

# Annual Radioactive Effluent Release Report 2025

**UNIT 1 AND UNIT 2 (Docket Numbers 50-456 and 50-457)  
ISFSI (Docket Number 72-73)**

**TABLE OF CONTENTS**

1.0 LIST OF ACRONYMS AND DEFINITIONS ..... 3

2.0 EXECUTIVE SUMMARY ..... 5

    2.1 Comparison to Regulatory Limits ..... 7

3.0 INTRODUCTION ..... 9

    3.1 About Nuclear Power ..... 9

    3.2 About Radiation Dose ..... 11

    3.3 About Dose Calculation ..... 12

4.0 DOSE ASSESSMENT FOR PLANT OPERATIONS ..... 14

    4.1 Regulatory Limits ..... 14

    4.2 Regulatory Limits for Gaseous Effluent Doses: ..... 15

    4.3 Regulatory Limits for Liquid Effluent Doses ..... 16

    4.4 40 CFR 190 Regulatory Dose Limits for a Member of the Public ..... 16

    4.5 Onsite Doses (Within Site Boundary) ..... 16

5.0 SUPPLEMENTAL INFORMATION ..... 18

    5.1 Gaseous Batch Releases ..... 18

    5.2 Liquid Batch Releases ..... 18

    5.3 Abnormal Releases ..... 18

    5.4 Land Use Census Changes ..... 19

    5.5 Meteorological Data ..... 19

    5.6 Effluent Radiation Monitors Out of Service Greater Than ODCM Requirements ..... 19

    5.7 Offsite Dose Calculation Manual (ODCM) Changes ..... 19

    5.8 Process Control Program (PCP) Changes ..... 20

    5.9 Radioactive Waste Treatment System Changes ..... 20

    5.10 Other Supplemental Information ..... 20

6.0 NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM ..... 22

    6.1 Voluntary Notification ..... 25

7.0 BIBLIOGRAPHY ..... 27

**TABLES**

Table 1, Braidwood Nuclear Power Station Unit 1 and Unit 2 Dose Summary ..... 7

Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for BNPS ..... 8

Table 3, Groundwater Protection Program Monitoring Well Sample Schedule ..... 22

Table 4, Groundwater Protection Program Monitoring Well Tritium Results ..... 24

Table 5, Gaseous Effluents Summation of All Releases Unit 1 and Unit 2 ..... 28

Table 6, Gaseous Effluents – Mixed Level Release, Batch Mode Unit 1 and 2 ..... 29

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 2 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

Table 7, Gaseous Effluents – Mixed Level Release, Continuous Mode Unit 1 and 2..... 30

Table 8, Liquid Effluents – Summation of All Releases Unit 1 and 2 ..... 31

Table 9, Batch Mode Liquid Effluents Unit 1 and 2 ..... 32

Table 10, Continuous Mode Liquid Effluents Unit 1 and 2 ..... 33

Table 11, Resins, Filters, and Evaporator Bottoms Summary Shipped from the BNPS Site ..... 34

Table 12, Dry Active Waste (DAW) Summary Shipped from the BNPS Site ..... 35

Table 13, Irradiated Components Summary Shipped from the BNPS Site..... 36

Table 14, Other Waste Summary Shipped from the BNPS Site..... 37

Table 15, Sum of All Low-Level Waste Shipped from the BNPS Site ..... 38

Table 16, Solid Waste Disposition from the BNPS Site ..... 39

Table 17, Classification of Atmospheric Stability ..... 41

**FIGURES**

Figure 1, Pressurized Water Reactor (PWR)..... 9

Figure 2, Boiling Water Reactor (BWR) ..... 10

Figure 3, Sources of Radiation Exposure ..... 11

Figure 4, Potential exposure pathways to Members of the Public due to Plant Operations ..... 13

**ATTACHMENTS**

Attachment 1, ARERR Release Summary Tables (RG-1.21 Tables) ..... 28

Attachment 2, Solid Waste Information ..... 34

Attachment 3, Meteorological Data Summary..... 40

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 3 of 41
Company: Constellation Energy Generation		Plant: Braidwood Nuclear Power Station	

## 1.0 LIST OF ACRONYMS AND DEFINITIONS

1. Alpha Particle ( $\alpha$ ): A charged particle emitted from the nucleus of an atom having a mass and charge equal in magnitude of a helium nucleus.
2. BWR: Boiling Water Reactor
3. Composite Sample: A series of single collected portions (aliquots) analyzed as one sample. The aliquots making up the sample are collected at time intervals that are very short compared to the composite period.
4. Control: A sampling station in a location not likely to be affected by plant effluents due to its distance and/or direction from the Plant.
5. Counting Error: An estimate of the two-sigma uncertainty associated with the sample results based on total counts accumulated.
6. Curie (Ci): A measure of radioactivity; equal to  $3.7 \times 10^{10}$  disintegrations per second, or  $2.22 \times 10^{12}$  disintegrations per minute.
7. Direct Radiation Monitoring: The measurement of radiation dose at various distances from the plant is assessed using thermoluminescent dosimeters (TLDs), optically stimulated luminescent dosimeters (OSLDs), and/or pressurized ionization chambers.
8. Grab Sample: A single discrete sample drawn at one point in time.
9. Indicator: A sampling location that is potentially affected by plant effluents due to its proximity and/or direction from the plant.
10. Ingestion Pathway: The ingestion pathway includes milk, fish, drinking water and garden produce. Also sampled (under special circumstances) are other media such as vegetation or animal products when additional information about particular radionuclides is needed.
11. ISFSI: Independent Spent Fuel Storage Installation
12. LLD: Lower Limit of Detection. An *a priori* measure of the detection capability of a radiochemistry measurement based on instrument setup, calibration, background, decay time, and sample volume. An LLD is expressed as an activity concentration. The MDA is used for reporting results. LLD are specified by a regulator, such as the NRC and are typically listed in the ODCM.
13. MDA: Minimum Detectable Activity. For radiochemistry instruments, the MDA is the *a posteriori* minimum concentration that a counting system detects. The smallest concentration or activity of radioactive material in a sample that will yield a net count above instrument background and that is detected with 95% probability, with only 5% probability of falsely concluding that a blank observation represents a true signal.
14. MDC: Minimum Detectable Concentration. Essentially synonymous with MDA for the purposes of radiological monitoring.
15. Mean: The sum of all of the values in a distribution divided by the number of values in the distribution, synonymous with average.

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 4 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

16. Microcurie ( $\mu\text{Ci}$ ):  $3.7 \times 10^4$  disintegrations per second, or  $2.22 \times 10^6$  disintegrations per minute.
17. millirem (mrem): 1/1000 rem; a unit of radiation dose equivalent in tissue.
18. Milliroentgen (mR): 1/1000 Roentgen; a unit of exposure to X- or gamma radiation.
19. N/A: Not Applicable
20. NEI: Nuclear Energy Institute
21. NRC: Nuclear Regulatory Commission
22. ODCM: Offsite Dose Calculation Manual
23. OSLD: Optically Stimulated Luminescence Dosimeter
24. Protected Area: A 10 CFR 73 security term is an area encompassed by physical barriers and to which access is controlled for security purposes. The fenced area immediately surrounding the plant and around ISFSI are commonly classified by the licensee as "Protected areas." Access to the protected area requires a security badge or escort.
25. PWR: Pressurized Water Reactor
26. REC: Radiological Effluent Control
27. REMP: Radiological Environmental Monitoring Program
28. Restricted Area: A 10 CFR 20 defined term where access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials.
29. TEDE: Total Effective Dose Equivalent (TEDE) means the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures).
30. TLD: Thermoluminescent Dosimeter
31. TRM: Technical Requirements Manual
32. TS: Technical Specification
33. Unrestricted Area: An area, access to which is neither limited nor controlled by the licensee.

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 5 of 41
Company: Constellation Energy Generation		Plant: Braidwood Nuclear Power Station	

## 2.0 EXECUTIVE SUMMARY

Braidwood Nuclear Power Station (BNPS) Radiological Effluent Control (REC) Program was established to limit the quantities of radioactive material that may be released based on calculated radiation doses or dose rates. Dose to Members of the Public due to radioactive materials released from the plant is limited by Technical Specifications, 10 CFR 20, and by 40 CFR 190. Operational doses to the public during 2025 were calculated to be within the limits required by regulation and compared to other sources of radiation dose and pose no health hazard. These doses are summarized and compared to the regulatory limits in Section 2.1 Comparison to Regulatory Limits below.

The quantity of radioactive material released from Braidwood Nuclear Power Plant was determined from in-house and vendor laboratory analysis of continuous inline sampling media and batch sample media from all ODCM specified effluent pathways. These pathways include continuous releases from the Unit 1 and Unit 2 Station Vent Stack, Condensate Polisher Sump, Waste Water Treatment, and Circulating Water Blowdown. The ODCM specified effluent pathways also include batch releases from the Unit 1 and Unit 2 Primary Containments, Waste Gas Decay Tanks, and Liquid Radwaste Batch Release Tanks.

The Annual Radioactive Effluent Release Report (ARERR) is published per REC requirements and provides data related to plant operation, including: quantities of radioactive materials released in liquid and gaseous effluents; radiation doses to members of the public; solid radioactive waste shipped offsite for processing or direct disposal; and other information as required by site licensing documents.

In 2025, the gaseous effluent dose assessments for locations from the Land Use Census showed that the critical receptor for Braidwood Nuclear Power Station is a Child due to Inhalation, at the Nearest Residence. The maximum Annual Organ Dose calculated for this receptor was 6.39E-02 mrem, to the thyroid. This represents 2.13E-01 percent of the ODCM Annual Dose Limit of 30 mrem.

The maximum annual dose calculated to any organ due to radioactive liquid effluents was 2.82E-01 mrem, for a Child/Infant to the Liver due to ingestion of potable water and fish. This represents 1.41E+00 percent of the ODCM Annual Dose Limit of 20 mrem.

Solid radioactive waste shipped offsite for processing or direct disposal included 2.79E+02 Curies and 3.29E+02 m<sup>3</sup>, shipped in 17 shipments.

In addition to monitoring radioactive effluents, BNPS has a Radiological Environmental Monitoring Program (REMP) that monitors for levels of radiation and radioactive materials in the local environment. Data from the REMP is published in the Annual Radiological Environmental Operating Report (AREOR).

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 6 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

The volume and quantity of radioactive waste shipped offsite from Braidwood Nuclear Power Plant for processing and disposal were determined from data maintained in the radwaste shipping database. Radwaste processed for shipment was in accordance with Constellation procedure RW-AA-100, "PROCESS CONTROL PROGRAM FOR RADIOACTIVE WASTE" and consistent with the UFSAR.

Meteorological data was obtained from the 320-foot meteorological tower located on the Braidwood Station premises. During 2025, the Braidwood site joint met data recovery was 99.9, which exceeded the goal of 90%.

**2.1 Comparison to Regulatory Limits**

During 2025 all liquid and gaseous radioactive effluents from Braidwood Nuclear Power Station were well below regulatory limits, as summarized in Table 1 and Table 2.

Table 1, Braidwood Nuclear Power Station Unit 1 and Unit 2 Dose Summary.<sup>1</sup>  
Summary of Gaseous and Liquid Effluent Doses to Members of the Public

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
Liquid Effluent Dose Limit, Total Body	<b>Limit</b>	<b>3.0 mrem</b>	<b>3.0 mrem</b>	<b>3.0 mrem</b>	<b>3.0 mrem</b>	<b>6.0 mrem</b>
	Total Body Dose	9.97E-02	4.54E-02	4.72E-02	8.96E-02	2.82E-01
	% of Limit	3.32E+00	1.51E+00	1.57E+00	2.99E+00	4.70E+00
Liquid Effluent Dose Limit, Any Organ	<b>Limit</b>	<b>10 mrem</b>	<b>10 mrem</b>	<b>10 mrem</b>	<b>10 mrem</b>	<b>20 mrem</b>
	Max Organ Dose	9.98E-02	4.54E-02	4.72E-02	8.96E-02	2.82E-01
	% of Limit	9.98E-01	4.54E-01	4.72E-01	8.96E-01	1.41E+00
Gaseous Effluent Dose Limit, Gamma Air (Noble Gas)	<b>Limit</b>	<b>10 mrad</b>	<b>10 mrad</b>	<b>10 mrad</b>	<b>10 mrad</b>	<b>20 mrad</b>
	Gamma Air Dose	1.86E-04	2.23E-04	9.01E-05	5.80E-05	5.57E-04
	% of Limit	1.86E-03	2.23E-03	9.01E-04	5.80E-04	2.78E-03
Gaseous Effluent Dose Limit, Beta Air (Noble Gas)	<b>Limit</b>	<b>20 mrad</b>	<b>20 mrad</b>	<b>20 mrad</b>	<b>20 mrad</b>	<b>40 mrad</b>
	Beta Air Dose	6.57E-05	8.11E-05	3.74E-05	3.25E-05	2.17E-04
	% of Limit	3.29E-04	4.06E-04	1.87E-04	1.62E-04	5.42E-04
Gaseous Effluent Organ Dose Limit (Iodine, Tritium, Particulates with > 8-day half-life)	<b>Limit</b>	<b>15 mrem</b>	<b>15 mrem</b>	<b>15 mrem</b>	<b>15 mrem</b>	<b>30 mrem</b>
	Max Organ Dose <sup>2</sup>	6.61E-03	3.06E-02	7.50E-03	1.92E-02	6.39E-02
	% of Limit	4.41E-02	3.04E-01	5.00E-02	1.28E-01	2.13E-01

<sup>1</sup> Table 1 demonstrates compliance with 10 CFR Part 50, App. I Limits. C-14 was not included in organ dose calculations from airborne effluents conforming to 10 CFR 50, Appendix I.

<sup>2</sup> Highest Dose Receptor to the Nearest Resident is the Child

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 8 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for BNPS.<sup>1</sup>

	Whole Body	Thyroid	Max Other Organ
Gaseous <sup>2</sup>	6.44E-02	6.45E-02	6.39E-02
Carbon-14	2.25E-01	2.25E-01	1.13E+00
Liquid	2.82E-01	2.81E-01	2.82E-01
Direct Shine	0.00E+00	0.00E+00	0.00E+00
Total Site Dose	5.71E-01	5.71E-01	1.47E+00
<b>Total with Other Nearby Facility<sup>3</sup></b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>Limit</b>	<b>25 mrem</b>	<b>75 mrem</b>	<b>25 mrem</b>
<b>% of Limit</b>	<b>2.3%</b>	<b>0.76%</b>	<b>5.9%</b>

<sup>1</sup> Table 2 is a summation of Units to show compliance with 40 CFR Part 190 Limits.

<sup>2</sup> Gaseous dose values in Table 2 include organ dose from Noble Gas, Iodine, Tritium, and Particulates.

<sup>3</sup> Other fuel cycle sources within 5 miles of the site are considered in this analysis.

**Company: Constellation Energy  
Generation****Plant: Braidwood Nuclear Power Station**

### 3.0 INTRODUCTION

#### 3.1 About Nuclear Power

Commercial nuclear power plants are generally classified as either Boiling Water Reactors (BWRs) or Pressurized Water Reactors (PWRs), based on their design. A BWR includes a single coolant system where water used as reactor coolant boils as it passes through the core and the steam generated is used to turn the turbine generator for power production. A PWR, in contrast, includes two separate water systems: radioactive reactor coolant and a secondary system. Reactor coolant is maintained under high pressure, preventing boiling. The high-pressure coolant is passed through a heat exchanger called a steam generator where the secondary system water is boiled, and the steam is used to turn the turbine generator for power production.

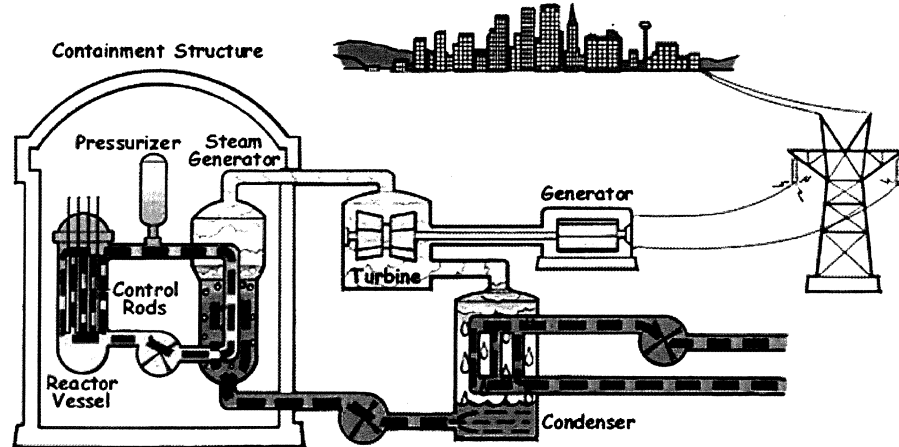


Figure 1, Pressurized Water Reactor (PWR) [1]

**Company: Constellation Energy  
Generation****Plant: Braidwood Nuclear Power Station**

## 3.1 (Continued)

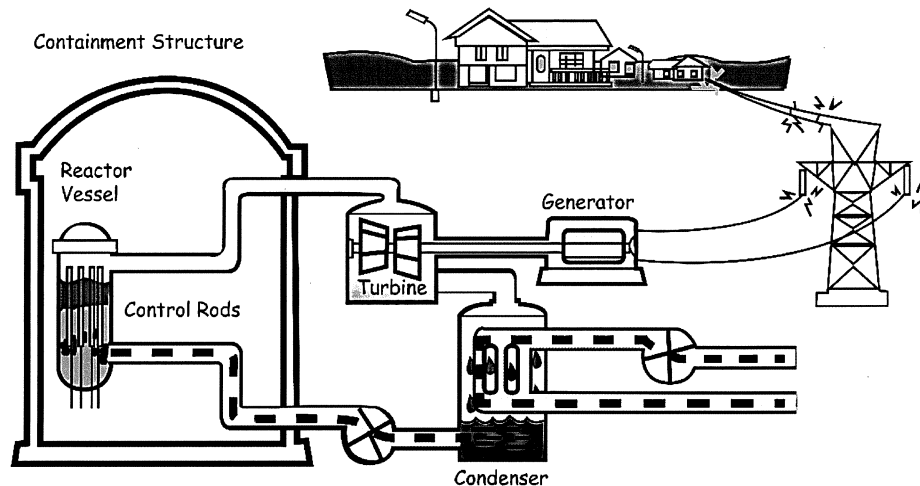


Figure 2, Boiling Water Reactor (BWR) [2]

Electricity is generated by a nuclear power plant similarly to the way that electricity is generated at other conventional types of power plants, such as those powered by coal or natural gas. Water is boiled to generate steam; the steam turns a turbine that is attached to a generator and the steam is condensed back into water to be returned to the boiler. What makes nuclear power different from these other types of power plants is that the heat is generated by fission and decay reactions occurring within and around the core containing fissionable uranium (U-235).

Nuclear fission occurs when certain nuclides (primarily U-233, U-235, or Pu-239) absorb a neutron and break into several smaller nuclides (called fission products) as well as producing some additional neutrons.

Fission results in production of radioactive materials including gases and solids that must be contained to prevent release or treated prior to release. These effluents are generally treated by filtration and/or hold-up prior to release. Releases are generally monitored by sampling and by continuously indicating radiation monitors. The effluent release data is used to calculate doses in order to ensure that dose to the public due to plant operation remains within required limits.

### 3.2 About Radiation Dose

Ionizing radiation, including alpha, beta, and gamma radiation from radioactive decay, has enough energy to break chemical bonds in tissues and result in damage to tissue or genetic material. The amount of ionization that will be generated by a given exposure to ionizing radiation is quantified as dose. Radiation dose is generally reported in units of millirem (mrem) in the US.

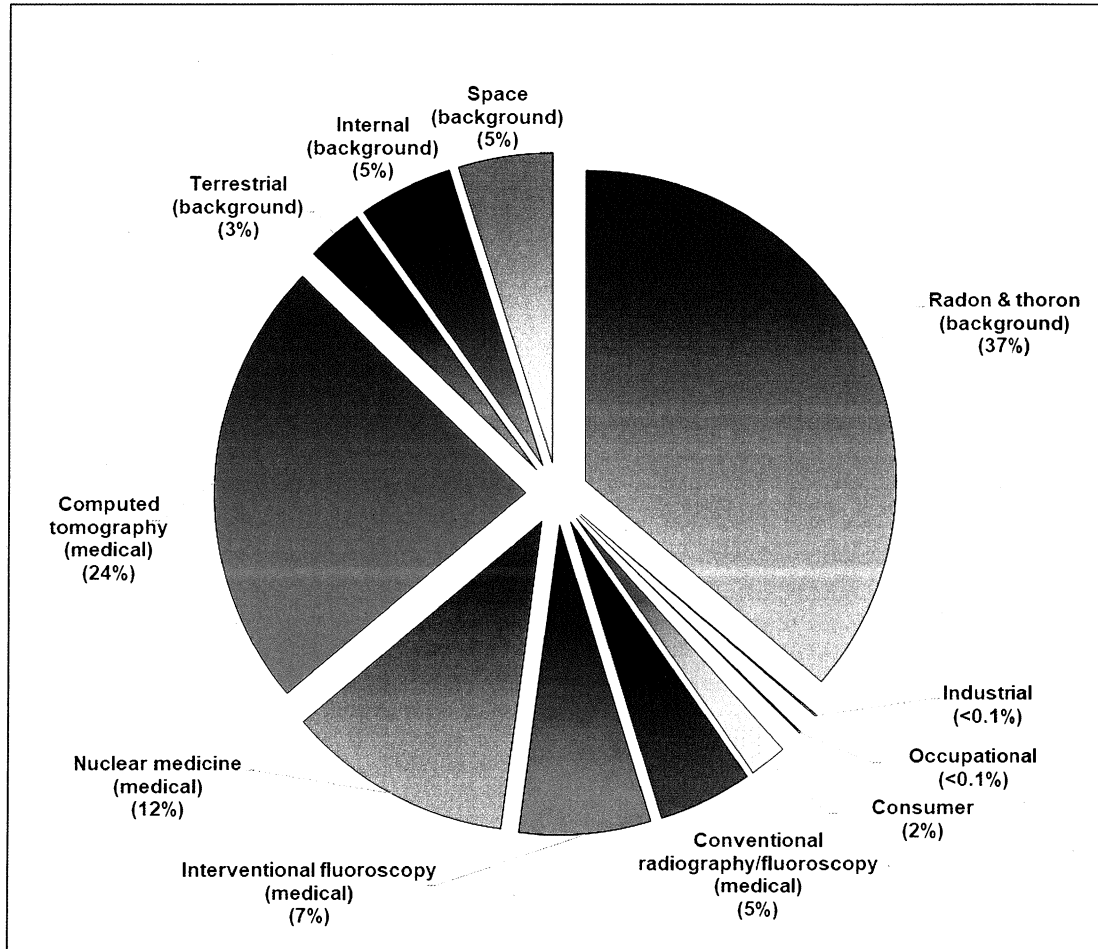


Figure 3, Sources of Radiation Exposure [3]

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 12 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

### 3.2 (Continued)

The National Council on Radiation Protection (NCRP) has evaluated the population dose for the US and determined that the average individual is exposed to approximately 620 mrem per year [3]. There are many sources for radiation dose, ranging from natural background sources to medical procedures, air travel, and industrial processes. Approximately half (310 mrem) of the average exposure is due to natural sources of radiation including exposure to radon, cosmic radiation, and internal radiation and terrestrial due to naturally occurring radionuclides. The remaining 310 mrem of exposure is due to man-made sources of exposure, with the most significant contributors being medical (48% of total mrem per year) due to radiation used in various types of medical scans and treatments. Of the remaining 2% of dose, most is due to consumer activities such as air travel, smoking cigarettes, and building materials. A small fraction of this 2% is due to industrial activities including generation of nuclear power.

Readers that are curious about common sources and effects of radiation dose that they may encounter can find excellent sources of information from the Health Physics Society, including the Radiation Fact Sheets [4], and from the US Nuclear Regulatory Commission website [5].

### 3.3 **About Dose Calculation**

Concentrations of radioactive material in the environment resulting from plant operations are very small and it is not possible to determine doses directly using measured activities of environmental samples. To overcome this, dose calculations based on measured activities of effluent streams are used to model the dose impact for Members of the Public due to plant operation and effluents. There are several mechanisms that can result in dose to Members of the Public, including: Ingestion of radionuclides in food or water; Inhalation of radionuclides in air; Immersion in a plume of noble gases; and Direct Radiation from the ground, the plant or from an elevated plume.

Company: Constellation Energy  
Generation

Plant: Braidwood Nuclear Power Station

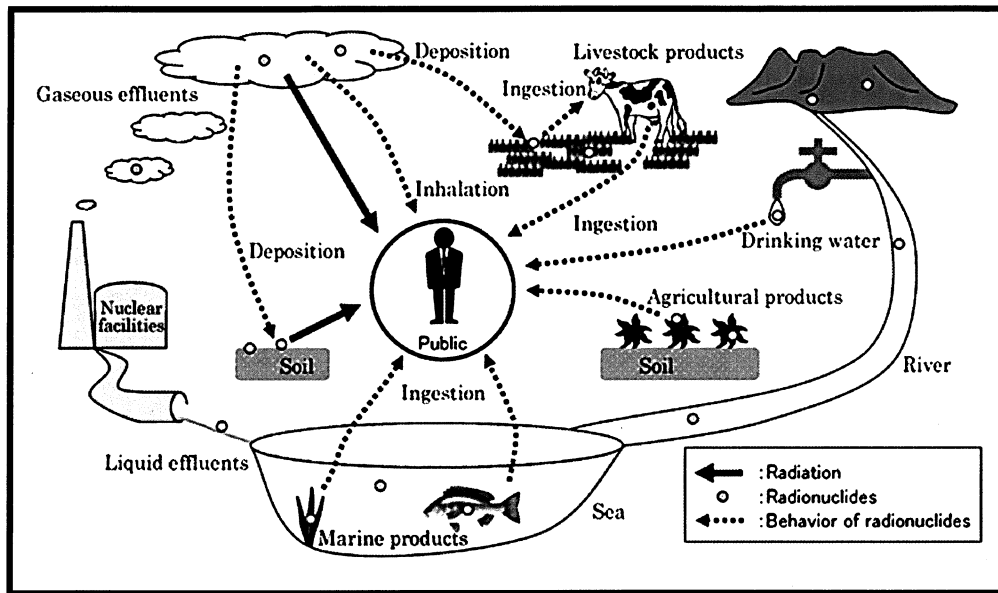


Figure 4, Potential exposure pathways to Members of the Public due to Plant Operations [6]

Each plant has an Offsite Dose Calculation Manual (ODCM) that specifies the methodology used to obtain the doses in the Dose Assessment section of this report. The dose assessment methodology in the ODCM is based on NRC Regulatory Guide 1.109 [7] and NUREG-0133 [8]. Doses are calculated by determining what the nuclide concentration will be in air, water, on the ground, or in food products based on plant effluent releases. Release points are continuously monitored to quantify what concentrations of nuclides are being released. For gaseous releases meteorological data is used to determine how much of the released activity will be present at a given location outside of the plant either deposited onto the ground or in gaseous form. Intake patterns and nuclide bio-concentration factors are used to determine how much activity will be transferred into animal milk or meat. Finally, human ingestion factors and dose factors are used to determine how much activity will be consumed and how much dose the consumer will receive. Inhalation dose is calculated by determining the concentration of nuclides and how much air is breathed by the individual.

For liquid releases, dilution and mixing factors are used to model the environmental concentrations in water. Drinking water pathways are modeled by determining the concentration of nuclides in the water at the point where the drinking water is sourced (e.g., taken from wells, rivers, or lakes). Fish and invertebrate pathways are determined by using concentration at the release point, bioaccumulation factors for the fish or invertebrate and an estimate of the quantity of fish consumed.

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 14 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

### 3.3 (Continued)

Each year a Land Use Census is performed to determine what potential dose pathways currently exist within a five-mile radius around the plant, the area most affected by plant operations. The Annual Land Use Census identifies the locations of vegetable gardens, nearest residences, milk animals and meat animals. The data from the census is used to determine who is the most likely to be exposed to radiation dose as a result of plant operation.

There is significant uncertainty in dose calculation results, due to modeling dispersion of material released and bioaccumulation factors, as well as assumptions associated with consumption and land-use patterns. Even with these sources of uncertainty, the calculations do provide a reasonable estimate of the order of magnitude of the exposure. Conservative assumptions are made in the calculation inputs such as the number of various foods and water consumed, the amount of air inhaled, and the amount of direct radiation exposure from the ground or plume, such that the actual dose received are likely lower than the calculated dose. Even with the built-in conservatism, doses calculated for the maximum exposed individual due to plant operation are a very small fraction of the annual dose that is received due to other sources. The calculated doses due to plant effluents, along with REMP results, serve to provide assurance that radioactive effluents releases are not exceeding safety standards for the environment or people living near the plant.

## 4.0 DOSE ASSESSMENT FOR PLANT OPERATIONS

### 4.1 Regulatory Limits

Regulatory limits are detailed in station licensing documents such as the plant Technical Specifications and the Offsite Dose Calculation Manual (ODCM). These documents contain the limits to which BNPS must adhere. BNPS drives to maintain the philosophy to keep dose "as low as is reasonably achievable" (ALARA) and actions are taken to reduce the amount of radiation released to the environment. Liquid and gaseous release data show that the dose from BNPS is well below the ODCM limits. The instantaneous concentration of liquid radioactive material released shall be limited to ten times the concentration specified in 10 CFR 20, Appendix B, Table 2, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the total concentration released shall be limited to  $2.0 \times 10^{-4}$  microCuries/mL.

The annual whole body, skin and organ dose was computed using the 2025 source term using the dose calculation methodology provided in the ODCM. The calculated doses due to gaseous effluents are used to demonstrate compliance with offsite dose limits are presented in Table 1 and Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for BNPS.

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 15 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

#### 4.2 Regulatory Limits for Gaseous Effluent Doses:

1. Fission and activation gases:
  - a. Noble gases dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following:
    - 1) Less than or equal to 500 mrems/year to the total body
    - 2) Less than or equal to 3,000 mrems/year to the skin
  - b. Noble gas air dose due to noble gases released in gaseous effluents, from the site, to areas at and beyond the site boundary shall be limited to the following:
    - 1) Quarterly
      - a) Less than or equal to 10 mrads gamma
      - b) Less than or equal to 20 mrads beta
    - 2) Yearly
      - a) Less than or equal to 20 mrads gamma
      - b) Less than or equal to 40 mrads beta
2. Iodine, tritium, and all radionuclides in particulate form with half-lives greater than 8 days.
  - a. The dose rate for Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released from the site to areas at and beyond the site boundary shall be limited to the following:
    - 1) Less than or equal to 1,500 mrems/yr to any organ
  - b. The dose to a MEMBER OF THE PUBLIC from Iodine-131, Iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 DAYS in gaseous effluents released from the site to areas at and beyond the site boundary shall be limited to the following:
    - 1) Quarterly
      - a) Less than or equal to 15 mrem to any organ
    - 2) Yearly

Annual Radioactive Effluent Release Report	YEAR: 2025	Page 16 of 41
<b>Company: Constellation Energy Generation</b>	<b>Plant: Braidwood Nuclear Power Station</b>	

4.2 (Continued)

- a) Less than or equal to 30 mrem to any organ

**4.3 Regulatory Limits for Liquid Effluent Doses**

1. The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from the site to unrestricted areas shall be limited to the following:
  - a. Quarterly
    - 1) Less than or equal to 3 mrems total body
    - 2) Less than or equal to 10 mrems critical organ
  - b. Yearly
    - 1) Less than or equal to 6 mrems total body
    - 2) Less than or equal to 20 mrems critical organ

**4.4 40 CFR 190 Regulatory Dose Limits for a Member of the Public**

1. Total Dose (40 CFR 190)
  - a. The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC in the unrestricted area due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to the following:
    - 1) Less than or equal to 25 mrems, total body or any organ except thyroid.
    - 2) Less than or equal to 75 mrems, thyroid.

**4.5 Onsite Doses (Within Site Boundary)**

BNPS classifies individuals within the site boundary as either occupationally exposed individuals or members of the public. This section evaluates dose to non-occupationally exposed workers and members of the public that may be onsite for various reasons. The report must include any other information as may be required by the Commission to estimate maximum potential annual radiation doses to the public resulting from effluent releases as required by 10 CFR 50.36a(a)(2). While within controlled or restricted areas, the limits from Sections 4.1 through 4.4 do not apply; however, 10 CFR 20.1301 dose limit of 100 mrem per year TEDE and dose rate limit

Annual Radioactive Effluent Release Report	YEAR: 2025	Page 17 of 41
<b>Company: Constellation Energy Generation</b>	<b>Plant: Braidwood Nuclear Power Station</b>	

of 2 mrem in an hour from external sources continue to apply. Braidwood had no non-occupational or members of the public exceed these limits in 2025.

**5.0 SUPPLEMENTAL INFORMATION**

**5.1 Gaseous Batch Releases**

**5.1.1 BNPS Unit 1 and Unit 2**

	<u>Units</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>	<u>Annual</u>
1. Number of Batch Releases		104	109	113	115	441
2. Total duration of batch releases	minutes	3.55E+04	3.24E+04	1.55E+04	1.85E+04	1.02E+05
3. Maximum batch release duration	minutes	2.11E+03	2.92E+03	2.20E+03	1.95E+03	2.92E+03
4. Average batch release duration	minutes	3.41E+02	2.98E+02	1.38E+02	1.61E+02	2.31E+02
5. Minimum batch release duration	minutes	2.70E+01	1.80E+01	1.40E+01	1.10E+01	1.10E+01

**5.2 Liquid Batch Releases**

**5.2.1 BNPS Unit 1 and Unit 2**

	<u>Units</u>	<u>Quarter 1</u>	<u>Quarter 2</u>	<u>Quarter 3</u>	<u>Quarter 4</u>	<u>Annual</u>
1. Number of Batch Releases		20	15	23	29	87
2. Total duration of batch releases	minutes	6.63E+04	2.86E+04	9.70E+04	9.09E+04	2.83E+05
3. Maximum batch release duration	minutes	8.60E+03	5.37E+03	1.01E+04	8.08E+03	1.01E+04
4. Average batch release duration	minutes	3.31E+03	1.91E+03	4.22E+03	3.14E+03	3.25E+03
5. Minimum batch release duration	minutes	1.22E+03	7.40E+01	2.70E+01	7.00E+01	2.70E+01
6. Avg stream flow during periods of release of liquid effluent into a flowing stream	ft <sup>3</sup> /sec	6246	5329	1608	1770	3463

**5.3 Abnormal Releases**

**5.3.1 Gaseous Abnormal Releases**

Number of releases	0
Total activity released	0 Ci

**5.3.2 Liquid Abnormal Releases**

Number of releases	0
Total activity released	0 Ci

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 19 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

**5.4 Land Use Census Changes**

The Land Use Census identified no new receptors or changes to the REMP program. The potential goat milk receptor reported in last year's ARERR declined to provide goat milk samples. This location was not added to the REMP sampling program, and vegetation is collected in accordance with ODCM requirements.

**5.5 Meteorological Data**

In accordance with ODCM Control 5.2, the ARERR should include a summary of meteorological data collected over the reporting year. During 2025, Braidwood site joint met data recovery was 99.9% which exceeded the goal of 90%. Joint Frequency Distribution (JFD) and meteorological data collected during 2025 is retained onsite. This data is available for review by the NRC upon request.

The Braidwood Station meteorological monitoring program produced 52,512 hours of valid data out of a possible 52,560 parameter hours during 2025 (365 days x 24 hours/day x 6 measured priority parameters), which represents an overall data recovery rate of 99.9%. Priority parameters are all parameters except dew point temperature and precipitation.

For the year, winds measured at 34 ft. most frequently came from the West-Northwest (10.83%) and fell into the 3.6 - 7.5 mph wind speed class (41.22%). Calms (wind speeds at or below the sensor threshold) were measured 0.02% of the time and speeds greater than 24.5 mph were measured 0.20% of the time. Stability based on the 199 - 30 ft. differential temperature most frequently fell into the neutral classification (41.22%).

**5.6 Effluent Radiation Monitors Out of Service Greater Than ODCM Requirements**

<b>Effluent Radiation Monitor Name</b>	<b>Number of Days Out of Service</b>	<b>Date Range Out of Service</b>	<b>Reason Out of Service &gt; 7 Days</b>	<b>Additional Notes (ODCM or TS)</b>
Noble Gas Activity Monitor – Providing Alarm (2RE-PR001B)	11	11/24/25 1520 to 12/5/25 0700	Parts acquisition delays	Table 12.2-3 Item 5a

**5.7 Offsite Dose Calculation Manual (ODCM) Changes**

There were no changes to the ODCM during the report period.

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 20 of 41
Company: Constellation Energy Generation		Plant: Braidwood Nuclear Power Station	

**5.8 Process Control Program (PCP) Changes**

There were no changes to the PCP during the report period.

**5.9 Radioactive Waste Treatment System Changes**

There were no changes or modifications to the gaseous radioactive waste, liquid radioactive waste, or ventilation exhaust treatment systems during the report period.

**5.10 Other Supplemental Information**

**5.10.1 Outside Tanks**

No outside tanks exceeded ODCM or Technical Specification Limits.

**5.10.2 Independent Spent Fuel Storage Installation (ISFSI) Monitoring Program**

An Independent Spent Fuel Storage Installation (ISFSI) was placed in service at Braidwood Station in 2011. The ISFSI is a closed system, and the only exposure would be due to direct radiation. In 2025, the direct dose to the nearest resident from the ISFSI was not detectable based on environmental dosimeters from the Radiological Environmental Monitoring Program. Currently, there is no off-site direct dose contribution from the ISFSI facility or any other waste or radioactive material storage areas on-site as evidenced by dosimetry data that is indistinguishable from the existing environmental dosimeters.

**5.10.3 Carbon-14**

Carbon-14 (C-14) is a naturally occurring radionuclide with a 5,730-year half-life. Nuclear weapons testing in the 1950s and 1960s significantly increased the amount of C-14 in the atmosphere. Nuclear power plants also produce C-14, but the amount is infinitesimal compared to what has been distributed in the environment due to weapons testing and what is produced by natural cosmic ray interactions.

In accordance with Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste," the NRC recommended re-evaluating "principal radionuclides" and reporting C-14 as appropriate. Carbon-14 production and release estimates were calculated using active core coolant mass, average neutron flux by energy and reactor coolant nitrogen concentrations to determine Carbon-14 generation based upon an effective full power year. The estimated generation for Braidwood Nuclear Power Station during 2025 was 8.69 Curies.

Public dose estimates were performed using methodology from the ODCM which is based on Regulatory Guide 1.109 methodology. C-14 dose is included in dose calculation results in Table 2.

Annual Radioactive Effluent Release Report	YEAR: 2025	Page 21 of 41
<b>Company: Constellation Energy Generation</b>	<b>Plant: Braidwood Nuclear Power Station</b>	

**5.10.4** Vendor non-conformance with Interlaboratory Cross Check Program

Teledyne Brown Engineering (TBE), the vendor laboratory performing analysis for samples submitted by BNPS, is required to participate in an interlaboratory cross check program. For the fourth quarter 2025, disagreements were discovered between TBE submitted results and the referenced values provided by the cross-check sample provider, Eckert & Ziegler Analytics (EZA). Constellation issued Issue Report (IR) 04947002 and TBE issued Non-Compliance Report (NCR) 26-01.

**5.10.5** Errata/Corrections to Previous ARERRs

There is no errata to be reported.

**6.0 NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM**

Braidwood Nuclear Power Station has developed a Groundwater Protection Initiative (GPI) program in accordance with NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document (2019). The purpose of the GPI is to ensure timely detection and an effective response to situations involving inadvertent radiological releases to groundwater in order to prevent migration of licensed radioactive material off-site and to quantify impacts on decommissioning. During 2025, BNPS collected and analyzed groundwater samples in accordance with the requirements of EN-BR-408-4160.

This section is included in this report to communicate results of NEI 07-07 Radiological Groundwater Monitoring Program. Monitoring wells installed as part of GPI program are sampled and analyzed, as summarized in Table 3, Groundwater Protection Program Monitoring Well Sample Schedule. In addition to reporting results from NEI 07-07 monitoring wells, voluntary communications to offsite governmental agencies for onsite leaks or spills per NEI 07-07 Objective 2.2, are also reported as part of this report. It is important to note, samples and results taken in support of NEI 07-07 groundwater monitoring program are not part of the Radiological Environmental Monitoring Program (REMP) but should be reported as part of ARERR. Drinking water results are reported in the AREOR as part of REMP ground water.

Table 3, Groundwater Protection Program Monitoring Well Sample Schedule

Well Name	Tritium	Gamma	Hard to Detect Nuclides	Alpha Spectroscopy
	Quarterly	Annually	Annually	(As needed)
MW-102R	X	X	X	X
MW-11	X	X	X	
MW-2	X	X	X	
MW-4	X	X	X	
MW-5	X	X	X	
MW-6	X	X	X	
MW-7	X	X	X	
MW-BW-141D	X	X	X	
MW-BW-142D	X	X	X	
MW-BW-143D	X	X	X	

**Company: Constellation Energy  
Generation**

**Plant: Braidwood Nuclear Power Station**

Well Name	Tritium	Gamma	Hard to Detect Nuclides	Alpha Spectroscopy
MW-BW-144D	X	X	X	
MW-BW-145D	X	X	X	
MW-BW-154	X	X	X	
MW-BW-155	X	X	X	
MW-BW-159D	X	X	X	
MW-BW-162D	X	X	X	
MW-BW-201S	X	X	X	
MW-BW-202S	X	X	X	
MW-BW-203S	X	X	X	
MW-BW-207I	X	X	X	
PS-10 <sup>1</sup>	X	X	X	
PS-12 <sup>2</sup>	X	X	X	
RW-6	X	X	X	
VB-1-1	X	X	X	
VB-10-1R	X	X	X	
VB-11-1	X	X	X	
VB-3-2	X	X	X	
VB-5-2R <sup>3</sup>	X	X	X	
VB-6-1	X	X	X	
VB-7-1	X	X	X	
VB-8-2R	X	X	X	
VB-9-1	X	X	X	

<sup>1</sup> PS-10 had insufficient water in Q3 and Q4

<sup>2</sup> PS-10 had insufficient water in 4th Quarter

<sup>3</sup> TBE calls well VB-5-2

Radiological Groundwater Monitoring Program tritium results are summarized in Table 4, Groundwater Protection Program Monitoring Well Tritium Results. Gamma-radionuclides and Sr-89/90 were not detected at concentrations greater than their respective LLDs during the 2nd quarter 2025 RGPP sampling round.

The 2nd quarter 2025 RGPP gross-alpha (suspended) result for MW-102R (3.92 pCi/L) exceeded the Alert Level for this well (2.438 pCi/L). The 3rd quarter sample collected from this well was analyzed for select transuranic radioisotopes to ensure the 2nd quarter 2025 gross-alpha result was not related to Station licensed material. No select transuranic radioisotopes were detected in the sample collected from MW-102R during the 3rd quarter 2025 RGPP sampling round.

Table 4, Groundwater Protection Program Monitoring Well Tritium Results

Well Name	Number of Positive Detections	Number of Analyses	Average Concentration. <sup>1</sup> (pCi/L)	Maximum Concentration (pCi/L)
MW-102R	0	4	<193	<195
MW-11	1	4	199	199
MW-2	4	4	271	348
MW-4	4	4	860	1100
MW-5	4	4	488	686
MW-6	4	4	471	745
MW-7	4	4	718	1010
MW-BW-141D	4	4	406	471
MW-BW-142D	4	4	686	862
MW-BW-143D	1	4	244	244
MW-BW-144D	4	4	261	274
MW-BW-145D	0	4	<188	<194
MW-BW-154	0	4	<190	<194
MW-BW-155	0	4	<193	<197
MW-BW-159D	1	4	207	207
MW-BW-162D	3	4	226	257
MW-BW-201S	1	4	360	360
MW-BW-202S	0	4	<190	<196
MW-BW-203S	1	4	212	212
MW-BW-207I	4	4	304	367
PS-10	0	2	<188	<189
PS-12	0	3	<192	<196
RW-6	0	4	<189	<193

<sup>1</sup> Results <MDA should not be included in the average concentration calculation.

Table 4, Groundwater Protection Program Monitoring Well Tritium Results

Well Name	Number of Positive Detections	Number of Analyses	Average Concentration. <sup>1</sup> (pCi/L)	Maximum Concentration (pCi/L)
VB-1-1	0	4	<190	<195
VB-10-1R	0	4	<187	<193
VB-11-1	0	4	<191	<198
VB-3-2	0	4	<190	<195
VB-5-2R	0	4	<189	<197
VB-6-1	0	4	<188	<196
VB-7-1	0	4	<188	<192
VB-8-2R	0	4	<191	<197
VB-9-1	0	4	<190	<196

### 6.1 Voluntary Notification

An NEI 07-07 notification was made on October 22, 2025, to the Illinois Environmental Protection Agency, Illinois Emergency Management Agency, American Nuclear Insurers, and Nuclear Regulatory Commission in accordance with site procedures, based on a spill or leak containing licensed material greater than 100 gallons with the potential to get into groundwater and not recaptured.

On October 21, 2025, the 15A Drain Cooler 1CB06AA, shell side relief valve (1DV021A), was found lifted/open with water relieving down the vent path outside of the Turbine Building. Water subsided when the condensate side of the drain cooler (tube side) was isolated by closing 1CB030A and 1CF004A. Engineering estimated the volume released from the system to be 7,500 gallons. A system sample taken soon after the event showed a H-3 concentration of 18,770 pCi/L. This equals 5.00E-04 curies being released. Tritium (H-3) was the only radionuclide detected.

The water discharged onto the asphalt outside the turbine building and flowed into a storm drain that leads to the North Oil Separator (NOS). The NOS was secured from discharging to the lake and sent back to Waste Water Treatment. A review of the tritium data showed that on 10/20/2025 the North Oil Separator was 664 pCi/L and on 10/21/2025 after the event it was 695 pCi/L. These results indicate that no appreciable amount of water went through this pathway to the lake.

The leak was isolated as soon as possible, and flow was diverted to a monitored pathway. Groundwater monitoring wells between spill location and downstream water intake are routinely monitored. As of this reporting, there have been no increase in groundwater activity due to this event. There is no drinking water source between the spill and the Kankakee River.

<sup>1</sup> Results <MDA should not be included in the average concentration calculation.

Annual Radioactive Effluent Release Report	YEAR: 2025	Page 26 of 41
<b>Company: Constellation Energy Generation</b>	<b>Plant: Braidwood Nuclear Power Station</b>	

The concentration of the water released was 1.88E-05  $\mu\text{Ci/ml}$  (1.877E4 pCi/L). Based on the 10CFR20 Appendix B Effluent Concentration Limit (ECL) H-3 limit of 1E-03  $\mu\text{Ci/ml}$  in water, the water released is 1.88% of the ECL. If an individual were to consume water at this concentration for a year, a conservative dose to the individual is calculated to be less than 1 mrem/year.

Annual Radioactive Effluent Release Report		YEAR: 2025	Page 27 of 41
<b>Company: Constellation Energy Generation</b>		<b>Plant: Braidwood Nuclear Power Station</b>	

## 7.0 BIBLIOGRAPHY

- [1] Nuclear Regulatory Commission, 30 June 2015. [Online]. Available: <http://www.nrc.gov/reading-rm/basic-ref/students/animated-pwr.html>. [Accessed October 2020].
- [2] Nuclear Regulatory Commission, 25 June 2015. [Online]. Available: <http://www.nrc.gov/reading-rm/basic-ref/students/animated-bwr.html>. [Accessed October 2020].
- [3] "NCRP Report No. 160 - Ionizing Radiation Exposure of the Population of the United States," National Council on Radiation Protection and Measurements, Bethesda, MD, 2009.
- [4] Health Physics Society, [Online]. Available: <http://hps.org/hpspublications/radiationfactsheets.html>. [Accessed 2020].
- [5] "NRC Resource Page," [Online]. Available: <http://www.nrc.gov/about-nrc/radiation.html>. [Accessed 10 November 2020].
- [6] "Japan Atomic Energy Agency," 06 November 2020. [Online]. Available: [https://www.jaea.go.jp/english/04/ntokai/houkan/houkan\\_02.html](https://www.jaea.go.jp/english/04/ntokai/houkan/houkan_02.html).
- [7] "Regulatory Guide 1.109 - Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Demonstrating Compliance with 10 CFR Part 50, Appendix I," Nuclear Regulatory Commission, October, 1977.
- [8] "NUREG-0133 - Preparation of Effluent Technical Specifications for Nuclear Power Plants," Nuclear Regulatory Commission, 1987.
- [9] "10 CFR 50 - Domestic Licensing of Production and Utilization Facilities," US Nuclear Regulatory Commission, Washington, DC.
- [10] "40 CFR 190 - Environmental Radiation Protection Standards for Nuclear Power Operation," US Environmental Protection Agency, Washington, DC.
- [11] "10 CFR 20 - Standards for Protection Against Radiation," US Nuclear Regulatory Commission, Washington, DC.
- [12] "NEI 07-07 - Industry Ground Water Protection Initiative — Final Guidance Document, Rev. 1," Nuclear Energy Institute, Washington, D.C., 2019.
- [13] "40 CFR 141 - National Primary Drinking Water Regulations," US Environmental Protection Agency, Washington, DC..
- [14] "NUREG-0324 - XOQDOQ, Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations," Nuclear Regulatory Commission, September, 1977.
- [15] "NUREG-1301 - Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Pressurized Water Reactors," Nuclear Regulatory Commission, April 1991.
- [16] "NUREG-1302 - Offsite Dose Calculation Manual Guidance: Standard Radiological Effluent Controls for Boiling Water Reactors," Nuclear Regulatory Commission, April 1991.
- [17] "Regulatory Guide 4.13 - Performance, Testing, and Procedural Specifications for Thermoluminescence Dosimetry: Environmental Applications, Revision 2," Nuclear Regulatory Commission, June, 2019.
- [18] "Regulatory Guide 4.15 - Quality Assurance for Radiological Monitoring Programs (Inception through Normal Operations to License Termination) -- Effluent Streams and the Environment," Nuclear Regulatory Commission, July, 2007.

**Attachment 1, ARERR Release Summary Tables (RG-1.21 Tables)**

**1.0 GASEOUS EFFLUENTS**

Table 5, Gaseous Effluents Summation of All Releases Unit 1 and Unit 2 <sup>1</sup>

A. Fission & Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total	Est. Total Error %
1. Total Release	Ci	5.78E-01	6.76E-01	4.46E-01	4.62E-01	2.16E+00	7.59E+00
2. Average Release Rate for Period	μCi/sec	7.43E-02	8.59E-02	5.61E-02	5.81E-02	6.85E-02	
<b>B. Iodine</b>							
1. Total Iodine – 131	Ci	1.45E-09	3.57E-07	1.10E-07	3.69E-07	8.37E-07	3.32E+01
2. Average Release Rate for Period	μCi/sec	1.86E-10	4.54E-08	1.39E-08	4.64E-08	2.65E-08	
<b>C. Particulates</b>							
1. Particulates with half-lives > 8 days.	Ci	2.84E-08	1.04E-06	3.58E-08	2.00E-09	1.11E-06	1.98E+01
2. Average Release Rate for Period	μCi/sec	3.65E-09	1.33E-07	4.51E-09	2.52E-10	3.52E-08	
<b>D. Tritium</b>							
1. Total Release	Ci	7.35E+01	3.41E+02	8.34E+01	2.14E+02	7.11E+02	8.07E+00
2. Average Release Rate for Period	μCi/sec	9.46E+00	4.33E+01	1.05E+01	2.69E+01	2.25E+01	
<b>E. Gross Alpha</b>							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	1.98E+01
2. Average Release Rate for Period	μCi/sec	N/A	N/A	N/A	N/A	N/A	
<b>F. Carbon-14</b>							
1. Total Release	Ci	2.22E+00	2.05E+00	2.21E+00	2.21E+00	8.69E+00	
2. Average Release Rate for Period	μCi/sec	2.85E-01	2.61E-01	2.78E-01	2.78E-01	2.75E-01	

<sup>1</sup> % of limit is provided in Table 1, Braidwood Nuclear Power Station Unit 1 and Unit 2 Dose Summary.

**Company: Constellation Energy  
Generation**

**Plant: Braidwood Nuclear Power Station**

Table 6, Gaseous Effluents – Mixed Level Release, Batch Mode Unit 1 and 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
<b>Fission Gases</b>						
Ar-41	Ci	5.73E-01	6.58E-01	2.71E-01	1.48E-01	1.65E+00
Kr-85m	Ci	0.00E+00	0.00E+00	0.00E+00	2.05E-03	2.05E-03
Kr-88	Ci	0.00E+00	0.00E+00	0.00E+00	3.39E-03	3.39E-03
Kr-89	Ci	0.00E+00	1.56E-02	0.00E+00	0.00E+00	1.56E-02
Xe-133	Ci	4.42E-03	2.14E-03	1.74E-01	2.32E-01	4.12E-01
Xe-135	Ci	0.00E+00	0.00E+00	8.02E-04	7.61E-02	7.69E-02
<b>Total for Period</b>	<b>Ci</b>	<b>5.78E-01</b>	<b>6.76E-01</b>	<b>4.46E-01</b>	<b>4.62E-01</b>	<b>2.16E+00</b>
<b>Iodines</b>						
Br-80	Ci	1.28E-05	9.17E-06	3.12E-05	1.19E-05	6.50E-05
Br-82	Ci	6.49E-05	1.02E-04	4.37E-05	3.37E-05	2.44E-04
I-131	Ci	1.45E-09	3.57E-07	1.10E-07	3.69E-07	8.37E-07
I-132	Ci	0.00E+00	5.64E-07	8.02E-08	4.75E-06	5.39E-06
I-133	Ci	5.44E-07	9.42E-07	8.34E-07	1.69E-07	2.49E-06
<b>Total for Period</b>	<b>Ci</b>	<b>7.83E-05</b>	<b>1.13E-04</b>	<b>7.59E-05</b>	<b>5.08E-05</b>	<b>3.18E-04</b>
<b>Particulates</b>						
Co-60	Ci	2.17E-08	7.78E-07	2.36E-08	2.00E-09	8.25E-07
As-76	Ci	5.93E-09	2.66E-07	1.23E-08	0.00E+00	2.84E-07
Cs-134	Ci	7.30E-10	0.00E+00	0.00E+00	0.00E+00	7.30E-10
<b>Total for Period</b>	<b>Ci</b>	<b>2.84E-08</b>	<b>1.04E-06</b>	<b>3.58E-08</b>	<b>2.00E-09</b>	<b>1.11E-06</b>
<b>Tritium</b>						
H-3	Ci	2.06E+01	1.16E+01	4.54E+00	4.24E+00	4.10E+01
<b>Gross Alpha</b>						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>Carbon-14</b>						
C-14	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 7, Gaseous Effluents – Mixed Level Release, Continuous Mode Unit 1 and 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
<b>Fission Gases</b>						
None	Ci	N/A	N/A	N/A	N/A	N/A
<b>Total for Period</b>	<b>Ci</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>Iodines</b>						
Br-82	Ci	4.03E-05	4.14E-05	4.46E-05	2.39E-05	1.50E-04
<b>Total for Period</b>	<b>Ci</b>	<b>4.03E-05</b>	<b>4.14E-05</b>	<b>4.46E-05</b>	<b>2.39E-05</b>	<b>1.50E-04</b>
<b>Particulates</b>						
None	Ci	N/A	N/A	N/A	N/A	N/A
<b>Total for Period</b>	<b>Ci</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<b>Tritium</b>						
H-3	Ci	5.29E+01	3.29E+02	7.88E+01	2.09E+02	6.70E+02
<b>Gross Alpha</b>						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>Carbon-14</b>						
C-14	Ci	2.22E+00	2.05E+00	2.21E+00	2.21E+00	8.69E+00

## 2.0 LIQUID EFFLUENTS

Table 8, Liquid Effluents – Summation of All Releases Unit 1 and 2.<sup>1</sup>

A. Fission & Activation Products	Unit	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual	Est. Total Error %
1. Total Release	Ci	6.95E-03	1.44E-03	3.44E-03	1.14E-03	1.30E-02	2.64E+00
2. Average diluted concentration	μCi/mL	4.19E-10	1.52E-10	1.85E-10	6.34E-11	2.07E-10	
<b>B. Tritium</b>							
1. Total Release	Ci	6.74E+02	4.97E+02	6.39E+02	7.88E+02	2.60E+03	5.85E+00
2. Average diluted concentration	μCi/mL	4.07E-05	5.23E-05	3.43E-05	4.37E-05	4.14E-05	
<b>C. Dissolved &amp; Entrained Gases</b>							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	2.64E+00
2. Average diluted concentration	μCi/mL	N/A	N/A	N/A	N/A	N/A	
<b>D. Gross Alpha Activity</b>							
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD	1.47E+01
2. Average diluted concentration	μCi/mL	N/A	N/A	N/A	N/A	N/A	
<b>E. Volume of Waste Released (prior to dilution)</b>							
	Liters	1.09E+10	7.56E+09	1.02E+10	1.09E+10	3.95E+10	
<b>F. Volume of Dilution Water Used During Period</b>							
	Liters	1.66E+10	9.49E+09	1.86E+10	1.80E+10	6.27E+10	

<sup>1</sup> % of limit is provided in Table 1, Braidwood Nuclear Power Station Unit 1 and Unit 2 Dose Summary.

Table 9, Batch Mode Liquid Effluents Unit 1 and 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
<b>Fission and Activation Products</b>						
Mn-54	Ci	0.00E+00	1.33E-06	4.66E-05	0.00E+00	4.80E-05
Co-58	Ci	2.07E-03	2.50E-04	3.64E-04	6.37E-04	3.32E-03
Co-60	Ci	1.11E-03	2.92E-04	2.93E-03	4.88E-04	4.82E-03
Ni-63	Ci	2.74E-03	8.89E-04	0.00E+00	0.00E+00	3.62E-03
Nb-95	Ci	0.00E+00	5.05E-07	0.00E+00	0.00E+00	5.05E-07
Ag-110m	Ci	0.00E+00	1.01E-06	6.80E-05	0.00E+00	6.91E-05
Sb-124	Ci	1.22E-05	0.00E+00	0.00E+00	0.00E+00	1.22E-05
Sb-125	Ci	1.02E-03	4.73E-06	2.99E-05	1.97E-05	1.08E-03
Total for Period	Ci	<b>6.95E-03</b>	<b>1.44E-03</b>	<b>3.44E-03</b>	<b>1.14E-03</b>	<b>1.30E-02</b>
<b>Tritium</b>						
H-3	Ci	<b>6.43E+02</b>	<b>4.39E+02</b>	<b>5.62E+02</b>	<b>5.86E+02</b>	<b>2.23E+03</b>
<b>Gross Alpha</b>						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>Entrained Gases</b>						
None	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 10, Continuous Mode Liquid Effluents Unit 1 and 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
<b>Fission and Activation Products</b>						
None	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
<b>Tritium</b>						
H-3	Ci	3.08E+01	5.72E+01	7.68E+01	2.03E+02	3.67E+02
<b>Gross Alpha</b>						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
<b>Entrained Gases</b>						
None	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

### Attachment 2, Solid Waste Information

#### 1.0 SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (NOT IRRADIATED FUEL)

Table 11, Resins, Filters, and Evaporator Bottoms Summary Shipped from the BNPS Site

Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	
A	3.95E+03	1.12E+02	1.61E+02
B	1.19E+02	3.37E+00	1.18E+02
C	0.00E+00	0.00E+00	0.00E+00
Unclassified	0.00E+00	0.00E+00	0.00E+00
All	4.07E+03	1.15E+02	2.79E+02
Major Nuclides for the Above Table: H-3, C-14, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Zn-65, Sr-90, Tc-99, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-241, Am-241, Cm-242, Cm-244			
<b>Waste Class A</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
H-3	8.01%	1.29E+01	
Mn-54	6.02%	9.69E+00	
Fe-55	31%	4.99E+01	
Co-58	4.87%	7.84E+00	
Co-60	35.8%	5.76E+01	
Ni-63	11.24%	1.81E+01	
<b>Waste Class B</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
H-3	2.66%	3.14E+00	
Mn-54	1.78%	2.09E+00	
Fe-55	3.38%	3.98E+00	
Co-58	4.08%	4.81E+00	
Co-60	24.2%	2.85E+01	
Ni-63	60.14%	7.10E+01	
Sb-125	1.81%	2.13E+00	
<b>Waste Class C</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
NONE	N/A	N/A	
<b>Total Combined</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
H-3	5.75%	1.60E+01	
Mn-54	4.22%	1.18E+01	
Fe-55	19.32%	5.39E+01	
Co-58	4.53%	1.26E+01	
Co-60	30.89%	8.62E+01	
Ni-63	31.92%	8.91E+01	
Sb-125	1.13%	3.17E+00	

### Attachment 2, Solid Waste Information

Table 12, Dry Active Waste (DAW) Summary Shipped from the BNPS Site

Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	
A	7.28E+03	2.06E+02	2.80E-01
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
Unclassified	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	<b>7.28E+03</b>	<b>2.06E+02</b>	<b>2.81E-01</b>
Major Nuclides for Above Table: H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-63, Sr-90, Zr-95, Nb-95, Tc-99, Ag-110m, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-241, Am-241, Cm-244			
<b>Waste Class A</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
H-3	21.33%	6.00E-02	
Cr-51	4.42%	1.24E-02	
Mn-54	1.51%	4.26E-03	
Fe-55	25.89%	7.28E-02	
Co-58	13.79%	3.88E-02	
Co-60	19.26%	5.41E-02	
Ni-63	3.1%	8.71E-03	
Zr-95	2.59%	7.28E-03	
Nb-95	4.75%	1.33E-02	
<b>Waste Class B</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
None	N/A	N/A	
<b>Waste Class C</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
None	N/A	N/A	
<b>Total Combined</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
H-3	21.33%	6.00E-02	
Cr-51	4.42%	1.24E-02	
Mn-54	1.51%	4.26E-03	
Fe-55	25.89%	7.28E-02	
Co-58	13.79%	3.88E-02	
Co-60	19.26%	5.41E-02	
Ni-63	3.1%	8.71E-03	
Zr-95	2.59%	7.28E-03	
Nb-95	4.75%	1.33E-02	

**Attachment 2, Solid Waste Information**

Table 13, Irradiated Components Summary Shipped from the BNPS Site

Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	
A	0.00E+00	0.00E+00	0.00E+00
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
Unclassified	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	0.00E+00	0.00E+00	0.00E+00
Major Nuclides for Above Table: N/A			
<b>Waste Class A</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance		Curies
None	N/A		N/A
<b>Waste Class B</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance		Curies
None	N/A		N/A
<b>Waste Class C</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance		Curies
None	N/A		N/A
<b>Total Combined</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance		Curies
None	N/A		N/A

### Attachment 2, Solid Waste Information

Table 14, Other Waste Summary Shipped from the BNPS Site

Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	
A	2.54E+02	7.19E+00	4.03E-03
B	0.00E+00	0.00E+00	0.00E+00
C	0.00E+00	0.00E+00	0.00E+00
Unclassified	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	<b>2.54E+02</b>	<b>7.19E+00</b>	<b>4.03E-03</b>
Major Nuclides for Above Table: H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-63, Sr-90, Zr-95, Nb-95, Tc-99, Ag-110m, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-241, Am-241, Cm-244			
<b>Waste Class A</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
Cr-51	7.97%	3.22E-04	
Mn-54	1.82%	7.34E-05	
Fe-55	29.61%	1.19E-03	
Co-58	19.75%	7.97E-04	
Co-60	21.76%	8.78E-04	
Ni-63	3.46%	1.39E-04	
Zr-95	3.78%	1.52E-04	
Nb-95	6.71%	2.71E-04	
Sb-125	1.09%	4.40E-05	
<b>Waste Class B</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
None	N/A	N/A	
<b>Waste Class C</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
None	N/A	N/A	
<b>Total Combined</b>			<b>≥ 1% Abundance</b>
Nuclide Name	Abundance	Curies	
Cr-51	7.97%	3.22E-04	
Mn-54	1.82%	7.34E-05	
Fe-55	29.61%	1.19E-03	
Co-58	19.75%	7.97E-04	
Co-60	21.76%	8.78E-04	
Ni-63	3.46%	1.39E-04	
Zr-95	3.78%	1.52E-04	
Nb-95	6.71%	2.71E-04	
Sb-125	1.09%	4.40E-05	

### Attachment 2, Solid Waste Information

Table 15, Sum of All Low-Level Waste Shipped from the BNPS Site

Waste Class	Volume		Curies Shipped
	ft <sup>3</sup>	m <sup>3</sup>	
A	1.15E+04	3.25E+02	1.61E+02
B	1.19E+02	3.37E+00	1.18E+02
C	0.00E+00	0.00E+00	0.00E+00
Unclassified	0.00E+00	0.00E+00	0.00E+00
<b>All</b>	<b>1.16E+04</b>	<b>3.29E+02</b>	<b>2.79E+02</b>
Major Nuclides for Above Table: H-3, C-14, Cr-51, Mn-54, Fe-55, Co-58, Co-60, Ni-59, Ni-63, Zn-65, Sr-90, Zr-95, Nb-95, Tc-99, Ag-110m, Sb-125, I-129, Cs-137, Pu-238, Pu-239, Pu-241, Am-241, Cm-242, Cm-244			
<b>Waste Class A <span style="float: right;">≥ 1% Abundance</span></b>			
Nuclide Name	Abundance		Curies
H-3	8.03%		1.30E+01
Mn-54	6.01%		9.69E+00
Fe-55	31%		5.00E+01
Co-58	4.88%		7.88E+00
Co-60	35.77%		5.77E+01
Ni-63	11.23%		1.81E+01
<b>Waste Class B <span style="float: right;">≥ 1% Abundance</span></b>			
Nuclide Name	Abundance		Curies
H-3	2.66%		3.14E+00
Mn-54	1.78%		2.09E+00
Fe-55	3.38%		3.98E+00
Co-58	4.08%		4.81E+00
Co-60	24.2%		2.85E+01
Ni-63	60.14%		7.10E+01
Sb-125	1.81%		2.13E+00
<b>Waste Class C <span style="float: right;">≥ 1% Abundance</span></b>			
Nuclide Name	Abundance		Curies
None	N/A		N/A
<b>Total Combined <span style="float: right;">≥ 1% Abundance</span></b>			
Nuclide Name	Abundance		Curies
H-3	5.76%		1.61E+01
Mn-54	4.22%		1.18E+01
Fe-55	19.33%		5.40E+01
Co-58	4.54%		1.27E+01
Co-60	30.88%		8.63E+01
Ni-63	31.89%		8.91E+01
Sb-125	1.13%		3.17E+00

**Attachment 2, Solid Waste Information**

**2.0 SOLID WASTE DISPOSITION**

Table 16, Solid Waste Disposition from the BNPS Site

Number of Shipments	Mode of Transportation	Destination
5	Hittman Transportation	Energy Solutions - Memphis 1790 Dock St. Memphis, TN
5	Hittman Transportation	Energy Solutions-Bear Creek Facility 1560 Bear Creek Road, Oak Ridge, TN
5	Hittman Transportation	Energy Solutions LLC., Clive, UT Clive Disposal Site - Containerized Waste Facility Clive, UT
1	Hittman Transportation	Waste Control Specialists LLC Compact Waste Disposal Facility, Andrews, TX
1	Landstar Inway	Energy Solutions - Memphis 1790 Dock St. Memphis, TN
17	Total	

### Attachment 3, Meteorological Data Summary

#### 2.1 Joint Frequency Distributions

1. Period of Record: 2025
2. Stability Class: All
  - a. Periods of calm (hours): 1.75 Hours
  - b. Hours of Valid Data: 52,512 of 52,560
  - c. Meteorological data are reported in percentage of total for all stability classes.
3. Tower Elevation: 320 ft

Wind Speed (mph)							
Wind Direction	< 3.5	3.6-7.5	7.6-12.5	12.6-18.5	18.6-24.5	>24.5	Total
N	0.73	0.86	0.95	0.08	0.00	0.00	2.62
NNE	0.91	1.81	1.28	0.03	0.00	0.00	4.03
NE	1.35	3.61	2.04	0.17	0.00	0.00	7.17
ENE	3.20	4.98	0.78	0.03	0.00	0.00	8.99
E	3.65	2.52	0.39	0.01	0.00	0.00	6.57
ESE	1.46	2.19	0.68	0.05	0.00	0.00	4.38
SE	0.68	2.39	1.20	0.16	0.00	0.00	4.43
SSE	0.37	2.95	1.60	0.40	0.00	0.00	5.32
S	0.18	2.31	3.27	1.51	0.18	0.00	7.45
SSW	0.16	1.23	2.18	1.59	0.51	0.06	5.73
SW	0.38	1.66	3.91	1.07	0.16	0.00	7.18
WSW	0.68	3.45	1.44	0.50	0.09	0.00	6.16
W	2.03	4.02	2.06	1.64	0.43	0.08	6.24
WNW	1.88	3.50	3.70	1.43	0.27	0.06	10.84
NW	0.86	2.09	1.52	0.12	0.00	0.00	4.59
NNW	0.53	1.65	1.68	0.36	0.00	0.00	4.22
Total	19.05	41.22	28.68	9.15	1.64	0.20	99.94

### Attachment 3, Meteorological Data Summary

#### 2.2 Stability class

Table 17, Classification of Atmospheric Stability

Stability Condition	Pasquill Categories	Percentage
Extremely Unstable	A	9.31%
Moderately Unstable	B	6.89%
Slightly Unstable	C	6.95%
Neutral	D	40.18%
Slightly Stable	E	24.71%
Moderately Stable	F	9.49%
Extremely Stable	G	3.45%