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Byron Station, Units 1 and 2
Renewed Facility Operating License Nos. NPF-37 and NPF-66
NRC Docket Nos. STN 50-454 and STN 50-455

Subject: 2025 Annual Radioactive Effluent Release Report

Enclosed is the Annual Radioactive Effluent Release Report for Byron Station. This report is being submitted in accordance with 10 CFR 50.36 a(2), "Technical specifications on effluents from nuclear power reactors," and includes a summary of radiological liquid and gaseous effluents and solid waste released from the site from January 2025 through December 2025.

If you have any questions regarding this information, please contact Ms. Zoe Cox, Regulatory Assurance Manager, at (779) 231-6606.

Respectfully,

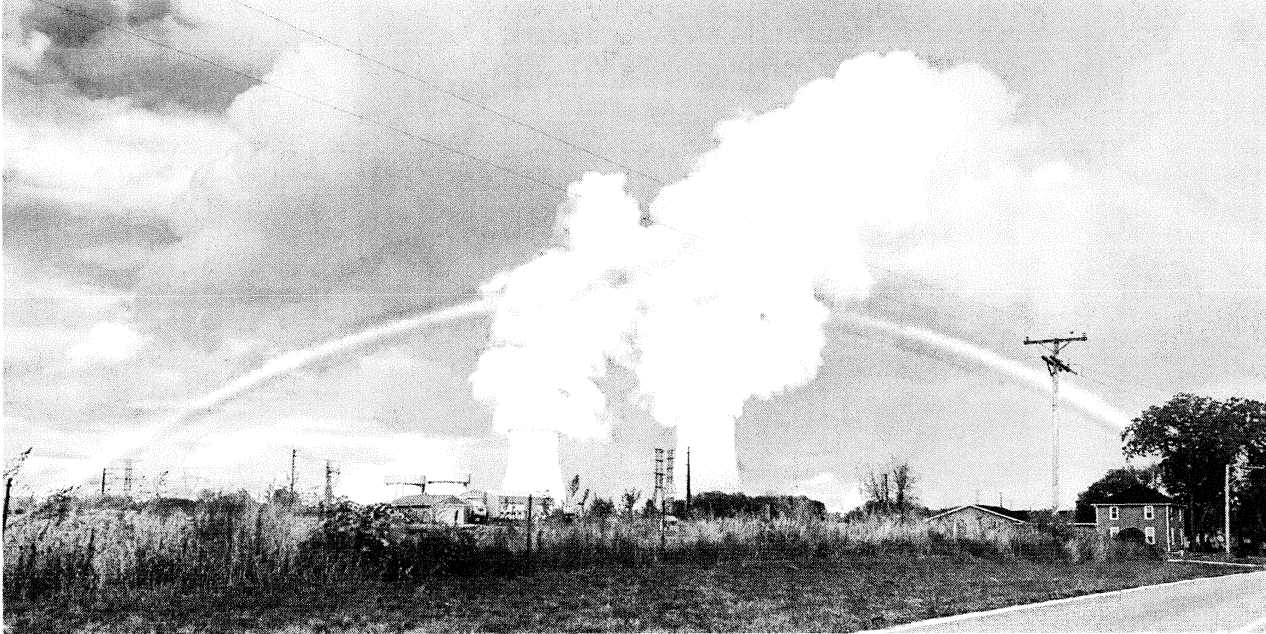
A handwritten signature in black ink, appearing to read "Harris Welt".

Harris Welt
Site Vice President
Byron Nuclear Generating Station

HW/EM/ZC/rlp

Enclosures

Cc: Mohammed Shuaibi, Regional Administrator – NRC Region III (Acting)



Annual Radiological Effluent Release Report 2025

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Company: Constellation**Plant: Byron Clean Energy Center**

1.0 LIST OF ACRONYMS AND DEFINITIONS

1. Alpha Particle (α): 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 3.7×10^{10} disintegrations per second, or 2.22×10^{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.
16. Microcurie (μCi): 3.7×10^4 disintegrations per second, or 2.22×10^6 disintegrations per minute.

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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.

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2.0 EXECUTIVE SUMMARY

Byron Clean Energy Center (BYR) 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 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, gaseous effluent dose assessments for locations from the Land Use Census showed that the critical receptor for Byron Clean Energy Center is a child. The maximum Annual Organ Dose calculated for this receptor was 2.331E0 mRem, to the bone found in Table 3.

The maximum dose calculated to any organ due to radioactive liquid effluents was 3.292E-2mRem, for a child GI-LI found in Table 3.

Solid radioactive waste shipped offsite for processing or direct disposal included 2.28E+01 Curies and 3.27E+02 m³, shipped in 21 shipments, found in Table 4.

In addition to monitoring radioactive effluents, BYR 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).

Company: Constellation**Plant: Byron Clean Energy Center****2.1 Comparison to Regulatory Limits**

During 2025 all liquid and gaseous radioactive effluents from Byron Clean Energy Center were well below regulatory limits, as summarized in Table 1, Table 2, and Table 3.

Table 1, Byron Clean Energy Center Unit 1 Dose Summary¹

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
Liquid Effluent Dose Limit, Total Body	Limit	1.5 mrem	1.5 mrem	1.5 mrem	1.5 mrem	3 mrem
	Total Body Dose	5.126E-03	4.090E-03	1.285E-03	5.581E-03	1.608E-02
	% of Limit	3.417E-01	2.726E-01	8.563E-02	3.721E-01	5.360E-01
Liquid Effluent Dose Limit, Any Organ	Limit	5 mrem	5 mrem	5 mrem	5 mrem	10 mrem
	Max Organ Dose	5.144E-03	4.358E-03	1.372E-03	5.585E-03	1.646E-02
	% of Limit	1.029E-01	8.717E-02	2.745E-02	1.117E-01	1.646E-01
Gaseous Effluent Dose Limit, Gamma Air (Noble Gas)	Limit	5 mrad	5 mrad	5 mrad	5 mrad	10 mrad
	Gamma Air Dose	2.844E-05	3.220E-05	3.278E-05	3.134E-05	1.248E-04
	% of Limit	5.687E-04	6.439E-04	6.557E-04	6.268E-04	1.247E-03
Gaseous Effluent Dose Limit, Beta Air (Noble Gas)	Limit	10 mrad	10 mrad	10 mrad	10 mrad	20 mrad
	Beta Air Dose	8.525E-06	1.044E-05	9.284E-06	9.749E-06	3.799E-05
	% of Limit	8.525E-05	1.044E-04	9.284E-05	9.749E-05	1.899E-04
Gaseous Effluent Organ Dose Limit (Iodine, Tritium, Particulates with > 8-day half-life)	Limit	7.5 mrem	7.5 mrem	7.5 mrem	7.5 mrem	15 mrem
	Max Organ Dose	2.896E-01	3.013E-01	3.203E-01	2.900E-01	1.201E+00
	% of Limit	3.861E+00	4.017E+00	4.271E+00	3.867E+00	8.008E+00

¹ Table 1 demonstrates compliance with 10 CFR Part 50, App. I Limits.

Company: Constellation**Plant: Byron Clean Energy Center**Table 2, Byron Clean Energy Center Unit 2 Dose Summary²

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
Liquid Effluent Dose Limit, Total Body	Limit	1.5 mrem	1.5 mrem	1.5 mrem	1.5 mrem	3 mrem
	Total Body Dose	5.126E-3	4.090E-3	1.285E-3	5.581E-3	1.608E-2
	% of Limit	3.417E-1	2.726E-1	8.563E-2	3.721E-1	5.360E-1
Liquid Effluent Dose Limit, Any Organ	Limit	5 mrem	5 mrem	5 mrem	5 mrem	10 mrem
	Max Organ Dose	5.144E-3	4.358E-3	1.372E-3	5.585E-3	1.646E-2
	% of Limit	1.029E-1	8.717E-2	2.745E-2	1.117E-1	1.646E-1
Gaseous Effluent Dose Limit, Gamma Air (Noble Gas)	Limit	5 mrad	5 mrad	5 mrad	5 mrad	10 mrad
	Gamma Air Dose	1.437E-5	1.621E-5	1.159E-5	1.991E-5	6.208E-5
	% of Limit	2.874E-4	3.242E-4	2.317E-4	3.983E-4	6.218E-4
Gaseous Effluent Dose Limit, Beta Air (Noble Gas)	Limit	10 mrad	10 mrad	10 mrad	10 mrad	20 mrad
	Beta Air Dose	5.019E-6	6.084E-6	3.654E-6	6.369E-6	2.113E-5
	% of Limit	5.019E-5	6.084E-5	3.654E-5	6.369E-5	1.056E-4
Gaseous Effluent Organ Dose Limit (Iodine, Tritium, Particulates with > 8-day half-life)	Limit	7.5 mrem	7.5 mrem	7.5 mrem	7.5 mrem	15 mrem
	Max Organ Dose	2.871E-01	2.352E-01	3.087E-01	2.991E-01	1.130E+00
	% of Limit	3.827E+00	3.136E+00	4.116E+00	3.988E+00	7.534E+00

² Table 2 demonstrates compliance with 10 CFR Part 50, App. I Limits.

Table 3, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for BYR³

	Whole Body	Thyroid	Max Other Organ
Gaseous ⁴	5.027E-1	5.017E-1	2.331E0
Liquid	3.216E-2	3.221E-2	3.292E-2
ISFSI	0.00E+00	0.00E+00	0.00E+00
Total Site Dose	5.349E-1	5.339E-1	2.364E0
Total w/Other Nearby Facility⁵	5.349E-1	5.339E-1	2.364E0
Limit	25 mrem	75 mrem	25 mrem
% of Limit	2.140E0	7.119E-1	9.456E0

³ Table 3 is a summation of Units to show compliance with 40 CFR Part 190 Limits.

⁴ Gaseous dose values in Table 3 include organ dose from Noble Gas, Iodine, Tritium, C-14, and particulates.

⁵ Other fuel cycle sources within 5 miles of the site are considered in this analysis.

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.

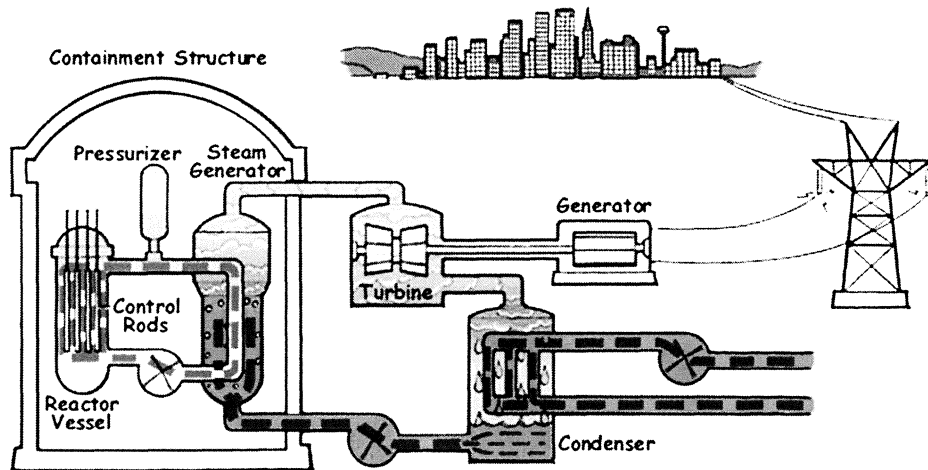


Figure 1, Pressurized Water Reactor (PWR) [1]

3.1 (Continued)

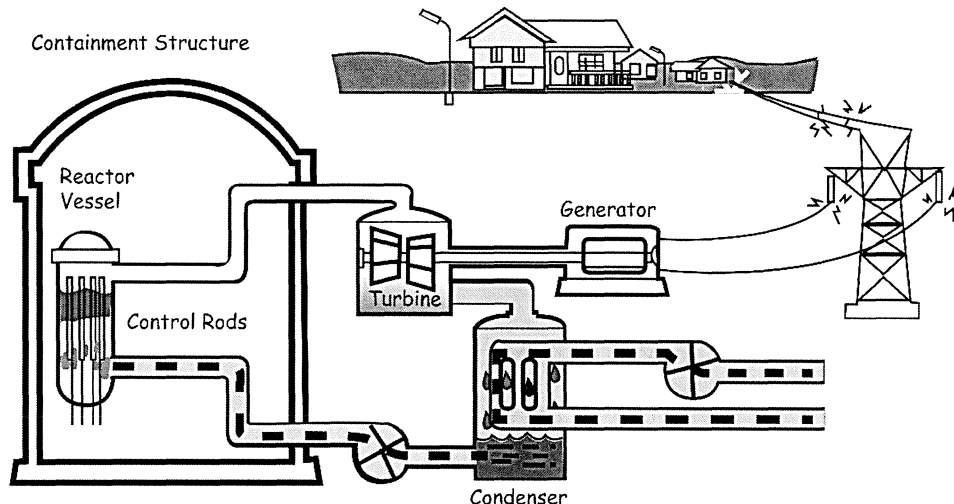


Figure 2, Boiling Water Reactor (BWR) [2]

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.

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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.

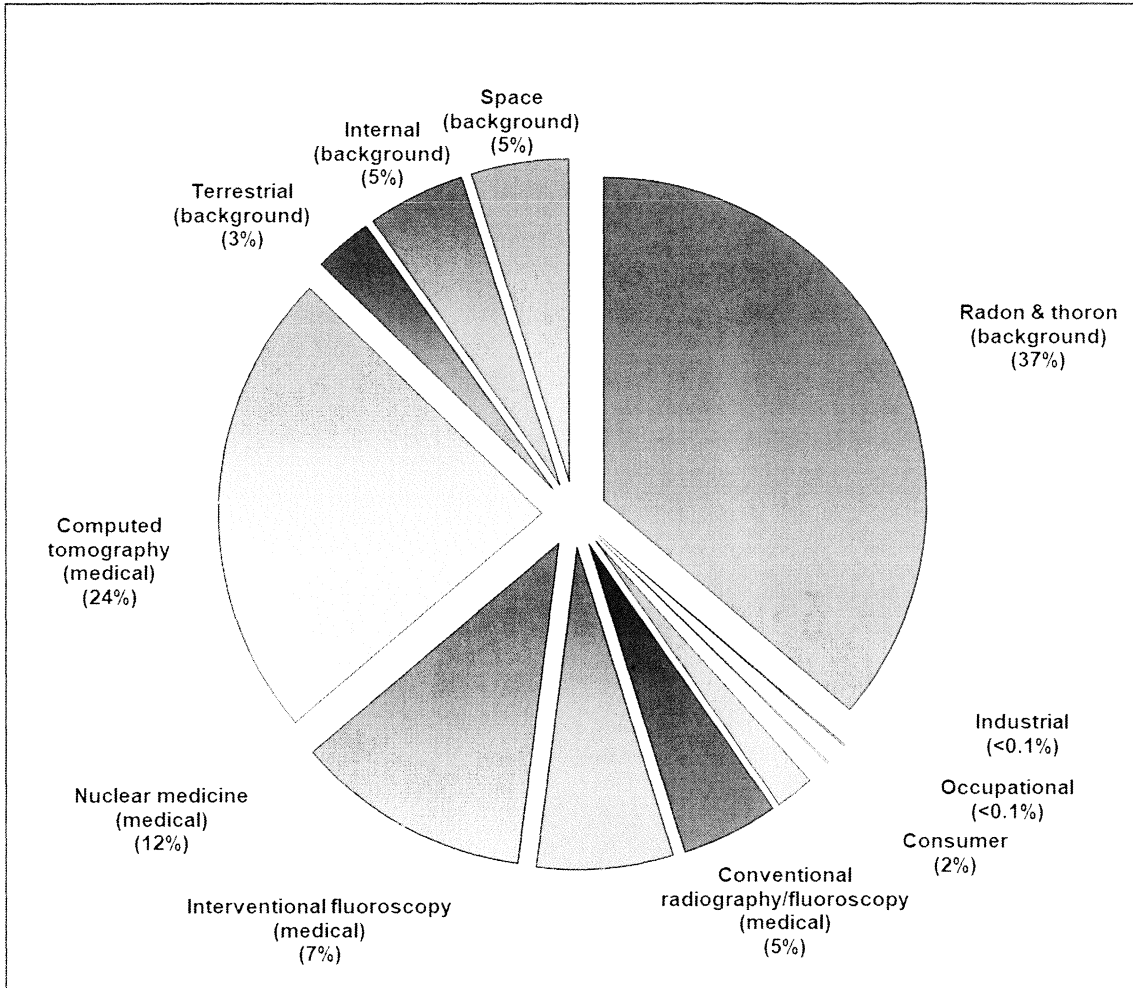


Figure 3, Sources of Radiation Exposure (NCRP Report No. 160) [3]

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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.

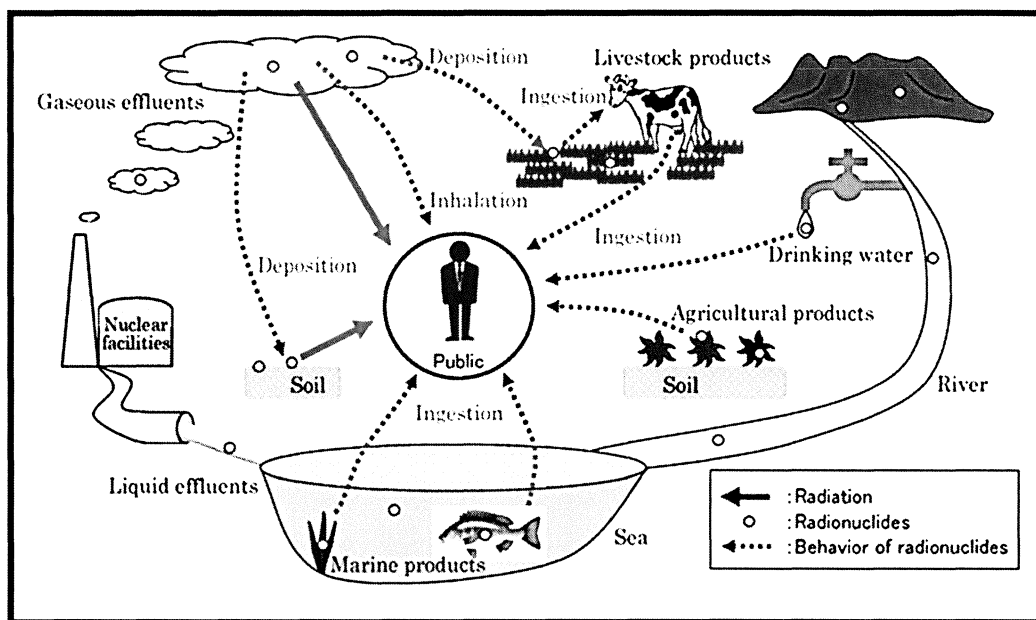


Figure 4, Potential exposure pathways to Members of the Public due to Plant Operations [6]

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.

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3.3 (Continued)

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.

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 likely to be most 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.

Company: Constellation**Plant: Byron Clean Energy Center**

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 BYR must adhere. BYR 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 BYR 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 2.0×10^{-4} microcuries/mL.

The annual whole body, skin and organ dose was computed using the 2024 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, Byron Clean Energy Center Unit 1 Dose Summary, Table 1, Byron Clean Energy Center Unit 1 Dose Summary, and Table 3, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for BYR.

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 mrem/year to the total body
 - 2) Less than or equal to 3000 mrem/year to the skin
 - b. Noble gas air dose due to noble gases released in gaseous effluents, from each reactor unit to areas at and beyond the site boundary shall be limited to the following:
 - 1) Quarterly
 - a) Less than or equal to 5 mrad gamma
 - b) Less than or equal to 10 mrad beta
 - 2) Yearly
 - a) Less than or equal to 10 mrad gamma
 - b) Less than or equal to 20 mrad beta

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4.2 (Continued)

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 1500 mrem/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 each reactor unit to areas at and beyond the site boundary shall be limited to the following:
 - 1) Quarterly
 - a) Less than or equal to 7.5 mrem to any organ
 - 2) Yearly
 - a) Less than or equal to 15 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 each reactor unit to unrestricted areas shall be limited to the following:
 - a. Quarterly
 - 1) Less than or equal to 1.5 mrem total body
 - 2) Less than or equal to 5 mrem critical organ
 - b. Yearly
 - 1) Less than or equal to 3 mrem total body
 - 2) Less than or equal to 10 mrem 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 mrem, Total Body or any Organ except Thyroid.
 - 2) Less than or equal to 75 mrem, Thyroid.

5.0 SUPPLEMENTAL INFORMATION

5.1 Gaseous Batch Releases

5.1.1 BYR Site

	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Number of Batch Releases		100	102	88	95	385
2. Total duration of batch releases	minutes	9.27E+03	1.89E+04	7.37E+03	7.94E+03	4.35E+04
3. Maximum batch release duration	minutes	6.99E+02	2.45E+03	1.70E+02	1.95E+02	2.45E+03
4. Average batch release duration	minutes	9.27E+01	1.85E+02	8.38E+01	8.36E+01	1.13E+02
5. Minimum batch release duration	minutes	4.70E+01	1.00E+00	4.50E+01	1.50E+01	1.00E+00

5.2 Liquid Batch Releases

5.2.1 BYR Site

	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Number of Batch Releases		19	22	15	12	68
2. Total duration of batch releases	minutes	5.486E+03	2.388E+03	1.044E+03	3.871E+03	1.279E+04
3. Maximum batch release duration	minutes	4.940E+02	2.610E+02	1.910E+02	6.210E+02	6.210E+02
4. Average batch release duration	minutes	2.887E+02	1.085E+02	6.960E+01	3.226E+02	1.881E+02
5. Minimum batch release duration	minutes	6.200E+01	5.300E+01	5.000E+01	7.700E+01	5.000E+01
6. Avg stream flow during periods of release of liquid effluent into a flowing stream	Ft ³ /sec	*	*	*	*	*

* average stream flow in calculating dose.

Company: Constellation**Plant: Byron Clean Energy Center****5.3 Abnormal Releases****5.3.1 Gaseous Abnormal Releases**

Number of releases	1
Total activity released	1.09E-5 Ci

There were no abnormal releases for Unit 1. One abnormal release was released through Unit 2 and lasted less than 1 minute.

During plant power ascension as part of B2R25, the 2B steam generator lifted during power ascension into Mode 1 (>5% power) due to all steam dumps not being available prior to power ascension. Steam pressure peaked at 1117 psig. The PORV setpoint is 1115 psig. The PORV was open for less than one minute.

The release had a permit created and is incorporated in the effluent data presented in this report.

Liquid Abnormal Releases

Number of releases	0
Total activity released	0 Ci

5.4 Land Use Census Changes

The results for the 2025 Land Use Census had a change noted for the nearest residence in the ENE sector. All other highest D/Q locations for nearest livestock, nearest residence and nearest milk animal did not change from the previous 2024 census. This change is documented further in the 2025 AREOR.

Company: Constellation**Plant: Byron Clean Energy Center****5.5 Meteorological Data**

In 2025, Byron Generating Station met the 90% data accumulation requirement. Joint Frequency Distribution tables are available on site per request.

5.6 Effluent Radiation Monitors Out of Service Greater Than 30 Days

No effluent radiation monitors were out of service for greater than 30 days in 2025.

5.7 Offsite Dose Calculation Manual (ODCM) Changes

No ODCM changes were made in 2025.

5.8 Process Control Program (PCP) Changes

No PCP changes were made in 2025.

5.9 Radioactive Waste Treatment System Changes

No waste treatment system changes were made in 2025.

5.10 Other Supplemental Information**5.10.1 Independent Spent Fuel Storage Installation (ISFSI) Monitoring Program**

There were no irradiated fuel shipments during the 2025 reporting period. An Independent Spent Fuel Storage Installation (ISFSI) campaign began in 2010 when used fuel was removed from the Spent Fuel Pool (SFP), placed into six (6) casks, each containing 32 fuel bundles, and transferred to an outdoor storage pad. No additional casks were placed on the pad in 2011. In 2012, eight (8) additional casks were placed on the pad for a total of fourteen (14) casks. No additional casks were placed on the pad in 2013 or 2014. In 2015, six (6) additional casks were placed on the pad for a total of twenty (20) casks. In 2016, six (6) additional casks were placed on the pad. No additional casks were placed on the pad in 2017. In 2018, five (5) additional casks were placed on the pad. In 2019, six (6) additional casks were placed on the pad. In 2020, no additional casks were added. In 2021, six (6) additional casks were placed on the pad. In 2022, seven (7) additional casks were placed on the pad for a total of fifty (50). In 2023, no additional casks were placed on the pad. In 2024, five (5) additional casks were placed on the pad. In 2025, six (6) additional casks were placed on the pad. Prior to the first ISFSI campaign, additional dosimeters were placed at the site boundary nearest to the storage pad (in between the pad and the nearest resident) for the purpose of measuring any potential offsite dose to the public from the storage pad. Since the dosimeters were placed, data from the dosimeters, when compared to the existing environmental dosimeters in the surrounding area, have shown no statistical difference. As a result, there is currently no offsite dose contribution from the ISFSI facility or any other on-site storage facility, including the Dry Active Waste (DAW) Building and the Old Steam Generator (OSG) Storage Building, as evidenced by dosimetry data that is indistinguishable from the existing environmental dosimeters.

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5.10.2 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 Byron Clean Energy Center during 2025 was 8.92E+00 Curies.

Public dose estimates were performed using methodology from the ODCM which is based on Regulatory Guide 1.109 methodology. C-14 is accounted for in the gaseous dose is included in dose calculation results in Table 3.

Company: Constellation**Plant: Byron Clean Energy Center**

5.10.3 Errata/Corrections to Previous ARERRs

The annual tritium value listed in Table 5, Gaseous Effluents Summation of All Releases Unit 2 of the 2023 ARERR was reported as 6.33E+02 Ci when it should have been reported as 6.33E+01 Ci. This was an issue due to the value being entered incorrectly into the report.

The ISFSI paragraph in the 2024 ARERR did not include the number of casks stored during that year. The paragraph should have included the following. In 2024, five (5) additional casks were placed on the pad.

During collection of daily totalizer readings for the Treated Runoff (TR) and Condensate Polisher (CP) effluent systems, there were irregularities noticed for the TR and CP totalizer effluent numbers. The totalizer reading was lower on 2/19/25 and 2/21/25 for TR and CP, respectively. This affected the known flow for those days for these systems, therefore requiring the flow to be estimated. Liquid composites for these effluent systems, including Circulating Water Blow Down (CWBD), are analyzed for gamma, tritium, and hard to detect nuclides following 10CFR50. The issue was due to staff recording data incorrectly.

5.10.4 Other Information

An external vendor performs hard to detect analysis for Constellation Nuclear sites and participates in a quarterly crosscheck program. In the 4th Quarter of 2025, disagreements were discovered between the vendor analysis results for Gross Beta and Ni-63 and the reference values provided by the vendor of those sources. The vendor was contacted about the discrepancy, and an investigation was opened to determine the cause of the disagreement. The Gross Beta crosscheck result was due to unexpected packaging of the sample filters which were stacked together as a blank, spiked filter, and another blank. The vendor did not visually inspect how the crosscheck filters were configured prior to analysis. The initial results showed lower activity for the crosscheck source because the three filters were run together. This prevented the detector from measuring the full activity of the spiked filter. The vendor separated the filters for the reanalysis, and the expected activity was consistent with the crosscheck vendor's results. The Ni-63 failure was due to the sample preparation being performed incorrectly. This resulted in the addition of more carrier than specified by the method. The resulting activity was reported to be lower than expected due to excess sample dilution. The vendor performed calculations to account for the excess dilution which indicated the sample activity would have met the expected activity value.

Company: Constellation**Plant: Byron Clean Energy Center**

6.0 NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM

Byron Clean Energy Center has developed a Groundwater Protection Initiative (GPI) program in accordance with NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document [9]. 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.

In 2025, fourteen (14) monitoring wells were sampled in total. Groundwater samples were obtained in March, June, August, and November for tritium. One well contained levels of tritium above the lower limit of detection (LLD) of 200 pCi/L: well AR-11 (265 pCi/L in June, 269 pCi/L in November). In addition, Sr-89/Sr-90 analyses were performed on select wells for the samples obtained in June in accordance with site procedures and the Nuclear Energy Institute (NEI) 07-07, Groundwater Protection Initiative. None of these samples showed activity above the minimum levels of detection. Well AR-11 is near the Circulating Water Blowdown piping, where historical leakage through vacuum breakers was known to have occurred. This well has exhibited an overall decreasing trend since 2006. None of Byron's onsite wells are used for drinking water, however, should any of the water in these aquifers migrate to off-site wells used for drinking, the off-site dose consequence from tritium present in these wells would be negligible. All groundwater well sample results are well below the drinking water standard of 20,000 pCi/L tritium. AMO Environmental Decisions, a nuclear utility groundwater consultant, has reviewed the 2025 RGPP data and concluded there is no evidence of new or ongoing tritium leak(s) at the site.

Comprehensive report of the groundwater and drinking samples can be found in the AREOR.

6.1 Voluntary Notification

During 2025, Byron Clean Energy Center did not make a voluntary NEI 07-07 notification to State/Local officials, NRC, and to other stakeholders required by site procedures.

Company: Constellation**Plant: Byron Clean Energy Center**

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

1.0 GASEOUS EFFLUENTS

Table 4, Gaseous Effluents Summation of All Releases Unit 1 ⁶

A. Fission & Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Total Release	Ci	6.667E-02	8.682E-02	6.419E-02	8.185E-02	2.995E-01
2. Average release rate for the period	μCi/sec	8.574E-03	1.104E-02	8.075E-03	1.030E-02	9.498E-03
B. Iodine						
1. Total Iodine – 131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
2. Average release rate for the period	μCi/sec	N/A	N/A	N/A	N/A	
C. Particulates						
1. Particulates with half-lives > 8 days	Ci	6.247E-07	6.247E-07	6.247E-07	6.247E-07	6.247E-07
2. Average release rate for the period	μCi/sec	8.034E-08	8.034E-08	8.034E-08	8.034E-08	8.034E-08
D. Tritium						
1. Total Release	Ci	4.988E+00	4.988E+00	4.988E+00	4.988E+00	4.988E+00
2. Average release rate for the period	μCi/sec	6.415E-01	6.415E-01	6.415E-01	6.415E-01	6.415E-01
E. Gross Alpha						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
2. Average release rate for the period	μCi/sec	N/A	N/A	N/A	N/A	
F. Carbon-14						
1. Total Release	Ci	1.109E+00	1.109E+00	1.109E+00	1.109E+00	1.109E+00
2. Average release rate for the period	μCi/sec	1.426E-01	1.426E-01	1.426E-01	1.426E-01	1.426E-01

⁶ % of limit is provided in Table 1, Byron Clean Energy Center Unit 1 Dose Summary

Company: Constellation**Plant: Byron Clean Energy Center**Table 5, Gaseous Effluents Summation of All Releases Unit 2 ⁷

A. Fission & Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Total Release	Ci	4.972E-02	5.920E-02	3.076E-02	5.597E-02	1.957E-01
2. Average release rate for the period	μCi/sec	6.394E-03	7.530E-03	3.870E-03	7.042E-03	6.204E-03
B. Iodine						
1. Total Iodine – 131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
2. Average release rate for the period	μCi/sec	N/A	N/A	N/A	N/A	N/A
C. Particulates						
1. Particulates with half-lives > 8 days	Ci	6.452E-07	8.759E-03	0.000E+00	0.000E+00	8.759E-03
2. Average release rate for the period	μCi/sec	8.297E-08	1.114E-03	0.000E+00	0.000E+00	2.778E-04
D. Tritium						
1. Total Release	Ci	3.043E+01	4.260E+01	3.107E+01	5.952E+01	1.636E+02
2. Average release rate for the period	μCi/sec	3.913E+00	5.418E+00	3.908E+00	7.488E+00	5.188E+00
E. Gross Alpha						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
2. Average release rate for the period	μCi/sec	N/A	N/A	N/A	N/A	N/A
F. Carbon-14						
1. Total Release	Ci	1.099E+00	8.936E-01	1.182E+00	1.145E+00	4.320E+00
2. Average release rate for the period	μCi/sec	1.414E-01	1.137E-01	1.487E-01	1.441E-01	1.370E-01

⁷ % of limit is provided in Table 1, Byron Clean Energy Center Unit 1 Dose Summary

Company: Constellation

Plant: Byron Clean Energy Center

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

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	5.210E-2	5.753E-02	6.052E-02	5.714E-02	2.273E-01
Kr-85m	Ci	<LLD	8.562E-05	7.833E-06	<LLD	9.346E-05
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	7.002E-05	7.000E-05	<LLD	<LLD	1.400E-04
Xe-133m	Ci	1.324E-04	8.209E-04	1.382E-04	<LLD	1.091E-03
Xe-133	Ci	1.415E-02	2.230E-02	2.988E-03	2.471E-02	6.415E-02
Xe-135	Ci	2.195E-04	6.021E-03	5.324E-04	<LLD	6.773E-03
Total for Period	Ci	6.667E-02	8.682E-02	6.419E-02	8.185E-02	2.995E-01
Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Particulates						
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Tritium						
H-3	Ci	7.195E-02	1.018E-01	1.037E-01	8.409E-02	3.616E-01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Company: Constellation

Plant: Byron Clean Energy Center

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

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	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-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
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
Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Particulates						
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ni-63	Ci	6.247E-07	7.828E-06	0.000E+00	0.000E+00	8.452E-06
Total for Period	Ci	6.247E-07	7.828E-06	0.000E+00	0.000E+00	8.452E-06
Tritium						
H-3	Ci	4.916E+00	6.386E+00	8.778E+00	7.889E+00	2.797E+01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	1.109E+00	1.153E+00	1.227E+00	1.111E+00	4.599E+00

Company: Constellation**Plant: Byron Clean Energy Center**

Table 8, Gaseous Effluents – Mixed Level Release Batch Mode Unit 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	2.568E-2	2.783E-02	2.101E-02	3.615E-02	1.107E-01
Kr-85m	Ci	<LLD	8.562E-05	7.833E-06	<LLD	9.346E-05
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-131m	Ci	7.002E-5	7.000E-05	<LLD	<LLD	1.400E-04
Xe-133m	Ci	1.324E-04	8.209E-04	1.382E-04	<LLD	1.091E-03
Xe-133	Ci	2.362E-02	2.437E-02	9.077E-03	1.982E-02	7.689E-02
Xe-135	Ci	2.195E-04	6.021E-03	5.324E-04	<LLD	6.773E-03
Total for Period	Ci	4.972E-02	5.920E-02	3.076E-02	5.597E-02	1.957E-01
Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Particulates						
Co-58	Ci	<LLD	8.741E-03	<LLD	<LLD	8.741E-03
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	8.741E-03	<LLD	<LLD	8.741E-03
Tritium						
H-3	Ci	5.827E-02	8.098E-02	2.796E-02	9.028E-02	2.575E-01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Company: Constellation

Plant: Byron Clean Energy Center

Table 9, Gaseous Effluents – Mixed Level Release Continuous Mode Unit 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	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
Kr-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
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
Iodines						
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Particulates						
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ni-63	Ci	6.452E-07	1.772E-05	0.000E+00	0.000E+00	1.837E-05
Total for Period	Ci	6.452E-07	1.772E-05	0.000E+00	0.000E+00	1.837E-05
Tritium						
H-3	Ci	3.037E+01	4.252E+01	3.104E+01	5.943E+01	1.634E+02
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	1.099E+00	8.936E-01	1.182E+00	1.145E+00	4.320E+00

Company: Constellation**Plant: Byron Clean Energy Center****2.0 LIQUID EFFLUENTS**Table 10, Liquid Effluents – Summation of All Releases Unit 1⁸

A. Fission & Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Total Release	Ci	1.432E-03	7.659E-03	2.990E-03	1.069E-03	1.315E-02
2. Average diluted concentration	μCi/ mL	4.331E-10	2.499E-09	1.410E-09	4.304E-10	1.198E-09
B. Tritium						
1. Total Release	Ci	5.084E+02	4.256E+02	1.388E+02	6.327E+02	1.706E+03
2. Average diluted concentration	μCi/ mL	1.538E-04	1.389E-04	6.546E-05	2.549E-04	1.554E-04
C. Dissolved & Entrained Gases						
1. Total Release	Ci	7.437E-05	2.451E-05	<LLD	<LLD	9.887E-05
2. Average diluted concentration	μCi/ mL	2.249E-11	7.996E-12	N/A	N/A	9.010E-12
D. Gross Alpha Activity						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
E. Volume of Waste Released (prior to dilution)						
E. Volume of Waste Released (prior to dilution)	Liters	3.202E+09	3.020E+09	2.101E+09	2.409E+09	1.073E+10
F. Volume of Dilution Water Used During Period						
F. Volume of Dilution Water Used During Period	Liters	1.038E+08	4.520E+07	1.976E+07	7.327E+07	2.421E+08

⁸ % of limit is provided in Table 1, Byron Clean Energy Center Unit 1 Dose Summary

Table 11, Liquid Effluents – Summation of All Releases Unit 2⁹

A. Fission & Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual
1. Total Release	Ci	1.432E-03	7.659E-03	2.990E-03	1.069E-03	1.315E-02
2. Average diluted concentration	μCi/mL	4.331E-10	2.499E-09	1.410E-09	4.304E-10	1.198E-09
B. Tritium						
1. Total Release	Ci	5.084E+02	4.256E+02	1.388E+02	6.327E+02	1.706E+03
2. Average diluted concentration	μCi/mL	1.538E-04	1.389E-04	6.546E-05	2.549E-04	1.554E-04
C. Dissolved & Entrained Gases						
1. Total Release	Ci	7.437E-05	2.451E-05	<LLD	<LLD	9.887E-05
2. Average diluted concentration	μCi/mL	2.249E-11	7.996E-12	N/A	N/A	9.010E-12
D. Gross Alpha Activity						
1. Total Release	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
E. Volume of Waste Released (prior to dilution)						
	Liters	3.202E+09	3.020E+09	2.101E+09	2.409E+09	1.073E+10
F. Volume of Dilution Water Used During Period						
	Liters	1.038E+08	4.520E+07	1.976E+07	7.327E+07	2.421E+08

⁹ % of limit is provided in Table 1, Byron Clean Energy Center Unit 1 Dose Summary

Company: Constellation**Plant: Byron Clean Energy Center**Error Analysis

The following is an estimate of the errors associated with effluent monitoring and analysis. The estimate is calculated using the square root of the sum of the squares methodology.

1. Gaseous Effluents

Qme=3.33%
 RM=N/A
 ECe=5%
 Stdcse/Smplcse=5%
 qme=N/A

Total error = 7.8%

2. Liquid Effluents

Qme=3.33%
 RM=N/A
 ECe=N/A
 Stdcse/Smplcse=5%
 qme=2.22%

Total error = 6.4%

3. Waste Resin

Qme=10.0%
 RM=N/A
 ECe=5%
 Stdcse/Smplcse=5%
 qme=1.0%

Total error = 12.3%

4. DAW, Mechanical Filters, and Contaminated Metal

Qme=10.0%
 RM=N/A
 ECe=N/A
 Stdcse/Smplcse=5%
 qme=N/A

Instrument calibration error = 10%
 Total error = 11.2%

Qme = the process quantity measurement error associated with the release point (e.g. flow, level measurements)

RM = error associated with the radiation monitor used in quantifying releases through the release point

ECe = error associated with the collection efficiency of the sample media

Stdcse = one-sigma counting error associated with the counting instrument of interest

Smplcse = one-sigma counting error associated with a sample of a given geometry that is used for the release point of interest

qme = sample quantity measurement error associated with the sample of interest

Company: Constellation

Plant: Byron Clean Energy Center

Table 12, Liquid Effluents Batch Mode Unit 1

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission and Activation Products						
Te-123m	Ci	<LLD	7.48E-5	4.22E-06	<LLD	7.91E-05
Cr-51	Ci	<LLD	2.42E-4	<LLD	<LLD	2.42E-04
Mn-54	Ci	4.63E-05	3.44E-5	2.79E-06	2.33E-06	8.58E-05
Fe-55	Ci	2.63E-04	2.43E-4	1.07E-04	1.65E-04	7.77E-04
Fe-59	Ci	<LLD	4.29E-6	<LLD	<LLD	4.29E-06
Co-57	Ci	<LLD	0.00E0	<LLD	1.67E-06	1.67E-06
Co-58	Ci	5.67E-04	1.10E-3	5.39E-04	5.52E-04	2.76E-03
Co-60	Ci	5.41E-04	5.01E-4	2.28E-04	3.40E-04	1.61E-03
Sr-89	Ci	8.56E-06	7.91E-06	3.49E-06	5.38E-06	2.53E-05
Sr-90	Ci	3.96E-06	3.66E-06	1.61E-06	2.49E-06	1.17E-05
Nb-95	Ci	2.12E-06	7.60E-06	<LLD	<LLD	9.72E-06
Te-125m	Ci	<LLD	5.43E-03	2.10E-03	<LLD	7.53E-03
Te-132	Ci	<LLD	9.08E-06	<LLD	<LLD	9.08E-06
I-132	Ci	<LLD	7.707E-06	<LLD	<LLD	7.70E-06
Total for Period	Ci	1.43E-03	7.66E-03	2.99E-03	1.07E-3	1.31E-02
Tritium						
H-3	Ci	4.47E+02	1.88E+02	7.07E+01	3.26E+02	1.03E+03
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	7.44E-05	2.45E-05	0.00E+00	0.00E+00	9.89E-05
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	7.44E-05	2.45E-05	0.00E+00	0.00E+00	9.89E-05

Company: Constellation

Plant: Byron Clean Energy Center

Table 13, Liquid Effluents Continuous Mode Unit 1

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission and Activation Products						
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Tritium						
H-3	Ci	6.15E+01	2.38E+02	6.81E+01	3.07E+02	6.74E+02
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
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

Company: Constellation

Plant: Byron Clean Energy Center

Table 14, Liquid Effluents Batch Mode Unit 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission and Activation Products						
Te-123m	Ci	<LLD	7.48E-05	4.22E-06	<LLD	7.91E-05
Cr-51	Ci	<LLD	2.42E-04	<LLD	<LLD	2.42E-04
Mn-54	Ci	4.63E-05	3.44E-05	2.79E-06	2.33E-06	8.58E-05
Fe-55	Ci	2.63E-04	2.43E-04	1.07E-04	1.65E-04	7.77E-04
Fe-59	Ci	<LLD	4.29E-06	<LLD	<LLD	4.29E-06
Co-57	Ci	<LLD	<LLD	<LLD	1.67E-06	1.67E-06
Co-58	Ci	5.67E-04	1.10E-03	5.39E-04	5.52E-04	2.76E-03
Co-60	Ci	5.41E-04	5.01E-04	2.28E-04	3.40E-04	1.61E-03
Sr-89	Ci	8.56E-06	7.91E-06	3.49E-06	5.38E-06	2.53E-05
Sr-90	Ci	3.96E-06	3.66E-06	1.61E-06	2.49E-06	1.17E-05
Nb-95	Ci	2.12E-06	7.60E-06	<LLD	<LLD	9.72E-06
Te-125m	Ci	<LLD	5.43E-03	2.10E-03	<LLD	7.53E-03
Te-132	Ci	<LLD	9.08E-06	<LLD	<LLD	9.08E-06
I-132	Ci	<LLD	7.70E-06	<LLD	<LLD	7.70E-06
Total for Period	Ci	1.43E-03	7.66E-03	2.99E-03	1.07E-03	1.31E-02
Tritium						
H-3	Ci	4.47E+02	1.88E+02	7.07E+01	3.26E+02	1.03E+03
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
Ar-41	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	7.44E-05	2.45E-05	0.00E+00	0.00E+00	9.89E-05
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	7.44E-05	2.45E-05	0.00E+00	0.00E+00	9.89E-05

Company: Constellation

Plant: Byron Clean Energy Center

Table 15, Liquid Effluents Continuous Mode Unit 2

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission and Activation Products						
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-131	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
I-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Tritium						
H-3	Ci	6.15E1	2.38E2	6.81E1	3.07E2	6.74E2
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
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

Company: Constellation

Plant: Byron Clean Energy Center

Attachment 2, Solid Waste Information

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

Table 16, Types of Solid Waste Summary Site

Types of Waste	Total Volume (m3)	Total Activity (Ci)	Est. Total Error (%)
a. Spent resins, filter sludges, evaporator bottoms, etc.	1.34E+02	2.03E-01	25
b. Dry compressible waste, contaminated equip, etc.	1.76E+02	1.72E+02	25
c. Irradiated components, control rods, etc.	0.00E+00	0.00E+00	25
d. Other (describe)	1.61E+01	2.11E-02	25

2.0 ESTIMATE OF MAJOR NUCLIDE COMPOSITION (BY WASTE TYPE) ONLY >1% ARE REPORTED. [NOTE 1]

Table 17, Major Nuclides

Major Nuclide Composition	%	Curies
a. Spent resins, filter sludges, evaporator bottoms, etc.		
H-3	33.58	9.15E+00
Co-60	18.97	5.17E+00
Ni-63	18.75	5.11E+00
Fe-55	18.72	5.10E+00
C-14	3.03	8.26E-01
Co-58	2.59	7.05E-01
Sb-125	1.87	5.11E-01
b. Dry compressible waste, contaminated equip, etc.		
Co-60	27.97	8.21E-02
Fe-55	23.10	6.78E-02
Cr-51	18.73	5.50E-02
Ni-63	11.33	3.32E-02
Co-58	9.80	2.88E-02
Nb-95	2.50	7.34E-03
Zr-95	1.88	5.51E-03
Sb-125	1.63	4.79E-03
Mn-54	1.55	4.54E-03
H-3	0.53	1.57E-03
c. Irradiated components, control rods, etc.	N/A	N/A
d. Other (describe)		
Ni-63	41.04	1.59E-03
Co-58	24.30	9.43E-04
Co-60	21.52	8.35E-04
Fe-55	11.70	2.47E-03
Sb-125	3.01	1.17E-04
Cr-51	2.61	1.01E-04
Mn-54	2.00	7.76E-05

Company: Constellation**Plant: Byron Clean Energy Center****3.0 SOLID WASTE DISPOSITION**

Table 4, Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
10	Hittman Transport Services	Energy Solutions -- Memphis
7	Hittman Transport Services	EnergySolutions Bear Creek Facility 1560 Bear Creek Rd.
1	Hittman Transport Services	EnergySolutions LLC. Clive Disposal Site – Bulk Waste Facility
2	Hittman Transport Services	EnergySolutions LLC. Clive Disposal Site – Containerized Waste Facility
1	Hittman Transport Services	Waste Control Specialists LLC Compact Waste Disposal Facility
21	Total	

4.0 IRRADIATED FUEL DISPOSITION

No irradiated fuel disposition in 2025.

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