

APR 23 2018



L-2018-080  
10 CFR 50.36b

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D.C. 20555-00001

Re: Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
2017 Annual Radiological  
Environmental Operating Report

Enclosed is the 2017 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. Robert J. Hess, Licensing Manager, at (305) 246-4112.

Sincerely,

A handwritten signature in black ink, appearing to read 'Robert Coffey', is written over a faint, circular stamp or watermark.

Robert Coffey  
Regional Vice President, Southern Region  
Turkey Point Nuclear Plant

SM  
Enclosure

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

IEZS  
NRR

**2017**

**ANNUAL**

**RADIOLOGICAL ENVIRONMENTAL**

**OPERATING REPORT**

**TURKEY POINT PLANT**

**UNITS 3 & 4**

**LICENSE NO. DPR-31, DPR-41**

**DOCKET NOS. 50-250, 50-251**

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**TURKEY POINT PLANT- UNITS 3 & 4**

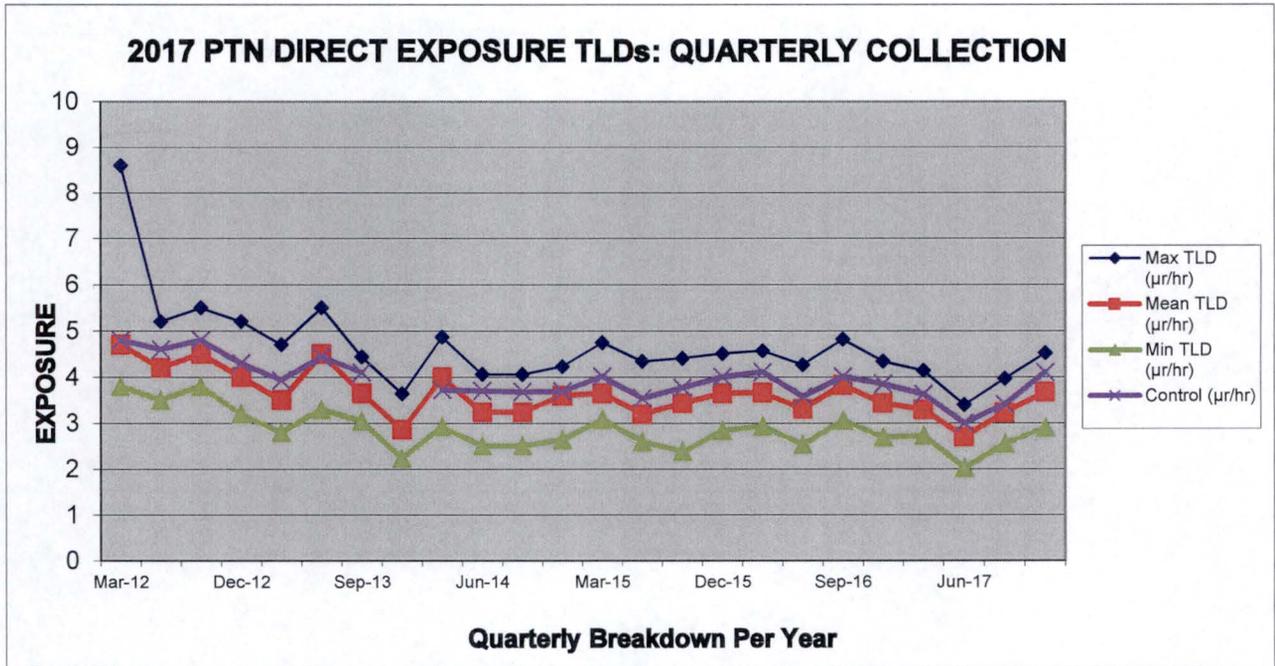
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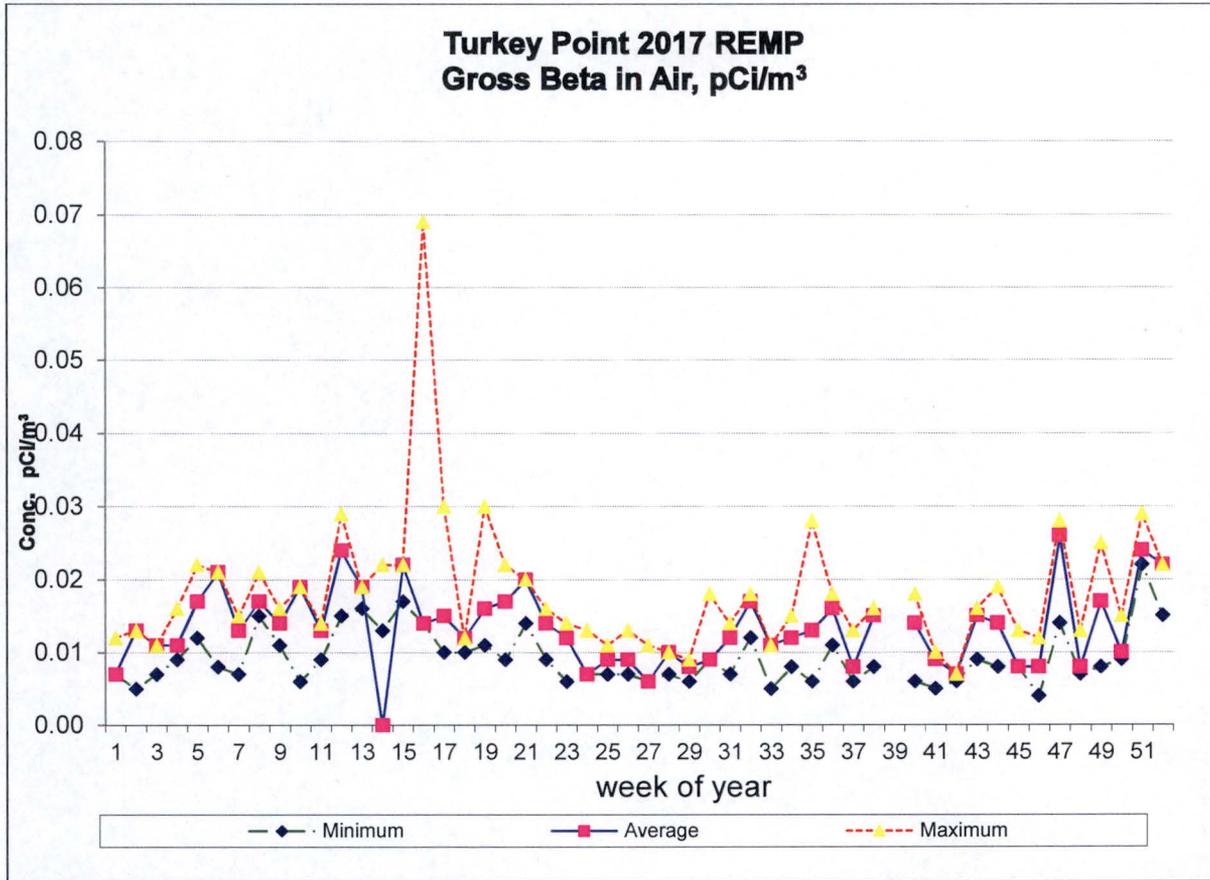
## 2017 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT TURKEY POINT PLANT- UNITS 3 & 4

### EXECUTIVE SUMMARY

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, 2017 to December 31, 2017. Additionally, supplemental samples collected by the State of Florida, DOH, do not indicate adverse trends in the radiological environment.



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**I. 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.

**II. RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM**

**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.

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B. Program Description

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

1. Sample Locations, Types and Frequencies:

- a. Direct radiation gamma exposure rate is monitored continuously at 23 locations by thermoluminescent dosimeters (TLDs). TLDs are collected and analyzed quarterly.
- b. 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.
- c. Surface water samples are collected from three locations. Samples are collected and analyzed monthly. Analyses include gamma isotopic and tritium measurements.
- d. 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.
- e. 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.
- f. 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.

Attachment A provides specific information pertaining to sample locations, types and frequencies.

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

2. Analytical Responsibility:

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.

Note: The State is not involved in the (Industry Initiative) ground water monitoring program.

C. Analytical Results

Table 1, Environmental Radiological Monitoring Program Annual Summary provides a summary for all specified samples collected during the referenced surveillance period. Deviations from the sample schedule, missing data and/or samples not meeting the specified "A PRIORI" LLD, if any, are noted and explained in Tables 1A and 1B respectively. Analysis data for all specified samples analyzed during the surveillance period is provided in Attachment B.

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D. Land Use Census

A land use census out to a distance of 5 miles radius from the Turkey Point Plant is conducted annually to determine the location of the nearest milk animal, residence, and garden producing broad leaf vegetation, in each of the sixteen meteorological sectors. A summary of the land use census for the surveillance year is provided in Table 2, Land Use Census Summary.

E. Interlaboratory Comparison Program

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 results for nuclides associated with the REMP are listed in ATTACHMENT C, *Results from the Interlaboratory Comparison Program*.

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III. DISCUSSION AND INTERPRETATION OF RESULTS

A. Reporting of Results

The Annual Radiological Environmental Operating Report contains the summaries, interpretations and information required by Control 1.4 of ODCM. Table 1 provides a summary of the measurements made for the nuclides required by ODCM Table 5.1-2, for all samples specified by Table 5.1-1. In addition, summaries are provided for other nuclides identified in the specified samples, including those not related to station operation. These include nuclides such as K-40, Th-232, Ra-226, and Be-7 which are common in the Florida environment.

B. Interpretation of Results

1. Direct Radiation:

The results of direct radiation monitoring are consistent with past measurements for the specified locations. The exposure rate data shows no indication of any trends attributed to effluents from the plant. The measured exposure rates are consistent with past historical exposure rates.

2. Air Particulates/Radioiodine:

For results attributed to plant effluents:

The results for radioactive air particulate and radioiodine monitoring are consistent with past measurements and indicate no trends attributed to plant effluents. All samples for radioiodine yielded no detectable I-131. Gamma isotopic measurements yielded no indication of any nuclides attributed to station operation. The results for air particulate/radioiodine samples are consistent with historical trends. Air particulate and radioiodine monitoring results are summarized in Table 1.

3. Waterborne, Surface Water:

The results of radioactivity measurements in surface water samples are consistent with past measurements. Tritium was reported as present in 2 of 24 indicator locations and 0 of the 12 control locations. The highest reported tritium is 128 pCi/L, below the required reporting level of 30,000 pCi/L as specified by ODCM Table 5.1-2. Additionally, the highest reported tritium for the supplemental sampling program is 24,483 pCi/L.

4. Waterborne, Sediment:

Gamma isotopic measurements yielded no indication of any nuclides attributed to station operation.

5. Waterborne, Food Products:

The results are consistent with past measurements. Gamma isotopic measurements yielded no indication of any nuclides attributed to station operation.

6. Broad Leaf Vegetation

For results attributed to plant effluents:

The results of radioactivity measurements are consistent with past measurements. Cs-137 was detected in samples collected from the indicator locations. This activity identified could be from weapons fallout testing 30-40 years ago and reactor accidents at Chernobyl and are contributors. The maximum concentration reported was 97 pCi/kg well below the

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required reporting level of 2000 pCi/kg as specified by ODCM Table 5.1-2. No other fission products were detected.

7. Land Use Census

A land use census out to a distance of a five mile radius from the Turkey Point Plant is conducted annually to determine the location of the nearest milk animal, residence, and garden producing broad leaf vegetation, in each of the 16 meteorological sectors. A summary of the land use census for the surveillance year is provided in Table 2, Land Use Census Summary.

8. Interlaboratory Comparison Program

The State laboratory participated in MAPEP 36 and 37. These satisfied the requirement of Control 5.3 of the ODCM for the Interlaboratory Comparison Program. The results are listed in Attachment C.

C. Conclusions

The data obtained through the Turkey Point Plant Radiological Environmental Monitoring Program verifies that the levels of radiation and concentrations of radioactive materials in environmental samples, representing the highest potential exposure pathways to members of the public, are not being increased. The measured exposure rates and air particulate/radioiodine samples are consistent with exposure rates that were observed during the pre-operational surveillance program. The highest value of tritium in surface water was 128 pCi/L far below the required LLD listed in ODCM Table 5.1-3. There were no indications of any other nuclides that could be attributed to plant effluents. There were no indications of any nuclides in waterborne sediment or food products attributed to plant effluents. The results of radioactivity measurements for broad leaf vegetation are consistent with past measurements. Additionally, supplemental to the ODCM program, sampling of the direct exposure, inhalation, and ingestion pathways, performed by Florida DOH, does not show adverse trends in levels of radiation and radioactive materials in unrestricted areas. The 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, are well within "as low as reasonably achievable (ALARA)" criteria established by 10 CFR 50, Appendix I.

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**ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM  
ANNUAL ANALYSIS SUMMARY**

**PATHWAY: DIRECT RADIATION**

SAMPLES COLLECTED: TLD

UNITS: micro-R/hr

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) <sup>b</sup> Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Exposure Rate, 91	---	3.19 (91/91)	NW-10	4.52 (4/4)	3.56 (4/4)
		2.18 - 4.52	10 mi., NW	3.4 - 4.52	3.00 - 4.11

Number of Non-routine Reported Measurements = 0

**PATHWAY: AIRBORNE**

SAMPLES COLLECTED: RADIOIODINE AND PARTICULATES

UNITS: pCi/m<sup>3</sup>

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) <sup>b</sup> Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
<sup>131</sup> I, 312	0.012	<MDA	---	---	< MDA
Gross Beta, 312	0.0064	0.013 (253/253) 0.005 - 0.029	T-52 8.0 mi, W	0.018 (51/51) 0.007- 0.069	0.014 (51/51) 0.006 - 0.026
Composite Gamma Isotopic, 32					
<sup>7</sup> Be	0.006	0.1316 (28/28) 0.0683 - 0.1739	T-51 2.2 mi, NNW	0.1459 ( 4/4) 0.0967 - 0.1739	0.1448 ( 4/4) 0.1085 - 0.1666
<sup>40</sup> K	0.018	0.0158 (1/28) < MDA - 0.0158	T-51 2.2 mi, NNW	0.0158 (1/4) < MDA - 0.0158	< MDA
<sup>134</sup> Cs	0.0008	< MDA	---	---	< MDA
<sup>137</sup> Cs	0.0008	< MDA	---	---	< MDA
<sup>210</sup> Pb	---	0.0105 (04/20) <MDA - 0.0116	T-41 1.6 mi, WNW	0.0158 ( 1/4) <MDA - 0.0105	0.0133 (1/4) <MDA - 0.0133

Be-7, K-40 & Pb-210 are naturally occurring.  
Number of Non-routine Reported Measurements = 0

**PATHWAY: WATERBORNE**

SAMPLES COLLECTED: SURFACE WATER

UNITS: pCi/L

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) <sup>b</sup> Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Tritium, 36	172	128 ( 2/24) <MDA - 128	T-42 <1 mi., ENE	109 ( 1/12) <MDA - 128	<MDA
Gamma Isotopic, 36					
<sup>40</sup> K	58	304 (24/24) 61 - 473	T-81 6 mi., S	337 (12/12) 240 - 473	211 (12/12) 79 - 360
<sup>54</sup> Mn	3	< MDA	---	---	< MDA
<sup>59</sup> Fe	6	< MDA	---	---	< MDA
<sup>58</sup> Co	3	< MDA	---	---	< MDA
<sup>60</sup> Co	4	< MDA	---	---	< MDA
<sup>65</sup> Zn	7	< MDA	---	---	< MDA
<sup>95</sup> Zr-Nb	6	< MDA	---	---	< MDA
<sup>131</sup> I	4	< MDA	---	---	< MDA
<sup>134</sup> Cs	4	< MDA	---	---	< MDA
<sup>137</sup> Cs	4	< MDA	---	---	< MDA
<sup>140</sup> Ba-La	9	< MDA	---	---	< MDA

K-40 is naturally occurring.

Number of Non-routine Reported Measurements = 0

**PATHWAY: WATERBORNE**

SAMPLES COLLECTED: SHORELINE SEDIMENT

UNITS: pCi/kg, DRY

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) <sup>b</sup> Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 6					
<sup>7</sup> Be	56	106 (2/4) <MDA -109	T-81 6 mi., S	106 103- 109	89 <MDA - 89
<sup>40</sup> K	100	134 (2/4) <MDA - 139	T-42 <1 mi., ENE	139 (1/2) <MDA - 139	511 (1/2) <MDA - 511
<sup>58</sup> Co	6	<MDA	---	---	< MDA
<sup>60</sup> Co	7	<MDA	---	---	< MDA
<sup>134</sup> Cs	7	<MDA	---	---	< MDA
<sup>137</sup> Cs	7	<MDA	---	---	< MDA
<sup>210</sup> Pb	---	566 (2/4) <MDA - 707	T-81 6 mi., S	707 (1/2) <MDA-707	<MDA
<sup>226</sup> Ra	15	1518 (3/4) <MDA - 1518	T-81 6 mi., S	1518 (1/2) <MDA - 1518	<MDA
<sup>235</sup> U	---	30 (2/4) <MDA - 30	---	---	< MDA
<sup>238</sup> U	---	380 (4/4) 213 - 594	T-81 6 mi., S	482 (2/2) 370 - 594	257 (1/2) < MDA - 257

Be-7, K-40, Pb-210, Ra-226, U-235 & U-238 are naturally occurring.  
Number of Non-routine Reported Measurements = 0

**PATHWAY: INGESTION**

SAMPLES COLLECTED: CRUSTACEA

UNITS: pCi/kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 2					
<sup>40</sup> K	270	1394 (2/2) 1271 - 1446	T-67 13-18 mi., N, NNE	1437 (2/2) 1428 - 1446	1437 (2/2) 1428 - 1446
<sup>226</sup> Ra	300	<MDA	---	---	<MDA
<sup>54</sup> Mn	16	---	---	---	---
<sup>59</sup> Fe	28	---	---	---	---
<sup>58</sup> Co	15	---	---	---	---
<sup>60</sup> Co	16	---	---	---	---
<sup>65</sup> Zn	32	---	---	---	---
<sup>134</sup> Cs	16	---	---	---	---
<sup>137</sup> Cs	18	---	---	---	---

Number of Non-routine Reported Measurements = 0

**PATHWAY: INGESTION**

SAMPLES COLLECTED: FISH

UNITS: pCi/kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 4					
<sup>7</sup> Be	---	<MDA	---	---	<MDA
<sup>40</sup> K	270	2731 (2/2) 2201 - 3346	T-67 13-18 mi., N, NNE	3081 (2/2) 3346 - 2816	3081 (2/2) 3346 - 2816
<sup>54</sup> Mn	16	<MDA	---	---	<MDA
<sup>59</sup> Fe	28	<MDA	---	---	<MDA
<sup>58</sup> Co	15	<MDA	---	---	<MDA
<sup>60</sup> Co	16	<MDA	---	---	<MDA
<sup>65</sup> Zn	32	<MDA	---	---	<MDA
<sup>134</sup> Cs	16	<MDA	---	---	<MDA
<sup>137</sup> Cs	16	<MDA	---	---	<MDA
<sup>226</sup> Ra	300	<MDA	---	---	<MDA
<sup>238</sup> U	---	<MDA	---	---	<MDA

Be-7, K-40, Pb-210, Ra-226 & U-238 are naturally occurring.

Number of Non-routine Reported Measurements = 0

**PATHWAY: INGESTION**

SAMPLES COLLECTED: BROAD LEAF VEGETATION

UNITS: pCi/kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 36					
<sup>7</sup> Be	64	1614 (24/24) 569 - 3605	T-40 3 mi., W	1981 (12/12) 742 - 3605	1270 (12/12) 726 - 1864
<sup>40</sup> K	120	4644 (24/24) 2472 - 7365	T-41 1.6 mi., WNW	5028 (12/12) 2472 - 7365	5154 (12/12) 3560 - 7572
<sup>58</sup> Co	6	<MDA	---	---	<MDA
<sup>60</sup> Co	8	<MDA	---	---	<MDA
<sup>131</sup> I	8	<MDA	---	---	<MDA
<sup>134</sup> Cs	8	<MDA	---	---	<MDA
<sup>137</sup> Cs	8	33 (20/24) 12 - 97	T-40 3 mi., W	49 (10/12) 16 - 97	16 (4/12) 8 - 21
<sup>210</sup> Pb	---	456 (5/24) 239 - 784	T-40 3 mi., W	502 (3/12) 248 - 784	365 (6/12) 209 - 629
<sup>226</sup> Ra	189	<MDA	---	---	<MDA

Be-7, K-40, Pb-210 & Ra-226 are naturally occurring.

Number of Non routine Reported Measurements = 0

## NOTES

- a. The LLD is an "a priori" lower limit of detection which establishes the smallest concentration of radioactive material in a sample that will yield a net count above system background that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a real signal. LLDs in this column are at time of measurement. The MDAs reported in Attachment B for the individual samples have been corrected to the time of sample collection.
- b. Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations is indicated in parentheses (f).
- c. Specific identifying information for each sample location is provided in Attachment A.
- d. Results were based upon the average net response of three elements in a TLD. (Thermoluminescent Dosimeter).

DEVIATIONS /MISSING DATA

- A) Pathway: T09-Sediment  
Location: T-09 - Old Discharge Canal  
Dates: 01-27-2017  
Deviation: Sample unavailability due to overgrown vegetation  
Description of Problem: Sediment Sample T09 Was uncollectable  
Corrective action: None required -supplemental sample. (AR# 2182310)
- B) Pathway: SSW-10- Direct Radiation  
Location: Located 10 miles SSW at Card Sound bridge on a siren pole  
Dates: 09-20-2017  
Deviation: TLD was lost  
Description of Problem: TLD was lost due to Hurricane IRMA  
Corrective action: TLD was replaced (AR# 2235918)
- C) Pathway: T-57- Radioiodine and Air Particulate  
Location: Siren Pole 27, intersection of SW 112<sup>th</sup> Ave and SW 304<sup>th</sup> St  
Dates: 19-Sep-17  
Deviation: Power outage due to Hurricane Irma  
Description of Problem: Estimated run time 144.7 out of 315.75 hours.  
Corrective action: Power was restored (AR #2235918)
- D) Pathway: T-57- Radioiodine and Air Particulate  
Location: Siren Pole 27, intersection of SW 112<sup>th</sup> Ave and SW 304<sup>th</sup> St  
Dates: 30-Aug-17  
Deviation: Vacuum pump failed and was replaced  
Description of Problem: Vacuum pump failed and was replaced. Estimated run time 31.6 out of 169 hours.  
Corrective action: Vacuum Pump was replaced (AR# 2235918)
- E) Pathway: ENE-1-Direct Radiation  
Location: Located E end of Turkey Point past Ranger station  
Dates: 09-20-2017  
Deviation: TLD was lost  
Description of Problem: TLD was lost due to Hurricane IRMA  
Corrective action: TLD was replaced (AR# 2235918)

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DEVIATIONS /MISSING DATA

F)	Pathway:	T-56 -Radioiodine and Air Particulate (supplemental)
	Location:	Located 7 miles SW corner parking lot at Black Point Marina
	Dates:	19-Sep-17
	Deviation:	Power outage due to Hurricane Irma
	Description of Problem:	Estimated run time 237.7 out of 314.75.
	Corrective action	Power was restored (AR #2235918)

## TURKEY POINT 2017 ANNUAL LAND-USE CENSUS SUMMARY

The annual land-use census identifies the nearest residences, vegetable gardens, and potential milk-producing animals within a five-mile radius from the Turkey Point nuclear plant.

The range (miles) and the bearing (degrees) from the plant are summarized for each receptor type in the table below.

(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.

TURKEY POINT 2017 ANNUAL LAND-USE CENSUS SUMMARY

The annual land-use census identifies the nearest residences, vegetable gardens, and potential milk-producing animals within a five-mile radius from the Turkey Point nuclear plant.

The range (miles) and the bearing (degrees) from the plant are summarized for each receptor type in the table below.

SECTOR	NEAREST RESIDENCE	NEAREST GARDEN (A)	NEAREST MILK ANIMAL
N	1.9 mi @ 349° 1.98 mi @ 349° 2.0 miles @ 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° 4.8 mi @ 302°	*
NW	3.6 mi @ 304° 3.7 mi @ 311° 3.8 mi @ 316° 3.9 mi @ 314°	*	*
NNW	4.4 mi @ 333° 4.5 mi @ 326° 4.7 mi @ 328° 4.9 mi @ 336°	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.

TURKEY POINT RESIDENCE SURVEY RESULTS

June 2017

Sector	Range Bearing	Nearest Residence Location
N (A)	<u>1.9 miles</u> 349°	This is the Homestead Bayfront Park complex. Contact is Jim Wyath. Office hours are 8am to 5pm 7 days a week. Some occasional overnight recreational occupancy (up to 4 nights) on boats at the marina. Approximately 25 workers, 7 days a week, hours and number of varies. Summer weekends can see 400+ 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 with 6 to 8 employees from Tues thru Sun from 11am to 8pm. Weekends may have up to 12 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 employees. Hours are M – F 7 am to 5 pm. Sat – Sun 7 am – 6 pm. N25° 27.767' W80° 20.206'.
N (C)	<u>2.0 miles</u> 354°	Biscayne National Park at Convoy Point. Contact is Sarah Bellmund, Administrative Officer. They work 7 days a week from 7:00 am to 5:30 pm and currently have about 40 employees with a large number of volunteers. Up to four at a time may be living in a 2-story building onsite along with a full-time security guard. 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.	

TURKEY POINT RESIDENCE SURVEY RESULTS

June 2017 (cont.)

Sector	Range Bearing	Nearest Residence 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 Anita Johnson, Director. There are 11 employees with 60 children currently enrolled, ages 6 months to 5 yrs. 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 people (a couple) live at 11790 Canal Drive on the south side of Canal Drive (SW 328 St) west of SW 117 <sup>th</sup> Ave (no gardens). Next door, to the east, is a makeshift produce stand which sells coconuts, limes, melons, sugar cane, ginger root and ornamental plants. Is not associated with the house next door. 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 328 <sup>th</sup> St) and east of SW 117 <sup>th</sup> Ave. There are 8 full time workers onsite Monday thru Friday usually from 7 am to 4:30 pm, no longer working Saturdays. N25° 27.833' W80° 22.767'.
NW (B)	<u>3.7 miles</u> 311°	11000 SW 320 <sup>th</sup> 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. N25° 28.217' W80° 22.567'.
NW (C)	<u>3.8 miles</u> 316°	High Hope Nursery at 11400 SW 316 <sup>th</sup> St. Contact is George Sprinkle, General Manager. This nursery currently has 30 employees. Hours of operations are 7am to 5pm Monday thru Friday, with some work on Saturdays until noon. A couple lives here that also provide security. N25° 28.441' W80° 22.430'.
NW (D)	<u>3.9 miles</u> 314°	Snapper Creek Nursery at 11600 SW 316 <sup>th</sup> 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'.
NNW (A)	<u>4.4 miles</u> 333°	29800 SW 107 <sup>th</sup> Ave. Per property records, this is a small one bedroom residence on land zoned as mixed use agricultural. Gate locked but appears lived in. N25° 29.450' W80° 21.817'.
NNW (B)	<u>4.5 miles</u> 326°	Accessible from entrance to SFM Tree Farm. No property address. Residence is vacant at this time. N25° 29.372' W80° 22.292'.

Sector	Range Bearing	Nearest Residence Location
NNW (C)	<u>4.7 miles</u> 328°	SFM Tree Farm. Entrance at SW 107 <sup>th</sup> Ave & SW 296 <sup>th</sup> St. One person works on property. Contact is Mario. Owner lives off property in Miami. N25° 29.564' W80° 22.264'.
NNW (D)	<u>4.9 miles</u> 336°	Oceanus Seafood, LLC. Fish farm at 29055 SW 107 <sup>th</sup> Ave Homestead. Manager is Jon Milchman. He initially stated they will farm Triple Tail and Pompano. 6 employees now, plan to go back to 12 in Dec., staffed 24/7. N25° 29.920' W80° 21.808'.

TURKEY POINT GARDEN SURVEY RESULTS

June 2017

Sector	<u>Range</u> <u>Bearing</u>	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.

TURKEY POINT GARDEN SURVEY RESULTS

June 2017 (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 Farms. Guava (mostly) and Dragon Fruit being grown at present. Small farm run by an Asian family south of Mowry Drive (SW 320th St) and about 0.6 miles west of Allapattah Rd (SW 117th Ave). N25° 28.217' W80° 23.467'.
WNW (B)	<u>4.8 miles</u> 302°	Located at the northeast corner of the intersection of SW 127 <sup>th</sup> Ave and SW 320 <sup>th</sup> Street. This is an inaccessible grove with coconut palms, some banana trees and a few avocado trees which appears to be unattended. N25° 28.250' W80° 23.750'.
WNW (C)	<u>6.0 miles</u> 295°	Farm Share, Inc at 14125 SW 320 <sup>th</sup> St, where farmers donate locally grown produce to be given to charitable organizations. Produce donations usually start in November and run through April. 15 to 17 workers present from 8 am to 4:30 pm Monday thru Friday. The produce usually donated is tomatoes, squash, green beans and okra. N25° 28.255' W80° 25.111'.
NW	No suitable gardens were located within a five-mile range.	
NNW	<u>4.7 miles</u> 328°	SFM Tree Farm. Entrance at SW 107 <sup>th</sup> Ave & SW 296 <sup>th</sup> St. Noticed bananas and plantain trees growing in various areas on the farm. One person works on property. Owner lives off property in Miami. 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.

## TURKEY POINT MILK ANIMAL SURVEY RESULTS

June 2017

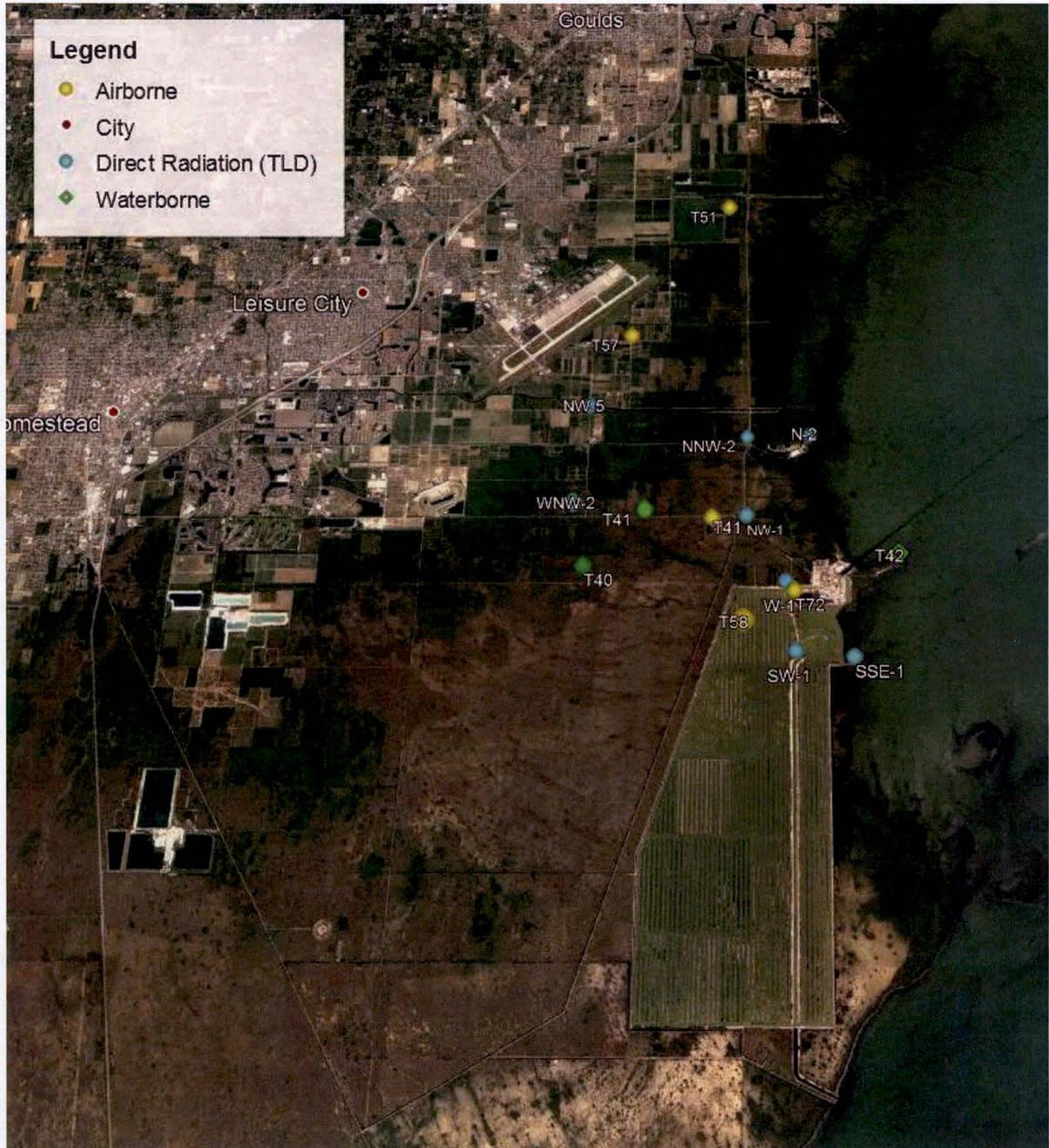
Sector	Nearest Milk Animals (cows or goats).
N	No potential milk animals were located within five miles.
NNE	No potential milk animals were located within five miles.
NE	No potential milk animals were located within five miles.
ENE	No potential milk animals were located within five miles.
E	No potential 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.

ATTACHMENT A

KEY TO SAMPLE LOCATIONS

**ATTACHMENT A**  
**NEAR SITE SAMPLING LOCATIONS**

(Page 1 of 6)



**ATTACHMENT A**  
**DISTANT REMP SAMPLING LOCATIONS**

(Page 2 of 6)



## ATTACHMENT A

(Page 3 of 6)

PATHWAY: DIRECT RADIATION

SAMPLES COLLECTED: TLD

SAMPLE COLLECTION FREQUENCY: QUARTERLY

Location <sup>(a)</sup>

<u>Name</u>	<u>Description</u>
N-2	Convey Point, Parking Area
N-7	Black Point Marina Parking Lot
N-10	Old Cutler Rd. approx. 196th Street
NNW-2	East End North Canal Road
NNW-10	Bailes Road & U.S. #1
NW-1	Turkey Point Entrance Road
NW-5	Mowry Drive & 117th Avenue
NW-10	Newton Road, North of Coconut Palm Drive
WNW-2	Satellite School
WNW-10	Homestead Middle School
W-1	On-Site, North Side of Discharge Canal
W-5	Palm Drive & Tallahassee Road
W-9	Card Sound Road, 0.6 mile from U.S. #1
WSW-8	Card Sound Road, 3.4 miles from U.S. #1
SW-1	On-Site near Land Utilization Offices
SW-8	Card Sound Road, 5 miles from U.S. #1
SSW-5	On-Site, Southwest Corner of Cooling Canals
SSW-10	Card Sound Road, west side of Toll Plaza
S-5	On-Site, South East Corner of Cooling Canals
S-10	Card Sound Road at Steamboat Creek
SSE-1	Turtle Point
SSE-10	Ocean Reef
<u>Control</u>	
NNE-22	Natoma Substation, 2475 SW 16 Ct.

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<sup>a</sup>The location name is the direction sector - approximate distance (miles)

ATTACHMENT A

(Page 4 of 6)

PATHWAY: AIRBORNE  
SAMPLES COLLECTED: RADIOIODINE AND PARTICULATES  
SAMPLE COLLECTION FREQUENCY: WEEKLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-51	NNW	2	Entrance Area to Biscayne National Park
T-57	NW	4	Siren pole 27, intersection of SW 112 <sup>th</sup> Ave and SW 304 <sup>th</sup> St.
T-58	NW	1	Turkey Point Entrance Road
T-72	WSW	<1	Just before entrance to Land Utilization's access gate.
T-41	WNW	1.6	Palm Dr. West of FPL Satellite School near the site boundary
<u>Control:</u>			
T-64	NNE	22	Natoma Substation , 2475 SW 16 Ct.

ATTACHMENT A

(Page 5 of 6)

PATHWAY: WATERBORNE  
SAMPLES COLLECTED: SURFACE WATER (OCEAN)  
SAMPLE COLLECTION FREQUENCY: MONTHLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-42	ENE	<1	Biscayne Bay at Turkey Point
T-81	S	6	Card Sound, near Mouth of Old Discharge Canal
<u>Control:</u>			
T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park

SAMPLES COLLECTED: SHORELINE SEDIMENT  
SAMPLE COLLECTION FREQUENCY: SEMI-ANNUALLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-42	ENE	<1	Biscayne Bay at Turkey Point
T-81	S	6	Card Sound, near Mouth of Old Discharge Canal
<u>Control:</u>			
T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park

ATTACHMENT A

(Page 6 of 6)

PATHWAY: INGESTION  
SAMPLES COLLECTED: CRUSTACEA AND FISH  
SAMPLE COLLECTION FREQUENCY: SEMI-ANNUALLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-81	S	6	Card Sound Vicinity of Turkey Point Facility
<u>Control:</u>			
T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park

SAMPLES COLLECTED: BROAD LEAF VEGETATION  
SAMPLE COLLECTION FREQUENCY: MONTHLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-40	W	3	South of Palm Dr. on S.W. 117th Street Extension
T-41	WNW	2	Palm Dr. West of FPL Satellite School near the site boundary
<u>Control:</u>			
T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park

**ATTACHMENT B**

**RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S**

**TURKEY POINT SITE**

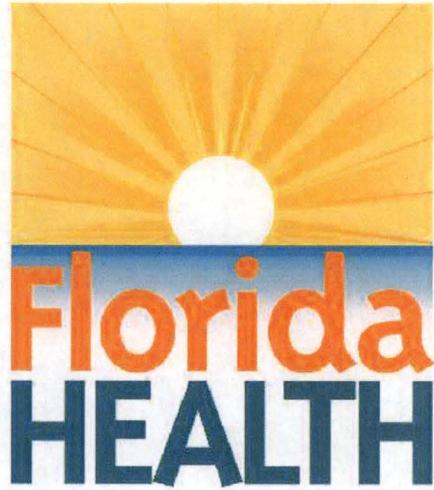
**2017**

**First Quarter, 2017**

**Second Quarter, 2017**

**Third Quarter, 2017**

**Fourth Quarter, 2017**



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

FIRST QUARTER 2017

BUREAU OF RADIATION CONTROL

TURKEY POINT SITE

Offsite Dose Calculation Manual Sampling

First Quarter, 2017

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	23	46
2. Airborne			
2.a. Air Iodines	Weekly	6	78
2.b. Air Particulates	Weekly	6	78
3. Waterborne			
3.a. Surface Water	Monthly	3	9
3.b. Shoreline Sediment	Semiannually	3	3
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	0
4.a.2. Fish	Semiannually	2	0
4.b. Broadleaf Vegetation	Monthly	3	9
			Total: 223

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - DUAL DEPLOYED TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment	
	14-Dec-16 Collection	21-Mar-17
	Old	New
N-2	3.39 ± 0.54	3.82 ± 0.40
N-7	2.95 ± 0.24	3.09 ± 0.26
N-10	3.57 ± 0.18	3.61 ± 0.34
NNW-2	3.24 ± 0.14	3.25 ± 0.15
NNW-10	3.55 ± 0.14	3.49 ± 0.25
NW-1	3.91 ± 0.12	3.82 ± 0.06
NW-5	3.16 ± 0.17	3.02 ± 0.32
NW-10	4.11 ± 0.06	4.17 ± 0.31
WNW-2	3.46 ± 0.36	3.40 ± 0.05
WNW-10	3.88 ± 0.10	3.77 ± 0.12
W-1	3.11 ± 0.56	3.10 ± 0.20
W-5	3.17 ± 0.19	3.10 ± 0.16
W-9	3.13 ± 0.22	3.12 ± 0.23
WSW-8	3.24 ± 0.07	3.15 ± 0.32
SW-1	3.65 ± 0.16	4.39 ± 0.90
SW-8	2.84 ± 0.18	2.75 ± 0.19
SSW-5	2.93 ± 0.13	2.86 ± 0.29
SSW-10	3.10 ± 0.18	2.96 ± 0.34
S-5	2.90 ± 0.15	2.68 ± 0.32
S-10	3.42 ± 0.37	3.22 ± 0.43
SSE-1	2.77 ± 0.30	2.69 ± 0.29
SSE-10	2.98 ± 0.28	2.93 ± 0.18
NNE-22	3.71 ± 0.16	3.54 ± 0.12

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
04-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
18-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
25-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02
01-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
07-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
14-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
20-Feb-17	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
28-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
07-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
15-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
21-Mar-17	<0.02	<0.03	<0.02	<0.02	<0.02	<0.02
29-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
04-Jan-17	0.011 ± 0.002	0.008 ± 0.002	0.010 ± 0.002	0.010 ± 0.002	0.007 ± 0.002	0.007 ± 0.002
11-Jan-17	0.011 ± 0.002	0.012 ± 0.002	0.009 ± 0.002	0.012 ± 0.002	0.013 ± 0.002	0.005 ± 0.002
18-Jan-17	0.010 ± 0.002	0.009 ± 0.002	0.009 ± 0.002	0.010 ± 0.002	0.011 ± 0.002	0.007 ± 0.002
25-Jan-17	0.009 ± 0.002	0.013 ± 0.002	0.013 ± 0.002	0.014 ± 0.002	0.011 ± 0.002	0.012 ± 0.002
01-Feb-17	0.014 ± 0.002	0.017 ± 0.002	0.020 ± 0.003	0.012 ± 0.002	0.017 ± 0.003	0.022 ± 0.003
07-Feb-17	0.009 ± 0.003	0.014 ± 0.003	0.014 ± 0.003	0.008 ± 0.003	0.021 ± 0.003	0.012 ± 0.003
14-Feb-17	0.007 ± 0.002	0.014 ± 0.002	0.012 ± 0.002	0.008 ± 0.002	0.013 ± 0.002	0.010 ± 0.002
20-Feb-17	0.019 ± 0.003	0.021 ± 0.003	0.017 ± 0.002	0.018 ± 0.002	0.017 ± 0.002	0.019 ± 0.003
28-Feb-17	0.012 ± 0.002	0.015 ± 0.002	0.011 ± 0.002	0.013 ± 0.002	0.014 ± 0.002	0.013 ± 0.002
07-Mar-17	0.013 ± 0.002	0.012 ± 0.002	0.014 ± 0.002	0.016 ± 0.002	0.019 ± 0.002	0.015 ± 0.002
15-Mar-17	0.013 ± 0.002	0.009 ± 0.002	0.012 ± 0.002	0.010 ± 0.002	0.013 ± 0.002	0.011 ± 0.002
21-Mar-17	0.019 ± 0.003	0.025 ± 0.003	0.022 ± 0.003	0.022 ± 0.003	0.024 ± 0.003	0.029 ± 0.003
29-Mar-17	0.019 ± 0.002	0.016 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	0.019 ± 0.002	0.017 ± 0.002
Average:	0.013 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.013 ± 0.001	0.015 ± 0.001	0.014 ± 0.001

2.b.2. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T41	0.1542 ± 0.0126	<0.0366	<0.0015	<0.0013	<0.0403
T51	0.1739 ± 0.0125	0.0158 ± 0.0070	<0.0014	<0.0012	<0.0388
T57	0.1309 ± 0.0111	<0.0244	<0.0013	<0.0013	<0.0360
T58	0.1310 ± 0.0098	<0.0179	<0.0013	<0.0011	<0.0192
T64	0.1666 ± 0.0120	<0.0226	<0.0016	<0.0010	<0.0407
T72	0.1324 ± 0.0098	<0.0190	<0.0015	<0.0011	<0.0200

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T42	25-Jan-17	<155	320 ± 24	<3	<3	<6	<4	<8	<6	<6	<3	<3	<5
	21-Feb-17	<157	316 ± 25	<3	<3	<7	<4	<7	<6	<4	<3	<4	<7
	22-Mar-17	128 ± 28	311 ± 38	<6	<6	<13	<7	<14	<9	<9	<5	<7	<12
T67	24-Jan-17	<156	360 ± 41	<6	<7	<14	<7	<15	<10	<11	<6	<7	<9
	20-Feb-17	<148	196 ± 33	<6	<6	<13	<7	<13	<9	<8	<5	<5	<10
	21-Mar-17	<156	150 ± 30	<7	<5	<12	<7	<14	<11	<9	<5	<7	<9
T81	24-Jan-17	<156	284 ± 24	<3	<4	<6	<4	<8	<6	<7	<3	<4	<5
	21-Feb-17	<161	405 ± 43	<6	<6	<11	<7	<14	<12	<7	<6	<6	<12
	22-Mar-17	<156	341 ± 26	<3	<3	<7	<3	<8	<6	<6	<3	<3	<5

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
T42	25-Jan-17	<80	139 ± 24	<8	<7	<7	<8	424 ± 61	552 ± 223	<31	30 ± 13	341 ± 21
T67	24-Jan-17	<108	511 ± 62	<10	<11	<8	<10	<808	<257	<52	<16	257 ± 46
T81	24-Jan-17	103 ± 24	128 ± 28	<10	<10	<10	<10	707 ± 108	1518 ± 107	<45	<16	594 ± 30

4.a.1. CRUSTACEA - Blue Crab - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	This sample to be collected.										
T81	This sample to be collected.										

4.a.2. FISH - Mixed Species - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	This sample to be collected.										
T81	This sample to be collected.										

4.b. BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
T40	26-Jan-17	1823 ± 63	4519 ± 162	<13	<7	62 ± 4	474 ± 84	<17	<186	<29
	20-Feb-17	1430 ± 78	4225 ± 198	<17	<11	97 ± 8	<1201	<27	<285	<51
	21-Mar-17	3369 ± 118	5041 ± 219	<16	<12	<18	784 ± 383	<34	<329	<67
T41	26-Jan-17	2309 ± 77	4858 ± 177	<13	<7	13 ± 2	537 ± 105	<18	<205	<37
	20-Feb-17	866 ± 58	5153 ± 219	<15	<11	13 ± 4	<939	<25	<270	<58
	21-Mar-17	2213 ± 101	7365 ± 302	<21	<13	16 ± 6	<1469	<32	<361	<80
T67	24-Jan-17	1390 ± 79	3803 ± 187	<22	<12	10 ± 4	<976	<27	<294	<57
	20-Feb-17	849 ± 45	4538 ± 172	<12	<8	<12	336 ± 91	<18	<211	<37
	21-Mar-17	1861 ± 68	5707 ± 203	<12	<9	8 ± 2	515 ± 99	12 ± 4	<231	<38

TURKEY POINT SITE

Supplemental Sampling

First Quarter, 2017

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	9	18
2. Airborne			
2.a. Air Iodines	Weekly	2	26
2.b. Air Particulates	Weekly	2	26
3. Waterborne			
3.a. Surface Water	Monthly	4	12
3.b. Shoreline Sediment	Semiannually	10	9
3.c. Aquatic Vegetation	Quarterly	1	0
4. Ingestion			
4.a. Milk	Semiannually	1	0
4.b. Marine Life	Semiannually	1	0
4.c. Food Crops	At Harvest	3	3
			Total: 94

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

1. DIRECT RADIATION - DUAL DEPLOYED TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 14-Dec-16 Collection 21-Mar-17	
	Old	New
NNW-6	$3.30 \pm 0.14$	$3.24 \pm 0.21$
NW-7	$3.76 \pm 0.17$	$3.62 \pm 0.22$
NW-8	$3.81 \pm 0.42$	$3.86 \pm 0.25$
WNW-3	$3.62 \pm 0.17$	$3.41 \pm 0.08$
WNW-6	$3.34 \pm 0.35$	$3.29 \pm 0.21$
W-8	$3.62 \pm 0.27$	$3.58 \pm 0.20$
ENE-1	$2.72 \pm 0.07$	$2.57 \pm 0.22$
T72	$3.27 \pm 0.27$	$3.55 \pm 0.16$
PTN-1	$2.80 \pm 0.28$	$3.43 \pm 0.17$

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - ( $\text{pCi}/\text{m}^3$ )

Collection Date	T52	T56
04-Jan-17	<0.02	<0.02
11-Jan-17	<0.02	<0.02
18-Jan-17	<0.02	<0.02
25-Jan-17	<0.02	<0.02
01-Feb-17	<0.02	<0.02
07-Feb-17	<0.02	<0.02
14-Feb-17	<0.02	<0.02
20-Feb-17	<0.03	<0.03
28-Feb-17	<0.02	<0.02
07-Mar-17	<0.02	<0.02
15-Mar-17	<0.02	<0.02
21-Mar-17	<0.02	<0.02
29-Mar-17	<0.02	<0.02

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

Collection Date	T52	T56
04-Jan-17	0.010 ± 0.002	0.012 ± 0.002
11-Jan-17	0.012 ± 0.002	0.007 ± 0.002
18-Jan-17	0.009 ± 0.002	0.011 ± 0.002
25-Jan-17	0.009 ± 0.002	0.016 ± 0.002
01-Feb-17	0.012 ± 0.002	0.020 ± 0.003
07-Feb-17	0.010 ± 0.003	0.012 ± 0.003
14-Feb-17	0.009 ± 0.002	0.015 ± 0.002
20-Feb-17	0.015 ± 0.002	0.018 ± 0.002
28-Feb-17	0.016 ± 0.002	0.012 ± 0.002
07-Mar-17	0.006 ± 0.002	0.014 ± 0.002
15-Mar-17	0.014 ± 0.002	0.011 ± 0.002
21-Mar-17	0.015 ± 0.002	0.023 ± 0.003
29-Mar-17	0.016 ± 0.002	0.017 ± 0.002
Average:	0.012 ± 0.001	0.015 ± 0.001

2.b.2. AIR PARTICULATES GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T52	0.1176 ± 0.0104	<0.0215	<0.0015	<0.0014	<0.0361
T56	0.1736 ± 0.0106	<0.0130	<0.0013	<0.0013	0.0116 ± 0.0035

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T08	24-Jan-17	5125 ± 125	609 ± 53	<6	<7	<13	<7	<14	<11	<11	<5	<6	<11
	21-Feb-17	6958 ± 139	689 ± 37	<4	<4	<7	<4	<8	<6	<4	<3	<4	<7
	22-Mar-17	24483 ± 254	725 ± 38	<4	<3	<9	<3	<9	<7	<6	<4	<4	<4
T75	24-Jan-17	<156	<87	<6	<6	<13	<6	<13	<11	<11	<5	<7	<9
	20-Feb-17	<142	<94	<5	<6	<11	<7	<15	<9	<7	<6	<7	<12
	22-Mar-17	<156	<44	<3	<3	<6	<3	<6	<6	<5	<3	<3	<5
T84	24-Jan-17	5094 ± 123	717 ± 55	<6	<7	<13	<7	<15	<11	<10	<6	<6	<12
	21-Feb-17	7989 ± 147	599 ± 35	<4	<3	<8	<4	<10	<7	<5	<4	<4	<7
	22-Mar-17	15452 ± 204	803 ± 58	<7	<6	<15	<7	<16	<12	<10	<5	<8	<9
T97	25-Jan-17	4399 ± 116	770 ± 58	<6	<6	<13	<8	<16	<11	<12	<6	<8	<11
	21-Feb-17	7876 ± 146	654 ± 53	<7	<6	<14	<7	<14	<12	<8	<7	<7	<10
	22-Mar-17	15754 ± 206	776 ± 58	<6	<8	<15	<7	<15	<12	<11	<6	<7	<11

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
T01	25-Jan-17	<133	195 ± 51	<16	<15	<13	<13	<1115	1388 ± 134	<58	<23	311 ± 66
T02	26-Jan-17	156 ± 49	912 ± 99	<19	<22	<16	<19	1000 ± 298	<430	<92	96 ± 38	515 ± 78
T03	26-Jan-17	770 ± 67	3708 ± 173	<20	<21	<18	82 ± 2	2611 ± 170	1940 ± 589	312 ± 22	113 ± 34	835 ± 50
T04	24-Jan-17	543 ± 45	442 ± 48	<12	<13	<12	22 ± 3	2556 ± 166	970 ± 330	64 ± 9	51 ± 19	650 ± 34
T07	26-Jan-17	<197	1109 ± 114	<19	<21	<18	57 ± 8	798 ± 326	1294 ± 153	87 ± 19	<27	409 ± 51
T08	26-Jan-17	213 ± 27	786 ± 58	<11	<13	<11	<13	1111 ± 134	1580 ± 117	<54	<18	311 ± 26
T10	26-Jan-17	293 ± 58	995 ± 104	<20	<19	<15	<20	<811	1226 ± 153	<91	<28	293 ± 78
T84*	24-Jan-17	<240	1310 ± 125	<26	<31	<22	<27	787 ± 352	2360 ± 192	<116	<32	212 ± 49
T85*	24-Jan-17	<155	396 ± 71	<18	<20	<15	<19	891 ± 410	1138 ± 143	<82	<26	364 ± 47

\*Note that site T84 is the same location as site T05, and site T85 is the same location as site T06.

3.c. AQUATIC VEGETATION - Non-Specific - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	Mn-54	Co-58	Co-60	Ag-110m	I-131	Cs-134	Cs-137	Ra-226	Ra-228
T84	No sample available this quarter.											

4.a. GOAT'S MILK - (pCi/L)

Sample Site	Collection Date	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ba-140</u> <u>La-140</u> (A)
T99	This sample to be collected.					

(A) - This tabulated LLD value is for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity.

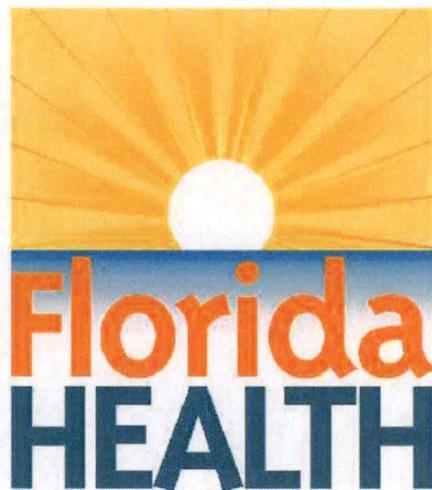
4.b. MARINE LIFE - Horseshoe Crab - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Ag-110m	Cs-134	Cs-137	Ra-226	Ra-228
T84	No sample available this quarter.											

4.c. FOOD CROPS - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	Mn-54	Co-58	Co-60	Ag-110m	I-131	Cs-134	Cs-137	Ra-226	Ra-228
T43(a)	20-Feb-17	<53	3011 ± 118	<7	<6	<8	<6	<7	<6	<9	<140	<24
T44(b)	20-Feb-17	<75	2132 ± 121	<11	<10	<12	<9	<11	<9	<11	<213	<45
T45(c)	15-Mar-17	<86	2981 ± 151	<12	<11	<13	<9	<19	<10	<11	<220	<47

- (A) Coconut milk
- (B) Corn
- (C) Green string bean



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

SECOND QUARTER 2017

BUREAU OF RADIATION CONTROL

TURKEY POINT SITE

Offsite Dose Calculation Manual Sampling

Second Quarter, 2017

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	23	23
2. Airborne			
2.a. Air Iodines	Weekly	6	78
2.b. Air Particulates	Weekly	6	78
3. Waterborne			
3.a. Surface Water	Monthly	3	9
3.b. Shoreline Sediment	Semiannually	3	0
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	2
4.a.2. Fish	Semiannually	2	2
4.b. Broadleaf Vegetation	Monthly	3	9

Total: 201

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - DUAL DEPLOYED TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment	
	21-Mar-17 Collection	14-Jun-17
	Old	New
N-2	3.12 $\pm$ 0.38	3.43 $\pm$ 0.35
N-7	2.51 $\pm$ 0.18	2.85 $\pm$ 0.15
N-10	2.89 $\pm$ 0.38	3.23 $\pm$ 0.32
NNW-2	2.64 $\pm$ 0.23	2.79 $\pm$ 0.08
NNW-10	2.81 $\pm$ 0.41	3.04 $\pm$ 0.19
NW-1	3.31 $\pm$ 0.36	3.47 $\pm$ 0.07
NW-5	2.52 $\pm$ 0.24	2.79 $\pm$ 0.14
NW-10	3.40 $\pm$ 0.17	3.62 $\pm$ 0.40
WNW-2	2.77 $\pm$ 0.16	3.05 $\pm$ 0.16
WNW-10	3.38 $\pm$ 0.19	3.62 $\pm$ 0.27
W-1	2.59 $\pm$ 0.06	2.67 $\pm$ 0.04
W-5	2.57 $\pm$ 0.14	2.78 $\pm$ 0.15
W-9	2.48 $\pm$ 0.14	2.63 $\pm$ 0.10
WSW-8	2.69 $\pm$ 0.12	2.86 $\pm$ 0.26
SW-1	2.94 $\pm$ 0.36	3.23 $\pm$ 0.13
SW-8	2.21 $\pm$ 0.32	2.44 $\pm$ 0.02
SSW-5	2.33 $\pm$ 0.12	2.57 $\pm$ 0.24
SSW-10	2.38 $\pm$ 0.06	2.58 $\pm$ 0.20
S-5	2.24 $\pm$ 0.14	2.32 $\pm$ 0.33
S-10	2.64 $\pm$ 0.10	2.97 $\pm$ 0.23
SSE-1	2.18 $\pm$ 0.13	2.39 $\pm$ 0.10
SSE-10	2.34 $\pm$ 0.05	2.52 $\pm$ 0.09
NNE-22	3.00 $\pm$ 0.18	3.28 $\pm$ 0.22

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
04-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
19-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
25-Apr-17	<0.02	<0.03	<0.03	<0.03	<0.03	<0.03
03-May-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
10-May-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
17-May-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
23-May-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
31-May-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
14-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.03
20-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
27-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
04-Apr-17	0.017 ± 0.002	0.015 ± 0.002	0.019 ± 0.002	0.022 ± 0.003	0.018 ± 0.002	0.016 ± 0.002
11-Apr-17	0.022 ± 0.002	0.019 ± 0.002	0.018 ± 0.002	0.019 ± 0.002	0.022 ± 0.002	0.020 ± 0.002
19-Apr-17	0.019 ± 0.002	0.019 ± 0.002	0.016 ± 0.002	0.016 ± 0.002	0.014 ± 0.002	0.018 ± 0.002
25-Apr-17	0.010 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.012 ± 0.002	0.015 ± 0.002	0.019 ± 0.002
03-May-17	0.011 ± 0.002	0.011 ± 0.002	0.012 ± 0.002	0.012 ± 0.002	0.012 ± 0.002	0.011 ± 0.002
10-May-17	0.012 ± 0.002	0.018 ± 0.002	0.014 ± 0.002	0.011 ± 0.002	0.016 ± 0.002	0.016 ± 0.002
17-May-17	0.011 ± 0.002	0.019 ± 0.002	0.018 ± 0.002	0.009 ± 0.002	0.017 ± 0.002	0.019 ± 0.002
23-May-17	0.015 ± 0.002	0.016 ± 0.002	0.017 ± 0.002	0.014 ± 0.002	0.020 ± 0.002	0.018 ± 0.002
31-May-17	0.011 ± 0.002	0.015 ± 0.002	0.016 ± 0.002	0.015 ± 0.002	0.014 ± 0.002	0.015 ± 0.002
06-Jun-17	0.007 ± 0.002	0.009 ± 0.002	0.009 ± 0.002	0.010 ± 0.002	0.012 ± 0.002	0.014 ± 0.002
14-Jun-17	0.010 ± 0.002	0.013 ± 0.002	0.007 ± 0.002	0.009 ± 0.002	0.007 ± 0.002	0.009 ± 0.002
20-Jun-17	0.008 ± 0.002	0.011 ± 0.002	0.011 ± 0.002	0.008 ± 0.002	0.009 ± 0.002	0.010 ± 0.002
27-Jun-17	0.008 ± 0.002	0.008 ± 0.002	0.008 ± 0.002	0.011 ± 0.002	0.009 ± 0.002	0.010 ± 0.002
Average:	0.012 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.013 ± 0.001	0.014 ± 0.001	0.015 ± 0.001

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T41	0.1340 ± 0.0094	<0.0134	<0.0014	<0.0012	0.0105 ± 0.0039
T51	0.1500 ± 0.0111	<0.0235	<0.0013	<0.0010	<0.0312
T57	0.1410 ± 0.0095	<0.0148	<0.0015	<0.0012	<0.0203
T58	0.1400 ± 0.0106	<0.0292	<0.0015	<0.0011	<0.0393
T64	0.1570 ± 0.0099	<0.0140	<0.0016	<0.0009	<0.0196
T72	0.1470 ± 0.0114	<0.0307	<0.0014	<0.0014	<0.0373

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T42	20-Apr-17	<147	411 ± 43	<6	<6	<13	<6	<14	<9	<9	<6	<7	<9
	17-May-17	89 ± 27	379 ± 27	<3	<3	<7	<3	<7	<6	<3	<3	<4	<7
	14-Jun-17	<147	318 ± 24	<3	<3	<7	<3	<7	<6	<6	<3	<4	<6
T67	20-Apr-17	<147	209 ± 19	<3	<3	<6	<4	<7	<5	<5	<3	<4	<5
	17-May-17	<143	308 ± 37	<5	<7	<14	<7	<11	<11	<9	<5	<7	<11
	13-Jun-17	<147	203 ± 19	<3	<4	<7	<3	<7	<5	<4	<3	<4	<5
T81	20-Apr-17	<147	455 ± 29	<3	<3	<8	<4	<7	<6	<5	<3	<3	<6
	17-May-17	<144	371 ± 42	<7	<6	<12	<7	<12	<12	<10	<6	<6	<9
	13-Jun-17	<145	473 ± 45	<6	<6	<13	<8	<15	<11	<11	<6	<7	<11

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232
These samples were previously collected.										

4.a.1. CRUSTACEA - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67(A)	14-Jun-17	1428 ± 188	<31	<26	<57	<28	<51	<23	<26	<502	<122
T81(B)	13-Jun-17	1271 ± 122	<23	<20	<42	<22	<52	<21	<22	<484	<96

(A) Blue Crab  
(B) Land Crab

4.a.2. FISH - Mixed Species - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	15-May-17	3346 ± 245	<25	<23	<59	<29	<67	<22	<26	<441	<104
T81	15-May-17	2201 ± 157	<20	<18	<43	<17	<44	<20	<22	<273	<63

4.b. BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
T40	19-Apr-17	2167 ± 108	4465 ± 217	<49	<15	73 ± 8	<1428	<30	<298	<74
	17-May-17	1330 ± 84	3680 ± 186	<36	<13	16 ± 5	<1010	<34	<308	<60
	14-Jun-17	2289 ± 104	4358 ± 216	<18	<14	58 ± 8	<1133	<35	<341	<69
T41	19-Apr-17	622 ± 41	5613 ± 200	<31	<8	19 ± 3	<368	<17	<197	<37
	17-May-17	1210 ± 49	5360 ± 186	<9	<8	30 ± 3	<336	<16	<182	<28
	14-Jun-17	1470 ± 59	5290 ± 189	<11	<8	18 ± 3	<260	<18	<209	<36
T67	20-Apr-17	748 ± 63	5341 ± 233	<40	<14	<20	<1122	<27	<309	<58
	17-May-17	726 ± 62	5200 ± 236	<17	<13	19 ± 5	<1090	<24	<311	<75
	13-Jun-17	1684 ± 67	4461 ± 171	<16	<9	21 ± 3	209 ± 83	<19	<215	<39

TURKEY POINT SITE

Supplemental Sampling

Second Quarter, 2017

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	9	9
2. Airborne			
2.a. Air Iodines	Weekly	2	26
2.b. Air Particulates	Weekly	2	26
3. Waterborne			
3.a. Surface Water	Monthly	4	12
3.b. Shoreline Sediment	Semiannually	9	0
4. Ingestion			
4.a. Milk	Semiannually	1	1
4.b. Food Crops	At Harvest	3	0

Total: 74

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

1. DIRECT RADIATION - DUAL DEPLOYED TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 21-Mar-17 Collection 14-June-17	
	Old	New
NNW-6	$2.58 \pm 0.11$	$2.82 \pm 0.28$
NW-7	$3.04 \pm 0.28$	$3.37 \pm 0.34$
NW-8	$3.14 \pm 0.46$	$3.34 \pm 0.24$
WNW-3	$2.91 \pm 0.06$	$3.28 \pm 0.19$
WNW-6	$2.68 \pm 0.17$	$2.79 \pm 0.03$
W-8	$3.07 \pm 0.06$	$3.09 \pm 0.34$
ENE-1	$2.03 \pm 0.22$	$2.30 \pm 0.15$
T72	$2.77 \pm 0.10$	$2.95 \pm 0.19$
PTN-1	$2.69 \pm 0.19$	$3.06 \pm 0.23$

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - ( $\text{pCi}/\text{m}^3$ )

Collection Date	T52	T56
04-Apr-17	<0.02	<0.02
11-Apr-17	<0.02	<0.02
19-Apr-17	<0.02	<0.02
25-Apr-17	<0.03	<0.02
03-May-17	<0.01	<0.02
10-May-17	<0.02	<0.02
17-May-17	<0.02	<0.02
23-May-17	<0.02	<0.02
31-May-17	<0.02	<0.02
06-Jun-17	<0.02	<0.02
14-Jun-17	<0.02	<0.02
20-Jun-17	<0.02	<0.02
27-Jun-17	<0.02	<0.02

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
04-Apr-17	0.013 ± 0.002	0.019 ± 0.002
11-Apr-17	0.017 ± 0.002	0.019 ± 0.002
19-Apr-17	0.069 ± 0.003	0.015 ± 0.002
25-Apr-17	0.030 ± 0.003	0.010 ± 0.002
03-May-17	0.010 ± 0.002	0.011 ± 0.002
10-May-17	0.030 ± 0.003	0.013 ± 0.002
17-May-17	0.014 ± 0.002	0.022 ± 0.002
23-May-17	0.016 ± 0.002	0.020 ± 0.002
31-May-17	0.009 ± 0.002	0.016 ± 0.002
06-Jun-17	0.006 ± 0.002	0.008 ± 0.002
14-Jun-17	0.008 ± 0.002	0.009 ± 0.002
20-Jun-17	0.011 ± 0.002	0.007 ± 0.002
27-Jun-17	0.007 ± 0.002	0.013 ± 0.002
Average:	0.018 ± 0.001	0.014 ± 0.001

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

<u>Sample Site</u>	<u>Be-7</u>	<u>K-40</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>
T52	0.1140 ± 0.0087	<0.0150	<0.0017	<0.0011	<0.0200
T56	0.1570 ± 0.0115	<0.0253	<0.0013	<0.0014	<0.0388

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T08	20-Apr-17	19152 ± 221	710 ± 38	<3	<3	<7	<4	<8	<6	<5	<3	<4	<4
	17-May-17	14156 ± 192	735 ± 39	<3	<3	<7	<3	<8	<6	<4	<3	<4	<7
	13-Jun-17	6226 ± 131	662 ± 36	<4	<3	<6	<4	<8	<5	<4	<4	<3	<5
T75	19-Apr-17	<140	<75	<6	<7	<13	<7	<12	<9	<9	<5	<6	<11
	17-May-17	<144	<38	<3	<3	<6	<3	<6	<5	<5	<3	<3	<5
	14-Jun-17	<147	<41	<3	<3	<7	<3	<6	<6	<6	<3	<4	<5
T84	20-Apr-17	18200 ± 216	679 ± 53	<6	<7	<16	<8	<14	<10	<9	<6	<8	<10
	17-May-17	12752 ± 182	705 ± 37	<4	<3	<8	<3	<8	<6	<6	<4	<4	<4
	14-Jun-17	6287 ± 132	737 ± 54	<6	<7	<13	<6	<16	<11	<11	<5	<6	<9
T97	20-Apr-17	18866 ± 219	767 ± 57	<7	<6	<14	<8	<16	<10	<10	<6	<7	<11
	17-May-17	13507 ± 187	730 ± 39	<3	<4	<8	<4	<8	<6	<5	<3	<3	<3
	14-Jun-17	6110 ± 130	601 ± 52	<6	<7	<14	<7	<15	<11	<10	<5	<6	<12

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232
These samples were previously collected.										

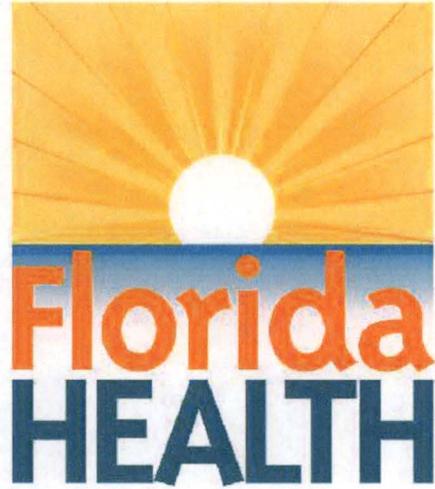
4.a. GOAT'S MILK - (pCi/L)

Sample Site	Collection Date	K-40	I-131	Cs-134	Cs-137	Ba-140 La-140 (A)
T99	06-Jun-17	1841 ± 91	<7	<6	<9	<14

(A) - This tabulated LLD value is for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity.

4.b. FOOD CROPS - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	Mn-54	Co-58	Co-60	Ag-110m	I-131	Cs-134	Cs-137	Ra-226	Ra-228
T43	This sample was previously collected.											
T44	This sample was previously collected.											
T45	This sample was previously collected.											



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

THIRD QUARTER 2017

BUREAU OF RADIATION CONTROL

TURKEY POINT SITE

Offsite Dose Calculation Manual Sampling

Third Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	23	22
2. Airborne			
2.a. Air Iodines	Weekly	6	72
2.b. Air Particulates	Weekly	6	72
3. Waterborne			
3.a. Surface Water	Monthly	3	9
3.b. Shoreline Sediment	Semiannually	3	3
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	0
4.a.2. Fish	Semiannually	2	0
4.b. Broadleaf Vegetation	Monthly	3	9
			Total: 187

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 14-Jun-17 Collection 20-Sep-17	
	Old	New
N-2	3.58 $\pm$ 0.38	3.52 $\pm$ 0.11
N-7	3.12 $\pm$ 0.05	2.82 $\pm$ 0.16
N-10	3.32 $\pm$ 0.46	3.28 $\pm$ 0.20
NNW-2	3.31 $\pm$ 0.32	3.20 $\pm$ 0.11
NNW-10	3.45 $\pm$ 0.32	3.38 $\pm$ 0.56
NW-1	3.73 $\pm$ 0.27	3.60 $\pm$ 0.67
NW-5	3.03 $\pm$ 0.10	2.93 $\pm$ 0.17
NW-10	4.04 $\pm$ 0.35	3.90 $\pm$ 0.41
WNW-2	3.24 $\pm$ 0.13	3.12 $\pm$ 0.40
WNW-10	3.79 $\pm$ 0.30	3.56 $\pm$ 0.22
W-1	3.10 $\pm$ 0.11	3.10 $\pm$ 0.62
W-5	3.16 $\pm$ 0.18	3.10 $\pm$ 0.06
W-9	3.01 $\pm$ 0.10	2.78 $\pm$ 0.09
WSW-8	2.99 $\pm$ 0.30	3.13 $\pm$ 0.17
SW-1	3.52 $\pm$ 0.32	3.31 $\pm$ 0.20
SW-8	2.70 $\pm$ 0.25	2.61 $\pm$ 0.18
SSW-5	2.83 $\pm$ 0.14	2.82 $\pm$ 0.29
SSW-10	(A)	
S-5	2.76 $\pm$ 0.16	2.66 $\pm$ 0.27
S-10	3.20 $\pm$ 0.11	3.34 $\pm$ 0.24
SSE-1	2.59 $\pm$ 0.23	2.53 $\pm$ 0.30
SSE-10	2.84 $\pm$ 0.52	2.79 $\pm$ 0.05
NNE-22	3.52 $\pm$ 0.35	3.30 $\pm$ 0.25

(A) TLD's lost due to Hurricane Irma.

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
05-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
11-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
17-Jul-17	<0.03	<0.03	<0.03	<0.02	<0.03	<0.03
24-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
31-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02
08-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
16-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
23-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
30-Aug-17	<0.03	<0.03	<0.15(A)	<0.03	<0.03	<0.03
06-Sep-17	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
19-Sep-17*	<0.01	<0.01	<0.03(B)	<0.01	<0.01	<0.01
27-Sep-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

\* This week's collection was a two-week run time because of inaccessibility to roads and sample sites due to Hurricane Irma.

(A) Vacuum pump failed and was replaced. Estimated run time 31.6 out of 169 hours.

(B) Power outage due to Hurricane Irma. Estimated run time 144.7 out of 315.75 hours.

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
05-Jul-17	0.008 ± 0.001	0.008 ± 0.001	0.007 ± 0.001	0.011 ± 0.002	0.006 ± 0.001	0.009 ± 0.002
11-Jul-17	0.010 ± 0.002	0.010 ± 0.002	0.009 ± 0.002	0.007 ± 0.002	0.010 ± 0.002	0.009 ± 0.002
17-Jul-17	0.006 ± 0.002	0.009 ± 0.002	0.009 ± 0.002	0.006 ± 0.002	0.008 ± 0.002	0.007 ± 0.002
24-Jul-17	0.012 ± 0.002	0.014 ± 0.002	0.013 ± 0.002	0.012 ± 0.002	0.009 ± 0.002	0.015 ± 0.002
31-Jul-17	0.009 ± 0.002	0.007 ± 0.002	0.010 ± 0.002	0.013 ± 0.002	0.012 ± 0.002	0.010 ± 0.002
08-Aug-17	0.017 ± 0.002	0.017 ± 0.002	0.015 ± 0.002	0.015 ± 0.002	0.017 ± 0.002	0.018 ± 0.002
16-Aug-17	0.007 ± 0.002	0.008 ± 0.002	0.007 ± 0.001	0.008 ± 0.002	0.011 ± 0.002	0.010 ± 0.002
23-Aug-17	0.013 ± 0.002	0.013 ± 0.002	0.012 ± 0.002	0.015 ± 0.002	0.012 ± 0.002	0.008 ± 0.002
30-Aug-17	0.006 ± 0.002	0.009 ± 0.002	0.028 ± 0.008(A)	0.009 ± 0.002	0.013 ± 0.002	0.016 ± 0.002
06-Sep-17	0.012 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	0.018 ± 0.002
19-Sep-17*	0.012 ± 0.001	<0.003	<0.006(B)	0.012 ± 0.001	0.008 ± 0.001	0.010 ± 0.001
27-Sep-17	0.011 ± 0.002	0.009 ± 0.002	0.008 ± 0.002	0.016 ± 0.002	0.015 ± 0.002	0.009 ± 0.002
Average:	0.010 ± 0.001	<0.010	<0.012	0.012 ± 0.001	0.011 ± 0.001	0.012 ± 0.001

\* This week's collection was a two-week run time because of inaccessibility to roads and sample sites due to Hurricane Irma.

(A) Vacuum pump failed and was replaced. Estimated run time 31.6 out of 169 hours.

(B) Power outage due to Hurricane Irma. Estimated run time 144.7 out of 315.75 hours.

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T41	0.0683 ± 0.0082	<0.0262	<0.0016	<0.0013	<0.0366
T51	0.0967 ± 0.0101	<0.0223	<0.0014	<0.0014	<0.0365
T57	0.0870 ± 0.0096	<0.0282	<0.0016	<0.0014	<0.0426
T58	0.1114 ± 0.0106	<0.0258	<0.0013	<0.0011	<0.0352
T64	0.1085 ± 0.0101	<0.0265	<0.0012	<0.0011	<0.0388
T72	0.0925 ± 0.0080	<0.0136	<0.0012	<0.0012	0.0104 ± 0.0034

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T42	19-Jul-17	<146	343 ± 43	<6	<7	<14	<7	<15	<11	<18	<5	<6	<14
	16-Aug-17	<152	289 ± 39	<6	<7	<14	<7	<14	<12	<11	<6	<6	<9
	19-Sep-17	<150	149 ± 31	<5	<6	<13	<7	<13	<11	<11	<5	<6	<10
T67	20-Jul-17	<146	258 ± 21	<4	<3	<7	<3	<9	<6	<12	<3	<3	<6
	16-Aug-17	<152	79 ± 13	<3	<3	<7	<3	<7	<6	<6	<3	<3	<5
	18-Sep-17	<150	181 ± 19	<3	<4	<7	<3	<8	<7	<7	<3	<4	<5
T81	19-Jul-17	<146	350 ± 41	<6	<7	<14	<7	<15	<11	<19	<6	<7	<15
	16-Aug-17	<152	339 ± 41	<6	<6	<13	<6	<12	<10	<10	<5	<6	<9
	20-Sep-17	<152	284 ± 39	<6	<7	<15	<6	<15	<10	<11	<5	<7	<9

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
T42	19-Jul-17	<134	<191	<13	<12	<10	<11	<912	404 ± 110	<61	25 ± 7	213 ± 56
T67	20-Jul-17	89 ± 32	<190	<12	<11	<9	<11	<807	<260	<57	<16	<186
T81	19-Jul-17	109 ± 48	<243	<16	<16	<12	<14	<1190	<410	<68	<26	370 ± 50

4.a.1. CRUSTACEA - Blue Crab - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	This sample not yet collected.										
T81	This sample not yet collected.										

4.a.2. FISH - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	This sample not yet collected.										
T81	This sample not yet collected.										

4.b. BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
T40	19-Jul-17	2020 ± 95	4490 ± 217	<17	<12	41 ± 6	<1250	<36	<384	<64
	16-Aug-17	3605 ± 135	4157 ± 211	<25	<13	36 ± 6	<1204	<29	<362	<74
	19-Sep-17	1672 ± 66	5114 ± 188	<18	<9	55 ± 4	248 ± 82	<19	<233	<38
T41	19-Jul-17	1230 ± 53	5770 ± 205	<11	<9	18 ± 3	<233	<19	<226	<39
	16-Aug-17	1361 ± 59	6024 ± 214	<17	<10	21 ± 3	<399	<19	<218	<38
	19-Sep-17	883 ± 69	3199 ± 183	<26	<14	14 ± 4	<1053	<29	<327	<61
T67	20-Jul-17	841 ± 65	6430 ± 269	<15	<14	<16	<1200	<33	<302	<73
	16-Aug-17	1605 ± 100	7572 ± 324	<28	<18	<22	<1369	<36	<383	<87
	18-Sep-17	1864 ± 71	4984 ± 186	<19	<10	<10	282 ± 88	<20	<147	<45

TURKEY POINT SITE

Supplemental Sampling

Third Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	9	8
2. Airborne			
2.a. Air Iodines	Weekly	2	24
2.b. Air Particulates	Weekly	2	24
3. Waterborne			
3.a. Surface Water	Monthly	4	12
3.b. Shoreline Sediment	Semiannually	2	2
4. Ingestion			
4.a. Milk	Semiannually	1	0
4.b. Food Crops	At Harvest	3	0
			Total: 70

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 14-Jun-17 Collection 20-Sep-17	
	Old	New
NNW-6	$3.30 \pm 0.28$	$3.08 \pm 0.25$
NW-7	$3.71 \pm 0.32$	$3.56 \pm 0.21$
NW-8	$3.75 \pm 0.15$	$3.67 \pm 0.11$
WNW-3	$3.54 \pm 0.24$	$3.44 \pm 0.22$
WNW-6	$3.30 \pm 0.44$	$3.09 \pm 0.30$
W-8	$3.44 \pm 0.17$	$3.55 \pm 0.19$
ENE-1	(A)	
T72	$3.37 \pm 0.07$	$3.27 \pm 0.11$
PTN-1	$3.33 \pm 0.32$	$3.13 \pm 0.30$

(A) Both TLD's lost due to Hurricane Irma.

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - ( $\text{pCi}/\text{m}^3$ )

Collection Date	T52	T56
05-Jul-17	<0.02	<0.02
11-Jul-17	<0.02	<0.02
17-Jul-17	<0.03	<0.03
24-Jul-17	<0.02	<0.02
31-Jul-17	<0.03	<0.02
08-Aug-17	<0.02	<0.02
16-Aug-17	<0.02	<0.02
23-Aug-17	<0.02	<0.02
30-Aug-17	<0.03	<0.03
06-Sep-17	<0.04	<0.04
19-Sep-17*	<0.01	<0.02(A)
27-Sep-17	<0.02	<0.02

\* This week's collection was a two-week run time because of inaccessibility to roads and sample sites due to Hurricane Irma the previous week.

(A) Power outage due to Hurricane Irma. Estimated run time 237.7 out of 314.75 hours.

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

Collection Date	T52	T56
05-Jul-17	0.008 ± 0.001	0.009 ± 0.002
11-Jul-17	0.007 ± 0.002	0.009 ± 0.002
17-Jul-17	0.006 ± 0.002	0.009 ± 0.002
24-Jul-17	0.009 ± 0.002	0.018 ± 0.002
31-Jul-17	0.009 ± 0.002	0.014 ± 0.002
08-Aug-17	0.012 ± 0.002	0.013 ± 0.002
16-Aug-17	0.005 ± 0.001	0.008 ± 0.002
23-Aug-17	0.015 ± 0.002	0.014 ± 0.002
30-Aug-17	0.010 ± 0.002	0.008 ± 0.002
06-Sep-17	0.011 ± 0.002	0.016 ± 0.002
19-Sep-17*	0.006 ± 0.001	0.013 ± 0.002(A)
27-Sep-17	0.010 ± 0.002	0.014 ± 0.002
Average:	0.009 ± 0.001	0.012 ± 0.001

\* This week's collection was a two-week run time because of inaccessibility to roads and sample sites due to Hurricane Irma the previous week.

(A) Power outage due to Hurricane Irma. Estimated run time 237.7 out of 314.75 hours.

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T52	0.1020 ± 0.0099	<0.0266	<0.0016	<0.0014	<0.0372
T56	0.1290 ± 0.0113	<0.0230	<0.0011	<0.0012	<0.0399

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T08	19-Jul-17	4963 ± 120	598 ± 53	<6	<7	<16	<7	<14	<11	<22	<6	<7	<18
	16-Aug-17	2428 ± 91	661 ± 54	<6	<7	<11	<6	<15	<11	<10	<6	<7	<11
	20-Sep-17	9348 ± 160	414 ± 27	<3	<3	<8	<4	<8	<7	<5	<3	<3	<5
T75	19-Jul-17	123 ± 29	19 ± 8	<4	<3	<7	<2	<7	<6	<10	<3	<4	<7
	16-Aug-17	<152	<85	<6	<7	<14	<5	<14	<10	<10	<5	<6	<9
	20-Sep-17	<150	<98	<6	<6	<12	<6	<12	<10	<10	<6	<6	<10
T84	19-Jul-17	3564 ± 105	694 ± 38	<4	<4	<9	<4	<9	<6	<13	<3	<3	<8
	16-Aug-17	2642 ± 94	663 ± 36	<3	<4	<9	<4	<9	<6	<7	<3	<4	<6
	20-Sep-17	7931 ± 149	442 ± 47	<7	<7	<14	<7	<14	<10	<12	<5	<7	<12
T97	19-Jul-17	3622 ± 105	627 ± 54	<7	<7	<16	<7	<14	<12	<21	<6	<7	<15
	16-Aug-17	2567 ± 93	522 ± 49	<5	<7	<12	<6	<13	<10	<7	<5	<7	<7
	19-Sep-17	6029 ± 132	426 ± 46	<6	<7	<13	<6	<16	<12	<12	<6	<5	<11

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
T84	19-Jul-17	<256	883 ± 136	<31	42 ± 6	<24	32 ± 5	<2210	2270 ± 244	<135	143 ± 15	<361
T85	19-Jul-17	<161	232 ± 79	<20	<17	<15	<18	1670 ± 600	1270 ± 165	<92	80 ± 10	398 ± 74

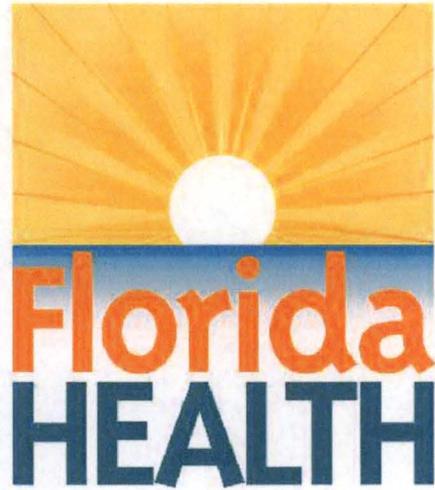
4.a. GOAT'S MILK - (pCi/L)

Sample Site	Collection Date	K-40	I-131	Cs-134	Cs-137	Ba-140 La-140 (A)
T99	This sample not yet collected.					

(A) - This tabulated LLD value is for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity.

4.c. FOOD CROPS - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	Mn-54	Co-58	Co-60	Ag-110m	I-131	Cs-134	Cs-137	Ra-226	Ra-228
T43	This sample was previously collected.											
T44	This sample was previously collected.											
T45	This sample was previously collected.											



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

FOURTH QUARTER 2017

BUREAU OF RADIATION CONTROL

TURKEY POINT SITE

Offsite Dose Calculation Manual Sampling

Fourth Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	23	23
2. Airborne			
2.a. Air Iodines	Weekly	6	78
2.b. Air Particulates	Weekly	6	78
3. Waterborne			
3.a. Surface Water	Monthly	3	9
3.b. Shoreline Sediment	Semiannually	3	0
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	2
4.a.2. Fish	Semiannually	2	2
4.b. Broadleaf Vegetation	Monthly	3	9
			Total: 201

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 20-Sep-17 Collection 12-Dec-17	
	Old	New
N-2	3.80 $\pm$ 0.20	4.10 $\pm$ 0.31
N-7	3.32 $\pm$ 0.09	3.38 $\pm$ 0.06
N-10	3.75 $\pm$ 0.39	4.01 $\pm$ 0.21
NNW-2	3.73 $\pm$ 0.20	3.72 $\pm$ 0.52
NNW-10	3.95 $\pm$ 0.08	4.02 $\pm$ 0.30
NW-1	4.17 $\pm$ 0.08	4.51 $\pm$ 0.09
NW-5	3.44 $\pm$ 0.19	3.42 $\pm$ 0.41
NW-10	4.49 $\pm$ 0.50	4.55 $\pm$ 0.21
WNW-2	3.75 $\pm$ 0.14	3.75 $\pm$ 0.25
WNW-10	4.23 $\pm$ 0.26	4.48 $\pm$ 0.37
W-1	3.56 $\pm$ 0.50	3.54 $\pm$ 0.18
W-5	3.61 $\pm$ 0.37	3.55 $\pm$ 0.12
W-9	3.30 $\pm$ 0.36	3.29 $\pm$ 0.16
WSW-8	3.68 $\pm$ 0.34	3.60 $\pm$ 0.23
SW-1	3.86 $\pm$ 0.14	3.88 $\pm$ 0.36
SW-8	2.94 $\pm$ 0.19	2.86 $\pm$ 0.42
SSW-5	3.09 $\pm$ 0.37	3.22 $\pm$ 0.25
SSW-10	3.27 $\pm$ 0.19	3.39 $\pm$ 0.30
S-5	3.19 $\pm$ 0.31	3.12 $\pm$ 0.32
S-10	3.70 $\pm$ 0.14	3.51 $\pm$ 0.05
SSE-1	2.92 $\pm$ 0.14	2.95 $\pm$ 0.19
SSE-10	3.14 $\pm$ 0.40	3.22 $\pm$ 0.17
NNE-22	4.19 $\pm$ 0.43	4.02 $\pm$ 0.44

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/m<sup>3</sup>)

<u>Collection Date</u>	<u>T41</u>	<u>T51</u>	<u>T57</u>	<u>T58</u>	<u>T64</u>	<u>T72</u>
03-Oct-17	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
10-Oct-17	<0.02	<0.03	<0.02	<0.02	<0.02	<0.02
17-Oct-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
24-Oct-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
02-Nov-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
09-Nov-17	<0.02	<0.02	<0.02	<0.03	<0.02	<0.02
16-Nov-17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
21-Nov-17	<0.03	<0.04	<0.04	<0.04	<0.04	<0.04
29-Nov-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
06-Dec-17	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
12-Dec-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
21-Dec-17	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
28-Dec-17	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

Collection Date	T41	T51	T57	T58	T64	T72
03-Oct-17	0.012 ± 0.002	0.006 ± 0.002	0.009 ± 0.002	0.011 ± 0.002	0.014 ± 0.002	0.018 ± 0.002
10-Oct-17	0.007 ± 0.002	0.008 ± 0.002	0.005 ± 0.001	0.007 ± 0.002	0.009 ± 0.002	0.009 ± 0.002
17-Oct-17	0.006 ± 0.001	0.007 ± 0.001	0.007 ± 0.002	0.006 ± 0.001	0.007 ± 0.002	0.007 ± 0.002
24-Oct-17	0.015 ± 0.002	0.016 ± 0.002	0.014 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.012 ± 0.002
02-Nov-17	0.012 ± 0.001	0.008 ± 0.001	0.015 ± 0.002	0.014 ± 0.002	0.014 ± 0.002	0.015 ± 0.002
09-Nov-17	0.013 ± 0.002	0.009 ± 0.002	0.009 ± 0.002	0.010 ± 0.002	0.008 ± 0.002	0.008 ± 0.002
16-Nov-17	0.006 ± 0.001	0.008 ± 0.002	0.007 ± 0.002	0.006 ± 0.002	0.008 ± 0.002	0.008 ± 0.002
21-Nov-17	0.014 ± 0.002	0.019 ± 0.003	0.017 ± 0.003	0.021 ± 0.003	0.026 ± 0.003	0.022 ± 0.003
29-Nov-17	0.007 ± 0.001	0.010 ± 0.002	0.011 ± 0.002	0.011 ± 0.002	0.008 ± 0.002	0.008 ± 0.002
06-Dec-17	0.016 ± 0.002	0.019 ± 0.002	0.014 ± 0.002	0.025 ± 0.002	0.017 ± 0.002	0.021 ± 0.002
12-Dec-17	0.009 ± 0.002	0.011 ± 0.002	0.014 ± 0.002	0.013 ± 0.002	0.010 ± 0.002	0.015 ± 0.002
21-Dec-17	0.024 ± 0.002	0.029 ± 0.002	0.022 ± 0.002	0.022 ± 0.002	0.024 ± 0.002	0.026 ± 0.002
28-Dec-17	0.018 ± 0.002	0.016 ± 0.002	0.018 ± 0.002	0.017 ± 0.002	0.022 ± 0.003	0.015 ± 0.002
Average:	0.012 ± 0.001	0.013 ± 0.001	0.013 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.014 ± 0.001

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T41	0.1440 ± 0.0109	<0.0186	<0.0016	<0.0013	<0.0233
T51	0.1630 ± 0.0124	<0.0293	<0.0016	<0.0014	<0.0443
T57	0.1310 ± 0.0096	<0.0163	<0.0016	<0.0012	<0.0216
T58	0.1540 ± 0.0125	<0.0296	<0.0017	<0.0015	<0.0390
T64	0.1470 ± 0.0105	<0.0177	<0.0016	<0.0010	0.0133 ± 0.0043
T72	0.1500 ± 0.0118	<0.0271	<0.0014	<0.0012	<0.0420

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T42	18-Oct-17	<159	61 ± 11	<5	<6	<11	<7	<15	<9	<9	<5	<6	<9
	17-Nov-17	<147	119 ± 30	<5	<6	<12	<6	<12	<10	<8	<5	<6	<10
	12-Dec-17	<150	232 ± 22	<4	<4	<10	<5	<10	<8	<7	<4	<5	<7
T67	17-Oct-17	<159	148 ± 17	<3	<3	<6	<3	<7	<5	<6	<3	<3	<5
	16-Nov-17	<147	173 ± 34	<6	<6	<12	<7	<13	<11	<8	<5	<7	<10
	13-Dec-17	<150	267 ± 24	<5	<5	<11	<5	<10	<8	<13	<5	<4	<29
T81	18-Oct-17	<159	240 ± 38	<6	<6	<14	<6	<12	<10	<9	<5	<7	<10
	16-Nov-17	<147	240 ± 38	<6	<7	<13	<6	<14	<10	<8	<5	<6	<9
	12-Dec-17	<150	267 ± 26	<4	<5	<11	<5	<10	<8	<13	<5	<4	<10

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
T42	This sample was previously collected.											
T67	This sample was previously collected.											
T81	This sample was previously collected.											

4.a.1. CRUSTACEA - Blue Crab - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	17-Nov-17	1446 ± 177	<26	<28	<59	<25	<68	<24	<23	<475	<100
T81	17-Nov-17	1429 ± 167	<28	<27	<58	<29	<70	<24	<24	<487	<112

4.a.2. FISH - Mixed Species - (pCi/kg, wet weight)

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
T67	13-Dec-17	2816 ± 170	<22	<26	<63	<25	<57	<27	<24	<428	<100
T81	17-Nov-17	2561 ± 216	<25	<27	<57	<26	<65	<25	<23	<448	<118

4.b. BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
T40	18-Oct-17	1659 ± 91	3629 ± 202	<18	<15	<24	<1158	<29	<374	<77
	17-Nov-17	1660 ± 89	3650 ± 197	<20	<15	19 ± 5	<1160	<30	<339	<73
	12-Dec-17	742 ± 40	3794 ± 138	<19	<11	36 ± 4	<237	<17	<195	<39
T41	18-Oct-17	1538 ± 59	2472 ± 111	<10	<7	<10	239 ± 71	<17	<199	<33
	17-Nov-17	569 ± 59	4270 ± 216	<23	<15	<20	<1140	<31	<331	<83
	12-Dec-17	691 ± 49	4957 ± 183	<25	<15	12 ± 3	<309	<23	<262	<55
T67	17-Oct-17	1111 ± 76	3678 ± 200	<17	<15	<19	<1120	<30	<327	<81
	16-Nov-17	1090 ± 69	3560 ± 185	<21	<12	<18	629 ± 305	<24	<330	<68
	13-Dec-17	1475 ± 62	6574 ± 228	<22	<16	<15	220 ± 96	<25	<281	<59

TURKEY POINT SITE

Supplemental Sampling

Fourth Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	9	9
2. Airborne			
2.a. Air Iodines	Weekly	2	26
2.b. Air Particulates	Weekly	2	26
3. Waterborne			
3.a. Surface Water	Monthly	4	12
3.b. Shoreline Sediment	Semiannually	2	0
4. Ingestion			
4.a. Milk	Semiannually	1	1
4.b. Food Crops	At Harvest	3	0
			Total: 74

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term. Measurement results that are not significantly above background are reported as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

The marine fauna listed in this report were collected in part, under Florida FWC SAL030.

1. DIRECT RADIATION - TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 20-Sep-17 Collection 12-Dec-17	
	Old	New
NNW-6	3.50 $\pm$ 0.32	3.59 $\pm$ 0.28
NW-7	4.10 $\pm$ 0.25	4.27 $\pm$ 0.41
NW-8	4.08 $\pm$ 0.25	4.18 $\pm$ 0.17
WNW-3	3.89 $\pm$ 0.23	4.00 $\pm$ 0.67
WNW-6	3.83 $\pm$ 0.33	3.58 $\pm$ 0.20
W-8	4.02 $\pm$ 0.39	3.94 $\pm$ 0.54
ENE-1	2.95 $\pm$ 0.07	2.99 $\pm$ 0.12
T72	3.55 $\pm$ 0.28	3.70 $\pm$ 0.21
PTN-1	3.65 $\pm$ 0.27	4.09 $\pm$ 1.42

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - ( $\text{pCi}/\text{m}^3$ )

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
03-Oct-17	<0.02	<0.01
10-Oct-17	<0.02	<0.03
17-Oct-17	<0.02	<0.02
24-Oct-17	<0.02	<0.02
02-Nov-17	<0.02	<0.02
09-Nov-17	<0.03	<0.02
16-Nov-17	<0.01	<0.01
21-Nov-17	<0.03	<0.04
29-Nov-17	<0.02	<0.02
06-Dec-17	<0.03	<0.03
12-Dec-17	<0.02	<0.02
21-Dec-17	<0.02	<0.02
28-Dec-17	<0.02	<0.02

2.b. AIR PARTICULATES - GROSS BETA - (pCi/m<sup>3</sup>)

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
03-Oct-17	0.012 ± 0.002	0.010 ± 0.002
10-Oct-17	0.008 ± 0.002	0.010 ± 0.002
17-Oct-17	0.006 ± 0.001	0.006 ± 0.001
24-Oct-17	0.015 ± 0.002	0.009 ± 0.002
02-Nov-17	0.010 ± 0.002	0.019 ± 0.002
09-Nov-17	0.009 ± 0.002	0.012 ± 0.002
16-Nov-17	0.004 ± 0.002	0.012 ± 0.002
21-Nov-17	0.028 ± 0.003	0.021 ± 0.003
29-Nov-17	0.013 ± 0.002	0.010 ± 0.002
06-Dec-17	0.021 ± 0.002	0.008 ± 0.002
12-Dec-17	0.011 ± 0.002	0.015 ± 0.002
21-Dec-17	0.029 ± 0.002	0.023 ± 0.002
28-Dec-17	0.019 ± 0.002	0.016 ± 0.002
Average:	0.014 ± 0.001	0.013 ± 0.001

2.b. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

<u>Sample Site</u>	<u>Be-7</u>	<u>K-40</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>
T52	0.1480 ± 0.0101	<0.0146	<0.0016	<0.0012	<0.0220
T56	0.1390 ± 0.0119	<0.0296	<0.0013	<0.0013	<0.0378

3.a. SURFACE WATER - (pCi/L)

Sample Site	Collection Date	H-3	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Zr-95 Nb-95 (A)	I-131	Cs-134	Cs-137	Ba-140 La-140 (B)
T08	18-Oct-17	13010 ± 189	466 ± 30	<3	<4	<8	<3	<6	<6	<5	<3	<3	<5
	16-Nov-17	9628 ± 165	457 ± 47	<6	<7	<10	<6	<14	<11	<8	<6	<7	<8
	12-Dec-17	7914 ± 150	428 ± 30	<4	<5	<11	<5	<11	<8	<10	<4	<5	<9
T75	17-Oct-17	<159	<101	<6	<6	<14	<6	<11	<11	<10	<5	<6	<10
	17-Nov-17	<147	<95	<6	<6	<12	<6	<13	<10	<8	<6	<6	<10
	12-Dec-17	<150	<51	<4	<4	<9	<4	<9	<9	<13	<5	<4	<9
T84	18-Oct-17	12705 ± 188	406 ± 28	<3	<4	<7	<4	<7	<6	<6	<3	<3	<6
	17-Nov-17	8933 ± 158	396 ± 43	<6	<6	<12	<7	<13	<11	<8	<6	<7	<9
	12-Dec-17	7433 ± 146	465 ± 32	<4	<4	<12	<5	<11	<9	<17	<5	<5	<11
T97	18-Oct-17	12135 ± 184	443 ± 29	<4	<4	<7	<4	<8	<7	<5	<3	<4	<4
	17-Nov-17	9091 ± 160	408 ± 44	<7	<6	<15	<7	<12	<12	<15	<6	<7	<13
	12-Dec-17	7679 ± 148	487 ± 30	<4	<5	<12	<5	<11	<9	<17	<5	<5	<11

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLD's.

(B) - These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b. SHORELINE SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
T84	This sample was previously collected.											
T85	This sample was previously collected.											

4.a. GOAT'S MILK - (pCi/L)

Sample Site	Collection Date	K-40	I-131	Cs-134	Cs-137	Ba-140 La-140 (A)
T99	06-Dec-17	1788 ± 68	<6	<5	3 ± 1	<10

(A) - This tabulated LLD value is for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity.

4.c. FOOD CROPS - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	Mn-54	Co-58	Co-60	Ag-110m	I-131	Cs-134	Cs-137	Ra-226	Ra-228
T43	This sample was previously collected.											
T44	This sample was previously collected.											
T45	This sample was previously collected.											

**ATTACHMENT C**

**RESULTS FROM THE 2017  
INTERLABORATORY COMPARISON PROGRAM  
CONDUCTED BY  
DEPARTMENT OF ENERGY**

**DOE-MAPEP 36 RESULTS**

Program status	Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
<b>Matrix:</b> RdF Air Filter Bq/filter					
Required	MN54	0.049		A	False Positive Test
Required	CO57	1.613	1.70	A	1.19 - 2.21
Required	CO60	0.809	0.78	A	0.55 - 1.01
	ZN65	1.402	1.29	A	0.90 - 1.68
Required	CS134	1.359	1.42	A	0.99 - 1.85
Required	CS137	0.709	0.685	A	0.480 - 0.891
<b>Matrix:</b> GrF Air Filter pCi/filter					
Required	Gross Beta	61.82	45.2	A	28.6 - 65.9
Required	Gross Alpha	83.83	85.5	A	28.6 - 133
<b>Matrix:</b> MaS Soil Bq/kg					
Required	K40	550.00	607	A	425 - 789
	MN54	952.57	967	A	677 - 1257
	CO57	0.67		A	False Positive Test
	CO60	849.43	891	A	624 - 1158
	ZN65	1.89		A	False Positive Test
	CS134	1456.23	1550	A	1085-2015
Required	CS137	610.29	611	A	428 - 794
<b>Matrix:</b> MaW Water Bq/L					
Required	H3	267.9	249	A	174 - 324
	MN54	15.705	14.9	A	10/4 - 19.4
	CO57	27.175	28.5	A	20.0 - 37.1
Required	CO60	12.640	12.3	A	8.6 - 16.0
	ZN65	0.111		A	False Positive Test
Required	CS134	-0.108		A	False Positive Test
Required	CS137	11.910	11.1	A	7.8 - 14.4
	SR90	9.12	10.1	A	7.1 - 13.1
<b>Matrix:</b> RdV Vegetation, Bq/sample :					
	MN54	3.158	3.28	A	2.30 - 4.26
	CO57	0.013		A	False Positive Test
Required	CO60	8.047	8.75	A	6.13 - 11.38
	ZN65	5.184	5.39	A	3.77 - 7.01
	CS134	6.257	6.95	A	4.87 - 9.04
Required	CS137	4.746	4.60	A	3.22 - 5.98

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

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.

### DOE-MAPEP 37 RESULTS

Program status	Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
<b>Matrix: RdF Air Filter Bq/filter</b>					
Required	MN54	1.367	1.3	A	0.91 - 1.69
Required	CO57	0.012		A	False Positive Test
Required	CO60	0.644	0.68	A	0.48 - 0.88
	ZN65	1.185	1.08	A	0.76 - 1.40
Required	CS134	0.969	1.00	A	0.70 - 1.30
Required	CS137	0.853	0.82	A	0.57 - 1.07
<b>Matrix: GrF Air Filter pCi/filter</b>					
Required	Gross Beta	54.74	61.8	A	39.1 - 90.1
Required	Gross Alpha	51.33	50.1	A	16.8 - 77.8
<b>Matrix: MaS Soil Bq/kg</b>					
Required	K40	554	592	A	414 - 770
	MN54	795	825	A	578 - 1073
	CO57	1250	1458	A	1021 - 1895
	CO60	0.08		A	False Positive Test
	ZN65	559	559	A	391 - 727
	CS134	410	448	A	314 - 582
Required	CS137	688	722	A	505 - 939
<b>Matrix: MaW Water Bq/L</b>					
Required	H3	272	258	A	181 - 335
	MN54	16.1	14.9	A	10.4 - 19.4
	CO57	11.5	12.1	A	8.5 - 15.7
Required	CO60	10.96	10.7	A	7.5 - 13.9
	ZN65	16.6	15.5	A	10.9 - 20.2
Required	CS134	11.3	11.5	A	8.1 - 15.0
Required	CS137	17.4	16.3	A	11.4 - 21.2
	SR90	7.03	7.77	A	5.44 - 10.10
<b>Matrix: RdV Vegetation, Bq/sample :</b>					
	MN54	2.73	2.62	A	1.83 - 3.41
	CO57	2.6	2.8	A	2.0 - 3.6
Required	CO60	1.91	2.07	A	1.45 - 2.69
	ZN65	5.26	5.37	A	3.76 - 6.98
	CS134	2.16	2.32	A	1.62 - 3.02
Required	CS137	0.018		A	False Positive Test

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

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.

**ATTACHMENT D**

**Industry Initiative**

**Ground Water Protection Program**

**Tritium in Ground Water Monitoring**

**2017**

## **A. Description of Program:**

Turkey Point maintains a sampling and analysis program to meet the requirements of NEI 07-07, Industry Ground Water Protection Initiative. 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.

## **B. 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 10,391 pCi/L in 2017 with a max concentration of 24,483 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 2017 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).

## **C. Results**

The tritium results for the groundwater wells were from <MDA to 13600 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:

### Groundwater Well Sampling Results 2017

Well number	First Quarter 2017			Second Quarter 2017			Third Quarter 2017			Fourth Quarter 2017		
	H-3	K-40	Cs-137	H-3	K-40	Cs-137	H-3	K-40	Cs-137	H-3	K-40	Cs-137
PTPED-1	469	--	--	374	--	--	357	--	--	324	--	--
CD-1	<MDC	--	--	527	--	--	446	--	--	370	--	--
P-94-2	685	107	--		N/A	N/A	494	--	--	N/A	N/A	N/A
P-94-4	947	--	--	910	--	--	633	--	--	845	--	--
STP-1	<MDC	--	--	N/A	N/A	N/A	<MDC	--	--	N/A	--	--

PTN-MW-1s	<MDC	--	--	N/A	N/A	N/A	<MDC	105	--	N/A	N/A	N/A
PTN-MW-1i	565	393	--	N/A	N/A	N/A	345	334	--	N/A	N/A	N/A
PTN-MW-1d	1940	534	--	N/A	N/A	N/A	1790	578	--	N/A	N/A	N/A
PTN-MW-2s	<MDC	--	--	N/A	N/A	N/A	<MDC	--	--	N/A	N/A	N/A
PTN-MW-3s	<MDC	--	--	N/A	N/A	N/A	<MDC	--	--	N/A	N/A	N/A
PTN-MW-4s	<MDC	--	--	<MDC	--	--	<MDC	--	--	<MDC	--	--
PTN-MW-4i	2840	371	--	2780	468	--	2900	545	--	2490	540	--
PTN-MW-4d	3650	631	--	<MDC	--	--	<MDC	--	--	<MDC	--	--
PTN-MW-5s	356	--	--	301	--	--	333	218	--	3290	225	--
PTN-MW-5i	<MDC	452	--	1090	413	--	1430	404	--	489	325	--
PTN-MW-5d	2550	521	--	2450	485	--	2200	411	--	2470	477	--
PTN-MW-6s	<MDA	--	--	N/A	N/A	N/A	<MDC	--	--	N/A	N/A	N/A
PTN-MW-6d	1820	--	--	N/A	N/A	N/A	2180	452	--	N/A	N/A	N/A
PTN-MW-7s	915	--	--	1220	--	--	1180	105	--	867	--	--
PTN-MW-7i	1030	250	--	1330	--	--	1750	--	--	1430	--	--
PTN-MW-7d	1160	--	--	<MDC	--	--	<MDC	--	--	<MDC	--	--
PTN-MW-8s	2010	--	17	1040	210	7.4	873	--	7.14	13600	--	12.9
PTN-MW-9s	334	--	--	853	--	--	702	--	--	798	--	--
PTN-MW-10s	<MDC	--	--	N/A	N/A	N/A	<MDC	--	--	N/A	N/A	N/A
PTN-MW-10i	<MDC	--	--	N/A	N/A	N/A	1320	374	--	N/A	N/A	N/A
PTN-MW-10d	<MDC	--	--	N/A	N/A	N/A	<MDC	--	--	N/A	N/A	N/A
PTN-MW-11s	<MDC	--	--	709	--	--	623	--	--	425	--	--
PTN-MW-12s	855	--	--	723	--	--	1080	--	--	963	--	--

NE StrmDrain	<MDC	--	--	<MDC	--	--	455	--	--	9990	--	--
SE StrmDrain	<MDC	--	--	<MDC	--	--	1570	--	--	13000	--	--
W StrmDrain	4750	--	--	825	--	--	4490	--	--	12000	--	--
CRF StrmDrain	--	--	--	<MDC	--	--	<MDC	--	--	545	--	--

N/A= Denotes not applicable, sampling not required for this period.

<MDC denotes a value less than 3.00E+02 pCi/L for Tritium

D. List of wells and their locations

<b>Well Name</b>	<b>Location</b>
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.

# Onsite Tritium Monitoring Wells

