Constellation

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Regulatory Assurance

JAFP-25-0031
May 13, 2025

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

James A. FitzPatrick Nuclear Power Plant
Renewed Facility Operating License No. DPR-59
Docket No. 50-333

Subject: 2024 Annual Radiological Environmental Operating Report

Dear Sir or Madam:

This letter transmits the James A. FitzPatrick Nuclear Power Plant's (JAF) Annual Radiological Environmental Operating Report, for the period of January 1, 2024, through December 31, 2024. This document is submitted in accordance with the Reporting Requirements of the Technical Specifications Section 5.6.2, and Appendix H of the Technical Requirements Manual "Offsite Dose Calculation Manual (ODCM)", Part 1, Section 6.1 Annual Radiological Environmental Operating Report.

There are no new regulatory commitments contained in this letter.

If you have any questions concerning the enclosed report, please contact Ryan Conger, Chemistry Manager, at (315) 349-6640.

Sincerely,

Mark R. Hawes
Regulatory Assurance

MRH/RC/kp

Enclosure: 2024 Annual Radiological Environmental Operating Report

cc: Next Page

cc:

NRC Regional Administrator, Region I
NRC Resident Inspector
NRC Project Manager

Supervisor, Town of Scriba
Route 8, Box 382
Oswego, NY 13126

JAFP-25-0031

Enclosure

2024 Annual Radiological Environmental Operating Report

(101 Pages)

2024
Annual Radiological Environmental Operating Report

James A. FitzPatrick Nuclear Power Plant
Facility Operating License No. DPR-59, Docket No. 50-333

Nine Mile Point Nuclear Station Unit 1
Facility Operating License No. DPR-63, Docket No. 50-220

Nine Mile Point Nuclear Station Unit 2
Facility Operating License No. NPF-69, Docket No. 50-410

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ATTACHMENTS

1.0 LIST OF ACRONYMS AND DEFINITIONS

1. Airborne Activity Sampling: Continuous sampling of air through the collection of particulates and radionuclides on filter media.

2. ARERR: Annual Radioactive Effluent Release Report

3. AREOR: Annual Radiological Environmental Operating Report

4. BWR: Boiling Water Reactor

5. 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.

6. Control: A sampling station in a location not likely to be affected by plant effluents due to its distance and/or direction from the station.

7. Curie (Ci): A measure of radioactivity; equal to 3.7×10^{10} disintegrations per second, or 2.22×10^{12} disintegrations per minute.

8. Direct Radiation Monitoring: The measurement of radiation dose at various distances from the plant is assessed using Thermoluminescent Dosimeters (TLD), Optically Stimulated Luminescence Dosimeters (OSLD) and pressurized ionization chambers.

9. EPA: Environmental Protection Agency

10. GPI: Groundwater Protection Initiative

11. Grab Sample: A single discrete sample drawn at one point in time.

12. Indicator: A sampling location that is likely to be affected by plant effluents due to its proximity and/or direction from the plant.

13. 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.

14. ISFSI: Independent Spent Fuel Storage Installation

15. Lower Limit of Detection (LLD): 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.

16. 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 five % probability of falsely concluding that a blank observation represents a true signal.

17. MDC: Minimum Detectable Concentration. Essentially synonymous with MDA for the purposes of radiological monitoring.

18. Mean: The sum of all of the values in a distribution divided by the number of values in the distribution, synonymous with average.

19. Microcurie: 3.7×10^4 disintegrations per second, or 2.22×10^6 disintegrations per minute.

20. N/A: Not Applicable

21. NEI: Nuclear Energy Institute

22. NIST: National Institute of Standards and Technology.

23. NRC: Nuclear Regulatory Commission

24. ODCM: Offsite Dose Calculation Manual

25. OSLD: Optically Stimulated Luminescence Dosimeter

26. pCi/L: picocuries / Liter

27. PWR: Pressurized Water Reactor

28. REMP: Radiological Environmental Monitoring Program

29. TLD: Thermoluminescent Dosimeter

2.0 EXECUTIVE SUMMARY

The Annual Radiological Environmental Operating Report is published in accordance with the James A. FitzPatrick Nuclear Power Plant (JAFNPP) Offsite Dose Calculation Manual (ODCM), Part I, Section 6.1., Section 6.6.2 Nine Mile Point 1 (NMP1) Technical Specifications and Section 5.6.2 of the Nine Mile Point Unit 2 (NMP2) Technical Specifications. The ODCM requires that the results from the annual Radiological Environmental Monitoring Program (REMP) be provided to the Nuclear Regulatory Commission by May 15th of each year.

This report describes the Radiological Environmental Monitoring Program (REMP), the implementation of the program, and the results obtained as required by the ODCM. The report also contains the analytical results tables, data evaluation, dose assessment, and data trends for each environmental sample media. Also included are results of the land use census, historical data, and the Environmental Laboratory's performance in the Quality Assurance Interlaboratory Comparison Program.

The REMP is a comprehensive surveillance program, which is implemented to assess the impact of site operations on the environment and compliance with 10 CFR 20, 40 CFR 190 and 10 CFR 72. Samples are collected from the aquatic and terrestrial pathways applicable to the site. The aquatic pathways include Lake Ontario fish, surface water and lakeshore sediment. The terrestrial pathways include airborne particulate and radioiodine, milk, food products and direct radiation.

During 2024 there were 1849 analyses performed on environmental media collected as part of the REMP. These results demonstrated that there is no significant or measurable radiological impact from the operation of the James A. FitzPatrick Nuclear Power Plant, Nine Mile Point Nuclear Station Unit 1 or Nine Mile Point Nuclear Station Unit 2. The 2024 results for all pathways sampled are consistent with the previous five-year historical results and exhibited no adverse trends.

Summary of Conclusions:

No measurable activities above background levels were detected. All values were consistent with historical results which indicate no adverse radiological environmental impacts associated with the operation of JAFNPP, NMP1, and NMP2. The program continues to demonstrate that the dose to a member of the public, as a result of the operation of all sites, remains significantly below the federally required dose limits specified in 10 CFR 20, 40 CFR 190 and 10 CFR 72.

Naturally occurring radionuclides are present in the Earth's crust and atmosphere and exists in detectable quantities throughout the world. It is common to detect naturally occurring radionuclides in many of the samples collected for REMP. Some examples of naturally occurring radionuclides that are frequently seen in samples are potassium-40, beryllium-7, actinium-228 (present as a decay product of radium-228), and radium-226. Additionally, some relatively long-lived anthropogenic radioisotopes, such as strontium-90 and cesium-137, are also seen in some REMP samples; these radionuclides exist in measurable quantities throughout the world as a result of fallout from historic atmospheric nuclear weapons testing. Detailed information on the exposure of the U.S. population to ionizing radiation can be found in NCRP Report No. 160 [1].

3.0 INTRODUCTION

The Radiological Environmental Monitoring Program (REMP) provides data on measurable levels of radiation and radioactive materials in the environment. This program also evaluates the relationship between quantities of radioactive materials released from the plant and resultant doses to individuals from principal pathways of exposure. In this capacity, REMP provides a check on the effluent release program and dispersion modeling to ensure that concentrations in the environment due to radioactive effluents conform to the "As Low as Is Reasonably Achievable" (ALARA) design objectives of 10 CFR 50, Appendix I [2], and implements the requirements of Section IV.B.2 and IV.B.3 of Appendix I. REMP is designed to conform to the Nuclear Regulatory Commission (NRC) Regulatory Guide 4.1 [3], NUREG 1301/1302 [4] [5], and the 1979 NRC Branch Technical Position [6].

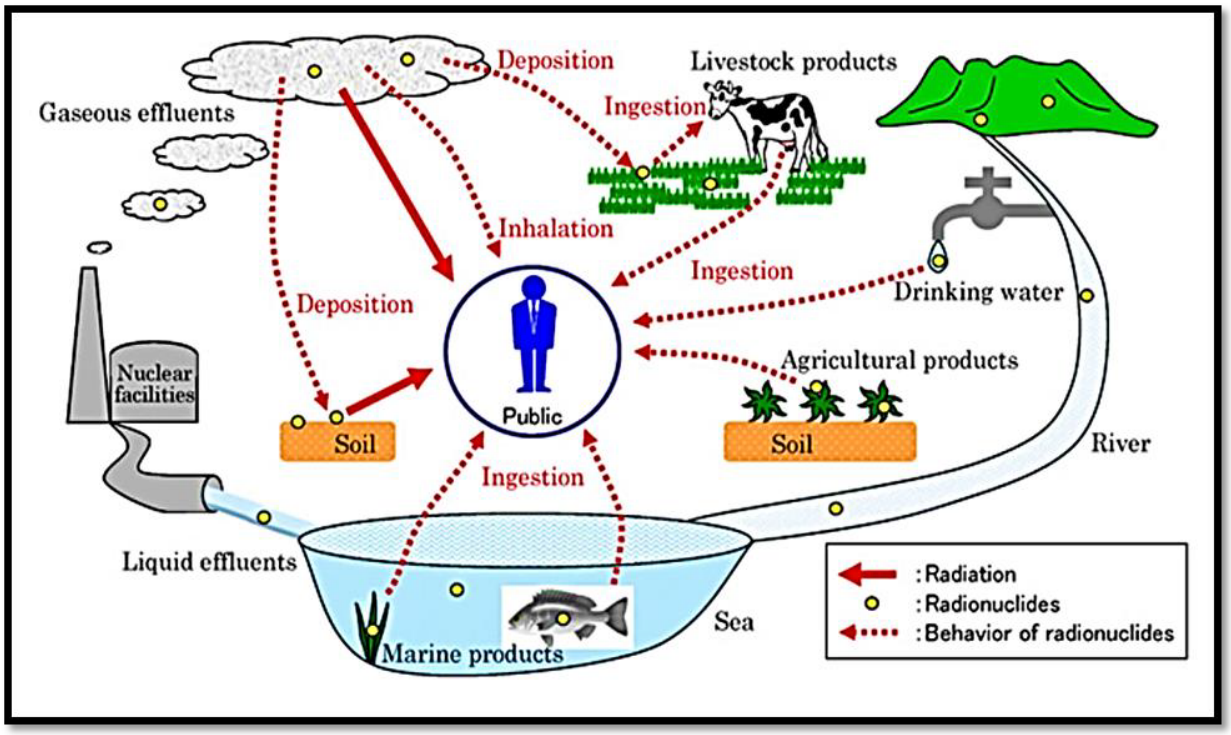

Figure 1: Potential exposure pathways to Members of the Public due to Plant Operations [7]

Quality assurance aspects of the sampling program and TLD/OSLD data collection are conducted in accordance with Regulatory Guides 4.15 [8] and 4.13 [9]. REMP also adheres to the requirements of New York, JAF & NMP Technical Specifications, and Offsite Dose Calculation Manual (ODCM). These governing documents dictate the environmental sampling, sample analysis protocols, data reporting and quality assurance requirements for the environmental monitoring program.

The Annual Radiological Environmental Operating Report provides summaries of the environmental data from exposure pathways, interpretations of the data, and analyses of trends of the results. Routinely monitored pathways include ingestion, inhalation, and direct radiation. Routes of exposure are based on site specific information such as meteorology, receptor locations, and water usage around the plant.

4.0 PROGRAM OVERVIEW

4.1 Program History

The James A. FitzPatrick Nuclear Power Plant, owned by Constellation, and Nine Mile Point Unit 1 and Nine Mile Point Unit 2, owned by Constellation are operated by the Nuclear Regulatory Commission (NRC) licensee, Constellation Energy Corporation. This report is submitted in accordance with James A. FitzPatrick Nuclear Power Plant's Offsite Dose Calculation Manual, Part 1, Section 6.1 to License DPR-59 Docket No. 50-333, Appendix A (Technical Specifications) Section 6.6.2 to License DPR-63, Docket No. 50-220 for Nine Mile Point Nuclear Station Unit 1, and Appendix A (Technical Specifications) Section 5.6.2 to License NPF-69, Docket No. 50-410 for Nine Nile Point Nuclear Station, Unit 2. This report covers the calendar year 2024. James A. FitzPatrick Nuclear Power Plant (JAFNPP), Nine Mile Point Unit 1 (NMP1) and Nine Mile Point Unit 2 (NMP2) Radiological Environmental Monitoring Program (REMP) requirements reside within each unit's Offsite Dose Calculation Manual (ODCM). Throughout this report, references will be made to the ODCM.

Environmental monitoring at the Nine Mile Point site has been ongoing since 1964. The program includes five years of pre-operational data, which was conducted prior to any reactor operations. In 1968, the Niagara Mohawk Power Company began the required pre-operational environmental site testing program. This pre-operational data serves as a reference point to compare later data obtained during reactor operation. In 1969, the Nine Mile Point Unit 1 Reactor, a 628 megawatt electric (MWe) Boiling Water Reactor (BWR) began full power operation. In 1975, the James A. FitzPatrick Nuclear Power Plant, owned and operated at that time by the New York Power Authority, began full power operation. The FitzPatrick plant, an 892 MWe (rated) BWR, occupies the east sector of the Nine Mile Point site, approximately 0.57 miles east of Nine Mile Point Unit 1. In 1988, the Nine Mile Point Unit 2 Reactor also owned and operated by Nine Mile Point Nuclear Station, LLC, began full power operation. This 1363 MWe BWR is located between the Nine Mile Point Unit 1 and FitzPatrick sites.

In 1985, the individual Plant Effluent Technical Specifications were standardized to the generic Radiological Effluent Technical Specifications, much of which was common to the two reactors, and subsequently Nine Mile Point Unit 2. Subsequent Technical Specification amendments relocated the REMP requirements to the ODCM for all three plants. Data generated by the Radiological Environmental Monitoring Program (REMP) is shared between each unit. On November 21, 2000, the ownership and operation of the James A. FitzPatrick Nuclear Power Plant was transferred from the New York Power Authority to Entergy Nuclear FitzPatrick, LLC and Entergy Nuclear Operations, Inc. The Facility Operating License No. DPR-59 and Docket No. 50-333 remained the same and in March 2017, ownership and operation of the James A. FitzPatrick Nuclear Power Plant was transferred to Exelon Generation Company, LLC. On November 7, 2001, the ownership of the Nine Mile Point Unit 1 and 2 facilities was transferred to Constellation Energy Nuclear Group (CENG). Nine Mile Point Nuclear Station, LLC, operates the two facilities. In March 2012 Constellation Energy merged with Exelon Generation and prior to March 25, 2014, Exelon Generation was an intermediate 50.01 percent parent company of CENG, which is the parent company owner of Nine Mile Point Nuclear Station, LLC. Following the transfer, Exelon Generation remained an intermediate parent company and became the co-licensee of Nine Mile Point Nuclear Station, LLC and the operator of NMP1 and NMP2. Exelon Generation Company, LLC took over ownership and operation of the Nine Mile Point Unit 1 and 2 facilities in 2014. In February 2022, a newly-formed company, Constellation Energy Corporation, separated from Exelon Generation Company and become the stand-alone owners of James A. FitzPatrick, Nine Mile Point Unit 1 and Nine Mile Point Unit 2.

In summary, three Boiling Water Reactors, which together generate 2883 MWe, have operated collectively at the Nine Mile Point site since 1988. A large database of environmental results from the exposure pathways have been collected and analyzed to evaluate the potential impact from reactor operations.

4.2 Site Description

The Nine Mile Point (NMP) site is located on the southeast shore of Lake Ontario in the town of Scriba, approximately 6.2 miles northeast of the city of Oswego. The nearest metropolitan area is located approximately 36 miles southeast of the site. The reactors and support buildings occupy a small shoreline portion of the 1600-acre site. The land, soil of glacier deposits, rises gently from the lake in all directions. Oswego County is a rural environment, with about 15% of the land devoted to agriculture.

4.3 Program Objectives

The objectives of the Radiological Environmental Monitoring Program (REMP) are to:

a. Measure and evaluate the effects of plant operation on the environs, and to verify the effectiveness of the controls on radioactive material sources,

b. Monitor natural radiation levels in the environs of the NMP nuclear site,

c. Demonstrate compliance with the requirements of applicable federal regulatory agencies, site Technical Specifications, and Offsite Dose Calculation Manual

4.4 Program Description

To achieve the objectives listed in Section 4.3, an extensive sampling and analysis program is conducted every year. The James A. FitzPatrick Nuclear Power Plant (JAFNPP), Nine Mile Point Unit 1 and Nine Mile Point Unit 2 Radiological Environmental Monitoring Program (REMP) consists of sampling and analysis of various media that include:

- Air
- Fish
- Food Products
- Milk
- Shoreline Sediment
- Surface Waters

In addition, direct radiation measurements are performed using thermoluminescent dosimeters (TLDs). The REMP sampling locations are selected based on local meteorology, receptor locations, and water usage around the plant, and are verified by an annual Land Use Census. The accuracy and precision of the program is assured by participation in an Interlaboratory Comparison Quality Assurance Program (ICQAP). In addition to NMPNS's participation in the ICQAP, sample splits are provided to the New York State Department of Health for cross-checking purposes.

Sample collections for the radiological program are accomplished via a coordinated effort between site Chemistry and site Environmental. The site staff is assisted by a contracted environmental company, EA Science and Technology, Inc. (EA).

Sampling and analysis requirements and the locations from which samples were collected are captured in the following tables and figures:

- Table 1: Radiological Environmental Monitoring Program – Direct Radiation
- Table 2: Radiological Environmental Monitoring Program – Airborne
- Table 3: Radiological Environmental Monitoring Program – Waterborne
- Table 4: Radiological Environmental Monitoring Program – Ingestion
- Table 5: REMP Sampling Locations – Direct Radiation
- Figure 3: On-Site Environmental Stations and TLD Locations
- Figure 4: Off-Site Environmental Stations and TLD Locations
- Figure 5: Food Product, Fish, and Shoreline Sediment Locations

Degrees and distance listed for sample locations throughout this report are based on the Nine Mile Point Unit 2 Reactor Centerline and are rounded to the nearest 1/10 of a mile. Tables 1 through 4 list the requirements, sampling and collection frequencies, and type and frequency of analyses from the Nine Mile Point Unit 2 ODCM.

5.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM REQUIREMENTS

Table 1: Radiological Environmental Monitoring Program – Direct Radiation

Requirement	Sample Locations[a]	Sampling and Collection Frequency[a]	Type and Frequency of Analyses
Direct Radiation 32 routine monitoring stations[b], placed as follows: a. An inner ring of stations, one in each meteorological sector in the general area of the site boundary b. An outer ring of stations, one in each land-based meteorological sector in the 4 to 5 mile[c] range from the site c. The balance of the stations should be placed in special interest areas such as population centers, nearby residences, schools, and in one or two areas to serve as control stations[d]	See Table 5	Once per 3 months	Gamma dose per 3 months

Table 2: Radiological Environmental Monitoring Program – Airborne

Requirement	Sample Locations[a]	Sampling and Collection Frequency[a]	Type and Frequency of Analyses
Airborne Radioiodine and Particulates			
a. Three samples from offsite locations close to the site boundary (within one mile) in different sectors[e]	**R1**: Nine Mile Point Road North 92º E @ 1.8 miles **R2:** Co. Rt. 29 & Lake Road 107º ESE @ 1.1 miles **R3:** Co. Rt. 29 133º SE @ 1.4 miles	Continuous sampler operation with sample collection weekly	Radioiodine canister: Analyze weekly for I-131 Particulate sampler: (1) Analyze for gross beta radioactivity ≥24 hours following filter change[f] (2) Perform gamma isotopic analysis on each sample[g] in which gross beta activity is >10 times the previous yearly mean of control samples, and (3) Gamma isotopic analysis[g] of composite sample (by location) once per 3 months
b. One sample from the vicinity of an established year-round community[e]	**R4:** Village of Lycoming, NY 145º SE @ 1.8 miles		
c. One sample from a control location, at least 10 miles distant and in a least prevalent wind direction[d]	**R5**: Montario Point Road 42º NE @ 16.2 miles		

Table 3: Radiological Environmental Monitoring Program – Waterborne

Requirement	Sample Locations[a]	Sampling and Collection Frequency[a]	Type and Frequency of Analyses
Surface Water a. One sample upstream[d][h] b. One sample from the site's downstream cooling water intake[h]	08: Oswego Steam Station (OSS) Inlet Canal 236º SW @ 7.6 miles 03: JAFNPP Inlet Canal 71º ENE @ 0.5 miles	Composite sample over one month period[i]	(1) Gamma isotopic analysis[g] once per month (2) Tritium analysis of each composite once per 3 months
Ground Water Samples from one or two sources if likely to be affected[j]	As required	Grab sample once per three months	Gamma isotopic[g] and tritium analysis one per three months
Drinking Water* One sample each of one to three of the nearest water supplies that could be affected by its discharge[k]	As required	When I-131 analysis is performed, a composite sample over a two week period[i]; otherwise, a composite sample monthly	(1) I-131 analysis on each composite when the dose calculated for the consumption of the water is greater than 1 mrem per year[l] (2) Composite for gross beta and gamma isotopic analyses[g] monthly (3) Composite for tritium analysis once per three months
Sediment from Shoreline One sample from a downstream area with existing or potential recreational value	05: Sunset Bay 84º ENE @ 1.2 miles	Twice per year	Gamma isotopic analysis[g]

*Requirement listed in NMP2 ODCM only.

Table 4: Radiological Environmental Monitoring Program – Ingestion

Requirement	Sample Locations[a]	Sampling and Collection Frequency[a]	Type and Frequency of Analyses
Milk			
a. Samples from Milk Sampling Locations in three locations within 3.5 miles[e]	No locations identified by the Land Use Census this year	Twice per Month, April-December[m]	(1) Gamma isotopic[g] and I-131 analysis of each sample twice per month April through December (2) Gamma isotopic[g] and I-131 analysis of each sample once per month January through March if required[m]
b. If there are none, then one sample from Milk Sampling Locations in each of three areas 3.5 – 5.0 miles[e]	No locations identified by the Land Use Census this year		
c. One sample from a Milk Sample Location at a control location 9-20 miles distant and in a least prevalent wind direction[d]	77: Summerville 190º S @ 16.0 miles		
Fish			
a. One sample of each of two commercially or recreationally important species in vicinity of a plant discharge area[n]	02: NMP Transect 290° WNW @ 0.4 miles 03: JAF Transect 62° ENE @ 0.8 miles	Twice per year	Gamma isotopic analysis[g] on edible portions twice per year
b. One sample of the same species in areas not influenced by station discharge[d]	00: Oswego Transect 237º WSW @ 5.9 miles		

Table 4: Radiological Environmental Monitoring Program – Ingestion

Requirement	Sample Locations[a]	Sampling and Collection Frequency[a]	Type and Frequency of Analyses
Food Products			
a. One sample of each principal class of food products from any area that is irrigated by water in which liquid plant wastes have been discharged[o]	No locations identified by the Land Use Census this year	At time of harvest[p]	Gamma isotopic[g] and I-131 analysis of each sample of edible portions
b. Samples of three different kinds of broad leaf vegetation (such as vegetables) grown nearest to each of two different offsite locations of highest calculated site average ground level D/Q (based on all licensed reactors)[e]	633 JAF Indicator: Onsite Garden 90º E @ 0.66 miles 634 JAF Indicator: Onsite Garden 109º ESE @ 0.64 miles 635 JAF Indicator: Onsite Garden 131º SE @ 0.62 miles	Once per year during harvest season	
c. One sample of each of the similar broad leaf vegetation grown at least 9.3 miles distant in a least prevalent wind direction.	632: Summerville (Control) 190º SSW @ 16.0 miles		

Notes for Tables 1 through 4

(a) Specific parameters of distance and direction sector from the centerline of one reactor, and additional descriptions where pertinent, shall be provided for each and every sample location. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," October 1978, and to Radiological Assessment Branch Technical Position on Environmental Monitoring, Revision 1, November 1979. Deviations are permitted from the required sampling schedule if specimens are unobtainable because of such circumstances as hazardous conditions, seasonal unavailability (which includes theft and uncooperative residents), or malfunction of automatic sampling equipment.

(b) One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously, may be used in place of, or in addition to, integrating dosimeters. Each of the 32 routine monitoring stations shall be equipped with two or more dosimeters or with one instrument for measuring and recording dose rate continuously. For the purpose of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor, two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation.

(c) At this distance, eight wind rose sectors, (W, WNW, NW, NNW, N, NNE, NE, and ENE) are over Lake Ontario.

(d) The purpose of these samples is to obtain background information. If it is not practical to establish control locations in accordance with the distance and wind direction criteria, other sites, which provide valid background data, may be substituted.

(e) Having the highest calculated annual site average ground-level D/Q based on all site licensed reactors.

(f) Airborne particulate sample filters shall be analyzed for gross beta activity 24 hours or more after sampling to allow for radon and thoron daughter decay.

(g) Gamma isotopic analysis means the identification and quantification of gamma –emitting radionuclides that may be attributable to the effluents from the facility.

(h) The upstream sample shall be taken at a distance beyond significant influence of the discharge. The downstream sample shall be taken in an area beyond but near the mixing zone.

(i) In this program, representative composite sample aliquots shall be collected at time intervals that are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure obtaining a representative sample.

(j) Groundwater samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

(k) Drinking water samples shall be taken only when drinking water is a dose pathway.

(l) Analysis for I-131 may be accomplished by Ge-Li analysis provided that the lower limit of detection (LLD) for I-131 in water samples found on NMP2 ODCM Table D 3.5.1-2 can be met. Doses shall be calculated for the maximum organ and age group.

(m) Samples will be collected January through March if I-131 is detected in November and December of the preceding year.

(n) In the event 2 commercially or recreationally important species are not available, after 3 attempts of collection, then 2 samples of one species or other species not necessarily commercially or recreationally important may be utilized.

(o) Applicable only to major irrigation projects within 9 miles of the site in the general downcurrent direction.

(p) If harvest occurs more than once/year, sampling shall be performed during each discrete harvest. If harvest occurs continuously, sampling shall be taken monthly. Attention should be paid to including samples of tuberous and root food products.

Table 5: REMP Sampling Locations – Direct Radiation

Site #	Location Type	Sector*	Distance (miles)*	Description
7	Inner Ring	WSW	0.7	Site Meteorological Tower, (G Onsite Station)
8	Control	NE	16.2	Montario Point Road (R5 Offsite Station – Control)
14	Control	SW	12.5	SW Oswego - Control
15	Special Interest	WSW	0.9	West Site Boundary, Bible Camp
18	Inner Ring	W	0.4	Energy Information Center
23	Inner Ring	ENE	0.8	North Shoreline Area (H Onsite Station)
49	Control	SSE	19.7	Phoenix, NY - Control
56	Special Interest	SE	5.2	New Haven Elementary School
58	Special Interest	SW	3.0	Alcan Aluminum, Rt. 1A
75	Inner Ring	N	0.1	North Fence, NMP-2
76	Inner Ring	NNE	0.1	North Fence, NMP-2
77	Inner Ring	NE	0.2	North Fence, NMP-2
78	Inner Ring	E	1.0	East Boundary, JAFNPP
79	Inner Ring	ESE	1.2	Co. Rt. 29
80	Inner Ring	SE	1.5	Co. Rt. 29
81	Inner Ring	SSE	1.6	Miner Road
82	Inner Ring	S	1.6	Miner Road
83	Inner Ring	SSW	1.2	Lakeview Road
84	Inner Ring	SW	1.1	Lakeview Road
85	Inner Ring	WNW	0.2	North Fence, NMP-1
86	Inner Ring	NW	0.1	North Fence, NMP-1

Table 5: REMP Sampling Locations – Direct Radiation

Site #	Location Type	Sector*	Distance (miles)*	Description
87	Inner Ring	NNW	0.1	North Fence, NMP-1
88	Outer Ring-Offsite	E	4.5	Hickory Grove Road
89	Outer Ring-Offsite	ESE	4.3	Leavitt Road
90	Outer Ring-Offsite	SE	4.2	Rt. 104 and Keefe Road
91	Outer Ring-Offsite	SSE	4.9	Co. Rt. 53
92	Outer Ring-Offsite	S	4.4	Maiden Lane Road
93	Outer Ring-Offsite	SSW	4.4	Co. Rt. 53
94	Outer Ring-Offsite	SW	4.4	Co. Rt. 1 and Kocher Road
95	Outer Ring-Offsite	WSW	3.7	Lake Shore, Alcan West Access Road
96	Special Interest	SSW	3.6	Creamery Road
97	Special Interest	SE	1.8	Co. Rt. 29

*Sector and Distance based on Nine Mile Point Unit 2 Reactor Centerline rounded to the nearest 1/10 of a mile.

6.0 MAPS

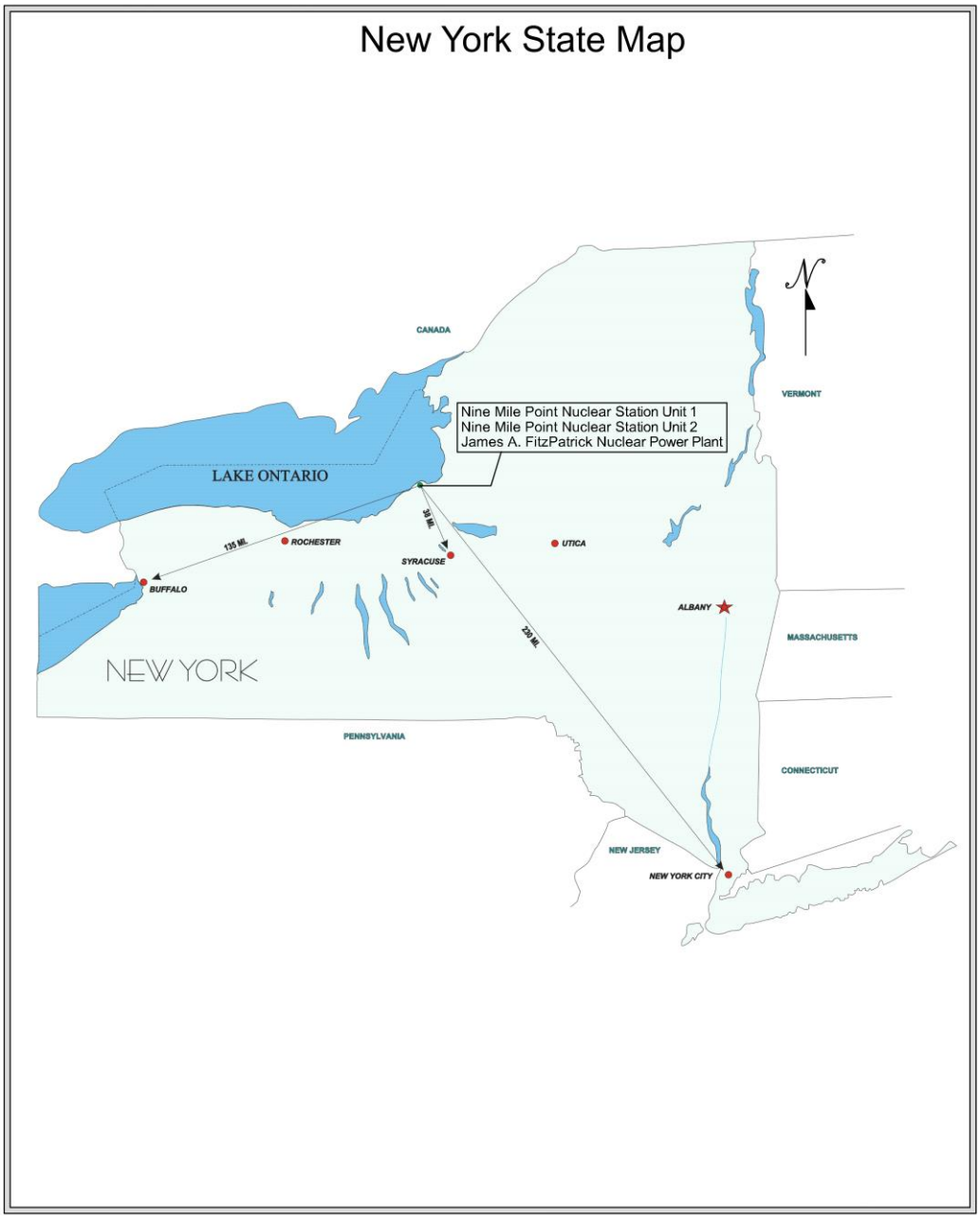

Figure 2**:** James A. FitzPatrick and Nine Mile Point Nuclear Station Locations

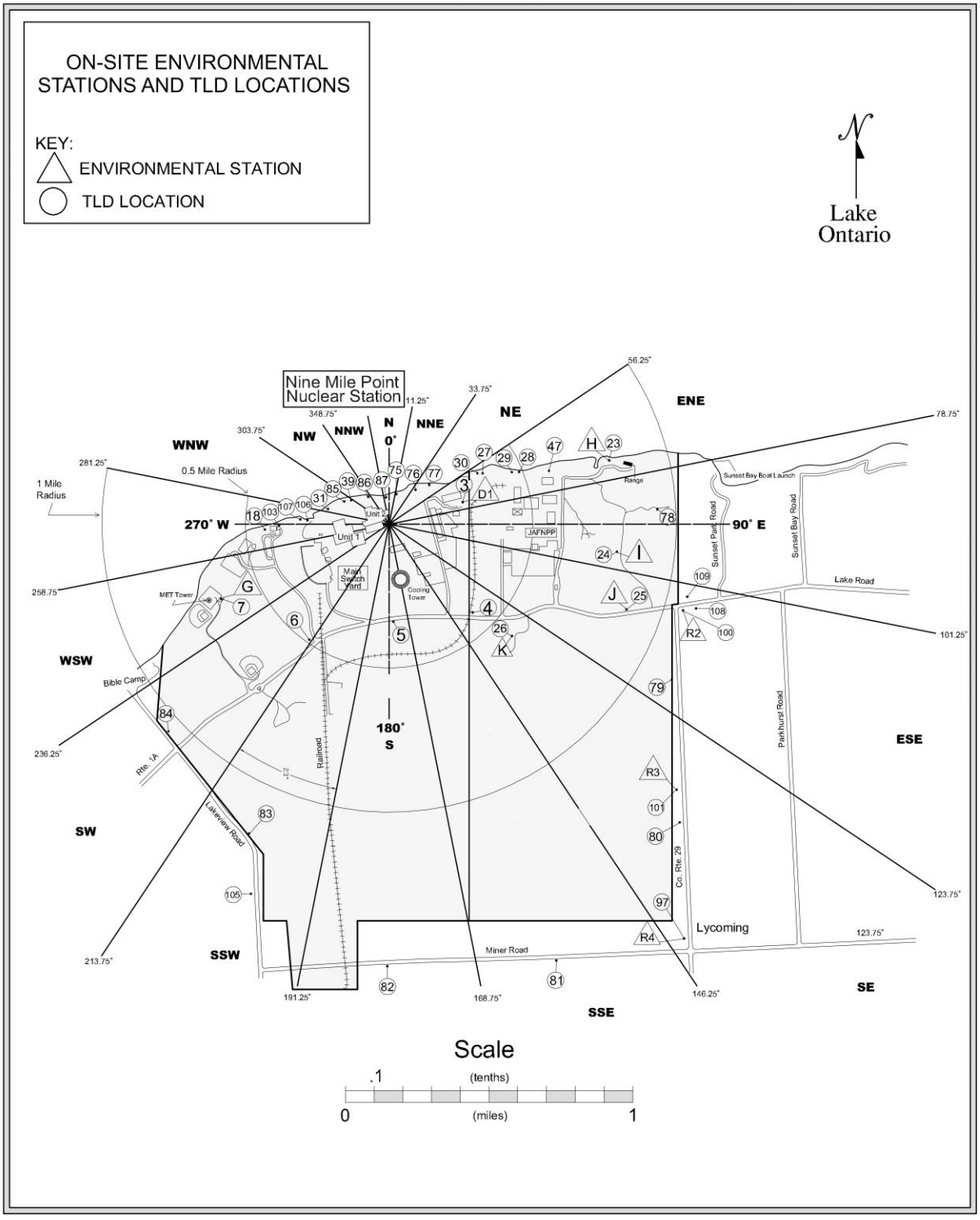

Figure 3: On-Site Environmental Stations and TLD Locations

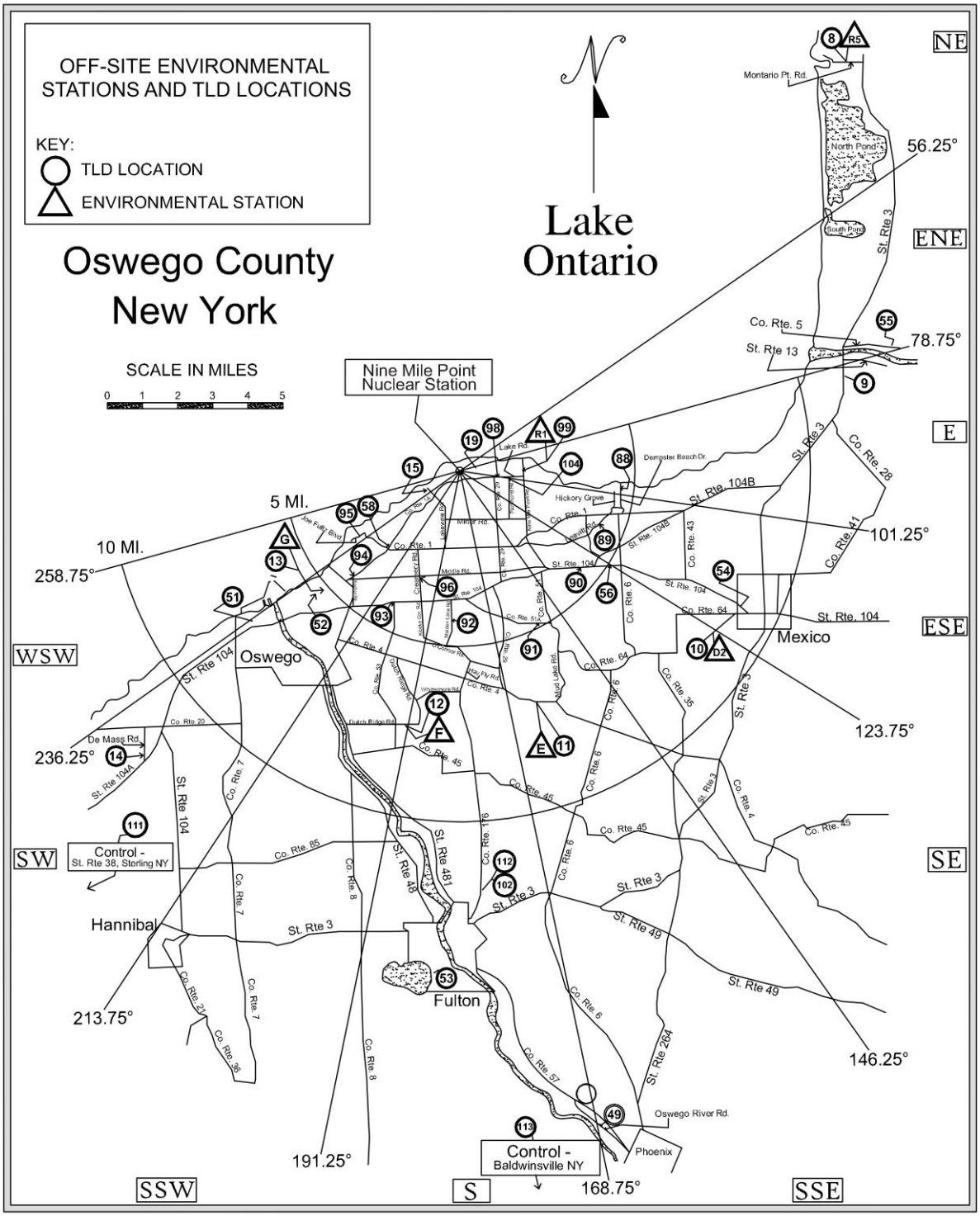

Figure 4: Off-Site Environmental Stations and TLD Locations

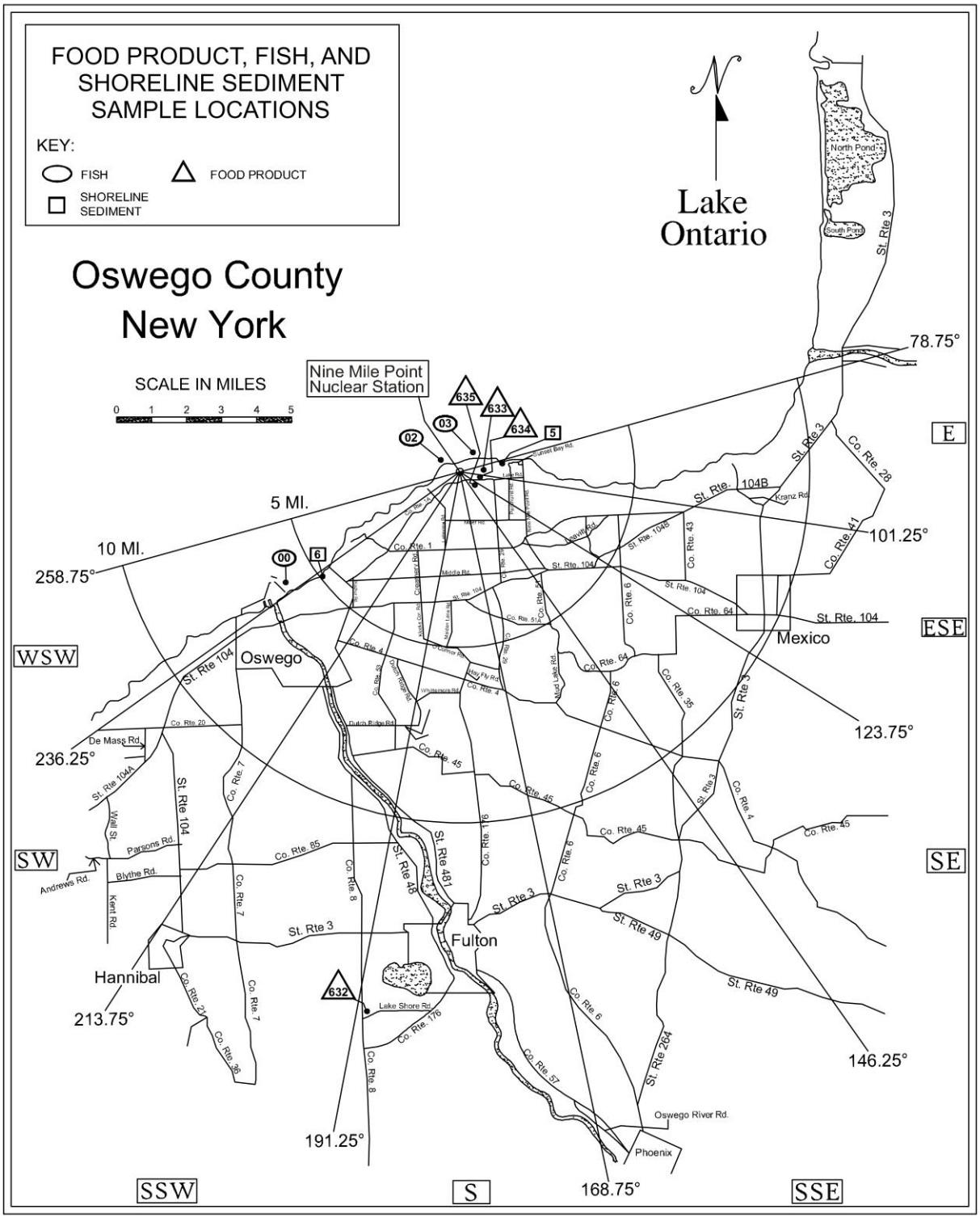

Figure 5: Food Product, Fish, and Shoreline Sediment Sample Locations

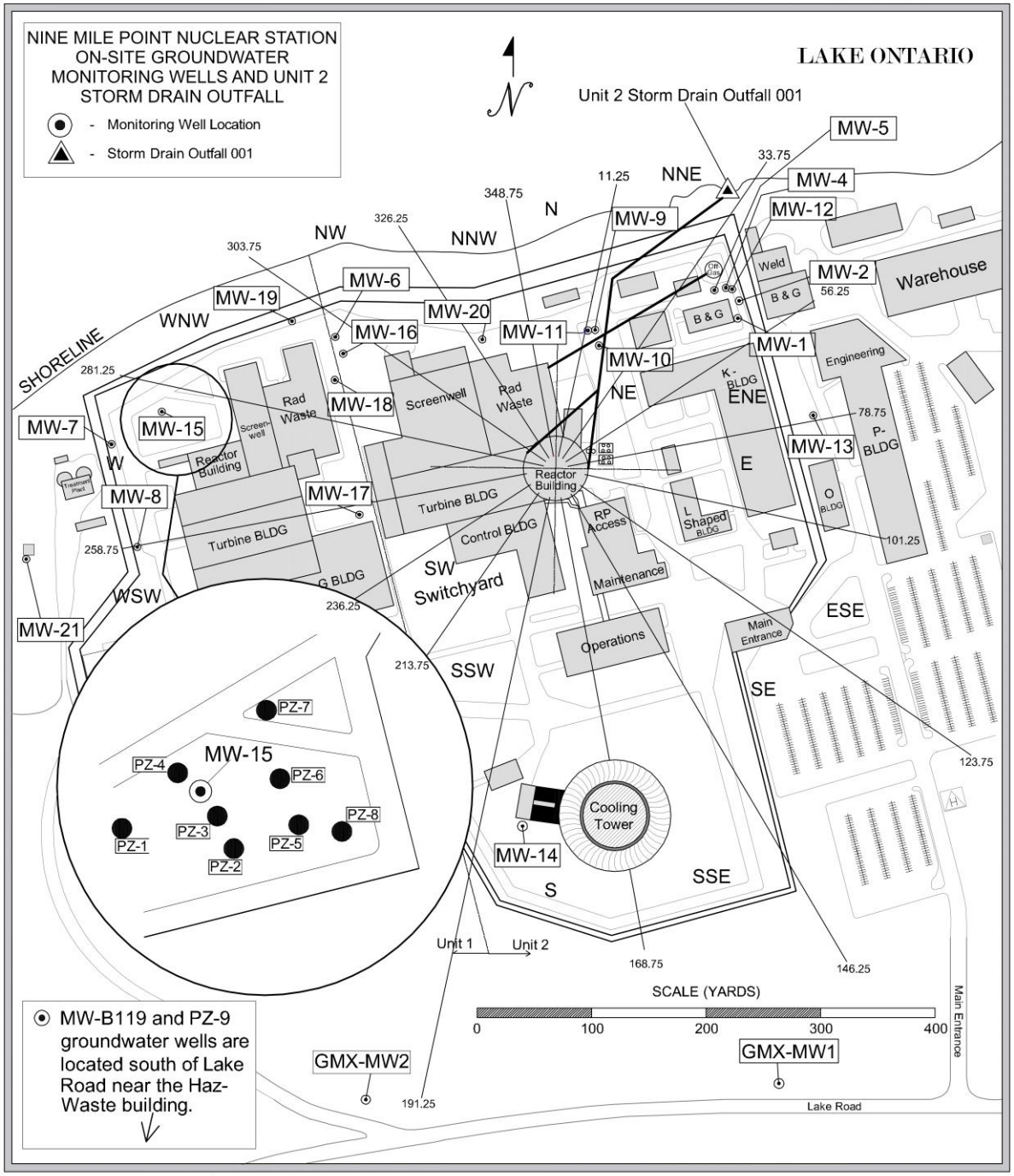

Figure 6: NMPNS On-Site Radiological Groundwater Protection Program Locations

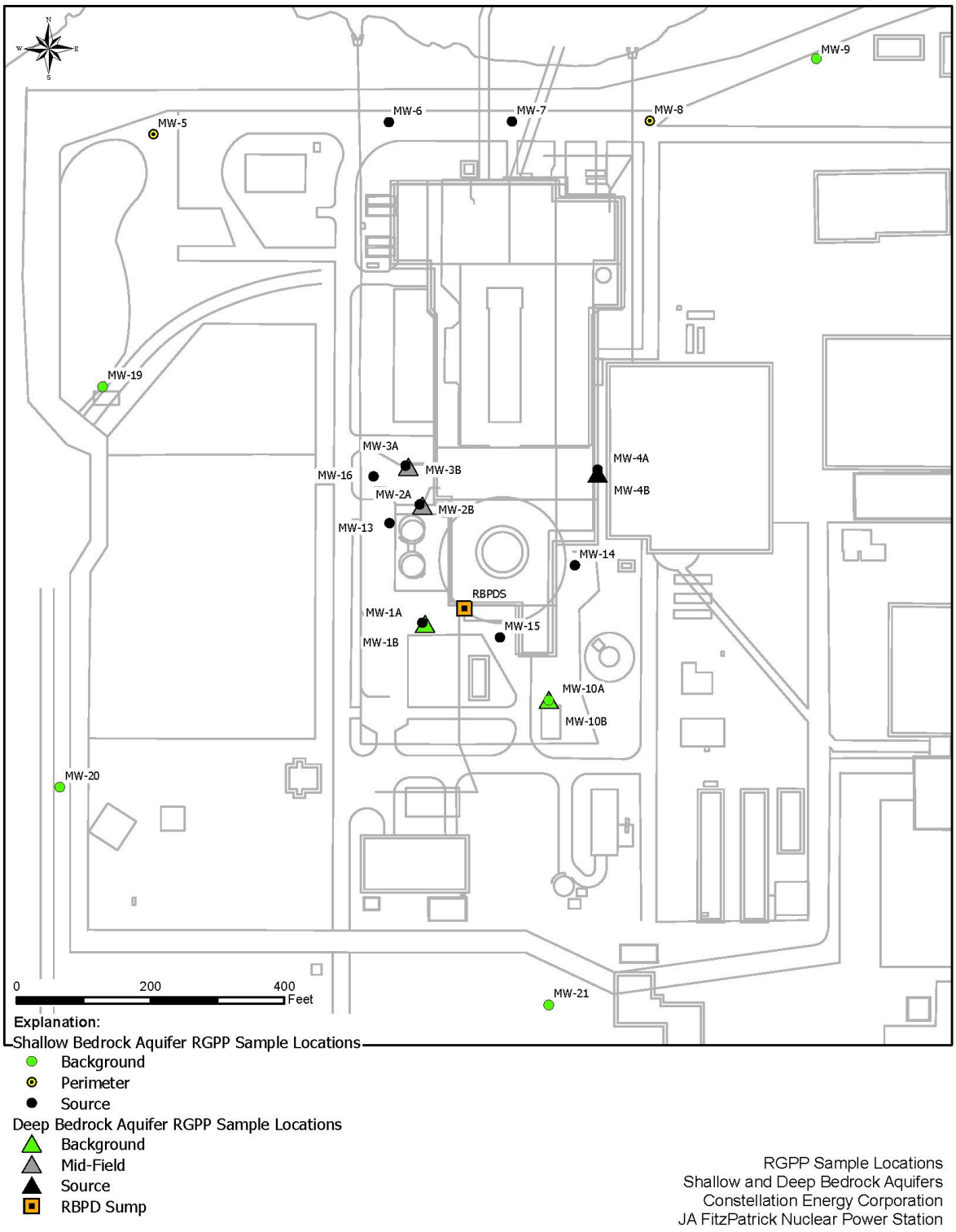

Figure 7: JAFNPP On-Site Radiological Groundwater Protection Program Locations

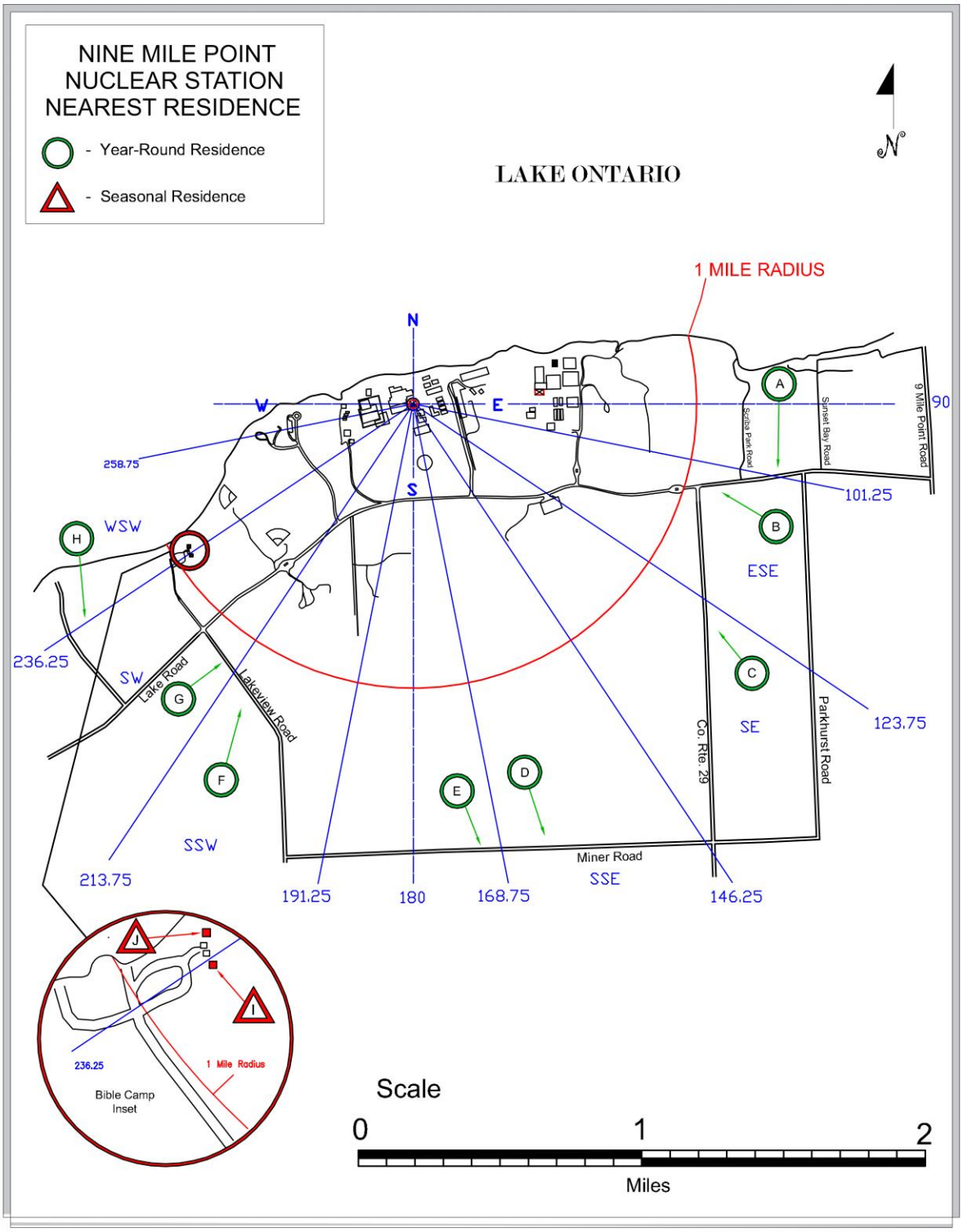

Figure 8: Nine Mile Point Nuclear Station Nearest Residence

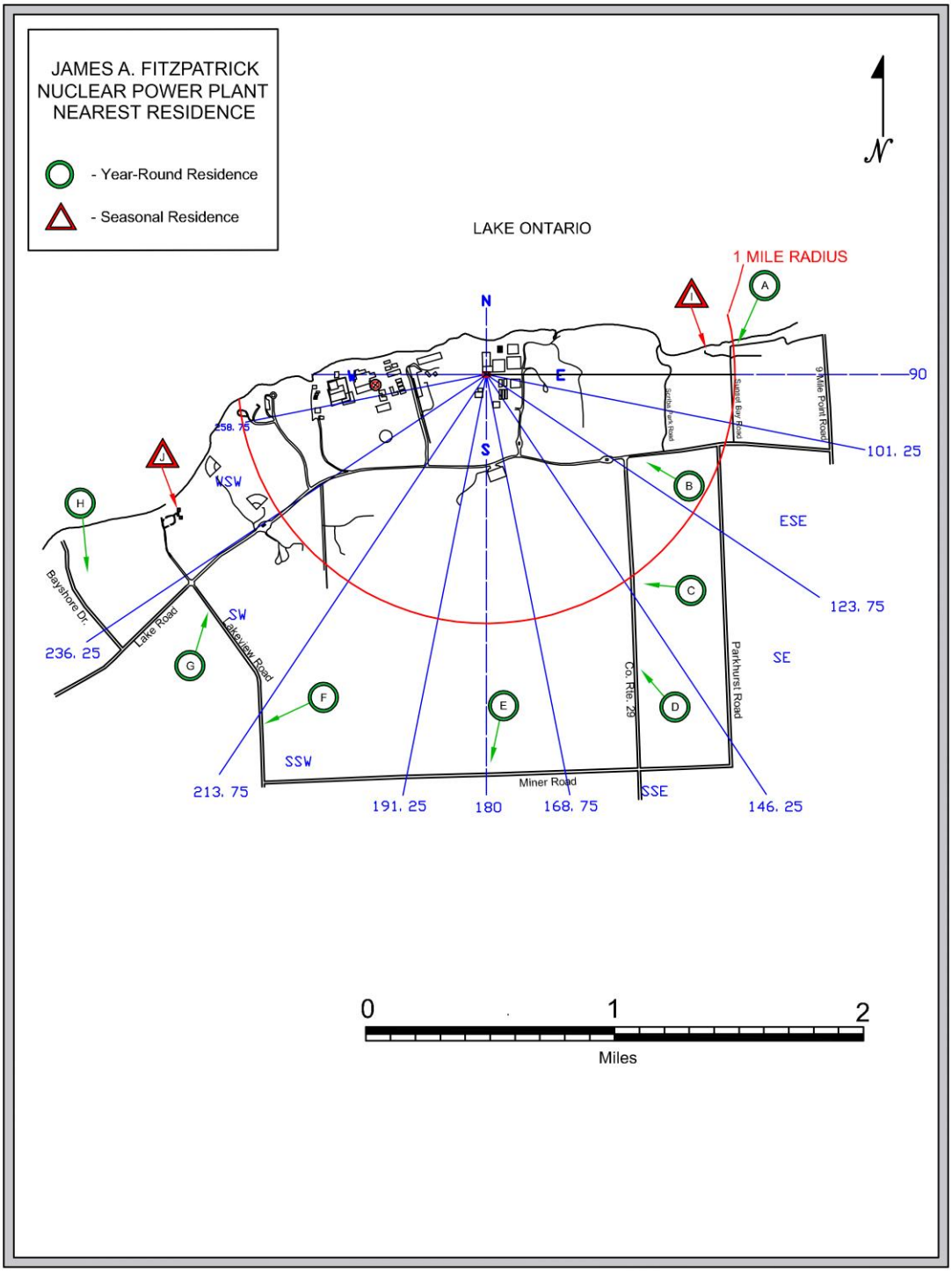

Figure 9: James A. FitzPatrick Nuclear Power Plant Nearest Residence

7.0 REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Table 6: Reporting Levels for Radioactivity Concentrations in Environmental Samples

Radionuclide	Water (pCi/L)	Air Particulates or Gases (pCi/m^3)	Fish (pCi/Kg-wet)	Milk (pCi/L)	Food Products (pCi/Kg-wet)
H-3	30,000 (1)				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-Nb-95	400				
I-131	20 (1)	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140	200			300	

Table 7: Lower Limits of Detection in Environmental Samples

Radionuclide	Water (pCi/L)	Air Particulates or Gases (pCi/m^3)	Fish (pCi/Kg-wet)	Milk (pCi/L)	Food Products (pCi/Kg-wet)	Sediment (pCi/Kg-dry)
Gross Beta	4.0	0.01				
H-3	3,000 (1)					
Mn-54	15		130			
Fe-59	30		260			
Co-58, Co-60	15		130			
Zn-65	30		260			
Zr-Nb-95	15					
I-131	15 (1)	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-La-140	15			15		

[1] No drinking water pathway exists at the Nine Mile Point site under normal operating conditions due to the direction and distance of the nearest drinking water intake. Therefore, the LLD value of 3,000 pCi/liter is used for H-3 and the LLD value of 15 pCi/liter is used for I-131, and the reporting value of 30,000 pCi/liter is used for H-3 and the reporting value of 20 pCi/liter is used for I-131.

8.0 SAMPLING PROGRAM, PROGRAM MODIFICATION AND INTEPRETATION OF RESULTS

At most nuclear stations, data was collected prior to plant operation to determine background radioactivity levels in the environment. Annual data is routinely compared to preoperational and/or 10-year average values to determine if changes in the environs are present. Strict comparison is difficult to make due to fallout from historical nuclear weapon testing. Cesium-137 can be routinely found in environmental samples as a results of above ground nuclear weapons testing. It is important to note, levels of Cs-137 in environment are observed to fluctuate, for example as silt distributions shift due to natural erosion and transport processes, Cs-137 may or may not be observed in sediment samples. Results from samples collected and analyzed during the year, 2024, are described below.

In the following sections, results from direct radiation, air, water, and food products analyzed as part of REMP in 2024 will be discussed. Sampling program descriptions and deviations will also be discussed.

8.1 Environmental Direct Radiation Dosimetry Results

Dose is measured as net exposure (field reading less transit reading) normalized to 90-day quarters and a 1 sigma uncertainty. Thermoluminescent dosimeters (TLDs) are used to measure direct radiation (gamma dose) in the environment. As part of the 2024 environmental monitoring program, TLDs were placed at a total of 72 different locations (32 required by the ODCM and 40 optional locations). These TLDs were placed, collected, and read each quarter of 2024. The results presented in this report are the average of the two TLD readings obtained for each given location. Environmental dose rates vary by location, depending on geological and land use considerations, and remain relatively constant for any given location (unless land use changes). Some facilities observe seasonal variation in environmental doses.

The following geographic categories are used to analyze the TLDs which were placed as part of the 2024 monitoring program, in accordance with the requirements listed in Table 1: Radiological Environmental Monitoring Program – Direct Radiation:

- Site Boundary (area of the site boundary in each of the 16 meteorological sectors: Only TLD results that are not affected by radwaste building direct shine, includes TLD #s 7, 18, 78, 79, 80, 81, 82, 83, 84; TLD #s: 23, 75, 76, 77, 85, 86, 87 are excluded)

- Offsite Sector (area four to five miles from the site in each of the eight-land based meteorological sectors, includes TLD #s: 88, 89, 90, 91, 92, 93, 94, 95)

- Special Interest (areas of high population density, includes TLD #s 15, 56, 58, 96, 97, 98*)

- Control (areas beyond significant influence of the site, includes TLD #s 8, 14, 49)
  **TLD applicable to NMP1 and NMP2 ODCMs*

A summary of the 2024 dose rates for each of these geographic categories is as follows:

2024 DOSE IN MREM PER STANDARD MONTH

Geographic Category	Minimum	Maximum	Mean
Site Boundary (Inner Ring)	4.5	5.7	5.0
Offsite Sectors (Outer Ring)	4.1	5.5	4.8
Special Interest	4.5	5.3	4.9
Control Locations	4.7	5.6	5.1

The analysis of offsite doses from direct radiation measurements, presented here and in Attachment 4 of this report, concludes that there is no significant difference in annual dose to the public at or beyond the site boundary. The measured annual dose rate at the nearest residence to the site was consistent with the dose rates measured at the site boundary and the offsite control locations. The results for the Site Boundary, Offsite Sectors, and Special Interest (offsite) were well within expected normal variation when compared to the Control Location TLD results.

The use of Hydrogen Water Chemistry (HWC) at both JAFNPP and NMPNS and the two Independent Spent Fuel Storage Installations (ISFSIs) on the NMP/JAF site did not measurably increase the ambient radiation exposure rate beyond the site boundary.

8.2 Air Particulate and Radioiodine Sample Results

Air particulate filters and charcoal canisters were collected from locations specified in Table 2: Radiological Environmental Monitoring Program – Airborne. During the calendar year 2024, a total of 779 samples were collected and analyzed for gross beta, gamma emitters and iodine. Particulate samplers are used to continuously collect airborne particulates on a filter. The samples are analyzed for gross beta activity following filter changeout which occurs weekly. Gamma isotopic analysis is also performed on the samples collected at each location and is analyzed quarterly. Radioiodine (I-131) analysis is performed weekly on radioiodine sample cartridges.

The air monitoring system consists of 15 sample locations, five required by the ODCM and 10 optional locations. The optional offsite locations are designated as D2, E, F and G-OFF. The optional onsite locations are designated as D1, G-ON, H, I, J and K. The mean gross beta concentration for samples collected from the control location (R5) in 2024 was 2.03E-3 pCi/m. The mean gross beta concentration for the samples collected from the indicator locations (R1, R2, R3 and R4) in 2024 was 2.02E-2 pCi/m. The consistency between the indicator and control mean values demonstrates that there are no increased airborne radioactivity levels in the general vicinity of the site from plant effluents.

All radioiodine samples were below detection limit.

Gamma spectrometric analyses of all quarterly composited air particulate weekly samples exhibited no detectable concentrations of any plant-related radionuclides in any of these samples. Naturally occurring radionuclides, such as Be-7, were detected in nearly all samples.

Air particulate and radioiodine results from this monitoring period, 2024, were compared to the last 10-years' annual averages. As shown in Figure 10:, there were no significant changes in the baseline beta emitters in air particulate filters. Air particulate results in 2024 of the ODCM required Indicator group and Control were also compared to the optional groups, Onsite and Offsite. The comparison of these weekly averages as shown in Figure 11, indicate there was a very small variance in activity week to week and differences in results between the groups are consistent with the Control, indicating the environment is not impacted by plant operation onsite or offsite of the facilities.

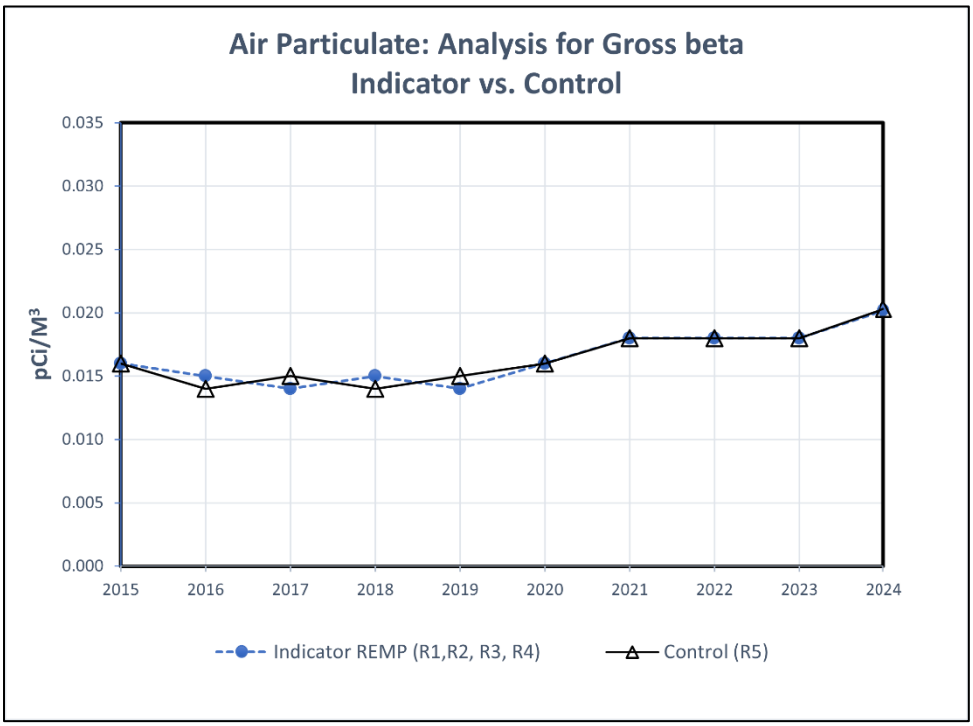

Figure 10: Air Particulate: Analysis for Gross Beta, Average for ODCM Indicator vs. Control Location

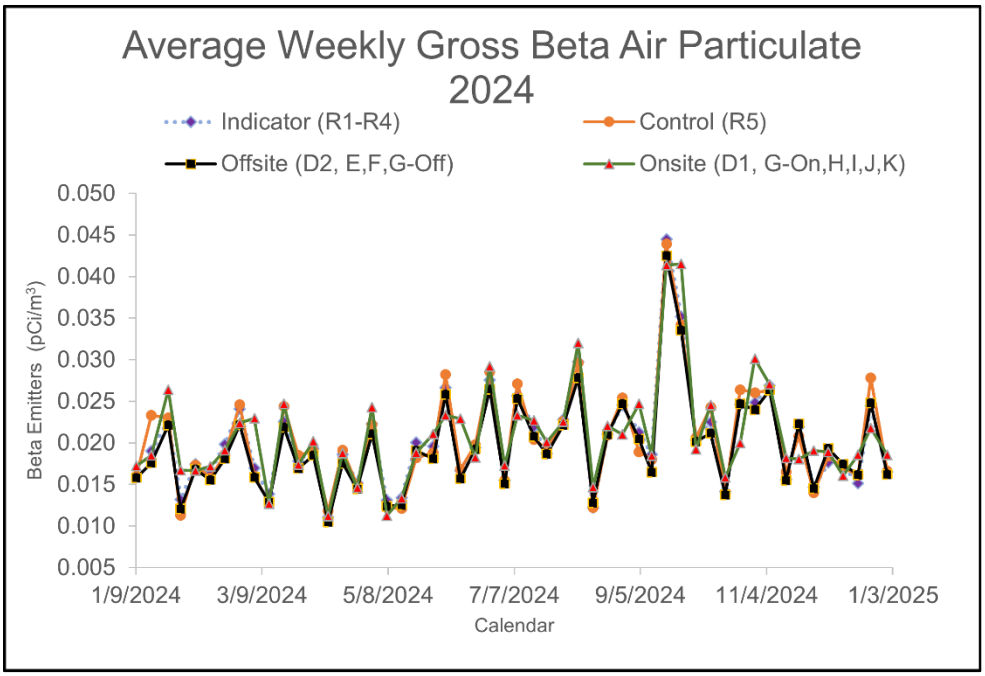

Figure 11: Air Particulate: Analysis for Gross Beta, Average Weekly Indicator Groups vs. Control

8.3 Waterborne Sample Results

8.3.1 Surface Water

Composite water samples are collected monthly at the upstream control location, Oswego Steam Station Inlet (#8), and at the downstream indicator location, JAF Inlet (#03). Optional surface water composite samples are also collected from the upstream Oswego City Water Supply (#10), as well as the NMP1 Inlet (#9) and NMP2 Inlet (#11). Monthly composite samples are analyzed for gamma emitters. Aliquots from the monthly composites are combined to form a quarterly composite which is then analyzed for tritium. During the calendar year 2024, a total of 48 surface water samples were collected and analyzed in accordance with the requirements in the ODCM and shown in Table 3: Radiological Environmental Monitoring Program – Waterborne. Gamma spectrometric analyses of all monthly composited water samples exhibited no detectable concentrations of any plant-related radionuclides in any of these samples. There was no detectable Tritium in the quarterly composited samples in 2024. Tritium concentrations in surface water for the last 10 years were well below the EPA tritium drinking water limit of 20,000 pCi/L.

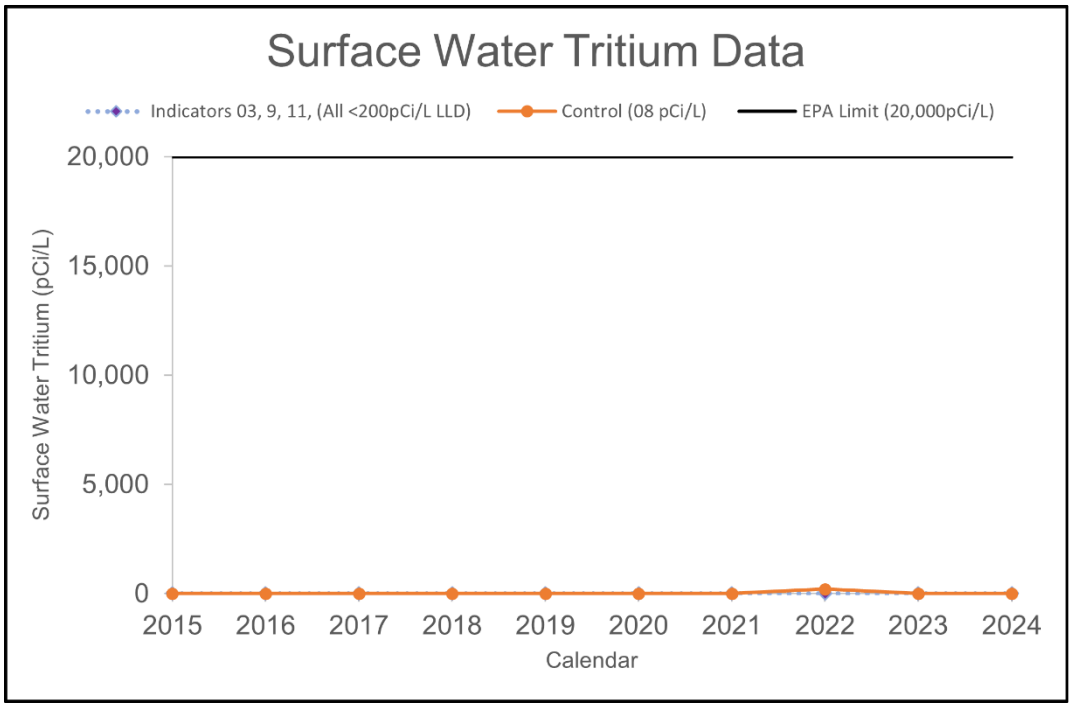

Figure 12: REMP Surface Water Tritium Sample Results

8.3.2 REMP Groundwater

Groundwater monitoring is not a requirement of the NMP/JAF REMP program as there is no waterborne pathway to exposure. Groundwater samples were collected for the Radiological Groundwater Protection Program in compliance with NEI 07-07 discussed in Section 11.1 and data provided in Attachment 5 of this report.

8.3.3 Sediment from Shoreline

Shoreline sediment collections were made in April and October 2024 and analyzed for gamma-emitting isotopes. Samples are collected at one optional offsite control location (Lang's Beach located near Oswego Harbor) and at one indicator location (Sunset Bay) which is an area east of the site considered to have recreational value. A total of 4 shoreline samples were analyzed in accordance with requirements in the ODCM and shown in Table 3: Radiological Environmental Monitoring Program – Waterborne.

No plant-related radionuclides were detected in the 2024 shoreline sediment samples. Naturally occurring isotopes were the only radionuclides detected in the sediment samples. Cesium-137 discussed in the introduction has not been detected at the control or indicator locations from 2008 through 2024.

8.4 Ingestion Pathway Sample Results

8.4.1 Milk

Based on the milk animal census, there were no adequate milk sample locations within five miles of the site in 2024. Samples were collected from two farms located beyond the five-mile requirement to ensure the continued monitoring of this important pathway. Milk samples from milking animals were collected at 2 locations, one approximately 8.7 miles having the highest dose potential, Indicator #55, and a control location, #77, 16 miles in the least prevalent wind direction. A total of 36 samples were collected and analyzed for Gamma isotopic and low level I-131 analysis semi-monthly when animals are on pasture (April-December); monthly at other times (January – March) if required. Gamma spectrometric analyses of these samples exhibited naturally occurring radionuclides like Potassium-40, but no detectable concentration of any plant-related radionuclides.

There were no program modifications and no changes in the environs that may impact the results based on the observations in the Land Use Census.

8.4.2 Fish

A total of 20 fish samples were collected in 2024. Fish collections were made utilizing gill nets at one control location greater than five miles from the site (Oswego Harbor area) and at two indicator locations in the vicinity of the lake discharges for the NMPNS and the JAFNPP facilities. These samples were analyzed for gamma emitting radionuclides in edible portions, in accordance with requirements of the ODCM and summarized in Table 4: Radiological Environmental Monitoring Program – Ingestion. These samples are collected from the indicator and control areas as required by the ODCM. Only the edible portions are analyzed excluding head, tail, bones and results are reported as pCi/kg wet.

The spring fish collection was made up of 10 individual samples representing 4 separate species. Walleye, brown trout, lake trout, and smallmouth bass were collected.

The summer fish collection was comprised of 10 individual samples representing 4 individual species. Chinook salmon, brown trout, smallmouth bass and walleye were collected.

Gamma spectrometric analyses of these samples exhibited naturally occurring radionuclides, but no detectable concentration of any plant-related radionuclides.

8.4.3 Food Products (Vegetation)

In accordance with the ODCM and as described in Table 4: Radiological Environmental Monitoring Program – Ingestion, 16 broad leaf vegetation samples were collected during the 2024 growing season. 12 samples were collected from 3 growing locations, nearest site boundary in areas of highest predicted annual average ground level D/Q. Gardens are identified as JAF-E (#633), JAF-ESE (#634), and JAF-SE (#635). 4 samples were collected from a control location 16.0 miles away in a predominately upwind direction, identified as Summerville (#632). Samples are collected and analyzed for gamma isotopic and I-131 from the indicator and control locations monthly during growing season. It is common to detect Cs-137 in broad leaf samples at both indicator and control locations. Cs-137 can be attributed to offsite sources such as weapons testing, Chernobyl, and Fukushima events. While Cs-137 is periodically found in vegetation samples, the historical relationship between the indicator and control locations demonstrate that the plant is not the source of activity detected.

Gamma spectrometric analyses of these samples exhibited only naturally occurring radionuclides, and no detectable concentration of any plant-related radionuclides.

9.0 LAND USE CENSUS

An annual land use census is required by the Offsite Dose Calculation Manual and is performed to ensure that changes in the use of areas at or beyond the site boundary are identified and modifications to REMP are made if required by changes in land use. The land use census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR 50 [2]. A Land Use Census was conducted during the calendar year, 2024, within the growing season to identify changes in land use, receptor locations, and new exposure pathways. The results for the 2024 Land Use Census are listed in Table 8: Land Use Census – Nearest Receptors within 10 miles, and locations of the nearest residents to NMP and JAF are shown in Figure(s) 8 and 9. In summary, the highest D/Q locations for nearest garden, nearest residence and nearest milk animal did not change following the 2024 census.

Table 8: Land Use Census – Nearest Receptors within 10 miles

Sector	JAF Nearest Residence (Miles)	NMP Nearest Residence (Miles)	Nearest Milk Animal (Miles)	Nearest Garden (Miles)
E	1.04	1.29	Location #55 within 10 miles (50 milking cows)	0.66
ESE	0.70	1.11	*	0.64
SE	1.07	1.35	*	0.62
SSE	1.29	1.59	*	2.23
S	1.57	1.57	Location #77 outside 10 miles (37 milking cows)	2.30
SSW	1.65	1.18	*	4.03
SW	1.45	1.11	*	1.14
WSW	1.81	1.38	*	1.48
W	0.90**	0.95**	*	*
WNW	1.34**	0.92**	*	*

* No locations identified in applicable sector within 10 miles by census
** Seasonal residences

10.0 DEVIATIONS AND EXCEPTIONS TO THE PROGRAM

The noted exceptions to the 2024 sample program address only those samples or monitoring requirements which are required by the ODCM. This section satisfies the reporting requirements of Part I, Section 5.1.3 of the JAFNPP ODCM, Section D 6.9.1.d of the NMP1 ODCM and Section D 4.1.2 of the NMP2 ODCM. All incidents were documented in the Station's Corrective Action Program (CAP).

The following are deviations from the program specified by the ODCMs in 2024:

Air Station R-2 Offsite had a loss of continuous sampling for 7 days between 9/24/24 and 10/1/24 due to pump malfunction.

Air Station R-3 Offsite had a loss of continuous sampling during the following time periods:

- Loss of 117 hours between 12/27/2023 and 1/4/2024 due to loss of power.
- Loss of 7 hours between 6/18/2024 and 6/25/2024 due to a windstorm which resulted in a local power outage.

Air Station R-4 Offsite had a loss of continuous sampling during the following time periods:

- Loss of 145 hours between 1/9/24 and 1/16/24 due to a windstorm which resulted in a local power outage.
- Loss of 7 hours between 6/18/2024 and 6/25/2024 due to a windstorm which resulted in a local power outage.

Air Station R-5 Offsite had a loss of continuous sampling of 66 hours between 1/9/24 and 1/16/24 due to a windstorm which resulted in a local power outage.

The sample collection pump at the Oswego Steam Station stopped working for approximately half of the week between 2/23/24 and 3/1/24 due to a loss of power.

TLD # 107 was found on the ground during the quarterly changeout which occurred on 4/3/24 (1st Quarter) due to sustained wind damage to the tree it was mounted on. The dosimeter itself was undamaged, and upon data analysis, no anomalies were observed with 1st Quarter TLD #107, and results agreed with neighboring TLD #106. The 2nd Quarter TLD #107 was placed on an immediately adjacent tree.

11.0 OTHER SUPPLEMENTAL INFORMATION

11.1 NEI 07-07 Onsite Radiological Groundwater Monitoring Program

James A. FitzPatrick and Nine Mile Point Nuclear Station, Units 1 and 2 has developed a Groundwater Protection Initiative (GPI) program in accordance with NEI 07-07, Industry Ground Water Protection Initiative – Final Guidance Document. 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. It is important to note, samples and results taken in support of NEI 07-07 on-site groundwater monitoring program are separate from the Radiological Environmental Monitoring Program (REMP). The results of the GPI are included in Attachment 5.

11.2 Independent Spent Fuel Storage Installation (ISFSI) Monitoring Program

11.2.1 JAFNPP ISFSI

In order to provide adequate spent fuel storage capacity at JAFNPP, Entergy constructed an onsite Independent Spent Fuel Storage Installation (ISFSI). On April 25, 2002, the ISFSI facility was placed in service. TLDs are used to monitor direct radiation levels in the vicinity of the ISFSI facility. Twelve TLD locations were established around the ISFSI pad on the perimeter fence. Six additional TLD locations are located at varying distances from the pad to determine dose rates at points of interest relative to the storage area and are designated as optional locations. Background data was collected starting in October 2000 at eight of the TLD locations on the perimeter fence. The remaining locations were established in October 2001. Two dosimeters are placed at each TLD monitoring location. The TLDs are sealed in polyethylene packages to ensure dosimeter integrity and placed in the field using a supporting structure such as a fence or other immovable object.

There were no casks moved to the JAF ISFSI in 2024. The total number of casks on the pad remained at 38.

JAF has an array of eighteen TLD locations are in place around the perimeter of the ISFSI pad. TLDs were placed at these locations prior to loading the first storage casks for baseline dose rate determination in the general area of the pad.

The use of hydrogen injection and the implementation of the Independent Spent Fuel Storage Installation (ISFSI) at the FitzPatrick plant did not measurably increase the ambient radiation exposure rate at or beyond the site boundary. The lack of a dose rate increase at or beyond the site boundary is consistent with design calculations performed to evaluate compliance with 10 CFR 72.104(a).

The measured results of the 2024 TLD monitoring program demonstrate compliance with the offsite dose limits to members of the public specified in 40 CFR 190 and 10 CFR 72.104(a)

Table 9: JAF Independent Spent Fuel Storage Installation

		Quarter 1 (mrem/90 day)		Quarter 2 (mrem/90 day)		Quarter 3 (mrem/90 day)		Quarter 4 (mrem/90 day)	
Site #	Description	mrem	±1σ	mrem	±1σ	mrem	±1σ	mrem	±1σ
I-1**	West Fence, South	409.52	10.98	411.45	11.09	407.14	12.27	395.24	11.16
I-2**	West Fence, Center	620.29	16.93	610.29	19.23	605.89	20.00	587.20	17.77
I-3**	West Fence, North	108.52	3.53	106.32	3.52	94.92	4.09	98.53	5.02
I-4**	North Fence, West	100.92	3.01	96.01	2.58	85.95	3.18	91.41	3.62
I-5**	North Fence, Center	144.88	4.18	140.85	3.68	127.64	3.86	133.12	4.84
I-6**	North Fence, East	117.73	4.44	114.36	3.09	106.05	2.48	105.20	3.80
I-7**	East Fence, North	92.65	2.82	89.96	4.11	83.26	4.84	80.09	2.71
I-8**	East Fence, Center	107.19	4.17	101.41	3.92	96.37	2.72	94.25	3.39
I-9**	East Fence, South	85.66	3.95	82.31	2.87	76.14	4.43	75.05	2.85
I-10**	South Fence, East	103.31	3.03	97.50	2.54	89.43	3.24	90.21	2.84
I-11**	South Fence, Center	122.88	4.59	116.61	4.17	115.80	4.59	107.22	3.26
I-12**	South Fence, West	259.01	9.37	252.91	7.78	249.58	7.73	238.97	7.24
I-13**	ISFSI Building and Grounds Garage, East of Pad	29.81	0.85	27.66	1.63	26.99	0.93	24.97	0.81
I-14**	ISFSI Tree – 100 yards South of Pad	17.79	0.61	16.18	0.54	15.67	0.39	16.39	0.89
I-15**	ISFSI Transmission Line Tower South of Pad at East /West Access Road	16.52	0.59	14.62	0.43	14.80	0.48	14.85	0.50
I-16**	ISFSI Perimeter Fence – 100 yards West of Pad on Pad Centerline	69.16	2.23	65.10	2.78	56.22	1.88	61.79	3.06

Table 9: JAF Independent Spent Fuel Storage Installation

		Quarter 1 (mrem/90 day)		Quarter 2 (mrem/90 day)		Quarter 3 (mrem/90 day)		Quarter 4 (mrem/90 day)	
Site #	**Description**	**mrem**	**±1σ**	**mrem**	**±1σ**	**mrem**	**±1σ**	**mrem**	**±1σ**
I-17**	ISFSI North Fence of Main Switch Yard on Pad Centerline	296.96	13.60	263.09	10.97	169.56	4.88	252.13	7.71
I-18**	ISFSI North Inner Perimeter Fence at Lake Shore on Pad Centerline	84.58	2.70	77.98	3.93	51.69	1.78	71.13	2.99

**Independent Spent Fuel Storage Installation, ISFSI, locations are immediate perimeter of the pad.

11.2.2 NMPNS ISFSI

In order to provide adequate spent fuel storage capacity at NMP1 and NMP2, NMPNS constructed an ISFSI onsite west of NMP1. During 2012 the NMPNS ISFSI facility was placed into service. TLDs are used to monitor direct radiation levels in the vicinity of the ISFSI facility. Background data has been collected from the initiation of the NMPNS REMP TLD program in 1985. In addition, 14 Optically Stimulated Luminescence Dosimeters (OSLDs) are located around the ISFSI and in areas where personnel are assigned routine work activities. These locations are designated as optional locations. Background data was collected starting in June 2011.

There were no casks moved to the NMP ISFSI in 2024. The total number of casks on the pad remained at 54.

An array of 10 OSLDs was established around the perimeter of the ISFSI pad and four OSLD locations were placed in specific areas of interest 12 months prior to facility usage. These pre-operational OSLDs were used for baseline dose rate determination. The OSLDs are placed, collected, and analyzed semi-annually. Two dosimeters are placed at each location and the average of the two dosimeters is reported. The semi-annual results are compared to baseline data to assess the contribution to ambient dose rates in the vicinity of the storage facility from casks as they are placed on the storage pad within the licensee-controlled area. The following table presents the pre-operation dose rate data and the operational dose rate data for 2024:

NMP Independent Spent Fuel Storage Installation			
OSLD Number	Sector	Pre-Operation	2024
		mrem/Std month	mrem/Std month
233	WNW	3.5	36.9
234	WSW	2.9	9.6
235	S	4.2	5.7
236	SSE	3.8	5.4
237	SE	3.0	3.4
238	ESE	3.5	3.8
239	E	4.0	7.0
240	NE	3.6	9.0
241	N	5.1	8.4
242	NE	6.3	5.3
243	NNW	4.8	9.1
244	NE	4.6	4.6
245	NE	4.0	5.8
246	ENE	4.8	7.2

An evaluation of Site Boundary TLDs and Control TLDs results for 2024 shows that there is no increase in dose rate at or beyond the site boundary. A detailed discussion of this evaluation is found in Section 8.1. The Environmental TLD results for this period show no significant difference in control and site boundary dose rates compared to 2024 and preoperational data gathered in 2012. The implementation of the ISFSI at the NMPNS plant did not measurably increase the ambient radiation exposure rate at or beyond the site boundary. The lack of a dose rate increase at or beyond the site boundary is consistent with design calculations performed to evaluate compliance with 10 CFR 72.104(a). The measured results of the 2024 TLD monitoring program demonstrate compliance with the offsite dose limits to members of the public specified in 40 CFR 190 and 10 CFR 72.104(a).

11.3 Corrections to Previous Reports

No errata to report.

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Attachment 1, Data Table Summary

Medium or Pathway Sampled (Units)	Type, Total Number of Analyses performed (e.g., I-131, 400)	Lower Limit of Detection (LLD)	Indicator Mean[5] (f[6]). Range[5]	Location with Highest Annual Mean		Control Mean[5] (f[6]). Range[5]	Number of Nonroutine Reported Measurements
				Name Distance and Direction	Mean[5] (f[6]) Range[5]		
Air Particulates (pCi/m^3)	Beta, 258	0.01	2.02E-2 (206/206) 1.04E-2 – 4.63E-2	R-1 Station 1.8 miles 92º	2.07E-2 (52/52) 1.17E-2 – 4.41E-2	2.03E-2 (52/52) 1.13E-2 – 4.39E-2	0
Direct Radiation (mrem/qtr.)	Gamma Dose, 128	N/A	16.66 (116/116) 13.00 – 26.31	#87 Unit 2, N. Fence, N. of E. Side of Screen House 0.1 miles 333º	26.31 (4/4) 24.49 – 27.97	15.26 (12/12) 14.65 – 16.43	0

[5] Mean and range are based on detectable measurements only.
[6] Fraction of detectable measurements at specified locations is indicated in parentheses.

Attachment 2
Complete Data Tables for All REMP Analysis Results Obtained In 2024

Table 10: Monthly Radionuclides in Surface Water (pCi/L)

03, JAF Inlet [1]		08, Oswego Steam Station (Control) [1]		09, NMP1 Inlet		10, Oswego City Water		11, NMP2 Inlet	
Collection Date	Gamma Emitters	Collection Date	Gamma Emitters	Collection Date	Gamma Emitters	Collection Date	Gamma Emitters	Collection Date	Gamma Emitters
1/31/2024	*	2/2/2024	*	2/2/2024	*	2/2/2024	*	2/2/2024	*
3/1/2024	*	3/1/2024	*	3/1/2024	*	3/1/2024	*	3/1/2024	*
4/1/2024	*	3/29/2024	*	3/29/2024	*	3/29/2024	*	3/29/2024	*
4/30/2024	*	5/3/2024	*	5/3/2024	*	5/3/2024	*	5/3/2024	*
5/31/2024	*	5/31/2024	*	5/31/2024	*	5/31/2024	*	5/31/2024	*
7/1/2024	*	6/27/2024	*	6/27/2024	*	6/27/2024	*	6/27/2024	*
8/1/2024	*	8/1/2024	*	8/1/2024	*	8/1/2024	*	8/1/2024	*
8/29/2024	*	8/29/2024	*	8/29/2024	*	8/29/2024	*	8/29/2024	*
9/30/2024	*	9/27/2024	*	9/27/2024	*	9/27/2024	*	9/27/2024	*
11/1/2024	*	11/1/2024	*	11/1/2024	*	11/1/2024	*	11/1/2024	*
12/2/2024	*	11/29/2024	*	11/29/2024	*	11/29/2024	*	11/29/2024	*
12/31/2024	*	1/3/2025	*	1/3/2025	*	1/3/2025	*	1/3/2025	*

* All Non-Natural Radionuclides <MDA

[1] ODCM Required Location

Table 11: Monthly Radionuclides in Milk (pCi/L)

Collection Date	55 (Indicator) Walthert	77 (Control) Summerville [1]
4/1/2024	*	*
4/15/2024	*	*
5/6/2024	*	*
5/20/2024	*	*
6/3/2024	*	*
6/17/2024	*	*
7/1/2024	*	*
7/22/2024	*	*
8/5/2024	*	*
8/19/2024	*	*
9/9/2024	*	*
9/23/2024	*	*
10/7/2024	*	*
10/21/2024	*	*
11/5/2024	*	*
11/18/2024	*	*
12/2/2024	*	*
12/18/2024	*	*

* All Non-Natural Radionuclides <MDA

[1] ODCM Required Sample Location

Table 12: Radionuclides in Vegetation (pCi/kg wet) required by ODCM

(633) JAF-E (Indicator)			(634) JAF-ESE (Indicator)			(635) JAF-SE (Indicator)			(632) JAF-SSW (Control)		
Collection Date	**Produce**	**Gamma Emitters**	**Collection Date**	**Produce**	**Gamma Emitters**	**Collection Date**	**Produce**	**Gamma Emitters**	**Collection Date**	**Produce**	**Gamma Emitters**
6/16/2024	Lettuce	*	6/16/2024	Lettuce	*	6/16/2024	Lettuce	*	6/16/2024	Lettuce	*
6/26/2024	Collards	*	7/8/2024	Swiss Chard	*	6/26/2024	Collards	*	7/8/2024	Swiss Chard	*
7/8/2024	Cabbage	*	7/8/2024	Collards	*	7/8/2024	Swiss Chard	*	7/8/2024	Collards	*
7/8/2024	Swiss Chard	*	7/8/2024	Cabbage	*	7/8/2024	Cabbage	*	7/8/2024	Cabbage	*

* All Non-Natural Radionuclides <MDA

Table 13: **Weekly Offsite Samples Gross Beta activity in Air Particulates (pCi/m^3)**

	R1		R2		R3		R4		R5 (Control)	
Collection Date	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**
1/9/2024	1.92E-02	1.45E-03	1.63E-02	1.28E-03	1.63E-02	1.30E-03	1.67E-02	1.32E-03	1.60E-02	1.25E-03
1/16/2024	1.88E-02	1.38E-03	1.93E-02	1.37E-03	1.90E-02	1.40E-03	[1]	[1]	2.33E-02	1.97E-03
1/24/2024	2.37E-02	1.38E-03	2.26E-02	1.33E-03	2.16E-02	1.31E-03	2.28E-02	1.35E-03	2.30E-02	1.32E-03
1/30/2024	1.28E-02	1.32E-03	1.29E-02	1.30E-03	1.35E-02	1.34E-03	1.36E-02	1.40E-03	1.13E-02	1.22E-03
2/6/2024	1.74E-02	1.33E-03	1.86E-02	1.34E-03	1.70E-02	1.32E-03	1.66E-02	1.34E-03	1.73E-02	1.29E-03
2/13/2024	1.63E-02	1.29E-03	1.60E-02	1.27E-03	1.75E-02	1.33E-03	1.67E-02	1.29E-03	1.58E-02	1.24E-03
2/20/2024	1.97E-02	1.42E-03	1.98E-02	1.40E-03	1.98E-02	1.40E-03	2.00E-02	1.38E-03	1.86E-02	1.33E-03
2/27/2024	2.42E-02	1.54E-03	2.47E-02	1.54E-03	2.37E-02	1.51E-03	2.37E-02	1.44E-03	2.46E-02	1.50E-03
3/5/2024	1.79E-02	1.39E-03	1.68E-02	1.33E-03	1.71E-02	1.35E-03	1.60E-02	1.24E-03	1.60E-02	1.27E-03
3/12/2024	1.46E-02	1.28E-03	1.28E-02	1.20E-03	1.40E-02	1.25E-03	1.39E-02	1.19E-03	1.28E-02	1.16E-03
3/19/2024	2.26E-02	1.46E-03	2.24E-02	1.49E-03	2.25E-02	1.50E-03	2.27E-02	1.45E-03	2.44E-02	1.50E-03
3/26/2024	1.95E-02	1.46E-03	1.73E-02	1.34E-03	1.68E-02	1.33E-03	1.76E-02	1.31E-03	1.85E-02	1.34E-03
4/2/2024	1.94E-02	1.39E-03	1.95E-02	1.42E-03	2.07E-02	1.47E-03	1.77E-02	1.31E-03	1.90E-02	1.36E-03
4/9/2024	1.17E-02	1.13E-03	1.08E-02	1.13E-03	1.12E-02	1.15E-03	1.04E-02	1.02E-03	1.18E-02	1.12E-03
4/16/2024	1.92E-02	1.39E-03	1.87E-02	1.41E-03	1.90E-02	1.43E-03	1.75E-02	1.32E-03	1.91E-02	1.38E-03
4/23/2024	1.55E-02	1.26E-03	1.56E-02	1.27E-03	1.46E-02	1.18E-03	1.50E-02	1.23E-03	1.49E-02	1.23E-03
4/30/2024	2.30E-02	1.46E-03	2.17E-02	1.42E-03	2.25E-02	1.42E-03	2.20E-02	1.40E-03	2.22E-02	1.42E-03
5/7/2024	1.30E-02	1.16E-03	1.29E-02	1.17E-03	1.37E-02	1.17E-03	1.27E-02	1.15E-03	1.22E-02	1.13E-03
5/14/2024	1.34E-02	1.22E-03	1.30E-02	1.21E-03	1.25E-02	1.16E-03	1.46E-02	1.24E-03	1.21E-02	1.16E-03
5/21/2024	2.06E-02	1.44E-03	1.96E-02	1.40E-03	2.04E-02	1.40E-03	1.95E-02	1.39E-03	1.82E-02	1.35E-03
5/29/2024	1.91E-02	1.28E-03	1.95E-02	1.29E-03	2.02E-02	1.29E-03	1.95E-02	1.27E-03	1.88E-02	1.25E-03
6/4/2024	2.61E-02	1.75E-03	2.67E-02	1.75E-03	2.76E-02	1.74E-03	2.61E-02	1.71E-03	2.82E-02	1.78E-03

Table 13: **Weekly Offsite Samples Gross Beta activity in Air Particulates (pCi/m^3)**

	R1		R2		R3		R4		R5 (Control)	
Collection Date	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**
6/11/2024	1.68E-02	1.35E-03	1.64E-02	1.34E-03	1.62E-02	1.29E-03	1.73E-02	1.34E-03	1.68E-02	1.33E-03
6/18/2024	2.10E-02	1.38E-03	1.73E-02	1.29E-03	1.94E-02	1.33E-03	2.00E-02	1.39E-03	1.98E-02	1.39E-03
6/25/2024	2.79E-02	1.54E-03	2.66E-02	1.57E-03	2.71E-02	1.62E-03	2.86E-02	1.66E-03	2.85E-02	1.64E-03
7/2/2024	1.74E-02	1.36E-03	1.49E-02	1.26E-03	1.48E-02	1.24E-03	1.48E-02	1.26E-03	1.55E-02	1.31E-03
7/8/2024	2.41E-02	1.65E-03	2.51E-02	1.69E-03	2.65E-02	1.72E-03	2.69E-02	1.75E-03	2.71E-02	1.80E-03
7/16/2024	2.29E-02	1.35E-03	2.08E-02	1.31E-03	2.19E-02	1.30E-03	2.22E-02	1.36E-03	2.04E-02	1.32E-03
7/22/2024	1.99E-02	1.48E-03	1.78E-02	1.43E-03	1.87E-02	1.39E-03	1.85E-02	1.48E-03	1.93E-02	1.52E-03
7/30/2024	2.25E-02	1.34E-03	2.23E-02	1.34E-03	2.24E-02	1.29E-03	2.40E-02	1.41E-03	2.26E-02	1.39E-03
8/6/2024	3.12E-02	1.68E-03	2.89E-02	1.63E-03	2.93E-02	1.57E-03	2.96E-02	1.65E-03	2.96E-02	1.68E-03
8/13/2024	1.28E-02	1.19E-03	1.20E-02	1.15E-03	1.10E-02	1.07E-03	1.30E-02	1.21E-03	1.22E-02	1.20E-03
8/20/2024	2.03E-02	1.42E-03	2.19E-02	1.46E-03	2.03E-02	1.38E-03	2.18E-02	1.47E-03	2.09E-02	1.46E-03
8/27/2024	2.54E-02	1.56E-03	2.47E-02	1.51E-03	2.29E-02	1.43E-03	2.51E-02	1.54E-03	2.54E-02	1.58E-03
9/4/2024	2.14E-02	1.36E-03	2.14E-02	1.35E-03	2.10E-02	1.30E-03	2.13E-02	1.36E-03	1.89E-02	1.32E-03
9/10/2024	1.91E-02	1.55E-03	1.76E-02	1.47E-03	1.84E-02	1.49E-03	1.94E-02	1.54E-03	1.80E-02	1.51E-03
9/17/2024	4.41E-02	1.99E-03	4.38E-02	1.96E-03	4.37E-02	1.93E-03	4.63E-02	2.02E-03	4.39E-02	1.99E-03
9/24/2024	3.79E-02	1.91E-03	3.22E-02	1.72E-03	3.51E-02	1.77E-03	3.55E-02	1.80E-03	3.42E-02	1.79E-03
10/1/2024	2.07E-02	1.39E-03	[1]	[1]	2.00E-02	1.38E-03	2.03E-02	1.42E-03	2.06E-02	1.43E-03
10/8/2024	2.18E-02	1.44E-03	2.28E-02	1.47E-03	2.20E-02	1.44E-03	2.33E-02	1.50E-03	2.43E-02	1.54E-03
10/15/2024	1.59E-02	1.26E-03	1.31E-02	1.19E-03	1.37E-02	1.19E-03	1.40E-02	1.22E-03	1.39E-02	1.22E-03
10/22/2024	2.48E-02	1.51E-03	2.25E-02	1.46E-03	2.57E-02	1.51E-03	2.53E-02	1.53E-03	2.64E-02	1.55E-03
10/29/2024	2.46E-02	1.54E-03	2.41E-02	1.55E-03	2.55E-02	1.54E-03	2.52E-02	1.57E-03	2.60E-02	1.58E-03
11/5/2024	2.78E-02	1.57E-03	2.52E-02	1.52E-03	2.66E-02	1.52E-03	2.79E-02	1.60E-03	2.63E-02	1.54E-03
11/13/2024	1.55E-02	1.19E-03	1.48E-02	1.18E-03	1.50E-02	1.15E-03	1.71E-02	1.25E-03	1.65E-02	1.22E-03

Table 13: **Weekly Offsite Samples Gross Beta activity in Air Particulates (pCi/m^3)**

	R1		R2		R3		R4		R5 (Control)	
Collection Date	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**	**Gross Beta Activity**	**(2-σ)**
11/19/2024	2.17E-02	1.62E-03	2.17E-02	1.63E-03	2.26E-02	1.61E-03	2.16E-02	1.65E-03	2.08E-02	1.59E-03
11/26/2024	1.51E-02	1.29E-03	1.43E-02	1.28E-03	1.34E-02	1.23E-03	1.58E-02	1.31E-03	1.40E-02	1.24E-03
12/3/2024	1.83E-02	1.34E-03	1.60E-02	1.26E-03	1.88E-02	1.30E-03	1.74E-02	1.32E-03	1.84E-02	1.36E-03
12/10/2024	1.92E-02	1.41E-03	1.59E-02	1.31E-03	1.67E-02	1.30E-03	1.69E-02	1.35E-03	1.70E-02	1.35E-03
12/17/2024	1.53E-02	1.28E-03	1.42E-02	1.23E-03	1.51E-02	1.21E-03	1.59E-02	1.31E-03	1.61E-02	1.30E-03
12/23/2024	2.62E-02	1.72E-03	2.42E-02	1.65E-03	2.41E-02	1.60E-03	2.33E-02	1.62E-03	2.78E-02	1.76E-03
12/31/2024	1.77E-02	1.27E-03	1.67E-02	1.23E-03	1.55E-02	1.16E-03	1.62E-02	1.20E-03	1.66E-02	1.23E-03

[1] Air sampler malfunction, insufficient volume collected

Table 14: Weekly Supplemental Monitoring Offsite Samples Gross Beta activity in Air Particulates (pCi/m^3)

	D2		E		F		G (Off)	
Collection Date	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)
1/9/2024	1.46E-02	1.19E-03	1.63E-02	1.27E-03	1.60E-02	1.26E-03	1.62E-02	1.29E-03
1/16/2024	1.50E-02	1.20E-03	1.77E-02	1.31E-03	1.87E-02	1.30E-03	1.90E-02	1.33E-03
1/24/2024	2.03E-02	1.24E-03	2.32E-02	1.35E-03	2.38E-02	1.36E-03	2.12E-02	1.34E-03
1/30/2024	1.03E-02	1.17E-03	1.12E-02	1.23E-03	1.23E-02	1.27E-03	1.45E-02	1.43E-03
2/6/2024	1.50E-02	1.20E-03	1.67E-02	1.28E-03	1.83E-02	1.34E-03	1.73E-02	1.27E-03
2/13/2024	1.45E-02	1.17E-03	1.51E-02	1.23E-03	1.57E-02	1.25E-03	1.69E-02	1.22E-03
2/20/2024	1.75E-02	1.32E-03	1.92E-02	1.37E-03	1.87E-02	1.39E-03	1.69E-02	1.23E-03
2/27/2024	2.07E-02	1.43E-03	2.32E-02	1.47E-03	2.32E-02	1.51E-03	2.16E-02	1.47E-03
3/5/2024	1.42E-02	1.24E-03	1.60E-02	1.29E-03	1.63E-02	1.32E-03	1.69E-02	1.35E-03
3/12/2024	1.19E-02	1.16E-03	1.35E-02	1.21E-03	1.25E-02	1.17E-03	1.35E-02	1.24E-03
3/19/2024	2.03E-02	1.40E-03	2.23E-02	1.46E-03	2.31E-02	1.45E-03	2.17E-02	1.47E-03
3/26/2024	1.56E-02	1.27E-03	1.61E-02	1.28E-03	1.81E-02	1.35E-03	1.79E-02	1.37E-03
4/2/2024	1.69E-02	1.32E-03	1.82E-02	1.36E-03	2.01E-02	1.45E-03	1.87E-02	1.25E-03
4/9/2024	1.04E-02	1.08E-03	1.05E-02	1.09E-03	1.09E-02	1.10E-03	1.01E-02	1.02E-03
4/16/2024	1.63E-02	1.31E-03	1.80E-02	1.34E-03	1.90E-02	1.36E-03	1.69E-02	1.25E-03
4/23/2024	1.41E-02	1.22E-03	1.43E-02	1.23E-03	1.39E-02	1.23E-03	1.55E-02	1.27E-03
4/30/2024	2.02E-02	1.38E-03	2.05E-02	1.39E-03	2.13E-02	1.40E-03	2.23E-02	1.43E-03
5/7/2024	1.15E-02	1.12E-03	1.30E-02	1.17E-03	1.11E-02	1.06E-03	1.38E-02	1.30E-03
5/14/2024	1.18E-02	1.16E-03	1.26E-02	1.19E-03	1.30E-02	1.20E-03	1.26E-02	1.13E-03
5/21/2024	1.76E-02	1.34E-03	1.93E-02	1.38E-03	1.90E-02	1.39E-03	2.04E-02	1.45E-03
5/29/2024	1.79E-02	1.24E-03	1.73E-02	1.22E-03	1.86E-02	1.27E-03	1.86E-02	1.19E-03
6/4/2024	2.24E-02	1.62E-03	2.50E-02	1.68E-03	2.53E-02	1.69E-03	3.05E-02	1.76E-03
6/11/2024	1.53E-02	1.32E-03	1.58E-02	1.29E-03	1.57E-02	1.29E-03	1.59E-02	1.31E-03

Table 14: Weekly Supplemental Monitoring Offsite Samples Gross Beta activity in Air Particulates (pCi/m^3)

	D2		E		F		G (Off)	
Collection Date	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)
6/18/2024	1.79E-02	1.32E-03	1.77E-02	1.33E-03	2.04E-02	1.37E-03	2.08E-02	1.37E-03
6/25/2024	2.39E-02	1.46E-03	2.71E-02	1.59E-03	2.85E-02	1.55E-03	2.62E-02	1.54E-03
7/2/2024	1.40E-02	1.18E-03	1.50E-02	1.26E-03	1.55E-02	1.23E-03	1.58E-02	1.23E-03
7/8/2024	2.33E-02	1.57E-03	2.77E-02	1.70E-03	2.56E-02	1.67E-03	2.47E-02	1.62E-03
7/16/2024	1.96E-02	1.21E-03	2.13E-02	1.32E-03	2.09E-02	1.30E-03	2.12E-02	1.27E-03
7/22/2024	1.75E-02	1.39E-03	1.89E-02	1.49E-03	1.93E-02	1.46E-03	1.90E-02	1.41E-03
7/30/2024	2.08E-02	1.28E-03	2.21E-02	1.36E-03	2.31E-02	1.35E-03	2.26E-02	1.30E-03
8/6/2024	2.73E-02	1.54E-03	2.64E-02	1.58E-03	2.71E-02	1.55E-03	3.05E-02	1.60E-03
8/13/2024	1.34E-02	1.17E-03	1.17E-02	1.16E-03	1.30E-02	1.15E-03	1.29E-02	1.14E-03
8/20/2024	2.02E-02	1.36E-03	2.01E-02	1.43E-03	2.25E-02	1.46E-03	2.13E-02	1.41E-03
8/27/2024	2.36E-02	1.44E-03	2.39E-02	1.52E-03	2.52E-02	1.52E-03	2.61E-02	1.48E-03
9/4/2024	1.98E-02	1.27E-03	2.04E-02	1.34E-03	1.91E-02	1.29E-03	2.25E-02	1.34E-03
9/10/2024	1.64E-02	1.41E-03	1.58E-02	1.43E-03	1.64E-02	1.40E-03	1.73E-02	1.40E-03
9/17/2024	4.05E-02	1.86E-03	4.07E-02	1.93E-03	4.51E-02	1.93E-03	4.36E-02	1.90E-03
9/24/2024	3.18E-02	1.72E-03	3.32E-02	1.77E-03	3.31E-02	1.73E-03	3.61E-02	1.82E-03
10/1/2024	1.98E-02	1.40E-03	1.95E-02	1.41E-03	1.98E-02	1.39E-03	2.14E-02	1.49E-03
10/8/2024	2.13E-02	1.44E-03	2.02E-02	1.43E-03	2.08E-02	1.42E-03	2.23E-02	1.46E-03
10/15/2024	1.24E-02	1.17E-03	1.38E-02	1.23E-03	1.38E-02	1.18E-03	1.49E-02	1.25E-03
10/22/2024	2.45E-02	1.51E-03	2.41E-02	1.54E-03	2.59E-02	1.54E-03	2.43E-02	1.52E-03
10/29/2024	2.33E-02	1.51E-03	2.29E-02	1.50E-03	2.57E-02	1.53E-03	2.40E-02	1.50E-03
11/5/2024	2.56E-02	1.53E-03	2.57E-02	1.54E-03	2.70E-02	1.55E-03	2.70E-02	1.50E-03
11/13/2024	1.45E-02	1.16E-03	1.57E-02	1.19E-03	1.53E-02	1.15E-03	1.65E-02	1.26E-03
11/19/2024	2.10E-02	1.59E-03	2.20E-02	1.64E-03	2.37E-02	1.65E-03	2.24E-02	1.53E-03
11/26/2024	1.20E-02	1.15E-03	1.46E-02	1.24E-03	1.67E-02	1.31E-03	1.47E-02	1.23E-03

Table 14: Weekly Supplemental Monitoring Offsite Samples Gross Beta activity in Air Particulates (pCi/m^3)

	D2		E		F		G (Off)	
Collection Date	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)
12/3/2024	1.91E-02	1.32E-03	1.96E-02	1.37E-03	1.97E-02	1.38E-03	1.88E-02	1.36E-03
12/10/2024	1.66E-02	1.28E-03	1.76E-02	1.35E-03	1.79E-02	1.35E-03	1.76E-02	1.40E-03
12/17/2024	1.62E-02	1.36E-03	1.56E-02	1.29E-03	1.64E-02	1.26E-03	1.63E-02	1.23E-03
12/23/2024	2.55E-02	1.68E-03	2.39E-02	1.65E-03	2.45E-02	1.61E-03	2.53E-02	1.56E-03
12/31/2024	1.74E-02	1.24E-03	1.59E-02	1.23E-03	1.47E-02	1.17E-03	1.67E-02	1.23E-03

Table 15: Weekly Onsite Samples Gross Beta activity in Air Particulates (pCi/m^3)

	D1		G		H		I		J		K	
Collection Date	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)
1/8/2024	1.58E-02	1.35E-03	1.70E-02	1.38E-03	1.71E-02	1.39E-03	1.82E-02	1.43E-03	1.68E-02	1.44E-03	1.83E-02	1.48E-03
1/15/2024	1.81E-02	1.29E-03	1.81E-02	1.37E-03	1.95E-02	1.28E-03	1.93E-02	1.30E-03	1.86E-02	1.37E-03	1.74E-02	1.33E-03
1/22/2024	2.64E-02	1.50E-03	2.55E-02	1.51E-03	2.52E-02	1.65E-03	2.77E-02	1.77E-03	2.72E-02	1.57E-03	2.63E-02	1.53E-03
1/29/2024	1.62E-02	1.23E-03	1.66E-02	1.29E-03	1.71E-02	1.31E-03	1.68E-02	1.33E-03	1.66E-02	1.33E-03	1.69E-02	1.32E-03
2/5/2024	1.60E-02	1.25E-03	1.79E-02	1.33E-03	1.62E-02	1.30E-03	1.64E-02	1.32E-03	1.66E-02	1.32E-03	1.69E-02	1.32E-03
2/12/2024	1.77E-02	1.29E-03	1.78E-02	1.32E-03	1.63E-02	1.29E-03	1.70E-02	1.31E-03	1.72E-02	1.33E-03	1.70E-02	1.32E-03
2/19/2024	1.87E-02	1.35E-03	1.88E-02	1.35E-03	1.98E-02	1.40E-03	1.98E-02	1.42E-03	1.87E-02	1.38E-03	1.89E-02	1.39E-03
2/26/2024	2.22E-02	1.46E-03	2.27E-02	1.46E-03	2.25E-02	1.49E-03	2.21E-02	1.48E-03	2.22E-02	1.50E-03	2.26E-02	1.51E-03
3/4/2024	1.84E-02	1.34E-03	1.96E-02	1.39E-03	1.87E-02	1.41E-03	2.00E-02	1.44E-03	2.01E-02	1.46E-03	4.10E-02	3.09E-03
3/11/2024	1.29E-02	1.16E-03	1.31E-02	1.17E-03	1.19E-02	1.18E-03	1.29E-02	1.20E-03	1.25E-02	1.21E-03	1.28E-02	1.21E-03
3/18/2024	2.58E-02	1.51E-03	2.43E-02	1.49E-03	2.40E-02	1.51E-03	2.31E-02	1.46E-03	2.49E-02	1.53E-03	2.59E-02	1.59E-03
3/25/2024	1.76E-02	1.36E-03	1.60E-02	1.31E-03	1.72E-02	1.36E-03	1.85E-02	1.40E-03	1.75E-02	1.36E-03	1.74E-02	1.34E-03
4/1/2024	1.99E-02	1.37E-03	2.01E-02	1.34E-03	1.88E-02	1.37E-03	2.07E-02	1.39E-03	2.12E-02	1.45E-03	2.03E-02	1.40E-03
4/8/2024	1.11E-02	1.12E-03	1.19E-02	1.18E-03	1.09E-02	1.14E-03	1.14E-02	1.12E-03	1.16E-02	1.18E-03	1.01E-02	1.09E-03
4/15/2024	1.96E-02	1.37E-03	1.81E-02	1.34E-03	1.93E-02	1.42E-03	1.88E-02	1.32E-03	1.91E-02	1.42E-03	1.75E-02	1.33E-03
4/22/2024	1.44E-02	1.22E-03	1.35E-02	1.20E-03	1.58E-02	1.31E-03	1.47E-02	1.21E-03	1.45E-02	1.21E-03	1.47E-02	1.25E-03
4/29/2024	2.39E-02	1.46E-03	2.43E-02	1.49E-03	2.55E-02	1.56E-03	2.35E-02	1.42E-03	2.38E-02	1.44E-03	2.46E-02	1.50E-03
5/6/2024	1.10E-02	1.07E-03	1.06E-02	1.08E-03	1.15E-02	1.14E-03	1.06E-02	1.04E-03	1.10E-02	1.08E-03	1.26E-02	1.16E-03
5/13/2024	1.31E-02	1.18E-03	1.31E-02	1.19E-03	1.36E-02	1.22E-03	1.34E-02	1.17E-03	1.37E-02	1.22E-03	1.30E-02	1.22E-03
5/20/2024	1.85E-02	1.34E-03	1.93E-02	1.39E-03	1.87E-02	1.37E-03	1.88E-02	1.33E-03	1.84E-02	1.35E-03	1.91E-02	1.36E-03
5/28/2024	2.08E-02	1.29E-03	2.20E-02	1.34E-03	2.04E-02	1.30E-03	2.01E-02	1.25E-03	2.21E-02	1.34E-03	2.08E-02	1.29E-03
6/3/2024	2.26E-02	1.60E-03	2.35E-02	1.66E-03	2.43E-02	1.68E-03	2.41E-02	1.65E-03	2.23E-02	1.61E-03	2.31E-02	1.61E-03
6/10/2024	2.22E-02	1.46E-03	2.20E-02	1.46E-03	2.74E-02	1.62E-03	2.25E-02	1.46E-03	2.09E-02	1.43E-03	2.25E-02	1.47E-03
6/18/2024	1.78E-02	1.21E-03	1.82E-02	1.24E-03	2.00E-02	1.29E-03	1.84E-02	1.22E-03	1.71E-02	1.18E-03	1.79E-02	1.22E-03

Table 15: Weekly Onsite Samples Gross Beta activity in Air Particulates (pCi/m^3)

	D1		G		H		I		J		K	
Collection Date	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)
6/24/2024	2.85E-02	1.76E-03	2.93E-02	1.79E-03	3.02E-02	1.87E-03	3.00E-02	1.81E-03	2.96E-02	1.82E-03	2.76E-02	1.75E-03
7/1/2024	1.68E-02	1.32E-03	1.75E-02	1.36E-03	1.87E-02	1.36E-03	1.73E-02	1.38E-03	1.60E-02	1.28E-03	1.73E-02	1.36E-03
7/8/2024	2.26E-02	1.49E-03	2.31E-02	1.53E-03	2.53E-02	1.55E-03	2.38E-02	1.47E-03	2.20E-02	1.46E-03	2.29E-02	1.49E-03
7/15/2024	2.29E-02	1.48E-03	2.26E-02	1.42E-03	2.31E-02	1.48E-03	2.38E-02	1.45E-03	2.12E-02	1.41E-03	2.26E-02	1.47E-03
7/22/2024	1.98E-02	1.38E-03	2.03E-02	1.36E-03	2.11E-02	1.41E-03	2.08E-02	1.37E-03	1.89E-02	1.34E-03	1.97E-02	1.38E-03
7/29/2024	2.31E-02	1.47E-03	2.23E-02	1.42E-03	2.26E-02	1.45E-03	2.26E-02	1.43E-03	2.15E-02	1.43E-03	2.30E-02	1.47E-03
8/5/2024	3.15E-02	1.70E-03	3.13E-02	1.65E-03	3.44E-02	1.75E-03	3.20E-02	1.67E-03	3.07E-02	1.67E-03	3.21E-02	1.71E-03
8/12/2024	1.40E-02	1.23E-03	1.38E-02	1.18E-03	1.58E-02	1.26E-03	1.46E-02	1.21E-03	1.43E-02	1.26E-03	1.55E-02	1.28E-03
8/19/2024	2.25E-02	1.48E-03	2.12E-02	1.40E-03	2.24E-02	1.45E-03	2.13E-02	1.41E-03	2.25E-02	1.51E-03	2.22E-02	1.47E-03
8/26/2024	2.10E-02	1.43E-03	2.07E-02	1.43E-03	2.07E-02	1.40E-03	2.18E-02	1.42E-03	2.06E-02	1.46E-03	2.11E-02	1.44E-03
9/3/2024	2.43E-02	1.42E-03	2.44E-02	1.42E-03	2.51E-02	1.41E-03	2.58E-02	1.41E-03	2.44E-02	1.46E-03	2.41E-02	1.42E-03
9/9/2024	1.94E-02	1.54E-03	1.79E-02	1.48E-03	1.91E-02	1.43E-03	1.84E-02	1.40E-03	1.94E-02	1.58E-03	1.66E-02	1.44E-03
9/16/2024	4.03E-02	1.89E-03	4.54E-02	2.00E-03	4.14E-02	1.92E-03	4.15E-02	1.91E-03	4.00E-02	1.92E-03	3.95E-02	1.87E-03
9/23/2024	4.34E-02	1.96E-03	4.02E-02	1.89E-03	4.49E-02	2.00E-03	3.94E-02	1.85E-03	4.14E-02	1.96E-03	3.99E-02	1.88E-03
9/30/2024	1.94E-02	1.39E-03	1.84E-02	1.35E-03	1.97E-02	1.40E-03	2.02E-02	1.40E-03	1.90E-02	1.40E-03	1.86E-02	1.35E-03
10/7/2024	2.47E-02	1.53E-03	2.34E-02	1.48E-03	2.55E-02	1.55E-03	2.48E-02	1.52E-03	2.52E-02	1.58E-03	2.36E-02	1.50E-03
10/14/2024	1.58E-02	1.27E-03	1.58E-02	1.24E-03	1.64E-02	1.30E-03	1.59E-02	1.25E-03	1.57E-02	1.29E-03	1.55E-02	1.26E-03
10/21/2024	1.94E-02	1.38E-03	2.09E-02	1.41E-03	2.02E-02	1.40E-03	2.09E-02	1.34E-03	2.03E-02	1.41E-03	1.82E-02	1.34E-03
10/28/2024	3.02E-02	1.69E-03	3.02E-02	1.65E-03	3.09E-02	1.71E-03	2.95E-02	1.58E-03	3.05E-02	1.69E-03	2.92E-02	1.65E-03
11/4/2024	2.71E-02	1.59E-03	2.81E-02	1.59E-03	2.72E-02	1.59E-03	2.59E-02	1.46E-03	2.83E-02	1.62E-03	2.56E-02	1.53E-03
11/12/2024	1.81E-02	1.27E-03	1.86E-02	1.25E-03	1.79E-02	1.26E-03	1.72E-02	1.16E-03	1.88E-02	1.28E-03	1.85E-02	1.25E-03
11/18/2024	1.84E-02	1.54E-03	1.69E-02	1.45E-03	1.86E-02	1.53E-03	1.80E-02	1.45E-03	1.79E-02	1.48E-03	1.84E-02	1.51E-03
11/25/2024	1.85E-02	1.42E-03	1.96E-02	1.40E-03	1.94E-02	1.43E-03	1.93E-02	1.37E-03	1.90E-02	1.40E-03	1.85E-02	1.37E-03
12/2/2024	1.93E-02	1.38E-03	1.90E-02	1.33E-03	1.88E-02	1.36E-03	1.92E-02	1.31E-03	1.94E-02	1.35E-03	1.77E-02	1.30E-03
12/9/2024	1.59E-02	1.33E-03	1.67E-02	1.31E-03	1.67E-02	1.33E-03	1.61E-02	1.25E-03	1.53E-02	1.26E-03	1.55E-02	1.27E-03

Table 15: Weekly Onsite Samples Gross Beta activity in Air Particulates (pCi/m^3)

	D1		G		H		I		J		K	
Collection Date	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)	Gross Beta Activity	(2-σ)
12/16/2024	1.85E-02	1.34E-03	1.92E-02	1.35E-03	1.91E-02	1.37E-03	1.85E-02	1.29E-03	1.82E-02	1.33E-03	1.78E-02	1.32E-03
12/23/2024	2.27E-02	1.47E-03	2.21E-02	1.43E-03	2.09E-02	1.42E-03	2.14E-02	1.37E-03	2.13E-02	1.42E-03	2.21E-02	1.43E-03
12/30/2024	1.77E-02	1.34E-03	1.91E-02	1.36E-03	1.95E-02	1.40E-03	1.84E-02	1.29E-03	1.78E-02	1.33E-03	1.88E-02	1.37E-03

Table 16: Weekly Airborne Offsite Samples for I-131 (pCi/m^3)

Collection Date	R1	R2	R3	R4	R5 (Control)	D2[1]	E[1]	F[1]	G[1]
1/9/2024	*	*	*	*	*	*	*	*	*
1/16/2024	*	*	*	[2]	*	*	*	*	*
1/24/2024	*	*	*	*	*	*	*	*	*
1/30/2024	*	*	*	*	*	*	*	*	*
2/6/2024	*	*	*	*	*	*	*	*	*
2/13/2024	*	*	*	*	*	*	*	*	*
2/20/2024	*	*	*	*	*	*	*	*	*
2/27/2024	*	*	*	*	*	*	*	*	*
3/5/2024	*	*	*	*	*	*	*	*	*
3/12/2024	*	*	*	*	*	*	*	*	*
3/19/2024	*	*	*	*	*	*	*	*	*
3/26/2024	*	*	*	*	*	*	*	*	*
4/2/2024	*	*	*	*	*	*	*	*	*
4/9/2024	*	*	*	*	*	*	*	*	*
4/16/2024	*	*	*	*	*	*	*	*	*
4/23/2024	*	*	*	*	*	*	*	*	*
4/30/2024	*	*	*	*	*	*	*	*	*
5/7/2024	*	*	*	*	*	*	*	*	*
5/14/2024	*	*	*	*	*	*	*	*	*
5/21/2024	*	*	*	*	*	*	*	*	*
5/29/2024	*	*	*	*	*	*	*	*	*
6/4/2024	*	*	*	*	*	*	*	*	*
6/11/2024	*	*	*	*	*	*	*	*	*

Table 16: Weekly Airborne Offsite Samples for I-131 (pCi/m^3)

Collection Date	R1	R2	R3	R4	R5 (Control)	D2[1]	E[1]	F[1]	G[1]
6/18/2024	*	*	*	*	*	*	*	*	*
6/25/2024	*	*	*	*	*	*	*	*	*
7/2/2024	*	*	*	*	*	*	*	*	*
7/8/2024	*	*	*	*	*	*	*	*	*
7/16/2024	*	*	*	*	*	*	*	*	*
7/22/2024	*	*	*	*	*	*	*	*	*
7/30/2024	*	*	*	*	*	*	*	*	*
8/6/2024	*	*	*	*	*	*	*	*	*
8/13/2024	*	*	*	*	*	*	*	*	*
8/20/2024	*	*	*	*	*	*	*	*	*
8/27/2024	*	*	*	*	*	*	*	*	*
9/4/2024	*	*	*	*	*	*	*	*	*
9/10/2024	*	*	*	*	*	*	*	*	*
9/17/2024	*	*	*	*	*	*	*	*	*
9/24/2024	*	*	*	*	*	*	*	*	*
10/1/2024	*	[2]	*	*	*	*	*	*	*
10/8/2024	*	*	*	*	*	*	*	*	*
10/15/2024	*	*	*	*	*	*	*	*	*
10/22/2024	*	*	*	*	*	*	*	*	*
10/29/2024	*	*	*	*	*	*	*	*	*
11/5/2024	*	*	*	*	*	*	*	*	*
11/13/2024	*	*	*	*	*	*	*	*	*
11/19/2024	*	*	*	*	*	*	*	*	*
11/26/2024	*	*	*	*	*	*	*	*	*

Table 16: Weekly Airborne Offsite Samples for I-131 (pCi/m^3)

Collection Date	R1	R2	R3	R4	R5 (Control)	D2[1]	E[1]	F[1]	G[1]
12/3/2024	*	*	*	*	*	*	*	*	*
12/10/2024	*	*	*	*	*	*	*	*	*
12/17/2024	*	*	*	*	*	*	*	*	*
12/23/2024	*	*	*	*	*	*	*	*	*
12/31/2024	*	*	*	*	*	*	*	*	*

*<MDA, Minimum Detectable Activity

[1] Not a required Sample, monitored as supplemental data.

[2] Sampler Malfunction, insufficient volume collected

Table 17: Weekly Supplemental Airborne Onsite Samples for I-131 (pCi/m^3)

Collection Date	D1	G	H	I	J	K
1/8/2024	*	*	*	*	*	*
1/15/2024	*	*	*	*	*	*
1/22/2024	*	*	*	*	*	*
1/29/2024	*	*	*	*	*	*
2/5/2024	*	*	*	*	*	*
2/12/2024	*	*	*	*	*	*
2/19/2024	*	*	*	*	*	*
2/26/2024	*	*	*	*	*	*
3/4/2024	*	*	*	*	*	*
3/11/2024	*	*	*	*	*	*
3/18/2024	*	*	*	*	*	*
3/25/2024	*	*	*	*	*	*
4/1/2024	*	*	*	*	*	*
4/8/2024	*	*	*	*	*	*
4/15/2024	*	*	*	*	*	*
4/22/2024	*	*	*	*	*	*
4/29/2024	*	*	*	*	*	*
5/6/2024	*	*	*	*	*	*

Table 17: Weekly Supplemental Airborne Onsite Samples for I-131 (pCi/m^3)

Collection Date	D1	G	H	I	J	K
5/13/2024	*	*	*	*	*	*
5/20/2024	*	*	*	*	*	*
5/28/2024	*	*	*	*	*	*
6/3/2024	*	*	*	*	*	*
6/10/2024	*	*	*	*	*	*
6/18/2024	*	*	*	*	*	*
6/24/2024	*	*	*	*	*	*
7/1/2024	*	*	*	*	*	*
7/8/2024	*	*	*	*	*	*
7/15/2024	*	*	*	*	*	*
7/22/2024	*	*	*	*	*	*
7/29/2024	*	*	*	*	*	*
8/5/2024	*	*	*	*	*	*
8/12/2024	*	*	*	*	*	*
8/19/2024	*	*	*	*	*	*
8/26/2024	*	*	*	*	*	*
9/3/2024	*	*	*	*	*	*
9/9/2024	*	*	*	*	*	*
9/16/2024	*	*	*	*	*	*

Table 17: Weekly Supplemental Airborne Onsite Samples for I-131 (pCi/m^3)

Collection Date	D1	G	H	I	J	K
9/23/2024	*	*	*	*	*	*
9/30/2024	*	*	*	*	*	*
10/7/2024	*	*	*	*	*	*
10/14/2024	*	*	*	*	*	*
10/21/2024	*	*	*	*	*	*
10/28/2024	*	*	*	*	*	*
11/4/2024	*	*	*	*	*	*
11/12/2024	*	*	*	*	*	*
11/18/2024	*	*	*	*	*	*
11/25/2024	*	*	*	*	*	*
12/2/2024	*	*	*	*	*	*
12/9/2024	*	*	*	*	*	*
12/16/2024	*	*	*	*	*	*
12/23/2024	*	*	*	*	*	*
12/30/2024	*	*	*	*	*	*

*<MDA, Minimum Detectable Activity

Table 18: Quarterly Water Composite for Tritium (pCi/L)

Location	Q1	Q2	Q3	Q4
03, JAF Inlet [1]	<MDA	<MDA	<MDA	<MDA
08, Oswego Steam Station (Control) [1]	<MDA	<MDA	<MDA	<MDA
09, NMP1 Inlet	<MDA	<MDA	<MDA	<MDA
10, Oswego City Water	<MDA	<MDA	<MDA	<MDA
11, NMP2 Inlet	<MDA	<MDA	<MDA	<MDA

NOTE: <MDA denotes laboratory analysis detected No Tritium at or above the ODCM required Minimum Detectable Activity of 200pCi/L

[1] ODCM required sample location

Table 19: Quarterly Air Filter Composites for Gamma Emitters (pCi/m^3)

Location	Q1	Q2	Q3	Q4
R1 [1]	<MDA	<MDA	<MDA	<MDA
R2 [1]	<MDA	<MDA	<MDA	<MDA
R3 [1]	<MDA	<MDA	<MDA	<MDA
R4 [1]	<MDA	<MDA	<MDA	<MDA
R5 [1]	<MDA	<MDA	<MDA	<MDA
D2	<MDA	<MDA	<MDA	<MDA
E	<MDA	<MDA	<MDA	<MDA
F	<MDA	<MDA	<MDA	<MDA
G-Offsite	<MDA	<MDA	<MDA	<MDA
D1	<MDA	<MDA	<MDA	<MDA
G-Onsite	<MDA	<MDA	<MDA	<MDA
H	<MDA	<MDA	<MDA	<MDA
I	<MDA	<MDA	<MDA	<MDA
J	<MDA	<MDA	<MDA	<MDA
K	<MDA	<MDA	<MDA	<MDA

NOTE: <MDA denotes laboratory analysis detected No non-natural radionuclides at or above the ODCM required Minimum Detectable Activity
[1] ODCM required sample location

Table 20: Semi-Annual Fish, and Shoreline Sediment

Radionuclides in Semi-Annual Samples of Recreational Fish (pCi/kg wet)			
Sample Code	**Sample Date**	**Sample Type**	**Gamma Emitters**
00 (Control)	5/21/2024	Walleye	<MDA
Oswego Transect [1]	5/21/2024	Lake Trout	<MDA
	5/21/2024	Smallmouth Bass	<MDA
	9/11/2024	Brown Trout	<MDA
	9/11/2024	Walleye	<MDA
	9/11/2024	Chinook Salmon	<MDA
	9/11/2024	Smallmouth Bass	<MDA
02	5/21/2024	Lake Trout	<MDA
NMP Transect [1]	5/21/2024	Brown Trout	<MDA
	5/21/2024	Walleye	<MDA
	5/21/2024	Smallmouth Bass	<MDA
	9/11/2024	Walleye	<MDA
	9/11/2024	Smallmouth Bass	<MDA
	9/11/2024	Chinook Salmon	<MDA
03	5/21/2024	Brown Trout	<MDA
JAF Transect [1]	5/21/2024	Brown Trout	<MDA
	5/21/2024	Walleye	<MDA
	9/11/2024	Chinook Salmon	<MDA
	9/11/2024	Walleye	<MDA
	9/11/2024	Smallmouth Bass	<MDA

[1] ODCM required samples

NOTE: <MDA denotes laboratory analysis detected No non-natural radionuclides at or above the ODCM required Minimum Detectable Activity

Table 21: Radionuclides in Semi-Annual Samples of Shoreline Sediment (pCi/kg dry)

Sample Code	Sample Date	Gamma Emitters
05 [1]	04/30/2024	<MDA
Sunset Bay	10/21/2024	<MDA
06 (Control)	04/30/2024	<MDA
Lang's Beach	10/21/2024	<MDA

[1] ODCM required samples

NOTE: <MDA denotes laboratory analysis detected No non-natural radionuclides at or above the ODCM required Minimum Detectable Activity

Attachment 3, Cross Check Intercomparison Program

Participation in cross check intercomparison studies is mandatory for laboratories performing analyses of REMP samples satisfying the requirements in the Offsite Site Dose Calculation Manual. Intercomparison studies provide a consistent and effective means to evaluate the accuracy and precision of analyses performed by a laboratory. Study results should fall within specified control limits and results that fall outside the control limits are investigated and corrected.

Constellation Generation Solutions Laboratory participated in the following proficiency testing studies provided by Environmental Resource Associates (ERA) and Eckert Ziegler Analytics (EZA) in 2024. The Laboratory's intercomparison program results for 2024 are summarized below.

Attachment 3 is a summary of Constellation Generation Solutions (CGS) laboratory's quality assurance program. It consists of Table 22 which is a compilation of the results of the CGS laboratory's participation in an interlaboratory comparison program with Environmental Resource Associates (ERA) located in Arvada, Colorado and Eckert and Ziegler Analytics, Inc. (EZA) located in Atlanta, Georgia.

It also includes a compilation of the results of the Constellation Generation Solutions (CGS) Laboratory's participation in a split sample program with Teledyne Brown Engineering located in Knoxville, Tennessee.

The CGS laboratory's intercomparison results, are in full agreement when they were evaluated using designated acceptance ranges and the Resolution Test Criteria in accordance with the Constellation Radiochemistry Quality Control procedure, except as noted in the Pass/Fail column and described below. The CGS laboratory's results are provided with their analytical uncertainties of 2 sigma. When evaluating with the Resolution Test a one sigma uncertainty is used to determine Pass or Fail and noted accordingly. Co-located air samplers provide the opportunity to perform interlaboratory comparisons of beta particulate and radioiodine filters that due to the nature of the sample precludes them from splitting for analysis. Results of E1-2 analyzed by CGS and E1-2Q analyzed by TBE for beta particulates are provided at the end of this table for review and are generally in good agreement. The radioiodine samples collected alongside the beta particulate filters were analyzed and all were below MDA so there are no results to compare for that parameter.

All CGS results reported passed their respective acceptance ranges and Resolution Test Criteria with the following two exceptions for the interlaboratory crosschecks:

RAD-137 I-131 water study on 04/08/2024 on Detector 6 (D6) failed high at 29.7 pCi/L for a true value of 25.1 pCi/L with an acceptance range of 21.7 – 28.5 pCi/L. This was a new detector and the study had very low area counts. Of the three runs, the other two values would have passed. Results on all other detectors were successful. Further review of the data indicated all the Ba-133 results in the other RAD-137 water study were in acceptable range. In that study, Ba-133 is meant to approximate I-131 results as it has an energy very close to I-131 in the spectrum. The detector is new in the lab and there is an ongoing review of its performance to identify the optimal operating range and any inherent bias.

E14044 Filter study on 12/05/24 failed low for Cs-134 on D6 reporting 91.3 +/- 3.25 pCi for a true value of 116 pCi. This study also had unusually low area counts in this range of the spectrum. The result did pass the acceptance range of 81.2 – 150.8 pCi, however due to the extremely low activity level, count times were extended significantly to capture other isotopes with lower yields resulting in very low uncertainties for higher yield isotopes. In the case of Cs-134 the uncertainty was less than 5% and at the level of recovery observed, the result failed the resolution test. Routine analysis is normally performed to achieve 15% +/- 5 %. Review of all other studies performed on this detector showed successful performance for Cs-134 and all other isotopes. The evaluation of detector performance is ongoing to identify inherent bias or variability at low count rates as is observed in environmental samples.

The vendor laboratories used by CGS for subcontracting and interlaboratory comparison samples, GEL Laboratories and Teledyne Brown Engineering (TBE), also participate in the ERA and EZA interlaboratory comparison program. A presentation of their full data report is provided in their Annual Environmental Quality Assurance Program Reports, (Ref 39,40). In summary Gel and TBE reported results met vendor and laboratory acceptance ranges with the following exceptions described here.

For TBE, the following three studies reported data that did not meet the specified acceptance criteria and were addressed through the TBE Corrective Action Program. Investigations of the failures are described as follows:

TBE Crosschecks failed high for MRAD-40 Gross Beta at 42.1 pCi/Filter. The true value was 22.2 and the acceptable range was 13.5-33.5 pCi/Filter. All QC associated with the original sample was acceptable and no anomalies were found. This sample was used as the WG duplicate with a result of 42.5 pCi. Both were counted on the same detector. Upon comparison to historical sample data, the alpha activity of this ERA submitted sample was the highest assigned result, and the beta activity was the lowest. Therefore, the alpha-to-beta crosstalk was more significant than normal, causing the beta activity to report falsely high data. The counting room laboratory staff will adjust the alpha-to-beta crosstalk via correction calculation measures when high alpha are observed. Subsequent study MRAD-41 for Gross Beta filter returned acceptable results.

RAD-137 Gross Alpha in water failed low at 35.2 pCi/L. The true value was 52.6 pCi/L and the acceptable range was 39.6 – 65.6 pCi/L. A QuiKResponse repeat study was analyzed and failed high at 40.3 pCi/L and the acceptable range was 21.5 – 38.5 pCi/L. Investigation showed higher than usual solids in the ERA study, out of the usual range of client samples received by the lab. Also, a different attenuation curve, Th-230, was used for the crosscheck than had been used historically. This curve was less representative of client samples. The lab review of data also showed that a replicate run of the sample would have passed but the lab chose the wrong replicate to report. The lab has gone to a lower volume of sample and resumed using the Am-241 attenuation curve which more closely mirrors client samples and subsequent crosschecks are reporting acceptable.

Quarter 1-2024 gamma results for Co-60 (air filter) and Ce-141 (soil) both failed high. The reported result for the filter Co-60 was 168+/- 12.7 and the known value was 126+/-2.1; the reported results for the soil Ce-141 was 0.106 and the known value was 0.0714+/-0.0013 pCi/g. The root cause investigation showed successful results for the filter on another detector. All QC associated with this sample was acceptable. The soil was recounted on another detector and Ce-141 result of 0.085 was acceptable and generally the same for other geometries. All QC associated with this sample was acceptable. No effective corrective action can be taken at this time. Historically, the Filter Co-60 and soil Ce-141 results have been well within TBE QC acceptance ranges. TBE has successfully passed cross-check results and it appears that these two results are anomalous. If there is a recurrence, a root cause investigation will be done promptly.

For the GEL Laboratory, the following six studies reported data that did not meet the specified acceptance criteria and were addressed through the GEL's internal nonconformance system. A summary is found below:

RAD-136 water Sr-90 failed high, while I-131 failed low.

Strontium-90: The Group Leader has reviewed the method to identify the bias. The method LCS trend was reviewed and no anomalies were identified. The calibration used for the analysis was compared to the new calibration performed recently and the original reported data was processed with both calibrations for comparison. Data still maintained a high bias but was within the limits of the study. A sample of known Strontium concentration was analyzed, and the results were processed using the new calibration. The result was within the mid-range of the acceptance limits. Instrument run logs were reviewed and there was no indication of possible bias from a previously counted sample.

Iodine-131: The laboratory has reviewed the data and found no errors. All batch QC samples, including a duplicate, met acceptance criteria. The carrier yields were found to be slightly higher than typically seen in this method, possibly contributing to the low bias in the result. The laboratory will continue to investigate all steps of the analytical process.

RAD-137 water Sr-90 and I-131 studies both failed low.

Strontium-90: The unacceptable result was analyzed by a modified method of 905.0 and recovered 83% of the known value which is acceptable for the laboratory's LCS. The PT sample was also analyzed by EPA DW method 905.0 and achieved an acceptable result recovering 94% of the assigned value. The RPD between the methods was 12%. The laboratory is evaluating calibration, yield determination, techniques, reagents, carriers, and each step of the process for areas of improvement.

Iodine-131: The laboratory has reviewed the data and no errors were noted. All batch QC samples, including an in-batch duplicate, met acceptance criteria. It was noted that the carrier yields were found to be slightly higher than are typically seen in this method including the reference sample used to calculate the LCS, potentially contributing to the low bias in the result.

RAD-138 Sr-90 and I-131 on water failed low.

Strontium-90: The laboratory conducted an in-depth review of all available data and did not identify any specific errors or anomalies that could explain the performance evaluation failure. The instrument calibrations were reviewed for possible significant areas of variance when compared to previous calibrations and none were noted. The quality department conducted direct observations of the analytical processes noting minor areas of improvement during precipitations and column separations. A definitive root cause was not isolated during the investigation.

Iodine-131: The laboratory has reviewed the data and found no errors. All batch QC samples, including an in-batch duplicate, met the acceptance criteria. As part of the investigation, the quality department observed the preparation process. During the review, it was identified that a reagent may have been improperly diluted, potentially contributing to the low bias observed in the results. This procedural discrepancy has been noted as a probable cause requiring corrective action.

The laboratory has since successfully completed a single-blind spiked sample, achieving results within the acceptance criteria for both Sr-90 and I-131.

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
3/14/2024	E14036 Milk	pCi/L	I-131	96.7	90.8	63.6	118	Pass
		pCi/L	Cs-134	182	198	139	257	Pass
		pCi/L	Cs-137	181	171	120	222	Pass
		pCi/L	Ce-141	88.1	85	59.5	111	Pass
		pCi/L	Cr-51	281	230	161	299	Pass
		pCi/L	Mn-54	187	183	128	238	Pass
		pCi/L	Fe-59	93.6	86.5	60.6	112	Pass
		pCi/L	Co-60	152	158	111	205	Pass
		pCi/L	Zn-65	161	176	123	229	Pass
3/14/2024	E14037 Water	pCi/L	Beta Cs-137	238	231	162	300	Pass
3/14/2024	E14038 Charcoal	pCi	I-131	75.9	90.2	63.1	117	Pass
3/14/2024	E14038 Charcoal	pCi	I-131	79.0	90.2	63.1	117	Pass
3/14/2024	E14038 Charcoal	pCi	I-131	77.1	90.2	63.1	117	Pass
3/14/2024	E14038 Charcoal	pCi	I-131	77.3	90.2	63.1	117	Pass
4/8/2024	RAD-137 Water	pCi/L	I-131	27.1	25.1	21.7	28.5	Pass
4/8/2024	RAD-137 Water	pCi/L	I-131	25.1	25.1	21.7	28.5	Pass
4/8/2024	RAD-137 Water	pCi/L	I-131	27.5	25.1	21.7	28.5	Pass
4/8/2024	RAD-137 Water	pCi/L	I-131	29.7	25.1	21.7	28.5	Fail [1]
4/8/2024	RAD-137 Water	pCi/L	Beta Cs-137	36.6	46.5	33.9	59.1	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
4/8/2024	RAD-137 Water	pCi/L	Cs-134	55.9	57.8	42.8	72.8	Pass
		pCi/L	Cs-137	190	186	149	223	Pass
		pCi/L	Co-60	98.8	98.8	79.7	118	Pass
		pCi/L	Zn-65	228	240	188	292	Pass
4/8/2024	RAD-137 Water	pCi/L	Cs-134	60.7	57.8	42.8	72.8	Pass
		pCi/L	Cs-137	185	186	149	223	Pass
		pCi/L	Co-60	97.7	98.8	79.7	118	Pass
		pCi/L	Zn-65	233	240	188	292	Pass
4/8/2024	RAD-137 Water	pCi/L	Cs-134	59.8	57.8	42.8	72.8	Pass
		pCi/L	Cs-137	190	186	149	223	Pass
		pCi/L	Co-60	97.2	98.8	79.7	118	Pass
		pCi/L	Zn-65	240	240	188	292	Pass
4/8/2024	RAD-137 Water	pCi/L	Cs-134	58.6	57.8	42.8	72.8	Pass
		pCi/L	Cs-137	185	186	149	223	Pass
		pCi/L	Co-60	102	98.8	79.7	118	Pass
		pCi/L	Zn-65	227	240	188	292	Pass
6/13/2024	E14101 Soil	pCi/g	Cs-134	0.406	0.408	0.286	0.530	Pass
		pCi/g	Cs-137	0.402	0.451	0.316	0.586	Pass
6/13/2024	E14101 Soil	pCi/g	Cs-134	0.372	0.408	0.286	0.530	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
6/13/2024	E14101 Soil	pCi/g	Cs-137	0.365	0.451	0.316	0.586	Pass
6/13/2024	E14039 Water	pCi/L	Beta Cs-137	265	262	183	341	Pass
6/13/2024	E14040 Water	pCi/L	Ce-141	45.4	37.5	26.3	48.8	Pass
		pCi/L	Co-60	402	391	274	508	Pass
		pCi/L	Cr-51	250	291	204	378	Pass
		pCi/L	Cs-134	237	242	169	315	Pass
		pCi/L	Cs-137	233	229	160	298	Pass
		pCi/L	Fe-59	183	174	122	226	Pass
		pCi/L	Mn-54	209	204	143	265	Pass
		pCi/L	Zn-65	89.6	99.1	69.4	129	Pass
6/13/2024	E14040 Water	pCi/L	Ce-141	40	37.5	26.3	48.8	Pass
		pCi/L	Co-60	397	391	274	508	Pass
		pCi/L	Cr-51	286	291	204	378	Pass
		pCi/L	Cs-134	238	242	169	315	Pass
		pCi/L	Cs-137	237	229	160	298	Pass
		pCi/L	Fe-59	183	174	122	226	Pass
		pCi/L	Mn-54	212	204	143	265	Pass
		pCi/L	Zn-65	95.4	99.1	69.4	129	Pass
6/13/2024	E14041 Filter	pCi	Ce-141	25.4	25.2	17.6	32.8	Pass
		pCi	Co-60	258	262	183	341	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
6/13/2024	E14041 Filter	pCi	Cr-51	211	195	137	254	Pass
		pCi	Cs-134	137	162	113	211	Pass
		pCi	Cs-137	159	153	107	199	Pass
		pCi	Fe-59	132	117	81.9	152	Pass
		pCi	Mn-54	143	137	95.9	178	Pass
		pCi	Zn-65	71.0	66.4	46.5	86.3	Pass
6/13/2024	E14042A Filter	pCi	Beta Cs-137	249	220	154	286	Pass
9/12/2024	E14043 Filter	pCi	Beta Cs-137	242	221	84.7	157	Pass
9/12/2024	E14102 Soil	pCi/g	Cs-134	0.318	0.336	0.235	0.437	Pass
		pCi/g	Cs-137	0.287	0.295	0.207	0.384	Pass
9/12/2024	E14102 Soil	pCi/g	Cs-134	0.299	0.336	0.235	0.437	Pass
		pCi/g	Cs-137	0.269	0.295	0.207	0.384	Pass
9/12/2024	E14102 Soil	pCi/g	Cs-134	0.305	0.336	0.235	0.437	Pass
		pCi/g	Cs-137	0.277	0.295	0.207	0.384	Pass
9/12/2024	E14102 Soil	pCi/g	Cs-134	0.312	0.336	0.235	0.437	Pass
		pCi/g	Cs-137	0.282	0.295	0.207	0.384	Pass
9/16/2024	MRAD-41 Filter	pCi	Cs-134	499	581	377	712	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
9/16/2024	MRAD-41 Filter	pCi	Cs-137	880	848	696	1110	Pass
		pCi	Co-60	865	839	713	1070	Pass
		pCi	Zn-65	269	239	196	365	Pass
10/4/2024	RAD-139 Water	pCi/L	Cs-134	79.6	80.2	63.0	97.4	Pass
		pCi/L	Cs-137	49.7	46.3	23.3	69.3	Pass
10/4/2024	RAD-139 Water	pCi/L	Co-60	47.9	45.3	31.6	59.0	Pass
		pCi/L	Zn-65	108	114	75.0	153	Pass
10/4/2024	RAD-139 Water	pCi/L	Cs-134	79.8	80.2	63.0	97.4	Pass
		pCi/L	Cs-137	46.0	46.3	23.3	69.3	Pass
		pCi/L	Co-60	49.4	45.3	31.6	59.0	Pass
		pCi/L	Zn-65	106	114	75.0	153	Pass
10/4/2024	RAD-139 Water	pCi/L	Cs-134	79.4	80.2	63.0	97.4	Pass
		pCi/L	Cs-137	46.3	46.3	23.3	69.3	Pass
		pCi/L	Co-60	47.5	45.3	31.6	59.0	Pass
		pCi/L	Zn-65	106	114	75.0	153	Pass
10/4/2024	RAD-139 Water	pCi/L	I-131	26.4	26.3	22.7	29.9	Pass
10/4/2024	RAD-139 Water	pCi/L	I-131	26.3	26.3	22.7	29.9	Pass
12/5/2024	E14044 Filter	pCi	Ce-141	75.7	74.8	52	97	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
12/5/2024	E14044 Filter	pCi	Co-58	105	97.9	69	127	Pass
		pCi	Cr-60	220	219	153	285	Pass
		pCi	Cr-51	182	185	130	241	Pass
		pCi	Cs-134	97.9	116	81	151	Pass
		pCi	Cs-137	144	144	101	187	Pass
		pCi	Fe-59	130	107	75	139	Pass
		pCi	Mn-54	113	104	73	135	Pass
		pCi	Zn-65	164	155	109	202	Pass
12/5/2024	E14044 Filter	pCi	Ce-141	69.3	74.8	52	97	Pass
		pCi	Co-58	93.7	97.9	69	127	Pass
		pCi	Cr-60	196	219	153	285	Pass
		pCi	Cr-51	166	185	130	241	Pass
		pCi	Cs-134	91.3	116	81	151	Fail [1]
		pCi	Cs-137	135	144	101	187	Pass
		pCi	Fe-59	113	107	75	139	Pass
		pCi	Mn-54	106	104	73	135	Pass
		pCi	Zn-65	146	155	109	202	Pass
12/5/2024	E14044 Filter	pCi	Ce-141	66.6	74.8	52	97	Pass
		pCi	Co-58	92.4	97.9	69	127	Pass
		pCi	Cr-60	204	219	153	285	Pass
		pCi	Cr-51	175	185	130	241	Pass
		pCi	Cs-134	95.7	116	81	151	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
12/5/2024	E14044 Filter	pCi	Cs-137	139	144	101	187	Pass
		pCi	Fe-59	119	107	75	139	Pass
		pCi	Mn-54	102	104	73	135	Pass
		pCi	Zn-65	139	155	109	202	Pass
12/5/2024	E14045 Water	pCi/L	Beta Cs-137	257	240	168	312	Pass
12/5/2024	E14046 Charcoal	pCi	I-131	58.0	65.3	45.7	84.9	Pass
		pCi	I-131	59.3	65.3	45.7	84.9	Pass
		pCi	I-131	59.4	65.3	45.7	84.9	Pass
12/5/2024	E14047 Milk	pCi/L	Ce-141	74.7	71.6	50.1	93.1	Pass
		pCi/L	Co-58	95.2	93.7	65.6	122	Pass
		pCi/L	Co-60	211	210	147	273	Pass
		pCi/L	Cr-51	164	177	124	230	Pass
		pCi/L	Cs-134	114	111	77.7	144	Pass
		pCi/L	Cs-137	150	138	96.6	179	Pass
		pCi/L	Fe-59	112	102	71.4	133	Pass
		pCi/L	I-131	50.1	51.0	35.7	66.3	Pass
		pCi/L	Mn-54	106	99.5	69.7	129	Pass
		pCi/L	Zn-65	141	149	104	194	Pass
12/5/2024	E14047 Milk	pCi/L	Ce-141	77.8	71.6	50.1	93.1	Pass
		pCi/L	Co-58	96.9	93.7	65.6	122	Pass

Table 22: CGS Cross Check Intercomparison Results

Study Date	Study ID	Units	Radionuclide	Reported Value	Assigned Value	Acceptance		Performance Evaluation
						Lower Limit	Upper Limit	
12/5/2024	E14047 Milk	pCi/L	Co-60	208	210	147	273	Pass
		pCi/L	Cr-51	205	177	124	230	Pass
		pCi/L	Cs-134	110	111	77.7	144	Pass
		pCi/L	Cs-137	140	138	96.6	179	Pass
		pCi/L	Fe-59	100	102	71.4	133	Pass
		pCi/L	I-131	45.5	51.0	35.7	66.3	Pass
		pCi/L	Mn-54	109	99.5	69.7	129	Pass
		pCi/L	Zn-65	136	149	104	194	Pass
12/5/2024	E14047 Milk	pCi/L	Ce-141	71.9	71.6	50.1	93.1	Pass
		pCi/L	Co-58	89.7	93.7	65.6	122	Pass
		pCi/L	Co-60	232	210	147	273	Pass
		pCi/L	Cr-51	180	177	124	230	Pass
		pCi/L	Cs-134	113	111	77.7	144	Pass
		pCi/L	Cs-137	149	138	96.6	179	Pass
		pCi/L	Fe-59	112	102	71.4	133	Pass
		pCi/L	I-131	63.3	51.0	35.7	66.3	Pass
		pCi/L	Mn-54	105	99.5	69.7	129	Pass
		pCi/L	Zn-65	148	149	104	194	Pass

[1] See Discussion at the beginning of Attachment 3

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Water	Q9-1	1/31/2024	Gross Beta	pCi/L	1.45	0.769	1.97E ± 1.27	Pass
Water	Q9-1	1/31/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	1/31/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	1/31/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	2/28/2024	Gross Beta	pCi/L	1.28	0.770	2.5±1.25	Pass
Water	Q9-1	2/28/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	2/28/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	2/28/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	3/27/2024	Gross Beta	pCi/L	1.39	0.722	2.92±1.26	Pass
Water	Q9-1	3/27/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	3/27/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	3/27/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	5/1/2024	Gross Beta	pCi/L	1.42	0.711	2.00±1.3	Pass
Water	Q9-1	5/1/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	5/1/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	5/1/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	5/29/2024	Gross Beta	pCi/L	<MDA		2.79±1.4	Pass
Water	Q9-1	5/29/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	5/29/2024	Gamma	pCi/L	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Water	Q9-1	5/29/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	6/26/2024	Gross Beta	pCi/L	1.37	0.753	3.39±1.52	Pass
Water	Q9-1	6/26/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	6/26/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	6/26/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	8/1/2024	Gross Beta	pCi/L	1.52	0.789	<MDA	Pass
Water	Q9-1	8/1/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	8/1/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	8/1/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	8/29/2024	Gross Beta	pCi/L	1.93	0.781	3.66±1.43	Pass
Water	Q9-1	8/29/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	8/29/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	8/29/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	10/3/2024	Gross Beta	pCi/L	1.60	0.762	<MDA	Pass
Water	Q9-1	10/3/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	10/3/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	10/3/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	10/30/2024	Gross Beta	pCi/L	1.97	0.788	2.68±1.62	Pass
Water	Q9-1	10/30/2024	LLI	pCi/L	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Water	Q9-1	10/30/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	10/30/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	12/4/2024	Gross Beta	pCi/L	1.58	0.768	<MDA	Pass
Water	Q9-1	12/4/2024	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	12/4/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	12/4/2024	Tritium	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	1/2/2025	Gross Beta	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	1/2/2025	LLI	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	1/2/2025	Gamma	pCi/L	<MDA		<MDA	Pass
Water	Q9-1	1/2/2025	Tritium	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	1/18/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	1/18/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	2/14/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	2/14/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	3/7/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	3/7/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	3/20/2024	Gamma	pCi/L	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Milk	G2-1	3/20/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	4/4/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	4/4/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	4/18/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	4/18/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	5/1/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	5/1/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	5/15/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	5/15/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	5/29/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	5/29/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	6/13/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	6/13/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	6/26/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	6/26/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	7/10/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	7/10/2024	LLI	pCi/L	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Milk	G2-1	7/24/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	7/24/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	8/8/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	8/8/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	8/22/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	8/22/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	9/5/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	9/5/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	9/19/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	9/19/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	10/3/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	10/3/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	10/17/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	10/17/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	10/30/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	10/30/2024	LLI	pCi/L	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Milk	G2-1	11/13/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	11/13/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	11/26/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	11/26/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	12/11/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	G2-1	12/11/2024	LLI	pCi/L	<MDA		<MDA	Pass
Filter Composite	E1-2	3/27/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	E1-2	6/26/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	E1-2	10/3/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	E1-2	1/2/2025	Gamma	pCi/m^3	<MDA		<MDA	Pass
Vegetation	H1-2	6/19/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	H1-2	7/17/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	H1-2	8/14/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	H1-2	9/11/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	B10-2	8/14/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	B10-2	8/14/2024	Strontium 90	pCi/kg	<MDA		<MDA	Pass
Fish	INDP	10/16/2024	Gamma	pCi/kg	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Fish	INDP	10/16/2024	Strontium 90	pCi/kg	<MDA		<MDA	Pass
Sediment	J2-1	10/29/24	Gamma	pCi/kg	<MDA		<MDA	Pass
Water	WA1	6/28/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Water	WA2	6/28/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Oysters	IA3	6/19/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Oysters	IA6	6/19/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Bottom Sediment	WBS4	6/19/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Bottom Sediment	WBS2	6/19/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	IB10	7/22/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	IB11	7/22/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	IB12	7/22/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Vegetation	East	7/23/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Milk	Farm A	09/03/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	Farm A	09/03/2024	LLI	pCi/L	<MDA		<MDA	Pass
Milk	Farm B	09/03/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	Farm B	09/03/2024	LLI	pCi/L	<MDA		<MDA	Pass

Table 23: Interlaboratory Split Sample Results

Sample Type	Location	Sample Date	Analysis	Result Units	CGS Results w 2σ		TBE Split Results w 2σ	Pass/Fail (Split)
Milk	#55	09/09/2024	Gamma	pCi/L	<MDA		<MDA	Pass
Milk	#55	09/09/2024	LLI	pCi/L	<MDA		<MDA	Pass
Fish (Spanish Mackerel)	IA1	8/14/2024	Gamma	pCi/kg	<MDA		<MDA	Pass
Filter Composite	CC-A1	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-A2	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-A3	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-A4	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-A5	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-SFA1	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-SFA2	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-SFA3	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass
Filter Composite	CC-SFA4	9/30/2024	Gamma	pCi/m^3	<MDA		<MDA	Pass

Table 24: Interlaboratory Split Sample Results (Air Particulate Beta)

Media	Location	Sample Date	Analysis	Result Units	(CGS) E1-2	±2σ	(TBE) E1-2Q	±2σ
Filter	E1-2 / E1-2Q	1/04/2024	Beta	pCi/m^3	2.46E-02	2.37E-03	8.99E-03	4.65E-03
Filter	E1-2 / E1-2Q	1/11/2024	Beta	pCi/m^3	1.73E-02	2.05E-03	1.40E-02	3.83E-03
Filter	E1-2 / E1-2Q	1/18/2024	Beta	pCi/m^3	3.39E-02	2.68E-03	2.02E-02	4.34E-03
Filter	E1-2 / E1-2Q	1/25/2024	Beta	pCi/m^3	2.64E-02	2.37E-03	1.61E-02	4.20E-03
Filter	E1-2 / E1-2Q	1/31/2024	Beta	pCi/m^3	1.25E-02	2.06E-03	9.29E-03	4.01E-03
Filter	E1-2 / E1-2Q	2/08/2024	Beta	pCi/m^3	1.83E-02	1.99E-03	1.23E-02	3.41E-03
Filter	E1-2 / E1-2Q	2/14/2024	Beta	pCi/m^3	2.28E-02	2.63E-03	1.23E-02	4.54E-03
Filter	E1-2 / E1-2Q	2/22/2024	Beta	pCi/m^3	2.14E-02	2.04E-03	1.11E-02	3.42E-03
Filter	E1-2 / E1-2Q	2/28/2024	Beta	pCi/m^3	2.37E-02	2.56E-03	1.91E-02	4.75E-03
Filter	E1-2 / E1-2Q	3/07/2024	Beta	pCi/m^3	1.32E-02	1.75E-03	7.60E-03	3.15E-03
Filter	E1-2 / E1-2Q	3/14/2024	Beta	pCi/m^3	1.86E-02	2.21E-03	1.42E-02	4.18E-03
Filter	E1-2 / E1-2Q	3/20/2024	Beta	pCi/m^3	2.06E-02	2.49E-03	1.57E-02	4.26E-03
Filter	E1-2 / E1-2Q	3/27/2024	Beta	pCi/m^3	1.31E-02	1.99E-03	1.16E-02	3.61E-03
Filter	E1-2 / E1-2Q	4/04/2024	Beta	pCi/m^3	1.63E-02	1.89E-03	9.42E-03	3.57E-03
Filter	E1-2 / E1-2Q	4/11/2024	Beta	pCi/m^3	1.61E-02	2.01E-03	8.08E-03	3.54E-03
Filter	E1-2 / E1-2Q	4/18/2024	Beta	pCi/m^3	1.99E-02	2.21E-03	1.01E-02	3.83E-03
Filter	E1-2 / E1-2Q	4/25/2024	Beta	pCi/m^3	1.54E-02	2.04E-03	1.09E-02	3.67E-03
Filter	E1-2 / E1-2Q	5/01/2024	Beta	pCi/m^3	2.45E-02	2.63E-03	1.75E-02	4.61E-03
Filter	E1-2 / E1-2Q	5/9/2024	Beta	pCi/m^3	1.41E-02	1.70E-03	1.12E-02	3.37E-03
Filter	E1-2 / E1-2Q	5/15/2024	Beta	pCi/m^3	8.08E-03	2.05E-03	8.46E-03	3.71E-03
Filter	E1-2 / E1-2Q	5/23/2024	Beta	pCi/m^3	1.40E-02	1.84E-03	1.16E-02	3.49E-03
Filter	E1-2 / E1-2Q	5/29/2024	Beta	pCi/m^3	1.94E-02	2.38E-03	1.13E-02	4.37E-03
Filter	E1-2 / E1-2Q	6/06/2024	Beta	pCi/m^3	1.87E-02	1.98E-03	1.80E-02	3.94E-03
Filter	E1-2 / E1-2Q	6/13/2024	Beta	pCi/m^3	1.08E-02	1.82E-03	1.02E-02	3.70E-03
Filter	E1-2 / E1-2Q	6/20/2024	Beta	pCi/m^3	2.35E-02	2.41E-03	2.06E-02	4.41E-03

Table 24: Interlaboratory Split Sample Results (Air Particulate Beta)

Media	Location	Sample Date	Analysis	Result Units	(CGS) E1-2	±2σ	(TBE) E1-2Q	±2σ
Filter	E1-2 / E1-2Q	6/26/2024	Beta	pCi/m^3	2.63E-02	2.67E-03	1.65E-02	4.74E-03
Filter	E1-2 / E1-2Q	7/03/2024	Beta	pCi/m^3	1.48E-02	1.93E-03	9.09E-03	3.78E-03
Filter	E1-2 / E1-2Q	7/10/2024	Beta	pCi/m^3	2.61E-02	2.43E-03	1.64E-02	4.38E-03
Filter	E1-2 / E1-2Q	7/18/2024	Beta	pCi/m^3	2.29E-02	2.15E-03	1.56E-02	3.79E-03
Filter	E1-2 / E1-2Q	7/24/2024	Beta	pCi/m^3	2.28E-02	2.55E-03	1.21E-02	4.55E-03
Filter	E1-2 / E1-2Q	8/01/2024	Beta	pCi/m^3	2.36E-02	2.15E-03	2.03E-02	4.15E-03
Filter	E1-2 / E1-2Q	8/08/2024	Beta	pCi/m^3	2.62E-02	2.44E-03	1.50E-02	4.32E-03
Filter	E1-2 / E1-2Q	8/15/2024	Beta	pCi/m^3	1.77E-02	2.14E-03	2.14E-02	4.43E-03
Filter	E1-2 / E1-2Q	8/22/2024	Beta	pCi/m^3	1.88E-02	2.21E-03	1.43E-02	4.01E-03
Filter	E1-2 / E1-2Q	8/29/2024	Beta	pCi/m^3	4.12E-02	2.87E-03	2.95E-02	4.85E-03
Filter	E1-2 / E1-2Q	9/05/2024	Beta	pCi/m^3	2.04E-02	2.30E-03	1.30E-02	4.17E-03
Filter	E1-2 / E1-2Q	9/12/2024	Beta	pCi/m^3	2.38E-02	2.37E-03	2.02E-02	4.26E-03
Filter	E1-2 / E1-2Q	9/19/2024	Beta	pCi/m^3	3.26E-02	2.63E-03	2.60E-02	4.61E-03
Filter	E1-2 / E1-2Q	9/26/2024	Beta	pCi/m^3	2.24E-02	2.24E-03	2.01E-02	4.39E-03
Filter	E1-2 / E1-2Q	10/03/2024	Beta	pCi/m^3	1.13E-02	1.89E-03	8.26E-03	3.65E-03
Filter	E1-2 / E1-2Q	10/10/2024	Beta	pCi/m^3	2.69E-02	2.40E-03	2.19E-02	4.66E-03
Filter	E1-2 / E1-2Q	10/17/2024	Beta	pCi/m^3	2.76E-02	2.41E-03	1.72E-02	4.17E-03
Filter	E1-2 / E1-2Q	10/24/2024	Beta	pCi/m^3	3.73E-02	2.72E-03	3.39E-02	5.17E-03
Filter	E1-2 / E1-2Q	10/30/2024	Beta	pCi/m^3	1.96E-02	2.45E-03	1.57E-02	4.58E-03
Filter	E1-2 / E1-2Q	11/07/2024	Beta	pCi/m^3	2.42E-02	2.15E-03	2.10E-02	3.89E-03
Filter	E1-2 / E1-2Q	11/13/2024	Beta	pCi/m^3	2.03E-02	2.46E-03	1.69E-02	4.76E-03
Filter	E1-2 / E1-2Q	11/20/2024	Beta	pCi/m^3	2.63E-02	2.45E-03	2.30E-02	4.50E-03
Filter	E1-2 / E1-2Q	11/26/2024	Beta	pCi/m^3	2.04E-02	2.36E-03	1.41E-02	4.52E-03
Filter	E1-2 / E1-2Q	12/04/2024	Beta	pCi/m^3	2.38E-02	2.15E-03	2.08E-02	4.08E-03
Filter	E1-2 / E1-2Q	12/11/2024	Beta	pCi/m^3	2.87E-02	2.53E-03	2.21E-02	4.54E-03
Filter	E1-2 / E1-2Q	12/19/2024	Beta	pCi/m^3	1.89E-02	1.93E-03	1.45E-02	3.56E-03

Table 24: Interlaboratory Split Sample Results (Air Particulate Beta)

Media	Location	Sample Date	Analysis	Result Units	(CGS) E1-2	±2σ	(TBE) E1-2Q	±2σ
Filter	E1-2 / E1-2Q	12/26/2024	Beta	pCi/m^3	2.01E-02	2.20E-03	1.65E-02	4.20E-03
Filter	E1-2 / E1-2Q	1/2/2025	Beta	pCi/m^3	1.69E-02	2.05E-03	1.08E-02	3.80E-03

Attachment 4, Environmental Direct Radiation Dosimetry Results
(Results in mrem/std. Quarter ± 1σ)

Site Location No.	Description	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Degrees & Distance
3	D1 Onsite	44.60 ± 1.43	40.44 ± 1.68	30.27 ± 1.20	40.49 ± 1.61	71° at 0.3 miles
4	D2 Onsite	16.55 ± 0.70	15.72 ± 0.55	15.44 ± 0.64	16.01 ± 0.69	143° at 0.4 miles
5	E Onsite	15.99 ± 0.49	15.85 ± 0.89	15.23 ± 0.47	15.62 ± 0.53	180° at 0.3 miles
6	F Onsite	14.67 ± 0.63	14.50 ± 0.47	14.31 ± 0.64	14.64 ± 0.54	213° at 0.5 miles
7*	G Onsite	14.41 ± 0.55	14.12 ± 0.46	14.18 ± 0.44	14.06 ± 0.54	245° at 0.7 miles
8*	R5 Offsite Control	16.93 ± 0.61	16.76 ± 0.66	15.92 ± 0.56	16.10 ± 0.71	42° at 16.2 miles
9	D1 Offsite - State Route 3	16.21 ± 0.58	14.04 ± 0.65	13.96 ± 0.62	14.46 ± 0.58	80° at 11.4 miles
10	D2 Offsite	14.51 ± 0.64	13.17 ± 0.52	13.01 ± 0.55	13.63 ± 0.47	118° at 9.0 miles
11	E Offsite	14.52 ± 0.84	13.05 ± 0.57	12.81 ± 0.38	13.28 ± 0.50	162° at 7.1 miles
12	F Offsite	14.40 ± 0.56	13.28 ± 0.39	12.95 ± 0.38	13.71 ± 0.80	192° at 7.6 miles
13	G Offsite	14.79 ± 0.44	13.92 ± 0.44	13.90 ± 0.48	14.19 ± 0.57	226° at 5.4 miles
14*	DeMass Rd., SW Oswego - Control	15.79 ± 0.60	14.50 ± 0.57	14.46 ± 0.66	14.09 ± 0.54	227° at 12.5 miles
15*	Pole 66, W. Boundary - Bible Camp	15.98 ± 0.65	14.75 ± 0.57	14.49 ± 0.41	14.82 ± 0.71	240° at 0.9 miles
18*	Energy Info. Center - Lamp Post, SW	17.06 ± 0.66	16.38 ± 0.55	16.43 ± 0.64	16.27 ± 0.65	268° at 0.4 miles
19	East Boundary - JAF, Pole 9	16.41 ± 0.87	15.50 ± 0.48	15.67 ± 0.47	15.36 ± 0.73	83° at 1.4 miles
23*	H Onsite	17.76 ± 0.71	16.77 ± 0.60	16.25 ± 0.54	17.03 ± 0.66	73° at 0.8 miles
24	I Onsite	15.21 ± 0.55	14.71 ± 0.44	14.71 ± 0.55	14.70 ± 0.72	95° at 0.8 miles
25	J Onsite	15.24 ± 0.69	14.75 ± 0.61	14.77 ± 0.57	14.31 ± 0.51	109° at 0.9 miles
26	K Onsite	15.97 ± 0.61	14.98 ± 0.48	15.26 ± 0.56	14.90 ± 0.70	132° at 0.5 miles
27	N. Fence, N. of Switchyard, JAF	71.95 ± 2.97	71.87 ± 3.17	45.00 ± 1.36	66.06 ± 2.98	60° at 0.4 miles
28	N. Light Pole, N. of Screenhouse, JAF	81.03 ± 5.43	77.71 ± 5.57	54.10 ± 3.05	78.13 ± 5.46	68° at 0.5 miles
29	N. Fence, N. of W. Side	82.39 ± 5.88	80.32 ± 6.47	51.82 ± 3.86	77.53 ± 6.37	65° at 0.5 miles
30	N. Fence, (NW) JAF	42.76 ± 2.56	40.16 ± 2.02	28.06 ± 1.34	38.82 ± 2.60	57° at 0.4 miles
31	N. Fence, (NW) NMP-1	22.49 ± 0.56	23.23 ± 0.80	22.10 ± 0.78	21.27 ± 1.09	279° at 0.2 miles
39	N. Fence, Rad. Waste-NMP-1	44.47 ± 2.94	37.39 ± 1.61	28.55 ± 1.14	27.92 ± 1.35	298° at 0.2 miles

Site Location No.	Description	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Degrees & Distance
47	N. Fence, (NE) JAF	24.06 ± 0.69	23.11 ± 1.13	19.04 ± 0.69	21.21 ± 1.02	69° at 0.6 miles
49*	Phoenix, NY - Control	15.54 ± 0.77	14.67 ± 0.48	13.97 ± 0.43	14.44 ± 0.55	168° at 19.7 miles
51	Liberty & Bronson Sts., E. of OSS	15.16 ± 0.51	14.66 ± 0.58	14.22 ± 0.47	14.42 ± 0.54	234° at 7.3 miles
52	E. 12th & Cayuga Sts., Oswego School	14.86 ± 0.71	14.49 ± 0.46	13.88 ± 0.46	14.06 ± 0.67	227° at 5.9 miles
53	Broadwell & Chestnut Sts., Fulton H.S.	15.32 ± 0.48	15.94 ± 0.54	14.81 ± 0.75	14.74 ± 0.69	183° at 13.7 miles
54	Mexico High School	15.93 ± 0.44	14.40 ± 0.69	13.44 ± 0.46	13.94 ± 0.58	115° at 9.4 miles
55	Gas Substation Co. Rt. 5-Pulaski	15.16 ± 0.57	14.63 ± 0.46	13.55 ± 0.51	14.18 ± 0.50	75° at 13.0 miles
56*	Rt. 104-New Haven Sch. (SE Corner)	14.50 ± 0.61	14.97 ± 0.50	14.00 ± 0.50	14.11 ± 0.59	124° at 5.2 miles
58*	Co. Rt. 1A-Novelis (E. of E. Entrance Rd.)	15.47 ± 0.71	15.64 ± 0.56	14.18 ± 0.54	15.12 ± 0.64	222° at 3.0 miles
75*	Unit 2, N. Fence, N. of Reactor Bldg.	25.80 ± 0.93	25.17 ± 1.20	22.71 ± 0.66	23.98 ± 1.15	354° at 0.1 miles
76*	Unit 2, N. Fence, N. of Change House	20.05 ± 0.67	20.84 ± 0.94	19.11 ± 0.82	19.39 ± 1.01	25° at 0.1 miles
77*	Unit 2, N. Fence, N. of Pipe Bldg.	21.74 ± 0.68	23.44 ± 0.72	20.66 ± 0.77	22.72 ± 0.86	36° at 0.2 miles
78*	JAF. E. of E. Old Lay Down Area	16.60 ± 0.51	16.63 ± 0.51	16.43 ± 0.64	16.46 ± 0.62	85° at 1.0 miles
79*	Co. Rt. 29, Pole #63, 0.2 mi. S. of Lake Rd.	14.42 ± 0.71	14.43 ± 0.49	14.19 ± 0.57	13.78 ± 0.71	120° at 1.2 miles
80*	Co. Rt. 29, Pole #54, 0.7 mi. S. of Lake Rd.	15.62 ± 0.44	14.61 ± 0.61	14.30 ± 0.59	14.21 ± 0.60	136° at 1.5 miles
81*	Miner Rd., Pole # 16, 0.5 mi. W. of Rt. 29	14.92 ± 0.64	14.51 ± 0.60	13.77 ± 0.55	13.64 ± 0.63	159° at 1.6 miles
82*	Miner Rd., Pole # 1-1/2, 1.1 mi. W. of Rt. 29	14.71 ± 0.45	14.92 ± 0.96	13.91 ± 0.65	14.06 ± 0.51	180° at 1.6 miles
83*	Lakeview Rd., Tree 0.45 mi. N. of Miner Rd.	15.38 ± 0.41	16.09 ± 0.54	14.85 ± 0.83	15.53 ± 0.69	203° at 1.2 miles
84*	Lakeview Rd., N., Pole #6117, 200ft. N. of Lake Rd.	14.76 ± 0.57	15.31 ± 0.68	14.65 ± 0.46	14.28 ± 0.62	226° at 1.1 miles
85*	Unit 1, N. Fence, N. of W. Side of Screen House	25.86 ± 1.04	28.46 ± 1.36	24.00 ± 1.18	23.67 ± 0.90	292° at 0.2 miles
86*	Unit 2, N. Fence, N. of W. Side of Screen House	25.42 ± 0.88	28.19 ± 1.50	24.86 ± 1.08	25.61 ± 1.31	311° at 0.1 miles
87*	Unit 2, N. Fence, N. of E. Side of Screen House	25.83 ± 1.03	27.97 ± 1.36	24.49 ± 1.18	26.94 ± 1.60	333° at 0.1 miles
88*	Hickory Grove Rd., Pole #2, 0.6 mi. N. of Rt. 1	14.26 ± 0.43	14.33 ± 0.49	14.35 ± 0.57	14.62 ± 0.48	97° at 4.5 miles
89*	Leavitt Rd., Pole #16, 0.4 mi. S. of Rt. 1	15.04 ± 0.45	15.04 ± 0.71	14.28 ± 0.50	14.82 ± 0.59	112° at 4.3 miles
90*	Rt. 104, Pole #300, 150 ft. E. of Keefe Rd.	14.65 ± 0.46	14.95 ± 0.73	13.86 ± 0.55	14.43 ± 0.55	135° at 4.2 miles
91*	Rt. 51A, Pole #59, 0.8 mi. W. of Rt. 51	13.93 ± 0.46	14.77 ± 0.71	13.69 ± 0.55	14.11 ± 0.61	157° at 4.9 miles
92*	Maiden Lane Rd., Power Pole, 0.6 mi. S. of Rt. 104	16.16 ± 0.43	16.53 ± 0.93	15.64 ± 0.62	16.16 ± 0.80	183° at 4.4 miles

Site Location No.	Description	Jan – Mar	Apr – Jun	Jul – Sep	Oct – Dec	Degrees & Distance
93*	Rt. 53 Pole 1-1, 120ft. S. of Rt. 104	14.71 ± 0.74	14.43 ± 0.40	13.65 ± 0.42	14.49 ± 0.84	206° at 4.4 miles
94*	Rt. 1, Pole #82, 250ft. E. of Kocher Rd. (Co. Rt. 63)	14.54 ± 0.52	13.83 ± 0.43	13.43 ± 0.51	13.44 ± 0.44	224° at 4.4 miles
95*	Novelis W. access Rd., Joe Fultz Blvd., Pole #21	13.53 ± 0.52	13.38 ± 0.45	12.70 ± 0.50	12.40 ± 0.72	239° at 3.7 miles
96*	Creamery Rd., 0.3 mi. S. of Middle Rd., Pole 1-1/2	14.81 ± 0.68	14.82 ± 0.67	13.54 ± 0.55	13.93 ± 0.56	199° at 3.6 miles
97*	Rt. 29, Pole #50, 200ft. N. of Miner Rd.	14.91 ± 0.48	15.33 ± 0.70	14.71 ± 0.53	13.78 ± 0.65	145° at 1.8 miles
98	Lake Rd., Pole #145, 0.15 mi. E. of Rt. 29	15.46 ± 0.44	15.76 ± 0.70	14.80 ± 0.57	14.34 ± 0.54	102° at 1.2 miles
99	NMP Rd., 0.4 mi. N. of Lake Rd., Env. Station R1	14.12 ± 0.38	13.69 ± 0.52	13.75 ± 0.46	13.57 ± 0.77	92° at 1.8 miles
100	Rt. 29 & Lake Rd. Env. Station R2	14.83 ± 0.43	14.46 ± 0.62	14.19 ± 0.66	13.96 ± 0.62	107° at 1.1 miles
101	Rt. 29, 0.7 mi. S. of Lake Rd. Env. Station R3	13.68 ± 0.52	13.81 ± 0.52	13.47 ± 0.50	13.07 ± 0.61	133° at 1.4 miles
102	EOF/Env. Lab, Rt. 176, E. Driveway, Lamp Post	14.59 ± 0.39	14.36 ± 0.57	13.84 ± 0.47	13.64 ± 0.52	175° at 11.9 miles
103	EIC, East Garage Rd., Lamp Post	16.67 ± 0.63	17.04 ± 0.64	16.15 ± 0.51	16.26 ± 0.80	268° at 0.4 miles
104	Parkhurst Rd., Pole #23, 0.1 mi. S. of Lake Rd.	15.65 ± 0.54	14.84 ± 0.79	14.53 ± 0.52	13.97 ± 0.63	102° at 1.4 miles
105	Lakeview Rd., Pole #36, 0.5 mi. S. of Lake Rd.	14.98 ± 0.60	14.53 ± 0.60	14.07 ± 0.61	14.23 ± 0.51	199° at 1.4 miles
106	Shoreline Cove, W. of NMP-1, Tree on W. Edge	17.38 ± 0.68	17.63 ± 0.76	17.36 ± 0.58	17.63 ± 1.12	274° at 0.3 miles
107	Shoreline Cove, W. of NMP-1, 30ft. SSW of #106	16.21 ± 0.45	17.26 ± 0.66	16.92 ± 0.51	16.17 ± 0.66	273° at 0.3 miles
108	Lake Rd., Pole #142, 300 ft. E. of Rt. 29 S.	15.00 ± 0.51	14.79 ± 0.59	14.70 ± 0.41	14.17 ± 0.57	105° at 1.1 miles
109	Tree North of Lake Rd., 300 ft. E. of Rt. 29 N.	14.66 ± 0.49	14.69 ± 0.52	14.89 ± 0.46	14.44 ± 0.54	104° at 1.1 miles
111	Control, State Route 38, Sterling, NY	14.21 ± 0.42	13.54 ± 0.46	13.14 ± 0.39	13.22 ± 0.54	214° at 21.8 miles
112	EOF/Env. Lab, Oswego County Airport	14.17 ± 0.50	13.89 ± 0.59	12.60 ± 0.52	12.50 ± 0.45	175° at 11.9 miles
113	Control, Baldwinsville, NY	14.07 ± 0.56	13.91 ± 0.51	13.28 ± 0.37	13.44 ± 0.66	178° at 24.7 miles

Attachment 5, Radiological Groundwater Protection Program

1.0 NMPNS GROUNDWATER

A. Results Summary

A groundwater monitoring program is not required by the ODCM. The program is being implemented as the result of Nuclear Energy Institute (NEI) Ground Water Protection Plan Initiative. Groundwater samples were collected from a number of locations shown in Figure 6. NMPNS has a total of 22 wells (twelve Background designated wells, one Mid-Field designated well, one Perimeter designated well, and eight Source designated wells) that are sampled as part of the Radiological Groundwater Protection Program (RGPP).

Samples collected from Source designated wells are analyzed for tritium quarterly, samples collected from the Mid-Field designated well are analyzed for tritium semi-annually, and samples collected from the Perimeter designated well are analyzed for tritium annually. Groundwater well sampling frequencies and tritium results are documented in the Annual Radiological Effluent Release Report.

Gamma radionuclides, gross-alpha, and Sr-89/90 were not detected in any of the groundwater samples collected during 2024.

B. Data Evaluation and Discussion

Plant-related gamma emitters and Sr-89/90 analyses were performed on indicator and control locations. No plant-related gamma emitters or Sr-89/90 were detected in the 2024 samples. This is consistent with historical data, which have not shown the presence of plant-related gamma emitters or Sr-89/90 in ground water samples.

Monitoring well tritium samples analyzed for the 2024 sample program were analyzed to an LLD of approximately 200 pCi/L. The tritium results for all locations ranged from <182 to 224 pCi/L, which is consistent with historical data.

C. Dose Evaluation

Sampling for groundwater, as found in Table 3: Radiological Environmental Monitoring Program – Waterborne, and Section D 3.5.1 of the NMP2 ODCM, was not required during 2024. There were no groundwater sources in 2024 that were tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties support contamination migration; therefore, drinking water was not a dose pathway during 2024.

To assess the maximum possible dose if drinking water were to become a dose pathway at the site, a conservative estimate was performed using Regulatory Guide 1.109 methodology and the following assumptions:

- Maximum groundwater tritium concentration obtained during 2024: 224 pCi/L

- 510 liters of water consumed per year (Table E-5, Regulatory Guide 1.109)

Assuming that the maximum affected individual obtained all of their drinking water for the year from this maximum affected well concentration, the calculated dose to the maximum exposed age group (Child) would be < 0.023 mrem to the Whole Body and all Organs.

D. Data Trends

There are no data trends for plant-related gamma emitters or Sr-89/90 as these radionuclides have not been detected in groundwater samples.

Groundwater tritium results are documented in the Annual Radiological Effluent Release Report.

2.0 JAF GROUNDWATER

A. Results Summary

A groundwater monitoring program is not required by the ODCM. The program is being implemented as the result of Nuclear Energy Institute (NEI) Ground Water Protection Plan Initiative. JAFNPP has a total of 22 wells, (seven Background designated wells, two Mid-Field designated wells, two Perimeter designated wells, and eleven Source designated wells), and one Reactor Building Perimeter Drain Sump (RBPDS) (sampled as a Source designated sample point), that are sampled as part of the Radiological Groundwater Protection Program (RGPP) in accordance with the requirements of EN-JF-408-4160.

Samples collected from Source designated wells and the RBPDS are analyzed for tritium quarterly; samples collected from Mid-Field designated wells are analyzed for tritium semi-annually, and samples collected from Background and Perimeter designated wells are analyzed for tritium annually. Groundwater well sampling frequencies and tritium results are documented in the Annual Radiological Effluent Release Report.

Gamma-radionuclide analysis was most recently performed during the 2nd quarter 2024 RGPP sampling round. Gamma radionuclides were not detected at concentrations exceeding their respective LLDs in 2024.

The most recent hard-to-detects (Fe-55 and Ni-63) analyses were performed on samples collected from Source designated wells in 2021. Hard-to-detects (Fe-55 and Ni-63) were not detected in the samples collected in 2021. The 3rd quarter 2024 sample collected from the RBPDS was analyzed for hard-to-detects (Fe-55 and Ni-63). Fe-55 and Ni-63 were not detected in the 3rd quarter RBPDS sample.

Gross-alpha analysis was most recently performed during the 1st quarter 2024 RGPP sampling round for the eleven Source designated monitoring wells, and 3rd quarter 2024 for the sample collected from the RBPDS. Gross-alpha (dissolved and suspended fractions) was not detected at concentrations greater than the established Alert Level in the samples collected in 2024.

Sr-89 and Sr-90 analyses were performed on samples collected from Source designated wells and RBPDS during the 3rd quarter 2024 RGPP sampling round. No detections of Sr-89 and Sr-90 were reported in the samples collected during the 3rd quarter 2024 RGPP sampling round.

B. Data Evaluation and Discussion

Plant-related gamma emitters, and tritium analyses were performed on all locations in 2024. No plant-related radionuclides were detected in the 2024 samples. This is consistent with historical data, which has not shown the presence of plant-related radionuclides in ground water samples.

Monitoring well tritium samples analyzed for the 2024 sample program were analyzed to an LLD of approximately <200 pCi/L, and the RBPDS was analyzed on site to the LLD of approximately 980 pCi/L. The tritium results for the background locations ranged from <181 to <190 pCi/L, the results from the mid-field locations ranged from <181 to 211 pCi/L, the results from the perimeter locations ranged from 239 to 275 pCi/L, the results from the source well locations ranged from <173 to 324 pCi/L, and the results from the RBPDS location ranged from <936 to 3496 pCi/L. All tritium results are consistent with historical data.

C. Dose Evaluation

There were no groundwater sources in 2024 that were tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties support contamination migration; therefore, drinking water was not a dose pathway during 2024.

To assess the dose associated with tritium, the highest positive value of 3496 pCi/L was used:

- Maximum tritium concentration 3496 pCi/L (highest value)
- 510 liters of water consumed per year

The theoretical dose to the whole body and maximum organ using the maximum value and Regulatory Guide 1.109 methodology were determined. The calculated dose would be < 0.36 mrem to the child whole body and < 0.36 mrem to the child liver (critical age group/organ).

D. Data Trends

There are no data trends for plant-related gamma emitters as these radionuclides have not been detected in groundwater samples.

Groundwater tritium results are documented in the JAFNPP Annual Radiological Effluent Release Report for 2024. A list of groundwater monitoring locations is provided below.

Table 25: JAFNPP Groundwater Monitoring Locations

Location Designation	Location Description
MW-1 (A)	Southwest of Reactor Building
MW-1 (B)	Southwest of Reactor Building
MW-2 (A)	Northwest of Reactor Building
MW-2 (B)	Northwest of Reactor Building
MW-3 (A)	Northwest of Reactor Building
MW-3 (B)	Northwest of Reactor Building
MW-4 (A)	Northeast of Reactor Building
MW-4 (B)	Northeast of Reactor Building
MW-5	Northwest Edge of Property
MW-6	North / Northwest Edge of Property
MW-7	North Edge of Property
MW-8	North / Northeast Edge of Property
MW-9	Northeast Edge of Property
MW-10 (A)	Southeast of Reactor Building
MW-10 (B)	Southeast of Reactor Building
MW-13	West of Reactor Building
MW-14	East of Reactor Building
MW-15	South of Reactor Building
MW-16	Northwest of Reactor Building
MW-19	Northwest Edge of Property
MW-20	Southwest Edge of Property
MW-21	South of Reactor Building (Outside protected area)
RBPDS	Southwest corner or Reactor Building