SRR-CWDA-2020-00055
Revision 1

FDB-5 and FDB-6 Special Analysis for the Performance Assessment for the F-Tank Farm at the Savannah River Site

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EXECUTIVE SUMMARY

Special Analyses are performed to evaluate the significance of new information or new analytical methods to the results and associated conclusions of a performance assessment (PA). As waste tanks and ancillary equipment, also referred to as ancillary structures, are cleaned at the F-Tank Farm (FTF) at the U.S. Department of Energy's (DOE) Savannah River Site (SRS), final residual inventories will be used to update the FTF fate and transport modeling contained in *Performance Assessment for the F-Tank Farm at the Savannah River Site*, SRS-REG-2007-00002, Revision 1 (hereinafter referred to as FTF PA) and its supporting Special Analyses *Tank 18/Tank 19 Special Analysis for the Performance Assessment for the F-Tank Farm at the Savannah River Site,* SRR-CWDA-2010-00124 (hereinafter referred to as Tank 18/19 Special Analysis) and *Tanks 5 and 6 Special Analysis for the Performance Assessment for the F-Tank Farm at the Savannah River Site*, SRR-CWDA-2012-00106 (hereinafter referred to as Tank 5/6 Special Analysis). This Special Analysis is being created to support operational closure of F-Area Diversion Box (FDB)-5 and FDB-6, which are no longer needed in support of FTF operations. This reanalysis allows for evaluation of the difference between the projected and final FTF inventories to determine if the results of the FTF PA transport modeling, and the conclusions reached based on the FTF PA information, remain valid.

This document describes the approaches used to assign inventories at closure for FDB-5 and FDB-6 for use in FTF transport modeling. The analytes used for the inventory determination are the same 60 radionuclides and 18 chemicals used for ancillary equipment inventory assignment in the FTF PA. The methodology used to assign the FDB-5 and FDB-6 inventories is similar to the approach used in the FTF PA to determine the FTF piping systems residual inventory. Using this approach results in there being several conservatisms inherent in the final FDB-5 and FDB-6 inventories. Camera inspection confirmed that the FDB-5 and FDB-6 vault and sump walls are clean with a minimal accumulation of material on the vault floor of only FDB-6, as would be expected in FDBs cleaned by flushing. To account for any uncertainty associated with volume determination through visual inspection, the radiological and chemical inventory assigned to FDB-5 and FDB-6 conservatively assumed a non-negligible accumulation of residue on the FDB surfaces (jumper internals and floors) most likely to have collected material after flushing.

For this Special Analysis, the FTF groundwater concentrations at 1-meter were calculated for the FTF PA Base Case using only the revised FTF FDB-5 and FDB-6 inventories presented in Section 5 of this Special Analysis to see the limited impact of this inventory. Calculations were performed using both the GoldSim FTF and PORFLOW FTF models. The FTF PA results (e.g., 100-meter groundwater pathway doses, inadvertent intruder doses, and chemical concentrations) are unchanged by the contribution from the FDB-5 and FDB-6 inventories. The FTF PA peak all-pathways annual dose for the Member of the Public (MOP) is unchanged by the contribution from the FDB-5 and FDB-6 inventories. The peak dose remains 0.4 mrem/yr in 1,000 years (at approximately year 700), 3.3 mrem/yr in 10,000 years, and 600 mrem/yr in 100,000 years (at year 43,000). The Special Analysis results provide reasonable assurance that compliance is maintained with the specific requirements of DOE M 435.1-1, NDAA Section 3116, and the MCLs and there is no impact to the conclusions of the FTF PA and supporting Special Analyses.

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ACRONYMS/ABBREVIATIONS

ALARA	As Low As Reasonably Achievable
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLSM	Controlled Low Strength Material
CMCOC	Contaminant Migration Constituents of Concern
CTS	Concentrate Transfer System
DB	Diversion Box
DCF	Dose Conversion Factor
DOE	U.S. Department of Energy
FDB	F-Area Diversion Box
FFA	Federal Facility Agreement
FMB	Fourmile Branch
FTF	F-Tank Farm
GSA	General Separations Area
HTF	H-Tank Farm
ICM	Integrated Conceptual Model
MCL	Maximum Contaminant Level
MOP	Member of the Public
N/A	Not Applicable/Not Available
ND	Not Determined
NDAA	Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005
NRC	U.S. Nuclear Regulatory Commission
PA	Performance Assessment
PCA	Pollution Control Act
PP	Pump Pit
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
SCDHEC	South Carolina Department of Health and Environmental Control
SRS	Savannah River Site
UTR	Upper Three Runs
UTRA	UTR Aquifer
UTRA-LZ	UTRA-Lower Zone
UTRA-UZ	UTRA-Upper Zone
Note:	Various figures throughout this document abbreviate Special Analysis as “SA”

1.0 SPECIAL ANALYSIS PURPOSE

This Special Analysis is being created to support operational closure of diversion boxes FDB-5 and FDB-6, which are no longer needed in support of FTF operations. The purpose of this Special Analysis is to evaluate the information regarding the final residual inventories that are planned to be grouted in-place in FDB-5 and FDB-6. This new inventory information was used to update select portions of the FTF fate and transport modeling performed in the FTF PA and its supporting Special Analyses (i.e., the Tank 18/19 Special Analysis [SRR-CWDA-2010-00124] and the Tank 5/6 Special Analysis [SRR-CWDA-2012-00106]). The potential impacts of the new inventory information on the assumptions from the FTF PA and supporting Special Analyses were also considered.

Since the FTF PA and supporting Special Analyses did not analyze projected inventories for FDB-5 and FDB-6, this report focuses on the incremental impact of the final FDB-5 and FDB-6 residual inventory on the information previously presented. Because there is no significant dose associated with the FDB-5 and FDB-6 inventories, sensitivity analyses were not performed as part of this Special Analysis.

It is not intended that information previously provided in the FTF PA and its supporting Special Analyses that is unaffected by the new residual inventory data be duplicated in this report. The Special Analysis results will be used to inform decisions documented in the FDB-5 and FDB-6 closure documents.

2.0 BASIS

This Special Analysis was prepared in accordance with the DOE Technical Standard: Disposal Authorization Statement and Tank Closure Documentation (DOE-STD-5002-2017), Section 8.3. As stated in DOE-STD-5002-2017, the primary role of the Special Analysis is to evaluate through modeling or other technical evaluation methods the impact of a proposed activity, discovery, or new information to the input and assumptions or results in the PA, or to supplement or amend the analyses performed in the original PA. Per Section 8.3.1.3 of DOE-STD-5002-2017, SAs should include, at a minimum, consideration of the following:

- Mathematical and conceptual models;
- Exposure pathway analysis;
- Dose assessments;
- Source term and release mechanisms;
- Material property changes;
- Uncertainty and Sensitivity analyses; and
- Inadvertent human intruder analyses.

This Special Analysis has a relatively limited scope, such that most of the aforementioned topics can be addressed through evaluation of the impact of the new FDB-5 and FDB-6 residual inventory information on the FTF characteristics information presented in Section 3.0 of the FTF PA, as described in Sections 6.1 through 6.5.

3.0 FDB-5 AND FDB-6 BACKGROUND INFORMATION

3.1 Savannah River Site Characteristics

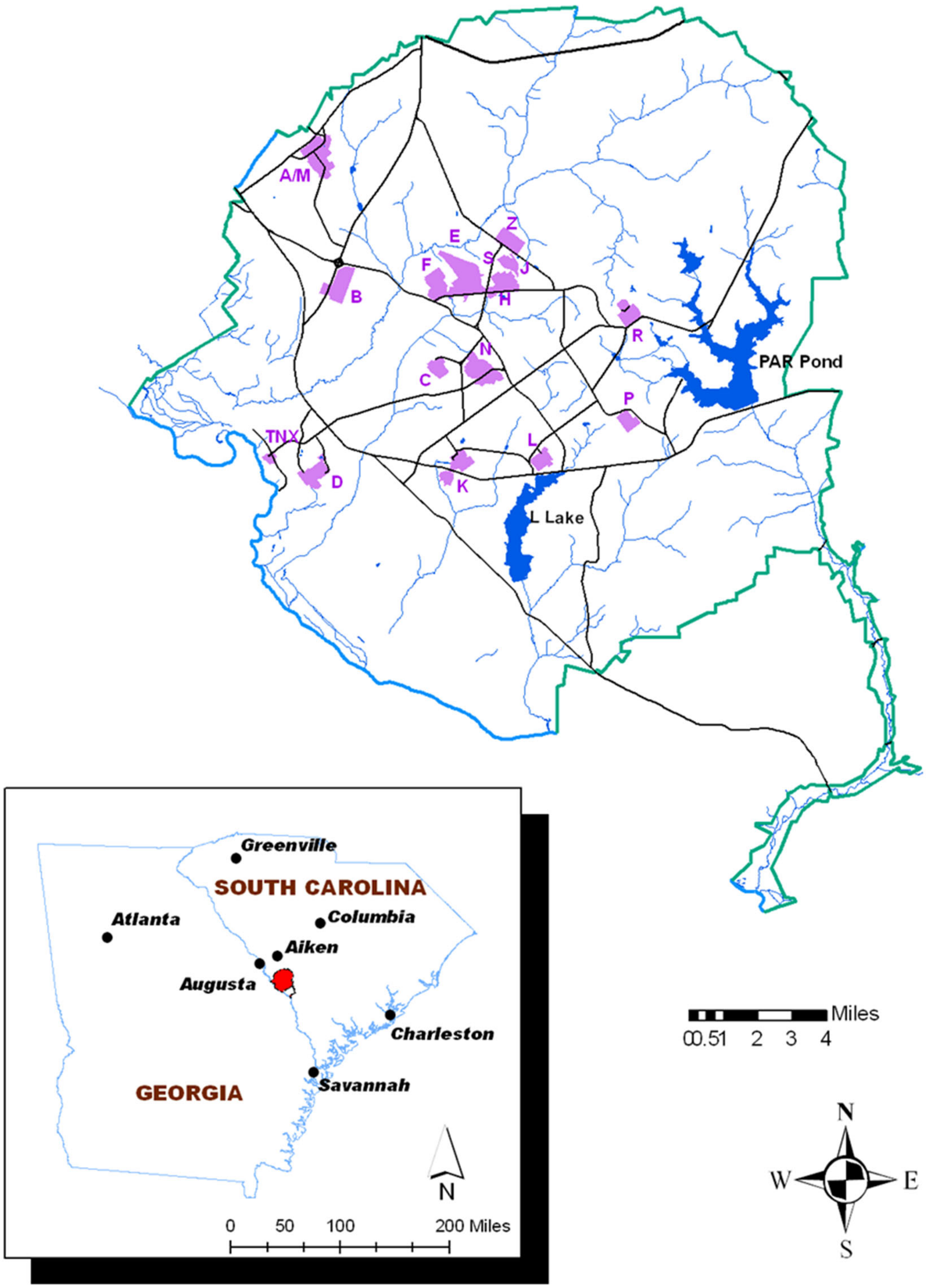
The Savannah River Site (SRS) is located in south-central South Carolina, approximately 100 miles from the Atlantic Coast. The major physical feature at SRS is the Savannah River, approximately 20 miles of which serves as the southwestern boundary of the site and the South Carolina-Georgia border. SRS encompasses portions of Aiken, Barnwell, and Allendale counties in South Carolina. SRS occupies approximately 310 square miles, or more than 198,000 acres, and contains operations, service, and research and development areas. The developed areas occupy less than 10% of the SRS footprint while the remainder of the site is undeveloped forest or wetlands. [SRS-REG-2007-00002]

Additional site characteristics are addressed in Section 3.1 of the FTF PA. Topics addressed in Section 3.1 of FTF PA include geography, demography, meteorology, climatology, ecology, geology, seismology, hydrogeology, geochemistry, and natural resources. [SRS-REG-2007-00002]

3.2 F-Tank Farm Facility Description

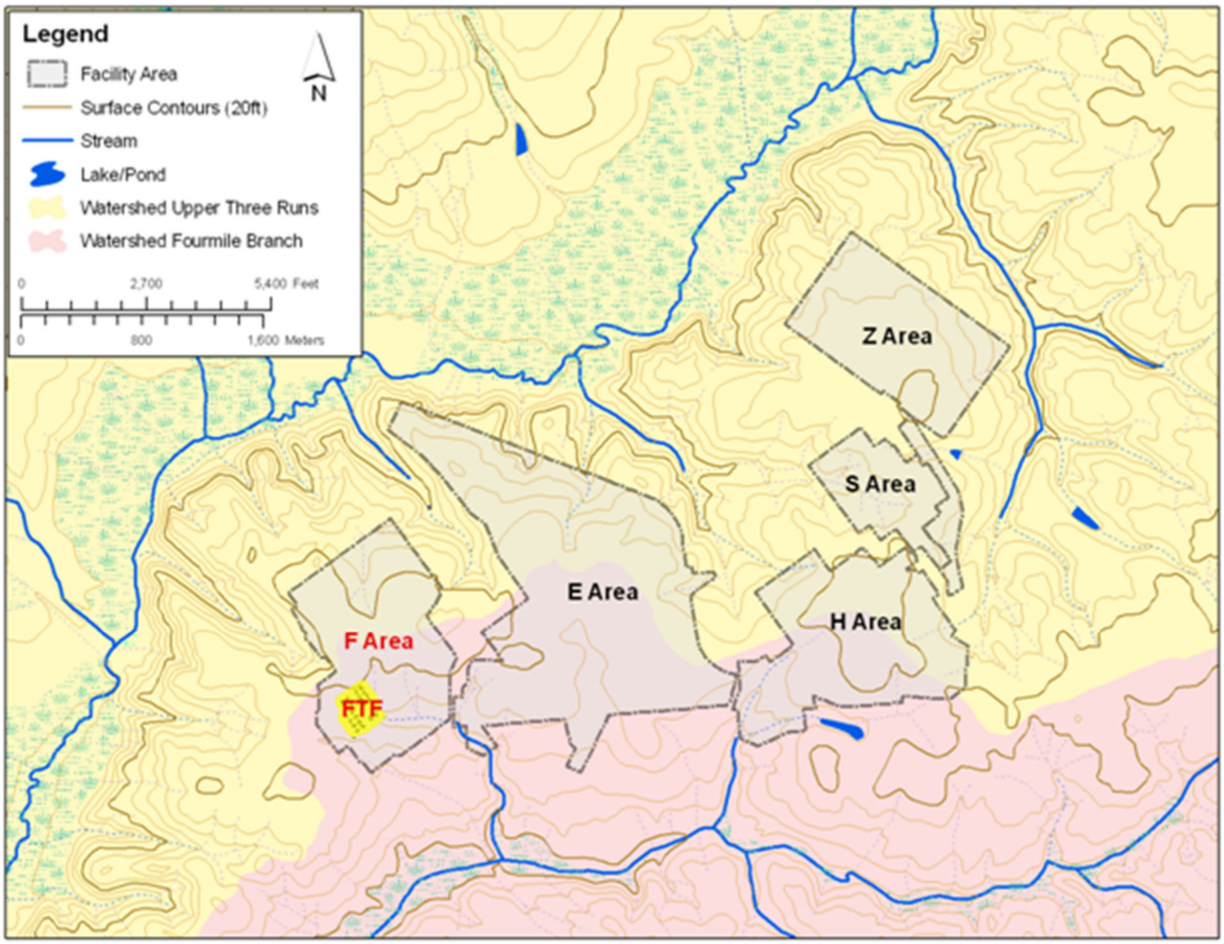
A legacy of the SRS mission was the generation of liquid waste from chemical separations processes in both F and H Areas. Since the beginning of SRS operations, an integrated waste management system has evolved, which consists of several facilities designed for the overall processing of liquid waste. Two of the major components of this system are the FTF and H-Tank Farm (HTF) (located in F Area and H Area, respectively), near the center of the site (Figure 3.2-1). In F Area, plutonium, uranium, and other radionuclides were separated from target assemblies using chemical separations processes. The Tank Farms, which store and process waste from the chemical separations operations, include waste tanks, evaporators, transfer line systems, and other ancillary structures such as Diversion Boxes (DB). Additional FTF facility characteristics are addressed in Section 3.2 of FTF PA. [SRS-REG-2007-00002]

Figure 3.2-1: SRS Operational Area Location Map



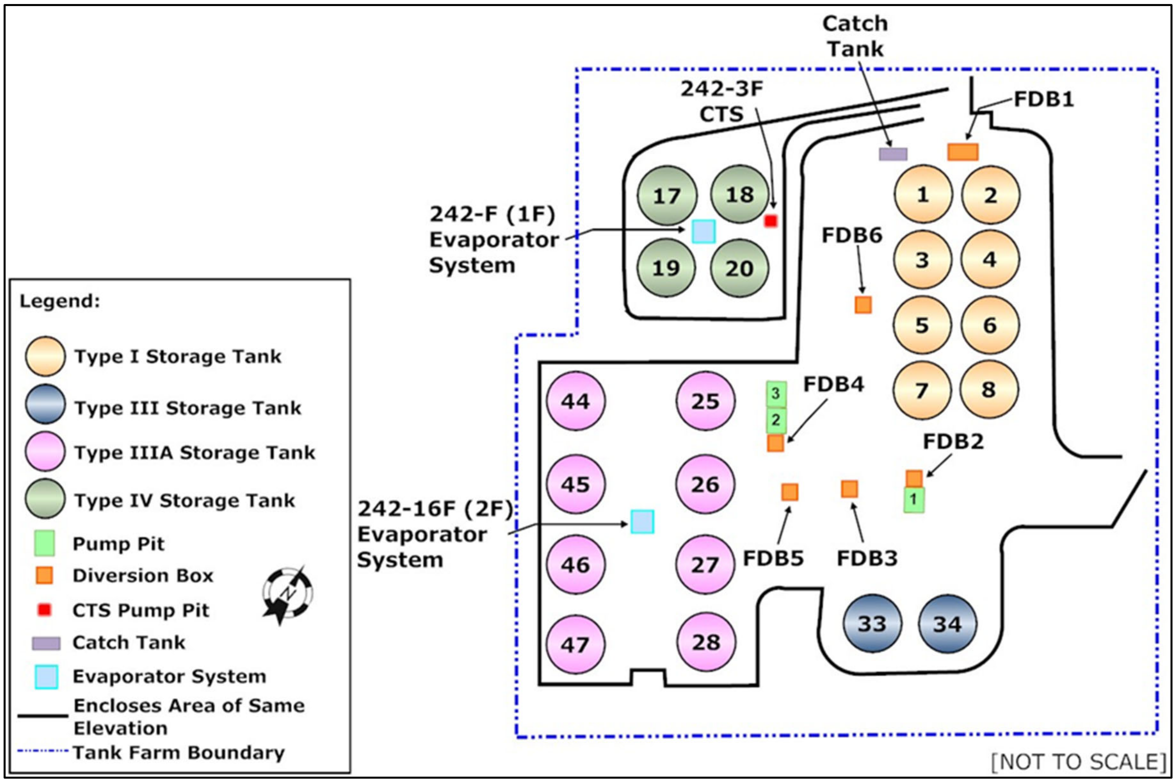
The FTF site was chosen because of its favorable terrain, proximity to the F-Canyon Separations Facility (the major waste generation source), and isolation distance from the SRS boundaries. Figure 3.2-1 shows the distance of the FTF from the SRS boundary. Figure 3.2-2 shows the setting of F Area and FTF within the General Separations Area (GSA).

Figure 3.2-2: Layout of the GSA



The FTF is a 22-acre site, which consists of 22 waste tanks and supporting ancillary structures. The major FTF ancillary structures are transfer lines, two evaporator systems, six DBs, one catch tank, one concentrate transfer system (CTS) tank, and three pump pits (PPs). There are three major waste tank types in FTF with nominal operating capacities ranging from 750,000 gallons (Type I tanks) to 1.3 million gallons (Type III, IIIA, and IV tanks). Figure 3.2-3 shows the general layout of FTF. The waste tanks have varying degrees of secondary containment (liner) and in-tank structural features (e.g., cooling coils and columns). All FTF waste tank types have primary liners constructed of carbon steel. The FTF was constructed to receive waste generated by various SRS production, processing, and laboratory facilities. The operation of FTF safely isolates these wastes from the environment, SRS workers, and the public. The FTF PA provides extensive descriptions of the FTF and waste processing facilities. [SRS-REG-2007-00002]

Figure 3.2-3: General Layout of F-Tank Farm



3.3 FDB-5 and FDB-6

The FTF contains six DBs (FDB-1 through FDB-6). The DBs are reinforced concrete structures that provide a central location for waste transfer lines. The DBs contain transfer line nozzles to which jumpers are connected to direct waste transfers to the desired waste tanks and pump tanks. This reduces the number of transfer lines necessary to perform transfers among tanks and other facilities. Each of the DBs is associated with, and provides connections to, a group of waste tanks. The DBs are often constructed in conjunction with a PP. Additional DB details are provided in Section 3 of the FTF PA. [SRS-REG-2007-00002] As discussed in Section 3.2.4.2 (Ancillary Equipment Strategy) of the FTF PA, ancillary structures (including DBs) would remain in place after operational closure. The ancillary structures would be filled with grout or other materials, as practical, to eliminate subsidence potential. As discussed below, fewer assumptions are made in the FTF PA regarding ancillary structure fill grout in comparison to tank fill grout and the DBs may therefore be grouted with controlled low strength material (CLSM) to prevent subsidence (versus the reducing grout typically used for waste tank fill).

The ancillary structure fill grout is not credited as a deterrent to the inadvertent intruder (per FTF PA Section 3.2.2.6.2, the FTF closure cap and concrete structures will serve as a deterrent to the inadvertent intruder). The impact of ancillary structure degradation (e.g., corrosion) was considered in FTF modeling. As described in FTF PA Section 4.2.3.2, the failure estimates considered general and localized corrosion mechanisms of transfer line stainless steel exposed to SRS soil conditions and do not credit corrosion control. As discussed in Section 4.4.2.7 of the

FTF PA, the ancillary structures were assumed to be completely intact at the time of closure with contaminant release assumed to occur at the same time. Once the release occurs, the source term associated with the ancillary structure was assumed available for release directly in the backfill soil surrounding the ancillary structure. No hold up or containment of the source term is assumed to be provided by any of the cementitious materials surrounding secondary containment structures (such as the DBs).

In contrast to tank fill grout, no grout performance assumptions were made in the FTF PA modeling with respect to ancillary structure fill grout (e.g., no assumptions regarding DB grout reducing capacity or DB grout hydraulic conductivity are used in the FTF PA contaminant release modeling). After structure failure for ancillary equipment, the flow through the inventory is set equal to the closure cap driven infiltration rate.

FDB-5

Figure 3.3-1 shows a cross-section and various features of FDB-5. FDB-5 is a rectangular concrete structure 13 feet long, 11.25 feet wide, and 17.17 feet high (inside dimensions) with the long axis oriented north-south. It has walls 2.5-feet thick and a base slab thickness of approximately 4.7 feet. The vault floor is approximately 17 feet below grade. The vault extends approximately 4 feet above grade and has three concrete cell covers that are 3-feet thick and topped with a rain cover. [W702452] The vault interior is lined with 11-gauge welded stainless-steel sheets. The exterior vault walls are coated with a damp-proofing compound. The vault has a 3-foot-long, 2-foot-wide, and 1.6-foot-deep stainless steel-lined sump in the northeast corner of the floor. The floor slopes towards a gutter along the east wall that drains to the sump. [W703321]

FDB-5 was constructed in the mid to late 1970's to support waste transfers from the CTS to Tanks 25F through 28F, 33F, and 34F. The 242-F Evaporator discharged concentrated supernate to the CTS which was then pumped to FDB-5 for transfer to the appropriate waste tank.

FDB-5 has a history of internal piping plugging caused by the concentrated high-salt CTS waste crystallizing in the transfer lines. When piping became plugged, the internal jumper was disconnected and lifted near the top of the vault. A "skill-of-the-craft catheterization procedure" was used to dissolve the salt and flush the line internals. The procedure involved inserting a polyethylene tube fed with water into the jumper and allowing the water to dissolve and flush out the very soluble salt waste. After the dissolution was complete, the interior walls of FDB-5 were washed down using the installed flushing apparatus. The waste and wash water were collected in the sump and gravity-drained to FPP-2. [SRR-CWDA-2018-00059]

FDB-6

Figure 3.3-2 shows a cross-section and various features of FDB-6. FDB-6 is a rectangular concrete structure 15 feet long, 11 feet wide and 18 feet high (inside dimensions) with the long axis oriented east-west. It has walls 2.5 feet thick and a base slab thickness of approximately 4.7 feet. The vault floor is approximately 16.6 feet below grade (17.6 feet below the bottom of the cell covers). The vault walls extend 4 feet above grade. The vault has five cell covers that are 3-feet thick and the structure is topped with a rain cover. The vault interior below the cell covers is lined with 11-gauge welded stainless-steel sheets. The exterior vault walls are coated with a damp-proofing compound. There are slots for leak collection beneath the stainless-steel sheets on the vault floor.

The slots drain to an underliner system that flows to a leak detection box. [W702275] The vault has a 2-foot-wide by 3-foot-long and 1.2-foot-deep stainless steel-lined sump in the southwest corner of the floor. The floor slopes towards a gutter along the west wall that drains to the sump. [W703384]

FDB-6 was constructed in the mid to late 1970s to transfer feed material to the 242-F Evaporator from Tanks 26F and 7F. FDB-6 usage stopped when the 242-F Evaporator went out of service in 1988.

Figure 3.3-1: Plan View of FDB-5

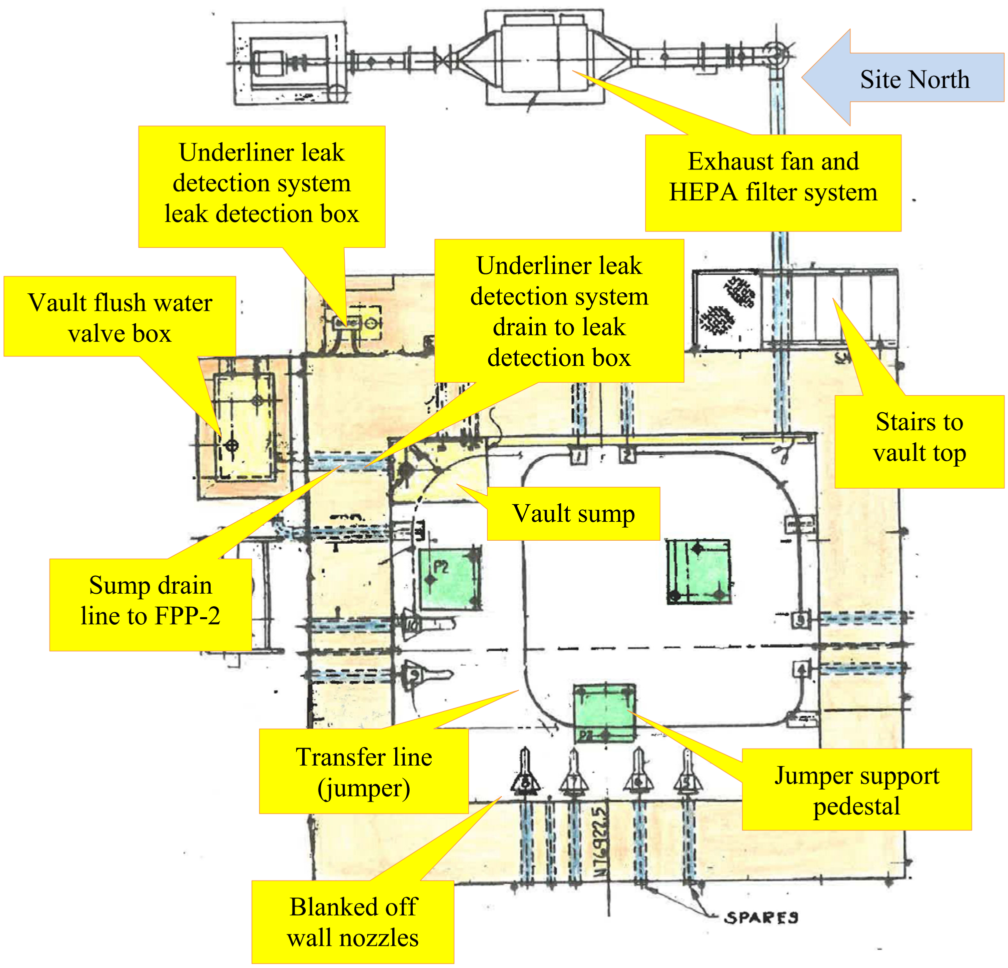
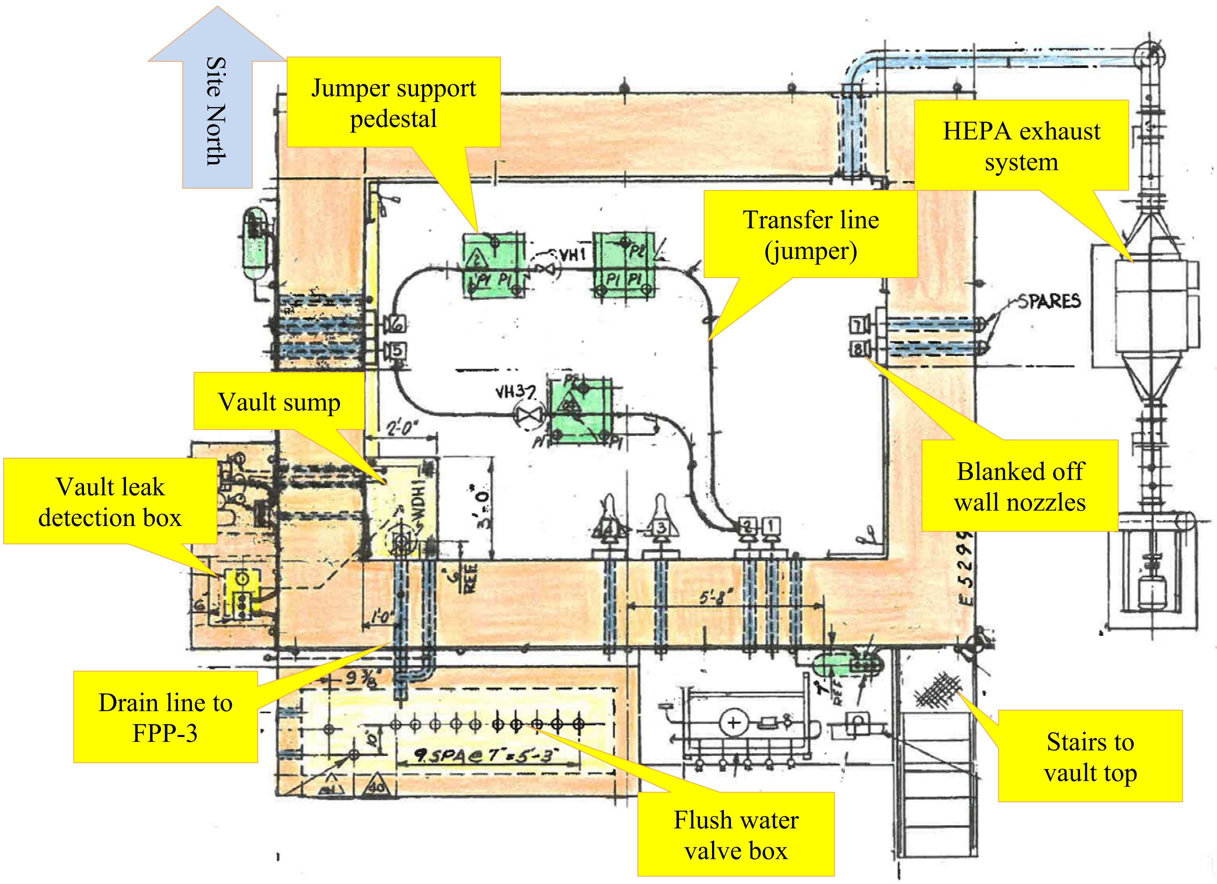


Figure 3.3-2: Plan View of FDB-6



4.0 F-TANK FARM PERFORMANCE ASSESSMENT BACKGROUND INFORMATION

This Special Analysis is being prepared based on the information presented in the FTF PA and its supporting Special Analyses (i.e., the Tank 18/19 Special Analysis and the Tank 5/6 Special Analysis). The FTF PA was prepared to support the eventual operational closure of the FTF underground waste tanks and ancillary structures. The Tank 18/19 Special Analysis evaluated the impact of the Tank 18F and Tank 19F final inventories and updated parameter sensitivity studies on the results and conclusion of the FTF PA. The Tank 5/6 Special Analysis evaluated the impact of the Tank 5F and Tank 6F final inventories and updated parameter sensitivity studies on the results and conclusion of the FTF PA. The FTF PA and its supporting Special Analyses provides the technical basis and results to be used in subsequent documents to demonstrate compliance with the pertinent requirements from the documents identified below for final closure of FTF as indicated in Table 4.0-1:

- *Radioactive Waste Management Manual* [DOE M 435.1-1]
- *Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005* (NDAA) [NDAA_3116]
- *Bureau of Water Permit to Construct, F and H-Area High-Level Radioactive Waste Tank Farms, Construction Permit #17,424-IW* [DHEC_01-25-1993]
- *Federal Facility Agreement for the Savannah River Site* (FFA) [WSRC-OS-94-42]

The key requirements from the preceding documents necessitate development and calculation of the following for the FTF: potential radiological doses to a hypothetical MOP; potential radiological doses to a hypothetical inadvertent intruder; radiological dose to a human receptor via the air pathway, radon flux and water concentrations. All of these calculations were performed in the FTF PA to provide results over a minimum of 10,000 years. The water concentrations were calculated for both radioactive and non-radioactive contaminants at multiple locations outside FTF.

Table 4.0-1: Key Performance Objectives

Requirement	All-Pathways Dose	Intruder Dose	Air Pathway Dose	Radon Flux	Groundwater Protection
NDAA Section 3116: 10 CFR 61.41 and 61.42	25 mrem/yr	500 mrem/yr	N/A	N/A	N/A
DOE M 435.1-1	25 mrem/yr	500 mrem – acute 100 mrem/yr – chronic	10 mrem/yr	20 pCi/m^2/s at ground surface	< MCL
SCDHEC Primary Drinking Water Regulations (SCDHEC R.61-58)	N/A	N/A	N/A	N/A	< MCL

N/A Not applicable
MCL Maximum Contaminant Level

In accordance with the FFA requirements for high-level radioactive waste tank system(s), a construction and operating permit (hereinafter referred to as Construction Permit #17,424-IW) was obtained for the SRS tank farms' waste tank systems from the South Carolina Department of Health and Environmental Control (SCDHEC). [DHEC_01-25-1993] The FFA requires that waste tank system(s) that have been issued an industrial wastewater operating permit under the Pollution Control Act (PCA), shall be removed from service in accordance with S.C. Code Ann., Section 48-1-10, et seq. (1985) and all applicable regulations promulgated pursuant to the PCA. [Title 48_Chapter 1_SC_Laws] Applicable regulations include SCDHEC Regulation 61-67, *Standards for Wastewater Facility Construction* and Regulation 61-82, *Proper Closeout of Wastewater Treatment Facilities*. [WSRC-OS-94-42 Section IX.E (4)] The SCDHEC has advised that this process will involve two bureaus (Bureau of Water and Bureau of Land and Waste Management).

The regulatory process to complete closure of the FTF requires the development of multiple detailed technical documents with reviews and approvals by state and federal agencies. The documents involved include DOE's final revision of the FTF basis for Section 3116 determination for facility closure, which will be used to demonstrate that the criteria in NDAA Section 3116 are met. [NDAA_3116] DOE's *Basis for Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site* (hereinafter referred to as the FTF 3116 Basis Document) provides a basis upon which the Secretary of Energy (in consultation with the U.S. Nuclear Regulatory Commission [NRC]) has determined that the criteria in NDAA Section 3116 is met and that the stabilized residual waste at closure is not high-level waste. [DOE/SRS-WD-2012-001] The criteria in NDAA Section 3116 provide that the waste will be disposed of in compliance with the performance objectives in 10 Code of Federal Regulations (CFR) Part 61, Subpart C. The current revision of the FTF PA provides the technical basis that has been used to demonstrate compliance with 10 CFR 61.41 (*Protection of the General Population from Releases of Radioactivity*) and 61.42 (*Protection of Individuals from Inadvertent Intrusion*) performance objectives, as described in the FTF 3116 Basis Document. [10 CFR 61] These performance objectives are used in concert with the comparable performance objectives from DOE M 435.1-1.

Compliance with the SCDHEC requirements will be demonstrated using two primary documents that are supported by the FTF PA. The first is the *Consolidated General Closure Plan for F-Area and H-Area Waste Tank Systems* (SRR-CWDA-2017-00015), which establishes the general protocols, requirements, and processes for operational closure of FTF. The second set of documents are waste tank-specific closure modules that authorize the operational closure and grouting of a specific waste tank, group of waste tanks, or ancillary equipment.

The FTF PA provides the baseline technical information at different points of assessment that can be used in subsequent decision documents (e.g., waste tank-specific closure modules). The FTF PA provides groundwater radionuclide concentrations at 1-meter, 100-meter, and exposure points at the two seeplines approximately 1,600 meters from FTF. The groundwater concentrations are provided for each of the three aquifers as applicable as a part of the FTF groundwater modeling. FTF PA also provides groundwater concentrations for chemical contaminants at 1-meter and 100-meter. In addition to doses determined from these groundwater concentrations, the FTF PA provides inadvertent intruder doses consistent with the requirements for 10 CFR 61.42, as well as analyses for the air pathways and radon ground-surface flux, as required by DOE M 435.1-1. The

FTF PA's supporting Special Analyses are used to supplement the FTF PA baseline technical information and provide additional information needed to demonstrate continued compliance with applicable performance objectives. It should be noted that compliance demonstration does not require recalculation of all the data contained within the initial FTF PA.

5.0 FDB-5 and FDB-6 RESIDUAL INVENTORY INFORMATION

FDB-5 and FDB-6 are not modeled explicitly in the FTF PA based on the fact that these locations did not serve as primary waste containment, and therefore should not contain significant radiological inventory at closure relative to other modeled inventories. As part of the FDB-5 and FDB-6 operational closure process, residual inventories at operational closure have been determined for FDB-5 and FDB-6. Although no inventory was assigned to FDB-5 and FDB-6 in the initial FTF PA modeling, the relatively insignificant FDB-5 and FDB-6 inventories still represent an increase relative to the FTF PA. The list of radionuclides and chemicals to be included in the FDB-5 and FDB-6 residual inventory list is based on the ancillary structure inventory analyses in Section 3.3.3 of the FTF PA.

The FDB components that would be most contaminated at closure are the floor surfaces (where residual material may have accumulated after DB flushing) and the jumpers left in the FDBs. These surfaces would therefore be the only significant contributors to the FDB residual inventory at closure. The assigned inventory remaining at closure in FDB-5 and FDB-6 can be determined analytically using a similar approach as was used in the FTF PA to determine the residual material in the FTF piping systems. The residue on the FDB surfaces (jumpers and floors) can be reasonably bounded by assuming that residual inventory accumulated in the DBs after flushing in the same manner as assumed for transfer lines (which are based on representative dry sludge waste concentrations decayed to 9/30/2020). While not directly analogous, this approach accounts for a residual remaining which would bound the insignificant amount of material evident on the DB floors in the visual inspections performed. [SRR-CWDA-2020-00029] This approach would ignore inventory accumulation via diffusion into metal or oxide film formed on the carbon steel and the stainless steel since these mechanisms are insignificant (i.e., less than 1%) compared to the contribution associated with residue inventory after flushing.

The total radiological and chemical inventory assigned to FDB-5 and FDB-6 after closure can be determined by multiplying the previously calculated transfer line residue surface concentrations from Table 3.3-11 of the FTF PA by the total affected FDB-5 and FDB-6 surface areas. The 4-inch Core Pipe Size concentration is the most conservative calculated radiological surface concentration calculated and represents a reasonably bounding floor coating after flushing. It should be noted that these concentrations are based on based on representative dry sludge waste concentrations decayed only to 9/30/2020.

Tables 5.0-1 and 5.0-2 list FDB-5 and FDB-6 residual inventories at final facility closure for FTF radionuclides and chemicals, respectively. [SRR-CWDA-2020-00029] Tables 5.0-1 and 5.0-2 also display the Tank 5 and Tank 6 radionuclide and chemical inventories for comparison. [SRR-CWDA-2012-00106] As shown in Table 5.0-2, no individual FDB-5 or FDB-6 chemical inventory was even 0.5% of the Tank 5 and Tank 6 chemical inventories, with most chemicals not even 0.1% of a tank chemical inventory. Cadmium (Cd) was the chemical in the FDB-5 or FDB-6 inventory with the largest quantity in relation to the Tank 5 and Tank 6 chemical inventories.

Table 5.0-1: FDB-5 and FDB-6 Radionuclide Inventories (Ci) (ND = Not determined)

Radionuclide	FDB-5	Tank 5 Actual	FDB-6	Tank 6 Actual
Ac-227	1.81E-10	6.9E-04	2.08E-10	8.1E-05
Al-26	1.76E-06	1.2E-01	2.03E-06	ND
Am-241	1.38E-01	6.9E+02	1.59E-01	1.3E+03
Am-242m	1.98E-04	1.7E+00	2.28E-04	1.8E+00
Am-243	2.26E-05	5.3E+00	2.59E-05	3.0E+01
Ba-137m	1.29E+00	3.3E+03	1.48E+00	6.3E+03
Bk-249	5.21E-31	ND	5.98E-31	ND
C-14	1.01E-05	7.1E-03	1.16E-05	3.1E-01
Ce-144	4.51E-10	7.0E-02	5.18E-10	6.4E-02
Cf-249	1.91E-22	2.8E-02	2.19E-22	ND
Cm-242	5.70E-22	ND	6.54E-22	ND
Cm-243	3.33E-06	4.5E-01	3.82E-06	6.2E+00
Cm-244	6.39E-03	2.2E+01	7.34E-03	7.3E+02
Cm-245	8.19E-08	5.4E-03	9.41E-08	1.0E-01
Cm-247	3.06E-20	9.7E-07	3.51E-20	2.4E-06
Cm-248	7.04E-21	1.3E-04	8.09E-21	1.2E-04
Co-60	5.51E-03	2.2E+01	6.33E-03	4.2E+01
Cs-134	3.06E-06	ND	3.51E-06	ND
Cs-135	3.88E-06	2.2E-02	4.45E-06	4.2E-02
Cs-137	1.38E+00	3.5E+03	1.59E+00	6.7E+03
Eu-152	1.57E-03	9.0E-01	1.80E-03	1.4E+00
Eu-154	1.71E-02	1.5E+02	1.96E-02	1.6E+02
Eu-155	1.52E-02	ND	1.75E-02	ND
H-3	1.93E-04	4.9E-02	2.22E-04	1.8E-01
I-129	1.68E-08	2.2E-03	1.93E-08	3.0E-03
Na-22	2.77E-06	ND	3.18E-06	ND
Nb-94	8.92E-06	1.1E-02	1.02E-05	1.5E-02
Ni-59	3.97E-04	6.0E+01	4.56E-04	7.5E+01
Ni-63	3.29E-02	3.1E+03	3.78E-02	5.2E+03
Np-237	1.87E-05	2.6E-01	2.15E-05	4.7E-01
Pa-231	7.39E-09	1.4E-03	8.49E-09	6.0E-03
Pm-147	1.48E-02	ND	1.69E-02	ND
Pr-144	4.51E-10	ND	5.18E-10	ND
Pu-238	4.33E-02	2.5E+01	4.97E-02	4.8E+01
Pu-239	1.70E-02	8.5E+01	1.96E-02	4.5E+01
Pu-240	6.26E-03	2.0E+01	7.19E-03	2.8E+01
Pu-241	2.95E-02	5.3E+01	3.39E-02	6.8E+01
Pu-242	5.15E-05	3.9E-03	5.91E-05	3.3E-02
Pu-244	2.42E-08	7.1E-06	2.78E-08	8.5E-06
Ra-226	3.40E-05	6.5E-03	3.91E-05	3.8E-02
Rh-106	3.51E-08	ND	4.03E-08	ND
Ru-106	3.51E-08	ND	4.03E-08	ND
Sb-125	9.66E-04	ND	1.11E-03	ND
Sb-126	5.28E-05	ND	6.06E-05	ND
Sb-126m	3.77E-04	ND	4.33E-04	ND
Se-79	2.00E-04	1.3E-01	2.30E-04	3.0E-01
Sm-151	5.84E-01	7.3E+03	6.71E-01	2.9E+03
Sn-126	3.77E-04	7.7E+00	4.33E-04	9.3E+00
Sr-90	7.41E+00	9.7E+04	8.51E+00	2.0E+05
Tc-99	3.55E-03	1.0E-01	4.08E-03	1.7E+00
Te-125m	2.37E-04	ND	2.72E-04	ND
Th-229	1.19E-05	2.9E-04	1.36E-05	1.5E-03
Th-230	3.39E-05	2.2E-02	3.89E-05	1.5E-02
U-232	1.76E-07	4.1E-05	2.02E-07	1.1E-03
U-233	8.81E-05	2.2E-03	1.01E-04	5.2E-02
U-234	5.66E-05	4.5E-02	6.50E-05	1.5E-01
U-235	6.70E-07	2.0E-03	7.69E-07	6.8E-03
U-236	1.08E-06	2.5E-03	1.24E-06	8.3E-03
U-238	3.31E-05	4.7E-02	3.80E-05	2.5E-01
Y-90	7.41E+00	9.7E+04	8.51E+00	2.0E+05

Table 5.0-2: FDB-5 and FDB-6 Chemical Inventories (kg)

Chemical	FDB-5	FDB-6	Tank 5 Actual	Tank 6 Actual
Ag	1.93E-03	2.22E-03	3.0E+00	1.7E+00
As	6.52E-05	7.48E-05	9.1E-02	7.9E-02
Ba	2.38E-03	2.74E-03	2.1E+01	2.0E+01
Cd	6.77E-03	7.77E-03	9.0E-01	1.7E+00
Cr	2.53E-03	2.91E-03	1.1E+01	8.2E+00
Cu	1.29E-03	1.48E-03	7.5E+00	1.7E+01
F	1.75E-03	2.01E-03	3.5E-01	5.9E+00
Fe	2.75E-01	3.16E-01	4.9E+03	3.3E+03
Hg	1.84E-03	2.11E-03	2.4E+01	6.1E+01
Mn	4.97E-02	5.71E-02	3.4E+02	3.0E+02
Ni	2.00E-01	2.30E-01	5.8E+02	8.5E+02
$NO_2 + NO_3$	2.29E-01	2.63E-01	2.5E+00	9.8E+02
Pb	1.41E-02	1.62E-02	3.6E+01	8.2E+00
Sb	1.56E-03	1.79E-03	7.4E+00	1.5E+01
Se	2.00E-04	2.30E-04	1.9E-02	1.6E-01
U	1.08E-01	1.24E-01	9.3E+01	7.1E+02
Zn	2.40E-03	2.76E-03	4.9E+00	1.6E+01

6.0 F-TANK FARM PERFORMANCE ASSESSMENT EVALUATION

This section will evaluate the new information on FDB-5 and FDB-6 residual inventories at operational closure presented in Section 5.0. As necessary, this new inventory information is used to update the FTF fate and transport modeling performed as part of FTF PA and its supporting Special Analyses. The potential impacts of the new inventory information on the assumptions from the FTF PA and supporting Special Analyses are also considered.

6.1 F-Tank Farm Facility Characteristics

This section will discuss the impact of the new residual inventory information on the FTF characteristics information presented in Section 3.0 of the FTF PA.

6.1.1 Site Characteristics

Section 3.1 of the FTF PA contains a description of SRS site characteristics. The site characteristics information presented in the FTF PA and its supporting Special Analyses are not affected by the new residual inventory information.

6.1.2 Principal Facility Design Features

Section 3.2 of the FTF PA contains a description of the FTF facility design features. Section 3.2.4.2 of the FTF PA (Ancillary Equipment Strategy) states that "Ancillary equipment including the evaporator buildings, the catch tank, PPs, and DBs to the extent practical will remain in place and be filled with grout or other materials, as practical, to eliminate subsidence potential". The FTF facility design features information presented in the FTF PA and its supporting Special Analyses are not affected by the new residual inventory information.

6.1.3 Stabilized Contaminant Characteristics

Section 3.3 of the FTF PA contains a description of the FTF stabilized contaminant characteristics, which is affected by the new residual inventory information as detailed below.

Section 3.3.1 of the FTF PA describes the stabilized contaminant characterization screening process. The screening process is not affected by the new residual inventory information.

Section 3.3.2 of the FTF PA includes the individual waste tank inventories, which are an integral part of the modeling process. The waste tank inventories are not affected by the updated FDB-5 and FDB-6 radionuclide and chemical inventories presented in Section 5 of this Special Analysis.

Section 3.3.3 of the FTF PA describes the FTF ancillary equipment inventory. The ancillary equipment inventory is based on the residual inventories at those specific locations (e.g., evaporator vessels, pump tanks) and is not affected by the new residual inventory information. FDB-5 and FDB-6 are not modeled explicitly in the FTF PA based on the fact that these locations did not serve as primary waste containment, and therefore should not contain significant inventory at closure relative to other modeled inventories. As part of the FDB-5 and FDB-6 operational closure process, residual inventories at operational closure were determined for FDB-5 and FDB-6 and these residual inventories are presented in Section 5 of

the Special Analysis. The impacts of these new FDB-5 and FDB-6 inventories on various PA analyses (e.g., public dose analyses) are presented later in Section 6.3 of this Special Analysis.

6.2 The F-Tank Farm Analysis of Performance

This section will discuss the impact of the new residual inventory information on the FTF analysis of performance information presented in Section 4.0 of the FTF PA and Section 6.2 of the supporting Special Analyses (i.e., Tank 18/19 Special Analysis and Tank 5/6 Special Analysis).

6.2.1 Overview of Analysis

Section 4.1 of the FTF PA contains an overview of analysis. The overview of analysis information presented in the FTF PA is not affected by the new residual inventory information.

6.2.2 Integrated Site Conceptual Model of Facility Performance

Section 4.2 of the FTF PA describes the Integrated Conceptual Model (ICM), which is used to simulate the release of radiological and chemical contaminants from the 22 underground waste tanks and select ancillary equipment in FTF (not DBs). The Section 4.2 ICM information presented in the FTF PA is affected by the new residual inventory information through this Special Analysis adding FDB-5 and FDB-6 to locations included in the ICM.

Section 4.2.2 (Source Term Release) of the FTF PA includes a discussion of the waste release model, which is an integral part of the waste tank modeling process but is not used in ancillary equipment modeling. The Section 4.2.2 Source Term Release information presented in the FTF PA is not affected by the new FDB-5 and FDB-6 residual inventory information.

6.2.3 Modeling Codes

Section 4.3 of the FTF PA contains a discussion of the modeling codes. The FTF PA Base Case (i.e., deterministic) modeling was performed using the same flow and transport model that was used in the FTF PA, Rev. 1 and its supporting Special Analyses. The FTF PORFLOW flow and transport model was not changed for the modeling runs performed for this Special Analysis except to add the FDB-5 and FDB-6 inventories. The FTF PORFLOW model was rerun with the updated FTF FDB-5 and FDB-6 inventories to provide 1-meter and 100-meter radiological concentrations. No PORFLOW deterministic sensitivity runs were performed.

The FTF GoldSim flow and transport model was not changed for the modeling runs performed for this Special Analysis except to add the FDB-5 and FDB-6 inventories. The FTF GoldSim model was rerun with the updated FDB-5 and FDB-6 inventories to provide radiological concentrations. Based on the extremely low inventories and associated low doses, no FTF probabilistic modeling for this Special Analysis was performed using the GoldSim model (i.e., the GoldSim model was used only for deterministic modeling).

A discussion of model scope and quality assurance (e.g., verification of modeling inputs used) for this model revision is documented in *Radionuclide Transport Modeling in Support of the Special Analysis for F-Area Diversion Box 5 and Diversion Box 6.* [SRR-CWDA-2020-00046] The modeling codes information presented in FTF PA is not affected by the new residual inventory information.

6.2.4 Closure System Modeling

Section 4.4 of the FTF PA describes how the FTF design elements and their associated properties were represented in the computer modeling codes. The closure system modeling information presented in the FTF PA is not affected by the new FDB-5 and FDB-6 information.

6.2.5 Airborne and Radon Analysis

Section 4.5 of the FTF PA contains a discussion of the airborne and radon analysis methodology. The air and radon pathway conceptual model and analysis approach presented in the FTF PA is not affected by the new FDB-5 and FDB-6 information.

6.2.6 Biotic Pathways

Section 4.6 of the FTF PA documents the bioaccumulation factors and human health exposure parameters used in the FTF PA modeling effort. The bioaccumulation factors and human health exposure parameters presented in the FTF PA are not affected by the new FDB-5 and FDB-6 information.

6.2.7 Dose Analysis

Section 4.7 of the FTF PA contains a discussion of the dose analysis approach used and presents the set of dose conversion factors (DCFs) used in the dose calculations modeling effort methodology. The dose analysis information presented in FTF PA is not affected by the new FDB-5 and FDB-6 information.

6.2.8 RCRA/CERCLA Risk Evaluation

Section 4.8 of the FTF PA contains a discussion of the Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation, and Liability Act (RCRA/CERCLA) risk evaluation methodology. The RCRA/CERCLA risk evaluation approach presented in the FTF PA is not affected by the new FDB-5 and FDB-6 information.

6.3 FTF Results of Analysis

This section will discuss the impact of the new residual inventory information on the FTF results presented in Section 5.0 of the FTF PA and Section 6.3 of the Tank 5/6 Special Analysis.

6.3.1 Source Term (Analyses Results)

Section 5.1 of the FTF PA presents the peak stabilized contaminant release rates from the FTF waste tanks and ancillary equipment. The release rates (fluxes) from PORFLOW are not presented herein. Since the peak flows release rates (fluxes) are waste tank fluxes (which are not affected by the new FDB-5 and FDB-6 information and did not change) the FTF PA peak flux information has not been updated.

6.3.2 Environmental Transport of Radionuclides

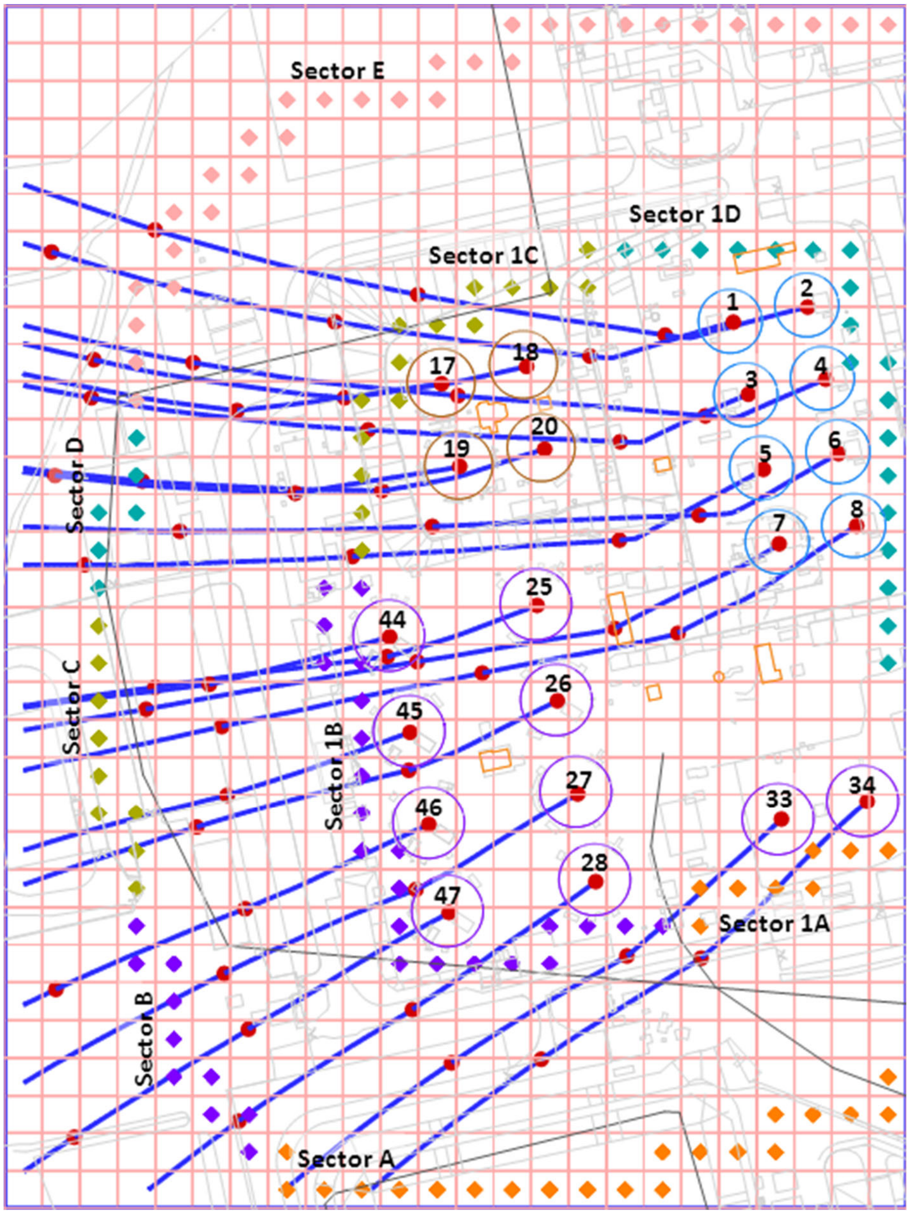
Section 5.2 of the FTF PA presents the groundwater concentrations for the FTF radionuclides and chemicals. Maximum groundwater concentrations are presented for two exposure points: 1) 100-meter from the FTF and 2) at the seeplines for Upper Three Runs (UTR) and Fourmile Branch (FMB). Results are presented in FTF PA for the three distinct aquifers modeled, Upper

Three Runs Aquifer (UTRA)-Upper Zone (UTRA-UZ), UTRA-Lower Zone (UTRA-LZ), and Gordon Aquifer. For this Special Analysis, the groundwater concentrations at 100-meter were calculated for the FTF PA Base Case using only the revised FDB-5 and FDB-6 inventories to see the limited impact of this inventory delta. Calculations were performed using the both the GoldSim FTF and PORFLOW FTF models (PORFLOW runs were performed only for sensitivity run radionuclides, as discussed in Section 6.3.2.2) and documented in *Radionuclide Transport Modeling in Support of the Special Analysis for F-Area Diversion Box 5 and Diversion Box 6.* [SRR-CWDA-2020-00046] Since the peak seepline concentrations are dominated by waste tank releases (which are not affected by the new FDB-5 and FDB-6 information and did not change) the seepline groundwater concentrations have not been updated. The results for the FDB-5 and FDB-6 only inventories are presented in Section 5 of this Special Analysis. Groundwater concentrations for the other FTF inventories are not affected by the new FDB-5 and FDB-6 information and therefore were not recalculated.

6.3.2.1 Groundwater Concentrations

Groundwater concentrations at 100-meter are calculated in the FTF PA using the PORFLOW FTF model, which divides the area around FTF into computational cells. Calculation of the 100-meter groundwater concentrations using the PORFLOW FTF model is discussed in more detail in Section 5.2.2 of the FTF PA. The PORFLOW 100-meter groundwater concentrations are calculated for five sectors (Sectors A through E) as shown on Figure 6.3-1. The peak concentration values for the 100-meter results are recorded for the three aquifers of concern (i.e., UTRA-UZ, UTRA-LZ, and Gordon Aquifer). The five sectors are analyzed for the Sensitivity Run Radionuclides (discussed in Section 6.3.2.2) to find the maximum groundwater concentrations at 100-meter from the FTF. The PORFLOW 1-meter concentrations are calculated for four sectors (Sector 1A through 1D), as shown in Figure 6.3-1. Using the highest groundwater concentration from any sector to determine the calculated peak doses overstates the dose results. This is because the concentration for each radionuclide is determined independent of the location (i.e., horizontal mesh and aquifer) within the given sector. The 100-meter and 1-meter concentrations are calculated using the GoldSim FTF model for all radionuclides as discussed in *Radionuclide Transport Modeling in Support of the Special Analysis for F-Area Diversion Box 5 and Diversion Box 6.* [SRR-CWDA-2020-00046]

Figure 6.3-1: PORFLOW FTF 1-Meter and 100-Meter Model Evaluation Sectors



Note: The individual sectors are indicated by unique diamond colors.

For this Special Analysis, the peak 1-meter and 100-meter radiological concentrations associated with the FDB-5 and FDB-6 inventories were calculated to show the incremental change. The maximum 1-meter concentrations are presented in Table 6.4-1.

Table 6.4-1 also lists the MCL for each constituent with the derived values for beta-gamma and photon emitters from Table II-3 of FR-00-9654. The maximum contaminant levels (MCLs) provided in the reference are based on a beta-gamma dose of 4 mrem/yr. The peak concentration of each beta-gamma emitter is compared to a specific MCL to determine their

fraction. To determine if the 4 mrem/yr beta-gamma limit is met, the sum of the fractions must be less than 1.0. The total alpha MCL includes Ra-226, but does not include radon or uranium. The radium MCL includes both Ra-226 and Ra-228. [SCDHEC R.61-58]

6.3.2.2 Sensitivity Run Radionuclide Determination

Section 5.2.2 of the FTF PA presents the methodology used to determine which radionuclides were most significant and to document which radionuclides would be considered a "sensitivity run radionuclide." While all radionuclides identified in the FTF waste tank inventory were included in the FTF PA 100-meter groundwater modeling efforts, narrowing the catalog of radionuclides down to a sensitivity run radionuclide list allowed the analysis to concentrate on the few radionuclides which posed more risk and concentrated modeling efforts on the areas of greatest concern.

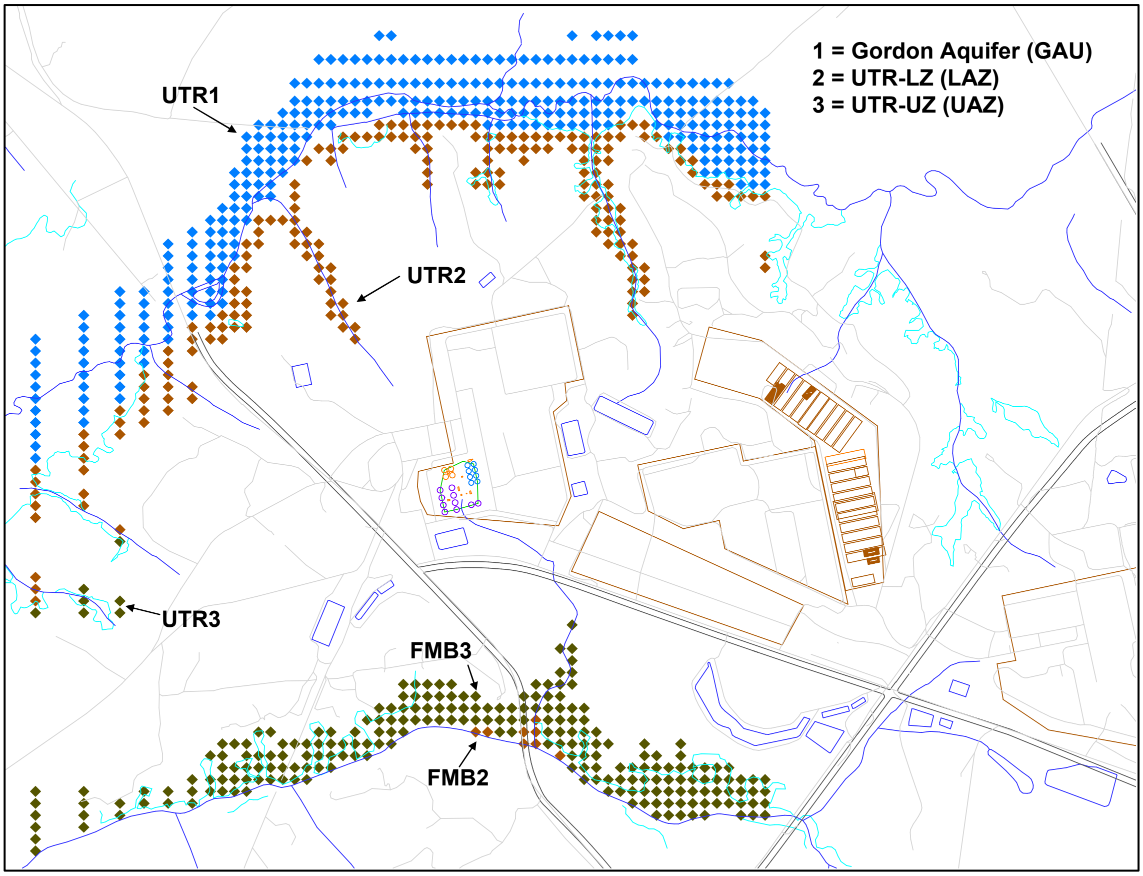
To support development of this Special Analysis, PORFLOW simulations were performed only for the key "sensitivity run" radionuclides identified in the Tank 5/6 Special Analysis. The list of sensitivity run radionuclides (SRR-CWDA-2012-00106) included Am-241, Am-243, C-14, Cl-36, Cm-244, Cs-135, I-129, Nb-93m, Nb-94, Np-237, Pa-231, Pu-238, Pu-239, Pu-240, Pu-241, Ra-226, Tc-99, Th-230, U-234, U-235, U-238, and Zr-93. This list was amended to include Sr-90 and Cs-137, which may drive early doses in the PA intruder analysis. This set of radionuclides is intended to capture those radionuclides with the greatest potential to influence dose results, based on the revised inventories.

6.3.2.3 Groundwater Concentrations at the Seeplines

The FTF PA seepline groundwater concentrations were calculated using the PORFLOW FTF model and are presented in Section 5.0 of FTF PA and Section 6.3 of the Tank 5/6 Special Analysis. Figure 6.3-2 shows the five evaluation sectors (UTR1, UTR2, UTR3, FMB1, and FMB2) that the PORFLOW seepline concentrations are provided for. These evaluation sectors are based on stream locations (UTR or FMB) and aquifer depths (1 = Gordon, 2 = UTR-LZ, and 3 = UTR-UZ) that represent the nearest downstream seeplines to the FTF. The peak concentration values for the seepline results were recorded for each evaluation sector.

Since the peak seepline concentrations are dominated by waste tank releases (which are not affected by the new FDB-5 and FDB-6 information and did not change) the seepline groundwater concentrations have not been updated. The seepline groundwater concentrations calculated in the Tank 5/6 Special Analysis remain the peak seepline groundwater concentrations for the two stream seeplines (FMB and UTR).

Figure 6.3-2: PORFLOW FTF Seepline Evaluation Sectors



6.3.3 Air Pathway and Radon Analysis

Section 5.3 of the FTF PA presents the air pathway and radon analysis results. These air pathway and radon analysis results were updated in the Tank 5/6 Special Analysis. Since the inventory of selected potentially airborne (i.e., gaseous) isotopes used in the Tank 5/6 Special Analysis is not impacted by the new FDB-5 and FDB-6 information, the air and radon results are not affected.

6.3.4 Biotic Pathways

Section 5.4 of the FTF PA describes how the biotic pathways doses to the MOP are calculated for the receptor with 100-meter well water as a primary water source and for the receptor with groundwater from a stream as a primary water source. The information regarding biotic pathways calculations presented in the FTF PA is not affected by the new FDB-5 and FDB-6 information.

6.3.5 Dose Analysis of MOP Exposure

Section 5.5 of the FTF PA contains calculations of the peak total doses for a) the MOP at the 100-meter well and b) the MOP at applicable streams (either UTR or FMB). Peak doses have been calculated using the FDB-5 and FDB-6 only peak groundwater concentrations identified

in Section 6.3.2 of this Special Analysis (i.e., the FDB-5 and FDB-6 only groundwater concentrations at 100-meter). The doses were calculated using the GoldSim dose calculator based on concentrations generated with the PORFLOW FTF model for the FTF PA Base Case.

6.3.5.1 Member of the Public at 100-Meter Groundwater Pathway Dose Results

Table 6.3-1 shows a comparison of the 100-meter peak groundwater pathway doses (calculated using the concentrations associated with the FDB-5 and FDB-6 inventories) for the different 100-meter sectors within 1,000 and 10,000 years. Table 6.3-1 also shows the 100-meter peak groundwater pathway doses from the Tank 5/6 Special Analysis calculated using the concentration associated with all the FTF inventories. In calculating the peak groundwater pathway dose, the highest radionuclide concentration within each sector's vertical computational mesh from each of the three distinct aquifers modeled (UTRA-UZ, UTRA-LZ, and the Gordon Aquifer), is used.

Table 6.3-1: 100-Meter MOP Peak Groundwater Pathways Dose by Sector

Sector	FTF Highest Peak Dose in 1,000 Years	FDB-5 Highest Peak Dose in 1,000 Years	FDB-6 Highest Peak Dose in 1,000 Years	FTF Highest Peak Dose in 10,000 Years	FDB-5 Highest Peak Dose in 10,000 Years	FDB-6 Highest Peak Dose in 10,000 Years
A	**0.1 mrem/yr (year 752)**	**0.001 mrem/yr (year 724)**	**<0.001 mrem/yr**	**0.1 mrem/yr (year 752)**	**0.001 mrem/yr (year 724)**	**<0.001 mrem/yr**
B	**0.1 mrem/yr (year 754)**	**0.006 mrem/yr (year 722)**	**<0.001 mrem/yr**	**0.1 mrem/yr (year 754)**	**0.006 mrem/yr (year 722)**	**<0.001 mrem/yr**
C	**0.1 mrem/yr (year 740)**	**0.006 mrem/yr (year 720)**	**0.005 mrem/yr (year 724)**	**0.2 mrem/yr (year 4,306)**	**0.006 mrem/yr (year 720)**	**0.005 mrem/yr (year 724)**
D	**0.3 mrem/yr (year 704)**	**<0.001 mrem/yr**	**0.01 mrem/yr (year 720)**	**1.8 mrem/yr (year 6,056)**	**<0.001 mrem/yr**	**0.01 mrem/yr (year 720)**
E	**0.4 mrem/yr (year 704)**	**<0.001 mrem/yr**	**0.004 mrem/yr (year 720)**	**3.3 mrem/yr (year 10,000)**	**<0.001 mrem/yr**	**0.004 mrem/yr (year 720)**

Note: Dose values are shown to two significant figures to illustrate changes/trends. The use of two significant figures is not meant to imply this level of precision for these dose projections.

Table 6.3-2 shows the 100-meter peak groundwater pathway dose contributions (calculated using the concentrations associated with the FDB-5 and FDB-6 FTF inventories) for individual radionuclides within 1,000 years (radionuclides with no dose contributions are not listed). The most significant individual radionuclide contributors are Tc-99 and Np-237.

Table 6.3-2: MOP Peak Groundwater Dose Contributions at 100-Meter Boundary Based on Radionuclides Released from FDB-5 and FDB-6

	FDB-5		FDB-6	
Radionuclide	Peak Dose (mrem/year)	Time of Peak Dose (year)	Peak Dose (mrem/year)	Time of Peak Dose (year)
	1 to 1,000 Years	1 to 1,000 Years	1 to 1,000 Years	1 to 1,000 Years
Ac-227	9.91E-09	802	1.85E-08	804
C-14	2.14E-28	1000	3.33E-28	1000
I-129	9.62E-06	564	1.79E-05	564
Nb-94	3.11E-04	562	5.73E-04	562
Np-237	2.17E-03	754	4.07E-03	758
Pa-231	5.98E-06	760	1.12E-05	762
Pb-210	4.51E-14	1000	1.07E-13	1000
Ra-226	2.43E-11	1000	5.69E-11	1000
Rn-222	5.81E-13	1000	1.36E-12	1000
Sr-90	1.64E-17	1000	3.93E-17	1000
Tc-99	4.38E-03	714	8.03E-03	712
Th-229	1.73E-10	1000	3.26E-10	1000
U-233	3.46E-09	1000	6.50E-09	1000
Peak Total Dose	**5.93E-03**	**720**	**1.08E-02**	**718**

The FDB-5 and FDB-6 related peak-groundwater pathway dose for both 1,000 years and 10,000 years is 0.01 mrem/yr in Sector D and is associated with FDB-6 (Tc-99 contributes over 50% of this peak). The 0.01 mrem/yr peak is significantly less than 100-meter peak groundwater pathway doses calculated for the entire FTF in 1,000 years (0.4 mrem/yr) and 10,000 years (3.3 mrem/yr). The FTF peak doses in 1,000 years and 10,000 years is therefore unchanged from the updated Base Case results previously reported in the Tank 5/6 Special Analysis. [SRR-CWDA-2012-00106].

The FDB-5 associated peak-groundwater pathway dose within 10,000 years is approximately 0.006 mrem/yr in Sector C around year 700. The FDB-5 associated peak-groundwater pathway dose within 100,000 years is approximately 0.01 mrem/yr in Sector C around year 36,000. Figure 6.3-3 shows the peak FDB-5 100-meter MOP receptor dose within 10,000 and 100,000 years for any of the five 100-meter sectors. The FDB-6 associated peak-groundwater pathway dose within 10,000 years is approximately 0.01 mrem/yr in Sector D around year 700. The FDB-6 associated peak-groundwater pathway dose within 100,000 years is approximately 0.02 mrem/yr in Sector D around year 36,000. Figure 6.3-4 shows the peak FDB-6 100-meter MOP receptor dose within 10,000 and 100,000 years for any of the five 100-meter sectors.

Figure 6.3-3: FDB-5 100-Meter MOP Peak Groundwater Pathway Dose within 10,000 Years

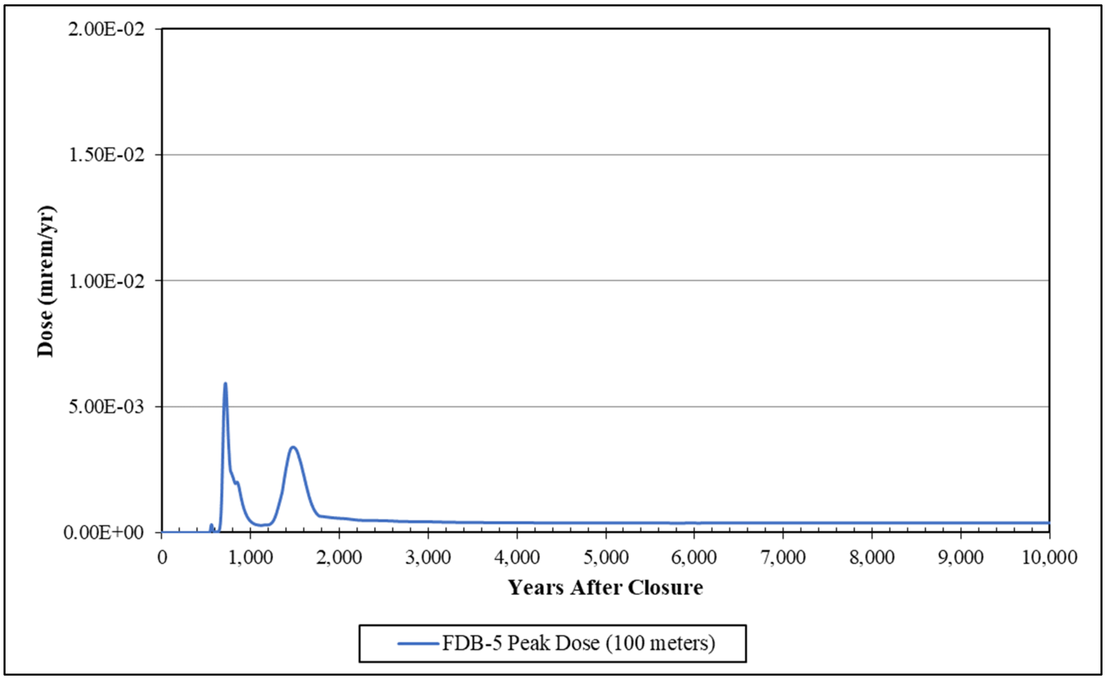


Figure 6.3-4: FDB-5 100-Meter MOP Peak Groundwater Pathway Dose within 10,000 for the Five 100-Meter Sectors

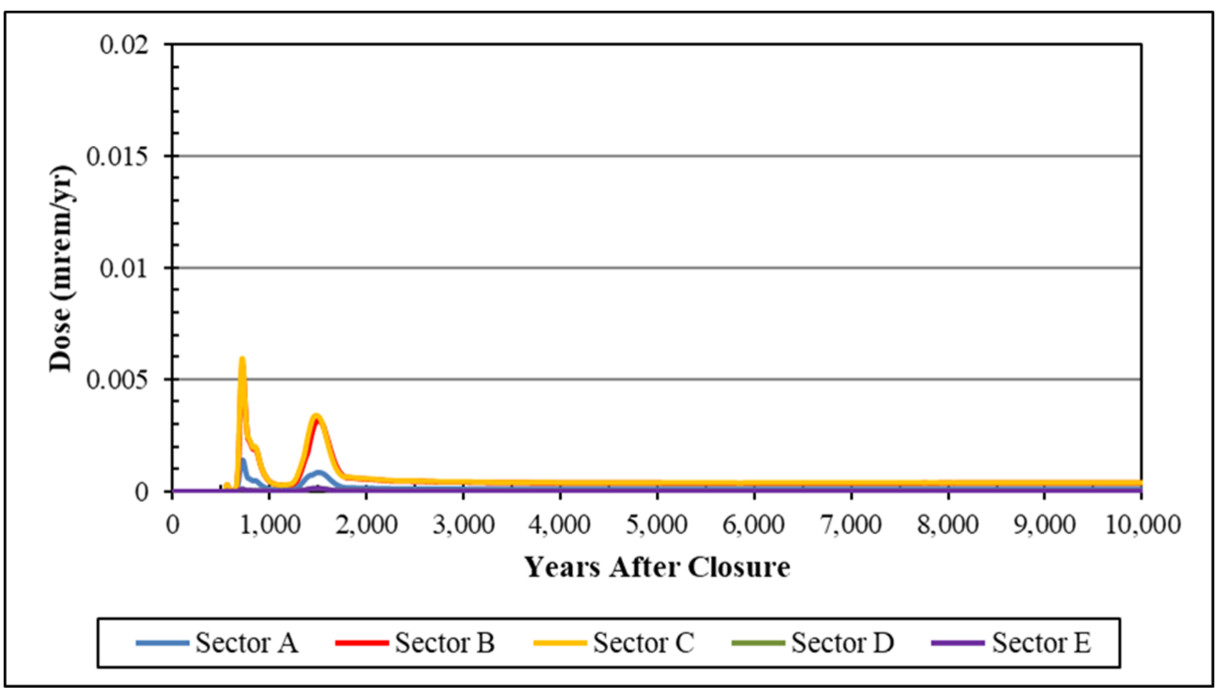


Figure 6.3-5: FDB-5 100-Meter MOP Peak Groundwater Pathway Dose within 100,000 Years

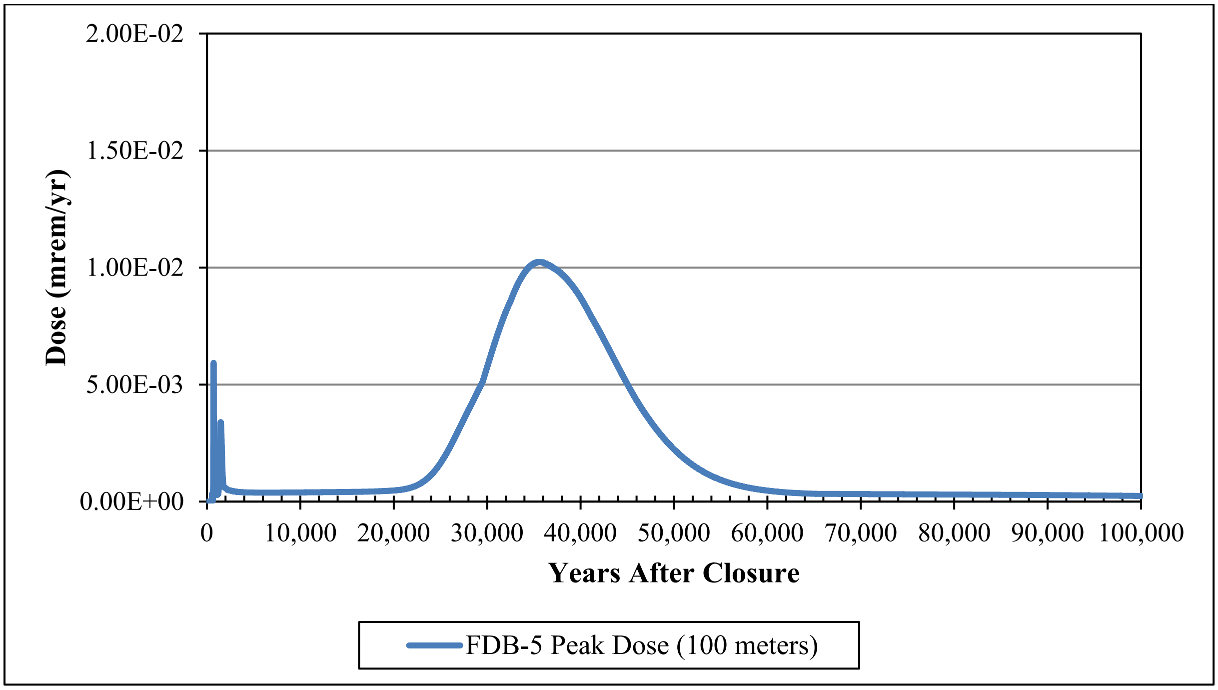


Figure 6.3-6: FDB-5 100-Meter MOP Peak Groundwater Pathway Dose within 100,000 Years for the Five 100-Meter Sectors

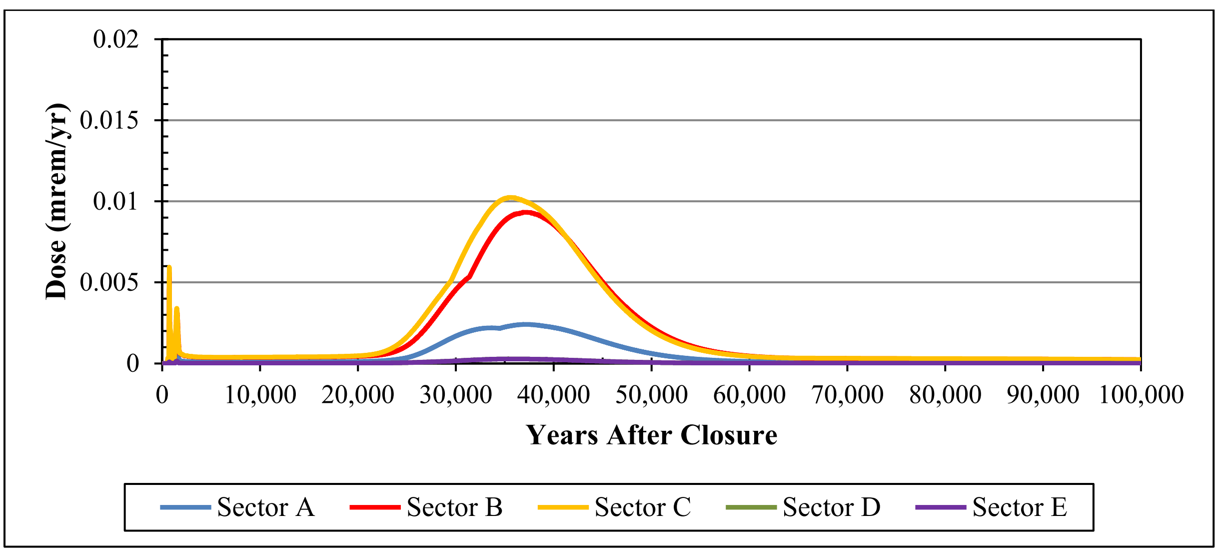


Figure 6.3-7: FDB-6 100-Meter MOP Peak Groundwater Pathway Dose within 10,000 Years

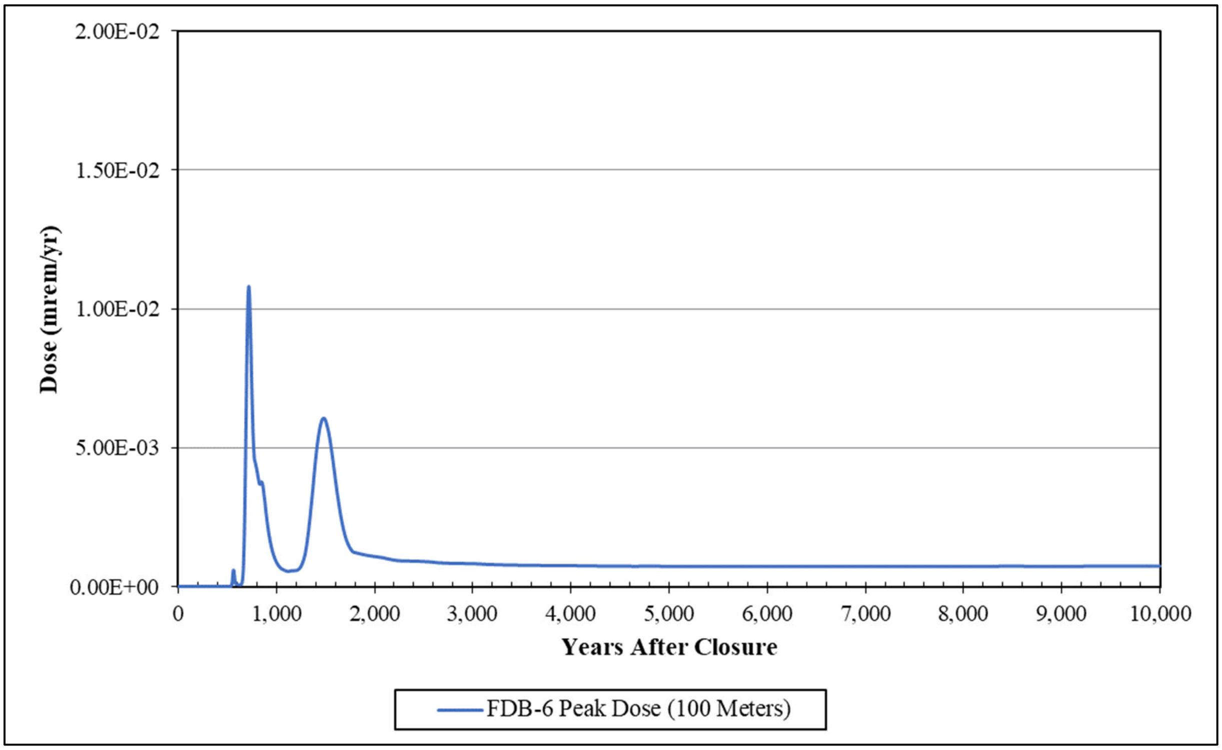


Figure 6.3-8: FDB-6 100-Meter MOP Peak Groundwater Pathway Dose within 10,000 Years for the Five 100-Meter Sectors

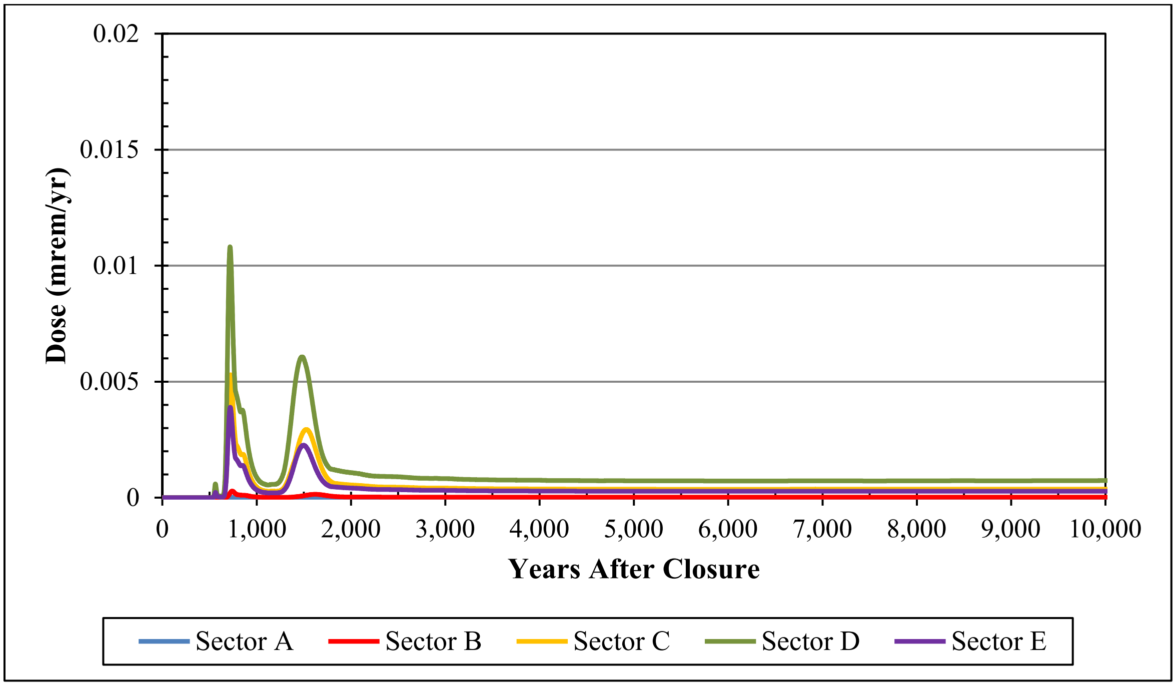


Figure 6.3-9: FDB-6 100-Meter MOP Peak Groundwater Pathway Dose within 100,000 Years

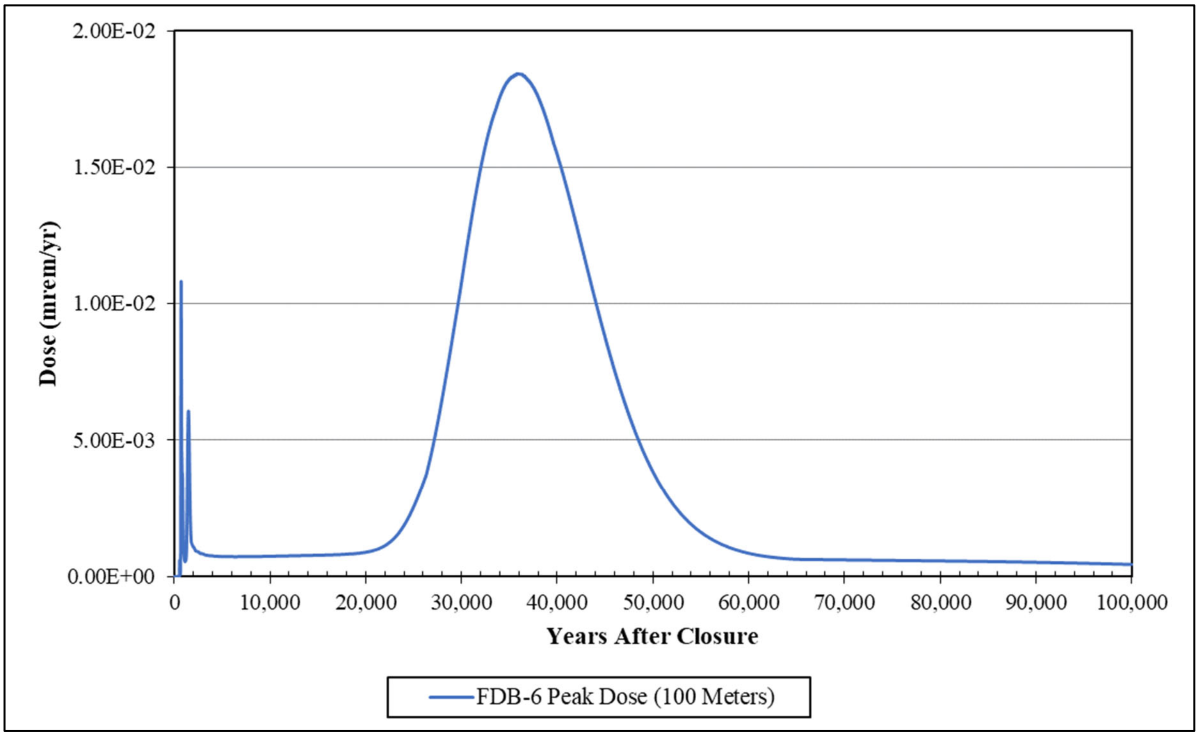
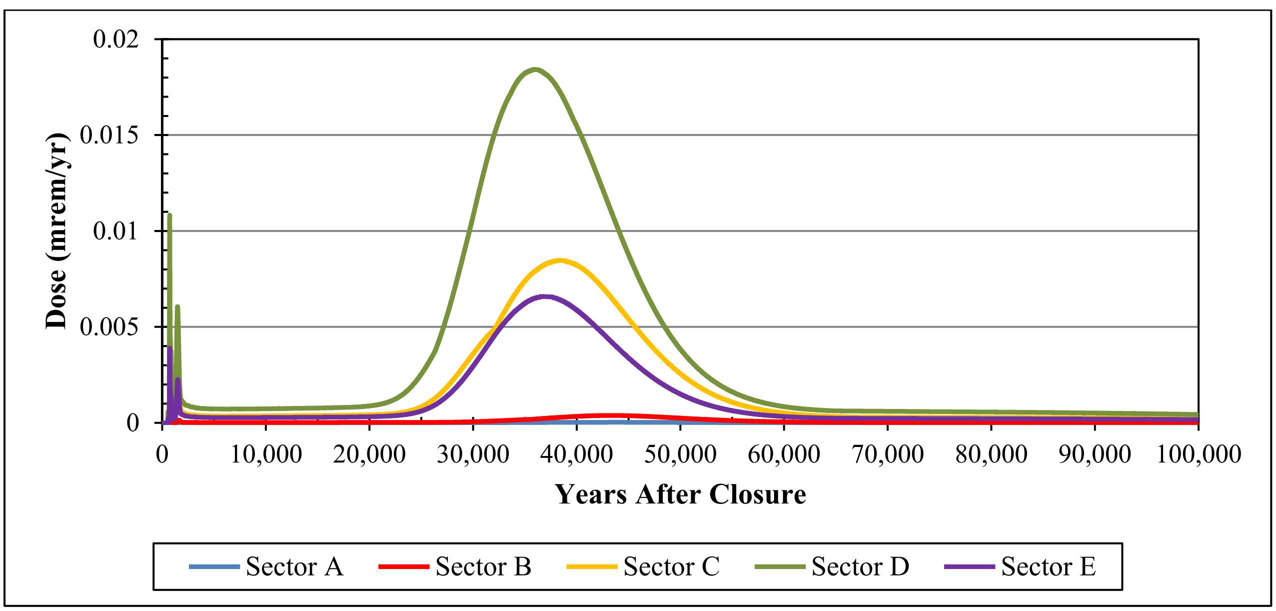


Figure 6.3-10: FDB-6 100-Meter MOP Peak Groundwater Pathway Dose within 100,000 Years for the Five 100-Meter Sectors



6.3.5.2 Peak Annual MOP Dose at the Stream

The peak groundwater-pathway doses for the two stream seeplines (FMB and UTR) were not recalculated for the updated FDB-5 and FDB-6 inventories based on the low 100-meter MOP doses in 100,000 years.

6.3.5.3 Member of the Public at 100-Meter Peak Annual All-Pathway Dose

The peak FTF all-pathways annual dose for the MOP at 100-meter is not impacted by the updated FDB-5/FDB-6 inventories. The peak all-pathways annual dose for the MOP remains 3.3 mrem/yr (as calculated in the Tank 5/6 Special Analysis) and is associated with Sector E.

6.3.5.4 MOP at Stream Peak Annual All-Pathways Dose

The peak all-pathways annual dose for the MOP at the stream is not impacted by the updated FDB-5/FDB-6 inventories. The peak all-pathways annual dose for the MOP at the stream remains 0.1 mrem/yr (as calculated in the Tank 5/6 Special Analysis) and is associated with Sector E.

6.3.6 Uncertainty and Sensitivity Analysis

Section 5.6 of the FTF PA considers the effects of uncertainties in the conceptual models used and sensitivities in the parameters used in the mathematical models. The uncertainty analyses and sensitivity analyses were primarily performed using a probabilistic model (i.e., the GoldSim FTF model), but some additional single parameter sensitivity analyses were performed through deterministic modeling using both the PORFLOW and GoldSim models.

The uncertainty analyses and sensitivity analyses information presented in the FTF PA and its supporting Special Analysis are not affected by the new FDB-5 and FDB-6 residual inventory information, and the uncertainty analyses and sensitivity analyses were not reperformed since insights remain unaffected.

6.3.7 RCRA/CERCLA Risk Analysis

The RCRA/CERCLA risk assessment for the FTF final facility closure follows the current Area Completion Project protocols for human health and ecological risk assessments. The FTF Contaminant Migration Constituents of Concern (CMCOC) were identified in the Tank 5/6 Special Analysis through a system that is consistent with both the Area Completion Project protocols and FTF PA. The CMCOC were identified by modeling the release of contaminants and their travel through the vadose zone, using the deterministic Base Case model with the updated inventories. The concentrations of contaminants that are modeled to reach the water table are compared to MCL, regional screening levels (RSLs), preliminary remediation goals (PRGs), or other appropriate standards in cases where the constituent does not have an MCL. Any constituents that are predicted to exceed these standards (i.e., fraction greater than 1.0) in the groundwater directly beneath FTF (1-meter from boundary) are identified as CMCOC. Based on the 1,000-year concentration curves, the Tank 5/6 Special Analysis identified Np-237 and Tc-99 as CMCOC using the described protocols.

The FTF CMOCs identified in the Tank 5/6 Special Analysis are not impacted by the radiological inventories in FDB-5 and FDB-6. Table 6.3-3 shows the Groundwater

Radionuclide Concentrations at 1-meter from FTF calculated with the GoldSim FTF model for the FTF PA Base Case based only on the radiological inventories in FDB-5 and FDB-6. As shown in Table 6.3-3, the peak groundwater concentrations calculated using FDB-5 and FDB-6 only are insignificant and the overall FTF peak radiological groundwater concentrations and CMCOCs identified in the Tank 5/6 Special Analysis remaining governing.

The Groundwater Chemical Concentrations at 1-Meter from FTF were not revised to incorporate FDB-5 and FDB-6 because those chemical inventories were insignificant in comparison to individual waste tank inventories. As shown in Section 5.0, no individual FDB-5 or FDB-6 chemical inventory was even 0.5% of a Tank 5 or Tank 6 chemical inventory, with most chemicals not even 0.1% of a tank chemical inventory. Cadmium (Cd) was the chemical in the FDB-5 or FDB-6 inventory with the largest quantity in relation to the Tank 5 and Tank 6 chemical inventories. Since the peak groundwater chemical contribution from FDB-5 and FDB-6 only is insignificant, the overall FTF peak chemical groundwater concentrations and CMCOCs identified in the Tank 5/6 Special Analysis remaining governing.

Table 6.3-3: FDB-5 and FDB-6 Groundwater Radionuclide Concentrations at 1-Meter from FTF

Radionuclide	MCL** (pCi/L)	Residential Tap Water PRG*** (pCi/L)	FDB-5 Peak Concentration (pCi/L) 1 to 1,000 Years	FDB-6 Peak Concentration (pCi/L) 1 to 1,000 Years	Peak Fraction of MCL or PRG at 1-meter
Ac-227	N/A	2.4E-01	9.99E-09	1.43E-08	5.97E-08
Al-26	N/A	2.8E+00	b	b	N/A
Am-241	N/A	4.6E-01	b	b	N/A
Am-242m	N/A	6.7E-01	b	b	N/A
Am-243	N/A	4.6E-01	b	b	N/A
Ba-137m*	N/A	Cs-137 daughter	N/A	N/A	N/A
Bk-249	N/A	4.3E+01	a	a	N/A
C-14	2.0E+03	MCL used	3.19E-24	1.26E-25	1.59E-27
Ce-144	N/A	1.4E+00	a	a	N/A
Cf-249	N/A	3.8E-01	b	b	N/A
Cl-36	7.0E+02	MCL used	b	b	N/A
Cm-242	N/A	1.2E+00	a	a	N/A
Cm-243	N/A	5.0E-01	b	b	N/A
Cm-244	N/A	5.7E-01	b	b	N/A
Cm-245	N/A	4.6E-01	b	b	N/A
Cm-247	N/A	4.8E-01	b	b	N/A
Cm-248	N/A	5.0E-03	b	b	N/A
Co-60	1.0E+02	MCL used	b	b	N/A
Cs-134	N/A	1.1E+00	a	a	N/A
Cs-135	9.0E+02	MCL used	b	b	N/A
Cs-137	2.0E+02	MCL used	b	b	N/A
Eu-152	2.0E+02	MCL used	b	b	N/A
Eu-154	6.0E+01	MCL used	b	b	N/A
Eu-155	6.0E+02	2.5E+01	a	a	N/A
Gd-152	N/A	1.6E+00	a	a	N/A
H-3	2.0E+04	MCL used	b	b	N/A
I-129	1.0E+00	MCL used	1.13E-04	1.62E-04	1.62E-04
K-40	N/A	1.9E+00	b	b	N/A
Mo-93m	N/A	1.5E+02	b	b	N/A
Na-22	N/A	5.0E+00	b	b	N/A
Nb-93m	1.0E+03	MCL used	b	b	N/A
Nb-94	N/A	6.1E+00	6.13E-02	8.74E-02	1.43E-02
Ni-59	3.0E+02	MCL used	2.22E-10	1.29E-10	7.39E-13
Ni-63	5.0E+01	MCL used	1.22E-11	7.09E-12	2.45E-13
Np-237	N/A	7.7E-01	3.28E-02	4.71E-02	6.12E-02
Pa-231	N/A	2.8E-01	1.44E-05	2.07E-05	7.38E-05
Pb-210	N/A	5.4E+02	8.25E-10	6.24E-10	1.53E-12
Pd-107	N/A	1.9E+02	b	b	N/A
Pm-147	N/A	2.8E+01	a	a	N/A

Table 6.3-3: FDB-5 and FDB-6 Groundwater Radionuclide Concentrations at 1 Meter from FTF (*continued*)

Radionuclide	MCL** (pCi/L)	Residential Tap Water PRG*** (pCi/L)	FDB-5 Peak Concentration (pCi/L) 1 to 1,000 Years	FDB-6 Peak Concentration (pCi/L) 1 to 1,000 Years	Peak Fraction of MCL or PRG at 1-meter
Pr-144	N/A	5.9E+02	a	a	N/A
Pu-238	N/A	3.6E-01	b	b	N/A
Pu-239	N/A	3.5E-01	b	b	N/A
Pu-240	N/A	3.5E-01	b	b	N/A
Pu-241	300	MCL used	b	b	N/A
Pu-242	N/A	3.7E-01	b	b	N/A
Pu-244	N/A	3.5E-01	b	b	N/A
Ra-226 + Ra-228	5.0E+00	MCL used	1.05E-06	8.06E-07	2.09E-07
Ra-228	N/A	4.6E-02	b	b	N/A
Rh-106*	N/A	Ru-106 daughter	a	a	N/A
Ru-106 + D	N/A	1.1E+00	a	a	N/A
Sb-125	N/A	1.1E+01	a	a	N/A
Sb-126	N/A	4.3E+00	a	a	N/A
Sb-126m	N/A	7.2E+02	a	a	N/A
Se-79	N/A	6.5E+00	b	b	N/A
Sm-147	N/A	1.3E+00	a	a	N/A
Sm-151	1.0E+03	MCL used	b	b	N/A
Sn-126	N/A	1.9E+00	b	b	N/A
Sr-90	8.0E+00	MCL used	9.35E-12	7.16E-12	1.17E-12
Tc-99	9.0E+02	MCL used	1.02E+01	1.45E+01	1.61E-02
Te-125m	N/A	1.4E+01	a	a	N/A
Th-228	N/A	4.5E-01	b	b	N/A
Th-229	N/A	2.1E-01	4.96E-10	7.05E-10	3.36E-09
Th-230	N/A	5.2E-01	b	b	N/A
Th-232	N/A	4.7E-01	b	b	N/A
U-232	N/A	1.6E-01	b	b	N/A
U-233	N/A	6.6E-01	1.15E-07	1.65E-07	2.50E-07
U-234	N/A	6.7E-01	b	b	N/A
U-235	N/A	6.8E-01	b	b	N/A
U-236	N/A	7.1E-01	b	b	N/A
U-238	N/A	7.4E-01	b	b	N/A
Y-90*	N/A	2.6E+00	a	a	N/A
Zr-93	2.0E+03	MCL used	b	b	N/A

a Concentrations not updated based on negligible FDB-5 and FDB-6 inventories.
b Values < 1.0E-25
* Daughters are assumed to be in equilibrium with the parent nuclide.
** MCL values for beta and photon emitters are calculated in Table II-3 of FR-00-9654 based on a beta-gamma dose of 4 mrem/yr.
*** Residential tap water PRGs are calculated based on a target cancer risk of 1.0E-06 (EPA-PRGs_11-13-2007)
N/A Not Available

6.3.8 ALARA Analysis

Section 5.8 of the FTF PA describes how the "as low as reasonably achievable" (ALARA) requirement of DOE O 435.1, Chg. 1 and 10 CFR 61.41 are implemented for FTF. The ALARA information presented in the FTF PA is not affected by the new residual inventory information.

6.4 FTF Inadvertent Intruder Analysis

This section will discuss the impact of the new FDB-5 and FDB-6 information on the FTF inadvertent intruder analysis information presented in Section 6.0 of the FTF PA.

6.4.1 Groundwater Concentrations at 1-Meter

Section 6.1 of the FTF PA presents the 1-meter groundwater concentrations for the FTF radionuclides and chemicals. Maximum groundwater concentrations are given for the modeling cell adjoining the analyzed source terms. Results are presented for the three distinct aquifers modeled (UTRA-UZ, UTRA-LZ, and Gordon Aquifer).

For this Special Analysis, the groundwater concentrations at 1-meter were calculated for the FTF PA Base Case using only the revised FDB-5 and FDB-6 inventories presented in Section 6.3.1 to see the limited impact of this inventory delta. Calculations were performed using the both the GoldSim FTF and PORFLOW FTF models (PORFLOW runs were performed only for sensitivity run radionuclides, as discussed in Section 6.3.2.2). These radionuclide concentrations reflect the peak concentrations for each radionuclide in the highest sector.

6.4.2 Acute Exposure Scenarios

Section 6.2 of the FTF PA describes how the biotic pathways doses are calculated for the Acute Exposure Scenarios. The acute exposure scenarios information presented in the FTF PA is not significantly affected by the new FDB-5 and FDB-6 information.

6.4.3 Chronic Exposure Scenarios

Section 6.3 of the FTF PA describes how the biotic pathways doses are calculated for the chronic exposure scenarios. The chronic exposure scenarios information presented in the FTF PA is not affected by the new FDB-5 and FDB-6 information.

6.4.4 Groundwater Doses at 1-Meter

Section 6.4 of the FTF PA contains calculations of the peak total intruder doses for the acute intruder scenario and for the chronic intruder agricultural (post-drilling) scenario. For the acute intruder, doses were calculated assuming the acute intruder drills into a three-inch diameter transfer line at any time after the 100-year period of institutional control following FTF facility closure. For the chronic intruder, annual doses were calculated assuming contamination from the drill cuttings, as well as from the use of water obtained from a well.

As described in Section 6.5.2.2 of the FTF PA, "the waste tank engineered barriers (e.g., closure cap erosion barrier, tank top concrete, and tank liner, where applicable), will prevent drilling into the waste inventory." [SRS-REG-2007-00002] Therefore, the acute intruder scenario is dependent on the transfer line inventory (i.e., it does not include a groundwater

contribution) and is not affected by a revision to the FTF inventories. Since the transfer line inventory is not affected by the new FDB-5 and FDB-6 information, the acute intruder results stated in the Tanks 5/6 Special Analysis are not impacted and remain valid. The peak dose for the acute intruder in 10,000 years therefore remains 2 mrem at year 100, primarily due to exposure to drill cuttings.

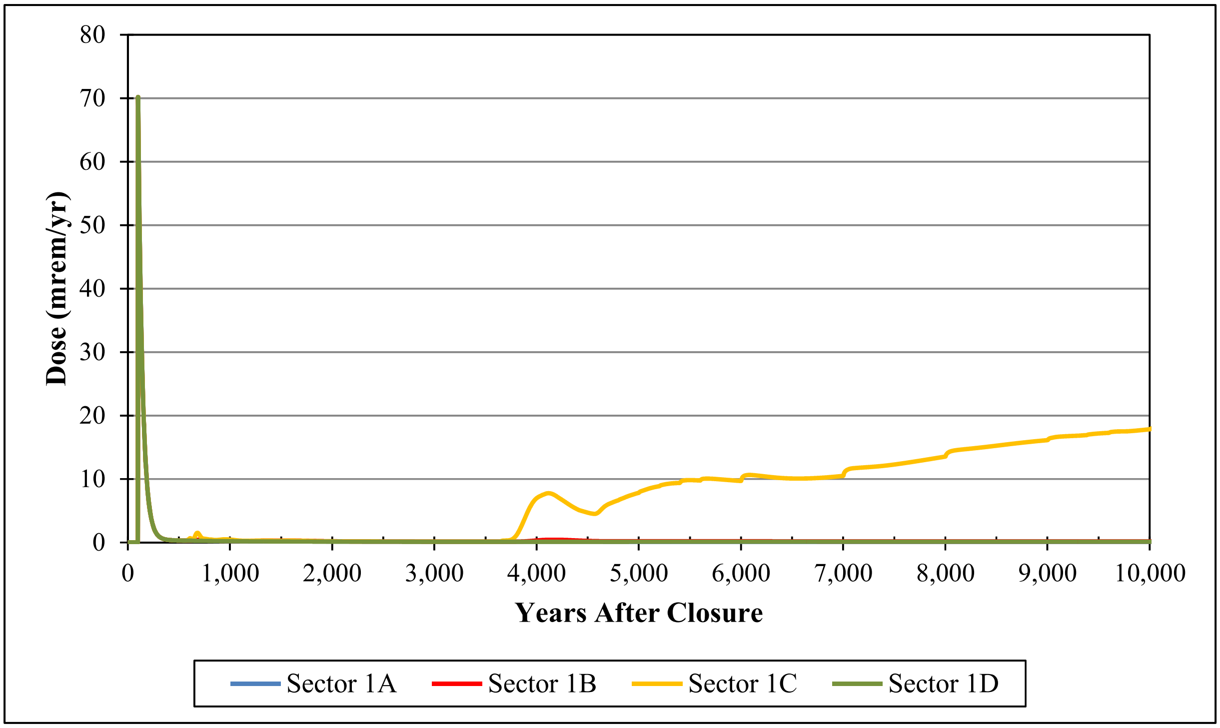
The peak FTF chronic doses are calculated using the FTF peak groundwater concentrations. Table 6.4-1 displays the peak dose contributions within 1,000 years at the 1-meter FTF boundary for radionuclides released from either FDB-5 and FDB-6 (radionuclides with no dose contributions are not listed). As demonstrated in Table 6.4-1, the FDB-5 and FDB-6 peak dose contributions within 1,000 years at the 1-meter FTF boundary are insignificant (<0.03 mrem/yr peak contribution) relative to the FTF peak chronic intruder dose of approximately 70 mrem/yr. Since the peak groundwater concentrations and associated doses are not affected by the new FDB-5 and FDB-6 information, the chronic intruder results stated in the Tanks 5 and 6 Special Analysis (SRR-CWDA-2012-00106) are not impacted and remain valid. These unchanged peak chronic intruder doses from the Tanks 5/6 Special Analysis are presented in Figure 6.4-1 and Table 6.4-2.

Table 6.4-1: Peak Dose Contributions at 1-Meter FTF Boundary of Radionuclides Released from FDB-5 and FDB-6

Radionuclide	Peak FDB-5 Doses within 1,000 years (mrem/year)	Time of FDB-5 Peak Doses (years)	Peak FDB-6 Doses within 1,000 years (mrem/year)	Time of FDB-6 Peak Doses (years)
Ac-227	3.17E-08	780	4.55E-08	782
C-14	5.60E-27	1000	2.22E-28	1000
I-129	3.02E-05	562	4.33E-05	562
Nb-94	9.57E-04	558	1.36E-03	560
Ni-59	3.33E-14	1000	1.93E-14	1000
Ni-63	4.38E-15	1000	2.54E-15	1000
Ni-63	4.38E-15	1000	2.54E-15	1000
Np-237	6.92E-03	736	9.95E-03	740
Pa-231	1.91E-05	740	2.73E-05	742
Pb-210	1.33E-09	1000	1.01E-09	1000
Ra-226	5.79E-07	1000	4.46E-07	1000
Ra-228	2.07E-35	1000	9.87E-36	1000
Sr-90	6.70E-13	1000	5.13E-13	1000
Tc-99	1.39E-02	690	1.97E-02	692
Th-228	7.29E-39	1000	3.47E-39	1000
Th-229	6.10E-10	1000	8.68E-10	1000
U-233	1.10E-08	1000	1.58E-08	1000
Peak Total Dose	**1.84E-02**	**694**	**2.61E-02**	**696**

Figure 6.4-1 (excerpted from the Tank 5/6 Special Analysis) graphically presents the annual dose to the chronic intruder for each of the four 1-meter sectors for 10,000 years after FTF facility closure. As shown in Figure 6.4-1, the dose to the chronic intruder, within 10,000 years, is highest at 100 years after FTF final facility closure and is attributed to the earliest time after FTF final facility closure that an intruder is assumed to drill into the closure area.

Figure 6.4-1: Annual Dose to the Chronic Intruder within 10,000 Years



Note Peak at year 100 occurs for all sectors.

Table 6.4-2 (excerpted from the Tank 5/6 Special Analysis) presents the FTF chronic intruder peak dose within 10,000 years and identifies the contribution from the significant pathways and their contributing radionuclides. The peak dose for the chronic intruder scenario in 10,000 years was 70 mrem/yr at year 100. This peak annual dose was almost entirely due to ingestion of vegetables contaminated with drill cuttings, with 96% of the 70 mrem/yr being due to vegetable ingestion. The principal radionuclide contributors to this vegetable dose were the short-lived isotopes Sr-90/Y-90 and Cs-137/Ba-137m.

Table 6.4-2: Chronic Intruder Peak Dose Contributors within 10,000 Years

Chronic Intruder Pathway Contributors	Contribution to Peak (mrem/yr)	Principal Radionuclide Pathway Dose (%)
Vegetable Ingestion	69	Sr-90 / Y-90 (56 %) Cs-137 / Ba-137m (44 %)
Soil Ingestion	0.7	Am-241 (42 %) Sr-90 / Y-90 (36 %)
External Exposure	0.4	Cs-137 / Ba-137m (94 %)
Total Dose	70	

6.4.5 Inadvertent Intruder Uncertainty/Sensitivity Analysis

Section 6.5 of the FTF PA considers the effects on the inadvertent intruder analysis of uncertainties in the conceptual models used and sensitivities to the parameters used in the mathematical models. In general, the inadvertent intruder uncertainty and sensitivity analyses information presented in the FTF PA is not affected by the new residual inventory information and the uncertainty and sensitivity analyses insights remain unaffected.

6.5 F-Tank Farm Interpretation of Results

Section 7.0 of the FTF PA summarizes the conservatisms used in modeling and provides a summary and interpretation of the results presented in Section 5.0 and Section 6.0 of the FTF PA. The FTF PA conservatisms information presented in the FTF PA is not affected by the new FDB-5 and FDB-6 residual inventory information. The integrated system behavior discussion provided in the Section 7.1.1 of the FTF PA remains valid irrespective of the new FDB-5 and FDB-6 residual inventory information. The individual dose results provided in the Section 7.1.2 of FTF PA and its supporting Special Analyses remain valid and are represented in the following sections.

6.5.1 100-Meter (Water from Well) Groundwater Pathways Doses

The FTF peak 100-meter groundwater pathway doses are unchanged by the contribution from the FDB-5/FDB-6 inventories. The FTF peak 100-meter groundwater pathway doses in 1,000 years remain 0.4 mrem/yr (in Sector E) and 0.3 mrem/yr (in Sector D). Similarly, in 10,000 years the peak 100-meter groundwater pathway doses are also in Sector E (3.3 mrem/yr) and Sector D (2 mrem/yr).

6.5.2 Water at the Stream Groundwater Pathways Doses

The peak-groundwater pathway dose at the stream are unchanged by the contribution from the FDB-5/FDB-6 inventories. The MOP at the stream peak-groundwater pathway dose in 10,000 years is 0.1 mrem/yr at year 10,000. The primary contributor to the peak dose is water ingestion.

6.5.3 All-Pathways Dose

The peak all-pathways annual dose for the MOP at 100-meter is calculated using the highest 100-meter groundwater-pathway dose results in 10,000 years in combination with the air pathway results. The peak all-pathways annual dose for the MOP is unchanged by the contribution from the FDB-5/FDB-6 inventories and remains 3.3 mrem/yr in 10,000 years (associated with Sector E). The all-pathways dose was dominated by the groundwater pathway, with the airborne pathway adding an additional 5E-06 mrem/yr to the MOP. The peak all-pathways dose is 0.4 mrem/yr in 1,000 years (at approximately year 700) and 600 mrem/yr in 100,000 years (at year 43,000).

6.5.4 Inadvertent Intruder Dose

The peak inadvertent intruder dose is unchanged by the contribution from the FDB-5 and FDB-6 inventories. The peak dose for the acute intruder in 10,000 years remains 2 mrem (primarily due to exposure to drill cuttings). The acute intruder scenario does not include a groundwater contribution and therefore does not vary by FTF sector. The peak dose for the chronic intruder

scenario in 10,000 years remains approximately 70 mrem/yr. This peak dose was almost entirely due to ingestion of vegetables contaminated with drill cuttings. The chronic intruder scenario peak dose is also driven by the drill cutting contributions.

6.5.5 Airborne Dose / Radon Flux

The airborne dose / radon flux information presented in the FTF PA and its supporting Special Analysis are not affected by the new FDB-5 and FDB-6 residual inventory information, and the airborne dose / radon flux analyses were not updated. The annual dose from airborne releases resulted in a total dose 4.6E-06 mrem/yr (principally from C-14) at 100-meter from the FTF in 10,000 years. These results were very conservative because the flux rates are based on simplified models. These simplified models also resulted in a peak flux of radon at the ground surface of 2E-16 pCi/m^2/s.

6.6 FTF Performance Evaluation

Section 8.0 of the FTF PA describes intended use and future work to be done to support its maintenance. The FTF PA use and future work information presented in the FTF PA are not adversely impacted by the new FDB-5 and FDB-6 residual inventory information.

7.0 CONCLUSION

The FTF PA provides groundwater radionuclide concentrations at 1-meter, 100-meter, and exposure points at the two seeplines approximately 1,600 meters from FTF. The groundwater concentrations are provided for each of the three aquifers as applicable as a part of the FTF groundwater modeling. The FTF PA also provides groundwater concentrations for chemical contaminants at 1-meter and 100-meter. In addition, FTF PA provides intruder doses as well as analyses for the air pathways and radon ground surface flux. The FTF PA results can be used in subsequent documents to demonstrate compliance with the pertinent requirements identified below for final facility closure of FTF as indicated in Table 7.0-1.

Table 7.0-1: Key Limits from Regulatory Requirements

Requirement	All-Pathways Dose	Intruder Dose	Air Pathway Dose	Radon Flux	Groundwater Protection
DOE M 435.1-1	25 mrem/yr	500 mrem – acute 100 mrem/yr – chronic	10 mrem/yr	20 $pCi/m^2/s$ at ground surface	< MCL
NDAA Section 3116: 10 CFR 61.41 and 61.42	25 mrem/yr	500 mrem/yr	N/A	N/A	N/A
SCDHEC Primary Drinking Water Regulations (SCDHEC R.61-58)	N/A	N/A	N/A	N/A	< MCL

The key radiological results from the FTF PA and supporting Special Analyses (Tank 18/19 Special Analysis and Tank 5/6 Special Analysis) remain valid and are shown in Table 7.0-2. These results were not changed by the new FDB-5 and FDB-6 residual inventory information.

Table 7.0-2: Summary Radiological Results for F-Tank Farm

Location	Peak Within 10,000 Years (from the FTF PA and supporting Special Analyses)		
	All-Pathways Dose (mrem/yr)	Groundwater Pathway Dose (mrem/yr)	Air Pathway Dose (mrem/yr)
100-meter from FTF	3.3 at ~ year 10,000	3.3 at ~ year 10,000	4.6E-06
At Seepline	0.10 at ~ year 5,550	0.10 at ~ year 5,550	8.3E-07

Note Dose values are shown to two significant figures to illustrate changes/trends. The use of two significant figures is not meant to imply this level of precision for these dose projections.
Note The FTF PA, Rev.1 peak intruder dose is 73 mrem/yr at year 101 from a chronic scenario, drilling through a transfer line and using groundwater concentrations at the maximum 1-meter FTF location. This value is not changed in this Special Analysis.
Note The FTF PA peak radon flux at the ground surface is 3.6E-08 $pCi/m^2/s$.

The FTF peak groundwater radionuclide concentrations were not changed by the new FDB-5 and FDB-6 residual inventory information.

As reported previously in the Tanks 5/6 Special Analysis, the peak groundwater radionuclide concentrations for Np-237 and Tc-99 were above the respective PRG or MCL values at 1-meter; no PRG or MCL values were exceeded at 100-meter or at the seepline. The peak concentrations for the chemicals of concern were also calculated, and all were less than the MCL or RSL at a distance of 1-meter from FTF.

The Special Analysis results provide reasonable assurance that compliance is maintained with the specific requirements of NDAA Section 3116, DOE M 435.1-1, and the MCLs. The results and conclusions presented in the FTF PA and supporting Special Analyses are not impacted by new information regarding the final residual inventories that are planned to be grouted in-place in FDB-5 and FDB-6.

8.0 REFERENCES

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