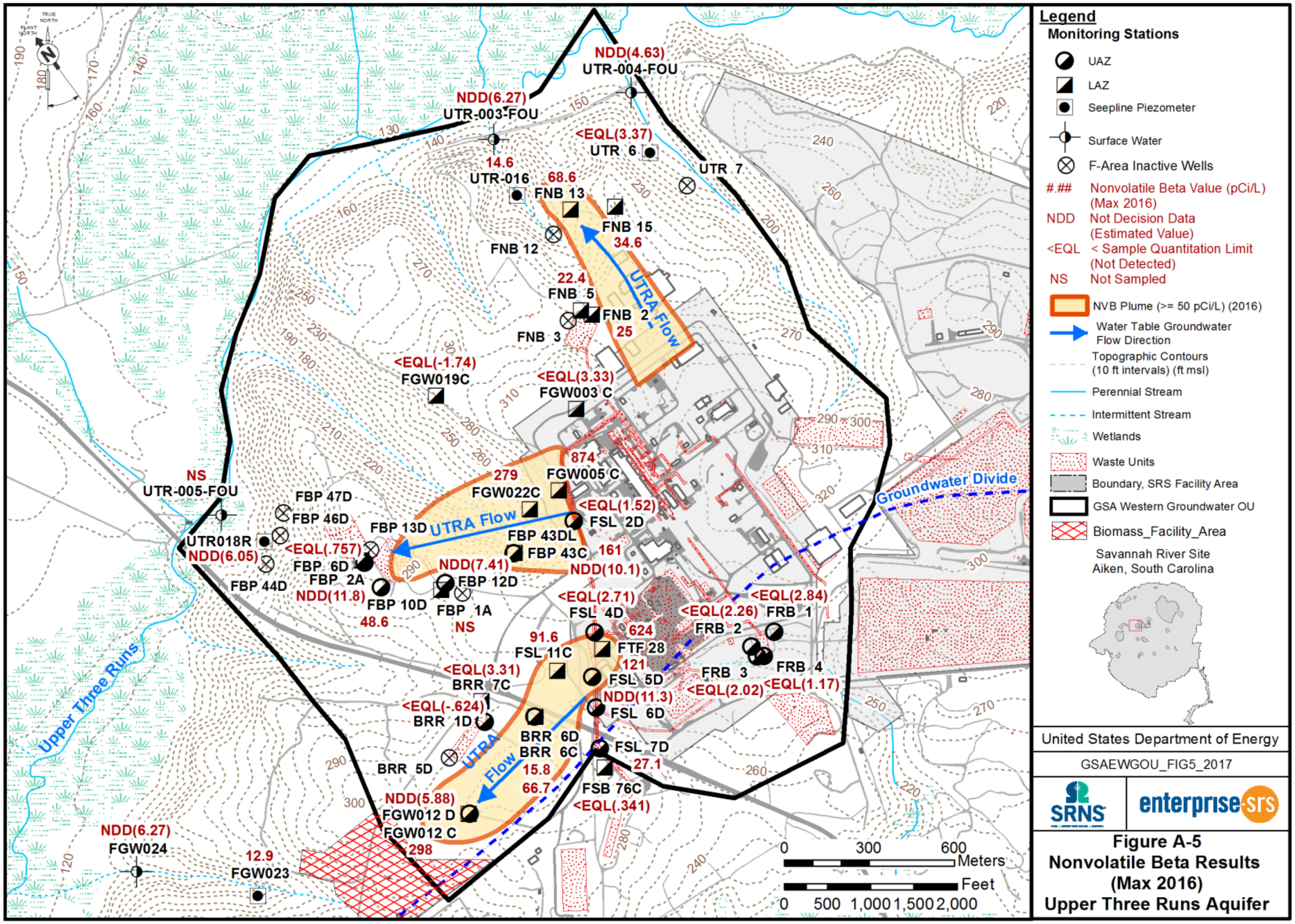


Figure A-5
Nonvolatile Beta Results
(Max 2016)
Upper Three Runs Aquifer

Appendix B

Isotopic Speciation Results
For FGW 005C

Well ID	Date	Analyte	Detection Limit	Quantitation Limit	Lab Qualifier	Review Qualifier	Result	Units
FGW005 C	5/3/2016	ACTINIUM-228	46.8	117	U	U	32.5	pCi/L
FGW005 C	5/3/2016	AMERICIUM-241	0.0606	0.0606	U	U	0.0	pCi/L
FGW005 C	5/3/2016	ANTIMONY-125	26.8	57.4	U	U	5.0	pCi/L
FGW005 C	5/3/2016	BARIUM-133	12.2	27.8	U	U	2.6	pCi/L
FGW005 C	5/3/2016	BISMUTH-214	19.2	85.6			166.0	pCi/L
FGW005 C	5/3/2016	CARBON-14	10.1	22.1	U	U	-1.6	pCi/L
FGW005 C	5/3/2016	CARBON-14	10.1	22.2	U	U	0.6	pCi/L
FGW005 C	5/3/2016	CESIUM-134	9.12	20.3	U	U	2.6	pCi/L
FGW005 C	5/3/2016	CESIUM-137	10.4	22.2	U	U	-0.4	pCi/L
FGW005 C	5/3/2016	COBALT-60	8.9	18.7	U	U	-1.4	pCi/L
FGW005 C	5/3/2016	CURIUM-242	0.0597	0.159	U	U	0.0	pCi/L
FGW005 C	5/3/2016	CURIUM-242	0.0737	0.197	U	U	0.0	pCi/L
FGW005 C	5/3/2016	CURIUM-243/244	0.0597	0.0597	U	U	0.0	pCi/L
FGW005 C	5/3/2016	CURIUM-243/244	0.0737	0.0737	U	U	0.0	pCi/L
FGW005 C	5/3/2016	CURIUM-245/246	0.0618	0.325	J	J	0.2	pCi/L
FGW005 C	5/3/2016	CURIUM-245/246	0.0763	0.356	U	U	0.2	pCi/L
FGW005 C	5/3/2016	EUROPIUM-152	102	230	U	U	42.1	pCi/L
FGW005 C	5/3/2016	EUROPIUM-154	18.6	41.9	U	U	-6.11	pCi/L
FGW005 C	5/3/2016	EUROPIUM-155	30.8	78.3	U	U	24.4	pCi/L
FGW005 C	5/3/2016	GROSS ALPHA	3.08	97.7			1240	pCi/L
FGW005 C	5/3/2016	IODINE-129	1.14	3.57			3.76	pCi/L
FGW005 C	5/3/2016	LEAD-212	20.2	42.8	U	U	16.1	pCi/L
FGW005 C	5/3/2016	LEAD-214	20.3	102			201	pCi/L
FGW005 C	5/3/2016	NEPTUNIUM-237	0.0593	0.563			0.569	pCi/L
FGW005 C	5/3/2016	NEPTUNIUM-237	0.169	0.78	J	J	0.685	pCi/L
FGW005 C	5/3/2016	NONVOLATILE BETA	15.2	76.5			874	pCi/L
FGW005 C	5/3/2016	PLUTONIUM-238	0.0587	0.182	U	U	0.0433	pCi/L
FGW005 C	5/3/2016	PLUTONIUM-238	0.149	0.255	U	U	0.0124	pCi/L
FGW005 C	5/3/2016	PLUTONIUM-239/240	0.0587	0.146	U	U	0.0216	pCi/L
FGW005 C	5/3/2016	PLUTONIUM-239/240	0.0674	0.168	U	U	0.0249	pCi/L
FGW005 C	5/3/2016	POTASSIUM-40	196	384	U	U	-22.2	pCi/L
FGW005 C	5/3/2016	PROMETHIUM-146	12	26	U	U	0.59	pCi/L
FGW005 C	5/3/2016	RADIUM-226	0.398	2.72		J	12.4	pCi/L
FGW005 C	5/3/2016	RADIUM-228	0.74	2.71			9.98	pCi/L
FGW005 C	5/3/2016	SODIUM-22	9.31	20.5	U	U	-2.54	pCi/L
FGW005 C	5/3/2016	STRONTIUM-90	3.21	32.9			114	pCi/L
FGW005 C	5/3/2016	STRONTIUM-90	3.21	31.5			109	pCi/L
FGW005 C	5/3/2016	TECHNETIUM-99	4.58	15.9			162	pCi/L
FGW005 C	5/3/2016	THALLIUM-208	12.2	25.1	U	U	6.16	pCi/L
FGW005 C	5/3/2016	THORIUM-228	0.348	0.677	U	U	0.0761	pCi/L
FGW005 C	5/3/2016	THORIUM-228	0.203	0.543	J	J	0.248	pCi/L
FGW005 C	5/3/2016	THORIUM-230	0.124	0.392	U	U	0.167	pCi/L
FGW005 C	5/3/2016	THORIUM-230	0.11	0.33	U	U	0.126	pCi/L
FGW005 C	5/3/2016	THORIUM-232	0.124	0.149	U	U	-0.00617	pCi/L
FGW005 C	5/3/2016	THORIUM-232	0.0593	0.0593	U	U	0	pCi/L
FGW005 C	5/3/2016	TRITIUM	0.423	1.5			6.5	pCi/mL
FGW005 C	5/3/2016	URANIUM-233/234	0.729	103			300	pCi/L
FGW005 C	5/3/2016	URANIUM-233/234	1.1	108			310	pCi/L
FGW005 C	5/3/2016	URANIUM-235	0.484	14.7			30.4	pCi/L
FGW005 C	5/3/2016	URANIUM-235	0.498	14.1			28.3	pCi/L
FGW005 C	5/3/2016	URANIUM-238	0.391	319			980	pCi/L
FGW005 C	5/3/2016	URANIUM-238	0.403	319			970	pCi/L

Appendix C

2016 Monitoring Well Results
Data Matrix Table

Key to Field Conditions Codes for Data Matrix Tables

Field Code	Explanation
A	Pump is surging excessively; aerated
B	Blank sample was collected
C	Well is continuously pumping
D	Well is dry-no sample or field data collected
E	Equipment blank was collected
I	Well went dry during sampling; field data collected but insufficient water to collect all samples
L	Well went dry before sampling began; only depth to water can be determined
N	Well was not stabilized before sampling began
P	Inaccessibility or mechanical failure prevented sample collection and field analysis of the water
S	No water in standpipe; for water level events only
T	Samples were collected, but some samples were not sent to the laboratory due to high turbidity
W	Unable to sample well because of stabilization or sampling equipment failure; water-level measurements were obtained
X	Well went dry during purging; samples collected after well recovered measurements obtained
0	OK
1	Pump Dry
2	Sampled after recovery
3	Gallons purged through sample port
4	DI water obtained from 772-7B
5	High turbidity
6	Flow meter leaking
7	Pump failure
8	Flow meter not operating
9	# gallons added
10	Well is inaccessible, well cannot be Sampled
11	Well abandoned
12	No water to surface
13	Field measurements only
14	Not all samples were collected
15	Equipment failure
16	No water in standpipe
17	Bailed well
18	Water level tape not long enough
19	Well not sampled, maintenance required
20	Well sampled, maintenance required
21	Measurement Exceeded Criteria

Matrix Table GSAWOU 2016

GSA Western GW OU Monitoring Constituent

Station	Well Use	Aquifer Zone	SAMPLE COLLECTION DATE (day-month-year)	DEPTH TO WATER (ft)	PH (pH)	SAMPLING EVENT WATER ELEVATION (ft)	SPECIFIC CONDUCTANCE (uS/cm)	TOTAL ALKALINITY (AS CACO3) (mg/L)	WATER TEMPERATURE (degC)	FIELD CONDITIONS	Constituent / Unit / GWPS	NITRATE-NITRITE AS NITROGEN (mg/L; 10)	CESIUM-137 (pCi/L; 200)	COMBINED RADIUM (226 AND 228) (pCi/L; 5)	GROSS ALPHA (pCi/L; 15)	IODINE-129 (pCi/L; 1)
FRB 1	F Area Retention Basin Plume	UAZ_UTRAU	03-May-2016	54.3	4.7	225.39	42	0	22.9	No Comments		NS	<EQL (21.1	NS	[6.53]	NS
			12-Dec-2016	54	4.8	225.65	41	0	23.7	No Comments		NS	<EQL (19.5	NS	[2.69]	NS
FRB 2	F Area Retention Basin Plume	UAZ_UTRAU	03-May-2016	50.6	4.8	223.76	54	0	23.6	No Comments		NS	<EQL (23.3	NS	[4.17]	NS
			12-Dec-2016	50.33	4.3	224.03	55	0	21.1	No Comments		NS	<EQL (20.5	NS	[4.31]	NS
FRB 3	F Area Retention Basin Plume	UAZ_UTRAU	03-May-2016	48.7	5.2	223.49	61	2	22.9	No Comments		NS	<EQL (21.5	NS	<EQL (3.76	NS
			12-Dec-2016	48.52	5.2	223.67	49	0	21.3	No Comments		NS	<EQL (20.9	NS	<EQL (6.13	NS
FRB 4	F Area Retention Basin Plume	UAZ_UTRAU	03-May-2016	47.4	4.7	223.66	43	0	23.5	No Comments		NS	<EQL (20.4	NS	[2.59]	NS
			12-Dec-2016	47.3	4.7	223.76	43	0	22.2	No Comments		NS	<EQL (18.7	NS	[3.09]	NS
UTR 6	North Plume Seepline Piezometer	LAZ_UTRAU	04-May-2016	5	5.3	167	25	7	17.5	No Comments		0.391	NS	NS	<EQL (5.45	<EQL (2.28
UTR-016	North Plume Seepline Piezometer	LAZ_UTRAU	04-May-2016	NS	NS	NS	NS	NS	NS	No Comments		1.83	NS	NS	<EQL (3.75	[2.15]
			05-May-2016	4.2	5	165.96	80	0	16	No Comments		NS	NS	NS	NS	NS
UTR-003-FOL	North Plume Surface Water	LAZ_UTRAU	04-May-2016	NS	6.9	NS	29	33	21.1	No Comments		0.111	NS	NS	<EQL (3.72	<EQL (4.33
UTR-004-FOL	North Plume Surface Water	LAZ_UTRAU	04-May-2016	NS	7	NS	51	41	19.1	No Comments		0.978	NS	NS	<EQL (3.82	<EQL (2.27
FNB 2	North Plume Well	LAZ_UTRAU	03-May-2016	84	4.4	204.68	45	0	22.2	No Comments		2.89	NS	NS	[7.31]	7.7
FNB 5	North Plume Well	LAZ_UTRAU	04-May-2016	83.02	4.3	204.68	89	0	21.5	No Comments		9.75	NS	NS	[8.23]	[1.95]
FNB 13	North Plume Well	LAZ_UTRAU	03-May-2016	23.52	4.9	191.43	118	0	19.4	No Comments		11.5	NS	NS	[4.26]	3.7
FNB 15	North Plume Well	LAZ_UTRAU	03-May-2016	76.96	4.9	194.26	134	0	21.4	No Comments		14.6	NS	NS	[6.79]	[3.51]
FGW023	South Plume Seepline Piezometer	LAZ_UTRAU	03-May-2016	3.2	4.9	180.94	40	0	22.2	No Comments		0.471	NS	NS	<EQL (4.35	[1.19]
			12-Dec-2016	2.96	5	181.18	36	0	17.4	No Comments		0.526	NS	NS	<EQL (4.79	<EQL (2.29
FGW024	South Plume Surfacewater	LAZ_UTRAU	03-May-2016	NS	5.2	NS	39	3	23.1	C		0.312	NS	NS	<EQL (3.72	<EQL (3.17
			12-Dec-2016	NS	6	NS	39	10	13.7	No Comments		0.593	NS	NS	<EQL (4.85	<EQL (2.38
BRR 1D	South Plume Well	UAZ_UTRAU	02-May-2016	81.7	4.6	214.5	39	0	22.5	No Comments		[1.62]	NS	NS	<EQL (4.48	<EQL (2.27
BRR 6C	South Plume Well	LAZ_UTRAU	02-May-2016	86.3	5.3	209.7	44	9	23.6	No Comments		[1.15]	NS	NS	<EQL (5	<EQL (2.22
BRR 6D	South Plume Well	UAZ_UTRAU	02-May-2016	90.7	5.9	205.5	58	19	20.8	No Comments		[0.51]	NS	NS	<EQL (4.55	<EQL (2.45
BRR 7C	South Plume Well	LAZ_UTRAU	02-May-2016	83.8	4.4	207.3	51	0	21.9	No Comments		[4.35]	NS	NS	<EQL (5.37	<EQL (2.28
FGW012 C	South Plume Well	LAZ_UTRAU	03-May-2016	80.12	5.1	206.25	110	0	19.9	No Comments		10.4	NS	NS	[3.69]	<EQL (2.32
FGW012 D	South Plume Well	UAZ_UTRAU	03-May-2016	75.2	4.1	211.35	45	0	20.8	No Comments		2.56	NS	NS	[2.96]	<EQL (2.51
FSB 76C	South Plume Well	LAZ_UTRAU	03-May-2016	81.7	4.8	212.1	49	0	21.2	No Comments		1.58	NS	NS	<EQL (4.41	<EQL (2.04
FSL 4D	South Plume Well	UAZ_UTRAU	03-May-2016	77.4	5.8	217.4	62	12	21.6	No Comments		[2.67]	NS	NS	<EQL (4.39	[1.65]
FSL 5D	South Plume Well	UAZ_UTRAU	03-May-2016	73.7	5.3	218.7	72	10	23.3	No Comments		2.59	NS	NS	<EQL (4.6	<EQL (2.34
FSL 6D	South Plume Well	UAZ_UTRAU	04-May-2016	68.7	5.2	218.1	133	2	23.6	No Comments		0.845	NS	NS	[2.35]	14.7
FSL 7D	South Plume Well	UAZ_UTRAU	03-May-2016	71.2	5	216.4	62	0	21.3	No Comments		5.63	NS	NS	[4.58]	[1.75]
FSL 11C	South Plume Well	LAZ_UTRAU	03-May-2016	89.3	5.4	211.43	42	8	22.1	No Comments		2.14	NS	NS	<EQL (3.84	<EQL (2.5
FTF 28	South Plume Well	LAZ_UTRAU	03-May-2016	84.1	4.4	212.62	40	0	24.1	No Comments		2.44	NS	NS	<EQL (5.45	<EQL (2.11
UTR018R	West Plume Seepline Piezometer	LAZ_UTRAU	04-May-2016	7.3	5.4	148.2	71	10	20.6	X		<EQL (0.25	NS	NS	<EQL (3.79	NS
UTR-005-FOL	West Plume Surface Water	LAZ_UTRAU	04-May-2016	NS	NS	NS	NS	NS	NS	D		NS	NS	NS	NS	NS
FBP 1A	West Plume Well	LAZ_UTRAU	02-May-2016	NS	NS	NS	NS	NS	NS	P		NS	NS	NS	NS	NS
FBP 2A	West Plume Well	LAZ_UTRAU	02-May-2016	105	4.8	184.3	80	0	21.1	No Comments		[5.75]	NS	NS	<EQL (5.51	NS
FBP 6D	West Plume Well	UAZ_UTRAU	02-May-2016	101.5	5.3	188.4	61	3	22.3	No Comments		[2.84]	NS	NS	<EQL (5.06	NS
FBP 10D	West Plume Well	UAZ_UTRAU	02-May-2016	88.9	7.3	197.4	310	64	21.5	No Comments		[15.7]	NS	NS	<EQL (3.23	NS
FBP 12D	West Plume Well	UAZ_UTRAU	02-May-2016	85.55	5.1	205.05	88	0	20.4	No Comments		[9.2]	NS	NS	[3.07]	NS
FBP 43C	West Plume Well	LAZ_UTRAU	03-May-2016	45.1	7.8	208.6	272	74	20.1	No Comments		12.6	NS	NS	<EQL (4.04	NS
FBP 43DL	West Plume Well	UAZ_UTRAU	03-May-2016	NS	NS	NS	NS	NS	NS	No Comments		31.6	NS	NS	<EQL (6.7	NS
			03-May-2016	44.3	7.4	209.52	449	81	19.8	No Comments		NS	NS	NS	NS	NS
FGW003 C	West Plume Well	LAZ_UTRAU	03-May-2016	99.7	4.3	211.94	102	0	22.8	No Comments		9.05	NS	NS	[2.22]	NS
FGW005 C	West Plume Well	LAZ_UTRAU	03-May-2016	96.21	4	213.25	414	0	21	No Comments		38.6	<EQL (22.2	NS	1240	3.76
FGW019C	West Plume Well	LAZ_UTRAU	03-May-2016	80.8	5	205.01	138	0	21.8	No Comments		NS	NS	NS	NS	NS
			03-May-2016	NS	NS	NS	NS	NS	NS	No Comments		0.0606	NS	NS	<EQL (2.32	NS
FGW022C	West Plume Well	LAZ_UTRAU	03-May-2016	55.4	4.2	211	350	0	21	No Comments		44.7	NS	NS	468	NS
FSL 2D	West Plume Well	UAZ_UTRAU	03-May-2016	82.5	5.1	224	47	5	22.5	No Comments		1.18	NS	NS	<EQL (4.39	NS

Explanation

[##]	EPA Functional Guideline Code of 'J' was applied to the result, indicating an estimated quantity.
<EQL(##)	Constituent was below detection. The sample-specific Estimated Quantitation Limit is in parentheses.
	Result exceeds applicable limit.
REJ	Result Rejected
	Result is less than the applicable limit and without EPA Functional Guidline qualifiers.
NS	Requested to be sampled but was not. See comments as to why not.
Blue Text	Not a required sample analysis.