TENNESSEE VALLEY AUTHORITY

Post Office Box 2000, Decatur, Alabama 35609-2000

April 30, 2026

10 CFR 50.4
10 CFR 50.36(a)
10 CFR 50 Appendix I

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Browns Ferry Nuclear Plant, Units 1, 2, and 3
Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68
NRC Docket Nos. 50-259, 50-260, and 50-296

Subject: **2025 Annual Radioactive Effluent Release Report**

In accordance with Browns Ferry Nuclear Plant (BFN), Units 1, 2, and 3, Technical Specification Section 5.6.3, the Tennessee Valley Authority is submitting the BFN Annual Radioactive Effluent Release Report for the period January through December 2025. The Annual Radioactive Effluent Release Report is being submitted in conformance with Title 10 of the Code of Federal Regulations (10 CFR) 50.36a and 10 CFR 50, Appendix I, Section IV.B.1.

There are no new regulatory commitments contained in this letter. Should you have any questions concerning this submittal, please contact David J. Renn at (256) 729-2636.

Respectfully,

Daniel A. Komm
Site Vice President

Enclosure: 2025 Annual Radioactive Effluent Release Report

cc (w/ Enclosure):

NRC Regional Administrator - Region II
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant
NRC Project Manager - Browns Ferry Nuclear Plant

ENCLOSURE

Browns Ferry Nuclear Plant
Units 1, 2, and 3

2025 Annual Radioactive Effluent Release Report

See Enclosed

Browns Ferry Nuclear Plant

Tennessee Valley Authority

Annual Radioactive Effluent Release Report

2025

TABLES

I. Introduction

II. Supplemental Information

A. Regulatory Limits

1. Gaseous Effluents

Fission and Activation Gases

The release of fission and activation gases is regulated by the dose limits of Title 10 of the Code of Federal Regulations (10 CFR) 50 Appendix I and Browns Ferry Nuclear Plant (BFN) Offsite Dose Calculation Manual (ODCM). The air dose to areas at and beyond the site boundary due to noble gases released in gaseous effluents per unit shall be limited during any calendar quarter to ≤ 5 millirad (mrad) for gamma radiation and ≤ 10 mrad for beta radiation; and during any calendar year to ≤ 10 mrad for gamma radiation and ≤ 20 mrad for beta radiation.

Iodines and Particulates with Half-Lives Greater than Eight Days

The release of iodines and particulates in gaseous effluent is regulated by the dose limits of 10 CFR 50 Appendix I and the BFN ODCM. The dose to a member of the public from radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than eight days in gaseous effluent released per unit to areas at and beyond the site boundary shall be limited to any organ during any calendar quarter to ≤ 7.5 millirem (mrem), and during any calendar year to ≤ 15 mrem.

2. Liquid Effluents

The release of radioactive liquid effluents is regulated by the dose limits of 10 CFR 50 Appendix I and the BFN ODCM. The doses or dose commitment to a member of the public from radioactive materials in liquid effluents released from each unit to unrestricted areas shall be limited during any calendar quarter to ≤ 1.5 mrem to the total body and ≤5 mrem to any organ and during any calendar year to ≤ 3 mrem to the total body and ≤ 10 mrem to any organ.

B. Limitation on Dose Rate

1. Gaseous Effluents

Fission and Activation Gases

The instantaneous release rate of fission and activation gases is based on the dose rate limits of 10 CFR 20.1301 and the BFN ODCM. The dose rate at any time to areas at and beyond the site boundary due to noble gases released in gaseous effluents from the site shall be limited to ≤ 500 mrem per year to the total body and ≤ 3000 mrem per year to the skin.
The BFN ODCM Section 7.2 determines the maximum noble gas release rate.

Iodines and Particulates with Half-Lives Greater than Eight Days

The instantaneous release rate of particulates and iodines is regulated by the dose rate limits of the BFN ODCM. The dose rate at any time to areas at and beyond the site boundary, due to I-131, I-133, H-3, and particulates with half-lives greater than eight days

in gaseous effluent released from the site, shall be limited to ≤ 1500 mrem per year to any organ.

The BFN ODCM Section 7.3 determines the maximum particulate and iodine dose rates.

2. Liquid Effluents

The concentration of radionuclides in liquid effluents released at any time from the site to unrestricted areas shall be limited to the concentrations specified in 10 CFR 20.1001-20.2402, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases.

For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 μCi per milliliter (ml) total activity.

C. Average Energy

The BFN ODCM limits the dose equivalent rates due to the release of noble gases to less than or equal to 500 mrem/year to the total body and less than or equal to 3000 mrem/year to the skin. The use of dose rate is in accordance with NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants." Since the release rate is not used for effluent control, the average beta and gamma energies (E) for gaseous effluents discussed in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste," are not applicable and not included in this report.

D. Measurements & Approximations of Total Radioactivity

Radioactivity measurements performed in support of the Browns Ferry Nuclear Plant ODCM meet the Lower Limit of Detection requirements given in ODCM Tables 2.2-1 and 2.2-2.

1. Gaseous Effluents

Noble gases in the building vent and stack (elevated) gaseous effluents are continuously monitored. The flow rate of the stack is continuously monitored and the building vent effluent flow rates are calculated once a shift based on the configuration of operating exhaust fans. The vent flow is calculated for each release. Gas grab samples of the stack are taken and analyzed weekly. Gas grab samples of in-service vents are taken and analyzed monthly. The specific noble gas activity concentrations and total volume of the gases are used to calculate the total Curies of noble gases released.

The tritium concentration is determined by the analysis of a monthly grab sample for each release point.

Iodines and particulates are continuously sampled on impregnated charcoal filters and particulate filters, respectively. The charcoal and particulate samples are replaced at least weekly and analyzed to determine specific activity concentrations. The specific activity concentrations and vent flow rate data are used weekly to verify that release rate limits were not exceeded. The specific activity concentrations and total volume of gaseous effluent are used on a monthly basis to determine the total curies of each particulate and iodine released during the month.

The gross alpha concentration is determined by analysis of a monthly particulate filter composite sample, and strontium-89 and strontium-90 are determined by analysis of a quarterly particulate filter composite sample for each release point.

Carbon-14 (C-14) production and gaseous waste effluent activity source term estimates were based on methodology provided in EPRI 1021106, Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents, December 2010. C-14 gaseous activity and dose calculations are made using the following assumptions: (1) continuous release of the estimated C-14 generated for each unit during power operation based on the number of Effective Fuel Power Days (EFPD) for the period, (2) maximum C-14 activity from literature values cited in EPRI Report 1021106, and (3) typical fraction as carbon dioxide for gaseous releases from literature values also cited in EPRI Report 1021106.

In 2019, Browns Ferry updated C-14 production rate estimates utilizing the proxy methodology provided in EPRI Report 1021106. TVA documented this update in Updated Carbon-14 Production Rate Estimates for Gaseous Releases at TVA NPG Sites, October 2019. The C-14 releases increased in 2019 due to all three units completing Extended Power Uprate (EPU). The EPU for each unit increased the units' MWth (Megawatt thermal) from 3,458 to 3,952 MWth. This increase in MWth is used in the calculation of C-14 releases. The increase in C-14 releases was expected with EPU.

2. Liquid Effluents

The gamma ray emitting radionuclide concentrations are determined for each batch by gamma ray spectroscopy analysis of a grab sample. The allowable release rate is calculated for each batch based upon the known dilution flow. The flow rate of the liquid effluent is continuously monitored and the total volume released in each batch is determined. The total gamma activity released in each batch is determined by multiplying the radionuclide concentrations by the total volume discharged. The total gamma activity released during the month is then determined by summing the gamma activity content of each batch discharged during the month.

The gross alpha and tritium concentrations are measured on a monthly composite sample. The strontium-89, strontium-90, and iron-55 are measured on a quarterly composite sample.

E. Batch Releases

1. Gaseous

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Number of Batch Releases		1	1	2	0	4
2. Total duration of batch releases	minutes	4.80E+01	4.80E+01	9.60E+01	N/A	1.92E+02
3. Maximum batch release duration	minutes	4.80E+01	4.80E+01	4.80E+01	N/A	4.80E+01
4. Average batch release duration	minutes	4.80E+01	4.80E+01	4.80E+01	N/A	4.80E+01
5. Minimum batch release duration	minutes	4.80E+01	4.80E+01	4.80E+01	N/A	4.80E+01

2. Liquid

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Number of Batch Releases		23	28	11	6	68
2. Total duration of batch releases	minutes	7.10E+03	7.04E+03	2.72E+03	1.46E+03	1.83E+04
3. Maximum batch release duration	minutes	4.55E+02	3.85E+02	3.80E+02	3.10E+02	4.55E+02
4. Average batch release duration	minutes	3.09E+02	2.51E+02	2.47E+02	2.43E+02	2.69E+02
5. Minimum batch release duration	minutes	1.95E+02	1.95E+02	2.00E+02	2.10E+02	1.95E+02
6. Avg stream flow	CFS	5.92E+04	4.74E+04	2.44E+04	2.47E+04	3.89E+04

F. Abnormal Releases

1. Abnormal Gaseous Releases

In 2025, a total of two abnormal gaseous tritium releases occurred. Tritium was detected in the Auxiliary Boiler System when the boilers were in service for unit outages. The identified source of tritium to the auxiliary boiler system is main steam leak-by from Steam Jet Air Ejector (SJAE) / Auxiliary Boiler valves to the auxiliary boiler header (CR 1508177). These valves were replaced during each unit's outage, completing in 2023. Following replacement of valves, low levels of tritium are still being detected in the auxiliary boilers, which may be due to in-service leak test (ISLT) not being completed on the Unit 1 valves (CR 1812308, 1921190).

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Gaseous						
1. Number of abnormal Releases		1	0	1	0	2
2. Total H-3 activity for abnormal releases	Ci	1.27E-01	N/A	1.97E-02	N/A	1.47E-01

2. Abnormal Liquid Releases

In Calendar year 2025, there were no abnormal liquid releases.

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
Liquids						
1. Number of abnormal Releases		0	0	0	0	0
2. Total activity for abnormal releases	Ci	N/A	N/A	N/A	N/A	N/A

G. Non-routine, Planned Discharges

In calendar year 2025 there were no non-routine planned discharges.

H. Radioactive Waste System Treatment Changes

In calendar year 2025 there were no changes to the radwaste system or the process control program.

I. Land Use Census Changes

In calendar year 2025 there were no changes to the land use census requiring revision to the ODCM.

J. Effluent Monitoring Instrument Inoperability > 30 Days

In calendar year 2025 there were two effluent monitoring instruments inoperable greater than 30 days.

1. Effluent radiation monitor 2-RM-90-132D, Raw Cooling Water Off-line, was declared inoperable on 5/8/2025 1400 and returned to service 6/13/2025 0110. The radiation monitor tripped on low sample flow and could not be restarted. The pump was later replaced. Reference Operations LCO Tracking number 2-090-ODCM-2025-0089 and CR 2018724.

2. Effluent radiation monitor 3-RM-90-132D, Raw Cooling Water Off-line, was declared inoperable on 6/21/2025 2030 and returned to service 8/4/2025 1045. The radiation monitor sample pump tripped and could not be restarted. The sample pump was later replaced. Reference Operations LCO Tracking number 3-090-ODCM-2025-0060 and CR 2021382.

K. Effluent Monitoring Equipment Sample Deviation

In calendar year 2025 there were no effluent monitoring equipment sample deviations.

L. Offsite Dose Calculation Manual Changes

In calendar year 2025 there were no changes to the Offsite Dose Calculation Manual.

M. Errata/Corrections to Previous ARERRs

In calendar year 2025 there were no errata or corrections to report from previous ARERRs.

N. Groundwater Monitoring and Program (NEI 07-07)

In 2007, the Nuclear Energy Institute (NEI) established the Groundwater Protection Initiative (GPI), NEI 07-07. The Groundwater Protection Initiative was established to 1) improve management of situations involving inadvertent radiological releases that get into groundwater and 2) to improve communication with external stakeholders to enhance trust and confidence on the part of local communities, States, the NRC, and the public in the nuclear industry's commitment to a high standard of public radiation safety and protection of the environment. This section provides information and sample results from on-site groundwater locations that were sampled in support of the Groundwater Protection Initiative at Browns Ferry Nuclear Plant. The groundwater wells described in this section are not part of the Radiological Environmental Monitoring Program (REMP).

In the early 2000s, BFN initiated a groundwater study to identify the source of low level tritium detected on-site. Results from the groundwater study (Investigation of Tritium Releases to Groundwater, 2006), suggest the source of tritiated groundwater was from historical leaks and spills associated with Radwaste/Condensate transfer tunnel. Groundwater and surface water level measurements during the study indicated the return channel and subsequently the Tennessee River will ultimately be recipient to tritiated groundwater discharge from the site. It has been determined that there are no groundwater wells onsite or within 2-miles of the site that are used as a source of drinking water. Groundwater movement in the area has been determined to be from the plant site toward the Tennessee River.

On-site groundwater monitoring was performed in 2025. The purpose of on-site groundwater monitoring is to ensure timely detection of inadvertent radiological releases to groundwater. Non-REMP groundwater wells monitor for potential leaks from plant equipment. As part of the GPI, BFN monitored a total of 30 groundwater wells located in the protected area and the owner controlled area during 2025. Normal sampling frequencies are quarterly and semiannually with some wells sampled monthly if certain criteria are met or for investigation purposes. Samples are routinely analyzed for environmental level tritium (H-3) and principle gamma emitters (PGE) with selected wells analyzed for Hard-to-Detect (HTD) radionuclides (Gross Alpha, Fe-55, Ni-63, Sr-89, and Sr-90). In support of the groundwater program, the site also monitors precipitation recapture and on-site storm drains, catch basins and surface water.

In 2025, low levels of tritium were detected in on-site groundwater wells as indicated in Table 1, Groundwater Data. Table 1 demonstrates all on-site groundwater wells that indicated detectable tritium concentrations. Tritium concentrations in 2025 ranged from non-detectable, less than 85 pCi/L, up to a maximum concentration of 3,870 pCi/L (MW-04). No other plant related radionuclides were detected in any groundwater well. There were no instances of any on-site spills or leaks that occurred during 2025 reporting period that were communicated to off-site agencies or that met the criteria in NEI 07-07, Appendix A.

Table 1 Groundwater Data

2025 Groundwater Tritium Data					
Well ID	**Units**	**1st Quarter**	**2nd Quarter**	**3rd Quarter**	**4th Quarter**
Dewat-A	pCi/L	3780	2120	2570	1500
MW-01	pCi/L	1040	410	461	834
MW-02	pCi/L	946	1230	406	407
MW-02i	pCi/L	609	700	216	255
MW-03	pCi/L	272	597	316	179
MW-04	pCi/L	3870	1340	310	333
MW-07	pCi/L	291	616	313	283
MW-08	pCi/L	341	674	259	247
MW-08i	pCi/L	215	221	< 137	< 85
MW-09	pCi/L	315	295	241	< 86
MW-14	pCi/L	NS[1]	NS	NS	284
MW-15	pCi/L	188	270	136	< 134
MW-18	pCi/L	174	567	186	150
MW-19	pCi/L	391	575	152	314
Well 6R	pCi/L	664	491	248	< 132

[1] NS = Not Sampled

III. Gaseous Effluents

Table 1-A Gaseous Effluents - Summation of all Releases

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	Uncertainty
A. Fission and Activation Gases							
1. Total Release	Curies	< LLD	< LLD	< LLD	1.21E+00	1.21E+00	45%
2. Average Release Rate for Period	uCi/sec	N/A	N/A	N/A	1.52E-01	3.83E-02	
3. Percent of Tech Spec Limit*	%	*	*	*	*	*	
B. Iodines / Halogens							
1. Total Release	Curies	3.41E-05	1.45E-04	3.08E-04	1.87E-04	6.75E-04	36%
2. Average Release Rate for Period	uCi/sec	4.38E-06	1.85E-05	3.87E-05	2.36E-05	2.14E-05	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
C. Particulates							
1. Total Release	Curies	5.35E-04	6.00E-05	7.08E-05	1.45E-04	8.11E-04	35%
2. Average Release Rate for Period	uCi/sec	6.87E-05	7.63E-06	8.91E-06	1.83E-05	2.57E-05	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
D. Tritium							
1. Total Release	Curies	1.62E+01[1]	7.83E+00	1.30E+01[1]	2.88E+01	6.58E+01[1]	21%
2. Average Release Rate for Period	uCi/sec	2.09E+00	9.96E-01	1.63E+00	3.62E+00	2.08E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
E. Gross Alpha							
1. Total Release	Curies	< LLD[2]	< LLD	< LLD	< LLD	< LLD	N/A
2. Average Release Rate for Period	uCi/sec	N/A	N/A	N/A	N/A	N/A	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
F. Carbon-14							
1. Total Release	Curies	1.31E+01	1.26E+01	1.35E+01	1.24E+01	5.16E+01	N/A
2. Average Release Rate for Period	uCi/sec	1.68E+00	1.61E+00	1.70E+00	1.56E+00	1.64E+00	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	

* Applicable Limits are expressed in terms of dose. Reference Section VI, Radiological Impact, Table 3.
[1] Includes activity from abnormal gaseous releases. Dilution flow was not determined for abnormal releases.
[2] LLD = Lower Limit of Detection

Table 1-B Gaseous Effluents – Ground Level Releases (Batch)[1]

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Kr-85	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A	N/A
Total For Period	Ci	N/A	N/A	N/A	N/A	N/A
2. Iodines / Halogens						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
Total For Period	Ci	N/A	N/A	N/A	N/A	N/A
3. Particulates						
Mn-54	Ci	N/A	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Zn-65	Ci	N/A	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A	N/A
Cs-137	Ci	N/A	N/A	N/A	N/A	N/A
Total For Period	Ci	N/A	N/A	N/A	N/A	N/A
4. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
5. Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
6. Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

[1] There were no gaseous batch releases through the ground release vents in 2025.

Table 1-B Gaseous Effluents – Ground Level Releases (Continuous)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
2. Iodines / Halogens						
I-131	Ci	< LLD	< LLD	1.98E-06	1.62E-06	3.60E-06
I-133	Ci	1.03E-05	1.54E-05	2.19E-05	9.45E-06	5.70E-05
Total For Period	Ci	1.03E-05	1.54E-05	2.39E-05	1.11E-05	6.06E-05
3. Particulates						
Mn-54	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-60	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	5.33E-07	< LLD	< LLD	1.03E-06	1.56E-06
Sr-90	Ci	1.34E-07	< LLD	< LLD	< LLD	1.34E-07
Cs-134	Ci	<LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	<LLD	< LLD	< LLD	< LLD	< LLD
Total For Period	Ci	6.68E-07	< LLD	< LLD	1.03E-06	1.70E-06
4. Gross Alpha						
Gross Alpha	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
5. Tritium						
H-3	Ci	1.11E+01	3.20E+00	4.05E+00	1.27E+01	3.11E+01
6. Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

Table 1-C Gaseous Effluents – Elevated Releases (Batch)[1]

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Kr-85	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A	N/A
Total For Period	Ci	N/A	N/A	N/A	N/A	N/A
2. Iodines / Halogens						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
Total For Period	Ci	N/A	N/A	N/A	N/A	N/A
3. Particulates						
Mn-54	Ci	N/A	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Zn-65	Ci	N/A	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A	N/A
Cs-137	Ci	N/A	N/A	N/A	N/A	N/A
Total For Period	Ci	N/A	N/A	N/A	N/A	N/A
4. Gross Alpha						
Gross Alpha	Ci	N/A	N/A	N/A	N/A	N/A
5. Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
6. Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

[1] There were no gaseous batch releases through the elevated release in 2025.

Table 1-C Gaseous Effluents – Elevated Releases (Continuous)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Ar-41	Ci	< LLD	< LLD	< LLD	1.21E+00	1.21E+00
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	1.21E+00	1.21E+00
2. Iodines / Halogens						
I-131	Ci	< LLD	1.41E-05	4.07E-05	2.07E-05	7.56E-05
I-133	Ci	2.38E-05	1.16E-04	2.43E-04	1.55E-04	5.38E-04
Total For Period	Ci	2.38E-05	1.30E-04	2.84E-04	1.76E-04	6.13E-04
3. Particulates						
Mn-54	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Co-60	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Sr-89	Ci	1.09E-06	1.50E-06	3.08E-07	2.02E-06	4.92E-06
Sr-90	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-134	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Au-199	Ci	1.08E-04	< LLD	2.70E-05	1.22E-04	2.57E-04
Total For Period	Ci	1.09E-04	1.50E-06	2.73E-05	1.24E-04	2.62E-04
4. Gross Alpha						
Gross Alpha	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
5. Tritium						
H-3	Ci	8.35E-01	1.09E+00	1.60E+00	1.84E+00	5.36E+00
6. Carbon-14						
C-14	Ci	1.31E+01	1.26E+01	1.35E+01	1.24E+01	5.16E+01

Table 1-D Gaseous Effluents – Mixed Mode Releases (Batch)[1]

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Kr-85	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	N/A	< LLD
2. Iodines / Halogens						
I-131	Ci	< LLD	< LLD	< LLD	N/A	< LLD
I-133	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	N/A	< LLD
3. Particulates						
Mn-54	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Co-58	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Co-60	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Zn-65	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Sr-89	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Sr-90	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Cs-134	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Cs-137	Ci	< LLD	< LLD	< LLD	N/A	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	N/A	< LLD
4. Gross Alpha						
Gross Alpha	Ci	<LLD	<LLD	<LLD	N/A	< LLD
5. Tritium						
H-3	Ci	3.16E-04	4.67E-04	1.60E-03	N/A	2.39E-03
6. Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

[1] Batch releases occurred in 1st, 2nd, and 3rd Quarters 2025 in support of unit outages. There were no batch releases in 4th Quarter 2025.

Table 1-D Gaseous Effluents – Mixed Mode Releases (Continuous)

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Gases						
Kr-85	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-85m	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-87	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Kr-88	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-138	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
2. Iodines / Halogens						
I-131	Ci	< LLD	< LLD	< LLD	5.59E-07	5.59E-07
I-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	5.59E-07	5.59E-07
3. Particulates						
Na-24	Ci	< LLD	< LLD	< LLD	1.73E-05	1.73E-05
Cr-51	Ci	3.75E-05	< LLD	< LLD	< LLD	3.75E-05
Mn-54	Ci	7.30E-06	< LLD	< LLD	< LLD	7.30E-06
Mn-56	Ci	2.78E-05	< LLD	< LLD	< LLD	2.78E-05
Co-58	Ci	1.78E-04	6.84E-06	< LLD	< LLD	1.85E-04
Co-60	Ci	1.23E-04	4.09E-05	2.77E-05	2.68E-06	1.95E-04
Zn-65	Ci	5.79E-06	< LLD	< LLD	< LLD	5.79E-06
Zn-69m	Ci	1.64E-05	< LLD	< LLD	< LLD	1.64E-05
Sr-89	Ci	9.80E-07	< LLD	< LLD	< LLD	9.80E-07
Sr-90	Ci	1.40E-07	< LLD	< LLD	< LLD	1.40E-07
Mo-99	Ci	2.42E-05	< LLD	< LLD	< LLD	2.42E-05
Ag-110m	Ci	3.03E-06	< LLD	< LLD	< LLD	3.03E-06
Cs-137	Ci	< LLD	1.08E-05	1.58E-05	< LLD	2.65E-05
Total For Period	Ci	4.25E-04	5.85E-05	4.35E-05	2.00E-05	5.47E-04
4. Gross Alpha						
Gross Alpha	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
5. Tritium						
H-3	Ci	4.13E+00	3.54E+00	7.34E+00	1.42E+01	2.92E+01
6. Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

IV. Liquid Effluents

Table 2-A Liquid Effluents - Summation of all Releases

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	Uncertainty
A. Fission and Activation Products							
1. Total Release	Curies	1.22E-02	4.79E-03	2.56E-03	4.71E-04	2.00E-02	9%
2. Average Diluted Concentration	uCi/mL	1.14E-10	7.67E-11	2.34E-11	1.20E-11	6.29E-11	
3. Percent of Tech Spec Limit*	%	*	*	*	*	*	
B. Tritium							
1. Total Release	Curies	2.92E+00	3.20E+00	2.06E+00	1.38E+00	9.56E+00	6%
2. Average Diluted Concentration	uCi/mL	2.71E-08	5.12E-08	1.89E-08	3.51E-08	3.00E-08	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
C. Dissolved and Entrained Noble Gases							
1. Total Release	Curies	1.78E-05	2.10E-05	2.08E-05	< LLD	5.96E-05	8%
2. Average Diluted Concentration	uCi/mL	1.66E-13	3.36E-13	1.90E-13	N/A	1.87E-13	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
D. Gross Alpha							
1. Total Release	Curies	< LLD[1]	< LLD	< LLD	< LLD	< LLD	48%
2. Average Diluted Concentration	uCi/mL	N/A	N/A	N/A	N/A	N/A	
3. Percent of Tech Spec Limit	%	*	*	*	*	*	
E. Primary Liquid Release Volume (batch releases before dilution)							
1. Total Release	Liters	5.15E+07	7.39E+07	1.86E+08	3.97E+07	3.51E+08	
F. Dilution Water Volume used for E. above							
1. Total Release	Liters	1.08E+11	6.24E+10	1.09E+11	3.94E+10	3.18E+11	10%
G. Balance of Plant Volume (continuous releases)							
1. Total Release	Liters	1.47E+08	2.37E+08	2.51E+08	1.34E+08	7.69E+08	
H. Total Condenser Cooling Water (dilution volume for G. above)							
1. Total Release	Liters	8.86E+11	1.02E+12	1.06E+12	1.06E+12	4.03E+12	
I. Average Stream Flow							
1. Flow past BFN	CFS	5.92E+04	4.74E+04	2.44E+04	2.47E+04	3.89E+04	

* Applicable Limits are expressed in terms of dose. Reference Section VI, Radiological Impact, Table 4.

[1] LLD = Lower Limit of Detection

Table 2-B Liquid Effluents – Batch Mode

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Products						
Cr-51	Ci	2.57E-04	< LLD	< LLD	< LLD	2.57E-04
Mn-54	Ci	9.91E-04	1.75E-04	1.13E-04	9.09E-06	1.29E-03
F-18	Ci	< LLD	< LLD	< LLD	2.46E-06	2.46E-06
Co-58	Ci	1.71E-03	6.55E-05	3.86E-06	< LLD	1.78E-03
Co-60	Ci	8.08E-03	3.93E-03	2.12E-03	2.72E-04	1.44E-02
Zn-65	Ci	6.13E-04	2.67E-05	1.82E-05	< LLD	6.58E-04
Sr-92	Ci	< LLD	< LLD	< LLD	6.40E-06	6.40E-06
Nb-95	Ci	2.03E-05	< LLD	< LLD	< LLD	2.03E-05
Mo-99	Ci	4.39E-06	< LLD	< LLD	< LLD	4.39E-06
Ag-110m	Ci	1.64E-04	9.37E-05	4.11E-05	6.55E-06	3.05E-04
Cs-134	Ci	< LLD	4.22E-06	< LLD	< LLD	4.22E-06
Cs-137	Ci	3.24E-04	4.99E-04	2.56E-04	1.75E-04	1.25E-03
Total For Period	Ci	1.22E-02	4.79E-03	2.56E-03	4.71E-04	2.00E-02
2. Dissolved and Entrained Gases						
Xe-133	Ci	9.41E-06	1.12E-05	4.75E-06	< LLD	2.54E-05
Xe-135	Ci	8.41E-06	9.79E-06	1.60E-05	< LLD	3.42E-05
Total For Period	Ci	1.78E-05	2.10E-05	2.08E-05	< LLD	5.96E-05
3. Tritium						
H-3	Ci	2.86E+00	2.93E+00	1.66E+00	1.32E+00	8.77E+00
4. Gross Alpha						
Gross Alpha	Ci	< LLD	< LLD	< LLD	< LLD	< LLD

Table 2-B Liquid Effluents – Continuous Mode

	Units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
1. Fission and Activation Products						
Co-60	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Cs-137	Ci	3.97E-05	< LLD	< LLD	< LLD	3.97E-05
Total For Period	Ci	3.97E-05	< LLD	< LLD	< LLD	3.97E-05
2. Dissolved and Entrained Gases						
Xe-133	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Xe-135	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
Total For Period	Ci	< LLD	< LLD	< LLD	< LLD	< LLD
3. Tritium						
H-3	Ci	5.44E-02	2.71E-01	4.02E-01	5.64E-02	7.84E-01
4. Gross Alpha						
Gross Alpha	Ci	< LLD	< LLD	< LLD	< LLD	< LLD

V. Solid Waste Storage and Shipment

A. Solid Radioactive Waste Shipped from the site (not irradiated fuel)

1.	Type of Waste	Units	Jan-June	July-Dec	Error %
a.	Spent Resins, Filters, Filter Sludge	m^3	1.38E+02	1.24E+02	+/-25.0
	Evaporator Bottoms, etc.	Ci	3.90E+01	4.21E+01	+/-25.0
b.	Dry Active Waste, Contaminated	m^3	9.30E+02	8.09E+02	+/-25.0
	Equipment, etc.	Ci	1.30E+00	7.40E-01	+/-25.0
c.	Irradiated Components, Control Rod	m^3	0.00E+00	1.50E+00	+/-25.0
	Blades & LPRMs with Fission Chambers	Ci	0.00E+00	6.85E+04	+/-25.0
d.	Other – Combined Packages	m^3	0.00E+00	2.08E+01	+/-25.0
		Ci	0.00E+00	6.91E-05	+/-25.0

2. Estimate of major nuclide composition (by type of waste)

a. Spent resins, filters, filter sludge evaporator bottoms, etc.

Nuclide Name	Abundance	Activity (Ci)
H-3	0.05%	4.43E-02
C-14	0.5%	4.09E-01
Cr-51	0.97%	7.88E-01
Mn-54	5.05%	4.09E+00
Fe-55	28.76%	2.33E+01
Fe-59	0.05%	4.05E-02
Co-57	0.03%	2.16E-02
Co-58	6.43%	5.22E+00
Co-60	44.48%	3.61E+01
Ni-63	1.99%	1.61E+00
Zn-65	4.97%	4.03E+00
Sr-89	0.09%	7.21E-02
Sr-90	0.01%	9.77E-03
Zr-95	0.22%	1.76E-01
Nb-95	0.12%	9.70E-02
Tc-99	0%	6.02E-04
Ag-110m	3.84%	3.12E+00
Sb-124	0.03%	2.65E-02
Sb-125	0.12%	9.84E-02
I-131	0.02%	1.94E-02
Cs-134	0.01%	5.63E-03
Cs-137	2.12%	1.72E+00
Ce-141	0.01%	7.92E-03
Ce-144	0.12%	9.43E-02
Pu-238	0%	5.66E-05
Pu-241	0.01%	4.48E-03
Am-241	0%	2.57E-04
Cm-242	0%	6.97E-06
Cm-243	0%	1.26E-04
Cm-244	0%	1.28E-07

b. Dry compressible waste, contaminated equipment, etc.

Nuclide Name	Abundance	Activity (Ci)
H-3	0.08%	1.69E-03
Cr-51	5.62%	1.15E-01
Mn-54	3.18%	6.50E-02
Fe-55	18.5%	3.78E-01
Fe-59	0%	5.15E-05
Co-58	3.73%	7.63E-02
Co-60	49.43%	1.01E+00
Ni-63	1.38%	2.82E-02
Zn-65	1.69%	3.46E-02
Sr-89	0.04%	7.93E-04
Sr-90	0%	9.59E-08
Zr-95	1.89%	3.87E-02
Nb-95	3.85%	7.86E-02
Ag-110m	2.26%	4.62E-02
Sb-124	0%	1.51E-05
Cs-134	0.46%	9.32E-03
Cs-137	7.88%	1.61E-01
Pu-238	0%	4.14E-07
Pu-241	0%	3.29E-05
Am-241	0%	1.87E-06
Cm-243	0%	9.22E-07

c. Irradiated components, control rod blades & LPRMs with fission chambers

Nuclide Name	Abundance	Activity (Ci)
H-3	0.01%	8.38E+00
C-14	0.01%	9.69E+00
Cr-51	0.14%	9.68E+01
Mn-54	1.84%	1.26E+03
Fe-55	56.23%	3.85E+04
Fe-59	0.03%	2.14E+01
Co-58	0.27%	1.84E+02
Co-60	24.8%	1.70E+04
Ni-59	0.04%	2.71E+01
Ni-63	8.44%	5.78E+03
Zn-65	0.04%	2.93E+01
Sr-89	0%	1.52E-02
Sr-90	0%	5.79E-01
Zr-95	0%	1.12E+00
Nb-94	0%	1.54E-01
Nb-95	0%	1.68E+00
Tc-99	0%	3.35E-02
Ag-110m	0%	4.78E-02
Sb-125	0%	1.91E-01
Cs-134	0%	2.00E+00
Cs-137	0%	6.40E-01
Ce-144	0%	3.72E-01
Hf-181	2.37%	1.62E+03
Ta-182	5.77%	3.95E+03
U-235	0%	5.48E-08
Np-237	0%	4.13E-06
Pu-238	0%	4.70E-02
Pu-239	0%	3.23E-05
Pu-240	0%	4.60E-05
Pu-241	0%	9.04E-03
Pu-242	0%	2.27E-07
Am-241	0%	8.60E-05
Am-243	0%	4.27E-06
Cm-242	0%	6.60E-04
Cm-243	0%	3.43E-06
Cm-244	0%	1.38E-03

d. Other –Combined Packages

Nuclide Name	Abundance	Activity (Ci)
Cr-51	3.57%	2.47E-06
Mn-54	3.42%	2.37E-06
Fe-55	14.3%	9.90E-06
Co-58	3.59%	2.48E-06
Co-60	50.05%	3.46E-05
Ni-63	1.19%	8.23E-07
Zn-65	1.92%	1.33E-06
Sr-89	0.04%	2.92E-08
Zr-95	2.22%	1.53E-06
Nb-95	4.59%	3.18E-06
Ag-110m	2.46%	1.71E-06
Cs-134	0.68%	4.70E-07
Cs-137	11.96%	8.28E-06

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
1	ESS (TVA)	Energy Solutions Services Inc. 1560 Bear Creek Road
8	Hittman Transport Services	Energy Solutions LLC. (Clive) Clive Disposal Site - Containerized Waste Facility
8	Hittman Transport Services	Energy Solutions Services Inc. 1560 Bear Creek Road
6	Hittman Transport Services	Waste Control Specialist, LLC CWF
1	Interstate Ventures, Inc.	Waste Control Specialist, LLC CWF
11	Interstate Ventures, Inc.	WCS TSD Facility TSD Facility
49	Specialty Transport, Inc.	Unitech Services Group, Inc. Oak Ridge Service Center

B. Irradiated Fuel Shipments (Disposition)

Number of Shipments	Mode of Transportation	Destination
6	Hittman Transport Services	Waste Control Specialist, LLC CWF

VI. Radiological Impact to Man

A. Introduction

Potential doses to the "maximum exposed individual" around Browns Ferry Nuclear Plant (BFN) is calculated for each quarter as required in Section 5.2 of the Offsite Dose Calculation Manual (ODCM). The methodology used to estimate dose for determining plant releases for the reporting period is specified in Sections 6 and 7 of the ODCM. Dispersion of radioactive effluents in the environment is estimated using meteorological data and river flow measured during the period. In this report, the doses resulting from releases are described and compared to limits established for BFN.

B. Dose Limits

The ODCM specifies limits for the release of radioactive effluents, as well as limits for doses to the general public from the release of radioactive effluents. These limits are set well below the Technical Specification limits which govern the concentrations of radioactivity and doses permissible in unrestricted areas. This ensures that radioactive effluent releases are As Low As Reasonably Achievable.

The air dose limits in areas at and beyond the Site Boundary due to noble gases released in gaseous effluents per unit are:

- ≤ 5 mrad per quarter and ≤ 10 mrad per year for gamma radiation.
  and
- ≤ 10 mrad per quarter and ≤ 20 mrad per year for beta radiation.

The dose limits to a member of the public in an unrestricted area from radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half lives > 8 days released in gaseous effluents for each unit are:

- ≤ 7.5 mrem per quarter and ≤ 15 mrem per year to any organ.

The dose or dose commitment to a member of the public from radioactive material in liquid effluents released to unrestricted areas are:

- ≤ 1.5 mrem per quarter and ≤ 3 mrem per year to the total body,
  and
- ≤ 5 mrem per quarter and ≤ 10 mrem per year to any organ.

The limit for the total effective dose equivalent to an individual member of the public inside the site boundary is:

- 100 mrem per year.

The Environmental Protection Agency limits for total dose to any member of the public in the vicinity of a nuclear power plant, established in the Environmental Dose Standard of 40 CFR 190, are:

- ≤ 25 mrem per year to the whole body, ≤ 75 mrem per year to the thyroid, and
- ≤ 25 mrem per year to any other organ.

C. Dose Calculations

Estimated doses to members of the public are determined using the computer model OpenEMS. This model is based on guidance provided by the Nuclear Regulatory Commission (NRC) for determining the potential dose to individuals living in the vicinity of the plant. The area around the plant is analyzed to determine the pathways through which the public may receive a dose. The doses calculated are a representation of the dose to a "maximum exposed individual." Some of the factors used in these calculations (such as ingestion rates) are maximum values to ensure conservative reporting of data. The values chosen will tend to overestimate the dose. The expected dose to actual individuals is lower. The calculated doses are presented in Tables 3, 4, and 5.

D. Doses from Airborne Effluents

For airborne effluents, members of the public can be exposed to radiation from several sources: direct radiation from the radioactivity in the air, direct radiation from radioactivity deposited on the ground, inhalation of airborne radioactivity, ingestion of vegetation which contains radioactivity deposited from the atmosphere, and ingestion of milk and beef which contains radioactivity deposited from the atmosphere onto vegetation and subsequently consumed by animals.

Releases from the stack are considered to be elevated releases. The Joint Frequency Distributions (JFDs) for elevated releases are based on wind directions and wind speeds measured at 90.29 meters and the vertical temperature difference between 10.03 and 89.59 meters.

Meteorological variables at BFN are continuously monitored. Measurements include wind speed and wind direction at heights of 10.5, 45.74, and 90.29 meters above ground level, and temperature at heights of 10.03, 45.30, and 89.59 meters. The ten-year average meteorological dataset for 2009–2018 is used for dose calculations. This dataset, along with the annual meteorological summary reports that contain joint frequency distributions (JFDs) of wind direction and wind speed by atmospheric stability class, is maintained onsite and available upon request. The JFDs are calculated for each release point using the appropriate levels of meteorological data. The JFD gives the percentage of the time that the wind is blowing out of a particular upwind compass sector in a particular range of wind speeds for a given stability class A through G. The wind speeds are divided into nine wind speed ranges.

Calms are distributed by direction in proportion to the distribution of noncalm wind directions less than 1.6 m/s (3.5 mph). Stability classes are determined from the vertical temperature difference between two measurement levels.

The generally open terrain around BFN does not cause any significant effects on the transport and dispersion of gaseous effluents from the plant. Within 30 kilometers of BFN, the terrain is mostly gently rolling hills (30-60 meters). Between 30 and 80 kilometers, the hills become larger to the north and south and mountainous to the east and northeast. The Tennessee River/Wheeler Lake may have a minor effect on transport and dispersion in the immediate vicinity of BFN during periods of winds with a southerly component, overcast skies, and relatively high wind speeds. Also, the lower layer (10-45 meters) stability class tends to be more stable. However, during this infrequent condition, dose estimates will be conservative.

Dose calculated for maximum external air dose (gamma-air and beta-air) are made for points at and beyond the unrestricted area boundary as described in the BFN ODCM. The highest of these doses is then selected.

External doses to the skin and total body, due to submersion in a cloud of noble gases, are calculated for the nearest residence in each sector. The residence with the highest dose is then selected from all sectors.

Dose to an organ due to releases of airborne effluents are estimated for the inhalation, ground contamination, and ingestion pathways. The ingestion pathway is further divided into three possible contributing pathways: ingestion of cow/goat milk, ingestion of beef, and ingestion of vegetables. Doses from applicable pathways are calculated for each receptor location identified in the most recent land use survey. To determine the maximum organ dose, the doses from the pathways are summed for each receptor. However, for the ingestion dose, only those pathways that exist for each receptor are considered in the sum, e.g., milk ingestion doses are included only for locations where milk was consumed without commercial preparation and vegetable ingestion is included only for those locations where a garden was identified. To conservatively account for beef ingestion, a beef ingestion dose equal to that for the highest unrestricted area boundary location is added to each identified receptor. For ground contamination, the dose added to the organ dose being calculated is the total body dose calculated for that location, i.e., it is assumed that the dose to an individual organ is equal to the total body dose.

The maximum organ dose, thyroid dose, and total body dose from airborne effluents are presented in Table 3.

E. Doses from Liquid Effluents

For liquid effluents, the public can be exposed to radiation from three sources: the ingestion of water from the Tennessee River, the ingestion of fish caught in the Tennessee River, and direct exposure from radioactive material deposited on the river shoreline sediment (recreation). The concentration of radionuclides in the Tennessee River is calculated by a computer model which uses measured hydraulic data downstream of BFN. Parameters used to determine the doses are based on guidance given by the NRC for maximum ingestion rates, exposure times, etc.

Wherever possible, parameters used in the dose calculation are site specific. The models that are used to estimate doses, as well as the parameters input to the models, are described in detail in the BFN ODCM.

Radionuclide concentrations in the Tennessee River are calculated assuming that releases in liquid effluents are continuous. When necessary, liquid releases from BFN, located at Tennessee River Mile 294, are made through diffusers which extend into the Tennessee River. It is assumed that releases to the river through these diffusers will initially be entrained in one-fifth of the water which flows past the plant. The assumption is that this mixing condition holds true until the water is completely mixed at the first downstream dam (Wheeler Dam), at Tennessee River Mile 283.

The maximum potential recreation dose is calculated for a location immediately downstream from the plant's release point. The maximum exposed individual dose from ingestion of fish is assumed to be that calculated for the consumption of fish caught anywhere between the plant and the first downstream dam. The maximum exposed individual dose from drinking water is assumed to be that calculated at the nearest downstream public water supply, West Morgan - East Lawrence (WMEL). This could be interpreted as indicating that the maximum exposed individual, as assumed for liquid releases from BFN, is an individual who obtains all drinking water at WMEL, consumes fish caught from the Tennessee River between BFN and Wheeler Dam, and spends a max of 67 hours per year on the shoreline just downstream of the plant's release point. Doses calculated for the maximum exposed individual due to liquid effluents for each quarter in the period are presented in Table 4 along with the average river flows past the plant site for the periods.

F. Offsite Direct Radiation Dose

External gamma radiation levels were measured by environmental dosimeters deployed around BFN as part of the 2025 Radiological Environmental Monitoring Program (REMP). The 2025 environmental dosimeters were evaluated in accordance with the guidance provided in ANSI N13.37. The process of this evaluation is summarized: 1) The average field dosimeter results is determined for each location and normalized to a standard quarter of 91 days, 2) The field results is adjusted by the transit and shield (storage) dose to determine the net dose at each location; this is performed at each location for each quarter, and the four quarters are summed to determine the annual net dose, 3) The quarterly and annual historical average net dose was determined for each monitoring location, 4) The standard deviation of each historical net dose was calculated, to determine the 90th percentile standard deviation for both the quarterly and annual results, 5) the 2025 quarterly and annual net dose are compared to the historical averages (plus 3 times the 90th percentile standard deviation, also known as the minimum differential dose) to determine if any facility related dose was identified at any location during any quarter or the year. Baseline adjusted dose reflect evaluation in accordance with ANSI N13.37, where facility dose is only recorded if the measurement exceeds the baseline plus Minimum Differential Dose (MDD)

The monitoring locations are grouped according to the distance from the plant. The onsite group consists of dosimeters within 2 miles of the plant. The offsite group consists of all locations greater than 2 miles from the plant. This difference in onsite and offsite averages is consistent with levels measured for preoperational and construction phases at BFN where

the average radiation levels onsite were generally 2-6 mrem/quarter higher than the levels offsite. This may be attributed to natural variations in environmental radiation levels, earth moving activities onsite, the mass of concrete employed in the construction of the plant, or other undermined influences. In order to implement the methodology of ANSI N13.37, the dose received by dosimeters in shielded storage that are used as unexposed controls was determined. This in turn was used to account for extraneous dose that should be removed from the gross measurements as measured by field dosimeters.

The result of the evaluation of environmental dosimeters is that there was no facility related dose measured in the environment around Browns Ferry. There were no quarterly or annual dosimeters that exceed the historical baseline plus the calculated minimum differential dose.

G. Dose to a Member of the Public Inside the Site Boundary

Pursuant to ODCM Section 7.7.5, a review was performed to determine the highest dose to a member of the public in the site boundary. The dose to a member of the public consists of the sum of dose commitments from effluent releases as well as any direct radiation dose. The gaseous effluent dose commitment is negligible compared to the direct radiation dose.

The direct radiation dose was determined from area environmental dosimeters located on-site. It consisted of gamma dose from the plume, ground contamination, and from equipment sources (i.e., tanks, turbine shine, radioactive material storage areas, etc.). The critical location was determined to be an Optically Stimulated Luminescence (OSL) dosimeter near the Livewell Center (SE-1). The annual background baseline was 78.1 mrem/yr at the Livewell Center and the annual field dose was 78.8 mrem/yr. The direct radiation dose at the Livewell Center was determined to be non-detectable at this location as it did not exceed the historical baseline plus the calculated minimum differential dose. The annual net dose was non-detectable for a Member of Public inside the Site Boundary, which is below the 10 CFR 20 annual limit of 100 mrem/year.

H. Total Dose

To determine compliance with 40 CFR 190, annual total dose contributions to the maximum exposed individual from BFN radioactive effluents and all other nearby uranium fuel cycle sources are considered.

The annual dose to any organ other than the thyroid for the maximum exposed individual is conservatively calculated by summing the following doses: the total body air submersion dose for each quarter, the critical organ dose (for any organ other than the thyroid) from airborne effluents for each quarter from ground contamination, inhalation and ingestion, the total body dose from liquid effluents for each quarter, the maximum organ dose (for any organ other than the thyroid) from liquid effluents for each quarter, and any identifiable increase in direct radiation dose levels as measured by the REMP. This dose is compared to the 40 CFR 190 limit for total body or any organ dose (other than the thyroid) to determine compliance.

The annual thyroid dose to the maximum exposed individual is conservatively estimated by summing the following doses: the total body air submersion dose for each quarter, the thyroid dose from airborne effluents for each quarter, the total body dose from liquid effluents for each quarter, the thyroid dose from liquid effluents for each quarter, and any

identifiable increase in direct radiation dose levels as measured by the REMP. This dose is compared to the 40 CFR 190 limit for thyroid dose to determine compliance.

Total dose from the fuel cycle is presented in Table 5.

10 CFR 50 Appendix I Dose Limits

Table 3-A Doses from Airborne Effluents – 1st Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Gamma Air	N/A	5 mrad	N/A	N/A
Beta Air	N/A	10 mrad	N/A	N/A
NG Total Body	N/A	N/A	N/A	N/A
NG Skin	N/A	N/A	N/A	N/A
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	3.71E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Total Body	3.86E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / GI-Lli	4.00E-03 mrem	7.5 mrem	< 1%	N 1525 meters

Table 3-B Doses from Airborne Effluents – 2nd Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Gamma Air	N/A	5 mrad	N/A	N/A
Beta Air	N/A	10 mrad	N/A	N/A
NG Total Body	N/A	N/A	N/A	N/A
NG Skin	N/A	N/A	N/A	N/A
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	1.36E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Total Body	1.29E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Liver	1.49E-03 mrem	7.5 mrem	< 1%	N 1525 meters

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Table 3-C Doses from Airborne Effluents – 3rd Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Gamma Air	N/A	5 mrad	N/A	N/A
Beta Air	N/A	10 mrad	N/A	N/A
NG Total Body	N/A	N/A	N/A	N/A
NG Skin	N/A	N/A	N/A	N/A
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	2.20E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Total Body	1.74E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Bone	2.07E-03 mrem	7.5 mrem	< 1%	N 1525 meters

Table 3-D Doses from Airborne Effluents – 4th Quarter

Individual Doses

Pathway	Dose	Quarterly Limit	Percent of Limit	Location
Gamma Air	1.72E-05 mrad	5 mrad	< 1%	N 1525
Beta Air	1.49E-06 mrad	10 mrad	< 1%	NNW 5400
NG Total Body	8.04E-06 mrad	N/A	NA	N 1525
NG Skin	1.38E-05 mrad	N/A	NA	N 1525
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	4.77E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Total Body	4.42E-03 mrem	7.5 mrem	< 1%	N 1525 meters
Child / Bone	4.43E-03 mrem	7.5 mrem	< 1%	N 1525 meters

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Table 3-E Doses from Airborne Effluents – Annual

Individual Doses

Pathway	Dose	Annual Limit	Percent of Limit	Location
Gamma Air	1.72E-05 mrad	10 mrad	< 1%	N 1525
Beta Air	1.49E-06 mrad	20 mrad	< 1%	NNW 5400
NG Total Body	8.04E-06 mrad	N/A	< 1%	N 1525
NG Skin	1.38E-05 mrad	N/A	< 1%	N 1525
Organ Doses (Iodine, Tritium, Particulates with >8-Day half-life)				
Child / Thyroid	1.20E-02 mrem	15 mrem	< 1%	N 1525 meters
Child / Total Body	1.13E-02 mrem	15 mrem	< 1%	N 1525 meters
Child / Bone	1.18E-02 mrem	15 mrem	< 1%	N 1525 meters

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Table 4-A Doses from Liquid Effluents – 1st Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Teen	Liver	4.91E-04 mrem	5 mrem	< 1%
Child	Thyroid	3.16E-04 mrem	5 mrem	< 1%
Adult	Total Body	4.24E-04 mrem	1.5 mrem	< 1%

Average River Flow Past BFN: 59,194 CFS

Table 4-B Doses from Liquid Effluents – 2nd Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Teen	Liver	3.59E-04 mrem	5 mrem	< 1%
Child	Thyroid	1.65E-04 mrem	5 mrem	< 1%
Adult	Total Body	2.90E-04 mrem	1.5 mrem	< 1%

Average River Flow Past BFN: 47,373 CFS

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Table 4-C Doses from Liquid Effluents – 3rd Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	1.90E-04 mrem	5 mrem	< 1%
Child	Thyroid	9.30E-05 mrem	5 mrem	< 1%
Adult	Total Body	1.55E-04 mrem	1.5 mrem	< 1%

Average River Flow Past BFN: 24,432 CFS

Table 4-D Doses from Liquid Effluents – 4th Quarter

Individual Doses

Age Group	Organ	Dose	Quarterly Limit	Percent of Limit
Child	Bone	8.60E-05 mrem	5 mrem	< 1%
Child	Thyroid	1.98E-05 mrem	5 mrem	< 1%
Adult	Total Body	6.13E-05 mrem	1.5 mrem	< 1%

Average River Flow Past BFN: 24,748 CFS

Table 4-E Doses from Liquid Effluents – Annual

Individual Doses

Age Group	Organ	Dose	Annual Limit	Percent of Limit
Teen	Liver	1.12E-03 mrem	10 mrem	< 1%
Child	Thyroid	5.94E-04 mrem	10 mrem	< 1%
Adult	Total Body	9.30E-04 mrem	3 mrem	< 1%

Table 5 Total Dose from Fuel Cycle

40 CFR 190 Dose Limits

Dose	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	
Total Body or any Organ (except thyroid)					
Total body air (submersion)	NA	NA	NA	8.04E-06	
Critical organ dose (airborne)	2.89E-02	2.76E-02	2.96E-02	2.78E-02	
Total body dose (liquid)	4.24E-04	2.90E-04	1.55E-04	6.13E-05	
Maximum organ dose (liquid)	4.91E-04	3.59E-04	1.90E-04	8.60E-05	
Direct Radiation Dose	ND[1]	ND	ND	ND	
Total	2.98E-02	2.82E-02	2.99E-02	2.80E-02	
				Cumulative Total Dose (mrem)	**1.16E-01**
				Annual Dose Limit (mrem)	**25**
				Percent of Limit	**< 1%**
Thyroid					
Total body air (submersion)	NA	NA	NA	8.04E-06	
Thyroid dose (airborne)	6.38E-03	5.76E-03	6.35E-03	6.62E-03	
Total body dose (liquid)	4.24E-04	2.90E-04	1.55E-04	6.13E-05	
Thyroid dose (liquid)	3.16E-04	1.65E-04	9.30E-05	1.98E-05	
Direct Radiation Dose	ND	ND	ND	ND	
Total	7.12E-03	6.22E-03	6.60E-03	6.71E-03	
				Cumulative Total Dose (mrem)	**2.66E-02**
				Annual Dose Limit (mrem)	**75**
				Percent of Limit	**< 1%**

[1] ND = Non-detectable