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10 CFR 50.36b

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

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
2021 Annual Radiological Environmental Operating Report

Enclosed is the 2021 Annual Radiological Environmental Operating Report for Turkey Point Units 3 and 4, as required by Technical Specification 6.9.1.3.

Should there be any questions or comments regarding this information, please contact Mr. William Nurnberger, Turkey Point Nuclear Chemistry Manager, at 305-246-6853.

Sincerely,



Timothy Lesniak
General Manager, Regulatory Affairs
Florida Power & Light Company

SM
Enclosure

cc: Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant



Plant: Turkey Point Nuclear Units 3 & 4	Page 1 of 55
	YEAR: 2021
Docket NOS Number: 50-250, 50-251	
Annual Radiological Environmental Operating Report	

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Annual Radiological Environmental Operating Report**1.0 EXECUTIVE SUMMARY****1.1 Radiological Environmental Monitoring Program**

The data obtained through the Turkey Point Radiological Environmental Monitoring Program (REMP) verifies that the levels of radiation and concentrations of radioactive materials in environmental samples are not increasing. These measurements verify that the dose or dose commitment to members of the public, due to operation of Turkey Point Units 3 & 4, during the surveillance year, is well within the limits established by 10 CFR 50, Appendix I. The sampling period was from January 1, 2021 to December 31, 2021. Additionally, supplemental samples collected by the State of Florida, DOH, do not indicate adverse trends in the radiological environment.

All required lower limit of detection (LLD) capabilities were achieved in all sample analyses during 2021, as required by the Turkey Point Units 3 & 4 Technical Specifications. No measurable levels of radiation above baseline levels attributable to Turkey Point Nuclear operation were detected in the vicinity of PTN. The 2021 Radiological Environmental Monitoring Program thus substantiated the adequacy of source control and effluent monitoring at Turkey Point Nuclear with no observed impact of plant operations on the environment.

Turkey Point Nuclear established the REMP prior to the station's becoming operational to provide data on background radiation and radioactivity normally present in the area. PTN has continued to monitor the environment by sampling air, water, sediment, crustacea, fish and broadleaf vegetation, as well as measuring direct radiation. PTN also samples milk if milk-producing animals used for human consumption are present within five miles (8 km) of the plant.

The REMP includes sampling indicator and control locations within an approximate 20-mile radius of the plant. The REMP utilizes indicator locations near the site to show any increases or buildup of radioactivity that might occur due to station operation and control locations farther away from the site to indicate the presence of only naturally occurring radioactivity. PTN personnel compare indicator results with control results to assess any impact PTN operation might have had on the surrounding environment.

In 2021, environmental samples were collected for radiological analysis. The results of indicator locations were compared with control locations. It was concluded that no significant relationship exists between PTN operation and effect on the area around the plant. The review of 2021 data showed radioactivity levels in the environment were undetectable in many locations and near background levels in significant pathways.

Radiological environmental monitoring for the Turkey Point Plant is conducted by the State of Florida, Department of Health (DOH). Samples are collected and analyzed by DOH personnel. Samples are analyzed at the DOH Environmental Radiation Control Laboratory in Orlando, Florida. The 2021 Radiological Surveillance Quarterly Report data is provided by the State of Florida Bureau of Radiation Control and is presented in Attachment 2. The State of Florida is not involved in the (Industry Initiative) ground water monitoring program.

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No samples equaled or exceeded reporting levels.

1.3 Sample Deviations

During 2021, environmental sampling was performed for seven media types addressed in the ODCM and for direct radiation. A total of 802 samples of the 802 scheduled were obtained. Of the scheduled samples, 100 percent were collected and analyzed in accordance with the requirements specified in the ODCM. Attachment 1 contains the listing of sample deviations and actions taken.

1.4 Program Modifications

- There were no program modifications during the reporting period.

Annual Radiological Environmental Operating Report**2.0 INTRODUCTION**

This report is submitted pursuant to Specification 6.9 of Turkey Point Units 3 & 4 Technical Specifications. The Annual Radiological Environmental Operating Report provides information, summaries and analytical results pertaining to the Radiological Environmental Monitoring Program for the calendar year indicated. This report covers surveillance activities described in the Offsite Dose Calculation Manual (ODCM) meeting the requirements of Unit 3 and Unit 4 Technical Specifications.

2.1 Radiological Environmental Monitoring Program

The Radiological Environmental Monitoring Program for the Turkey Point Plant is conducted pursuant to Control 5.1 of Turkey Point Unit 3 & 4 ODCM.

A. Purpose

The purpose of the Radiological Environmental Monitoring Program is to provide representative measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides which lead to the highest potential radiation exposures of members of the public resulting from station operation. The Radiological Environmental Monitoring Program also supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and the modeling of the environmental exposure pathways.

Sample Locations, Types and Frequencies:

- Direct radiation gamma exposure rate is monitored continuously at 23 locations by thermoluminescent dosimeters (TLDs). TLDs are collected and analyzed quarterly.
- Airborne radioiodine and particulate samplers are operated continuously at six locations. Samples are collected and analyzed weekly. Analyses include Iodine-131, gross beta, and gamma isotopic measurements.
- Surface water samples are collected from three locations. Samples are collected and analyzed monthly. Analyses include gamma isotopic and tritium measurements.
- Shoreline sediment samples are collected from three locations coinciding with the locations for surface water samples. Samples are collected and analyzed semi-annually. Sediment samples are analyzed by gamma isotopic measurements.
- Fish and invertebrate samples are collected from two locations coinciding with two of the locations for surface water samples. Samples are collected and analyzed semi-annually. Fish and invertebrate samples are analyzed by gamma isotopic measurements.
- Broad leaf vegetation samples are collected from three locations. Samples are collected and analyzed monthly. Broad leaf vegetation samples are analyzed by gamma isotopic measurements.

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Table 1 through 4 provides specific information pertaining to sample locations, types, and frequencies.

Note: Ground Water Protection, NEI Initiative: The program and results are described in Attachment 4.

2.2 Pathways Monitored

The airborne, direct radiation, waterborne and ingestion pathways are monitored as required by Control 5.1 of Turkey Point Unit 3 & 4 ODCM. A description of the REMP utilized to monitor the exposure pathways is described in the attached Tables and Figures.

Section 4.0 of this report provides a discussion of 2021 sampling results with Section 5.0 providing a summary of results for the monitored exposure pathways.

2.3 Land Use Census

PTN conducts a land use census annually, as required by Turkey Point Units 3 & 4 ODCM. The purpose of this census is to identify changes in uses of land within five miles of PTN that would require modifications to the REMP and the Offsite Dose Calculation Manual (ODCM). Section 4.5 on the report contains a narrative on the results of the 2021 land use census.

3.0 RADIOLOGICAL ENVIRONMENTAL SAMPLING PROGRAM REQUIREMENTS

Table 1: Exposure Pathway – Airborne

Requirement	Sample Point Description Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
<p><u>RADIOIODINE AND PARTICULATES</u> 5 sample indicator locations and 1 sample control location.</p>	<ul style="list-style-type: none"> • T51 (2 mi. NNW) – Entrance Area to Biscayne National Park. • T57 (4 mi. NW) – Siren Pole 27, intersection of SW 112th Ave and SW 304th St. • T58 (1 mi. NW) – Turkey Point Entrance Road. • T72 (<1 mi. WSW) – Just before entrance to Land Utilizations access gate. • T41 (1.6 mi. WNW) – Palm Dr. West of FPL Satellite School near the site boundary. • T64* (22 mi. NNE) – Natoma Substation, 2475 SW 16 Ct. 	<p>Continuous sampler operation with sample collection weekly or more frequently if required by dust loading.</p>	<ul style="list-style-type: none"> • Radioiodine Canisters – I-131 analysis weekly. • Air Particulate – Gross beta radioactivity analysis following filter change. • Air Particulate – Gamma Isotopic analysis quarterly.

*Denotes Control sample

Table 2: Exposure Pathway – Direct Radiation

Requirement	Sample Point Description Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
<p><u>TLDS</u> 22 indicator sample locations and 1 control sample location.</p>	<ul style="list-style-type: none"> • N-2 (2 mi N) – Convoy Point • N-7 (7.1 mi N) – Black Point Marina parking lot on siren pole • N-10 (10.6 mi N) – Old Cutler Rd across from Perdue Med. Ctr. On siren pole. • NNW-2 (2.2 mi NNW) – East End of N. Canal Dr. on siren pole E. of 117th Ave. • NNW-10 (9.2 mi NNW) – Bailes Rd. E. of US 1 on siren pole. • NW-1 (1.4 mi NW) – Turkey Point Entrance Rd. • NW-5 (3.9 mi NW) – Intersection of Mowry Dr. and 117th Ave. on siren pole. • NW-10 (10 mi NW) – On Newtown Rd. N. of Coconut Palm Drive on siren pole. • W-5 (5.3 mi W) – Palm Drive 0.3 mi west of Tallahassee Rd. • WNW-10 (9.8 mi WNW) – NW 2nd Ave. S. of Campbell Dr. at Hmstd. Middle School on siren pole. • W-1 (0.7 mi W) – On site north side of Discharge Canal. 	<p>Quarterly</p>	<ul style="list-style-type: none"> • mR exposure quarterly.

Table 2: Exposure Pathway – Direct Radiation

Requirement	Sample Point Description Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
<p><u>TLDS (Cont'd)</u> 22 indicator sample locations and 1 control sample location.</p>	<ul style="list-style-type: none"> • W-9 (8.6 mi W) – Card Sound Rd. 0.6 mi SSE of US 1 on siren pole. • WSW-8 (7.8 mi WSW) – Card Sound Rd. 3.4 mi. SSE of US 1 on siren Pole. • SW-1 (1 mi SW) – On site near land utilization offices. • SSE-1 (1 mi SSE) – On site South East side of cooling canals at “Turtle Point”. • SW-8 (8 mi SW) – Card Sound Rd. 5 mi. SSE of US 1 at entrance to Navy facility. • SSW-5 (5 mi SSW) – On site, southwest corner of cooling canals. • SSW-10 (10 mi SSW) – At Card Sound Bridge on siren pole. • S-5 (5 mi S) – On site, south east end of cooling canals. • S-10 (10 mi S) – Card Sound Road at Steamboat Creek. • SSE-10 (9 mi SSE) – Ocean Reef. • NNE-22* (22.6 mi NNE) – Natoma Substation. • WNW2 (1.6 mi WNW) – Palm Dr. West of FPL Satellite School, near Site Boundary. 	<p>Quarterly</p>	<ul style="list-style-type: none"> • mR exposure quarterly.

*Denotes Control sample

Table 3: Exposure Pathway – Waterborne

Requirement	Sample Point Description Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
<p><u>SURFACE WATER</u> 2 indicator sample locations and 1 control sample location.</p>	<ul style="list-style-type: none"> • T42 (<1 mi. ENE) – Biscayne Bay at Turkey Point. • T81 (6 mi. S) – Card Sound, near Mouth of Old Discharge Canal. • T67* (13-18 mi. N, NNE) – Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park 	Grab samples Monthly	<ul style="list-style-type: none"> • Gamma isotopic analysis and tritium analysis monthly.
<p><u>SEDIMENT FROM SHORELINE</u> 2 indicator sample locations and 1 control sample location. Locations coincide with the surface water sample locations.</p>	<ul style="list-style-type: none"> • T42 (<1 mi ENE) – Biscayne Bay at Turkey Point. • T81 (6 mi. S) – Card Sound, near Mouth of Old Discharge Canal. • T67* (13-18 mi. N, NNE) – Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park 	Semi-annually	<ul style="list-style-type: none"> • Gamma isotopic analysis semi-annually.

*Denotes Control sample

Table 4: Exposure Pathway – Ingestion

Requirement	Sample Point Description Distance and Direction	Sampling and Collection Frequency	Type and Frequency Of Analyses
<p><u>CRUSTACEA AND FISH</u></p> <ul style="list-style-type: none"> 1 indicator sample location and 1 control sample location. 	<ul style="list-style-type: none"> T81 (6 mi. S) – Card Sound, near Mouth of Old Discharge Canal. T67* (13-18 mi. N, NNE) – Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park 	Semi-annually	Gamma isotopic analysis semi-annually.
<p><u>BROADLEAF VEGATATION</u></p> <ul style="list-style-type: none"> 2 indicator sample locations and 1 control sample location. 	<ul style="list-style-type: none"> T40 (3 mi W) – South of Palm Dr. on S.W. 117th Street Extension. T41 (2 mi WNW) – Palm Dr. West of FPL Satellite School near the site boundary. T67* (13-18 mi. N, NNE) – Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park 	Monthly	Gamma isotopic analysis monthly.

*Denotes Control sample

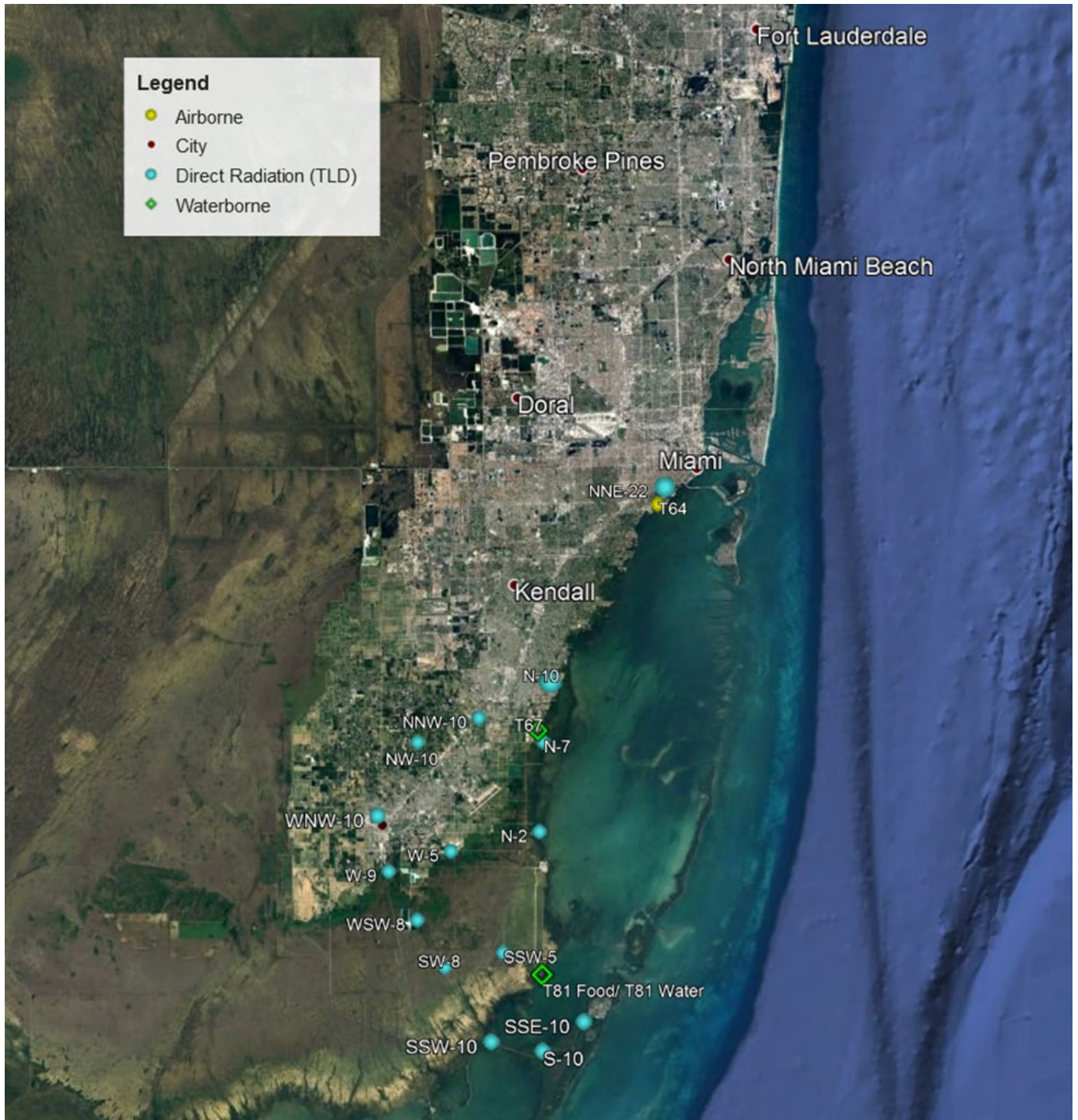
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Figure 1: Sample Collection Sites – Near Station



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Figure 2: Sample Collection Sites – Distant from Station



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4.0 INTERPRETATION AND TRENDS OF RESULTS

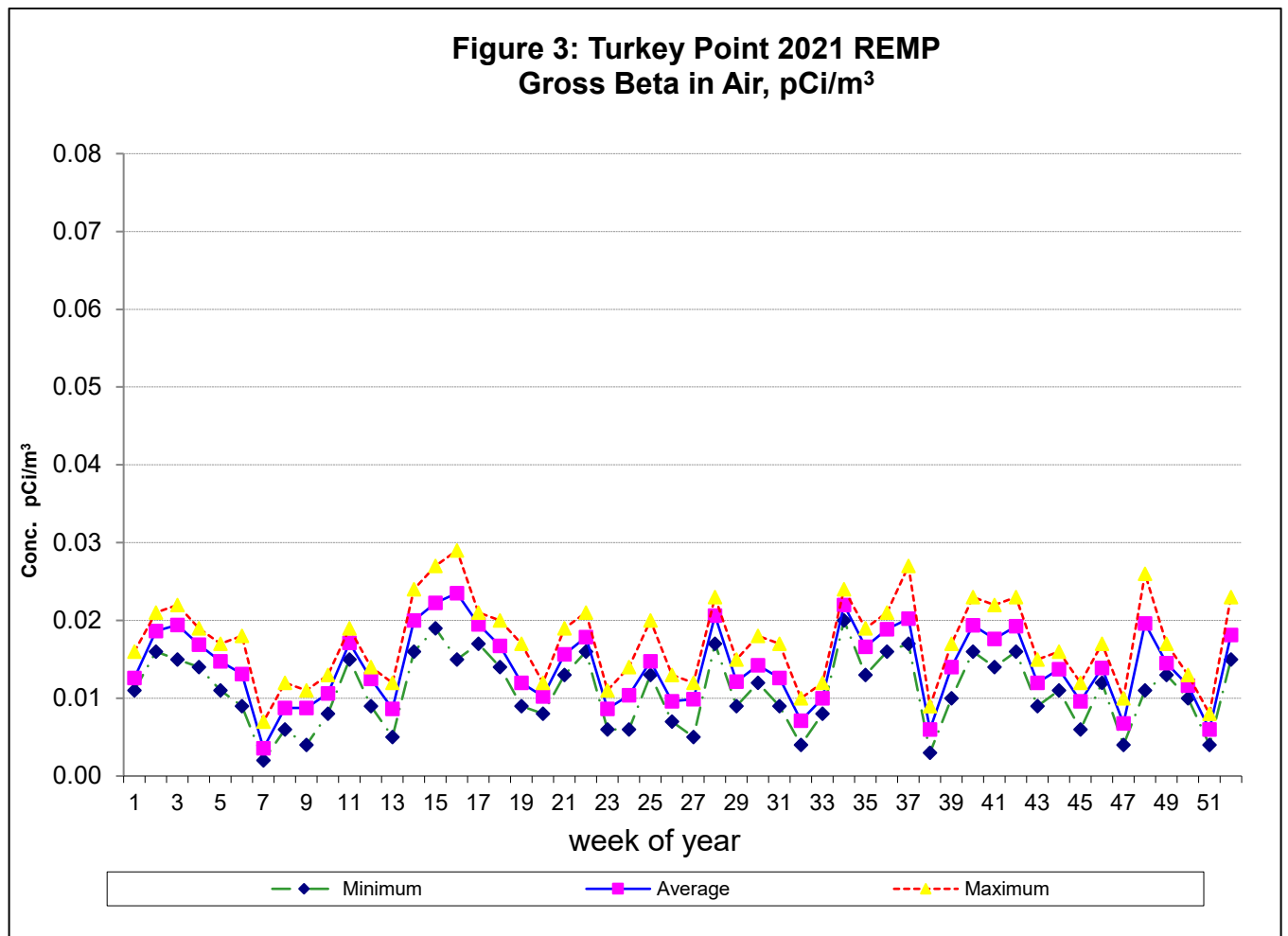
4.1 Air Particulate and Radioiodine Sample Results

In 2021 there were no samples above the LLD for I-131. Indicator gross beta air particulate results for 2021 were comparable to results obtained from 2018-2020 of the operational REMP. Results are reported in picocuries per cubic meter (pCi/m³).

<u>Monitoring Period</u>	<u>Result</u>
2018 – 2020 (Minimum Value)	0.002
2021 Average Value	0.014
2018 – 2020 (Maximum Value)	0.032

Gross beta activity is attributed to naturally occurring radionuclides. Table 6, which include gross beta concentrations and provide a comparison of the indicator and control means and ranges emphasizes the consistent trends seen in this pathway to support the presence of naturally occurring activity. Figure 3 is a comparison of the weekly Gross Beta results for 2021. Therefore, it can be concluded that the airborne pathway continues to be unaffected by Turkey Point Nuclear operations.

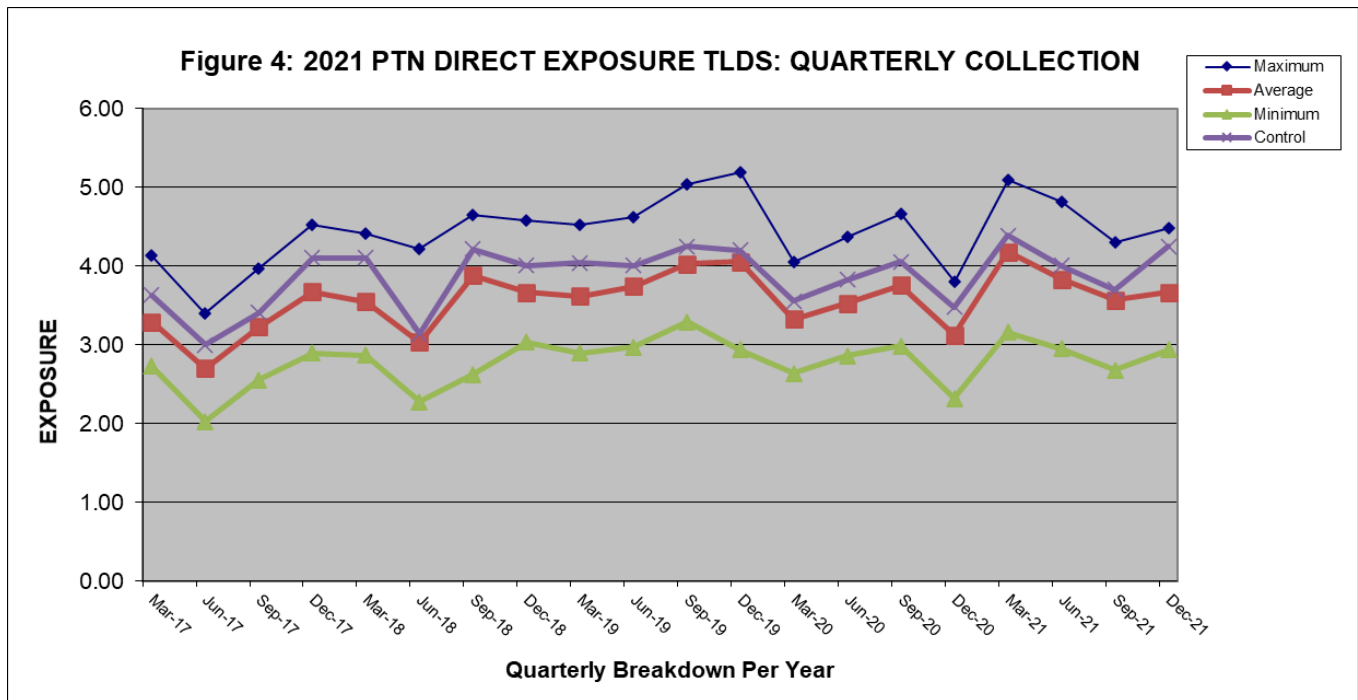
Figure 3: Turkey Point 2021 REMP
Gross Beta in Air, pCi/m³



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4.2 Thermoluminescent Dosimetry (TLD) Sample Results

Turkey Point Nuclear reports relies on comparison of the indicator locations to the control as a measure of plant impact. Turkey Point Nuclear’s comparison of the indicator to the control, as seen in Table 6, identified no noticeable trend that would indicate that the ambient radiation levels are being affected by plant operations. In addition, the quarterly indicator averages shown in the TLD radiation dose comparison graph below shows the 2021 indicator results are comparable to control location results. Overall, Turkey Point Nuclear concluded that the ambient radiation levels are not being affected by plant operations.



4.3 Waterborne Sample Results

Analytical results for 2021 surface water samples were similar to those reported in previous years. Gamma radionuclides and tritium analytical results for 2021 waterborne samples were below the ODCM-required LLD similar to those reported in previous years. These results are further explained below.

4.3.1 Surface Water Results

Samples were collected from two indicator and one control location and analyzed for gamma radionuclides and tritium. Tritium was detected in 4 out of 24 indicator location samples with an average concentration of 97 pCi/L which is consistent with results seen in previous operational years. There were no plant related gamma radionuclides detected in any of the control or indicator location samples. Therefore, the operation of Turkey Point Nuclear had no definable impact on this waterborne pathway during 2021.

Annual Radiological Environmental Operating Report**4.3.2 Shoreline Sediment Sample Results**

Sediment samples were collected from two indicators and one control location in 2021 and analyzed for gamma radionuclides. Plant related gamma radionuclides were below the LLD limits at both indicator and control locations. Turkey Point Nuclear operations had no significant impact on the environment or public by this waterborne pathway.

4.4 Ingestion Sample Results**4.4.1 Crustacea and Fish Sample Results**

Crustacea and Fish samples were collected from one indicator and one control location and analyzed for gamma radionuclides. In 2021, gamma radionuclides were below detectable limits which are consistent with the results seen in previously operational years. Therefore, based on these measurements, Turkey Point Nuclear operations had no significant radiological impact upon the environment or public by this ingestion pathway.

4.4.2 Broad Leaf Vegetation Sample Results

The REMP has detected radionuclides prior to 1990 in vegetation that are attributable to other sources. These include the radioactive plume release due to reactor core degradation at Chernobyl Nuclear Power Plant in 1986 and atmospheric weapons testing.

In 2021, Broad Leaf Vegetation samples were collected from two indicator and one control locations and analyzed for gamma radionuclides. The 2021 Cs-137 was detected in samples collected from the indicator and control locations. This activity identified could be from weapons fallout testing 30-40 years ago and reactor accidents at Chernobyl and are contributors. Therefore, based on these measurements, Turkey Point Nuclear operations had no significant radiological impact upon the environment or public by this ingestion pathway.

4.5 Land Use Census Results

The latest land use census (performed in 2021) did not identify any new locations that yielded a calculated dose or dose commitment greater than those currently calculated (see Table 5).

The land use census identified no changes in the new resident census.

There were no changes in the milk cows/goats or garden census in 2021.

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Table 5: Land Use Census –2021 Nearest Residence, Garden, and Milk Animal Within Five Miles

SECTOR	NEAREST RESIDENCE/BUSINESS	NEAREST GARDEN (A)	NEAREST MILK ANIMAL
N	1.9 mi @ 349° 1.98 mi @ 349° 2.0 mi @ 354°	*	*
NNE	*	*	*
NE	*	*	*
ENE	*	*	*
E	*	*	*
ESE	*	*	*
SE	*	*	*
SSE	*	*	*
S	*	*	*
SSW	*	*	*
SW	*	*	*
WSW	*	*	*
W	*	*	*
WNW	1.7 mi @ 302° 3.7 mi @ 302°	4.5 mi @ 303° 6.0 mi @ 295°	*
NW	3.6 mi @ 304° 3.7 mi @ 311° 3.8 mi @ 316° 3.9 mi @ 314°	*	*
NNW	4.4 mi @ 333° 4.7 mi @ 328°	4.4 mi @ 332° 4.7 mi @ 328°	*

(A) - Only gardens with an estimated total area of 500 square feet, or more, and producing green leafy vegetables are considered.

* - No suitable sites were located within a five-mile range.

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TURKEY POINT RESIDENCE SURVEY RESULTS

July 2021

Sector	<u>Range</u> <u>Bearing</u>	Nearest Residence/Business Location
N (A)	<u>1.9 miles</u> 349°	This is the Homestead Bayfront Park complex. Contact is Jim Wyath. Office hours are 8:30 to 4:30, 7 days a week. Some occasional overnight recreational occupancy (up to 4 nights) on boats at the marina. Approximately 10 workers, 7 days a week, hours and number of varies. Summer weekends can see 1000+ visitors. There is always someone here 24 hours with more workers in the summer than the rest of the year (February thru September have the highest peak of workers). LaPlaya restaurant is open at the park weekdays with 8 to 10 employees from 11 am to 8:30pm. Weekends open till 10 pm and may have up to 15 employees. N25° 27.683' W80° 20.200'.
N (B)	<u>1.98 miles</u> 349°	South Glade Outfitters. Located on opposite side of building from office of Homestead Bayfront Park. Manager is Robert and have 2-3 employees. Hours are weekdays 7 am to 5 pm, Fridays till 6 pm Weekends 7 am – 6 pm. Hours may vary depending on the weather. N25° 27.767' W80° 20.206'.
N (C)	<u>2.0 miles</u> 354°	Biscayne National Park at Convoy Point. Open 7 am to 5:30 pm everyday. There are 65 employees including volunteers and individuals at the institute. The one ranger and two seasonal employees are there all year. There are about 500,000 visitors (more including boaters) per year. Contacts include: Michelle Penick, Chief of Facilities, J. Ernest Jutte, Chief of Administration, 305-242-7721 (office) 202-438-6636 (mobile), and Cindy Holl (administrator) 239- 695-1114. N25° 27.817' W80° 20.067'.
NNE	No residences were located within a five-mile range.	
NE	No residences were located within a five-mile range.	
ENE	No residences were located within a five-mile range.	
E	No residences were located within a five-mile range.	
ESE	No residences were located within a five-mile range.	
SE	No residences were located within a five-mile range.	
SSE	No residences were located within a five-mile range.	
S	No residences were located within a five-mile range.	
SSW	No residences were located within a five-mile range.	
SW	No residences were located within a five-mile range.	
WSW	No residences were located within a five-mile range.	
W	No residences were located within a five-mile range.	

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TURKEY POINT RESIDENCE SURVEY RESULTS

July 2021 (cont.)

Sector	Range Bearing	Nearest Residence/Business Location
WNW (A)	<u>1.7 miles</u> 302°	FP&L daycare center and shooting range near the entrance to the Turkey Point Plant. Contact is Yudisvel "Judy" Diaz, Director. There are 15 employees with 90 children currently enrolled, ages 6 months to 5 yrs. Occasionally, they will have school aged children. The center is open from 6am to 6pm Monday thru Friday. The number of people and times at the shooting range varies. N25° 26.817' W80° 21.217'.
WNW (B)	<u>3.7 miles</u> 302°	Two elderly people live at 11790 Canal Drive on the south side of Canal Drive (SW 328 St) west of SW 117th Ave (no gardens). Their son lives onsite on weekends, 2-3 nights/week. Residents plan on selling soon. Next door, to the east, is a makeshift produce stand which sells coconuts, limes, mandarin oranges, flowers, garlic, mangoes, papaya, avocado, honey, melons, sugar cane, ginger, plantains and pumpkins. It is not associated with the house next door. Two employees may be working there from 8 am to 6 pm. N25° 27.767' W80° 22.867'.
NW (A)	<u>3.6 miles</u> 304°	The Waste Management Homestead Landfill is located north of Canal Drive (SW 328th St) and east of SW 117th Ave. There are 9 full time employees onsite Monday thru Friday from 7 am to 3:30 pm. N25° 27.833' W80° 22.767'.
NW (B)	<u>3.7 miles</u> 311°	11000 SW 320th St. Per property records, this house is on land zoned agriculture and the owners live in Texas. Unable to verify if anyone lives there because the gate is locked and the residence is too far from the road to see anything. Noticed the property was for sale a few months ago and there is a backhoe doing construction. N25° 28.217' W80° 22.567'.
NW (C)	<u>3.8 miles</u> 316°	High Hope Nursery at 11400 SW 316th St. Contact is George Sprinkle, Owner and General Manager. This nursery has approximately 35 employees. Hours of operations are 7am to 5pm Monday thru Friday, with some work on Saturdays until noon. A man lives onsite providing security. N25° 28.441' W80° 22.430'.
NW (D)	<u>3.9 miles</u> 314°	Snapper Creek Nursery at 11600 SW 316th Street. 14 workers that work Monday thru Friday 7 am to 5 pm. Contact is Elmer. Security is provided by another person who lives onsite. N25° 28.444' W80° 22.560'.

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TURKEY POINT RESIDENCE SURVEY RESULTS

July 2021 (cont.)

Sector	<u>Range</u> <u>Bearing</u>	Nearest Residence/Business Location
NNW (A)	<u>4.4 miles</u> 333°	29800 SW 107th Ave. Per property records, this is a small one bedroom residence on land zoned as mixed use agricultural. Spoke to the woman who lives there with three men and two children. N25° 29.450' W80°21.817'.
NNW (B)	<u>4.7 miles</u> 328°	Previously SFM Tree Farm. Now Mirtica and Sons Dragon Fruit Farm. Entrance at the end of SW 296th St. Contact is Ernesto Gonzalez Abreu. Owner lives off property in Miami. Multiple attempts made to speak to someone on property. N25° 29.564' W80° 22.264'.

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TURKEY POINT GARDEN SURVEY RESULTS

July 2021

Sector	<u>Range</u> Bearing	Nearest Garden Location (with estimated total area of 500 square feet, or more, and producing green leafy vegetables).
N		No suitable gardens were located within a five-mile range.
NNE		No suitable gardens were located within a five-mile range.
NE		No suitable gardens were located within a five-mile range.
ENE		No suitable gardens were located within a five-mile range.
E		No suitable gardens were located within a five-mile range.
ESE		No suitable gardens were located within a five-mile range.
SE		No suitable gardens were located within a five-mile range.
SSE		No suitable gardens were located within a five-mile range.
S		No suitable gardens were located within a five-mile range.
SSW		No suitable gardens were located within a five-mile range.
SW		No suitable gardens were located within a five-mile range.
WSW		No suitable gardens were located within a five-mile range.
W		No suitable gardens were located within a five-mile range.

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TURKEY POINT GARDEN SURVEY RESULTS

July 2021 (cont.)

Sector	Range Bearing	Nearest Garden Location (with estimated total area of 500 square feet, or more, and producing green leafy vegetables).
WNW (A)	<u>4.5 miles</u> 303°	Thai Farm. South of Mowry Drive (SW 320th St) and about 0.6 miles west of Allapattah Rd (SW 117th Ave). Growing guava, dragon fruit, papaya, palm, bamboo, and more. No one present. Phone number on farm sign reached the previous owner who sold 3 years ago and does not know how to contact the new owners. N25° 28.217' W80° 23.467'.
WNW (B)	<u>6.0 miles</u> 295°	Farm Share, Inc at 14125 SW 320th St, where farmers donate locally grown produce to be given to charitable organizations. Produce donations usually start in November and run through April. About 20 workers present from 8 am to 4:30 pm Monday thru Friday. The produce donated is usually tomatoes, bananas, squash, green beans, okra, corn, potatoes, watermelon and zucchini. The contact is Nick Sanchez or Aaron Garcia, Facility Manager, 305-246-3276 (office), 305-926-9832 (cell). N25° 28.255' W80° 25.111'.
NW		No suitable gardens were located within a five-mile range.
NNW (A)	<u>4.4 miles</u> 332°	Under the Vine. 11100 SW 296th St. Entrance at SW 107th Ave & SW 296th St just east of SFM Tree Farm/Mirtica Farm. Growing only dragon fruit. Open Mon-Sat 8:00-5:00. 3 employees plus the owner, Cindy, work here. Sometimes they hire extra help. The owner's brother, Pepper, sometimes spends the weekends onsite. N25° 29.464' W80° 21.828'.
NNW (B)	<u>4.7 miles</u> 328°	Previously SFM Tree Farm. Now Mirtica and Sons Dragon Fruit Farm. Entrance at the end of SW 296th St. Noticed bananas, dragon fruit, plantain tress, coconuts and mangoes growing in various areas on the farm. Also noticed beehives. Owner lives off property in Miami. Multiple attempts made to speak to someone on property. N25° 29.564' W80° 22.264'.

Note: At the time of our survey, many fields in the area surveyed were bare soil or cover crops. Other than the sites already described above, the only non-ornamental crops known to have been grown in the survey area were: bananas, beans, corn, guava, malanga, papaya, eggplant, sorghum, squash, sugar cane, tambis, okra and melon.

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TURKEY POINT MILK ANIMAL SURVEY RESULTS

July 2021

Sector	Nearest Milk Animals (cows or goats).
N	No potential milk animals were located within five miles.
NNE	No potential milk animals were located within five miles.
NE	No potential milk animals were located within five miles.
ENE	No potential milk animals were located within five miles.
E	No potential milk animals were located within five miles.
ESE	No potential milk animals were located within five miles.
SE	No potential milk animals were located within five miles.
SSE	No potential milk animals were located within five miles.
S	No potential milk animals were located within five miles.
SSW	No potential milk animals were located within five miles.
SW	No potential milk animals were located within five miles.
WSW	No potential milk animals were located within five miles.
W	No potential milk animals were located within five miles.
WNW	No potential milk animals were located within five miles.
NW	No potential milk animals were located within five miles.
NNW	No potential milk animals were located within five miles.

Annual Radiological Environmental Operating Report**4.6 Interlaboratory Comparison Results**

Attachment 3 contains result summary for Interlaboratory Comparison program for the Department of Energy Mixed Analyte Performance Evaluation Program (MAPEP). These satisfied the requirement of Control 5.3 of the ODCM for the Interlaboratory Comparison Program.

5.0 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SUMMARY

1. Table 6, Radiological Environmental Monitoring Program Summary, summarizes data for the 2021 REMP program.

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Table 6: Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type / Number of Analyses ⁽¹⁾	LLD ⁽²⁾	Indicator Locations Mean (F) ⁽³⁾ [Range]	Indicator ⁽⁴⁾ Location [Highest Annual Mean]	Mean (F) ⁽³⁾ [Range]	Control Locations Mean (F) ⁽³⁾ [Range]	Number of Non Routine Results ⁽⁵⁾
Air Particulate (pCi/m ³)	GB / 312	0.01	0.0141 (256 / 260) [0.0020 - 0.0270]	T72 (<1 mi. WSW)	0.0149 (49 / 52) [0.0040 - 0.0270]	0.0146 (52 / 52) [0.003 - 0.0290]	0
	GS / 24 Be-7	--	0.1164 (20 / 20) [0.0802 - 0.1680]	T72 (<1 mi. WSW)	0.1218 (4 / 4) [0.0830 - 0.1610]	0.1145 (4 / 4) [0.0843 - 0.1620]	0
	K-40	--	< LLD	N/A	N/A	< LLD	0
	Cs-134	0.05	< LLD	N/A	N/A	< LLD	0
	Cs-137	0.06	< LLD	N/A	N/A	< LLD	0
	Pb-210	--	0.0104 (12 / 20) [0.0068 - 0.0137]	T72 (<1 mi. WSW)	0.0137 (2 / 4) [0.0136 - 0.0137]	0.0103 (3 / 4) [0.0069 - 0.0134]	0
Airborne Iodine (pCi/m ³)	I-131 / 312	0.07	< LLD	N/A	N/A	< LLD	0
Direct Radiation Indicator TLD (μR/hour)	Gamma / 88	⁽⁶⁾	3.8 (88 / 88) [2.7 - 5.1]	NW-10 (10 mi NW)	4.6 (4 / 4) [4.1 - 5.1]	N/A	0
Direct Radiation Control TLD (μR/hour)	Gamma / 4	⁽⁶⁾	N/A	N/A	N/A	4.1 (4 / 4) [3.7 - 4.4]	0

LEGEND:

⁽¹⁾ - GB = Gross beta; I-131 = Iodine-131; H-3 = Tritium; GS = Gamma scan.

⁽²⁾ - LLD = Required lower limit of detection based on Turkey Point ODCM.

⁽³⁾ - Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis (F).

⁽⁴⁾ - Locations are specified (1) by name and (2) direction relative to reactor site.

⁽⁵⁾ - Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

⁽⁶⁾ - LLD is not defined in Turkey Point ODCM.

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Table 6: Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type / Number of Analyses ⁽¹⁾	LLD ⁽²⁾	Indicator Locations Mean (F) ⁽³⁾ [Range]	Indicator ⁽⁴⁾ Location [Highest Annual Mean]	Mean (F) ⁽³⁾ [Range]	Control Locations Mean (F) ⁽³⁾ [Range]	Number of Non Routine Results ⁽⁵⁾
Surface Water (pCi/L)	H-3 / 36	3,000	97 (4 / 24) [72 - 118]	T81 (6 mi. S)	99 (2 / 12) [92 - 105]	118 (1 / 12) [<LLD - 118]	0
	GS / 36 K-40	--	305 (24 / 24) [181 - 409]	T81 (6 mi. S)	327 (12 / 12) [211 - 409]	242 (10 / 12) [102 - 348]	0
Sediment (pCi/kg dry)	GS / 6	--	< LLD	N/A	N/A	< LLD	0
	Be-7	--	< LLD	N/A	N/A	< LLD	0
	K-40	--	135 (1 / 4) [<LLD - 135]	T81 (6 mi. S)	135 (1 / 2) [<LLD - 135]	109 (2 / 2) [88 - 130]	0
	Cs-137	180	< LLD	N/A	N/A	< LLD	0
	Pb-210	--	416 (2 / 4) [316 - 515]	T81 (6 mi. S)	416 (2 / 2) [316 - 515]	< LLD	0
	Ra-226	--	703 (3 / 4) [543 - 974]	T42 (<1 mi ENE)	593 (1 / 2) [<LLD - 593]	181 (1 / 2) [<LLD - 181]	0
	Th-232	--	<LLD	N/A	N/A	< LLD	0
	U-235	--	44 (3 / 4) [34 - 61]	T81 (6 mi. S)	48 (2 / 2) [34 - 61]	11 (1 / 2) [<LLD - 11]	0
U-238	--	261 (4 / 4) [118 - 495]	T81 (6 mi. S)	387 (2 / 2) [278 - 495]	91 (2 / 2) [87 - 94]	0	

LEGEND:

⁽¹⁾ - GB = Gross beta; I-131 = Iodine-131; H-3 = Tritium; GS = Gamma scan.

⁽²⁾ - LLD = Required lower limit of detection based on Turkey Point ODCM.

⁽³⁾ - Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis (F).

⁽⁴⁾ - Locations are specified (1) by name and (2) direction relative to reactor site.

⁽⁵⁾ - Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

⁽⁶⁾ - LLD is not defined in Turkey Point ODCM.

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Table 6: Radiological Environmental Monitoring Program Summary

Sample Type (Units)	Type / Number of Analyses ⁽¹⁾	LLD ⁽²⁾	Indicator Locations Mean (F) ⁽³⁾ [Range]	Indicator ⁽⁴⁾ Location [Highest Annual Mean]	Mean (F) ⁽³⁾ [Range]	Control Locations Mean (F) ⁽³⁾ [Range]	Number of Non Routine Results ⁽⁵⁾
Crustacea (pCi/kg wet)	GS / 4 K-40	--	1380 (2 / 2) [1360 - 1400]	T81 (6 mi. S)	1380 (2 / 2) [1360 - 1400]	1440 (2 / 2) [1380 - 1500]	0
	Ra-226	--	495 (1 / 2) [<LLD - 495]	T81 (6 mi. S)	495 (1 / 2) [<LLD - 495]	<LLD	0
	Ra-228	--	<LLD	N/A	N/A	<LLD	0
Fish (pCi/kg wet)	GS / 4 K-40	--	2560 (2 / 2) [1990 - 3130]	T81 (6 mi. S)	2560 (2 / 2) [1990 - 3130]	2725 (2 / 2) [2160 - 3290]	0
	Ra-226	--	< LLD	N/A	N/A	< LLD	0
	Ra-228	--	< LLD	N/A	N/A	< LLD	0
Broad Leaf (pCi/kg wet)	GS / 36 Be-7	--	1444 (24 / 24) [582 - 2440]	T40 (3 mi W)	1498 (12 / 12) [651 - 2440]	1440 (12 / 12) [728 - 2510]	0
	K-40	--	3969 (24 / 24) [2580 - 5510]	T41 (2 mi WNW)	4597 (12 / 12) [2580 - 5510]	3661 (12 / 12) [2400 - 4950]	0
	Cs-137	80	33 (15 / 24) [4 - 57]	T40 (3 mi W)	38 (11 / 12) [18 - 54]	10 (8 / 12) [5 - 14]	0
	Pb-210	--	223 (8 / 12) [62 - 521]	T41 (2 mi WNW)	261 (5 / 12) [87 - 521]	178 (5 / 12) [44 - 404]	0
	Pb-212	--	< LLD	N/A	N/A	11 (2 / 12) [5 - 16]	0
	Ra-226	--	< LLD	N/A	N/A	< LLD	0

LEGEND:

⁽¹⁾ - GB = Gross beta; I-131 = Iodine-131; H-3 = Tritium; GS = Gamma scan.

⁽²⁾ - LLD = Required lower limit of detection based on Turkey Point ODCM.

⁽³⁾ - Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parenthesis (F).

⁽⁴⁾ - Locations are specified (1) by name and (2) direction relative to reactor site.

⁽⁵⁾ - Non-routine results are those which exceed ten times the control station value. If no control station value is available, the result is considered non-routine if it exceeds ten times the preoperational value for the location.

⁽⁶⁾ - LLD is not defined in Turkey Point ODCM.

Sample Deviations

Table 7: Sample Deviations Table

Comment No.	Sample Media Affected	Sample Location	Date	Problem	Evaluation / Actions
1	Air Sample	T72	01/06/21	Pump Failure	Vacuum Pump failed, estimated run time was 64 out of 191 hours. T72 vacuum pump was replaced. AR# 02399193
2	Air Sample	T72	01/20/21	Power Outage	Power outage at station T72, estimated run time was 20 out of the 150 hours. The power was restored 01/22/21 at 14:03. AR# 02399193
3	Air Sample	T72	01/25/21	Power Outage	Due to previous power outage, this week's filter ran for 74 hours. AR# 02399193
4	Surface Water	T97	05/11/21	Exceeded Reporting Level	The results for T97 (Cooling Canal, Intake) identified a tritium value of 12,658 pCi/L . A condition report is being generated as the results is above the reporting level of 12,000 pCi/L. AR# 02414363
5	Air Sample	T51	05/26/21	Pump Failure	Vacuum Pump failed, estimated run time 91 hours out of 149 hours. T51 Vacuum pump was replaced. AR# 02399193
6	Air Sample	T51	06/02/21	Power Outage	Power outage at station T51, estimated run time was 124 out of the 161 hours. AR# 02399193
7	Air Sample	T72	06/09/21	Sample Missing	Air Cartridge lost somewhere between shipping it and receiving it. AR# 02399193
8	Air Sample	T58	08/18/21	Pump Failure	Vacuum Pump failed, estimated run time was 74.3 out of 120.9 hours. T58 sample pump was replaced. AR# 02411663
9	Surface Water	T84	10/11/21	Exceeded Reporting Level	The results for T84 (Cooling Canal, Discharge) identified a tritium value of 13,471 pCi/L . A condition report is being generated as the results is above the reporting level of 12,000 pCi/L. AR# 02422816

Sample Deviations

Table 7: Sample Deviations Table Cont'd

Comment No.	Sample Media Affected	Sample Location	Date	Problem	Evaluation / Actions
10	Surface Water	T97	10/11/21	Exceeded Reporting Level	The results for T97 (Cooling Canal, Intake) identified a tritium value of 13,492 pCi/L . A condition report is being generated as the results is above the reporting level of 12,000 pCi/L. AR# 02422816
11	Surface Water	T08	11/03/21	Exceeded Reporting Level	The results for T08 (Southern Shore of canal system, west of Grand Bridge) identified a tritium value of 12,214 pCi/L . A condition report is being generated as the results is above the reporting level of 12,000 pCi/L. AR# 02422816
12	Surface Water	T97	11/03/21	Exceeded Reporting Level	The results for T97 (Cooling Canal, Intake) identified a tritium value of 12,474 pCi/L . A condition report is being generated as the results is above the reporting level of 12,000 pCi/L. AR# 02422816
13	Milk	T99	2021	Sample Unavailable	Goat milk sample was unavailable this year. The farm has not had any milking goats. AR# 0422809

ATTACHMENT 2

Monitoring Results Tables

RADIOLOGICAL SURVEILLANCE OF FLORIDA POWER AND LIGHT COMPANY'S

TURKEY POINT SITE 2021

**First Quarter, 2021
Second Quarter, 2021
Third Quarter, 2021
Fourth Quarter, 2021**

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Monitoring Results Tables
Table 8: Air Particulate - Gross Beta

Analysis: Gross Beta				Units: pCi/m ³		
End Date	T41 (Indicator)	T51 (Indicator)	T57 (Indicator)	T58 (Indicator)	T64 (Control)	T72 ⁽¹⁾ (Indicator)
LLD →	0.01	0.01	0.01	0.01	0.01	0.01
01/06/2021	0.011	0.011	0.013	0.011	0.013	0.014
01/14/2021	0.021	0.021	0.017	0.016	0.017	0.020
01/20/2021	0.015	0.022	0.022	0.019	0.020	<0.048
01/25/2021	0.019	0.015	0.018	0.014	0.018	0.016
02/02/2021	0.015	0.017	0.016	0.014	0.017	0.011
02/09/2021	0.015	0.011	0.011	0.012	0.018	0.015
02/17/2021	0.004	0.003	0.002	0.003	0.007	<0.005
02/25/2021	0.007	0.011	0.011	0.009	0.006	0.008
03/02/2021	0.011	0.009	0.010	0.008	0.009	0.011
03/08/2021	0.010	0.011	0.011	0.012	0.013	0.010
03/16/2021	0.019	0.018	0.016	0.015	0.016	0.018
03/25/2021	0.012	0.014	0.014	0.011	0.014	0.013
03/31/2021	0.012	0.011	0.009	0.010	0.005	0.009
04/06/2021	0.021	0.020	0.022	0.016	0.021	0.024
04/14/2021	0.022	0.019	0.021	0.024	0.027	0.020
04/22/2021	0.015	0.025	0.023	0.026	0.029	0.027
04/29/2021	0.017	0.021	0.018	0.019	0.021	0.021
05/05/2021	0.017	0.014	0.016	0.015	0.020	0.016
05/12/2021	0.014	0.010	0.012	0.012	0.012	0.017
05/20/2021	0.011	0.011	0.009	0.011	0.012	0.008
05/26/2021	0.016	0.013	0.015	0.015	0.015	0.017
06/02/2021	0.017	0.016	0.021	0.019	0.020	0.018
06/09/2021	0.006	0.009	0.010	0.008	0.011	0.009
06/16/2021	0.012	0.014	0.012	0.009	0.009	0.011
06/24/2021	0.013	0.014	0.016	0.013	0.014	0.015
06/30/2021	0.010	0.007	0.010	0.010	0.009	0.010
07/08/2021	0.005	0.012	0.010	0.010	0.009	0.011
07/13/2021	0.020	0.023	0.023	0.017	0.023	0.017
07/21/2021	0.009	0.013	0.011	0.015	0.013	0.013
07/29/2021	0.018	0.015	0.012	0.014	0.012	0.016
08/04/2021	0.010	0.017	0.009	0.014	0.010	0.016
08/11/2021	0.008	0.006	0.009	0.007	0.006	0.010
08/18/2021	0.009	0.012	0.010	0.008	0.008	0.012
08/24/2021	0.020	0.023	0.021	0.023	0.022	0.024
08/31/2021	0.015	0.018	0.017	0.017	0.015	0.019
09/09/2021	0.021	0.017	0.016	0.020	0.021	0.017
09/14/2021	0.017	0.021	0.018	0.020	0.019	0.021
09/21/2021	0.009	0.007	0.005	0.009	0.003	0.004
09/30/2021	0.013	0.014	0.015	0.017	0.017	0.015
10/06/2021	0.017	0.021	0.016	0.023	0.018	0.018
10/12/2021	0.018	0.019	0.014	0.018	0.016	0.017
10/20/2021	0.019	0.016	0.023	0.018	0.018	0.019
10/25/2021	0.012	0.015	0.009	0.013	0.010	0.013
11/02/2021	0.015	0.013	0.015	0.011	0.012	0.016
11/10/2021	0.009	0.009	0.006	0.010	0.010	0.012
11/17/2021	0.014	0.012	0.014	0.013	0.014	0.015
11/24/2021	0.007	0.005	0.006	0.006	0.010	0.004
12/01/2021	0.011	0.015	0.018	0.022	0.025	0.021
12/08/2021	0.013	0.013	0.016	0.016	0.014	0.017
12/16/2021	0.010	0.013	0.012	0.011	0.013	0.012
12/21/2021	0.005	0.004	0.006	<0.007	0.007	<0.008
12/28/2021	0.019	0.020	0.016	0.017	0.023	0.015

⁽¹⁾ Station with highest annual mean.

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Monitoring Results Tables

Table 9: Air Particulate Composite - Gamma

Analysis: Gamma Isotopic			Units: pCi/m ³			
Location	Collection Date	Be-7	K-40	Cs-134	Cs-137	Pb-210
REQUIRED LLD →		--	--	0.05	0.06	--
T41 (Indicator)	03/31/2021	0.1680	<0.0173	<0.0011	<0.0009	0.0097
T51 (Indicator)	03/31/2021	0.1460	<0.0131	<0.0012	<0.0009	<0.0083
T57 (Indicator)	03/31/2021	0.1440	<0.0142	<0.0013	<0.0009	<0.0151
T58 (Indicator)	03/31/2021	0.1270	<0.0180	<0.0009	<0.0007	0.0068
T64 (Control)	03/31/2021	0.1620	<0.0124	<0.0011	<0.0009	0.0106
T72 (Indicator)	03/31/2021	0.1610	<0.0223	<0.0010	<0.0008	0.0137
T41 (Indicator)	06/30/2021	0.1060	<0.0165	<0.0009	<0.0008	0.0110
T51 (Indicator)	06/30/2021	0.1230	<0.0162	<0.0014	<0.0010	<0.0148
T57 (Indicator)	06/30/2021	0.1430	<0.0169	<0.0012	<0.0010	0.0123
T58 (Indicator)	06/30/2021	0.1550	<0.0147	<0.0010	<0.0009	0.0127
T64 (Control)	06/30/2021	0.1120	<0.0147	<0.0010	<0.0007	0.0069
T72 (Indicator)	06/30/2021	0.1530	<0.0144	<0.0012	<0.0009	<0.0147
T41 (Indicator)	09/30/2021	0.1000	<0.0118	<0.0010	<0.0008	0.0085
T51 (Indicator)	09/30/2021	0.0971	<0.0138	<0.0009	<0.0008	0.0105
T57 (Indicator)	09/30/2021	0.0892	<0.0147	<0.0009	<0.0008	0.0101
T58 (Indicator)	09/30/2021	0.1070	<0.0128	<0.0013	<0.0011	<0.0154
T64 (Control)	09/30/2021	0.0843	<0.0150	<0.0008	<0.0007	0.0134
T72 (Indicator)	09/30/2021	0.0830	<0.0178	<0.0008	<0.0007	0.0136
T41 (Indicator)	12/28/2021	0.0825	<0.0120	<0.0010	<0.0008	<0.0115
T51 (Indicator)	12/28/2021	0.0818	<0.0132	<0.0007	<0.0007	0.009
T57 (Indicator)	12/28/2021	0.0802	<0.0132	<0.0010	<0.0007	<0.0118
T58 (Indicator)	12/28/2021	0.0901	<0.0131	<0.0007	<0.0006	0.0072
T64 (Control)	12/28/2021	0.0996	<0.0108	<0.0009	<0.0007	<0.0113
T72 (Indicator)	12/28/2021	0.0902	<0.0138	<0.0007	<0.0006	<0.0075

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Monitoring Results Tables
Table 10: Air Cartridges - Iodine-131

Analysis: Gross Beta				Units: pCi/m ³		
End Date	T41 (Indicator)	T51 (Indicator)	T57 (Indicator)	T58 (Indicator)	T64 (Control)	T72 (Indicator)
LLD →	0.07	0.07	0.07	0.07	0.07	0.07
01/06/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.07
01/14/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
01/20/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.11
01/25/2021	<0.03	<0.03	<0.03	<0.03	<0.03	<0.04
02/02/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
02/09/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
02/17/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
02/25/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
03/02/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
03/08/2021	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
03/16/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
03/25/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
03/31/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
04/06/2021	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
04/14/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
04/22/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
04/29/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
05/05/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
05/12/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
05/20/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
05/26/2021	<0.02	<0.03	<0.02	<0.02	<0.02	<0.02
06/02/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06/09/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06/16/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06/24/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06/30/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
07/08/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
07/13/2021	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
07/21/2021	<0.02	<0.02	<0.02	<0.01	<0.01	<0.02
07/29/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
08/04/2021	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
08/11/2021	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
08/18/2021	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02
08/24/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
08/31/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
09/09/2021	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
09/14/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
09/21/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
09/30/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
10/06/2021	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
10/12/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
10/20/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
10/25/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11/02/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11/10/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11/17/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11/24/2021	<0.03	<0.03	<0.02	<0.02	<0.03	<0.03
12/01/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
12/08/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
12/16/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
12/21/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
12/28/2021	<0.02	<0.03	<0.03	<0.02	<0.03	<0.03

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Table 11: Direct Radiation– Indicators

Analysis: Gamma Dose			Units: mrem/hr		
Station	1 st Qtr 2021	2 nd Qtr 2021	3 rd Qtr 2021	4 th Qtr 2021	Annual Mean 2021
N-2	4.9	4.6	4.1	4.2	4.5
N-7	3.9	3.4	3.1	3.6	3.5
N-10	4.5	3.9	3.4	3.8	3.9
NNW-2	4.2	3.8	3.9	3.4	3.8
NNW-10	4.3	4.1	3.7	3.8	4.0
NW-1	4.9	4.4	4.3	4.1	4.4
NW-5	3.9	3.6	3.4	3.5	3.6
NW-10⁽¹⁾	5.1	4.8	4.1	4.5	4.6
WNW-2	4.1	3.9	3.7	3.7	3.8
WNW-10	4.9	4.5	4.2	4.2	4.4
W-1	4.6	4.4	3.8	4.0	4.2
W-5	4.2	3.9	3.7	3.9	3.9
W-9	3.9	3.7	3.1	3.4	3.5
WSW-8	4.1	3.7	3.5	3.6	3.7
SW-1	4.5	4.0	4.0	4.0	4.1
SW-8	3.5	3.1	3.0	2.9	3.1
SSW-5	3.7	3.4	3.0	3.3	3.4
SSW-10	3.8	3.5	3.5	3.3	3.5
S-5	3.4	3.2	2.7	3.2	3.1
S-10	4.1	3.8	3.8	3.7	3.9
SSE-1	3.2	3.3	3.0	3.0	3.1
SSE-10	3.6	3.4	2.8	3.4	3.3

⁽¹⁾ Indicator station with highest annual mean.

Table 12: Direct Radiation – Control

Analysis: Gamma Dose			Units: mrem/Hr		
Station	1 st Qtr 2021	2 nd Qtr 2021	3 rd Qtr 2021	4 th Qtr 2021	Annual Mean 2021
NNE-22	4.4	4.0	3.7	4.3	4.1

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Table 14: Shoreline Sediment - Gamma

Analysis: Gamma Isotopic					Units: pCi/kg (dry)				
Location	Collection Date	Be-7	K-40	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
REQUIRED LLD →		--	--	180	--	--	--	--	--
T42 (Indicator)	02/04/2021	<80	<128	<8	<344	<207	<37	<13	118
T67 (Control)	02/05/2021	<63	88	<7	<305	<182	<34	<11	87
T81 (Indicator)	02/05/2021	<91	135	<9	515	543	<41	34	278
T42 (Indicator)	07/12/2021	<134	<98	<8	<330	593	<30	37	151
T67 (Control)	07/12/2021	<101	130	<9	<242	181	<64	11	94
T81 (Indicator)	07/09/2021	<156	<130	<10	316	974	<39	61	495

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Table 15: Crustacea - Gamma

Analysis: Gamma Isotopic			Units: pCi/kg (wet)		
Location	Collection Date	Sample Type	K-40	Ra-226	Ra-228
REQUIRED LLD →			--	--	--
T67 (Control)	06/22/2021	Blue Crab	1500	<429	<76
T81 (Indicator)	03/11/2021	Blue Crab	1360	<555	<98
T67 (Control)	12/20/2021	Blue Crab	1380	<439	<117
T81 (Indicator)	12/21/2021	Blue Crab	1400	495	<91

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Table 16: Fish - Gamma

Analysis: Gamma Isotopic			Units: pCi/kg (wet)		
Location	Collection Date	Sample Type	K-40	Ra-226	Ra-228
REQUIRED LLD →			--	--	--
T67 (Control)	06/21/2021	Mixed Species	2160	<342	<74
T81 (Indicator)	05/11/2021	Mixed Species	1990	<476	<70
T67 (Control)	12/20/2021	Mixed Species	3290	<1170	<243
T81 (Indicator)	12/20/2021	Mixed Species	3130	<396	<103

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Table 17: Broad Leaf Vegetation - Gamma

Analysis: Gamma Isotopic				Units: pCi/kg (wet)				
Location	Collection Date	Sample Type	Be-7	K-40	Cs-137	Pb-210	Pb-212	Ra-226
REQUIRED LLD →			--	--	80	--	--	--
T40 (Indicator)	01/25/2021	Brazilian Pepper	2090	4750	<12	<113	<20	<245
T40 (Indicator)	02/09/2021	Brazilian Pepper	1650	3870	35	<110	<19	<232
T40 (Indicator)	03/09/2021	Brazilian Pepper	1020	3070	18	<580	<16	<212
T40 (Indicator)	04/07/2021	Brazilian Pepper	949	2770	39	<594	<18	<196
T40 (Indicator)	05/12/2021	Brazilian Pepper	651	3070	41	<527	<15	<177
T40 (Indicator)	06/15/2021	Brazilian Pepper	1170	2820	54	<467	<14	<166
T40 (Indicator)	07/12/2021	Brazilian Pepper	1340	2850	26	<228	<17	<201
T40 (Indicator)	08/10/2021	Brazilian Pepper	2010	4430	29	80	<15	<199
T40 (Indicator)	09/21/2021	Brazilian Pepper	1620	2820	45	<207	<16	<193
T40 (Indicator)	10/11/2021	Brazilian Pepper	1760	3130	45	62	<15	<191
T40 (Indicator)	11/03/2021	Brazilian Pepper	2440	3150	49	332	<16	<203
T40 (Indicator)	12/29/2021	Brazilian Pepper	1280	3360	38	<218	<15	<189
T41 (Indicator)	01/25/2021	Brazilian Pepper	1410	5180	<13	<297	<21	<258
T41 (Indicator)	02/09/2021	Brazilian Pepper	1010	4730	<10	171	<21	<236
T41 (Indicator)	03/09/2021	Brazilian Pepper	1320	4770	<10	87	<18	<136
T41 (Indicator)	04/07/2021	Brazilian Pepper	1630	2580	57	336	<18	<190
T41 (Indicator)	05/12/2021	Brazilian Pepper	582	4460	11	<183	<15	<159
T41 (Indicator)	06/15/2021	Brazilian Pepper	630	4930	<8	<513	<14	<175
T41 (Indicator)	07/12/2021	Brazilian Pepper	1180	5360	<10	<594	<16	<198
T41 (Indicator)	08/10/2021	Brazilian Pepper	1700	4640	8	<247	<19	<216
T41 (Indicator)	09/21/2021	Brazilian Pepper	2340	5000	<12	<92	<16	<206
T41 (Indicator)	10/11/2021	Brazilian Pepper	1350	4730	<9	192	<15	<188
T41 (Indicator)	11/03/2021	Brazilian Pepper	1520	3270	<10	<230	<17	<204
T41 (Indicator)	12/29/2021	Brazilian Pepper	2010	5510	4	521	<17	<197
T67 (Control)	01/26/2021	Brazilian Pepper	1130	4300	8	<231	<17	<193
T67 (Control)	02/09/2021	Brazilian Pepper	771	4950	13	<88	<16	<180
T67 (Control)	03/17/2021	Brazilian Pepper	1030	4240	5	<590	16	<211
T67 (Control)	04/07/2021	Brazilian Pepper	728	3990	<10	<214	<17	<182
T67 (Control)	05/10/2021	Brazilian Pepper	1320	3690	<8	44	5	<154
T67 (Control)	06/16/2021	Brazilian Pepper	1470	2400	<9	<77	<14	<158
T67 (Control)	07/13/2021	Brazilian Pepper	1740	2750	6	<556	<15	<179
T67 (Control)	08/11/2021	Brazilian Pepper	1780	3660	11	45	<15	<185
T67 (Control)	09/21/2021	Brazilian Pepper	2220	3250	14	231	<16	<179
T67 (Control)	10/11/2021	Brazilian Pepper	2510	2860	13	<86	<15	<182
T67 (Control)	11/04/2021	Brazilian Pepper	1320	3930	13	164	<19	<215
T67 (Control)	12/28/2021	Brazilian Pepper	1260	3910	<12	404	<20	<235

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Table 18: Supplemental Direct Radiation– Indicators

Analysis: Gamma Dose			Units: mrem/hr		
Station	1 st Qtr 2021	2 nd Qtr 2021	3 rd Qtr 2021	4 th Qtr 2021	Annual Mean 2021
NNW-6	4.4	3.8	3.8	3.8	3.9
NW-7⁽¹⁾	4.9	4.6	4.0	4.1	4.4
NW-8	4.7	4.3	4.3	4.1	4.4
WNW-3	4.3	3.6	3.4	3.7	3.7
WNW-6	4.3	3.6	3.6	3.6	3.8
W-8	4.4	3.9	3.7	3.8	3.9
ENE-1	3.4	3.0	3.0	3.0	3.1
T72	4.0	3.9	3.6	3.8	3.8
PTN-1	4.2	3.9	3.4	3.7	3.8

⁽¹⁾ Indicator station with highest annual mean.

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Table 19: Supplemental Air Particulate - Gross Beta

Analysis: Gross Beta		Units: pCi/m ³
End Date	T52 (Indicator)	T56 ⁽¹⁾ (Indicator)
<u>LLD</u> →	<u>0.01</u>	<u>0.01</u>
01/06/2021	0.012	0.016
01/14/2021	0.018	0.019
01/20/2021	0.019	0.019
01/25/2021	0.019	0.016
02/02/2021	0.014	0.014
02/09/2021	0.009	0.014
02/17/2021	0.003	0.003
02/25/2021	0.006	0.012
03/02/2021	0.008	0.004
03/08/2021	0.010	0.008
03/16/2021	0.018	0.017
03/25/2021	0.009	0.013
03/31/2021	0.006	0.007
04/06/2021	0.016	0.020
04/14/2021	0.022	0.023
04/22/2021	0.020	0.023
04/29/2021	0.020	0.019
05/05/2021	0.018	0.018
05/12/2021	0.010	0.009
05/20/2021	0.010	0.010
05/26/2021	0.015	0.019
06/02/2021	0.016	0.016
06/09/2021	0.008	0.008
06/16/2021	0.006	0.010
06/24/2021	0.020	0.013
06/30/2021	0.008	0.013
07/08/2021	0.010	0.012
07/13/2021	0.019	0.023
07/21/2021	0.010	0.013
07/29/2021	0.013	0.014
08/04/2021	0.012	0.013
08/11/2021	0.004	0.007
08/18/2021	0.011	0.010
08/24/2021	0.023	0.020
08/31/2021	0.013	0.019
09/09/2021	0.019	0.020
09/14/2021	0.027	0.019
09/21/2021	0.006	0.005
09/30/2021	0.011	0.010
10/06/2021	0.022	0.020
10/12/2021	0.022	0.017
10/20/2021	0.022	0.019
10/26/2021	0.011	0.013
11/02/2021	0.013	0.015
11/10/2021	0.011	0.010
11/17/2021	0.017	0.012
11/24/2021	0.007	0.009
12/01/2021	0.019	0.026
12/08/2021	0.013	0.014
12/16/2021	0.010	0.012
12/21/2021	0.008	0.006
12/28/2021	0.020	0.015

⁽¹⁾ Station with highest annual mean.

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Table 20: Supplemental Air Particulate Composite - Gamma

Analysis: Gamma Isotopic		Units: pCi/m ³				
Location	Collection Date	Be-7	K-40	Cs-134	Cs-137	Pb-210
REQUIRED LLD →		--	--	0.05	0.06	--
T52 (Indicator)	03/31/2021	0.1320	<0.0192	<0.0009	<0.0007	0.0108
T56 (Indicator)	03/31/2021	0.1470	<0.0159	<0.0011	<0.0007	0.0127
T52 (Indicator)	06/30/2021	0.1350	<0.0152	<0.0010	<0.0009	<0.0115
T56 (Indicator)	06/30/2021	0.1210	<0.0142	<0.0009	<0.0009	0.0145
T52 (Indicator)	09/30/2021	0.1080	<0.0174	<0.0014	<0.0009	<0.0156
T56 (Indicator)	09/30/2021	0.0935	<0.0146	<0.0009	<0.0008	0.008
T52 (Indicator)	12/28/2021	0.1010	<0.0086	<0.0009	<0.0006	0.0146
T56 (Indicator)	12/28/2021	0.0924	<0.0137	<0.0008	<0.0006	0.0103

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Table 21: Supplemental Air Cartridges - Iodine-131

Analysis: Gross Beta		Units: pCi/m ³
End Date	T52 (Indicator)	T56 (Indicator)
LLD →	0.07	0.07
01/06/2021	<0.02	<0.02
01/14/2021	<0.01	<0.01
01/20/2021	<0.01	<0.01
01/25/2021	<0.03	<0.03
02/02/2021	<0.02	<0.02
02/09/2021	<0.02	<0.02
02/17/2021	<0.02	<0.02
02/25/2021	<0.01	<0.01
03/02/2021	<0.02	<0.02
03/08/2021	<0.03	<0.03
03/16/2021	<0.02	<0.02
03/25/2021	<0.02	<0.02
03/31/2021	<0.01	<0.01
04/06/2021	<0.03	<0.03
04/14/2021	<0.01	<0.01
04/22/2021	<0.01	<0.01
04/29/2021	<0.01	<0.01
05/05/2021	<0.02	<0.02
05/12/2021	<0.02	<0.02
05/20/2021	<0.01	<0.01
05/26/2021	<0.02	<0.02
06/02/2021	<0.02	<0.02
06/09/2021	<0.02	<0.02
06/16/2021	<0.02	<0.02
06/24/2021	<0.02	<0.02
06/30/2021	<0.02	<0.02
07/08/2021	<0.01	<0.01
07/13/2021	<0.03	<0.03
07/21/2021	<0.02	<0.02
07/29/2021	<0.01	<0.01
08/04/2021	<0.04	<0.04
08/11/2021	<0.03	<0.03
08/18/2021	<0.02	<0.02
08/24/2021	<0.02	<0.02
08/31/2021	<0.02	<0.02
09/09/2021	<0.01	<0.01
09/14/2021	<0.02	<0.02
09/21/2021	<0.02	<0.02
09/30/2021	<0.02	<0.02
10/06/2021	<0.03	<0.03
10/12/2021	<0.02	<0.02
10/20/2021	<0.02	<0.02
10/26/2021	<0.02	<0.02
11/02/2021	<0.02	<0.02
11/10/2021	<0.02	<0.02
11/17/2021	<0.02	<0.02
11/24/2021	<0.03	<0.02
12/01/2021	<0.02	<0.02
12/08/2021	<0.02	<0.02
12/16/2021	<0.02	<0.02
12/21/2021	<0.02	<0.02
12/28/2021	<0.02	<0.03

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Table 22: Supplemental Surface Water – Tritium and Gamma

Analysis: Gamma Isotopic				Units: pCi/L											
Location	End Date	H-3	K-40	Location	End Date	H-3	K-40	Location	End Date	H-3	K-40	Location	End Date	H-3	K-40
REQUIRED LLD →		3,000	--	REQUIRED LLD →		3,000	--	REQUIRED LLD →		3,000	--	REQUIRED LLD →		3,000	--
T08 (Indicator)	01/22/2021	3734	289	T75 (Indicator)	01/25/2021	<133	<42	T84 (Indicator)	01/22/2021	4084	378	T97 (Indicator)	01/22/2021	4107	325
T08 (Indicator)	02/05/2021	4720	377	T75 (Indicator)	02/05/2021	<137	<40	T84 (Indicator)	02/05/2021	3262	313	T97 (Indicator)	02/04/2021	3465	339
T08 (Indicator)	03/09/2021	7204	288	T75 (Indicator)	03/09/2021	<139	<80	T84 (Indicator)	03/09/2021	5349	251	T97 (Indicator)	03/11/2021	7460	336
T08 (Indicator)	04/07/2021	5817	446	T75 (Indicator)	04/07/2021	<134	<77	T84 (Indicator)	04/07/2021	5380	457	T97 (Indicator)	04/07/2021	5454	441
T08 (Indicator)	05/11/2021	10578	443	T75 (Indicator)	05/11/2021	<135	<34	T84 (Indicator)	05/11/2021	11455	463	T97 (Indicator)	05/11/2021	12658	433
T08 (Indicator)	06/15/2021	5669	413	T75 (Indicator)	06/15/2021	<134	<49	T84 (Indicator)	06/15/2021	6051	397	T97 (Indicator)	06/15/2021	6074	466
T08 (Indicator)	07/09/2021	4153	399	T75 (Indicator)	07/12/2021	<141	<47	T84 (Indicator)	07/09/2021	4307	355	T97 (Indicator)	07/12/2021	3985	369
T08 (Indicator)	08/10/2021	4937	388	T75 (Indicator)	08/10/2021	<137	<79	T84 (Indicator)	08/10/2021	3247	383	T97 (Indicator)	08/10/2021	3201	470
T08 (Indicator)	09/20/2021	9978	351	T75 (Indicator)	09/21/2021	<134	<37	T84 (Indicator)	09/20/2021	9648	382	T97 (Indicator)	09/20/2021	9959	379
T08 (Indicator)	10/11/2021	8666	286	T75 (Indicator)	10/11/2021	<136	<76	T84 (Indicator)	10/11/2021	13471	363	T97 (Indicator)	10/11/2021	13492	365
T08 (Indicator)	11/03/2021	12214	341	T75 (Indicator)	11/03/2021	<135	87	T84 (Indicator)	11/03/2021	11692	415	T97 (Indicator)	11/03/2021	12474	339
T08 (Indicator)	12/27/2021	9618	280	T75 (Indicator)	12/27/2021	<132	<78	T84 (Indicator)	12/29/2021	9291	326	T97 (Indicator)	12/27/2021	9242	316

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Table 23: Supplemental Shoreline Sediment - Gamma

Analysis: Gamma Isotopic					Units: pCi/kg (dry)				
Location	Collection Date	Be-7	K-40	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
REQUIRED LLD →		--	--	180	--	--	--	--	--
T01 (Indicator)	02/04/2021	<131	<163	<9	915	464	<48	29	230
T02 (Indicator)	02/05/2021	<194	2410	19	2150	<621	<108	181	966
T03 (Indicator)	02/05/2021	<374	3200	84	6690	<962	<154	299	1450
T04 (Indicator)	02/05/2021	<134	327	<11	789	547	<49	35	226
T07 (Indicator)	02/05/2021	<175	289	45	<687	326	<60	<30	<203
T08 (Indicator)	02/05/2021	<143	531	<13	566	776	<83	<28	<217
T10 (Indicator)	02/05/2021	<159	546	<15	<714	539	<60	<27	<210
T84* (Indicator)	02/09/2021	<189	399	<14	2540	1670	<70	105	245
T85* (Indicator)	02/05/2021	<102	100	<10	495	698	<51	44	242
T84* (Indicator)	07/09/2021	<272	222	<18	2030	2690	<72	170	311
T85* (Indicator)	07/09/2021	<187	636	<14	<602	1230	<86	77	299

* Note that site T48 is the same location as site T05, and site T85 is the same location as site T06.

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Table 24: Supplemental Broad Leaf Vegetation - Gamma

Analysis: Gamma Isotopic				Units: pCi/kg (wet)		
Location	Collection Date	Sample Type	Be-7	K-40	Cs-137	Ra-226
REQUIRED LLD →			--	--	80	--
T43 (Indicator)	02/08/2021	Corn & Green Beans	<90	2080	<12	<233
T44 (Indicator)	03/08/2021	Corn & Green Beans	<55	2250	<7	<169
T45 (Indicator)	03/22/2021	Corn & Green Beans	<81	1900	<10	<209

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Interlaboratory Comparison Program Results

1.0 Summary

The Interlaboratory Comparison Program consists of participating in the DOE Mixed Analyte Performance Evaluation Program (MAPEP).

This program provides similar testing (matrices, nuclides, and levels) as the former EPA Interlaboratory Comparison Program and is referred to as the Mixed Analyte Performance Evaluation Program (MAPEP).

The samples are analyzed using the methods applicable to the REMP (gamma spectroscopy, Gross Beta, and Tritium for water).

From the MAPEP handbook:

Acceptance criteria were developed from a review of precision and accuracy data compiled by other performance evaluation programs (PEPs), the analytical methods literature, from several MAPEP pilot studies, and from what is considered reasonable, acceptable, and achievable for routine analyses among the more experienced laboratories.

The State laboratory participated in MAPEP 44 and 45. These satisfied the requirement of Control 5.3 of the ODCM for the Interlaboratory Comparison Program.

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Interlaboratory Comparison Program Results

Table 25: DOE's Mixed Analyte Performance Evaluation Program (MAPEP) 44 RESULTS

Program status	Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
Matrix: RdF Air Filter Bq/filter					
Required	MN54	0.3	0.312	A	0.218 - 0.406
Required	CO57	0.62	0.686	A	0.480 - 0.892
Required	CO60	0.018		A	False Positive Test
	ZN65	0.358	0.352	A	0.246 - 0.458
Required	CS134	1.841	2.14	A	1.50 - 2.78
Required	CS137	0.004		A	False Positive Test
Matrix: GrF Air Filter Bq/filter					
Required	Gross Beta	0.7915	0.649	A	0.325 - 0.974
Required	Gross Alpha	2.01	1.77	A	0.53 - 3.01
Matrix: MaS Soil Bq/kg					
Required	K40	620.25	618	A	433 - 803
	MN54	0.70		A	False Positive Test
	CO57	838.63	920	A	644 - 1196
	CO60	1320	1370	A	959 - 1781
	ZN65	630.88	604	A	423 - 785
	CS134	0.12		A	False Positive Test
Required	CS137	1541.25	1550	A	1085 - 2015
Matrix: MaW Water Bq/L					
Required	H3	1.098		A	False Positive Test
	MN54	16.2	15.5	A	10.9 - 20.2
	CO57	11.7	11.4	A	8.0 - 14.8
Required	CO60	0.1		A	False Positive Test
	ZN65	11.5	10.5	A	7.4 - 13.7
Required	CS134	10.908	11.5	A	8.1 - 15.0
Required	CS137	8.27	7.9	A	5.5 - 10.3
	SR90	4.003	4.47	A	3.13 - 5.81
Matrix: RdV Vegetation, Bq/sample					
	MN54	5.956	5.25	A	3.68 - 6.83
	CO57	6.197	5.05	W	3.54 - 6.57
Required	CO60	3.213	2.99	A	2.09 - 3.89
	ZN65	0.005		A	False Positive Test
	CS134	3.861	3.6	A	2.5 - 4.7
Required	CS137	5.409	4.69	A	3.28 - 6.10

Evaluation: A = Acceptable, W = Acceptable with Warning, N = Not Acceptable, NR = Not Reported

A false positive test with an "A" designation flag identifies the result as less than the detectable activity, since MAPEP does not report zero values. Sensitivity Evaluation has no acceptance range but an identified value at low activity.

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Interlaboratory Comparison Program Results

Table 26: DOE's Mixed Analyte Performance Evaluation Program (MAPEP) 45 RESULTS

Program status	Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
Matrix: RdF Air Filter Bq/filter					
Required	MN54	1.540	1.46	A	1.02 - 1.90
Required	CO57	0.779	0.83	A	0.58 - 1.08
Required	CO60	2.230	2.28	A	1.60 - 2.96
	ZN65	0.014		A	False Positive Test
Required	CS134	1.202	1.32	A	0.92 - 1.72
Required	CS137	1.305	1.28	A	0.90 - 1.66
Matrix: GrF Air Filter Bq/filter					
Required	Gross Beta	0.66	0.553	A	0.277 - 0.830
Required	Gross Alpha	1.247	0.960	A	0.288 - 1.632
Matrix: MaS Soil Bq/kg					
Required	K40	578.61	607	A	425 - 789
	MN54	404.87	410	A	287 - 533
	CO57	1.22		A	False Positive Test
	CO60	679.30	722	A	505 - 939
	ZN65	913.99	907	A	635 - 1179
	CS134	1152.05	1170	A	819 - 1521
Required	CS137	553.85	572	A	400 - 744
Matrix: MaW Water Bq/L					
Required	H3	266.45	250	A	175 - 325
	MN54	9.053	9.0	A	6.3 - 11.7
	CO57	13.117	13.9	A	9.7 - 18.1
Required	CO60	13.450	14.0	A	9.8 - 18.2
	ZN65	0.277		A	False Positive Test
Required	CS134	9.349	10.4	A	7.3 - 13.5
Required	CS137	-0.010		A	False Positive Test
	SR90	3.552	3.86	A	2.70 - 5.02
Matrix: RdV Vegetation, Bq/sample:					
	MN54	-0.003		A	False Positive Test
	CO57	5.169	4.66	A	3.26 - 6.06
Required	CO60	3.610	3.51	A	2.46 - 4.56
	ZN65	2.604	2.43	A	1.70 - 3.16
	CS134	4.189	4.34	A	3.04 - 5.64
Required	CS137	2.380	2.21	A	1.55 - 2.87

Evaluation: A = Acceptable, W = Acceptable with Warning, N = Not Acceptable, NR = Not Reported

A false positive test with an "A" designation flag identifies the result as less than the detectable activity, since MAPEP does not report zero values. Sensitivity Evaluation has no acceptance range but an identified value at low activity.

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Industry Initiative Ground Water Protection Program 2021

1.0 Description of Program

Turkey Point Nuclear maintains a sampling and analysis program to meet procedural requirements. The procedures that govern the performance are EV-AA-100-1001, *Fleet Ground Water Protection Program Implementing Guideline* and 0-ADM-654, *Ground Water Protection Program*.

The sampling frequency is quarterly; more often if conditions warrant.

Sample assay is performed by a private contractor GEL labs.

2.0 Discussion

The Turkey Point Nuclear site is surrounded on three sides by the closed cooling canal system. This canal system, in addition to being the source of tertiary cooling, is the body of water receiving permitted liquid radiological waste the canal system tritium level averages was 7,126 pCi/L in 2021 with a max concentration of 13,492 pCi/L. This supports the expectation to see tritium in subsurface water collected either on-site or off-site close to the (within the Owner Controlled Area) cooling canal system. Twenty-eight (28) wells were involved in the 2021 monitoring program; some locations have multiple (two or three) depths.

Samples are analyzed for Tritium & Gamma emitters. As conditions warrant, analysis included Fe-55, Ni-63, Sr-89/90 and alpha (all were < LLD).

3.0 Results

The tritium results for the groundwater wells were from <MDA to 5,320 pCi/L. All results were less than the limits of the Offsite Dose Calculation Manual, Table 5.1-2, Reporting Levels for Radioactivity Concentrations in Environmental Samples. Storm drain outfalls occasionally are below the tidal mark of the canal and will have ingress of canal water into the storm drain. The higher levels of tritium in the storm drain section are due to the canal water ingress into the storm drain.

Tabular results follow:

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Monitoring Results Tables

Table 27: Ground Water – Tritium

Analysis: Tritium		Units: pCi/L			
Location	First Quarter 2021 H-3	Second Quarter 2021 H-3	Third Quarter 2021 H-3	Fourth Quarter 2021 H-3	
REQUIRED LLD →	3,000	3,000	3,000	3,000	
PTPED-1	146	364	336	271	
CD-1	255	122	288	92.7	
P-94-2	517	---	519	---	
P-94-4	471	706	386	623	
STP-1	88	---	22.7	---	
PTN-MW-1s	-45	---	146	---	
PTN-MW-1i	365	---	283	---	
PTN-MW-1d	1210	---	1420	---	
PTN-MW-2s	87	---	115	---	
PTN-MW-3s	160	---	-10.3	---	
PTN-MW-4s	-45	152	2550	77	
PTN-MW-4i	1490	1900	223	76.2	
PTN-MW-4d	127	152	-46.5	-11.2	
PTN-MW-5s	579	218	94.9	5.82	
PTN-MW-5i	453	267	268	105	
PTN-MW-5d	1540	1490	79.9	1480	
PTN-MW-6s	20	---	55.1	---	
PTN-MW-6i	---	---	---	---	
PTN-MW-6d	1220	---	1360	---	
PTN-MW-7s	742	1160	787	447	
PTN-MW-7i	133	14	1300	31.2	
PTN-MW-7d	29	116	42.3	202	
PTN-MW-8s	5320	355	1290	820	
PTN-MW-9s	859	1110	739	984	
PTN-MW-10s	78	---	56.3	---	
PTN-MW-10i	765	---	44.6	---	
PTN-MW-10d	98	---	98.9	---	
PTN-MW-11s	7	314	319	544	
PTN-MW-12s	545	623	761	686	
NE StrmDrain	869	626	647	21.3	
SE StrmDrain	620	482	340	573	
W StrmDrain	536	4420	2830	1720	
CRF StrmDrain	dry	dry	dry	dry	

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Industry Initiative Ground Water Protection Program 2021

D. List of wells and their locations

Well Name	Location
PTN-MW-1s PTN-MW-1i PTN-MW-1d	Northeast of Switch Yard, South of entrance road to Fossil Plant
PTN-MW-2s	South Switch Yard by parking lot
PTN-MW-3s	Northeast of new Issues Warehouse
PTN-MW-4s PTN-MW-4i PTN-MW-4d	SW corner of parking lot South of Training Bldg.
PTN-MW-5s PTN-MW-5i PTN-MW-5d	SW of CRF, by canal
PTN-MW-6s PTN-MW-6d	NE of site in the berm for fossil oil tanks
PTN-MW-7s PTN-MW-7i PTN-MW-7d	NE of RCA, by Neutralization Tank
PTN-MW-8s	Near U3 RWST
PTN-MW-9s	Near U4 RWST
PTN-MW-10s PTN-MW-10i PTN-MW-10d	SE of Radwaste Bldg. by S/G Bldg.
PTN-MW-11s	South of truck entrance to Rad Waste Bldg.
PTN-MW-12s	West of Condenser Polisher road
STP-1	West of Maintenance Bldg. on corner or road into parking lot
P-94-4	East of Dressout Building, under delay fence
P-94-2	By Neutralization Basin, East of the RCA
CD-1	By Neutralization Basin, East of the RCA
PTPED-1	By Neutralization Basin, East of the RCA

Note: s, i and d refer to well depth: shallow - 20 ft., intermediate - 40 ft. and deep - 60 ft
Maps depicting the well locations follow.

