



SVP-26-032

10 CFR 50.36a

April 30, 2026

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

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Radioactive Effluent Release Report for 2025

Pursuant to Technical Specifications Section 5.6.3 and 10 CFR 50.36a, enclosed is the Quad Cities Nuclear Power Station Radioactive Effluent Release Report for January through December 2025.

Should you have any questions concerning this letter, please contact Blake Young at (309) 227-3200.

Respectfully,

A handwritten signature in black ink that reads "Erik Frederikson".

Erik Frederikson for
Doug Hild
Site Vice President
Quad Cities Nuclear Power Station

Attachments:

1. 2025 Annual Radioactive Effluent Release Report

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Quad Cities Nuclear Power Station

Attachment 1

2025 Annual Radioactive Effluent Release Report



Quad Cities Generating Station



2025

Annual Radioactive Effluent Release Report

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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 likely to be 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.
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: The fenced area immediately surrounding the Plant. 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: An area, 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.

2.0 Executive Summary

Quad Cities Nuclear Power Station Units 1 and 2 (Quad Cities Station) 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, the gaseous effluent dose assessments for locations from the Land Use Census showed that the critical receptor for Quad Cities Nuclear Power Station Units 1 and 2 is a Child. The maximum Annual Organ Dose calculated for this receptor was $2.11\text{E}-01$ mRem to the bone.

The maximum dose calculated to any organ due to radioactive liquid effluents was $2.82\text{E}-07$ mRem for Teen Liver.

Solid radioactive waste shipped offsite for processing or direct disposal included $1.79\text{E}+03$ Curies and $7.58\text{E}+02$ m³, shipped in 48 shipments.

In addition to monitoring radioactive effluents, Quad Cities Station 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).

2.1 Comparison to Regulatory Limits

During 2025 all solid, liquid, and gaseous radioactive effluents from Quad Cities were well below regulatory limits, as summarized in Table 1 and Table 2.

Table 1, Quad Cities Nuclear Power Station Units 1 and 2 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	3.19E-08	0.00E+00	0.00E+00	1.63E-07	1.95E-07
	% of Limit	2.13E-06	0.00E+00	0.00E+00	1.09E-05	6.50E-06
Liquid Effluent Dose Limit, Any Organ	Limit	5 mrem	5 mrem	5 mrem	5 mrem	10 mrem
	Max Organ Dose	2.28E-08	0.00E+00	0.00E+00	2.59E-07	2.82E-07
	% of Limit	4.56E-07	0.00E+00	0.00E+00	5.17E-06	2.82E-06
Gaseous Effluent Dose Limit, Gamma Air (Noble Gas)	Limit	5 mrad	5 mrad	5 mrad	5 mrad	10 mrad
	Gamma Air Dose	2.16E-04	2.01E-04	2.28E-04	3.62E-04	1.01E-03
	% of Limit	4.32E-03	4.02E-03	4.56E-03	7.24E-03	1.01E-02
Gaseous Effluent Dose Limit, Beta Air (Noble Gas)	Limit	10 mrad	10 mrad	10 mrad	10 mrad	20 mrad
	Beta Air Dose	1.65E-04	1.78E-04	1.46E-04	5.64E-04	1.05E-03
	% of Limit	1.65E-03	1.78E-03	1.46E-03	5.64E-03	5.25E-03
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	4.69E-02	5.22E-02	5.58E-02	5.63E-02	2.11E-01
	% of Limit	6.25E-01	6.96E-01	7.44E-01	7.51E-01	1.41E+00

Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for Quad Cities¹

	Whole Body	Thyroid	Max Other Organ
Gaseous ²	1.80E-02	3.03E-02	1.95E-02
Carbon-14	3.90E-02	3.90E-02	1.95E-01
Liquid	1.95E-07	3.83E-08	2.82E-07
Direct Shine	7.56E+00	7.56E+00	7.56E+00
Total Site Dose	7.62E+00	7.63E+00	7.77E+00
Total w/Other Nearby Facility ³	7.62E+00	7.63E+00	7.77E+00
Limit	25 mrem	75 mrem	25 mrem
% of Limit	30.5%	10.2%	31.1%

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

² Gaseous dose values in Table 2 include organ dose from Noble Gas, Iodine, Tritium, and particulates.

³ Other fuel cycle sources within 5 miles of the site are considered in this analysis. Quad Cities does not have other fuel cycle sources within 5 miles of the site.

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.

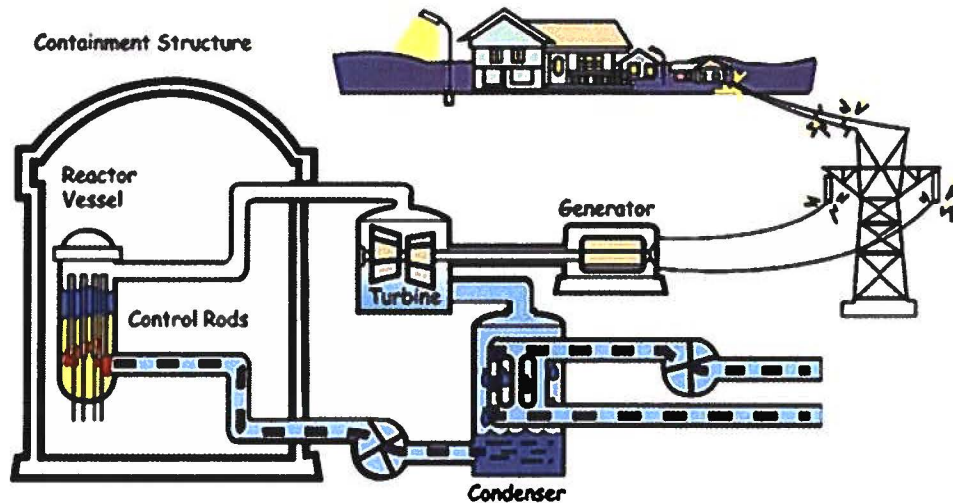


Figure 1, Boiling Water Reactor (BW) [2]

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 driven 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 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

All matter is made of atoms. An atom is the smallest part into which matter can be broken down and still maintain all its chemical properties. Nuclear radiation is energy, in the form of waves or particles that is given off by unstable, radioactive atoms. Radioactive material exists naturally and has always been a part of our environment. The earth's crust, for example, contains radioactive uranium, radium, thorium, and potassium. Some radioactivity is a result of nuclear weapons testing.

Examples of radioactive fallout that is normally present in environmental samples are Cesium-137 and Strontium-90. Some examples of radioactive materials released from a nuclear power plant are Cesium-137, Iodine-131, Strontium-90, and Cobalt-60. Radiation dose is measured in units of millirem; much like temperature is measured in degrees. A millirem is a measure of the biological effect of the energy deposited in tissue. The natural and man-made radiation dose received in one year by the average American is 300 to 400 mrem. Radioactivity is measured in curies. A curie is that amount of radioactive material needed to produce 37,000,000,000 nuclear disintegrations per second. 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.

Cosmic radiation from the sun and outer space penetrates the earth's atmosphere and continuously interacts with us via rays and charged particles. Some of this cosmic radiation interacts with gases and particles in the atmosphere, making them radioactive in turn. These radioactive byproducts from cosmic ray interaction are referred to as cosmogenic radionuclides. Isotopes such as Beryllium-7 and Carbon-14 are formed in this way. Exposure to cosmic and cosmogenic sources of radioactivity results in about 33 mrem of radiation dose per year.

Additionally, natural radioactivity is in our body and in the food we eat (about 29 mrem/year), the ground we walk on (about 21 mrem/year) and the air we breathe (about 228 mrem/year). The majority of a person's annual dose results from exposure to radon and thoron in the air we breathe. These gases and their radioactive decay products arise from the decay of naturally occurring uranium, thoron and radium in the soil and building products such as brick, stone, and concrete. Radon and thoron levels vary greatly with location, primarily due to changes in the concentration of uranium and thorium in the soil. Residents at some locations in Colorado, New York, Pennsylvania, and New Jersey have a higher annual dose as a result of higher levels of radon/thoron gases in these areas. In total, these various sources of naturally occurring radiation and radioactivity contribute to a total dose of about 311 mrem per year.

In addition to natural radiation, we are normally exposed to radiation from a number of man-made sources. The single largest doses from man-made sources result from the therapeutic and diagnostic applications of x-rays and radiopharmaceuticals. The annual dose to an individual in the U.S. from medical and dental exposure is about 300 mrem. Consumer products, such as televisions and smoke detectors, contribute about 13 mrem/year. Much smaller doses result from weapons fallout (less than 1 mrem/year) and nuclear power plants. Typically, the average person in the United States receives about 314 mrem/year from man-made sources.

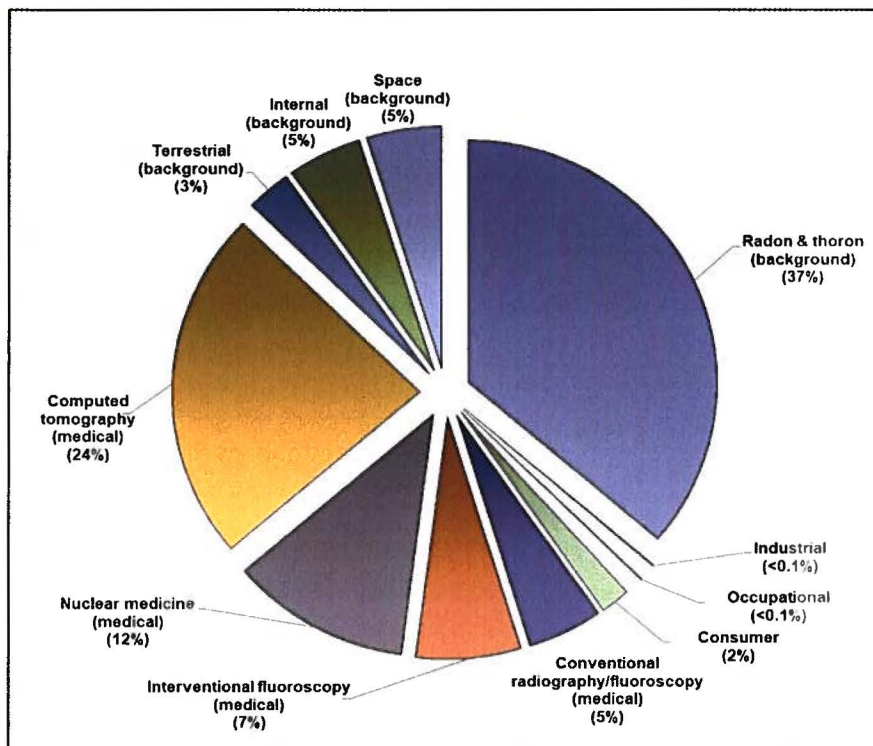


Figure 1, Sources of Radiation Exposure (NCRP Report No. 160) [3]

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]. 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

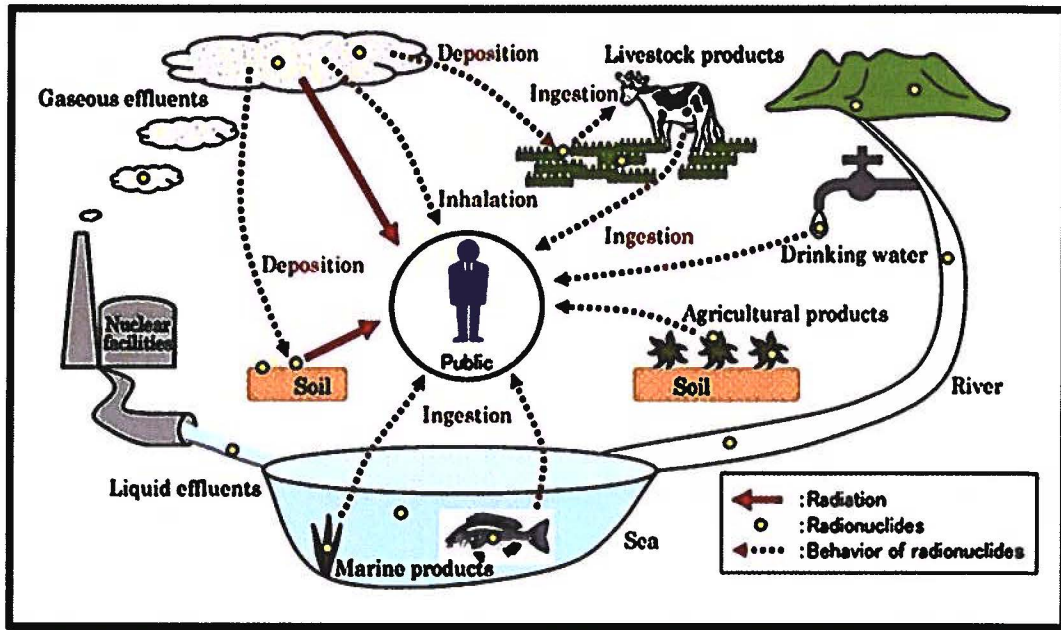


Figure 3, Potential exposure pathways to Members of the Public due to Plant Operations [6]

The Offsite Dose Calculation Manual (ODCM) specifies the methodology used to obtain the doses in the Dose Assessment section of this report. The 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 bioconcentration 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. 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 hypothetical individual 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 doses received are likely lower than the calculated doses. Even with the built-in conservatism, doses calculated for the highest hypothetical exposed individual due to plant operation are a very small fraction of the annual dose that is received due to other sources. The low calculated doses due to plant effluents, along with REMP results, serve to provide assurance that the site is not having a negative impact on 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 Quad Cities Station must adhere. Quad Cities Station 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 Quad Cities Station 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 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, Quad Cities Nuclear power Station Units 1 and 2 Dose Summary and Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for Quad Cities Station.

4.2 Regulatory Limits for Gaseous Effluent Doses

1. Fission and activation gases

- i. 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:
 - a. Less than or equal to 500 mrem/year to the total body
 - b. Less than or equal to 3000 mrem/year to the skin
- ii. 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:
 - a. Quarterly
 1. Less than or equal to 5 mrad gamma
 2. Less than or equal to 10 mrad beta
 - b. Yearly
 1. Less than or equal to 10 mrad gamma
 2. Less than or equal to 20 mrad beta

2. Iodine, tritium, and all radionuclides in particulate form with half-lives greater than 8 days
 - i. 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:
 - a. Less than or equal to 1500 mrem/yr to any organ
 - ii. 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:
 - a. Quarterly
 1. Less than or equal to 7.5 mrem to any organ
 - b. Yearly
 1. 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:
 - i. Quarterly
 - a. Less than or equal to 1.5 mrem total body
 - b. Less than or equal to 5 mrem critical organ
 - ii. Yearly
 - a. Less than or equal to 3 mrem total body
 - b. 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)

- i. 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:
 - a. Less than or equal to 25 mrem, Total Body or any Organ except Thyroid.
 - b. Less than or equal to 75 mrem, Thyroid.

4.5 Onsite Doses (Within Site Boundary)

Not applicable for Quad Cities Nuclear Power Station. Any member of the public that is onsite for a significant period will be issued a dosimeter.

5.0 SUPPLEMENTAL INFORMATION**5.1 Gaseous Batch Releases**5.1.1 Quad Cities Station Unit 1 & 2

Number of Batch Releases	0
Total time period for a Batch Release	0 minutes
Maximum time period for a Batch Release	0 minutes
Average time period for a Batch Release	0 minutes
Minimum time period for a Batch Release	0 minutes

Quad Cities did not perform any gaseous batch releases in 2025.

5.2 Liquid Batch Releases

5.2.1 Quad Cities (All Units)

	Q1	Q2	Q3	Q4	Total
1. Number of Batch Releases	1	0	0	0	1
2. Total Time Period (minutes)	4.05E+02	N/A	N/A	N/A	4.05E+02
3. Maximum Time Period (minutes)	4.05E+02	N/A	N/A	N/A	4.05E+02
4. Average Time Period (minutes)	4.05E+02	N/A	N/A	N/A	4.05E+02
5. Minimum Time Period (minutes)	4.05E+02	N/A	N/A	N/A	4.05E+02
6. Average Stream Flow During Period (gpm)	6.47E+00	N/A	N/A	N/A	6.47E+00

5.3 Abnormal Releases

5.3.1 Gaseous Abnormal Releases

Number Of Releases	0
Total activity released (Ci)	0

Quad Cities did not perform any abnormal gaseous releases in 2025.

5.3.2 Liquid Abnormal Releases

Number Of Releases	3
Total activity released (Ci)	5.77E-02

1. On July 3, 2023, the station contacted the Illinois Environmental Protection Agency (IEPA) and Illinois Emergency Management Agency (IEMA) to report a release of a radionuclide pursuant to 35 Ill. Adm. Code 1010.202. The station also notified the Nuclear Regulatory Commission (NRC) of the report to state agencies to satisfy 10CFR50.72(b)(2)(xi), notification of the NRC for any event related to the health and safety of the public for which a notification to other government agencies has been or will be made (EN #56606).

Station personnel performed an evaluation of SSC's (Systems, Structures and Components) and identified leakage from a degraded weld seam at the bottom of the Waste Collector Tank (WCT) within the Radwaste Building. Liquids from this system were leaking onto the concrete floor. The tritium concentration in the WCT is over 5 million pCi/L. The WCT was taken out of service and drained on July 17, 2023, and repairs were completed on July 19, 2023. After removing the standing water in the WCT room, station personnel identified two cracks in the concrete floor.

These cracks, as well as seams along the perimeter of the room, were identified as a potential pathway to groundwater.

Five additional monitoring wells (QC-GP-19 through QC-GP-23) were installed on July 13 through 19, 2023, between the Radwaste Building and Cribhouse, to assist in delineating the tritium plume. On July 25, 2023, extraction well QC-RW-2 was installed and began pumping water on July 27, 2023, to assist in the remediation of the groundwater plume. QC-RW-2 originally started pumping at 20 gpm, but the groundwater extraction rate was increased to 25 gpm on July 28, 2023, and it has since been operating at this extraction rate. The operation of the extraction well at its current pumping rate has lowered the water table in the area of the Radwaste Building and Cribhouse by approximately three to nine feet and QC-RW-2 appears to be effectively capturing the known extent of the tritium plume. An additional well was installed at the beginning of November 2023, downgradient of the Main Chimney to evaluate if impacted groundwater was migrating north of the Cribhouse prior to the installation of extraction well QC-RW-2. Tritium has not been detected in samples collected from this additional well since being installed. Additionally, well sampling frequency was increased to monitor tritium concentrations. It should be noted that the newly installed wells are currently not a part of the station's RGPP program.

Remediation of QC-RW-2 continued throughout 2024, totaling a discharge of $1.32\text{E}+07$ gallons released to the discharge bay outfall. Monthly composite samples were analyzed for gross alpha, Fe-55, Ni-63, Sr-89, and Sr-90 with all results below LLD. During this period of release to the discharge bay, only tritium was detected in the well discharge at levels above the required limit of detection. A total of $2.72\text{E}-01$ Ci of tritium was released to the Mississippi River via QC-RW-2. The associated dose impact to members of the public from QC-RW-2 was calculated to be $8.46\text{E}-08$ mRem to the Child/Liver dose pathway. The total body dose associated with this abnormal release was calculated to be $8.46\text{E}-08$ mRem to the Child Total Body.

Remediation out of QC-RW-2 is on-going, with a total of $1.32\text{E}+07$ gallons released to the Discharge Bay Outfall during the 2025 calendar year. Monthly composite samples continue to be analyzed for gross alpha, Fe-55, Ni-63, Sr-89, and Sr-90. LLDs and sampling requirements for this monitored abnormal release are identical to the requirements listed in the ODCM for routine liquid effluent analysis. During the period that the wells were routed to the discharge bay, no nuclides were detected in the well discharge at levels above the required limit of detection.

2. On March 19th, 2025, Chemistry obtained a sample of Unit 1 Standby Coolant as part of a scheduled surveillance to flush the Standby Coolant Supply Header to the Main Condenser Waterbox. The initial sample to verify potential contamination showed $3.363\text{E}-08$ uCi/mL of Co-60 and $5.79\text{E}-03$ uCi/mL of H-3 activity. Sampling continued until no activity was recorded, ending on 3/21/2025 at 0850. It could not be determined where the source of activity originated. A conservative total of $2.62\text{E}+03$ gallons were discharged during the release period. Total

release activity was $5.75\text{E-}02$ Ci and the total body and organ dose was calculated to be $3.84\text{E-}08$ mRem to the Child/Total Body and $3.86\text{E-}08$ mRem to the Child/GI-Li, respectively.

3. On December 7th, 2025 the Unit 2 Service Water Radiation Monitor (SWRM) was declared inoperable due to erratic recorder spiking and compensatory sampling began. All samples collected associated with these compensatory actions showed no activity. Upon investigation, the erratic spiking observed on the Unit 2 SWRM occurred following a 2A Loop of Residual Heat Removal (RHR) surveillance and subsequent 2A RHRSW pump start, indicating a possible RHR Heat exchanger leak in the "A" loop. Sampling of the "A" RHR Hx was performed on 12/18/2025, with nuclide activity containing H-3, Co-60, and Cs-137. These accounted for a total nuclide release of $2.75\text{E-}04$ Ci. The total body and organ dose associated with the activity of this release was calculated to be $1.63\text{E-}07$ mRem to the Adult Total Body and $2.59\text{E-}07$ to the Teen Liver, respectively.

5.4 Land Use Census Changes

No changes in the Land Use Census for the 2025 calendar year.

5.5 Meteorological Data

In 2025, Quad Cities Station meteorological monitoring program produced **78,589** hours of valid data out of a possible **78,840** hours, resulting in an overall data recovery rate of **99.7%**.

5.6 Effluent Radiation Monitors Out of Service Greater Than 30 Days

In 2025, there were no Effluent Radiation Monitors out of service for a period equal or greater to 30 days.

5.7 Offsite Dose Calculation Manual (ODCM) Changes

Quad Cities instituted a new revision (15) of the ODCM in 2025.

Date Of Change	Revision	Page Number	Description Of Change
07-08-2025	15	11	Updated "inplace" to "in place" under CHANNEL CALIBRATION definition description.
		15	Updated AREOR Technical Specification Requirement (5.6.2.)
		38	Updated verbiage of REC 12.0.3. to reflect change in LCO 3.0.3. Bases from TSTF-565 guidance
		100	Updated 12.7.2.1. verbiage to align with TS 5.6.2.
		107	Updated verbiage of REC 12.0.2. to reflect change in LCO 3.0.2. Bases from TSTF-565 guidance
		110	Updated verbiage of REC 12.0.3. to reflect change in LCO 3.0.3. Bases from TSTF-565 guidance
		142	Added C-14 to "Dose from radioiodines, tritium, and particulates with half-lives greater than 8 days for inhalation, ingestion of vegetation, milk and meat, and ground place exposure" column of the Dose Assessment Receivers
		158	Updated "18 months" to "24 months" for Setpoint calculations to align with calibration and fuel cycle frequency.
		164	Updated AO EPNs
		169	Removed RE 1-2318C and RE 1-2418D from Figure 2-1; abandoned
		291	Included information of the addition of six (6) Holtec HI-SAFE Low-Level Waste casks stored on the ISFSI Pad from EC# 631286 and QDC-0836-M-2377
		301	Q-03 location change due to permanent power loss of original equipment
		301	Q-42 distance from site updated in Table 6-1
		311	9.3-Mile REMP Map updated to remove redundant scale

5.8 Process Control Program (PCP) Changes

No changes to the site Process Control Program (PCP) in the 2025 calendar year.

5.9 Radioactive Waste Treatment System Changes

No changes to the site Radioactive Waste Treatment System during the 2025 calendar year.

5.10 Other Supplemental Information**5.10.1 Outside Tanks**

No onsite tanks exceeding ODCM or TS requirements in the 2025 calendar year.

5.10.2 Independent Spent Fuel Storage Installation (ISFSI) Monitoring Program

ISFSI dose contribution occurs in the form of direct radiation, as no liquid or gas releases are expected to occur. Subsequent dose contribution from this array as well as historical uranium fuel cycle operations is within 40CFR190 and 10CFR72.104 limits. There were no radioactive effluents released from the QCNPS ISFSI in 2025. The report prepared in accordance with ISFSI requirements is submitted separately from the ARERR.

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.

Quad Cities has estimated its Carbon-14 generation and release in accordance with EPRI Technical Report 1021106, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents". The Quad Cities estimate of $2.84\text{E}+01$ Ci of Carbon-14 and the resultant $2.84\text{E}+01$ Ci $^{14}\text{CO}_2$ released is based upon a normalized Carbon-14 production rate of $5.10\text{E}+00$ Ci/GWTh-yr, a gaseous release fraction of 1.00, a Carbon-14 CO_2 fraction of 1.00, a reactor power rating of 2957 MWTh/unit for 2 units, and a calculated Effective Full Power days based upon Total Core Therms data. The maximum expected annual dose contribution from Carbon-14 has been calculated to be $2.08\text{E}-01$ mrem/yr organ dose and $4.15\text{E}-02$ mrem/yr total body dose. This was obtained using maximum gross thermal capacity maintained for 365 days for both units.

The estimated generation for Quad Cities Nuclear Power Station Units 1 and 2 during 2025 was $2.83\text{E}+01$ Ci. Public dose estimates were performed using methodology from the ODCM. The total body and thyroid dose associated with Carbon-14 release was found to be $3.90\text{E}-02$ (child), while the maximum dose to other organs was found to be $1.95\text{E}-01$ (child/bone). Carbon-14 dose is included in dose calculation results in Table 2.

5.10.4 Errata/Corrections to Previous ARERRs

A total of three errors were identified in the 2024 Annual Radioactive Effluent Release Report. The first two errors were identified on page 8, Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for Quad Cities Station. The errors observed in the table were incorrect accounting for Total Site Dose for the Thyroid and Max Other Organ. No other errors were noted in the table. Revisions have been made to the table to reflect the appropriate Total Site Dose and can be seen in Attachment 4.

A single data entry error was identified in the 2024 Annual Radioactive Effluent Release Report on page 54, Table 17, Continuous Mode Liquid Effluents Unit 1 and 2. The error observed was regarding Q2 nuclide accounting, where $3.70\text{E}-02$ Ci were erroneously reported for Sr-89 where they should have been reported for Zn-65. This did not affect the total curie accounting for the period, nor did it affect dose calculated for the period. The error was strictly typographical in nature, and a review of all associated permits did not reveal any further issues with the data. Revisions have been made to reflect the correct nuclide accounting for the period and can be seen in Attachment 4 at the end of this report.

5.10.5 Teledyne Brown Crosscheck Failure

Disagreements were identified in the 4th Quarter crosschecks results between the offsite vendor laboratory Teledyne Brown Engineering (TBE), and Eckert and Ziegler Analytics (EZA). Discrepancies were discovered between TBE's analysis of Gross Beta and Ni-63, and the reference values provided by Eckert & Ziegler Analytics (EZA).

The Gross Beta failure was due to unexpected packaging of the sample filter, which arrived as a stack of three filters without disclosure in the instructions provided by EZA. TBE initially ran the stack of filters together which resulted in erroneous low results. TBE separated and re-ran each of the three filters individually, with the spiked filter yielding an expected activity in agreement with the EZA value. As a corrective action, TBE included a note to the project to visually inspect Gross Beta crosscheck filters for potential stacking or atypical configurations prior to analysis.

TBE determined that the Ni-63 failure was due to incorrect sample preparation in the form of excess sample dilution. TBE performed calculations to account for this excess dilution, which demonstrated that the sample activity would have been consistent with EZA's stated value had the correct dilution been utilized. As a corrective action, TBE included a prompt in the Laboratory Information Management System (LIMS) used by Technicians to validate the correct value for the method is utilized. A nonconformance report (NCR 26-01) was prepared and submitted along with a revised analysis report.

6.0 NEI 07-07 ONSITE RADIOLOGICAL GROUNDWATER MONITORING PROGRAM

Quad Cities 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. During 2025, Quad Cities collected and analyzed groundwater samples in accordance with the requirements of approved procedures following regulatory methods.

Although NEI-07-07 Rev 1 gives guidance for groundwater samples taken in support of the GPI but not part of the REMP program to be included in the ARERR, Constellation Corporate Environmental procedures give direction to deviate from this guidance and include RGPP results in the Annual Radiological Environmental Operating Report (AREOR).

6.1 Voluntary Notification

During the week of August 25, 2025 (third quarter), RGPP sampling was conducted at the Quad Cities Clean Energy Center. One of the site's monitoring wells, QC-GP-9, exhibited an elevated tritium concentration of 10,600 pCi/L, compared to its typical historical levels of less than 2,000 pCi/L. The Chemistry department subsequently re-analyzed the original sample and collected an additional sample from QC-GP-9; both analyses confirmed increased tritium concentrations.

On September 6, Operations personnel switched RCIC suction from the CCST to the Torus and lined up keepfill for both units' RCIC suction, enabling isolation and drainage of the line as part of the station's ongoing investigative efforts. This line remained isolated until September 18. On September 9, a new monitoring well was installed to better delineate the extent of the plume and assess other potential underground sources. The new well showed tritium levels below 2,000 pCi/L. A new recovery well, installed on September 15, also reported tritium concentrations below 2,000 pCi/L. Newly installed wells are not currently apart of the RGPP program.

Between August 26 and September 11, 2025, tritium concentrations in monitoring well QC-GP-9 continued to rise, peaking at 93,100 pCi/L on September 11. Due to the continued increase in tritium concentration, Quad Cities Nuclear Power Station made a voluntary NEI 07-07 notification to State/Local officials, NRC, and other stakeholders required by site procedures.

Concentrations began declining on September 12 and have remained below 2,000 pCi/L since September 20. During this period, all adjacent wells maintained tritium levels below 2,000 pCi/L. On September 16, 2025, water was detected in two abandoned CCST lines previously believed to be dry. These lines were flushed, drained, and abandoned in 2011. When sampled on September 17, 2025, the 1/2A CCST line exhibited a tritium concentration of 66,200 pCi/L, while the 1/2B CCST line measured 117,000 pCi/L. As a corrective action, several abandoned CCST lines in the vicinity were identified and filled with a concrete/foam mixture to prevent recurrence.

7.0 BIBLIOGRAPHY

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

1.0 GASEOUS EFFLUENTS

Table 3, Gaseous Effluents Summation of All Releases¹

A. Fission & Activation Gases	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est.Total Error %
1. Total Release	Ci	2.07E+01	2.13E+01	1.98E+01	5.70E+01	1.27E+01
2. Average release rate for the period	μCi/sec	2.66E+00	2.71E+00	2.49E+00	7.18E+00	

B. Iodine						
1. Total Iodine – 131	Ci	5.76E-05	1.12E-05	1.96E-05	<LLD	4.17E+01
2. Average release rate for the period	μCi/sec	7.40E-06	1.42E-06	2.46E-06	<LLD	

C. Particulates						
1. Particulates with half-lives >8 days	Ci	3.26E-03	4.42E-03	3.42E-03	3.59E-03	3.22E+01
2. Average release rate for the period	μCi/sec	4.20E-04	5.62E-04	4.30E-04	4.52E-04	

D. Tritium						
1. Total Release	Ci	2.31E+01	1.75E+01	1.70E+01	1.55E+01	6.30E+00
2. Average release rate for the period	μCi/sec	2.97E+00	2.23E+00	2.14E+00	1.95E+00	

E. Gross Alpha						
1. Total Release	Ci	<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	6.17E+00	6.99E+00	7.57E+00	7.58E+00	
2. Average release rate for the period	μCi/sec	7.94E-01	8.89E-01	9.52E-01	9.53E-01	

¹ % of limit is provided in Table 1, Quad Cities Dose Summary

Table 4, Gaseous Effluents - Ground Level Release Batch Mode Units 1 & 2²

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135m	Ci	N/A	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A	N/A
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
I-135	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
Particulates						
Mn-54	Ci	N/A	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Fe-59	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A	N/A
Mo-99	Ci	N/A	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A	N/A
Cs-137	Ci	N/A	N/A	N/A	N/A	N/A
Ce-141	Ci	N/A	N/A	N/A	N/A	N/A
Ce-144	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
Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
Gross Alpha						
Alpha	Ci	N/A	N/A	N/A	N/A	N/A
Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

² Quad Cities performed no Gaseous Batch Releases in 2025.

Table 5, Gaseous Effluents - Ground Level Release Continuous Mode Units 1 & 2³

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135m	Ci	N/A	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A	N/A
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
I-135	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
Particulates						
Mn-54	Ci	N/A	N/A	N/A	N/A	N/A
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Fe-59	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A	N/A
Mo-99						
Cs-134	Ci	N/A	N/A	N/A	N/A	N/A
Cs-137						
Ce-141	Ci	N/A	N/A	N/A	N/A	N/A
Ce-144						
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A

³ Quad Cities performed no Ground Level Gaseous Releases in 2025.

Table 6, Gaseous Effluents - Mixed Level Release Batch Mode Units 1 & 2⁴

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135m	Ci	N/A	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A	N/A
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
I-135	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
Particulates						
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A	N/A
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
Gross Alpha						
Alpha	Ci	N/A	N/A	N/A	N/A	N/A
Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

⁴ Quad Cities performed no Gaseous Batch Releases in 2025.

Table 7, Gaseous Effluents - Mixed Level Release Continuous Mode Units 1 & 2⁵

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-85	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-85m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	1.26E+01	1.40E+01	1.08E+01	4.68E+01*	8.41E+01
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	CI	1.26E+01	1.40E+01	1.08E+01	4.68E+01	8.41E+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						
Cr-51	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mn-54	Ci	6.85E-05	9.37E-06	1.44E-05	2.88E-05	1.21E-04
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-58	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	2.89E-04	1.13E-04	1.38E-04	2.89E-04	8.29E-04
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sb-124	Ci	<LLD	<LLD	1.64E-05	<LLD	1.64E-05
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	CI	3.57E-04	1.22E-04	1.69E-04	3.18E-04	9.66E-04
Tritium						
H-3	Ci	4.11E+00	2.79E+00	2.32E+00	3.12E+00	1.23E+01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	1.85E-01	2.10E-01	2.27E-01	2.27E-01	8.49E-01

⁵ All LLDs comply with requirements listed in the ODCM.

*Conservative values utilized due to data unavailability.

Table 8, Gaseous Effluents - Elevated Level Release Batch Mode Units 1 & 2⁶

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85	Ci	N/A	N/A	N/A	N/A	N/A
Kr-85m	Ci	N/A	N/A	N/A	N/A	N/A
Kr-87	Ci	N/A	N/A	N/A	N/A	N/A
Kr-88	Ci	N/A	N/A	N/A	N/A	N/A
Xe-133	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135	Ci	N/A	N/A	N/A	N/A	N/A
Xe-135m	Ci	N/A	N/A	N/A	N/A	N/A
Xe-138	Ci	N/A	N/A	N/A	N/A	N/A
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Iodines						
I-131	Ci	N/A	N/A	N/A	N/A	N/A
I-133	Ci	N/A	N/A	N/A	N/A	N/A
I-135	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
Particulates						
Co-58	Ci	N/A	N/A	N/A	N/A	N/A
Co-60	Ci	N/A	N/A	N/A	N/A	N/A
Sr-89	Ci	N/A	N/A	N/A	N/A	N/A
Sr-90	Ci	N/A	N/A	N/A	N/A	N/A
Cs-134	Ci	N/A	N/A	N/A	N/A	N/A
Total for Period	Ci	N/A	N/A	N/A	N/A	N/A
Tritium						
H-3	Ci	N/A	N/A	N/A	N/A	N/A
Gross Alpha						
Alpha	Ci	N/A	N/A	N/A	N/A	N/A
Carbon-14						
C-14	Ci	N/A	N/A	N/A	N/A	N/A

⁶ Quad Cities performed no Gaseous Batch Releases in 2025.

Table 9, Gaseous Effluents - Elevated Level Release Continuous Mode Units 1 & 2⁷

Radionuclide Released	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Total for year
Fission Gases						
Ar-41	Ci	8.74E-01	7.08E-01	7.77E-01	1.07E+00	3.43E+00
Kr-85	Ci	<LLD	<LLD	3.49E-02	<LLD	3.49E-02
Kr-85m	Ci	8.43E-02	6.91E-02	6.23E-02	6.62E-02	2.82E-01
Kr-87	Ci	1.94E-01	1.79E-01	2.30E-01	2.57E-01	8.60E-01
Kr-88	Ci	1.28E-01	1.08E-01	1.37E-01	1.47E-01	5.20E-01
Xe-131m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	2.24E-01	1.97E-01	2.09E-01	2.15E-01	8.45E-01
Xe-135	Ci	2.03E-01	1.50E-01	1.95E-01	2.16E-01	7.64E-01
Xe-135m	Ci	1.33E+00	1.22E+00	1.54E+00	1.73E+00	5.82E+00
Xe-138	Ci	5.12E+00	4.68E+00	5.77E+00	6.61E+00	2.22E+01
Total for Period	CI	8.16E+00	7.31E+00	8.96E+00	1.03E+01	3.47E+01
Iodines						
I-131	Ci	5.76E-05	1.12E-05	1.96E-05	<LLD	8.84E-05
I-133	Ci	2.44E-04	2.60E-04	3.77E-04	1.20E-04	1.00E-03
I-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	CI	3.02E-04	2.71E-04	3.97E-04	1.20E-04	1.09E-03
Particulates						
Cr-51	Ci	<LLD	6.25E-05	<LLD	<LLD	6.25E-05
Mn-54	Ci	4.45E-04	5.81E-04	5.22E-04	4.39E-04	1.99E-03
Fe-55	Ci	<LLD	4.86E-04	<LLD	<LLD	4.86E-04
Co-58	Ci	1.74E-04	4.61E-04	4.05E-04	3.95E-04	1.43E-03
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	1.80E-03	2.03E-03	1.73E-03	1.68E-03	7.24E-03
Ni-63	Ci	3.35E-05	<LLD	<LLD	<LLD	3.35E-05
Zn-65	Ci	3.94E-04	5.23E-04	5.73E-04	7.21E-04	2.21E-03
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ag-110m	Ci	5.72E-05	9.97E-05	2.21E-05	3.43E-05	2.13E-04
Cs-134	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Cs-137	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	CI	2.90E-03	4.25E-03	3.25E-03	3.27E-03	1.37E-02
Tritium						
H-3	Ci	1.90E+01	1.47E+01	1.47E+01	1.24E+01	6.08E+01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Carbon-14						
C-14	Ci	5.99E+00	6.78E+00	7.34E+00	7.35E+00	2.75E+01

⁷ All LLDs comply with requirements listed in the ODCM.

2.0 LIQUID EFFLUENTS

Table 10, Liquid Effluents - Summation of All Releases¹

A.	Fission & Activation Products	Units	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Est. Total Error %
1.	Total Release	Ci	3.34E-07	<LLD	<LLD	2.43E-06	4.80E+00
2.	Average diluted concentration	μCi/mL	1.37E-15	N/A	N/A	6.88E-15	

B.	Tritium						
1.	Total Release	Ci	5.75E-02	<LLD	<LLD	2.73E-04	4.10E+00
2.	Average diluted concentration	μCi/mL	2.36E-10	N/A	N/A	7.73E-13	

C.	Dissolved & Entrained Gases						
1.	Total Release	Ci	<LLD	<LLD	<LLD	<LLD	4.80E+00
2.	Average diluted concentration	μCi/mL	N/A	N/A	N/A	N/A	

D.	Gross Alpha Activity						
1.	Total Release	Ci	<LLD	<LLD	<LLD	<LLD	1.47E+01

E.	Volume of Waste Released (prior to dilution)	Liters				
			1.23E+07	1.24E+07	1.26E+07	9.12E+10

F.	Volume of Dilution Water Used During Period	Liters				
			2.43E+11	4.08E+11	4.97E+11	3.53E+11

¹ % of limit is provided in Table 1, Quad Cities Dose Summary

Table 11, Batch Mode Liquid Effluents

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
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-60	Ci	3.34E-07	<LLD	<LLD	<LLD	3.34E-07
Zn-65	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
Mo-99	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
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	3.34E-07	<LLD	<LLD	<LLD	3.34E-07
Tritium						
H-3	Ci	5.75E-02	<LLD	<LLD	<LLD	5.75E-02
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 12, Continuous Mode Liquid Effluents

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	1.50E-06	1.50E-06
Zn-65	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
Mo-99	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	9.31E-07	9.31E-07
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	2.43E-06	2.43E-06
Tritium						
H-3	Ci	<LLD	<LLD	<LLD	2.73E-04	2.73E-04
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Attachment 2, Solid Waste Information

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

Table 13, Types of Solid Waste Summary

Type of Waste	Total Volume (m ³)	Total Activity (Ci)	Est. Total Error (%)
a. Spent resins, filter sludges, evaporator bottoms, etc.	1.53E+02	1.82E+03	25
b. Dry compressible waste, contaminated equip, etc.	5.59E+02	1.20E+00	25
c. Irradiated components, control rods, etc.	0.00E+00	0.00E+00	25
d. Other (describe)	4.59E+01	1.18E-02	25

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

Table 14, Major Nuclides

Type Of Waste	Nuclide	%	Curies
a. Spent resins, filter sludges, evaporator bottoms, etc.	-	-	-
	Mn-54	3.61	6.55E+01
	Fe-55	54.28	9.86E+02
	Co-60	34.45	6.26E+02
	Zn-65	4.16	7.55E+01
	Cs-137	2.03	3.68E+01
b. Dry compressible waste, contaminated equip, etc.	-	-	-
	Mn-54	4.19	5.04E-02
	Fe-55	60.34	7.27E-01
	Co-60	30.1	3.62E-01
	Zn-65	2.16	2.60E-02
	Ni-63	1.6	1.93E-02
c. Irradiated components, control rods, etc.	-	-	-
	N/A	N/A	N/A
d. Other (describe)	-	-	-
	Mn-54	3.89	4.60E-04
	Fe-55	61.83	7.31E-03
	Co-60	29.11	3.44E-03
	Zn-65	2.33	2.76E-04
	Ni-63	1.27	1.50E-04

3.0 SOLID WASTE DISPOSITION

Table 15, Solid Waste Disposition

Number Of Shipments	Mode Of Transportation	Destination
34	HITTMAN TRANSPORT	EnergySolutions LLC. Clive Disposal Site – Containerized Waste Facility
12	HITTMAN TRANSPORT	Energy Solutions Services, Inc (Oakridge) 1560 Bear Creek Road
2	Landstar INWAY	Energy Solutions Services, Inc (Oakridge) 1560 Bear Creek Road

4.0 IRRADIATED FUEL DISPOSITION

Table 16, Irradiated Fuel Shipments Disposition

Number Of Shipments	Mode Of Transportation	Destination
0	NA	NA

Attachment 3, Meteorological Data

1.0 METEOROLOGICAL DATA SUMMARY

1.1 Joint Frequency Distributions

Period of Record: 2025

- 1. Winds Measured at 33 Feet
- 2. Stability Class: All [Based on 196 ft - 33 ft Delta-T (F)]
 - Hours of calm: 290
 - Hours of missing wind measurements: 0
 - Hours of missing stability measurements: 35
 - Hours of no data: 0
 - Percent complete: 99.6

Wind Direction	Wind Speed (mph)						Total
	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	>24	
N	50	158	92	21	0	0	321
NNE	98	132	114	7	0	0	351
NE	138	215	100	4	0	0	457
ENE	164	306	57	1	0	0	528
E	252	274	104	23	0	0	653
ESE	222	332	118	10	1	0	683
SE	157	245	61	10	0	0	473
SSE	109	235	85	9	1	0	439
S	89	195	128	17	0	0	429
SSW	80	241	178	15	0	0	514
SW	96	214	78	14	0	0	402
WSW	100	200	120	29	2	0	451
W	111	458	306	125	27	0	1027
WNW	121	324	383	86	5	0	919
NW	84	217	156	11	0	0	468
NNW	78	134	89	19	0	0	320
Variable	0	0	0	0	0	0	0
Total	1949	3880	2169	401	36	0	8435

1. Winds Measured at 296 Feet
2. Stability Class: All [Based on 296 ft - 33 ft Delta-T (F)]
 - Hours of calm: 0
 - Hours of missing wind measurements: 0
 - Hours of missing stability measurements: 35
 - Hours of no data: 0
 - Percent complete: 99.6

Wind Direction	Wind Speed (mph)						Total
	1 - 3	4 - 7	8 - 12	13 - 18	19 - 24	>24	
N	5	63	123	105	23	2	321
NNE	8	52	129	78	14	4	285
NE	8	59	148	170	25	1	411
ENE	12	89	155	109	14	0	379
E	13	115	285	118	21	5	557
ESE	10	93	200	198	80	34	615
SE	16	100	179	225	66	10	596
SSE	16	96	163	185	70	16	546
S	12	87	170	218	71	28	586
SSW	17	84	190	248	115	46	700
SW	14	86	140	155	50	21	466
WSW	23	76	132	117	47	25	420
W	14	99	217	212	104	53	699
WNW	17	84	217	358	202	103	981
NW	9	78	225	310	120	30	772
NNW	9	54	154	124	40	10	391
Variable	0	0	0	0	0	0	0
Total	203	1315	2827	2930	1062	388	8725

1.2 Stability Class

Table 17, Classification of Atmospheric Stability based on the 196-33 ft differential

1. Winds Measured at 33 Feet

2. Stability Class: Based on 196 ft - 33 ft Delta-T (F)

Stability Condition	Pasquill Categories	Percentage
Extremely Unstable	A	7.56%
Moderately Unstable	B	3.47%
Slightly Unstable	C	8.16%
Neutral	D	40.24%
Slightly Stable	E	26.01%
Moderately Stable	F	9.15%
Extremely Stable	G	5.38%

Table 18, Classification of Atmospheric Stability based on the 296-33 ft differential

1. Winds Measured at 296 Feet

2. Stability Class: Based on 296 ft - 33 ft Delta-T (F)

Stability Condition	Pasquill Categories	Percentage
Extremely Unstable	A	1.59%
Moderately Unstable	B	4.28%
Slightly Unstable	C	8.30%
Neutral	D	44.33%
Slightly Stable	E	25.73%
Moderately Stable	F	10.81%
Extremely Stable	G	4.96%

Attachment 4, 2024 ERRATA

Table 1, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for Quad Cities Station¹

	Whole Body	Thyroid	Max Other Organ
Gaseous ²	6.54E-03	1.17E-02	6.82E-03
Carbon-14	4.00E-02	4.00E-02	2.00E-01
Liquid	8.03E-04	1.81E-07	1.67E-03
Direct Shine	7.74E+00	7.74E+00	7.74E+00
Total Site Dose	7.79E+00	7.83E+00	8.15E+00
Total w/Other Nearby Facility³	7.79E+00	7.79E+00	7.95E+00
Limit	25 mrem	75 mrem	25 mrem
% of Limit	3.12E+01	1.04E+01	3.18E+01

Table 2, Total Annual Offsite-Dose Comparison to 40 CFR 190 Limits for Quad Cities Station¹

	Whole Body	Thyroid	Max Other Organ
Gaseous ²	6.54E-03	1.17E-02	6.82E-03
Carbon-14	4.00E-02	4.00E-02	2.00E-01
Liquid	8.03E-04	1.81E-07	1.67E-03
Direct Shine	7.74E+00	7.74E+00	7.74E+00
Total Site Dose	7.79E+00	7.79E+00	7.95E+00
Total w/Other Nearby Facility³	7.79E+00	7.79E+00	7.95E+00
Limit	25 mrem	75 mrem	25 mrem
% of Limit	3.12E+01	1.04E+01	3.18E+01

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

² Gaseous dose values in Table 2 include organ dose from Noble Gas, Iodine, Tritium, and particulates.

³ Other fuel cycle sources within 5 miles of the site are considered in this analysis. Quad Cities does not have other fuel cycle sources within 5 miles of the site.

Table 17, Continuous Mode Liquid Effluents Unit 1 & 2¹⁵

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	1.09E-02	<LLD	<LLD	1.09E-02
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	3.39E-03	<LLD	<LLD	3.39E-03
Co-58	Ci	<LLD	3.85E-02	<LLD	<LLD	3.85E-02
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-89	Ci	<LLD	3.70E-02	<LLD	<LLD	3.70E-02
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	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
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	8.99E-02	<LLD	<LLD	8.99E-02
Tritium						
H-3	Ci	4.96E-02	2.32E-01	4.54E-02	<LLD	3.27E-01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD

Table 17, Continuous Mode Liquid Effluents Unit 1 & 2¹⁵

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	1.09E-02	<LLD	<LLD	1.09E-02
Fe-55	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Fe-59	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Co-57	Ci	<LLD	3.39E-03	<LLD	<LLD	3.39E-03
Co-58	Ci	<LLD	3.85E-02	<LLD	<LLD	3.85E-02
Co-60	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Zn-65	Ci	<LLD	3.70E-02	<LLD	<LLD	3.70E-02
Sr-89	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Sr-90	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Nb-95	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Mo-99	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
Ce-141	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Ce-144	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	8.99E-02	<LLD	<LLD	8.99E-02
Tritium						
H-3	Ci	4.96E-02	2.32E-01	4.54E-02	<LLD	3.27E-01
Gross Alpha						
Alpha	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Entrained Gases						
Kr-87	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Kr-88	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-133m	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-135	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Xe-138	Ci	<LLD	<LLD	<LLD	<LLD	<LLD
Total for Period	Ci	<LLD	<LLD	<LLD	<LLD	<LLD