

MAY 12 2016



**FPL**

L-2016-106  
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  
2015 Annual Radiological  
Environmental Operating Report

Enclosed is the 2015 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. Mitch Guth, Licensing Manager, at (305) 246-6698.

Sincerely,

Thomas Summers  
Vice President  
Turkey Point Nuclear Plant

SM  
Enclosure

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

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NR R

**2015**

**ANNUAL**

**RADIOLOGICAL ENVIRONMENTAL**

**OPERATING REPORT**

**TURKEY POINT PLANT**

**UNITS 3 & 4**

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

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

**2015  
ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT  
TURKEY POINT PLANT- UNITS 3 & 4**

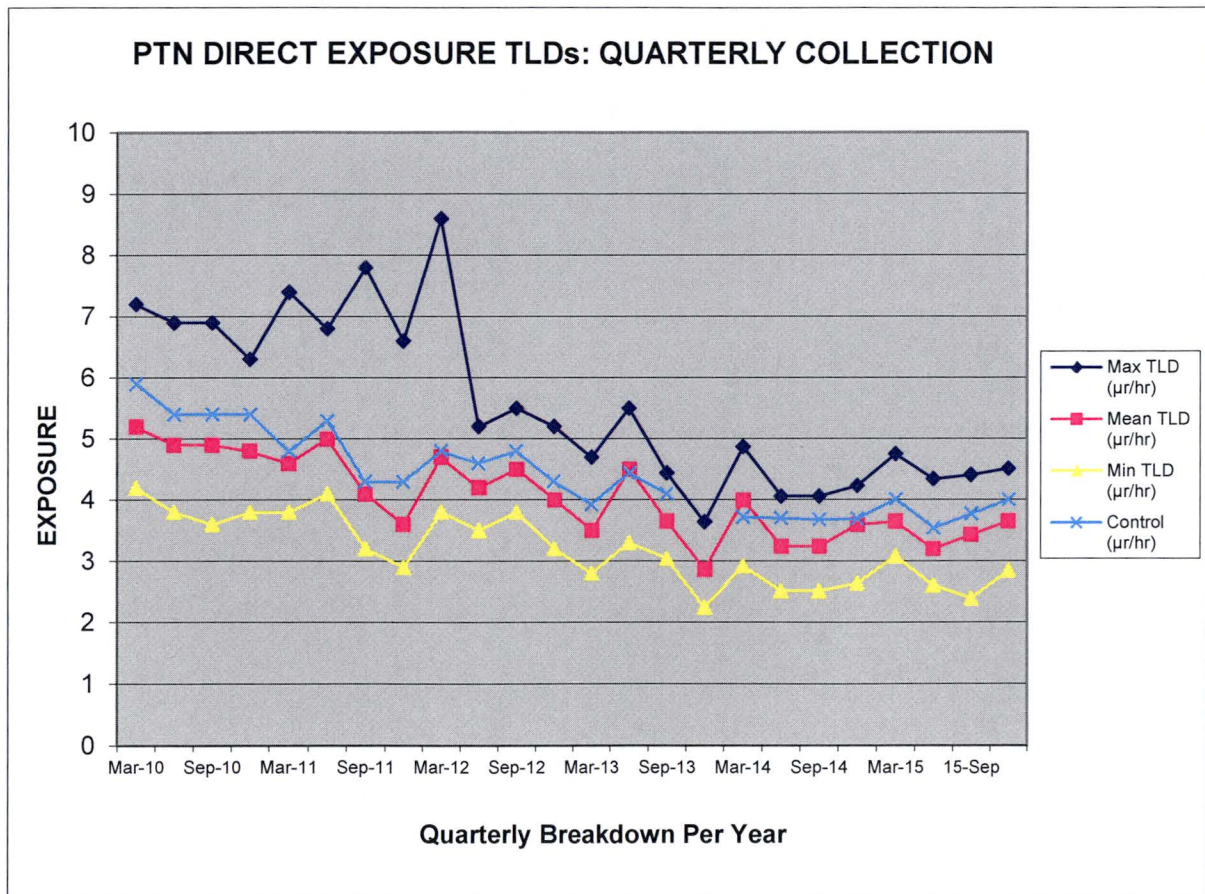
**TABLE OF CONTENTS**

<u><b>DESCRIPTION</b></u>	<u><b>PAGE</b></u>
Table of Contents	1
Executive Summary/Program Description	2-5
Discussion and Interpretation of Results	6-7
Environmental Radiological Monitoring Program Annual Analysis Summary	8-15
Deviations / Missing Data	16-17
Land Use Census	18-23
Key to Sample Locations	ATTACHMENT A 24-32
Radiological Surveillance of Florida Power and Light Company's Turkey Point Site	ATTACHMENT B
First Quarter, 2015	33-47
Second Quarter, 2015	48-61
Third Quarter, 2015	62-75
Fourth Quarter, 2015	76-89
Results from the Interlaboratory Comparison Program, 2015	ATTACHMENT C 90-94
Ground Water Protection, Industry Initiative	ATTACHMENT D 95-99

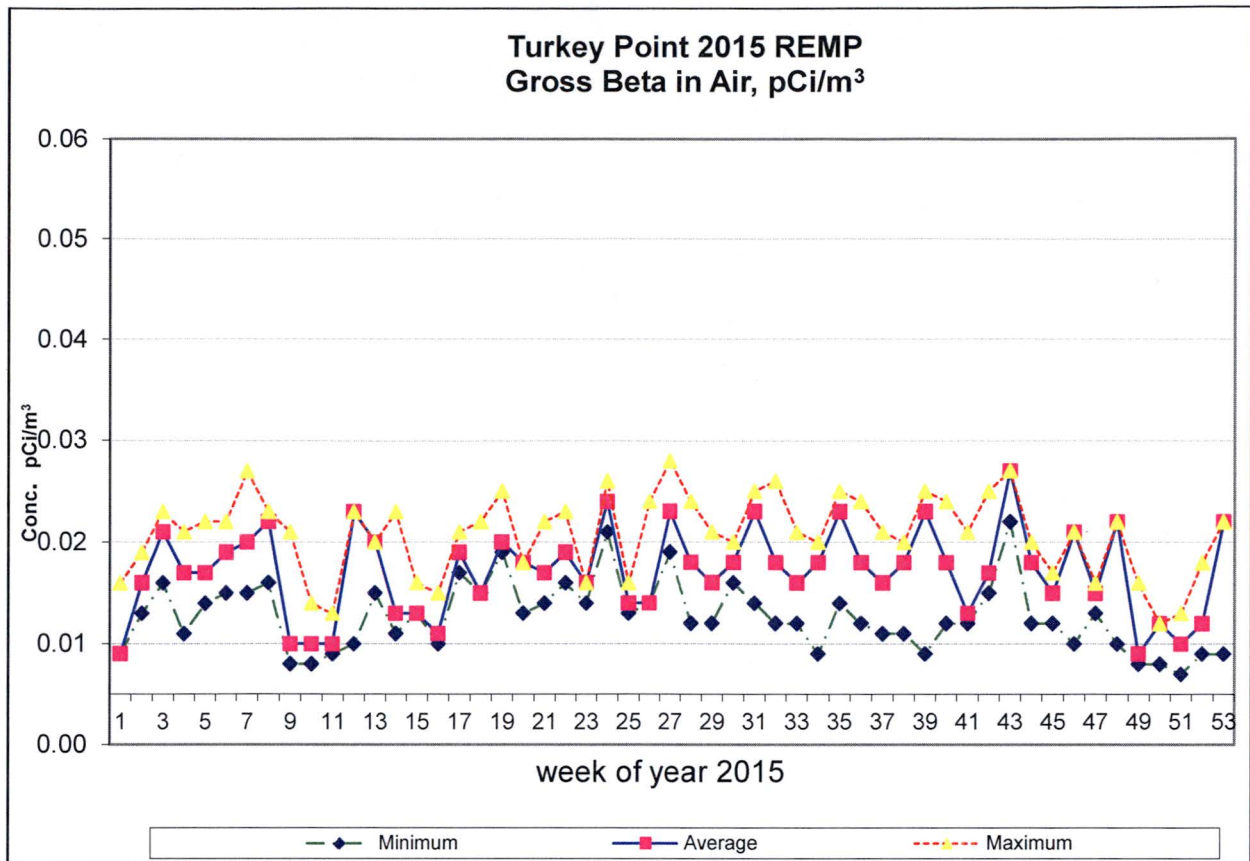
**2015**  
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**  
**TURKEY POINT PLANT- UNITS 3 & 4**

EXECUTIVE SUMMARY

The data obtained through the Turkey Point Radiological Environmental Monitoring Program 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, 2015 to December 31, 2015. Additionally, supplemental samples collected by the State of Florida Department of Health (DOH), do not indicate adverse trends in the radiological environment.



**2015**  
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**  
**TURKEY POINT PLANT- UNITS 3 & 4**



**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.

**2015**  
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**  
**TURKEY POINT PLANT- UNITS 3 & 4**

**B. Program Description**

The Radiological Environmental Monitoring Program (REMP) 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. Supplemental Sampling (Non-REMP) locations are also listed in Attachment A.

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

**2015**  
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**  
**TURKEY POINT PLANT- UNITS 3 & 4**

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.

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.

**2015**  
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**  
**TURKEY POINT PLANT- UNITS 3 & 4**

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 252 pCi/L, well below the required reporting level of 30,000 pCi/L as specified by ODCM Table 5.1-2.

4. Waterborne, Sediment:

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



**2015  
ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT  
TURKEY POINT PLANT- UNITS 3 & 4**

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. The maximum concentration reported was 17 pCi/L well below the required reporting level of 50 pCi/L 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 32 and 33. 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 252 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.

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, 92	*---	3.45 (92/92)	NW-10	4.46 (4/4)	3.8 (4/4)
		2.6. - 4.75	10 mi., NW	4.24 - 4.75	3.54 - 4.01

Number of Non-routine Reported Measurements = 0

\*--- Denotes that no LLD has been calculated for this isotope

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> Distance & Direction	Mean (f) <sup>b</sup> Range	
<sup>131</sup> I, 312	0.012	<MDA	---	---	< MDA
Gross Beta, 312	0.0064	0.012 (264/264) 0.002 - 0.021	T-58 1.3 mi, NW	0.013 (53/53) 0.003 - 0.021	0.012 (53/53) 0.004 - 0.022
Composite Gamma Isotopic, 32					
<sup>7</sup> Be	0.006	0.1104 (28/28) 0.0751 - 0.1398	T-72 <1 mi, WSW	0.1179 ( 4/4) 0.1065 - 0.1237	0.0938 ( 4/4) 0.0804 - 0.1194
<sup>40</sup> K	0.018	< MDA	---	---	< MDA
<sup>134</sup> Cs	0.0008	< MDA	---	---	< MDA
<sup>137</sup> Cs	0.0008	< MDA	---	---	< MDA
<sup>210</sup> Pb	*---	0.0113 (11/24) 0.0075 - 0.0226	T-58 1.3 mi, NW	0.0110 ( 4/4) <MDA - 0.0110	0.0086 (1/4) <MDA - 0.0106

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

Number of Non-routine Reported Measurements = 0

\*--- Denotes that no LLD has been calculated for this isotope

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	201 ( 2/24) 150 - 252	T-81 6 mi., S	252 ( 12/12) <MDA - 252	<MDA
Gamma Isotopic, 36					
<sup>40</sup> K	58	312 (24/24) 161 - 431	T-81 6 mi., S	334.5 (12/12) 175 - 398	232 (12/12) 127 - 314
<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	<MDA	---	---	<MDA
<sup>40</sup> K	100	183 (4/4) 119 - 277	T-81 6 mi., S	225 (2/2) 174 - 277	611 (2/2) 117 - 1106
<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	---	---	12.5 (2/2) <MDA - 17
<sup>210</sup> Pb	*---	937 (3/4) 830 - 1056	T-81 6 mi., S	990.5 (2/2) 925 - 1056	1073 (2/2) <MDA - 1529
<sup>226</sup> Ra	15	928 (4/4) 428 - 1343	T-42 < 1mi, ENE	970.5 (2/2) 943 - 998	980 (2/2) 242 - 1718
<sup>235</sup> U	*---	<MDA	---	---	86 (2/2) <MDA - 86
<sup>238</sup> U	*---	414 (4/4) 335 - 506	T-81 6 mi., S	485 (2/2) 464 - 506	478 (2/2) <MDA - 763

Be-7, K-40, Pb-210, Ra-226, U-235 & U-238 are naturally occurring.

Number of Non-routine Reported Measurements = 0

\*--- Denotes that no LLD has been calculated for this isotope

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	1896 (2) 1762 - 2030	T-81 6 mi., S	1896 (2) 1762 - 2030	2031 (2) 1912 - 2150
<sup>226</sup> Ra	300	---	---	---	---
<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	3204 (2/2) 3017- 3392	T-81 6 mi., S	3204 (2/2) 3017-3392	2624 (2/2) 2318 - 2930
<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	18	<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

\*--- Denotes that no LLD has been calculated for this isotope

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	1461(24/24) 382 - 2701	T-40 3 mi., W	1565 (12/12) 655 - 2701	1792 (12/12) 260 - 4757
<sup>40</sup> K	120	4798 (24/24) 2846 - 6520	T-41 1.6 mi.,WNW	4885 (12/12) 3676 - 6520	4124 (12/12) 2110 - 5330
<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	46.2 (21/24) 11 - 111	T-40 3 mi., W	65 (12/12) 26 - 111	17 (3/12) 13- 25
<sup>210</sup> Pb	*---	314.6 (5/24) 208 - 472	T-40 3 mi., W	318 (2/12) 208 - 472	1147 (2/12) 958 - 1336
<sup>226</sup> Ra	189	203 (1/24) 203	T-41 1.6 mi.,WNW	203	<MDA

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

Number of Non routine Reported Measurements = 0

\*--- Denotes that no LLD has been calculated for this isotope



### 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

- A) Pathway: Airborne – Particulates and Iodine  
Location: T-56, SW Parking lot of Blackpoint Marina (Supplemental)  
Dates: 1-13-15  
Deviation: Run time 135.4 hours out of 199.1  
Description of Problem: Vacuum Pump failed  
Corrective action: Replaced vacuum pump.
- B) Pathway Airborne – Particulates and Iodine  
Location: T-51, Entrance to Homestead Bayfront Park  
Dates: 1-20-15  
Deviation: Loss of power during week, flow showed 134 hours out of 166  
Description of Problem: Flow was adjusted and this is assumed to be a power outage  
Corrective Action: Restored sampler, no problems afterward
- C) Pathway Airborne – Particulates and Iodine  
Location: T-51, Entrance to Homestead Bayfront Park  
Dates: 1-27-15  
Deviation: Power was found turned off upon arrival. Estimated 77.8 of 165.8 hours.  
Description of Problem: Power had been turned off during the week This is a very public area.  
Corrective Action: Restored power, no problems afterward
- D) Pathway: Airborne – Particulates and Iodine  
Location: T-52, Florida City Substation (Supplemental)  
Dates: 11-10-15  
Deviation: Estimated run time 79.4 out of 143.4 hours.  
Description of Problem: Pump failed and was replaced that day.  
Corrective action Replaced pump and restored continuous sampling.

- E) Pathway: Airborne – Particulates and Iodine  
 Location: T-41, Palm drive West of FPL Satellite school near site boundary  
 Dates: 12-01-15.  
 Deviation: Estimated run time 145.4 out of 170 hours.  
 Description of Problem: Pump failed and was replaced that day.  
 Corrective action: Replaced pump and restored continuous sampling.
- F) Pathway: Airborne – Particulates and Iodine  
 Location: T-57, Siren Pole 27, intersection of SW 112 Ave. and SW 304th St., 4 miles NW  
 Dates: 12-07-15.  
 Deviation: Sample was left running additional week because of excess flooding in the area.  
 Description of Problem: Severe flooding in the area made it inaccessible.  
 Corrective action: Sample was collected the next week as it would normally have been.
- G) Pathway: Airborne – Particulates and Iodine  
 Location: T-51, Entrance to Homestead Bayfront Park  
 Dates: 12-29-15  
 Deviation: Flow showed 134 hours out of 166  
 Description of Problem: Vacuum pump failed  
 Corrective action: Replaced pump and restored continuous sampling.

### TURKEY POINT 2015 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° 2.0 mi @ 354°	*	*
NNE	*	*	*
NE	*	*	*
ENE	*	*	*
E	*	*	*
ESE	*	*	*
SE	*	*	*
SSE	*	*	*
S	*	*	*
SSW	*	*	*
SW	*	*	*
WSW	*	*	*
W	*	*	*
WNW	1.7 mi @ 302° 3.7 mi @ 302°	4.5 mi @ 303°	*
NW	3.6 mi @ 304° 3.7 mi @ 311°	*	*
NNW	4.4 mi @ 333° 4.7 mi @ 328°	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.

July 2015

<u>Sector</u>	<u>Range Bearing</u>	<u>Nearest Residence Location</u>
N (A)	<u>1.9 miles</u> 349°	This is the Homestead Bayfront Park complex. Contact is Jim White. Office hours are 8am – 5pm 7 days a week. There is occasional overnight recreational occupancy (up to 4 nights) on boats at the marina. There are approximately 30 workers at the park working various hours 7 days a week; number of daily workers sometimes varies. 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 – Sun from 11am – 8pm. N25° 27.683' W80° 20.200'.
N (B)	<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 a.m to dusk and currently have about 40 employees with a large number of volunteers. 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.	
WNW (A)	<u>1.7 miles</u> 302°	FP&L daycare center and shooting range near the entrance to the Turkey Point Plant. Daycare Center contact is Anita Johnson, Director. There are 9 employees with 52 children currently enrolled, ages 6 months to 5 years. The center is open from 6am – 6pm Monday thru Friday. The number of people and the times at the shooting range varies. N25° 26.817' W80° 21.217'.

## TURKEY POINT RESIDENCE SURVEY RESULTS

July 2015 (cont.)

<u>Sector</u>	<u>Range Bearing</u>	<u>Nearest Residence Location</u>
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). 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 pm with 3-4 employees working Saturdays from 7 am to noon. 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 too far from residence 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 – 5pm Monday to Friday. 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. There is one man who lives in a trailer on the premises and 14 workers that work Monday thru Saturday 7 am to 5 pm. 24-hour security is also provided by another person 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 can see the residence which appears to be occupied. Unknown number of occupants. N25° 29.450' W80° 21.817'.
NNW (B)	<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 lives and works on property. Owner lives off property in Miami. N25° 29.564' W80° 22.264'.
NNW (C)	<u>4.9 miles</u> 336°	Oceanus Seafood , LLC. New fish farm being built at 29055 SW 107 <sup>th</sup> Ave Homestead. Manager is Jon Milchman. He stated they will farm Triple Tail and Pompano. When open later this year it will be staffed 24/7 with approximately 12 employees. N25° 29.920' W80° 21.808'

## TURKEY POINT GARDEN SURVEY RESULTS

July 2015

<u>Sector</u>	<u>Range Bearing</u>	<u>Nearest Garden Location (with estimated total area of 500 square feet, or more, and producing green leafy vegetables).</u>
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.
WNW (A)	<u>4.5 miles</u> 303°	Thai Farms. Guava (mostly), bananas and some sugar are grown at this small farm run by a family south of Mowry Drive (SW 320th St) and about 0.6 miles west of Allapattah Rd (SW 117th Ave). Two or three workers Monday – Friday. 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'.

## TURKEY POINT GARDEN SURVEY RESULTS

July 2015 (cont.)

<u>Sector</u>	<u>Range</u> <u>Bearing</u>	<u>Nearest Garden Location (with estimated total area of 500 square feet, or more, and producing green leafy vegetables).</u>
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. Approximately 13 workers present from 8 am to 4:30pm Monday thru Friday. The produce usually donated is tomatoes, squash and green beans. 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 lives and 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

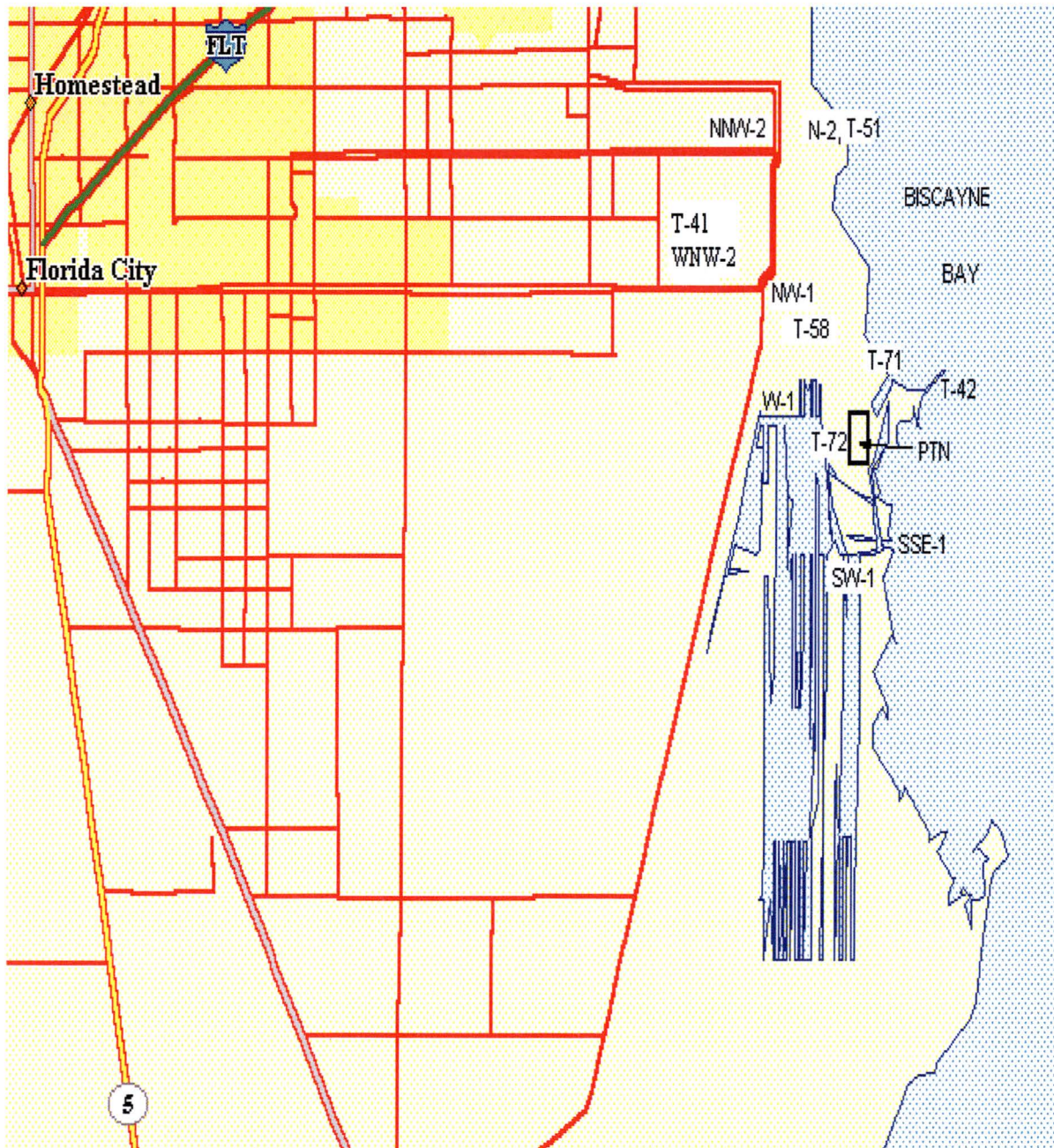
July 2015

<u>Sector</u>	<u>Nearest Milk Animals (cows or goats).</u>
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

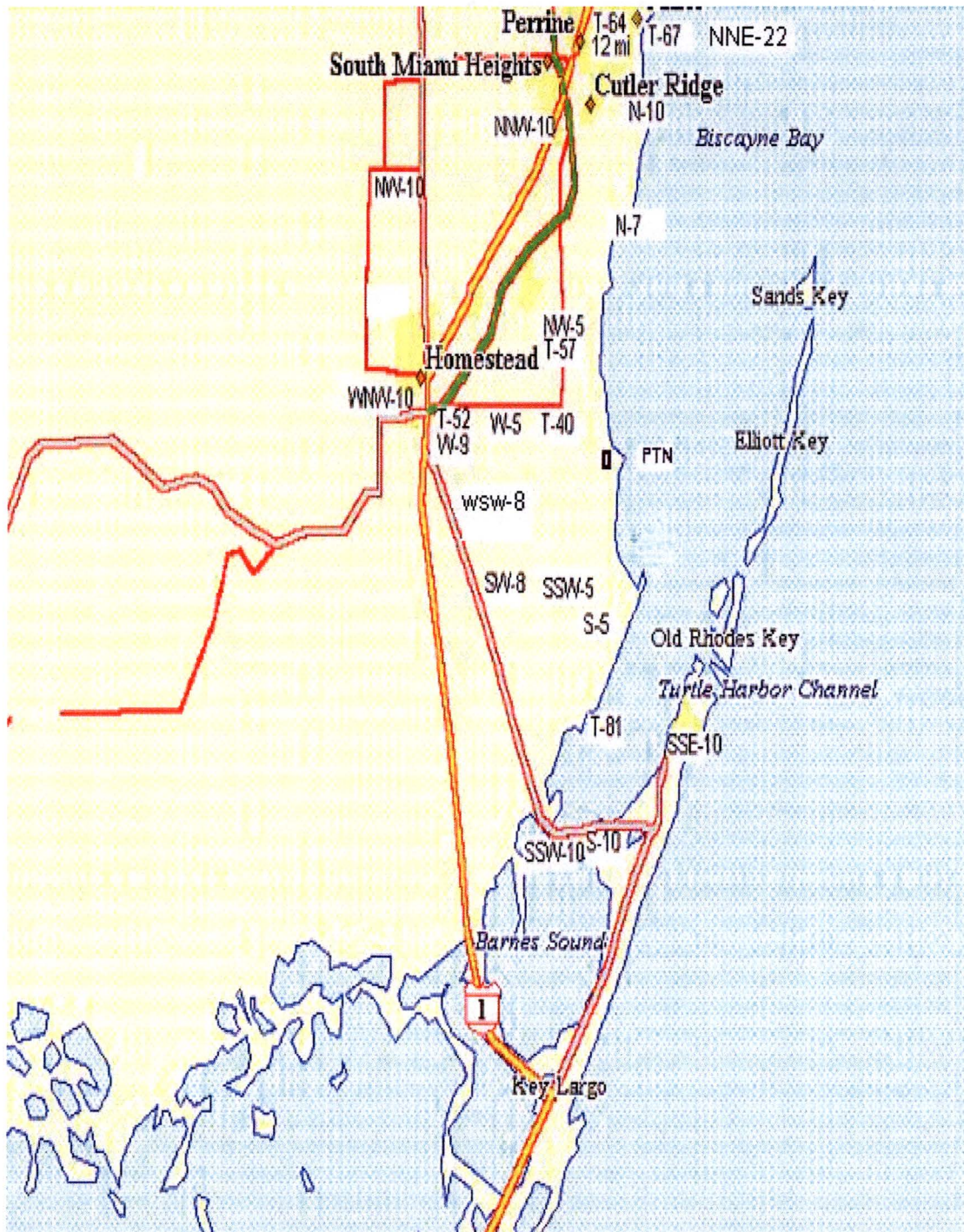
KEY TO SAMPLE LOCATIONS

ATTACHMENT A  
NEAR SITE REMP SAMPLING LOCATIONS





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



## ATTACHMENT A

**PATHWAY: DIRECT RADIATION**

**SAMPLES COLLECTED: TLD**

**REMP 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.

### **Turkey Point Site Supplemental Sampling Non-REMP**

**Pathway: Direct Radiation,**

**Collection Frequency: Quarterly**

Location <sup>(a)</sup> <u>Name</u>	<u>Description</u>
NNW-6	Siren S29 pole, NE corner Moody Dr (SW 268 St) and Allapattah (SW 112 Ave)
NW-7	Siren S28 pole, E side Pine Island Rd (SW 132 Ave) and N of Waldin Dr (SW 280 St)
NW-8	Siren S7 pole, SW 152 Ave at E end of SW 248 St
WNW-3	Siren S21 pole, NW corner Palm Dr and Allapattah Rd (SW 117 Ave)
WNW-6	Siren S25 pole, W side Tallahassee Rd (SW 137 Ave), N of Moody Dr
W - 8	Florida City Substation
ENE - 1	E end of Turkey Point, past Ranger Station
T71	On site Red Barn picnic area
T72	On site, just outside LU entrance

(a) The location name is the direction sector - approximate distance (miles)

ATTACHMENT A

**PATHWAY: AIRBORNE**

**SAMPLES COLLECTED: RADIOIODINES AND PARTICULATES**

**REMP 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	SW 107th Avenue at Mowry Canal
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. - W. of school near site boundary

Control:

T-64	NNE	22	Natoma Substation , 2475 SW 16 Ct.
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**Turkey Point Supplemental Sampling (Non-REMP)**

**Pathway: Airborne**

**Collection Frequency-Weekly**

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-52	W	8	Florida City Substation
T-56	N	7	SW corner Parking Lot at Black Point Marina
T-71	NNE	0.5	On site Red Barn picnic area

ATTACHMENT A

**PATHWAY: WATERBORNE**

**SAMPLES COLLECTED: SURFACE WATER (OCEAN)**

**REMP 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

Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park
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**Turkey Point Supplemental Sampling (Non-REMP)**

**Pathway: Waterborne-Surface Water**

**Collection Frequency: Monthly**

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-08	S	5.5	Southern Shore of canal system, west of Grand Canal Bridge
T-75	NW	1.2	Florida City Canal
T-84	WSW	0.5	Cooling canal discharge
T-97	E	0.2	Cooling canal intake

## ATTACHMENT A

### **PATHWAY: WATERBORNE, SEDIMENT**

#### **SAMPLES COLLECTED: SHORELINE SEDIMENT**

#### **REMP 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

#### Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park
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### **Turkey Point Supplemental Sampling (Non-REMP)**

#### **Pathway: Waterborne, Shoreline Sediment**

#### **Collection Frequency: Semiannual**

<u>Name</u>	<u>Description</u>
T01	~ Air Force school area
T02	West side of dam @ 'old intake'
T03	North end of collector canals, west of 'Grand Canal'
T04	In front (east) of LU offices
T05 / T84	Cooling canal, discharge, ~ by bridge to parking lot
T06 / T85	NW corner of canal system
T07	SW corner of canal system
T08	South end of main canal, near bridge
T09	'Old Discharge Canal' at bend south of earth dam
T10	SE corner of canal system

### **Turkey Point Supplemental Sampling (Non-REMP)**

#### **Pathway: Waterborne, Aquatic Vegetation**

#### **Collection Frequency: Quarterly**

<u>Name</u>	<u>Description</u>
T-84	"Seaweed" from any location in the cooling canals



ATTACHMENT A

**PATHWAY: INGESTION**

**SAMPLES COLLECTED: CRUSTACEA AND FISH**

**REMP 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

Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park
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**Turkey Point Supplemental Sampling (Non-REMP)**

**Pathway: Ingestion, Milk, Marine life-Fish**

**Collection Frequency: Semiannual**

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-99	WNW	12	183 <sup>rd</sup> Block 262 st (Milk)
Alt	W	11	134 Block of SW 224 st.(Milk)
T-84			Cooling Canal (Marine Life-Fish)

## ATTACHMENT A

### **PATHWAY: INGESTION**

**SAMPLES COLLECTED: BROADLEAF VEGETATION**

**REMP 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 Old Missile Site near Plant Site Boundary

### Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park
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### **Turkey Point Supplemental Sampling (Non-REMP)**

**Pathway: Ingestion, Food Crops**

**Collection Frequency: Annual Collection at Harvest**

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-43, T44 T45	N thru NW to W	2-10 Miles from site	Various Locations: truck farm points of sale, locally grown food crops

ATTACHMENT B

RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S

TURKEY POINT SITE

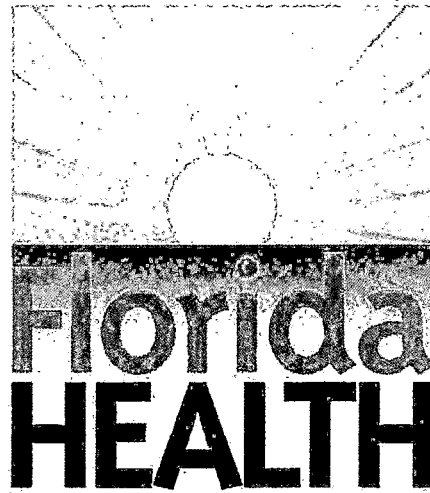
2015

First Quarter, 2015

Second Quarter, 2015

Third Quarter, 2015

Fourth Quarter, 2015



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

FIRST QUARTER 2015

BUREAU OF RADIATION CONTROL

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

First Quarter, 2015

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Number of Sample Locations</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	3
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	1
4.a.2. Fish	Semiannually	2	1
4.b. Broadleaf Vegetation	Monthly	3	9
			<hr/> Total: 202

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 16-Dec-14 Collection 18-Mar-15	Sample Site	Deployment 16-Dec-14 Collection 18-Mar-15
N-2	$4.09 \pm 0.48$	WSW-8	$3.70 \pm 0.45$
N-7	$3.44 \pm 0.32$		
N-10	$3.92 \pm 0.64$	SW-1	$3.29 \pm 0.12$
		SW-8	$3.11 \pm 0.43$
NNW-2	$3.65 \pm 0.10$		
NNW-10	$3.90 \pm 0.28$	SSW-5	$3.25 \pm 0.13$
		SSW-10	$3.44 \pm 0.50$
NW-1	$4.14 \pm 0.35$		
NW-5	$3.44 \pm 0.18$	S-5	$3.08 \pm 0.04$
NW-10	$4.75 \pm 0.58$	S-10	$3.88 \pm 0.34$
WNW-2	$3.62 \pm 0.18$	SSE-1	$3.11 \pm 0.33$
WNW-10	$4.38 \pm 0.51$	SSE-10	$3.33 \pm 0.44$
W-1	$3.68 \pm 0.14$	NNE-22	$4.01 \pm 0.46$
W-5	$3.61 \pm 0.30$		
W-9	$3.48 \pm 0.45$		

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>
05-Jan-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
13-Jan-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
20-Jan-15	<0.03	<0.04(A)	<0.03	<0.03	<0.03	<0.03
27-Jan-15	<0.03	<0.02(B)	<0.03	<0.03	<0.03	<0.03
02-Feb-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
09-Feb-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
16-Feb-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
23-Feb-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
03-Mar-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
10-Mar-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
16-Mar-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
23-Mar-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
30-Mar-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

(A) Unexplained low flow rate. Estimated run time 135.4 out of 166.3 hours.

(B) Power supply was shut off upon arrival; power turned back on. Estimated run time 77.8 out of 165.8 hours.

2.b.1. AIR PARTICULATES - GROSS BETA - (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>
05-Jan-15	0.005 ± 0.002	0.006 ± 0.002	0.008 ± 0.002	0.009 ± 0.002	0.004 ± 0.001	0.009 ± 0.002
13-Jan-15	0.008 ± 0.001	0.012 ± 0.002	0.008 ± 0.001	0.011 ± 0.002	0.011 ± 0.002	0.014 ± 0.002
20-Jan-15	0.016 ± 0.002	0.014 ± 0.002(A)	0.013 ± 0.002	0.014 ± 0.002	0.016 ± 0.002	0.016 ± 0.002
27-Jan-15	0.006 ± 0.002	0.016 ± 0.004(B)	0.014 ± 0.002	0.015 ± 0.002	0.012 ± 0.002	0.015 ± 0.002
02-Feb-15	0.011 ± 0.002	0.013 ± 0.002	0.012 ± 0.002	0.009 ± 0.002	0.012 ± 0.002	0.017 ± 0.002
09-Feb-15	0.015 ± 0.002	0.012 ± 0.002	0.017 ± 0.002	0.011 ± 0.002	0.014 ± 0.002	0.016 ± 0.002
16-Feb-15	0.014 ± 0.002	0.010 ± 0.002	0.019 ± 0.002	0.013 ± 0.002	0.015 ± 0.002	0.019 ± 0.002
23-Feb-15	0.013 ± 0.002	0.011 ± 0.002	0.014 ± 0.002	0.013 ± 0.002	0.017 ± 0.002	0.018 ± 0.002
03-Mar-15	0.005 ± 0.001	0.004 ± 0.001	0.006 ± 0.001	0.003 ± 0.001	0.005 ± 0.001	0.016 ± 0.002
10-Mar-15	0.006 ± 0.002	0.006 ± 0.002	0.006 ± 0.001	0.006 ± 0.001	0.005 ± 0.001	0.006 ± 0.001
16-Mar-15	0.008 ± 0.002	0.005 ± 0.002	0.008 ± 0.002	0.008 ± 0.002	0.005 ± 0.002	0.008 ± 0.002
23-Mar-15	0.016 ± 0.002	0.015 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.018 ± 0.002	0.005 ± 0.001
30-Mar-15	0.010 ± 0.002	0.015 ± 0.002	0.014 ± 0.002	0.010 ± 0.002	0.015 ± 0.002	0.013 ± 0.002
Average:	0.010 ± 0.001	0.011 ± 0.001	0.012 ± 0.001	0.010 ± 0.001	0.012 ± 0.001	0.013 ± 0.001

(A) Unexplained low flow rate. Estimated run time 135.4 out of 166.3 hours.

(B) Power supply was shut off upon arrival; power turned back on. Estimated run time 77.8 out of 165.8 hours.

2.b.2. 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>
T41	0.1122 ± 0.0093	<0.0202	<0.0013	<0.0014	<0.0105
T51	0.1237 ± 0.0082	<0.0134	<0.0009	<0.0013	0.0088 ± 0.0019
T57	0.1034 ± 0.0089	<0.0201	<0.0011	<0.0014	<0.0097
T58	0.1079 ± 0.0092	<0.0211	<0.0015	<0.0014	0.0110 ± 0.0018
T64	0.0838 ± 0.0070	<0.0139	<0.0009	<0.0010	0.0065 ± 0.0016
T72	0.1152 ± 0.0093	<0.0236	<0.0013	<0.0013	<0.0102



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

Sample Site	Collection Date	<u>H-3</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Zr-95 Nb-95 (A)</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ba-140 La-140 (B)</u>
T42	14-Jan-15	<143	212 ± 26	<5	<4	<9	<6	<10	<8	<6	<5	<6	<10
	24-Feb-15	<158	237 ± 21	<3	<2	<6	<4	<6	<6	<5	<3	<3	<5
	16-Mar-15	<153	290 ± 30	<5	<4	<9	<7	<12	<8	<7	<5	<6	<7
T67	14-Jan-15	<143	294 ± 20	<3	<3	<6	<4	<6	<5	<4	<3	<3	<6
	23-Feb-15	<158	204 ± 26	<5	<5	<8	<7	<11	<9	<8	<4	<5	<6
	16-Mar-15	<159	127 ± 10	<2	<2	<4	<3	<4	<3	<3	<2	<2	<4
T81	14-Jan-15	<143	323 ± 25	<3	<3	<7	<3	<5	<5	<4	<3	<3	<5
	24-Feb-15	<152	277 ± 23	<3	<2	<6	<4	<7	<6	<4	<3	<3	<4
	16-Mar-15	<144	302 ± 23	<3	<3	<6	<3	<7	<5	<3	<3	<3	<6

(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	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Ra-226</u>	<u>Th-232</u>	<u>U-235</u>	<u>U-238</u>
T42	14-Jan-15	<102	162 ± 29	<9	<12	<9	<11	830 ± 160	998 ± 71	<41	<19	335 ± 48
T67	14-Jan-15	<82	117 ± 28	<8	<11	<7	<8	<618	242 ± 37	<42	<9	<192
T81	14-Jan-15	<127	174 ± 34	<11	<13	<10	<13	1056 ± 200	1343 ± 86	<51	<21	506 ± 49

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

Sample Site	Collection Date	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	This sample to be collected.										
T81	18-Feb-15	2030 ± 199	<22	<34	<76	<44	<69	<29	<36	<545	<144

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

Sample Site	Collection Date	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	This sample to be collected.										
T81	18-Feb-15	3392 ± 243	<24	<30	<64	<38	<65	<28	<33	<476	<117

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Pb-212</u>	<u>Ra-226</u>	<u>Ra-228</u>
T40	14-Jan-15	1340 ± 71	4023 ± 190	<24	<15	66 ± 6	<1403	<27	<337	<60
	24-Feb-15	1729 ± 81	4801 ± 212	<28	<14	26 ± 4	<1282	<27	<337	<61
	16-Mar-15	1233 ± 59	2846 ± 140	<13	<11	66 ± 5	<1135	<23	<270	<49
T41	14-Jan-15	1498 ± 70	5411 ± 218	<22	<12	28 ± 4	<1255	<24	<284	<58
	24-Feb-15	1117 ± 64	6030 ± 249	<25	<14	18 ± 4	<1344	<27	<347	<66
	16-Mar-15	860 ± 49	3946 ± 176	<15	<11	<17	<1118	<22	<272	<49
T67	14-Jan-15	2304 ± 94	4735 ± 206	<25	<14	<17	<1350	<27	<333	<69
	23-Feb-15	1443 ± 75	4704 ± 208	<27	<14	<17	<1332	<28	<346	<59
	16-Mar-15	960 ± 53	3527 ± 166	<15	<13	<13	<1174	<25	<283	<53

TURKEY POINT SITE

Supplemental Sampling

First Quarter, 2015

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Number of Sample Locations</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	10	10
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	2
			<hr/> Total: 85

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 - TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 16-Dec-14 18-Mar-15 Collection
NNW-6	$3.80 \pm 0.01$
NW-7	$4.04 \pm 0.13$
NW-8	$4.13 \pm 0.14$
WNW-3	$4.26 \pm 0.24$
WNW-6	$3.66 \pm 0.50$
W-8	$3.88 \pm 0.22$
ENE-1	$3.16 \pm 0.29$
T72	$4.47 \pm 0.21$
PTN-1	$3.82 \pm 0.27$

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

Collection Date	T52	T56
05-Jan-15	<0.03	<0.03
13-Jan-15	<0.03	<0.05(A)
20-Jan-15	<0.03	<0.03
27-Jan-15	<0.03	<0.03
02-Feb-15	<0.04	<0.04
09-Feb-15	<0.04	<0.04
16-Feb-15	<0.03	<0.03
23-Feb-15	<0.04	<0.04
03-Mar-15	<0.03	<0.03
10-Mar-15	<0.03	<0.03
16-Mar-15	<0.04	<0.04
23-Mar-15	<0.03	<0.03
30-Mar-15	<0.03	<0.03

(A) Vacuum pump failed and was replaced. Estimated run time 135.4 out of 199.1 hours.

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

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
05-Jan-15	0.005 ± 0.002	0.011 ± 0.002
13-Jan-15	0.010 ± 0.002	0.011 ± 0.002(A)
20-Jan-15	0.018 ± 0.002	0.011 ± 0.002
27-Jan-15	0.009 ± 0.002	0.014 ± 0.002
02-Feb-15	0.017 ± 0.002	0.010 ± 0.002
09-Feb-15	0.010 ± 0.002	0.011 ± 0.002
16-Feb-15	0.022 ± 0.002	0.012 ± 0.002
23-Feb-15	0.014 ± 0.002	0.013 ± 0.002
03-Mar-15	0.005 ± 0.001	0.006 ± 0.001
10-Mar-15	0.009 ± 0.002	0.003 ± 0.001
16-Mar-15	0.004 ± 0.002	0.008 ± 0.002
23-Mar-15	0.015 ± 0.002	0.018 ± 0.002
30-Mar-15	0.013 ± 0.002	0.010 ± 0.002
Average:	0.012 ± 0.001	0.011 ± 0.001

(A) Vacuum pump failed and was replaced. Estimated run time 135.4 out of 199.1 hours.

### 2.b.2. 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	0.1104 ± 0.0093	<0.0208	<0.0014	<0.0012	<0.0092
T56	0.0917 ± 0.0074	<0.0144	<0.0012	<0.0008	0.0075 ± 0.0018

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	14-Jan-15	5639 ± 124	758 ± 40	<3	<3	<9	<3	<7	<5	<6	<3	<3	<5
	24-Feb-15	3973 ± 108	808 ± 42	<3	<4	<8	<4	<7	<6	<6	<3	<4	<5
	16-Mar-15	3410 ± 103	853 ± 44	<3	<3	<7	<4	<6	<6	<4	<3	<3	<6
T75	15-Jan-15	<143	<39	<3	<3	<6	<3	<6	<5	<3	<3	<3	<8
	23-Feb-15	<158	<72	<4	<5	<9	<6	<7	<8	<8	<5	<6	<7
	16-Mar-15	<159	<33	<3	<3	<6	<3	<6	<5	<3	<2	<3	<4
T84	14-Jan-15	6063 ± 134	809 ± 41	<3	<3	<7	<3	<8	<6	<5	<3	<3	<4
	24-Feb-15	3755 ± 106	737 ± 40	<3	<3	<8	<5	<8	<6	<6	<3	<4	<4
	16-Mar-15	3162 ± 98	829 ± 42	<3	<3	<8	<3	<8	<5	<4	<3	<4	<4
T97	14-Jan-15	5666 ± 124	699 ± 38	<3	<3	<6	<3	<7	<5	<4	<3	<4	<7
	24-Feb-15	4188 ± 110	742 ± 40	<3	<3	<7	<4	<7	<6	<6	<3	<4	<5
	16-Mar-15	3183 ± 100	841 ± 43	<3	<3	<7	<4	<9	<5	<4	<3	<4	<7

(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	14-Jan-15	<131	286 ± 40	<11	<13	<11	<13	<1051	1450 ± 89	<57	<22	573 ± 59
T02	14-Jan-15	<129	1550 ± 97	<14	<16	<14	<17	1139 ± 81	<436	<76	147 ± 6	742 ± 133
T03	14-Jan-15	<206	<806	<22	<24	<21	76 ± 6	2143 ± 190	3798 ± 341	279 ± 21	244 ± 10	1387 ± 191
T04	15-Jan-15	67 ± 20	577 ± 54	<12	<15	<10	5 ± 2	1623 ± 248	1149 ± 82	<56	<21	463 ± 60
T07	14-Jan-15	113 ± 16	778 ± 46	<10	8 ± 1	<9	25 ± 2	787 ± 51	1385 ± 67	<46	<20	256 ± 17
T08	14-Jan-15	<146	1096 ± 103	<16	<20	<15	25 ± 4	459 ± 121	997 ± 144	<72	<31	<273
T09	14-Jan-15	<136	206 ± 38	<11	<13	<11	<13	1365 ± 229	491 ± 229	<46	45 ± 13	343 ± 54
T10	14-Jan-15	<109	1149 ± 73	<12	<11	<11	14 ± 2	343 ± 39	592 ± 52	<48	<18	<142
T84*	15-Jan-15	<130	1368 ± 81	<14	18 ± 2	<13	45 ± 4	1046 ± 71	1876 ± 97	<74	<28	472 ± 28
T85*	15-Jan-15	<174	878 ± 95	<21	43 ± 5	<20	25 ± 4	1184 ± 234	2892 ± 360	<103	<32	496 ± 69

\*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)

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ba-140 La-140 (A)</u>
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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)

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Ag-110m</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
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T84                      This sample to be collected.

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Ag-110m</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
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T43	22-Jan-15	<92	2278 ± 114	<10	<10	<13	<10	<32	<10	<11	<208	<44
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T44	17-Feb-15	<98	2641 ± 133	<9	<11	<14	<10	<24	<10	<11	<241	<41
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T45                      This sample to be collected.



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

SECOND QUARTER 2015

BUREAU OF RADIATION CONTROL

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

Second Quarter, 2015

<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	1
4.a.2. Fish	Semiannually	2	1
4.b. Broadleaf Vegetation	Monthly	3	9
			<hr/> Total: 199

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 18-Mar-15 Collection 10-June-15	Sample Site	Deployment 18-Mar-15 Collection 10-June-15
N-2	$3.75 \pm 0.19$	WSW-8*	$3.12 \pm 0.33$
N-7*	$2.91 \pm 0.22$		
N-10	$3.59 \pm 0.56$	SW-1	$2.70 \pm 0.05$
		SW-8	$2.64 \pm 0.10$
NNW-2	$3.23 \pm 0.24$		
NNW-10	$3.65 \pm 0.75$	SSW-5*	$2.77 \pm 0.18$
		SSW-10	$2.71 \pm 0.26$
NW-1	$3.63 \pm 0.24$		
NW-5*	$2.81 \pm 0.15$	S-5	$2.60 \pm 0.13$
NW-10*	$4.34 \pm 0.48$	S-10*	$3.18 \pm 0.38$
WNW-2	$3.26 \pm 0.16$	SSE-1	$2.72 \pm 0.44$
WNW-10	$3.75 \pm 0.25$	SSE-10	$2.88 \pm 0.19$
W-1	$3.04 \pm 0.22$	NNE-22	$3.54 \pm 0.31$
W-5*	$2.86 \pm 0.12$		
W-9	$2.83 \pm 0.44$		

\* Sites of dual deployed TLD's.

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

Collection Date	T41	T51	T57	T58	T64	T72
06-Apr-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
13-Apr-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
20-Apr-15	<0.04	<0.04	<0.03	<0.04	<0.04	<0.04
27-Apr-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
04-May-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
11-May-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
18-May-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
26-May-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
01-Jun-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
09-Jun-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
15-Jun-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
22-Jun-15	<0.03	<0.03	<0.03	<0.03	<0.04	<0.03
30-Jun-15	<0.02	<0.03	<0.03	<0.02	<0.02	<0.02

2.b. AIR PARTICULATES - GROSS BETA - (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>
06-Apr-15	0.006 ± 0.002	0.007 ± 0.002	0.010 ± 0.002	<0.009	<0.008	0.018 ± 0.002
13-Apr-15	0.009 ± 0.002	0.011 ± 0.002	0.008 ± 0.002	0.010 ± 0.002	0.008 ± 0.002	0.009 ± 0.002
20-Apr-15	0.010 ± 0.002	0.006 ± 0.002	0.008 ± 0.002	0.009 ± 0.002	0.006 ± 0.002	0.005 ± 0.001
27-Apr-15	0.013 ± 0.002	0.015 ± 0.002	0.014 ± 0.002	0.012 ± 0.002	0.014 ± 0.002	0.015 ± 0.002
04-May-15	0.011 ± 0.002	0.012 ± 0.002	0.013 ± 0.002	0.011 ± 0.002	0.010 ± 0.002	0.013 ± 0.002
11-May-15	0.018 ± 0.002	0.014 ± 0.002	0.016 ± 0.002	0.017 ± 0.002	0.015 ± 0.002	0.015 ± 0.002
18-May-15	0.011 ± 0.002	0.012 ± 0.002	0.013 ± 0.002	0.011 ± 0.002	0.013 ± 0.002	0.013 ± 0.002
26-May-15	0.009 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	0.014 ± 0.002	0.012 ± 0.002	0.014 ± 0.002
01-Jun-15	0.011 ± 0.002	0.014 ± 0.002	0.011 ± 0.002	0.012 ± 0.002	0.014 ± 0.002	0.018 ± 0.002
09-Jun-15	0.009 ± 0.002	0.010 ± 0.002	0.011 ± 0.002	0.010 ± 0.002	0.011 ± 0.002	0.010 ± 0.002
15-Jun-15	0.017 ± 0.002	0.019 ± 0.002	0.019 ± 0.002	0.021 ± 0.002	0.019 ± 0.002	0.019 ± 0.002
22-Jun-15	0.008 ± 0.002	0.011 ± 0.002	0.008 ± 0.001	0.011 ± 0.002	0.009 ± 0.002	0.009 ± 0.002
30-Jun-15	0.011 ± 0.002	0.016 ± 0.002	0.009 ± 0.002	0.018 ± 0.002	0.009 ± 0.002	0.017 ± 0.002
Average:	0.011 ± 0.001	0.013 ± 0.001	0.012 ± 0.001	<0.013	<0.011	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>
T41	0.1334 ± 0.0108	<0.0260	<0.0016	<0.0013	<0.0387
T51	0.1310 ± 0.0109	<0.0216	<0.0014	<0.0011	<0.0376
T57	0.1291 ± 0.0082	<0.0166	<0.0009	<0.0008	<0.0264
T58	0.1257 ± 0.0106	<0.0236	<0.0014	<0.0013	<0.0389
T64	0.1194 ± 0.0110	<0.0236	<0.0013	<0.0015	<0.0392
T72	0.1398 ± 0.0122	<0.0231	<0.0016	<0.0012	<0.0392

### 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	13-Apr-15	<164	372 ± 27	<3	<3	<6	<3	<6	<5	<4	<3	<3	<5
	18-May-15	<157	386 ± 35	<5	<5	<9	<6	<11	<9	<6	<5	<6	<8
	09-Jun-15	<144	431 ± 38	<5	<6	<12	<6	<11	<9	<7	<5	<6	<12
T67	13-Apr-15	<164	290 ± 23	<3	<3	<6	<3	<7	<5	<4	<3	<3	<6
	18-May-15	<157	314 ± 32	<5	<4	<10	<7	<11	<8	<7	<5	<6	<6
	09-Jun-15	<146	226 ± 20	<3	<3	<7	<3	<7	<6	<4	<3	<3	<6
T81	13-Apr-15	<161	398 ± 27	<3	<3	<6	<3	<6	<5	<4	<3	<3	<6
	18-May-15	<157	360 ± 25	<3	<3	<7	<3	<7	<5	<4	<3	<3	<5
	10-Jun-15	<144	388 ± 26	<4	<3	<7	<4	<7	<6	<4	<3	<3	<7

(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	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Ra-226</u>	<u>Th-232</u>
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These samples were previously collected.

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

Sample Site	Collection Date	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	18-Jun-15	2150 ± 210	<27	<27	<56	<33	<60	<21	<24	<432	<123
T81	This sample was previously collected.										

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

Sample Site	Collection Date	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	19-May-15	2930 ± 198	<21	<19	<42	<21	<48	<18	<21	<409	<87
T81	This sample was previously collected.										



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

Sample Site	Collection Date	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Pb-212</u>	<u>Ra-226</u>	<u>Ra-228</u>
T40	13-Apr-15	1240 ± 72	4360 ± 200	<17	<13	40 ± 6	<1120	<27	<341	<56
	18-May-15	655 ± 54	5570 ± 236	<19	<15	52 ± 6	<1240	<28	<306	<63
	10-Jun-15	1100 ± 51	4550 ± 173	<14	<9	54 ± 4	208 ± 65	<17	<202	<40
T41	13-Apr-15	382 ± 45	4010 ± 187	<15	<13	11 ± 4	<1210	<24	<292	<49
	18-May-15	455 ± 53	4030 ± 200	<17	<11	<18	<1180	<26	203 ± 96	<73
	10-Jun-15	1190 ± 56	6520 ± 229	<15	<9	26 ± 3	<299	<19	<222	<42
T67	13-Apr-15	260 ± 28	4720 ± 202	<10	<9	14 ± 3	<314	<17	<201	<38
	18-May-15	567 ± 54	5330 ± 233	<21	<15	25 ± 4	<1310	<28	<350	<68
	09-Jun-15	421 ± 56	2110 ± 142	<20	<12	<23	<980	<26	<332	<66

# TURKEY POINT SITE

## Supplemental Sampling

Second Quarter, 2015

<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	10	0
3.c. Aquatic Vegetation	Quarterly	1	0
4. Ingestion			
4.a. Milk	Semiannually	1	1
4.b. Marine Life	Semiannually	1	0
4.c. Food Crops	At Harvest	3	1
			<hr/> Total: 75

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 - TLD's - ( $\mu\text{R}/\text{hour}$ )

Sample Site	Deployment 18-Mar-15 Collection 10-June-15
NNW-6*	$3.16 \pm 0.32$
NW-7	$4.13 \pm 0.25$
NW-8	$3.59 \pm 0.02$
WNW-3	$3.49 \pm 0.21$
WNW-6*	$3.19 \pm 0.29$
W-8	$3.33 \pm 0.28$
ENE-1*	$2.74 \pm 0.07$
T72	$3.36 \pm 0.28$
PTN-1	$3.16 \pm 0.24$

\* Sites of dual deployed TLD's.

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

Collection Date	T52	T56
06-Apr-15	<0.03	<0.03
13-Apr-15	<0.03	<0.03
20-Apr-15	<0.04	<0.04
27-Apr-15	<0.03	<0.03
04-May-15	<0.04	<0.04
11-May-15	<0.03	<0.03
18-May-15	<0.04	<0.04
26-May-15	<0.03	<0.03
01-Jun-15	<0.03	<0.03
09-Jun-15	<0.03	<0.03
15-Jun-15	<0.04	<0.04
22-Jun-15	<0.03	<0.03
30-Jun-15	<0.02	<0.03

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

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
06-Apr-15	0.008 ± 0.002	0.006 ± 0.002
13-Apr-15	0.008 ± 0.002	0.010 ± 0.002
20-Apr-15	0.007 ± 0.002	0.008 ± 0.002
27-Apr-15	0.016 ± 0.002	0.015 ± 0.002
04-May-15	0.011 ± 0.002	0.017 ± 0.002
11-May-15	0.020 ± 0.002	0.019 ± 0.002
18-May-15	0.012 ± 0.002	0.008 ± 0.002
26-May-15	0.017 ± 0.002	0.017 ± 0.002
01-Jun-15	0.015 ± 0.002	0.013 ± 0.002
09-Jun-15	0.010 ± 0.002	0.009 ± 0.002
15-Jun-15	0.016 ± 0.002	0.017 ± 0.002
22-Jun-15	0.010 ± 0.002	0.011 ± 0.002
30-Jun-15	0.017 ± 0.002	0.019 ± 0.002
Average:	0.013 ± 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	0.1415 ± 0.0116	<0.0221	<0.0014	<0.0011	<0.0390
T56	0.1196 ± 0.0108	<0.0221	<0.0014	<0.0010	<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	13-Apr-15	2245 ± 86	981 ± 46	<4	<3	<7	<4	<9	<6	<4	<3	<4	<5
	18-May-15	3506 ± 101	788 ± 40	<3	<3	<8	<4	<7	<6	<5	<3	<4	<5
	10-Jun-15	3254 ± 99	938 ± 42	<3	<4	<8	<4	<9	<6	<5	<4	<4	<5
T75	13-Apr-15	<161	<31	<2	<2	<4	<3	<4	<3	<3	<2	<2	<4
	18-May-15	<157	<38	<3	<3	<5	<3	<5	<5	<4	<3	<3	<5
	10-Jun-15	<146	<35	<3	<3	<6	<3	<7	<5	<4	<3	<3	<7
T84	13-Apr-15	2324 ± 89	933 ± 47	<3	<3	<8	<4	<8	<6	<4	<3	<4	<5
	18-May-15	3454 ± 104	779 ± 39	<3	<3	<7	<3	<7	<5	<4	<3	<3	<5
	09-Jun-15	2912 ± 94	961 ± 42	<4	<3	<8	<4	<8	<7	<5	<3	<4	<6
T97	13-Apr-15	2253 ± 89	911 ± 33	<2	<2	<5	<3	<5	<4	<3	<2	<3	<3
	18-May-15	3501 ± 101	851 ± 27	<2	<2	<5	<3	<5	<4	<3	<2	<2	<3
	09-Jun-15	3109 ± 97	918 ± 59	<6	<6	<16	<7	<14	<11	<7	<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	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Ra-226</u>	<u>Th-232</u>
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These samples were previously collected.

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

Sample Site	Collection Date	<u>Be-7</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Ag-110m</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-212</u>	<u>Ra-226</u>	<u>Ra-228</u>
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T84            There was no sample available during the 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	16-Apr-15	1795 ± 76	<69(B)	<3	<4	<20

(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.

(B) - Due to extenuating circumstances, unable to get milk sample to lab in time to meet I-131 time constraints.

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

Sample Site	Collection Date	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Ag-110m</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
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T84            This sample was not available during the quarter.

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Ag-110m</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T43	This sample was previously collected.											
T44	This sample was previously collected.											
T45(A)	13-May-15	<71	2090 ± 116	<8	<11	<13	<9	<16	<8	<12	<181	<35
(A) Guava												



RADIOLOGICAL SURVEILLANCE  
OF  
FLORIDA POWER AND LIGHT COMPANY

**TURKEY POINT SITE**

THIRD QUARTER 2015

BUREAU OF RADIATION CONTROL



# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

Third Quarter, 2015

<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	3
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	1
4.a.2. Fish	Semiannually	2	0
4.b. Broadleaf Vegetation	Monthly	3	9
			<hr/> 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 10-June-15 Collection 16-Sep-15	Sample Site	Deployment 10-June-15 Collection 16-Sep-15
N-2	$4.41 \pm 0.31$	WSW-8	$3.38 \pm 0.18$
N-7	$3.30 \pm 0.28$		
N-10	$3.79 \pm 0.18$	SW-1	$3.17 \pm 0.14$
		SW-8	$2.85 \pm 0.16$
NNW-2	$3.51 \pm 0.22$		
NNW-10	$3.66 \pm 0.52$	SSW-5	$3.07 \pm 0.25$
		SSW-10	$3.17 \pm 0.41$
NW-1	$4.09 \pm 0.33$		
NW-5	$3.18 \pm 0.18$	S-5	$2.88 \pm 0.15$
NW-10	$4.24 \pm 0.33$	S-10	$3.30 \pm 0.14$
WNW-2	$3.57 \pm 0.15$	SSE-1	$2.71 \pm 0.25$
WNW-10	$4.09 \pm 0.31$	SSE-10	$3.06 \pm 0.14$
W-1	$3.27 \pm 0.19$	NNE-22	$3.77 \pm 0.14$
W-5	$3.26 \pm 0.18$		
W-9	$3.15 \pm 0.04$		

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>
06-Jul-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
13-Jul-15	<0.03	<0.04	<0.04	<0.04	<0.04	<0.04
20-Jul-15	<0.04	<0.03	<0.03	<0.04	<0.03	<0.04
27-Jul-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
03-Aug-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
10-Aug-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
18-Aug-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
24-Aug-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
31-Aug-15	<0.04	<0.04	<0.04	<0.04	<0.03	<0.04
08-Sep-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
14-Sep-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
21-Sep-15	<0.04	<0.04	<0.03	<0.04	<0.04	<0.04
29-Sep-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03

2.b. AIR PARTICULATES - GROSS BETA - (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>
06-Jul-15	0.015 ± 0.002	0.019 ± 0.002	0.014 ± 0.002	0.020 ± 0.002	0.018 ± 0.002	0.017 ± 0.002
13-Jul-15	0.007 ± 0.002	0.017 ± 0.002	0.013 ± 0.002	0.019 ± 0.002	0.013 ± 0.002	0.017 ± 0.002
20-Jul-15	0.014 ± 0.002	0.016 ± 0.002	0.007 ± 0.002	0.015 ± 0.002	0.011 ± 0.002	0.014 ± 0.002
27-Jul-15	0.014 ± 0.002	0.013 ± 0.002	0.011 ± 0.002	0.015 ± 0.002	0.013 ± 0.002	0.012 ± 0.002
03-Aug-15	0.013 ± 0.002	0.012 ± 0.002	0.014 ± 0.002	0.014 ± 0.002	0.010 ± 0.002	0.019 ± 0.002
10-Aug-15	0.019 ± 0.002	0.016 ± 0.002	0.011 ± 0.002	0.012 ± 0.002	0.013 ± 0.002	0.017 ± 0.002
18-Aug-15	0.007 ± 0.001	0.011 ± 0.002	0.007 ± 0.001	0.008 ± 0.001	0.007 ± 0.001	0.008 ± 0.001
24-Aug-15	0.007 ± 0.002	0.007 ± 0.002	0.004 ± 0.002	0.009 ± 0.002	0.005 ± 0.002	0.005 ± 0.002
31-Aug-15	0.010 ± 0.002	0.011 ± 0.002	0.010 ± 0.002	0.009 ± 0.002	0.008 ± 0.002	0.009 ± 0.002
08-Sep-15	0.010 ± 0.002	0.007 ± 0.001	0.007 ± 0.001	0.010 ± 0.002	0.012 ± 0.002	0.009 ± 0.001
14-Sep-15	0.009 ± 0.002	0.011 ± 0.002	0.010 ± 0.002	0.011 ± 0.002	0.007 ± 0.002	0.006 ± 0.002
21-Sep-15	0.007 ± 0.002	0.009 ± 0.002	0.005 ± 0.001	0.006 ± 0.001	0.005 ± 0.001	0.008 ± 0.002
29-Sep-15	0.006 ± 0.001	0.005 ± 0.001	0.005 ± 0.001	0.008 ± 0.002	<0.006	0.006 ± 0.001
Average:	0.011 ± 0.001	0.012 ± 0.001	0.009 ± 0.001	0.012 ± 0.001	<0.010	0.011 ± 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>
T41	0.0751 ± 0.0072	<0.0167	<0.0016	<0.0011	0.0120 ± 0.0026
T51	0.1065 ± 0.0096	<0.0215	<0.0013	<0.0011	<0.0352
T57	0.0785 ± 0.0083	<0.0234	<0.0013	<0.0013	<0.0354
T58	0.1053 ± 0.0099	<0.0252	<0.0014	<0.0014	<0.0390
T64	0.0917 ± 0.0078	<0.0174	<0.0012	<0.0011	<0.0130
T72	0.1007 ± 0.0099	<0.0276	<0.0016	<0.0011	<0.0360

### 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	14-Jul-15	<145	448 ± 20	<2	<2	<4	<2	<4	<3	<3	<2	<2	<3
	19-Aug-15	<147	455 ± 29	<4	<3	<7	<4	<8	<6	<5	<3	<3	<4
	16-Sep-15	<166	410 ± 28	<4	<3	<7	<4	<8	<6	<4	<3	<3	<7
T67	13-Jul-15	<145	290 ± 36	<6	<7	<9	<7	<14	<11	<7	<6	<7	<8
	19-Aug-15	<147	173 ± 18	<3	<4	<6	<3	<8	<5	<5	<3	<3	<4
	15-Sep-15	<166	271 ± 26	<4	<4	<8	<5	<8	<6	<5	<4	<5	<7
T81	14-Jul-15	<145	432 ± 29	<4	<3	<6	<4	<7	<5	<4	<3	<3	<6
	18-Aug-15	<147	440 ± 44	<5	<5	<9	<7	<14	<10	<7	<4	<6	<7
	16-Sep-15	<166	362 ± 26	<3	<3	<7	<4	<7	<5	<4	<3	<4	<6

(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	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Ra-226</u>	<u>Th-232</u>	<u>U-235</u>	<u>U-238</u>
T42	14-Jul-15	<100	119 ± 41	<11	<10	<9	<11	<1094	943 ± 103	<48	<18	351 ± 36
T67	14-Jul-15	<108	1106 ± 69	<10	<10	<9	17 ± 2	1529 ± 230	1718 ± 89	58 ± 8	86 ± 20	763 ± 35
T81	13-Jul-15	<121	277 ± 50	<15	<11	<10	<13	925 ± 416	428 ± 207	<51	<20	464 ± 61

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

Sample Site	Collection Date	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	This sample not yet collected.										
T81	14-Jul-15	1762 ± 200	<23	<24	<53	<24	<63	<21	<30	<594	<126

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

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

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Pb-212</u>	<u>Ra-226</u>	<u>Ra-228</u>
T40	14-Jul-15	1291 ± 81	5179 ± 247	<20	<14	70 ± 8	<1183	<34	<324	<72
	19-Aug-15	2344 ± 80	4930 ± 185	<12	<9	63 ± 5	472 ± 85	<20	<227	<40
	16-Sep-15	1896 ± 96	4475 ± 222	<26	<13	76 ± 8	<1284	<31	<349	<73
T41	14-Jul-15	879 ± 59	3676 ± 182	<14	<11	13 ± 4	<1130	<22	<280	<58
	19-Aug-15	1874 ± 96	4390 ± 225	<16	<14	<24	<1228	21 ± 10	<364	<77
	16-Sep-15	2364 ± 84	4970 ± 189	<16	<10	19 ± 3	382 ± 74	<19	<227	<35
T67	13-Jul-15	1490 ± 84	3740 ± 194	<18	<13	<16	<1024	<32	<314	<66
	19-Aug-15	2048 ± 99	3904 ± 203	<19	<14	13 ± 6	1336 ± 467	<36	<333	<69
	15-Sep-15	3185 ± 131	4637 ± 228	<29	<15	<20	958 ± 418	<34	<419	<83

# TURKEY POINT SITE

## Supplemental Sampling

Third Quarter, 2015

<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	2
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	0
			<hr/> Total: 75

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 10-Jun-15 Collection 16-Sep-15
NNW-6	$3.32 \pm 0.10$
NW-7	$3.86 \pm 0.31$
NW-8	$3.92 \pm 0.08$
WNW-3	$3.51 \pm 0.02$
WNW-6	$3.49 \pm 0.45$
W-8	$3.81 \pm 0.72$
ENE-1	$2.39 \pm 0.43$
T72	$3.57 \pm 0.51$
PTN-1	$3.49 \pm 0.17$

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

Collection Date	T52	T56
06-Jul-15	<0.04	<0.04
13-Jul-15	<0.04	<0.04
20-Jul-15	<0.04	<0.03
27-Jul-15	<0.03	<0.03
03-Aug-15	<0.04	<0.04
10-Aug-15	<0.03	<0.03
18-Aug-15	<0.03	<0.03
24-Aug-15	<0.03	<0.03
31-Aug-15	<0.04	<0.04
08-Sep-15	<0.03	<0.03
14-Sep-15	<0.03	<0.03
21-Sep-15	<0.03	<0.03
29-Sep-15	<0.03	<0.03

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

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
06-Jul-15	0.019 ± 0.002	0.023 ± 0.003
13-Jul-15	0.015 ± 0.002	0.011 ± 0.002
20-Jul-15	0.011 ± 0.002	0.015 ± 0.002
27-Jul-15	0.014 ± 0.002	0.014 ± 0.002
03-Aug-15	0.015 ± 0.002	0.009 ± 0.002
10-Aug-15	0.021 ± 0.002	0.014 ± 0.002
18-Aug-15	0.010 ± 0.002	0.011 ± 0.002
24-Aug-15	0.004 ± 0.002	0.007 ± 0.002
31-Aug-15	0.010 ± 0.002	0.011 ± 0.002
08-Sep-15	0.008 ± 0.001	0.011 ± 0.002
14-Sep-15	0.008 ± 0.002	0.011 ± 0.002
21-Sep-15	0.006 ± 0.001	0.006 ± 0.001
29-Sep-15	0.006 ± 0.001	0.004 ± 0.001
Average:	0.011 ± 0.001	0.011 ± 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	0.0890 ± 0.0078	<0.0147	<0.0015	<0.0012	0.0132 ± 0.0029
T56	0.0981 ± 0.0091	<0.0295	<0.0011	<0.0014	0.0266 ± 0.0111

### 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	13-Jul-15	3510 ± 101	1029 ± 48	<3	<3	<8	<4	<9	<7	<5	<4	<4	<6
	18-Aug-15	4800 ± 116	934 ± 45	<4	<3	<7	<4	<9	<6	<5	<3	<4	<6
	16-Sep-15	9681 ± 91	712 ± 38	<3	<3	<8	<4	<8	<5	<4	<3	<4	<7
T75	14-Jul-15	<142	<45	<4	<3	<6	<4	<7	<6	<4	<3	<4	<8
	18-Aug-15	<147	<46	<4	<3	<7	<4	<7	<6	<4	<3	<4	<7
	16-Sep-15	<166	<38	<3	<3	<6	<3	<7	<5	<4	<3	<4	<7
T84	14-Jul-15	3587 ± 102	979 ± 46	<3	<4	<7	<3	<10	<6	<4	<3	<4	<6
	19-Aug-15	4744 ± 115	901 ± 33	<2	<2	<5	<2	<5	<4	<3	<2	<2	<4
	16-Sep-15	7667 ± 82	725 ± 54	<5	<6	<11	<7	<13	<11	<10	<5	<8	<9
T97	14-Jul-15	3392 ± 100	1086 ± 49	<3	<3	<9	<4	<8	<6	<4	<3	<4	<5
	19-Aug-15	4701 ± 115	919 ± 44	<4	<3	<9	<4	<9	<7	<6	<3	<4	<4
	16-Sep-15	7879 ± 83	739 ± 39	<4	<4	<8	<4	<9	<6	<5	<3	<4	<4

(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	14-Jul-15	<159	1632 ± 92	<16	22 ± 3	<15	16 ± 2	2263 ± 327	3347 ± 193	116 ± 11	<26	419 ± 38
T85	14-Jul-15	89 ± 28	349 ± 54	<13	25 ± 3	<11	9 ± 4	<1014	1341 ± 119	<55	<19	417 ± 40

### 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	Pb-210	Pb-212	Ra-226	Ra-228
T84	No sample available for collection.													

### 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.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	This sample not yet collected.											

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

Sample Site	Collection Date	<u>Be-7</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Ag-110m</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
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 2015

BUREAU OF RADIATION CONTROL

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

Fourth Quarter, 2015

<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	77
2.b. Air Particulates	Weekly	6	77
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	1
4.a.2. Fish	Semiannually	2	2
4.b. Broadleaf Vegetation	Monthly	3	9
			<hr/> Total: 198

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 16-Sep-15 Collection 15-Dec-15	Sample Site	Deployment 16-Sep-15 Collection 15-Dec-15
N-2	$4.16 \pm 0.09$	WSW-8	$3.45 \pm 0.21$
N-7	$3.41 \pm 0.16$		
N-10	$3.97 \pm 0.36$	SW-1	$3.26 \pm 0.10$
		SW-8	$2.84 \pm 0.12$
NNW-2	$3.69 \pm 0.31$		
NNW-10	$3.98 \pm 0.25$	SSW-5	$3.18 \pm 0.28$
		SSW-10	$3.37 \pm 0.46$
NW-1	$4.21 \pm 0.12$		
NW-5	$3.44 \pm 0.36$	S-5	$2.96 \pm 0.11$
NW-10	$4.51 \pm 0.05$	S-10	$3.75 \pm 0.09$
WNW-2	$3.65 \pm 0.14$	SSE-1	$2.86 \pm 0.33$
WNW-10	$4.46 \pm 0.21$	SSE-10	$3.19 \pm 0.30$
W-1	$3.52 \pm 0.26$	NNE-22	$4.00 \pm 0.30$
W-5	$3.64 \pm 0.12$		
W-9	$3.36 \pm 0.15$		



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>
06-Oct-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
12-Oct-15	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
19-Oct-15	<0.04	<0.04	<0.03	<0.03	<0.04	<0.04
26-Oct-15	<0.03	<0.04	<0.03	<0.03	<0.03	<0.03
04-Nov-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
10-Nov-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
18-Nov-15	<0.04	<0.03	<0.03	<0.03	<0.03	<0.03
24-Nov-15	<0.02	<0.02	<0.02	<0.02	<0.03	<0.02
01-Dec-15	<0.03(A)	<0.03	<0.03	<0.03	<0.03	<0.03
07-Dec-15	<0.04	<0.04	(B)	<0.04	<0.04	<0.04
14-Dec-15	<0.04	<0.03	<0.02	<0.04	<0.04	<0.03
21-Dec-15	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
29-Dec-15	<0.02	<0.04(C)	<0.02	<0.02	<0.03	<0.02

(A) Vacuum pump failed and was replaced. Estimated run time 145.4 out of 170 hours.

(B) Sample could not be collected due to flooding; site inaccessible. Collected the following week as a two week sample collection.

(C) Vacuum pump failed and was replaced. Estimated run time 108.4 out of 192.3 hours.

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

Collection Date	T41	T51	T57	T58	T64	T72
06-Oct-15	0.007 ± 0.002	0.014 ± 0.002	0.010 ± 0.002	0.014 ± 0.002	0.008 ± 0.002	0.016 ± 0.002
12-Oct-15	0.014 ± 0.002	0.014 ± 0.002	0.012 ± 0.002	0.020 ± 0.002	0.012 ± 0.002	0.017 ± 0.002
19-Oct-15	0.018 ± 0.002	0.017 ± 0.002	0.018 ± 0.002	0.021 ± 0.002	0.022 ± 0.002	0.018 ± 0.002
26-Oct-15	0.007 ± 0.002	0.013 ± 0.002	0.010 ± 0.002	0.015 ± 0.002	0.013 ± 0.002	0.014 ± 0.002
04-Nov-15	0.008 ± 0.001	0.009 ± 0.001	0.012 ± 0.002	0.009 ± 0.001	0.010 ± 0.001	0.007 ± 0.001
10-Nov-15	0.008 ± 0.002	0.005 ± 0.002	0.007 ± 0.002	0.008 ± 0.002	0.016 ± 0.002	0.009 ± 0.002
18-Nov-15	0.009 ± 0.001	0.010 ± 0.002	0.008 ± 0.001	0.009 ± 0.001	0.010 ± 0.001	0.011 ± 0.002
24-Nov-15	0.009 ± 0.002	0.009 ± 0.002	0.005 ± 0.002	0.012 ± 0.002	0.017 ± 0.002	0.012 ± 0.002
01-Dec-15	0.008 ± 0.002(A)	0.003 ± 0.001	0.005 ± 0.001	0.005 ± 0.001	0.004 ± 0.001	0.011 ± 0.002
07-Dec-15	<0.007	<0.007	(B)	<0.007	0.007 ± 0.002	0.003 ± 0.002
14-Dec-15	0.006 ± 0.001	0.004 ± 0.001	0.005 ± 0.001	0.008 ± 0.002	0.005 ± 0.001	0.002 ± 0.001
21-Dec-15	0.004 ± 0.001	0.009 ± 0.002	0.010 ± 0.002	0.010 ± 0.002	0.007 ± 0.002	0.007 ± 0.002
29-Dec-15	0.006 ± 0.001	0.008 ± 0.002(C)	0.007 ± 0.001	0.005 ± 0.001	0.017 ± 0.002	0.005 ± 0.001
Average:	<0.009	<0.009	0.009 ± 0.001	<0.010	0.011 ± 0.001	0.010 ± 0.001

(A) Vacuum pump failed and was replaced. Estimated run time 145.4 out of 170 hours.

(B) Sample could not be collected due to flooding; site inaccessible. Collected the following week as a two week sample collection.

(C) Vacuum pump failed and was replaced. Estimated run time 108.4 out of 192.3 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	0.0807 ± 0.0074	<0.0172	<0.0013	<0.0009	0.0088 ± 0.0026
T51	0.1105 ± 0.0088	<0.0139	<0.0014	<0.0010	0.0088 ± 0.0029
T57	0.1118 ± 0.0103	<0.0268	<0.0014	<0.0008	<0.0391
T58	0.1147 ± 0.0097	<0.0251	<0.0017	<0.0016	<0.0363
T64	0.0804 ± 0.0075	<0.0161	<0.0013	<0.0009	0.0106 ± 0.0027
T72	0.1036 ± 0.0099	<0.0205	<0.0013	<0.0012	<0.0385

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

Sample Site	Collection Date	<u>H-3</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	Zr-95 Nb-95 (A)	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	Ba-140 La-140 (B)
T42	19-Oct-15	<142	161 ± 17	<3	<3	<6	<3	<8	<6	<5	<3	<3	<5
	09-Nov-15	<149	304 ± 24	<3	<3	<6	<3	<7	<4	<4	<3	<4	<6
	15-Dec-15	150 ± 30	173 ± 18	<3	<3	<7	<4	<7	<6	<6	<3	<3	<4
T67	19-Oct-15	<142	153 ± 32	<6	<6	<10	<6	<13	<10	<7	<6	<6	<10
	09-Nov-15	<149	173 ± 18	<3	<3	<5	<4	<6	<4	<4	<3	<3	<6
	16-Dec-15	<143	171 ± 18	<3	<3	<7	<4	<7	<6	<5	<3	<3	<5
T81	19-Oct-15	<142	307 ± 25	<4	<4	<7	<4	<8	<6	<4	<3	<4	<7
	10-Nov-15	<149	338 ± 27	<3	<3	<7	<4	<7	<5	<4	<3	<4	<7
	15-Dec-15	252 ± 31	175 ± 18	<3	<3	<7	<4	<7	<4	<6	<3	<3	<4

(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)

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Ra-226</u>	<u>Th-232</u>	<u>Others:</u>
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)

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	11-Dec-15	1912 ± 204	30	30	57	33	52	19	29	501	132
T81	This sample was previously collected.										

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	11-Dec-15	2318 ± 164	21	20	40	18	40	20	18	390	74
T81	11-Dec-15	3017 ± 245	25	24	54	26	59	23	26	472	109

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>	<u>Pb-212</u>	<u>Ra-226</u>	<u>Ra-228</u>
T40	19-Oct-15	1745 ± 71	5303 ± 197	<19	<10	111 ± 6	273 ± 72	<20	<227	<39
	06-Nov-15	1504 ± 88	5126 ± 231	<37	<13	100 ± 8	<1068	<28	<318	<75
	15-Dec-15	2701 ± 119	5370 ± 255	<30	<14	61 ± 8	<1317	<36	<325	<72
T41	19-Oct-15	1880 ± 96	5812 ± 256	<28	<13	32 ± 5	<1344	<35	<310	<72
	06-Nov-15	1975 ± 76	5270 ± 195	<24	<8	23 ± 3	<329	<20	<236	<38
	15-Dec-15	1822 ± 71	4557 ± 178	<18	<10	16 ± 3	238 ± 71	<19	<240	<40
T67	19-Oct-15	2261 ± 105	4705 ± 227	<28	<14	<22	<1207	<34	<354	<73
	06-Nov-15	1808 ± 96	4075 ± 209	<37	<14	<21	<1429	<38	<284	<70
	16-Dec-15	4757 ± 159	3300 ± 183	<24	<14	<17	<1218	<32	<362	<67

# TURKEY POINT SITE

## Supplemental Sampling

Fourth Quarter, 2015

<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
3.c. Aquatic Vegetation	Quarterly	1	0
4. Ingestion			
4.a. Milk	Semiannually	1	1
4.b. Marine Life	Semiannually	1	0
4.c. Food Crops	At Harvest	3	0
			<hr/> 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 16-Sep-15 Collection 15-Dec-15
NNW-6	$3.60 \pm 0.16$
NW-7	$4.07 \pm 0.17$
NW-8	$4.14 \pm 0.17$
WNW-3	$3.87 \pm 0.33$
WNW-6	$3.73 \pm 0.43$
W-8	$4.10 \pm 0.23$
ENE-1	$7.56 \pm 2.08$
T72	$3.55 \pm 0.54$
PTN-1	$3.49 \pm 0.31$

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

Collection Date	T52	T56
06-Oct-15	<0.03	<0.03
12-Oct-15	<0.04	<0.04
19-Oct-15	<0.03	<0.03
26-Oct-15	<0.03	<0.03
04-Nov-15	<0.03	<0.03
10-Nov-15	<0.05(A)	<0.03
18-Nov-15	<0.03	<0.03
24-Nov-15	<0.02	<0.02
01-Dec-15	<0.03	<0.03
07-Dec-15	<0.04	<0.04
15-Dec-15	<0.03	<0.04
21-Dec-15	<0.04	<0.03
29-Dec-15	<0.02	<0.02

(A) Vacuum pump failed and was replaced. Estimated run time 79.4 out of 143.4 hours.

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

<u>Collection Date</u>	<u>T52</u>	<u>T56</u>
06-Oct-15	0.013 ± 0.002	0.007 ± 0.002
12-Oct-15	0.010 ± 0.002	0.013 ± 0.002
19-Oct-15	0.018 ± 0.002	0.020 ± 0.002
26-Oct-15	0.009 ± 0.002	0.009 ± 0.002
04-Nov-15	0.007 ± 0.001	0.011 ± 0.002
10-Nov-15	0.009 ± 0.003(A)	0.008 ± 0.002
18-Nov-15	0.011 ± 0.002	0.009 ± 0.001
24-Nov-15	0.010 ± 0.002	0.010 ± 0.002
01-Dec-15	0.005 ± 0.001	0.005 ± 0.001
07-Dec-15	<0.007	0.003 ± 0.002
15-Dec-15	0.007 ± 0.001	0.008 ± 0.002
21-Dec-15	0.006 ± 0.002	0.013 ± 0.002
29-Dec-15	0.006 ± 0.001	0.004 ± 0.001
Average:	<0.009	0.009 ± 0.001

(A) Vacuum pump failed and was replaced. Estimated run time 79.4 out of 143.4 hours.

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	0.1057 ± 0.0087	<0.0119	<0.0012	<0.0011	0.0100 ± 0.0028
T56	0.0923 ± 0.0098	<0.0280	<0.0013	<0.0011	<0.0374



### 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-Oct-15	16062 ± 200	553 ± 24	<2	<2	<4	<2	<4	<3	<3	<2	<2	<3
	10-Nov-15	13655 ± 192	540 ± 32	<3	<4	<8	<3	<8	<5	<6	<3	<4	<6
	15-Dec-15	9588 ± 162	369 ± 26	<3	<3	<5	<4	<7	<5	<6	<3	<3	<5
T75	19-Oct-15	<142	<38	<3	<3	<7	<3	<6	<5	<4	<3	<2	<5
	10-Nov-15	<149	<103	<6	<5	<11	<6	<14	<11	<10	<5	<7	<11
	15-Dec-15	83 ± 29	<34	<3	<3	<7	<4	<7	<5	<6	<3	<3	<5
T84	19-Oct-15	16830 ± 205	523 ± 32	<4	<3	<8	<4	<9	<7	<6	<4	<4	<5
	10-Nov-15	13852 ± 193	575 ± 33	<3	<3	<7	<3	<7	<6	<6	<3	<4	<5
	15-Dec-15	9138 ± 159	324 ± 20	<2	<3	<5	<3	<6	<5	<4	<2	<3	<4
T97	19-Oct-15	18376 ± 219	563 ± 33	<3	<3	<8	<3	<7	<6	<4	<3	<4	<5
	09-Nov-15	13637 ± 192	502 ± 31	<4	<3	<8	<4	<8	<6	<5	<3	<4	<7
	15-Dec-15	9151 ± 159	335 ± 25	<3	<3	<7	<3	<8	<6	<6	<3	<3	<4

(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	Others:
T84	This sample was previously collected.										
T85	This sample was previously collected.										

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	Pb-212	Ra-226	Ra-228
T84	There was no sample available during the quarter.												

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	01-Dec-15	1289 ± 52	<4	<3	<4	<8

(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)

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Ag-110m</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T84	There was no sample available during the quarter.											

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

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

ATTACHMENT C

RESULTS FROM THE 2015  
INTERLABORATORY COMPARISON PROGRAM  
CONDUCTED BY  
DEPARTMENT OF ENERGY

## DOE-MAPEP 32 RESULTS

Program status	Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
<b>Matrix: RdF Air Filter Bq/filter</b>					
Required	MN54	1.103	1.02	A	0.71 – 1.33
Required	CO57	1.508	1.51	A	1.06 – 1.33
Required	CO60	0	0	A	False Positive Test
	ZN65	.983	0.83	A	0.069 – 0.129
Required	CS134	1.089	1.15	A	0.81 – 1.51
Required	CS137	0.003	1.76	A	False Positive Test

<b>Matrix: GrF Air Filter Bq/filter</b>					
Required	Gross Beta	0.86	0.75	A	0.38 – 1.13
Required	Gross Alpha	1.83	1.77	A	0.53 – 3.01

<b>Matrix: MaS Soil Bq/kg</b>					
Required	K40	680.28	622	A	435 – 809
	MN54	1264	1198	A	839 – 1557
	CO57	0.01	0	A	False Positive Test
	CO60	838	817	A	572 – 1062
	ZN65	1178	1064	A	745 – 1383
	CS134	624	678	A	475 – 881
Required	CS137	1301.3	1238	A	False Positive Test

<b>Matrix: MaW Water Bq/L</b>					
Required	H3	589	563	A	394 – 732
	MN54	0.01	0	A	False Positive Test
	CO57	30.95	29.9	A	20.9 – 38.9
Required	CO60	0.074	0	A	False Positive Test
	ZN65	21.5	18.3	A	12.8 – 23.8
Required	CS134	24.6	23.5	A	16.5 – 30.6
Required	CS137	21.	19.1	A	13.4 – 24.8
	SR90	9.05	9.48	A	6.64 – 12.32

<b>Matrix: RdV Vegetation, Bq/sample :</b>					
	MN54	0.0	0.0	A	False Positive Test
	CO57	0.043	0	A	False Positive Test
Required	CO60	5.582	5.55	A	3.89 – 7.22
	ZN65	.311	0	A	False Positive Test
	CS134	7.25	7.32	A	5.12 – 9.52
Required	CS137	10.22	9.18	A	6.43 – 11.93

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

\* Acceptable Uncertainty Value for False Positive.

In MAPEP 32, the results for gamma on air filters, water, soil, and vegetation matrices for those nuclides associated with nuclear power plant operation and using analytical methods used in the REMP are acceptable.

There are no relevant data flags:

## DOE-MAPEP 33 RESULTS

Program status	Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
<b>Matrix: RdF Air Filter Bq/filter</b>					
Required	MN54	2.26	2.11	A	1.48 – 2.74
Required	CO57	2.65	2.74	A	1.92 – 3.56
Required	CO60	1.76	1.71	A	1.20 – 2.22
	ZN65	1.45	1.32	A	0.92 – 1.72
Required	CS134	2.50	2.45	A	1.72 – 3.19
Required	CS137	2.02	1.96	A	1.92 – 3.56
<b>Matrix: GrF Air Filter Bq/filter</b>					
Required	Gross Beta	0.83	0.90	A	0.27 – 1.53
<b>Matrix: MaS Soil Bq/kg</b>					
Required	K40	609.83	599	A	419 - 779
	MN54	1395	1340	A	938 - 1742
	CO57	1203	1180	A	826 - 1534
	CO60	1.92	1.3	N	Sensitivity evaluation <sup>Note *1</sup>
	ZN65	709.5	662	A	463 - 861
	CS134	23.07	23.1	A	16.2 - 30
Required	CS137	0.117		A	False Positive Test
<b>Matrix: MaW Water Bq/L</b>					
Required	H3	220.17	216	A	151 - 261
	MN54	17.01	15.6	A	10.9 – 20.3
	CO57	21.7	20.8	A	14.6 – 27.0
Required	CO60	18.3	17.1	A	12.0 – 22.2
	ZN65	16.12	13.9	A	9.7 – 18.1
Required	CS134	23.069	23.1	A	16.2 – 30.0
Required	CS137	0.117		A	False Positive Test
	SR90	4.89	4.80	A	3.36 – 6.24
<b>Matrix: RdV Vegetation, Bq/sample :</b>					
	MN54	8.376	7.68	A	5.38 – 9.98
	CO57	6.892	6.62	A	4.63- 8.61
Required	CO60	4.568	4.56	A	3.19 – 5.93
	ZN65	5.896	5.46	A	3.82 – 7.10
	CS134	5.947	5.80	W	4.06 – 7.54
Required	CS137	0.041		A	False Positive Test
Evaluation : A = Acceptable, W = Acceptable with Warning, N = Not Acceptable					

NOTE \*1: In MAPEP 33, the results for gamma on air filters, water, soil, and vegetation matrices for those nuclides associated with nuclear power plant operation and using analytical methods used in the REMP are acceptable. There was one Not Acceptable data flag for MAPEP 33 for Matrix Soil for Co-60 (per ODCM Table 5.3-1, Interlaboratory Comparison Program Sample Analysis, Co-60 soil sampling is not required for Turkey Point). Turkey Point Condition Report AR # 02114797 was generated to document this flag in MAPEP 33 effectiveness.



ATTACHMENT D

Industry Initiative

Ground Water Protection Program

Tritium in Ground Water Monitoring

2015

#### 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 lab.

#### 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 average (measured by supplemental sampling) was 6560 pCi/L in 2015 with a max concentration of 18,376 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 2015 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 3840 pico curies per liter. 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 2015

Well number	Q1 2015			Q2 2015			Q3 2015			Q4 2015		
	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	579	---	---	418	---	---	484	---	---	536	---	69
CD-1	554	---	---	865	166	---	725	115	---	734	---	---
P-94-2	740	177	---	740	n/a	n/a	806	---	---	806	n/a	n/a
P-94-4	2010	---	8.3	3060	---	---	1690	---	---	2460	---	6.88
STP-1	0	---	---	0	n/a	n/a	197	---	---	197	n/a	n/a
PTN-MW-1s	0	---	---	n/a	n/a	n/a	54	---	---	n/a	n/a	n/a
PTN-MW-1i	484	369	---	n/a	n/a	n/a	571	382	---	n/a	n/a	n/a
PTN-MW-1d	1500	422	---	n/a	n/a	n/a	2310	548	---	n/a	n/a	n/a
PTN-MW-2s	0	---	---	n/a	n/a	n/a	104	---	---	n/a	n/a	n/a
PTN-MW-3s	310	---	---	n/a	n/a	n/a	293	---	---	n/a	n/a	n/a
PTN-MW-4s	21	---	---	109	---	---	149	---	---	188	---	---
PTN-MW-4i	0	---	---	3300	503	---	3180	556	---	3250	418	---
PTN-MW-4d	50	---	---	2950	492	---	3590	624	---	3840	609	---
PTN-MW-5s	163	414	---	210	372	---	235	432	---	2850	276	---
PTN-MW-5i	397	463	---	88	406	---	255	335	---	255	580	---
PTN-MW-5d	2360	544	---	291	615	---	2800	618	---	1950	592	---
PTN-MW-6s	5	166	---	n/a	n/a	n/a	50	---	---	n/a	n/a	n/a
PTN-MW-6d	1610	458	---	n/a	n/a	n/a	1990	519	---	n/a	n/a	n/a
PTN-MW-7s	762	---	---	732	-	---	530	---	---	1070	---	---
PTN-MW-7i	261	---	---	1380	259	---	1960	189	---	1820	---	---
PTN-MW-7d	132	333	---	116	---	---	26	---	---	456	---	---
PTN-MW-8s	2740	125	---	568	---	21.65	561	110	10.8	1430	---	13.25
PTN-MW-9s	747	114	---	676	---	---	470	---	---	773	---	---
PTN-MW-10s	0	-	---	n/a	n/a	n/a	0	---	---	n/a	n/a	n/a
PTN-MW-10i	156	385	---	n/a	n/a	n/a	1460	346	---	n/a	n/a	n/a
PTN-MW-10d	350	---	---	n/a	n/a	n/a	331	648	---	n/a	n/a	n/a
PTN-MW-11s	182	---	---	536	---	---	781	---	---	265	---	---
PTN-MW-12s	607	---	---	590	141	---	567	110	---	1040	---	---
NE StrmDrain	306	---	---	382	---	---	493	---	---	437	---	---
SE StrmDrain	231	---	---	1070	---	---	764	---	---	5890	---	---
W StrmDrain	459	---	---	347	---	---	2800	---	---	11240	---	---
CRF StrmDrain	NS	NS	NS	NS	NS	NS	NS	NS	NS	<MDA	---	---

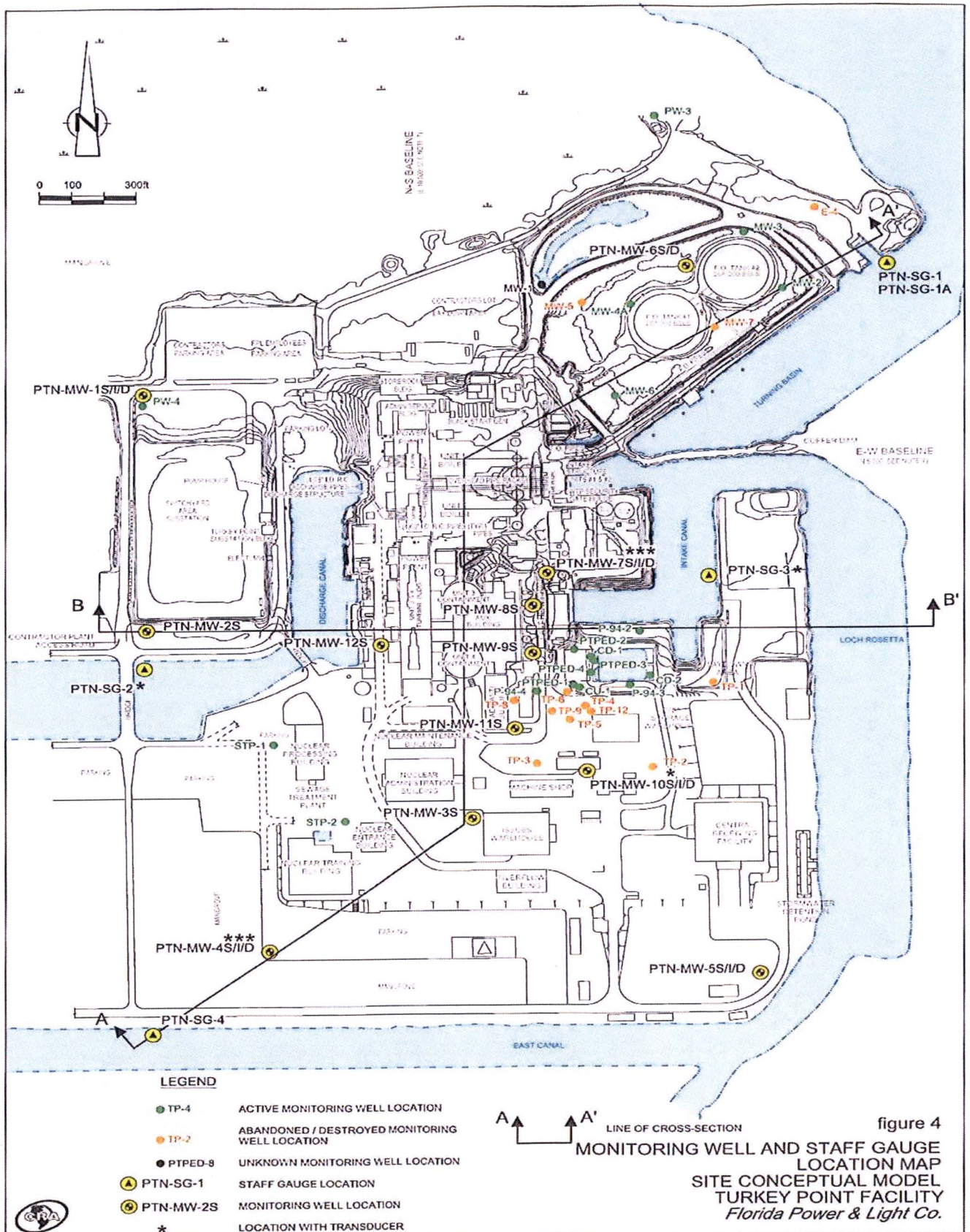
D. List of wells and their locations

<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



51293-02(002)GN-WA002 OCT 06/2009