



APR 19 2018

L-2018-088
10 CFR 50.4
10CFR 50.36

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

RE: St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Annual Radiological Environmental
Operating Report for Calendar Year 2017

The enclosed report is being submitted pursuant to Technical Specification 6.9.1.8. The *Annual Radiological Environmental Operating Report* provides information summaries and analytical results of the Radiological Environmental Monitoring Program (REMP) for calendar year 2017.

Please contact me at (772) 467-7036 should there be any questions regarding this report.

Sincerely,

A handwritten signature in black ink that reads "Michael J. Snyder".

Michael J. Snyder
Licensing Manager
St. Lucie Plant

Enclosure: 2017 Annual Radiological Environmental Operating Report (68 pages)

MJS/spt

IEZS
NRR

2017
ANNUAL
RADIOLOGICAL ENVIRONMENTAL
OPERATING REPORT

ST. LUCIE PLANT

UNITS 1 & 2

LICENSE NOS. DPR-67, NPF-16

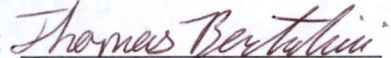
DOCKET NOS. 50-335, 50-389

Data Submitted by:

Prepared by:



Reviewed by:



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I. INTRODUCTION

This report is submitted pursuant to Specification 6.9.1.8 of St. Lucie Unit 1 and St. Lucie Unit 2 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 meeting the requirements of Unit 1 and Unit 2 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 to 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.

B. Program Description

The radiological environmental monitoring program (REMP) for the St. Lucie Plant (PSL) is conducted pursuant to the St. Lucie Units 1 and 2 Offsite Dose Calculation Manual (ODCM) Section 3/4.12.1, Monitoring Program.

1. Sample Locations, Types and Frequencies:

- a. Direct radiation gamma exposure rate is monitored continuously at 27 locations by thermoluminescent dosimeters (TLDs). TLDs are collected and analyzed quarterly.
- b. Airborne radioiodine and particulate samplers are operated continuously at five locations. Samples are collected and analyzed weekly. Analyses include Iodine-131, gross beta, and gamma isotopic measurements.
- c. Surface water samples are collected from two locations. Samples are collected and analyzed weekly and monthly, respectively. Analyses include gamma isotopic and tritium measurements.
- d. Shoreline sediment samples are collected from two 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. 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.

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

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

2. Analytical Responsibility:

Radiological environmental monitoring for the St. Lucie Plant is conducted by the State of Florida, Department of Health (DOH), Bureau of Radiation Control (BRC). Samples are collected and analyzed by DOH personnel.

Samples are analyzed at the DOH BRC Environmental Radiation Control Laboratory in Orlando, Florida.

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 or missing data, if any, are noted and explained in Table 1A. Samples not meeting the specified "A PRIORI" LLD, if any, are noted and explained in Table 1B. Analysis data for all specified samples analyzed during the surveillance period is provided in Attachment B.

D. Land Use Census

A Land Use Census Survey out to a distance of a five mile radius from the St. Lucie 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.

E. Interlaboratory Comparison Program

The interlaboratory comparison program consists of participating in the DOE Mixed Analyte Performance Evaluation Program (MAPEP).

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

The samples are analyzed using the methods applicable to the REMP (Gamma Spectroscopy, Gross Beta, and Tritium for Water).

From the MAPEP handbook:

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

The results for nuclides associated with the REMP are listed in ATTACHMENT C, RESULTS FROM THE INTERLABORATORY COMPARISON PROGRAM.

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III. DISCUSSION AND INTERPRETATION OF RESULTS

A. Reporting of Results

The Annual Radiological Environmental Operating Report contains the summaries, interpretations and information required by St. Lucie Plant ODCM. Table 1 provides a summary of the measurements made for the nuclides required by ODCM, Table 4.12-1, for all samples specified by Table 3.12-1. 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 adverse trends attributed to effluents from the plant. The measured exposure rates are consistent with exposure rates that were observed during the pre-operational surveillance program.

The BRC has performed a comprehensive investigation to determine the cause of a potential decreasing Direct Exposure TLD trend at St. Lucie. Results indicate that TLDs may be experiencing age related degradation. The BRC implemented a new TLD alongside the old TLDs starting in Quarter 1 of 2017. Both the old and new TLD measurements are listed in the quarterly reports from BRC, however, only the new TLD measurements are used in the summary.

Direct radiation monitoring results are summarized in Table 1 and are trended in Figure 1 below.

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 measurements that were made during the pre-operational surveillance program.

Air particulate and radioiodine monitoring results are summarized in Table 1 and are trended in Figure 2 below.

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: DIRECT RADIATION
 SAMPLES COLLECTED: TLD
 UNITS: micro-R/hr

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c Distance & Direction	Mean (f) ^b Range	
Exposure ^d Rate, 106	---	3.15 (102/104) 2.20 – 4.61	NW-10 9.6 mi., NW	3.96 (4/4) 3.48 – 4.57	3.31 (4/4) 2.88 - 3.83

Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: AIRBORNE
 SAMPLES COLLECTED: RADIOIODINE AND PARTICULATES
 UNITS: PICO - Ci/M³

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c	Mean (f) ^b	
			Distance & Direction	Range	
¹³¹ I, 255	0.012	<MDA	---	---	<MDA
Gross Beta, 255	0.0064	0.0136 (259/260) 0.0040 - 0.0490	H-34 0.5 mile, N	0.015 (50/52) 0.004 - 0.049	0.015 (52/52) 0.004 - 0.027
Composite Gamma Isotopic, 20					
⁷ Be	0.0006	0.1384 (16/16) 0.0715 - 0.1828	H-14 1 mile, SE	0.1478 (4/4) 0.0792 - 0.1828	0.1375 (4/4) 0.0696 - 0.1654
¹³⁴ Cs	0.0008	<MDA	<MDA	<MDA	<MDA
¹³⁷ Cs	0.0008	<MDA	<MDA	<MDA	<MDA
²¹⁰ Pb	---	0.0185 (16/16) 0.013 - 0.0324	H-30 2 mile, W	0.0247 (4/4) <0.0113 - 0.0324	0.0158 (4/4) <0.0415 - 0.0204

Be-7 & Pb-210 are naturally occurring.

Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: WATERBORNE
 SAMPLES COLLECTED: SURFACE WATER
 UNITS: PICO - Ci/LITER

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c	Mean (f) ^b	
			Distance & Direction	Range	
Tritium, 64	172	201 (1/52)	H-15 <1 mi., ENE/E/ESE	201 (1/52)	<MDA (0/12)
Gamma Isotopic, 64					
⁴⁰ K	58	367 (51/52) 286 - 457	H-15 <1 mi., ENE/E/ESE	367 (51/52) 286-457	371 (12/12) 315 - 434
⁵⁴ Mn	3	<MDA	---	---	<MDA
⁵⁹ Fe	6	<MDA	---	---	<MDA
⁵⁸ Co	3	<MDA	---	---	<MDA
⁶⁰ Co	4	<MDA	---	---	<MDA
⁶⁵ Zn	7	<MDA	---	---	<MDA
⁹⁵ Zr-Nb	6-3	<MDA	---	---	<MDA
¹³¹ I	4	<MDA	---	---	<MDA
¹³⁴ Cs	4	<MDA	---	---	<MDA
¹³⁷ Cs	4	<MDA	---	---	<MDA
¹⁴⁰ Ba-La	9-3	<MDA	---	---	<MDA

K-40 is naturally occurring.

Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: WATERBORNE
 SAMPLES COLLECTED: SHORELINE SEDIMENT
 UNITS: PICO - Ci/Kg, DRY

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c Distance & Direction	Mean (f) ^b Range	
Gamma Isotopic, 4					
⁷ Be	56	<MDA	---	---	<MDA
⁴⁰ K	100	424 (1/2)	H-15 <1 mi, ENE/E/ESE	424 (1/2)	253 (1/2)
⁵⁸ Co	6	<MDA	---	---	<MDA
⁶⁰ Co	7	<MDA	---	---	<MDA
¹³⁴ Cs	7	<MDA	---	---	<MDA
¹³⁷ Cs	7	<MDA	---	---	<MDA
²¹⁰ Pb	---	<MDA	---	---	---
²²⁶ Ra	15	269 (1/2)	H-15 <1 mi., ENE/E/ESE	269(1/2)	103 (1/2)
²³² Th	25	88 (1/2)	H-15 <1 mi., ENE/E/ESE	88 (1/2)	48 (1/2)
²³⁵ U	---	17 (1/2)	H-15 <1 mi., ENE/E/ESE	17(1/2)	7 (1/2)
²³⁸ U	---	234 (2/2) 224 - 243	H-15 <1 mi., ENE/E/ESE	234 (2/2) 224 - 243	123.5 (2/2) 77-170

Be-7, K-40, Pb-210, Ra-226, Th-232, U-235 & U-238 are naturally occurring. Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: INGESTION
 SAMPLES COLLECTED: CRUSTACEA
 UNITS: PICO - Ci/Kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c Distance & Direction	Mean (f) ^b Range	
Gamma Isotopic, 4					
⁴⁰ K	270	1464(2/2) 1333-1594	H-15 <1 mi., NE/ENE/E	1464 (2/2) 1333-1594	1274 (2/2) 1142-1406
⁵⁴ Mn	16	<MDA	---	---	<MDA
⁵⁹ Fe	28	<MDA	---	---	<MDA
⁵⁸ Co	15	<MDA	---	---	<MDA
⁶⁰ Co	16	<MDA	---	---	<MDA
⁶⁵ Zn	32	<MDA	---	---	<MDA
¹³⁴ Cs	16	<MDA	---	---	<MDA
¹³⁷ Cs	18	<MDA	---	---	<MDA
²²⁶ Ra	300	<MDA	---	---	<MDA
²²⁸ Ra	58	< MDA	---	---	< MDA

K-40, Ra-226 & Ra-228 are naturally occurring.

Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: INGESTION
 SAMPLES COLLECTED: FISH
 UNITS: PICO - Ci/Kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c	Mean (f) ^b	
			Distance & Direction	Range	
Gamma Isotopic, 4					
⁴⁰ K	270	2973 (2/2) 2677 - 3268	H-15 <1 mi., ENE/E/ESE	2973 (2/2) 2677 - 3268	2934 (2/2) 2620 - 3247
⁵⁴ Mn	16	<MDA	---	---	<MDA
⁵⁹ Fe	28	<MDA	---	---	<MDA
⁵⁸ Co	15	<MDA	---	---	<MDA
⁶⁰ Co	16	<MDA	---	---	<MDA
⁶⁵ Zn	32	<MDA	---	---	<MDA
¹³⁴ Cs	16	<MDA	---	---	<MDA
¹³⁷ Cs	18	<MDA	---	---	<MDA

K-40 is naturally occurring.

Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
 Name of Facility St. Lucie Units 1 & 2, Docket No(s) 50-335 & 50-389
 Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
 (County, State)

PATHWAY: INGESTION
 SAMPLES COLLECTED: BROAD LEAF VEGETATION
 UNITS: PICO - Ci/Kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection ^a (LLD)	All Indicator Locations Mean (f) ^b Range	Location with Highest Annual Mean		Control Locations Mean (f) ^b Range
			Name ^c Distance & Direction	Mean (f) ^b Range	
Gamma Isotopic, 36					
⁷ Be	64	1067 (24/24) 476 - 1856	H-52 1 mi., S/SSE	1132 (12/12) 476 - 1856	1143 (12/12) 658 - 2154
⁴⁰ K	120	3964 (24/24) 2496 - 5940	H-51 1 mi., N/NNW	4508 (12/12) 3305 - 5940	3336 (12/12) 2637 - 4867
⁵⁸ Co	6	<MDA	---	---	<MDA
⁶⁰ Co	8	<MDA	---	---	<MDA
¹³¹ I	8	<MDA	---	---	<MDA
¹³⁴ Cs	8	<MDA	---	---	<MDA
¹³⁷ Cs	8	<MDA	---	---	8 (2/12) 7-9
²¹⁰ Pb		224 (5/24) 139 - 280	H-52 1 mi., S/SSE	248 (2/12) 216 - 280	408 (2/12) 314-501
²¹² Pb	---	21 (4/24) 12-24	H-51 1 mi., N/NNW	24 (2/12) 23 - 24	19 (1/12)
²²⁶ Ra	189	<MDA	---	---	<MDA

Be-7, K-40, Pb-210, Pb-212, & Ra-226 are naturally occurring.

Number of Non-Routine Reported Measurements = 0

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility St. Lucie Units 1 & 2, Docket No(s). 50-335 & 50-389

Location of Facility St. Lucie, Florida, Reporting Period January 1 - December 31, 2017
(County, State)

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).

MDA refers to minimum detectable activity.

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TABLE 1A

DEVIATIONS / MISSING DATA

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There were several instances of missing data and air sampler partial run times as follows:

- A) Pathway: Direct Radiation Exposure
- Location: TLD: SW-10
- Dates: 06/06/17 – 09/13/17
- Deviation: Failure to Perform Continuous Monitoring
- Description of Problem: TLD was missing and lost during quarter 2 sampling by the State of Florida Bureau of Radiation Control (BRC) at the ODCM required REMP Program sampling location NNW-10. The TLD had been lost during Hurricane Irma.
- Corrective Action: Replaced TLD
- B) Pathway: Direct Radiation Exposure
- Location: TLD: SSW-10
- Dates: 06/06/17 – 09/13/17
- Deviation: Failure to Perform Continuous Monitoring
- Description of Problem: TLD was missing and lost during quarter 2 sampling by the State of Florida Bureau of Radiation Control (BRC) at the ODCM required REMP Program sampling location WNW-2. The TLD had been lost during Hurricane Irma.
- Corrective Action: Replaced TLD
- C) Pathway: Airborne, Particulates and Radioiodines
- Location: H14, 1 miles SE
- Dates: 9/06/17 – 9/13/17
- Deviation: Failure to Perform Continuous Monitoring
- Description of Problem: Power was lost at the air sample station on 09/06/17 as a result of Hurricane Irma. Estimated run time for the week of 09/06/17 was 143.6 out of 173.3 hours.
- Corrective Action: Power restored

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- D) Pathway: Airborne, Particulates and Radioiodines
- Location: H30, 2 Miles W
- Dates: 09/06/17 – 09/26/17
- Deviation: Failure to Perform Continuous Monitoring
- Description of Problem: Power was lost at the air sample station on 09/06/17 as a result of Hurricane Irma. Estimated run time for the week of 09/06/17 was 106.2 out of 171.3 hours. Estimated run time for the week of 09/13/17 was 125.5 out of 190 hours.
- Corrective Action: Power restored
-
- E) Pathway: Airborne, Particulates and Radioiodines
- Location: H34, Site Met Tower, 0.5 miles N
- Dates: 09/06/17 - 09/21/17
- Deviation: Failure to Perform Continuous Monitoring
- Description of Problem: Power was lost at the air sample station on 09/06/17 as a result of Hurricane Irma. Estimated run time for the week of 09/06/17 was 144.2 out of 173 hours. Hazardous conditions around the base of the MET tower also caused by Hurricane Irma prevented sampling of week 09/13/17 to 09/21/17.
- Corrective Action: Power was restored and the hazardous conditions removed.

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TABLE 1B

ANALYSIS WITH LLDs ABOVE THE REQUIRED DETECTION CAPABILITIES
(LLDs) Listed in ODCM TABLE 4.12-1
1/1/2017 – 12/31/2017

The values specified in ODCM Table 4.12-1, Detection Capabilities, were achieved for all samples. REMP Program sampling deviations and missing data are listed in Table 1A.

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TABLE 2

LAND USE CENSUS
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The St. Lucie Annual Land Use Census Survey was performed from June through August 2017 - No additions or changes were identified as compared to the 2016 St. Lucie Annual Land Use Census Survey. No locations were identified of potential milk-producing animals (cows or goats).

Distance to Nearest (a, b)

Sector	Residence	Garden (d)	Milk Animal (c)
N	O (e)	O	O
NNE	O	O	O
NE	O	O	O
ENE	O	O	O
E	O	O	O
ESE	O	O	O
SE	1.5/142 1.6/145	O	O
SSE	1.8/147 (g) 2.0/149	L (f)	L
S	3.3/190	L	L
SSW	2.2/212	4.4/207	L
SW	1.9/234	L	L
WSW	1.9/240	2.0/250	L
W	1.9/260	L	L
WNW	2.3/281	4.0/282	L
NW	3.4/304	L	L
NNW	2.7/344	L	L

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TABLE 2

LAND USE CENSUS
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NOTES

- a. All categories surveyed out to a 5-mile radius from the St. Lucie Plant.
- b. The following format is used to denote the location:

distance (miles) / bearing (degrees)

For example, a residence located in the southeast sector at a distance of 1.5 miles bearing 142 degrees is recorded as 1.5/142.
- c. Potential milk animal locations.
- d. Only gardens with an estimated total area of 500 square feet, or more, and producing green leafy vegetables are considered.
- e. "O" denotes that the sector area is predominantly an ocean area.
- f. "L" denotes that the sector area is predominantly a land area unoccupied by the category type.
- g. Non-residential occupied buildings in these sectors include the following:

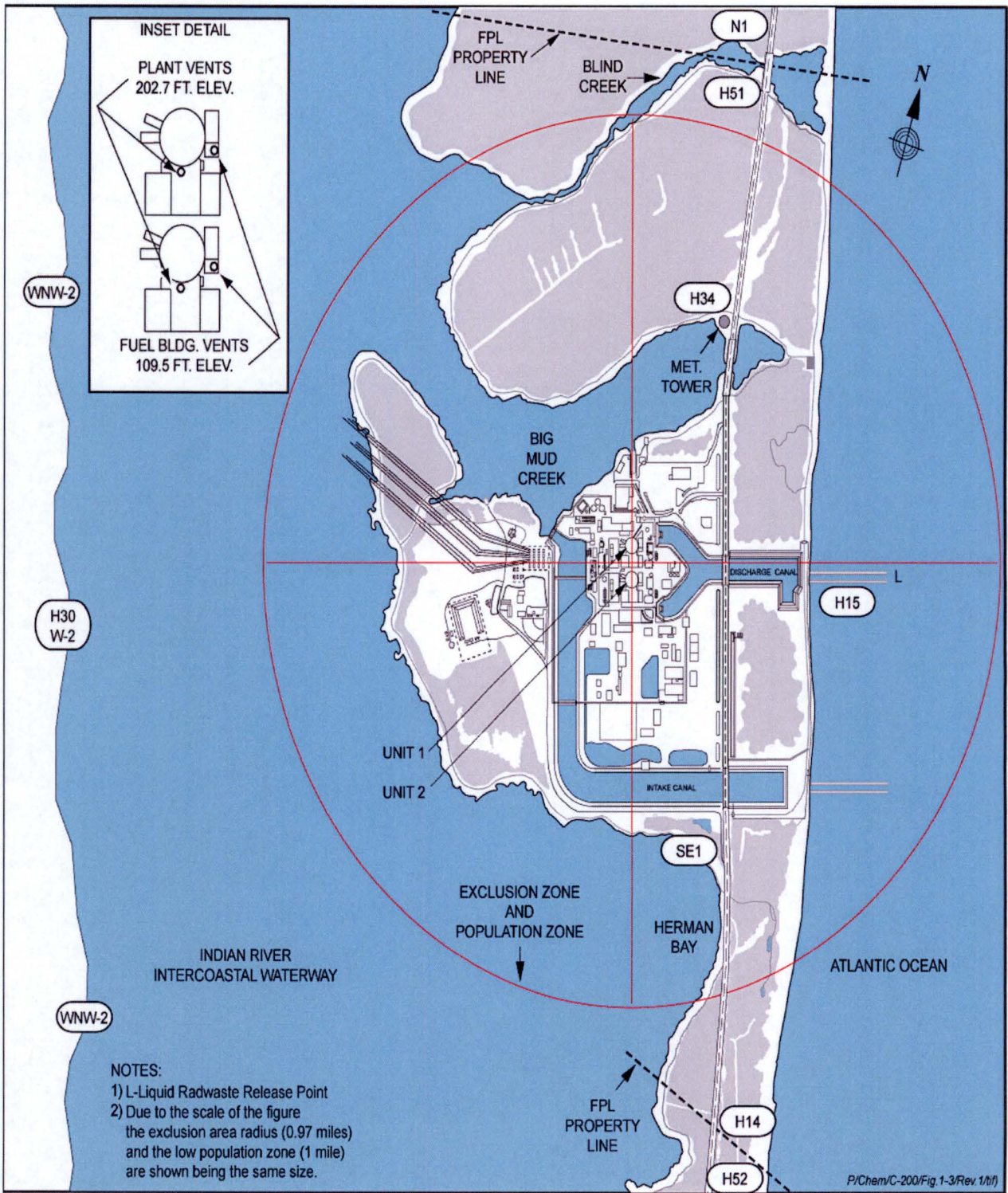
<u>Sector</u>	<u>Distance</u>	<u>Description</u>
SSE	1.8/147	Fire Station

ATTACHMENT A

KEY TO SAMPLE LOCATIONS

SITE AREA MAP & ENVIRONMENTAL SAMPLE LOCATIONS

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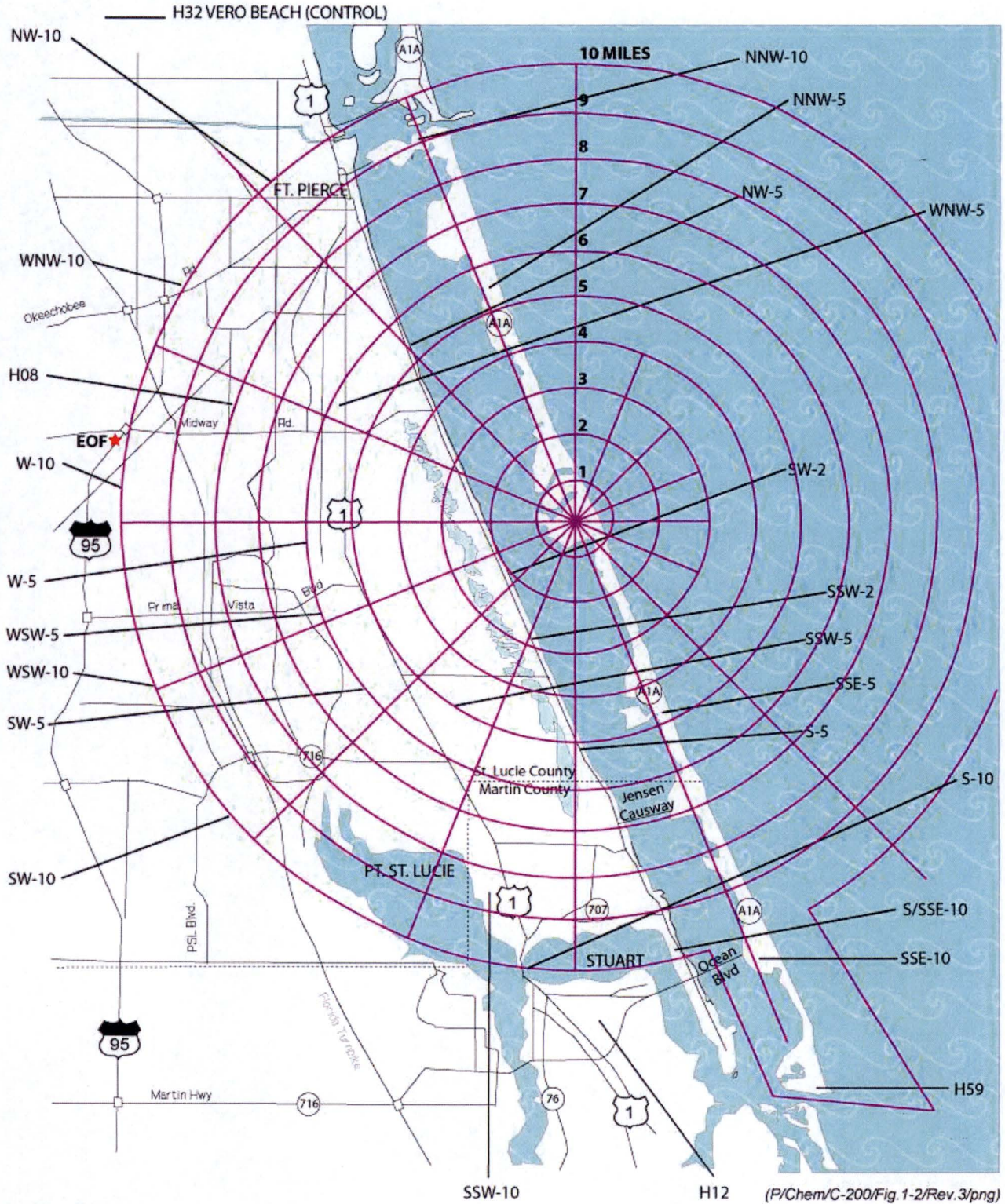


- NOTES:
- 1) L-Liquid Radwaste Release Point
 - 2) Due to the scale of the figure the exclusion area radius (0.97 miles) and the low population zone (1 mile) are shown being the same size.

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ENVIRONMENTAL SAMPLE LOCATIONS (10 MILES)

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ATTACHMENT A
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PATHWAY: DIRECT RADIATION
 SAMPLES COLLECTED: TLD
 SAMPLE COLLECTION FREQUENCY: QUARTERLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
N-1	N	1	A1A, North of Blind Creek
NNW-5	NNW	4.8	Frederick Douglas Beach Entrance
NNW-10	NNW	8.7	Coast Guard Station
NW-5	NW	5.4	Indian River Dr. at Rio Vista Dr.
NW-10	NW	9.6	FPL Facility, S.R. 68 and 33 RD St.
WNW-2	WNW	2.3	Cemetery South of 7107 Indian River Dr.
WNW-5	WNW	5.1	U.S. 1 at S.R. 712
WNW-10	WNW	10	S.R. 70, West of Interstate 95
W-2	W	2	Power Line - 77609 Indian River Drive
W-5	W	5.4	Oleander and Sager Street
W-10	W	10.3	Interstate 95 and S.R. 709
WSW-2	WSW	1.8	8503 Indian River Dr.
WSW-5	WSW	5.6	Prima Vista Blvd. at Yacht Club
WSW-10	WSW	10	Del Rio and Davis Street
SW-2	SW	2	9205 Indian River Drive
SW-5	SW	4.5	FPL Walton Service Center
SW-10	SW	10.2	Port St. Lucie Blvd. and Cairo Rd.
SSW-2	SSW	2.6	10307 Indian River Drive
SSW-5	SSW	6	U.S. 1 and Port St. Lucie Blvd.
SSW-10	SSW	8	Pine Valley and Westmoreland Rd.
S-5	S	5.2	13189 Indian River Drive
S-10	S	10.8	U.S. 1 and Palm City Ave
S/SSE-10	SSE	9.9	Indian River Dr. and Quail Run Lane
SSE-5	SSE	5.1	North of Entrance to Miramar
SSE-10	SSE	10.2	Elliot Museum
SE-1	SE	1	South of Cooling Canal
<u>Control:</u>			
H32	NNW	18.1	U. of Florida IFAS Entomology Lab Vero Beach

ATTACHMENT A
PAGE 4 OF 5

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

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
H08	WNW	6	FPL Substation, Weatherbee Rd.
H14	SE	1	On-Site, near south property line
H30	W	2	Power Line, 7609 Indian River Drive
H34	N	0.5	Onsite at Meteorological Tower
<u>Control:</u>			
H12	S	12	FPL Substation, SR-76 Stuart

PATHWAY: WATERBORNE
SAMPLES COLLECTED: SURFACE WATER (OCEAN)
SAMPLE COLLECTION FREQUENCY: H-15 WEEKLY, H-59 MONTHLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
H15	ENE/E/SSE	<1	Atlantic Ocean, public beaches east side A1A
<u>Control:</u>			
H59	S/SSE	10-20	Near south end of Hutchinson Island

ATTACHMENT A
PAGE 5 OF 5

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

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
H15	ENE/E/ESE	<1	Atlantic Ocean, public beaches east side A1A

Control:

H59	S/SSE	10-20	Near south end of Hutchinson Island
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PATHWAY: INGESTION - FOOD PRODUCTS
SAMPLES COLLECTED: CRUSTACEA AND FISH
SAMPLE COLLECTION FREQUENCY: SEMI-ANNUALLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
H15	ENE/E/ESE	<1	Ocean Side, Vicinity of St. Lucie Plant

Control:

H59	S/SSE	10-20	Near south end of Hutchinson Island
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SAMPLES COLLECTED: BROAD LEAF VEGETATION - FOOD PRODUCTS
SAMPLE COLLECTION FREQUENCY: MONTHLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
H51	N/NNW	1	Off-Site Near North Property Line
H52	S/SSE	1	Off-Site Near South Property Line

Control:

H59	S/SSE	10-20	Near south end of Hutchinson Island
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ATTACHMENT B

RADIOLOGICAL SURVEILLANCE OF
FLORIDA POWER AND LIGHT COMPANY

ST. LUCIE SITE

2017

First Quarter 2017

Second Quarter 2017

Third Quarter 2017

Fourth Quarter 2017

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ST. LUCIE PLANT – UNITS 1 & 2



RADIOLOGICAL SURVEILLANCE
OF
FLORIDA POWER AND LIGHT COMPANY

ST. LUCIE PLANT

FIRST QUARTER 2017

BUREAU OF RADIATION CONTROL

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ST. LUCIE PLANT - UNITS 1 & 2

ST. LUCIE SITE

Offsite Dose Calculation Manual Sampling

First Quarter, 2017

Sample Type	Collection Frequency	Number of Sample Locations	Number of Samples
1. Direct Radiation	Quarterly	27	54
2. Airborne			
2.a. Air Iodines	Weekly	5	65
2.b. Air Particulates	Weekly	5	65
3. Waterborne			
3.a. Surface Water	Weekly	1	13
	Monthly	1	3
3.b. Shoreline Sediment	Semiannually	2	2
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
			Total: 213

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

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

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

Sample Site	Deployment 08-Dec-16 Collection 08-Mar-17		Sample Site	Deployment 08-Dec-16 Collection 08-Mar-17	
	Old	New		Old	New
N-1	3.85 ± 0.27	3.49 ± 0.06	SW-2	3.83 ± 0.24	3.25 ± 0.19
NNW-5	4.13 ± 0.32	3.49 ± 0.13	SW-5	4.54 ± 0.17	3.97 ± 0.19
NNW-10	4.84 ± 0.19	4.16 ± 0.43	SW-10	4.13 ± 0.60	3.66 ± 0.11
NW-5	3.95 ± 0.03	3.36 ± 0.26	SSW-2	4.04 ± 0.16	3.44 ± 0.40
NW-10	7.13 ± 5.65	4.57 ± 0.18	SSW-5	4.54 ± 0.14	4.03 ± 0.37
WNW-2	3.91 ± 0.29	3.43 ± 0.22	SSW-10	4.91 ± 0.39	4.61 ± 0.53
WNW-5	4.14 ± 0.48	3.49 ± 0.32	S-5	4.53 ± 0.45	4.11 ± 0.16
WNW-10	3.94 ± 0.52	3.57 ± 0.38	S-10	3.75 ± 0.07	3.44 ± 0.35
W-2	3.78 ± 0.42	3.27 ± 0.30	S/SSE-10	3.70 ± 0.13	3.60 ± 0.04
W-5	4.42 ± 0.27	3.85 ± 0.32	SSE-5	3.54 ± 0.13	3.23 ± 0.20
W-10	3.53 ± 0.15	3.03 ± 0.27	SSE-10	3.79 ± 0.27	3.43 ± 0.32
WSW-2	4.25 ± 0.30	3.47 ± 0.32	SE-1	3.70 ± 0.05	3.37 ± 0.17
WSW-5	4.07 ± 0.14	3.38 ± 0.28	H-32	4.13 ± 0.08	3.58 ± 0.17
WSW-10	3.66 ± 0.26	2.98 ± 0.23			

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/ m³)

Collection Date	H08	H12	H14	H30	H34
04-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02
10-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02
18-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02
24-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02
31-Jan-17	<0.02	<0.02	<0.02	<0.02	<0.02
07-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02
14-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02
22-Feb-17	<0.02	<0.02	<0.02	<0.02	<0.02
01-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02
08-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02
15-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02
21-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02
28-Mar-17	<0.02	<0.02	<0.02	<0.02	<0.02

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m³)

Collection Date	H08	H12	H14	H30	H34
04-Jan-17	0.013 ± 0.003	0.008 ± 0.002	0.010 ± 0.002	0.007 ± 0.002	0.012 ± 0.003
10-Jan-17	0.016 ± 0.003	0.018 ± 0.003	0.010 ± 0.003	0.017 ± 0.003	0.016 ± 0.003
18-Jan-17	0.009 ± 0.002	0.005 ± 0.002	0.007 ± 0.002	0.006 ± 0.002	0.009 ± 0.002
24-Jan-17	0.013 ± 0.003	0.012 ± 0.003	0.016 ± 0.003	0.008 ± 0.002	0.010 ± 0.003
31-Jan-17	0.018 ± 0.003	0.012 ± 0.002	0.019 ± 0.003	0.018 ± 0.003	0.017 ± 0.002
07-Feb-17	0.020 ± 0.003	0.011 ± 0.002	0.010 ± 0.002	0.016 ± 0.003	0.020 ± 0.003
14-Feb-17	0.011 ± 0.002	0.014 ± 0.002	0.012 ± 0.002	0.017 ± 0.003	0.017 ± 0.003
22-Feb-17	0.016 ± 0.002	0.016 ± 0.002	0.019 ± 0.002	0.016 ± 0.002	0.017 ± 0.002
01-Mar-17	0.011 ± 0.002	0.015 ± 0.002	0.012 ± 0.002	0.011 ± 0.002	0.010 ± 0.002
08-Mar-17	0.016 ± 0.002	0.013 ± 0.002	0.014 ± 0.002	0.014 ± 0.002	0.018 ± 0.002
15-Mar-17	0.012 ± 0.002	0.017 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.010 ± 0.002
21-Mar-17	0.025 ± 0.003	0.021 ± 0.003	0.020 ± 0.003	0.018 ± 0.002	0.024 ± 0.003
28-Mar-17	0.022 ± 0.002	0.023 ± 0.002	0.019 ± 0.002	0.014 ± 0.002	0.026 ± 0.002
Average:	0.016 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.016 ± 0.001

2.b.2. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m³)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
H08	0.1358 ± 0.0117	<0.0350	<0.0013	<0.0014	<0.0334
H12	0.1654 ± 0.0125	<0.0247	<0.0016	<0.0011	<0.0415
H14	0.1828 ± 0.0115	<0.0155	<0.0014	<0.0011	0.0164 ± 0.0039
H30	0.1367 ± 0.0112	<0.0313	<0.0016	<0.0014	0.0324 ± 0.0135
H34	0.1766 ± 0.0115	<0.0173	<0.0016	<0.0013	0.0158 ± 0.0044

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)
H15	04-Jan-17	<158	382 ± 27	<3	<3	<6	<3	<7	<5	<3	<3	<3	<4
	10-Jan-17	<161	356 ± 26	<3	<3	<7	<3	<8	<6	<4	<3	<4	<6
	18-Jan-17	<159	384 ± 41	<6	<6	<13	<8	<15	<11	<10	<6	<8	<11
	24-Jan-17	<145	386 ± 26	<4	<3	<7	<4	<8	<5	<5	<3	<3	<7
	31-Jan-17	201 ± 49	355 ± 26	<3	<3	<6	<3	<8	<5	<3	<3	<3	<12
	07-Feb-17	<145	369 ± 26	<3	<3	<7	<3	<6	<5	<4	<3	<3	<7
	14-Feb-17	<147	363 ± 26	<3	<3	<6	<4	<8	<5	<4	<3	<4	<11
	22-Feb-17	<146	392 ± 27	<3	<3	<7	<4	<7	<6	<3	<3	<4	<11
	01-Mar-17	<146	372 ± 27	<4	<3	<9	<3	<8	<6	<18	<3	<4	<10
	08-Mar-17	<166	352 ± 26	<3	<4	<8	<4	<8	<6	<11	<3	<4	<8
	15-Mar-17	<162	380 ± 43	<6	<6	<14	<5	<16	<11	<12	<7	<8	<11
	21-Mar-17	<162	326 ± 26	<4	<3	<6	<3	<7	<6	<4	<3	<3	<7
	28-Mar-17	<162	420 ± 26	<3	<3	<7	<3	<7	<6	<4	<3	<3	<7
H59	18-Jan-17	<159	409 ± 28	<3	<3	<7	<3	<7	<6	<5	<3	<3	<5
	10-Feb-17	<145	323 ± 40	<6	<6	<11	<5	<12	<12	<8	<5	<6	<8
	09-Mar-17	<166	323 ± 25	<3	<3	<9	<3	<8	<7	<11	<3	<3	<8

(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
H15	07-Feb-17	<81	424 ± 52	<10	<11	<9	<9	<901	<259	88 ± 11	<13	243 ± 45
H59	07-Feb-17	<90	253 ± 45	<10	<10	<9	<11	<746	<242	48 ± 10	<13	170 ± 48

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	12-Jan-17	1594 ± 134	<22	<23	<50	<20	<47	<25	<24	<483	<91
H59	This sample not yet collected.										

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

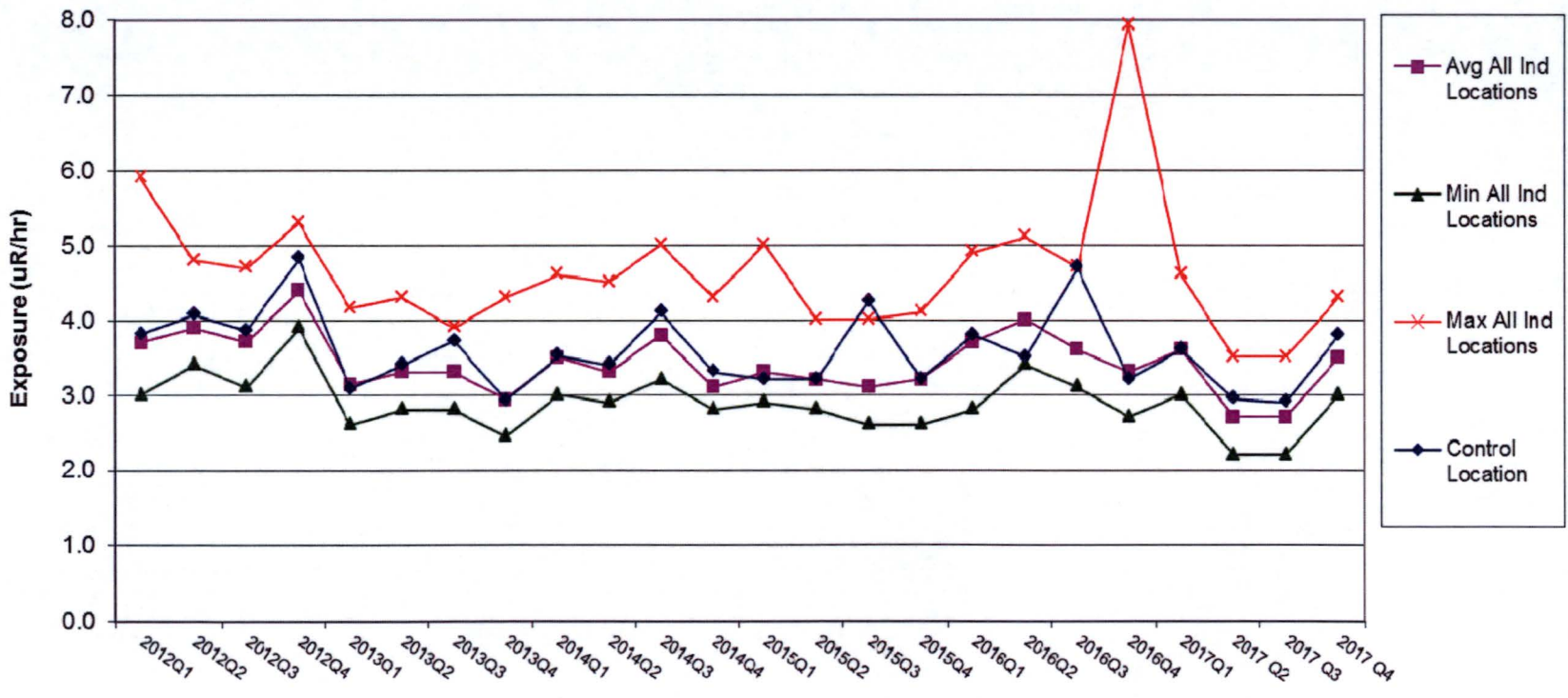
Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	This sample not yet collected.										
H59	09-Mar-17	3247 ± 250	<23	<28	<63	<32	<66	<21	<28	<432	<118

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

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
H51	18-Jan-17	954 ± 48	4204 ± 162	<15	<8	<9	274 ± 71	<17	<203	<37
	10-Feb-17	727 ± 62	4345 ± 209	<20	<12	<17	<1178	23 ± 10	<311	<70
	08-Mar-17	988 ± 73	3478 ± 194	<29	<12	<17	<1095	<36	<328	<76
H52	18-Jan-17	1290 ± 84	2959 ± 175	<25	<12	<15	<1135	<26	<327	<63
	10-Feb-17	476 ± 54	5669 ± 242	<18	<12	<15	<1004	<27	<289	<80
	08-Mar-17	1601 ± 62	2887 ± 121	<17	<7	<9	<341	<16	<185	<30
H59	18-Jan-17	1326 ± 53	2893 ± 121	<12	<7	7 ± 2	<321	<16	<175	<27
	10-Feb-17	664 ± 36	2637 ± 112	<10	<7	<8	<196	<14	<158	<30
	09-Mar-17	1062 ± 69	2662 ± 160	<26	<13	<16	<982	<23	<303	<60

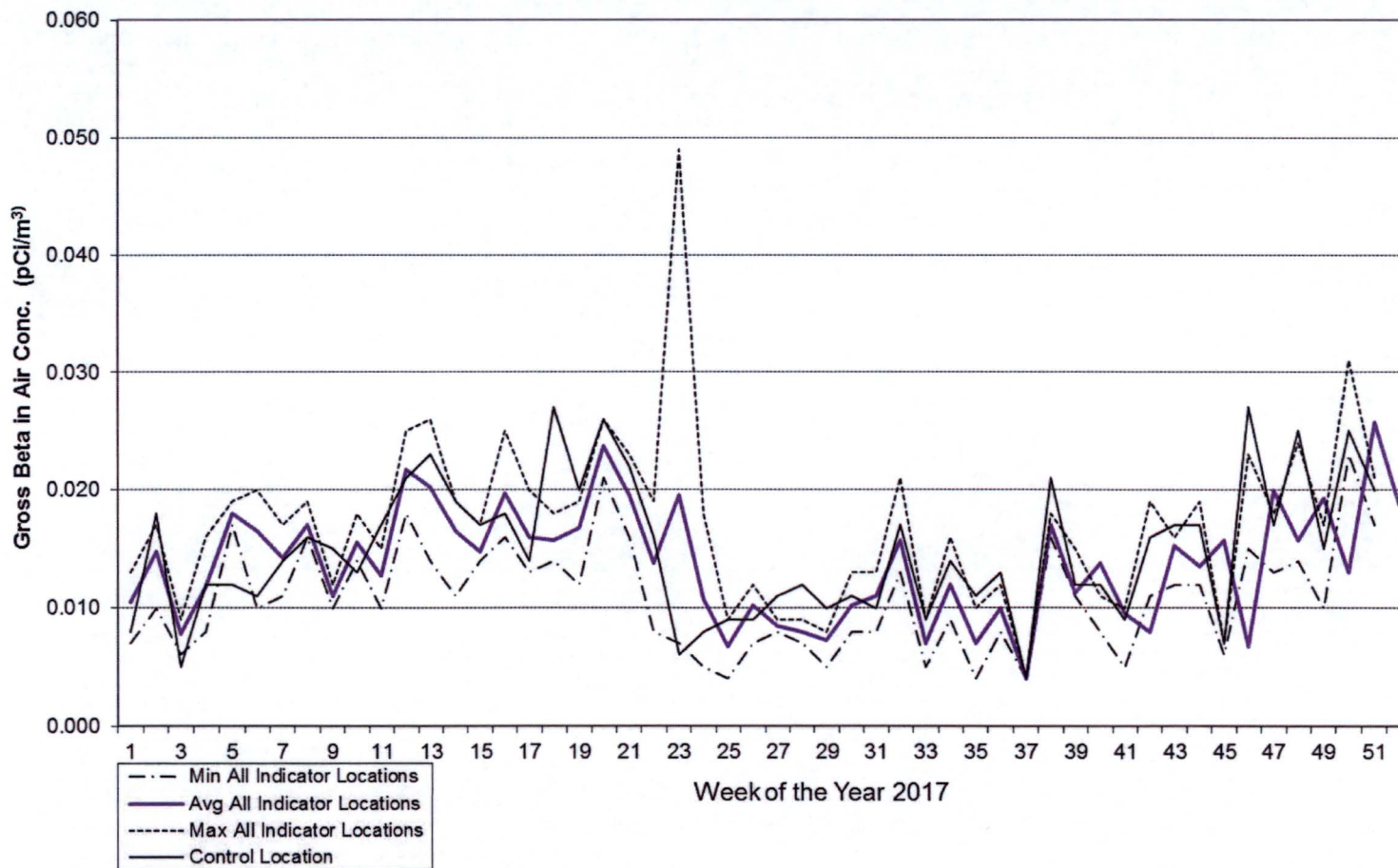
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Figure 1 - St. Lucie Direct Radiation Gamma Exposure (via TLD)



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Figure 2 - St. Lucie 2017 REMP Program
Gross Beta in Air, pCi/m³



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3. Waterborne, Surface Water:

The results for radioactivity measurements in surface water are consistent with past measurements and with measurements made during the pre-operational surveillance program. Tritium was reported as present in 1 of the 52 ODCM required samples for the indicator location and none of the 12 samples of the control location surface water samples collected. The highest value was 6.7% of the required lower limit of detection and 0.67% of the reporting level listed in ODCM Table 4.12-1. There were no indications of any other nuclides that could be attributed to plant effluents. Results are summarized in Table 1.

4. Waterborne, Sediment and Food Products:

The results for radioactivity measurements in waterborne sediment, fish, and crustacean samples are consistent with past measurements and with measurements made during the pre-operational surveillance program. For the Fish Ingestion Pathway, Cs-137 was not reported for the two samples at the indicator location as well as the 2 samples at the control location. There were no indications of any other nuclides that could be attributed to plant effluents. Results for the waterborne sediment, fish, and crustacean samples are summarized in Table 1.

5. Broad Leaf Vegetation:

The results for radioactivity measurements in broad leaf vegetation are consistent with past measurements and with measurements made during the pre-operational surveillance program. Cs-137 was reported as not present in any of the 24 ODCM required samples but was present in 2 out of the 12 Control locations. The highest value at the control location was 11.25% of the required lower limit of detection and 0.45% of the reporting level listed in ODCM Table 3.12-2. There were no indications of any other nuclides that could be attributed to plant effluents. Results for broad leaf vegetation samples are summarized in Table 1.

6. Land Use Census:

There were no additions or changes identified in the Land Use Census as compared to last year's report.

No locations yielding a calculated dose or dose commitment greater than the values currently being calculated were identified by the Land Use Census.

No locations yielding a calculated dose or dose commitment (via the same exposure pathway) 20 percent greater than locations currently being sampled in the radiological environmental monitoring program were identified by the Land Use Census.

The Land Use Census is summarized in Table 2.

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7. Interlaboratory Comparison Program:

The State of Florida laboratory participated in MAPEP 36 and 37. These satisfied the requirements as directed in the PSL Offsite Dose Calculation Manual (ODCM) for the Interlaboratory Comparison Program.

The results are listed in Attachment C.

C. Conclusions

The data obtained through the St. Lucie 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. Measured exposure rates are consistent with exposure rates that were observed during the pre-operational surveillance program.

- Results for air particulate/radioiodine samples are consistent with measurements that were made during the pre-operational surveillance program.
- The highest value for tritium in surface water was 6.7% of the required lower limit of detection and 0.67% of the reporting level listed in ODCM Table 4.12-1. There were no indications of any other nuclides that could be attributed to plant effluents.
- The highest value for Cs-137 in broad leaf vegetation was in the control location, and 11.25% of the required lower limit of detection and 0.45% of the reporting level listed in ODCM Table 4.12-1. There were no indications of any other nuclides that could be attributed to plant effluents.
- There were no indications in the waterborne sediment or food products of any other nuclides that could be attributed to plant effluents.

The measurements verify that the dose or dose commitment to members of the public, due to operation of St. Lucie Units 1 and 2, during the surveillance year, are well within "as low as reasonably achievable" (ALARA) criteria established by 10 CFR 50, Appendix I.

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RADIOLOGICAL SURVEILLANCE
OF
FLORIDA POWER AND LIGHT COMPANY

ST. LUCIE PLANT

SECOND QUARTER 2017

BUREAU OF RADIATION CONTROL

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ST. LUCIE SITE

Offsite Dose Calculation Manual Sampling

Second Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	27	27
2. Airborne			
2.a. Air Iodines	Weekly	5	65
2.b. Air Particulates	Weekly	5	65
3. Waterborne			
3.a. Surface Water	Weekly	1	13
	Monthly	1	3
3.b. Shoreline Sediment	Semiannually	2	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
			Total: 184

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

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

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

Sample Site	Deployment 08-Mar-17 Collection 06-Jun-17		Sample Site	Deployment 08-Mar-17 Collection 06-Jun-17	
	Old	New		Old	New
N-1	2.40 ± 0.05	2.83 ± 0.33	SW-2	2.33 ± 0.06	2.47 ± 0.22
NNW-5	2.33 ± 0.27	2.71 ± 0.47	SW-5	2.73 ± 0.13	2.95 ± 0.32
NNW-10	2.88 ± 0.08	3.11 ± 0.40	SW-10	2.52 ± 0.38	2.73 ± 0.54
NW-5	2.20 ± 0.30	2.55 ± 0.25	SSW-2	2.26 ± 0.22	2.61 ± 0.30
NW-10	3.16 ± 0.29	3.48 ± 0.08	SSW-5	2.63 ± 0.37	2.89 ± 0.24
WNW-2	2.34 ± 0.22	2.58 ± 0.12	SSW-10	3.10 ± 0.39	3.50 ± 0.38
WNW-5	2.33 ± 0.21	2.62 ± 0.37	S-5	2.76 ± 0.20	3.18 ± 0.09
WNW-10	2.31 ± 0.25	2.46 ± 0.18	S-10	2.39 ± 0.29	2.60 ± 0.02
W-2	2.17 ± 0.29	2.31 ± 0.22	S/SSE-10	2.33 ± 0.13	2.50 ± 0.30
W-5	2.53 ± 0.48	2.94 ± 0.13	SSE-5	2.26 ± 0.07	2.48 ± 0.36
W-10	2.02 ± 0.24	2.21 ± 0.03	SSE-10	2.43 ± 0.23	2.91 ± 0.15
WSW-2	2.35 ± 0.18	2.54 ± 0.08	SE-1	2.45 ± 0.15	2.66 ± 0.41
WSW-5	2.38 ± 0.19	2.62 ± 0.30	H-32	2.59 ± 0.23	2.94 ± 0.23
WSW-10	2.33 ± 0.18	2.39 ± 0.28			

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/ m³)

<u>Collection Date</u>	<u>H08</u>	<u>H12</u>	<u>H14</u>	<u>H30</u>	<u>H34</u>
04-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02
11-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02
18-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02
25-Apr-17	<0.02	<0.02	<0.02	<0.02	<0.02
03-May-17	<0.02	<0.02	<0.02	<0.02	<0.02
09-May-17	<0.02	<0.02	<0.02	<0.02	<0.02
16-May-17	<0.02	<0.02	<0.02	<0.02	<0.02
23-May-17	<0.02	<0.02	<0.02	<0.02	<0.02
30-May-17	<0.02	<0.02	<0.02	<0.02	<0.02
06-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02
13-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02
19-Jun-17	<0.03	<0.02	<0.03	<0.03	<0.02
27-Jun-17	<0.02	<0.02	<0.02	<0.02	<0.02

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m³)

Collection Date	H08	H12	H14	H30	H34
04-Apr-17	0.019 ± 0.002	0.019 ± 0.002	0.017 ± 0.002	0.019 ± 0.002	0.011 ± 0.002
11-Apr-17	0.014 ± 0.002	0.017 ± 0.002	0.014 ± 0.002	0.014 ± 0.002	0.017 ± 0.002
18-Apr-17	0.019 ± 0.002	0.018 ± 0.002	0.019 ± 0.002	0.016 ± 0.002	0.025 ± 0.002
25-Apr-17	0.014 ± 0.002	0.014 ± 0.002	0.013 ± 0.002	0.017 ± 0.002	0.020 ± 0.002
03-May-17	0.018 ± 0.002	0.027 ± 0.002	0.017 ± 0.002	0.014 ± 0.002	0.014 ± 0.002
09-May-17	0.018 ± 0.003	0.020 ± 0.003	0.018 ± 0.003	0.012 ± 0.002	0.019 ± 0.003
16-May-17	0.021 ± 0.002	0.026 ± 0.003	0.026 ± 0.003	0.025 ± 0.002	0.023 ± 0.002
23-May-17	0.021 ± 0.002	0.022 ± 0.002	0.016 ± 0.002	0.018 ± 0.002	0.023 ± 0.002
30-May-17	0.019 ± 0.002	0.016 ± 0.002	0.008 ± 0.002	0.013 ± 0.002	0.015 ± 0.002
06-Jun-17	0.010 ± 0.002	0.006 ± 0.002	0.012 ± 0.002	0.007 ± 0.002	0.049 ± 0.003
13-Jun-17	0.009 ± 0.002	0.008 ± 0.002	0.011 ± 0.002	0.005 ± 0.001	0.018 ± 0.002
19-Jun-17	0.008 ± 0.002	0.009 ± 0.002	0.004 ± 0.002	0.009 ± 0.002	0.006 ± 0.002
27-Jun-17	0.010 ± 0.002	0.009 ± 0.002	0.007 ± 0.002	0.012 ± 0.002	0.012 ± 0.002
Average:	0.015 ± 0.001	0.016 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.019 ± 0.001

2.b.2. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m³)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
H08	0.1550 ± 0.0100	<0.0156	<0.0013	<0.0011	0.0166 ± 0.0042
H12	0.1550 ± 0.0100	<0.0169	<0.0015	<0.0010	0.0176 ± 0.0046
H14	0.1710 ± 0.0125	<0.0355	<0.0014	<0.0012	<0.0393
H30	0.1620 ± 0.0115	<0.0371	<0.0013	<0.0014	<0.0410
H34	0.1610 ± 0.0114	<0.0240	<0.0014	<0.0012	<0.0400

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)
H15	04-Apr-17	<158	314 ± 25	<3	<3	<8	<4	<7	<6	<6	<3	<3	<5
	11-Apr-17	<158	391 ± 28	<4	<3	<8	<4	<8	<7	<6	<3	<3	<5
	18-Apr-17	<151	408 ± 28	<3	<3	<7	<4	<6	<5	<4	<3	<4	<6
	25-Apr-17	<141	358 ± 41	<7	<6	<12	<6	<15	<11	<9	<6	<7	<11
	03-May-17	<144	335 ± 26	<3	<3	<7	<3	<8	<5	<5	<3	<4	<4
	09-May-17	<145	342 ± 26	<3	<3	<7	<4	<7	<6	<4	<3	<4	<7
	16-May-17	<148	395 ± 27	<3	<3	<6	<3	<7	<5	<4	<3	<4	<9
	23-May-17	<147	357 ± 26	<3	<3	<8	<4	<7	<5	<4	<3	<3	<12
	30-May-17	<144	362 ± 27	<3	<3	<6	<3	<7	<6	<3	<3	<4	<12
	07-Jun-17	<144	395 ± 27	<3	<4	<6	<4	<8	<7	<6	<3	<3	<5
	13-Jun-17	<145	399 ± 28	<3	<4	<6	<4	<8	<6	<3	<3	<3	<11
	19-Jun-17	<145	351 ± 25	<4	<3	<6	<3	<7	<6	<4	<3	<3	<7
	27-Jun-17	<143	394 ± 27	<3	<3	<8	<4	<8	<6	<4	<3	<4	<11
H59	18-Apr-17	<140	379 ± 27	<3	<3	<7	<3	<7	<6	<4	<3	<3	<7
	09-May-17	<148	434 ± 28	<3	<3	<6	<3	<7	<5	<4	<3	<3	<12
	07-Jun-17	<147	431 ± 44	<7	<6	<11	<8	<14	<11	<10	<5	<6	<9

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

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

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

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

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	This sample was previously collected.										
H59	07-Jun-17	1406 ± 121	<21	<20	<39	<18	<42	<22	<22	<287	<103

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	22-Jun-17	2677 ± 220	<27	<25	<55	<34	<59	<24	<18	<486	<122
H59	This sample was previously collected.										

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

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
H51	18-Apr-17	832 ± 65	5820 ± 257	<16	<15	<19	<1180	<33	<350	<75
	09-May-17	1058 ± 48	4614 ± 169	<9	<8	<9	139 ± 66	<16	<178	<34
	07-Jun-17	1154 ± 73	3743 ± 191	<16	<14	<15	<1072	<28	<309	<71
H52	18-Apr-17	1258 ± 53	2496 ± 113	<9	<7	<9	<363	12 ± 3	<184	<34
	09-May-17	646 ± 52	3911 ± 189	<15	<12	<13	<876	<24	<289	<58
	07-Jun-17	891 ± 67	3767 ± 191	<22	<12	<15	<987	<26	<290	<59
H59	18-Apr-17	658 ± 38	4867 ± 179	<10	<8	<9	<342	<18	<180	<33
	09-May-17	725 ± 58	3986 ± 206	<19	<14	<17	<1021	<29	<336	<67
	07-Jun-17	1040 ± 67	2933 ± 162	<21	<12	<17	<1031	<25	<285	<59

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RADIOLOGICAL SURVEILLANCE
OF
FLORIDA POWER AND LIGHT COMPANY

ST. LUCIE PLANT

THIRD QUARTER 2017

BUREAU OF RADIATION CONTROL

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ST. LUCIE PLANT - UNITS 1 & 2

ST. LUCIE SITE

Offsite Dose Calculation Manual Sampling

Third Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	27	25
2. Airborne			
2.a. Air Iodines	Weekly	5	65
2.b. Air Particulates	Weekly	5	65
3. Waterborne			
3.a. Surface Water	Weekly	1	13
	Monthly	1	3
3.b. Shoreline Sediment	Semiannually	2	2
4. Ingestion			
4.a. Fish and Invertebrates			
4.a.1. Crustacea	Semiannually	2	0
4.a.2. Fish	Semiannually	2	1
4.b. Broadleaf Vegetation	Monthly	3	9
			Total: 183

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 06-Jun-17		Sample Site	Deployment 06-Jun-17	
	Collection	13-Sep-17		Collection	13-Sep-17
	Old	New		Old	New
N-1	2.53 \pm 0.14	2.55 \pm 0.22	SW-2	2.52 \pm 0.33	2.60 \pm 0.17
NNW-5	2.90 \pm 0.16	2.74 \pm 0.25	SW-5	2.98 \pm 0.12	3.17 \pm 0.44
NNW-10	3.35 \pm 0.40	3.20 \pm 0.18	SW-10	(A)	
NW-5	2.63 \pm 0.15	2.52 \pm 0.04	SSW-2	2.45 \pm 0.16	2.58 \pm 0.09
NW-10	3.61 \pm 0.33	3.48 \pm 0.73	SSW-5	3.15 \pm 0.28	3.05 \pm 0.18
WNW-2	2.48 \pm 0.15	2.68 \pm 0.15	SSW-10	(B)	
WNW-5	2.74 \pm 0.34	2.65 \pm 0.08	S-5	2.92 \pm 0.33	2.88 \pm 0.14
WNW-10	2.53 \pm 0.13	2.46 \pm 0.08	S-10	2.71 \pm 0.30	2.59 \pm 0.24
W-2	2.59 \pm 0.08	2.56 \pm 0.19	S/SSE-10	2.66 \pm 0.25	2.59 \pm 0.25
W-5	2.93 \pm 0.24	2.85 \pm 0.15	SSE-5	2.57 \pm 0.21	2.43 \pm 0.17
W-10	2.28 \pm 0.18	2.20 \pm 0.22	SSE-10	2.71 \pm 0.43	2.68 \pm 0.15
WSW-2	2.77 \pm 0.09	2.65 \pm 0.32	SE-1	2.52 \pm 0.19	2.38 \pm 0.20
WSW-5	2.71 \pm 0.22	2.67 \pm 0.11	H-32	2.80 \pm 0.20	2.88 \pm 0.31
WSW-10	2.54 \pm 0.05	2.37 \pm 0.16			

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

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

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/ m³)

<u>Collection Date</u>	<u>H08</u>	<u>H12</u>	<u>H14</u>	<u>H30</u>	<u>H34</u>
05-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.02
11-Jul-17	<0.03	<0.02	<0.03	<0.03	<0.02
18-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.02
24-Jul-17	<0.02	<0.02	<0.02	<0.02	<0.02
01-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02
08-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02
15-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02
22-Aug-17	<0.02	<0.02	<0.02	<0.02	<0.02
29-Aug-17	<0.03	<0.03	<0.03	<0.03	<0.03
06-Sep-17	<0.03	<0.03	<0.03	<0.03	<0.03
13-Sep-17	<0.02	<0.02	<0.03(A)	<0.03(B)	<0.03(C)
21-Sep-17	<0.01	<0.01	<0.01	<0.02(D)	(E)
26-Sep-17	<0.03	<0.03	<0.03	<0.03	<0.01

(A) Power outage due to Hurricane Irma. Estimated run time 143.6 out of 173.3 hours.

(B) Power outage due to Hurricane Irma. Estimated run time 106.2 out of 171.3 hours.

(C) Power outage due to Hurricane Irma. Estimated run time 144.2 out of 173 hours.

(D) Estimated run time 125.5 out of 190 hours.

(E) Unable to collect an air sample due to hazardous conditions from work being done on the met-tower.

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m³)

Collection Date	H08	H12	H14	H30	H34
05-Jul-17	0.009 ± 0.002	0.011 ± 0.002	0.009 ± 0.002	0.008 ± 0.002	0.008 ± 0.001
11-Jul-17	0.007 ± 0.002	0.012 ± 0.002	0.008 ± 0.002	0.008 ± 0.002	0.009 ± 0.002
18-Jul-17	0.008 ± 0.002	0.010 ± 0.002	0.005 ± 0.002	0.008 ± 0.002	0.008 ± 0.002
24-Jul-17	0.009 ± 0.002	0.011 ± 0.002	0.013 ± 0.002	0.011 ± 0.002	0.008 ± 0.002
01-Aug-17	0.011 ± 0.002	0.010 ± 0.002	0.012 ± 0.002	0.008 ± 0.002	0.013 ± 0.002
08-Aug-17	0.014 ± 0.002	0.017 ± 0.002	0.021 ± 0.002	0.015 ± 0.002	0.013 ± 0.002
15-Aug-17	0.007 ± 0.002	0.009 ± 0.002	0.007 ± 0.002	0.009 ± 0.002	0.005 ± 0.002
22-Aug-17	0.016 ± 0.002	0.014 ± 0.002	0.012 ± 0.002	0.011 ± 0.002	0.009 ± 0.002
29-Aug-17	0.007 ± 0.002	0.011 ± 0.002	0.007 ± 0.002	0.010 ± 0.002	0.004 ± 0.002
06-Sep-17	0.010 ± 0.002	0.013 ± 0.002	0.010 ± 0.002	0.008 ± 0.002	0.012 ± 0.002
13-Sep-17	0.004 ± 0.002	0.004 ± 0.001	0.005 ± 0.002(A)	0.013 ± 0.003(B)	0.012 ± 0.002(C)
21-Sep-17	0.016 ± 0.002	0.021 ± 0.002	0.018 ± 0.002	0.021 ± 0.003(D)	(E)
26-Sep-17	0.014 ± 0.002	0.014 ± 0.003	0.011 ± 0.002	0.010 ± 0.002	0.013 ± 0.001
Average:	0.010 ± 0.001	0.012 ± 0.001	0.011 ± 0.001	0.011 ± 0.001	0.010 ± 0.001

(A) Power outage due to Hurricane Irma. Estimated run time 143.6 out of 173.3 hours.

(B) Power outage due to Hurricane Irma. Estimated run time 106.2 out of 171.3 hours.

(C) Power outage due to Hurricane Irma. Estimated run time 144.2 out of 173 hours.

(D) Estimated run time 125.5 out of 190 hours.

(E) Unable to collect an air sample due to hazardous conditions from work being done on the met-tower.

2.b.2. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m³)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
H08	0.0901±0.0072	<0.0148	<0.0012	<0.0010	<0.0177
H12	0.0696 ± 0.0064	<0.0118	<0.0011	<0.0010	0.0095 ± 0.0032
H14	0.0792 ± 0.0083	<0.0242	<0.0015	<0.0011	<0.0318
H30	0.0772 ± 0.0072	<0.0156	<0.0014	<0.0012	<0.0113
H34	0.0715 ± 0.0077	<0.0262	<0.0014	<0.0012	<0.0330

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)
H15	05-Jul-17	<151	367 ± 26	<3	<3	<7	<4	<7	<6	<4	<3	<3	<12
	11-Jul-17	<151	376 ± 27	<3	<4	<6	<4	<8	<6	<3	<3	<4	<12
	18-Jul-17	<155	309 ± 41	<7	<7	<15	<6	<11	<10	<21	<5	<7	<12
	24-Jul-17	<155	357 ± 26	<3	<4	<7	<3	<7	<7	<11	<3	<4	<6
	01-Aug-17	<154	382 ± 27	<3	<3	<7	<4	<6	<5	<6	<3	<4	<5
	08-Aug-17	<154	341 ± 26	<3	<3	<17	<4	<7	<6	<4	<3	<4	<8
	15-Aug-17	<154	328 ± 41	<5	<7	<13	<7	<14	<12	<9	<5	<5	<10
	22-Aug-17	<155	423 ± 28	<3	<3	<6	<3	<7	<5	<3	<3	<3	<12
	29-Aug-17	<155	422 ± 28	<3	<3	<7	<3	<8	<6	<4	<3	<4	<10
	06-Sep-17	<155	354 ± 45	<5	<7	<14	<6	<15	<11	<23	<5	<6	<17
	14-Sep-17	<155	<173	<6	<7	<15	<6	<13	<11	<17	<5	<6	<10
	21-Sep-17	<151	286 ± 37	<6	<7	<13	<6	<11	<11	<11	<5	<5	<11
	26-Sep-17	<151	338 ± 26	<3	<3	<8	<3	<7	<6	<5	<3	<3	<5
H59	11-Jul-17	<151	409 ± 28	<3	<3	<7	<3	<7	<5	<4	<3	<4	<11
	17-Aug-17	<152	368 ± 26	<3	<4	<7	<3	<8	<6	<5	<3	<3	<5
	21-Sep-17	<152	315 ± 40	<6	<7	<13	<7	<15	<11	<11	<5	<7	<11

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

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

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

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Pb-210	Ra-226	Th-232	U-235	U-238
H15	17-Aug-17	<65	<194	<13	<11	<10	<11	<896	269 ± 90	<67	17 ± 6	224 ± 38
H59	17-Aug-17	<70	<103	<7	<6	<7	<7	<168	103 ± 48	<35	7 ± 3	77 ± 17

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	01-Jul-17	1333 ± 181	<31	<87	<403	<27	<87	<26	<28	<487	<117
H59	This sample not yet collected.										

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	01-Jul-17	1333 ± 181	<31	<87	<403	<27	<87	<26	<28	<487	<117
H59	This sample not yet collected.										

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

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
H51	11-Jul-17	707 ± 60	4245 ± 217	<15	<14	<20	<1114	24 ± 9	<324	<78
	17-Aug-17	964 ± 44	5363 ± 187	<12	<8	<9	<335	<16	<194	<39
	21-Sep-17	1056 ± 75	3793 ± 203	<21	<13	<15	<1094	<34	<334	<77
H52	11-Jul-17	735 ± 55	3082 ± 168	<11	<12	<15	<924	24 ± 9	<280	<65
	17-Aug-17	1217 ± 52	3349 ± 135	<14	<8	<9	216 ± 73	<16	<187	<36
	21-Sep-17	1020 ± 44	3720 ± 141	<12	<8	<10	<339	<16	<183	<31
H59	11-Jul-17	842 ± 54	2762 ± 146	<11	<10	9 ± 4	<860	19 ± 7	<253	<53
	17-Aug-17	908 ± 63	3288 ± 173	<21	<12	<16	<962	<26	<289	<62
	21-Sep-17	1578 ± 88	<747	<23	<15	<18	<1304	<31	<356	<72

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ST. LUCIE PLANT - UNITS 1 & 2



RADIOLOGICAL SURVEILLANCE
OF
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ST. LUCIE SITE

FOURTH QUARTER 2017

BUREAU OF RADIATION CONTROL

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ST. LUCIE PLANT - UNITS 1 & 2

ST. LUCIE SITE

Offsite Dose Calculation Manual Sampling

Fourth Quarter, 2017

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	27	27
2. Airborne			
2.a. Air Iodines	Weekly	5	65
2.b. Air Particulates	Weekly	5	65
3. Waterborne			
3.a. Surface Water	Weekly	1	13
	Monthly	1	3
3.b. Shoreline Sediment	Semiannually	2	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
			Total: 185

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 13-Sep-17		Sample Site	Deployment 13-Sep-17	
	Collection	04-Dec-17		Collection	04-Dec-17
	Old	New		Old	New
N-1	3.85 ± 0.23	3.49 ± 0.20	SW-2	3.99 ± 0.35	3.25 ± 0.20
NNW-5	4.09 ± 0.15	3.61 ± 0.50	SW-5	4.49 ± 0.34	4.17 ± 0.22
NNW-10	4.59 ± 0.42	4.15 ± 0.22	SW-10	4.00 ± 0.30	3.55 ± 0.29
NW-5	3.93 ± 0.21	3.51 ± 0.01	SSW-2	3.87 ± 0.38	3.45 ± 0.43
NW-10	5.16 ± 0.33	4.29 ± 0.27	SSW-5	4.40 ± 0.37	4.03 ± 0.13
WNW-2	3.82 ± 0.42	3.45 ± 0.19	SSW-10	3.74 ± 0.24	3.51 ± 0.22
WNW-5	3.92 ± 0.01	3.43 ± 0.11	S-5	4.06 ± 0.52	3.57 ± 0.36
WNW-10	3.88 ± 0.15	3.34 ± 0.43	S-10	3.80 ± 0.50	3.30 ± 0.27
W-2	3.70 ± 0.09	3.34 ± 0.32	S/SSE-10	3.92 ± 0.33	3.27 ± 0.24
W-5	4.34 ± 0.06	3.83 ± 0.52	SSE-5	3.71 ± 0.25	3.30 ± 0.38
W-10	3.57 ± 0.06	3.04 ± 0.42	SSE-10	3.98 ± 0.15	3.40 ± 0.10
WSW-2	3.94 ± 0.22	3.58 ± 0.14	SE-1	3.95 ± 0.11	3.22 ± 0.32
WSW-5	3.97 ± 0.21	3.45 ± 0.23	H-32	4.39 ± 0.24	3.83 ± 0.28
WSW-10	3.64 ± 0.17	3.28 ± 0.33			

2.a. IODINE-131 IN WEEKLY AIR CARTRIDGES - (pCi/ m³)

<u>Collection Date</u>	<u>H08</u>	<u>H12</u>	<u>H14</u>	<u>H30</u>	<u>H34</u>
03-Oct-17	<0.01	<0.01	<0.01	<0.01	<0.01
10-Oct-17	<0.02	<0.02	<0.02	<0.02	<0.02
17-Oct-17	<0.02	<0.02	<0.02	<0.02	<0.02
24-Oct-17	<0.02	<0.02	<0.02	<0.02	<0.02
31-Oct-17	<0.03	<0.03	<0.03	<0.03	<0.03
06-Nov-17	<0.04	<0.04	<0.04	<0.04	<0.04
15-Nov-17	<0.01	<0.01	<0.01	<0.01	<0.01
20-Nov-17	<0.02	<0.02	<0.02	<0.02	<0.02
28-Nov-17	<0.02	<0.02	<0.02	<0.02	<0.02
04-Dec-17	<0.03	<0.03	<0.03	<0.03	<0.03
12-Dec-17	<0.01	<0.02	<0.02	<0.02	<0.02
19-Dec-17	<0.03	<0.03	<0.03	<0.03	<0.03
27-Dec-17	<0.02	<0.02	<0.02	<0.02	<0.02

2.b.1. AIR PARTICULATES - GROSS BETA - (pCi/m³)

Collection Date	H08	H12	H14	H30	H34
03-Oct-17	0.015 ± 0.002	0.012 ± 0.002	0.014 ± 0.002	0.011 ± 0.002	0.015 ± 0.002
10-Oct-17	0.009 ± 0.002	0.012 ± 0.002	0.010 ± 0.002	0.008 ± 0.002	0.011 ± 0.002
17-Oct-17	0.009 ± 0.002	0.009 ± 0.002	0.005 ± 0.001	0.008 ± 0.002	0.010 ± 0.002
24-Oct-17	0.017 ± 0.002	0.016 ± 0.002	0.019 ± 0.002	0.011 ± 0.002	0.014 ± 0.002
31-Oct-17	0.012 ± 0.002	0.017 ± 0.002	0.016 ± 0.002	0.012 ± 0.002	0.014 ± 0.002
06-Nov-17	0.019 ± 0.002	0.017 ± 0.002	0.018 ± 0.002	0.012 ± 0.002	0.014 ± 0.002
15-Nov-17	0.006 ± 0.001	0.007 ± 0.001	0.007 ± 0.001	0.007 ± 0.001	0.007 ± 0.001
20-Nov-17	0.023 ± 0.003	0.027 ± 0.003	0.015 ± 0.003	0.021 ± 0.003	0.021 ± 0.003
28-Nov-17	0.016 ± 0.002	0.017 ± 0.002	0.018 ± 0.002	0.016 ± 0.002	0.013 ± 0.002
04-Dec-17	0.020 ± 0.002	0.025 ± 0.003	0.024 ± 0.002	0.014 ± 0.002	0.019 ± 0.002
12-Dec-17	0.014 ± 0.002	0.015 ± 0.002	0.017 ± 0.002	0.011 ± 0.002	0.010 ± 0.002
19-Dec-17	0.025 ± 0.003	0.025 ± 0.002	0.031 ± 0.003	0.024 ± 0.002	0.023 ± 0.002
27-Dec-17	0.021 ± 0.002	0.020 ± 0.002	0.019 ± 0.002	0.017 ± 0.002	0.018 ± 0.002
Average:	0.016 ± 0.001	0.017 ± 0.001	0.017 ± 0.001	0.013 ± 0.001	0.015 ± 0.001

2.b.2. AIR PARTICULATES - GAMMA ANALYSIS OF QUARTERLY COMPOSITES - (pCi/m³)

Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
H08	0.1510 ± 0.0100	<0.0152	<0.0015	<0.0011	0.0130 ± 0.0037
H12	0.1600 ± 0.0102	<0.0178	<0.0013	<0.0008	0.0204 ± 0.0042
H14	0.1580 ± 0.0121	<0.0223	<0.0014	<0.0012	<0.0376
H30	0.1290 ± 0.0094	<0.0162	<0.0014	<0.0011	0.0169 ± 0.0045
H34	0.1780 ± 0.0141	<0.0284	<0.0018	<0.0016	<0.0460

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)
H15	03-Oct-17	<154	291 ± 24	<3	<3	<7	<3	<7	<5	<4	<3	<4	<10
	10-Oct-17	<150	381 ± 27	<2	<3	<7	<4	<8	<6	<4	<3	<3	<8
	17-Oct-17	<158	323 ± 25	<3	<3	<7	<3	<6	<5	<4	<3	<3	<5
	24-Oct-17	<154	386 ± 26	<4	<3	<8	<4	<8	<6	<4	<3	<3	<5
	31-Oct-17	<154	320 ± 25	<4	<3	<7	<4	<8	<6	<4	<3	<3	<10
	06-Nov-17	<154	305 ± 25	<3	<3	<7	<4	<6	<6	<3	<3	<3	<11
	15-Nov-17	<154	319 ± 39	<7	<6	<13	<7	<12	<10	<10	<5	<6	<9
	20-Nov-17	<154	429 ± 28	<3	<3	<7	<4	<7	<5	<4	<3	<3	<12
	28-Nov-17	<151	384 ± 26	<3	<3	<7	<4	<7	<5	<4	<3	<3	<10
	05-Dec-17	<151	416 ± 29	<4	<4	<9	<5	<10	<7	<5	<4	<4	<15
	12-Dec-17	<150	437 ± 28	<5	<4	<10	<5	<10	<8	<5	<4	<5	<10
	19-Dec-17	<150	362 ± 28	<5	<4	<9	<5	<10	<8	<9	<5	<5	<8
	27-Dec-17	<150	457 ± 29	<4	<4	<8	<5	<10	<7	<5	<5	<5	<15
H59	10-Oct-17	<150	349 ± 43	<6	<5	<13	<7	<13	<10	<10	<6	<7	<10
	20-Nov-17	<151	355 ± 26	<3	<3	<7	<3	<7	<6	<4	<4	<4	<8
	05-Dec-17	<151	361 ± 28	<4	<4	<9	<5	<10	<7	<5	<5	<4	<13

(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
H15	This sample was previously collected.											
H59	This sample was previously collected.											

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	This sample was previously collected.										
H59	03-Oct-17	1142 ± 108	<23	<28	<74	<20	<56	<23	<26	<462	<98

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

Sample Site	Collection Date	K-40	Mn-54	Co-58	Fe-59	Co-60	Zn-65	Cs-134	Cs-137	Ra-226	Ra-228
H15	28-Nov-17	3268 ± 247	<26	<26	<47	<29	<59	<25	<27	<472	<113
H59	26-Dec-17	2620 ± 156	<21	<19	<46	<25	<52	<25	<23	<392	<92

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

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210	Pb-212	Ra-226	Ra-228
H51	10-Oct-17	1292 ± 55	3305 ± 137	<11	<8	<10	213 ± 79	<17	<207	<36
	20-Nov-17	1290 ± 55	5940 ± 209	<9	<9	<10	<390	<20	<190	<40
	05-Dec-17	998 ± 49	5244 ± 174	<33	<12	<10	<256	<18	<197	<45
H52	10-Oct-17	746 ± 63	2610 ± 158	<17	<15	<16	<1079	<26	<333	<71
	20-Nov-17	1850 ± 63	2750 ± 114	<9	<7	<8	280 ± 75	<15	<181	<32
	05-Dec-17	1856 ± 69	3849 ± 147	<40	<12	<12	<296	<21	<240	<49
H59	10-Oct-17	982 ± 45	3247 ± 130	<10	<7	<9	<319	<15	<172	<31
	20-Nov-17	1780 ± 61	4290 ± 156	<9	<7	<6	314 ± 77	<17	<185	<34
	05-Dec-17	2154 ± 70	3126 ± 121	<33	<10	<10	501 ± 63	<19	<210	<40

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ATTACHMENT C

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

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DOE-MAPEP 36 RESULTS

Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
Matrix: RdF Air Filter (Bq/filter)				
MN54	0.049	0	A	False Positive Test (within acceptance range)
CO57	1.613	1.70	A	1.19-2.21
CO60	0.809	0.78	A	0.55-1.01
ZN65	1.402	1.29	A	0.90-1.68
CS134	1.359	1.42	A	0.99-1.85
CS137	0.709	0.685	A	0.480-0.891
Matrix: GrF Air Filter (pCi/filter)				
Gross Beta*	54.74	61.8	A	39.1-90.1
Matrix: MaS Soil (Bq/kg)				
K40	550	607	A	425-789
MN54	952.57	967	A	677-1257
CO57	0.67	0	A	False Positive Test (within acceptance range)
CO60	849.43	891	A	624-1158
ZN65	1.89	0	A	False Positive Test (within acceptance range)
CS134	1456.23	1550	A	1085-2015
CS137	610.29	611	A	428-794
Matrix: MaW Water (Bq/L)				
H3	267.9	249	A	174-324
MN54	15.705	14.9	A	10.4-19.4
CO57	27.175	28.5	A	20.0-37.1
CO60	12.64	12.3	A	8.6-16.0
ZN65	0.111	0	A	False Positive Test (within acceptance range)
CS134	-0.108	0	A	False Positive Test (within acceptance range)
CS137	11.910	11.1	A	7.8-14.4
SR90	9.12	10.1	A	7.1-13.1
Matrix: RdV Vegetation (Bq/sample)				
MN54	3.158	3.28	A	2.30-4.26
CO57	0.013	0	A	False Positive Test (within acceptance range)
CO60	8.047	8.75	A	6.13-11.38
ZN65	5.184	5.39	A	3.77-7.01
CS134	6.257	6.95	A	4.87-9.04
CS137	4.746	4.60	A	3.22 – 5.98

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

*Sample from Environmental Resource Associates (ERA) Multi-Media Radiochemistry Proficiency Testing (MRAD-27)

In MAPEP 36, 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.

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DOE-MAPEP 37 RESULTS

Radionuclide	Result	Ref. Value	Flag (Evaluation)	Acceptance Range
Matrix: RdF Air Filter (Bq/filter)				
MN54	1.367	1.30	A	0.91 – 1.69
CO57	0.012	0	A	False Positive Test (within acceptance range)
CO60	0.644	0.68	A	0.48-0.88
ZN65	1.185	1.08	A	0.76-1.40
CS134	0.969	1.00	A	0.70-1.30
CS137	0.853	0.82	A	0.57-1.07
Matrix: MaS Soil (Bq/kg)				
K40	554	592	A	414 – 770
MN54	794.75	825	A	578 – 1073
CO57	1250	1458	A	1021-1895
CO60	0.08	0	A	False Positive Test (within acceptance range)
ZN65	558.5	559	A	391 - 727
CS134	409.8	448	A	314-582
CS137	688	722	A	505 - 939
Matrix: MaW Water (Bq/L)				
H3	272.38	258	A	181 – 335
MN54	16.054	14.9	A	10.4 – 19.4
CO57	11.546	12.1	A	8.5 – 15.7
CO60	10.962	10.7	A	7.5 – 13.9
ZN65	16.585	15.5	A	10.9 – 20.2
CS134	11.257	11.5	A	8.1 – 15.0
CS137	17.408	16.3	A	11.4-21.2
Matrix: RdV Vegetation (Bq/sample)				
MN54	2.734	2.62	A	1.83 – 3.41
CO57	2.644	2.8	A	2.0 – 3.6
CO60	1.912	2.07	A	1.45-2.69
ZN65	5.258	5.37	A	3.76 – 6.98
CS134	2.156	2.32	A	1.62 – 3.02
CS137	0.018	0	A	False Positive Test (within acceptance range)

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

In MAPEP 37, the results for gamma on air filters, water, and vegetation matrices for those nuclides associated with nuclear power plant operation and using analytical methods used in the REMP are acceptable.

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ATTACHMENT D

Industry Initiative

Ground Water Protection Program

Tritium in Ground Water Monitoring

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A. Description of Program:

Quarterly sampling & analysis for Tritium & principle gamma emitters is performed by the State of Florida Department of Health (DOH) and Bureau of Radiation Control (BRC), pursuant to an Agreement between FPL and DOH, as part of the ODCM REMP sampling program.

The wells identified for radiological environmental sampling in support of the industry initiative are listed below, and in Appendix B-2 of the ODCM. The ten wells are on the 'outside' perimeter of the protected area. Two locations where the Plant ID ends with "S" are shallower wells adjacent, within a few feet, of a deeper well at the same location.

State ID	St. Lucie Plant ID	Location Description
H70	GIS-MW-ES	West of A1A; between the discharge canal and Gate "B"
H71	GIS-MW-EI	West of A1A; between the discharge canal and Gate "B"
H72	GIS-MW-SI	South of Intake canal and the adjacent access road
H73	GIS-MW-SWS	S/W corner of Intake canal and the adjacent access road
H74	GIS-MW-SWI	S/W corner of Intake canal and the adjacent access road
H75	GIS-MW-WI	West of plant site and intake canal; South of switchyard
H76	H76	North of Simulator; South of Big Mud Creek
H77	H77	East of Barge Slip; By LU bldg
H78	H78	South of North Warehouse
H79	H79	West of A1A and East of Parking Lot

B. St. Lucie 2017 Tritium Results ⁽¹⁾ Summary, pCi/L

Well number	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
H70	<161	195	<144	<158
H71	317	672	1266	830
H72	<161	<141	<144	<158
H73	<161	<141	<144	<158
H74	<161	<141	<144	<158
H75	<161	<141	<144	<159
H76	<167	<144	<144	<159
H77	<161	<141	<146	<159
H78	<160	<144	<146	<155
H79	<160	<144	<146	<155

Notes

1. Samples analyzed for H3 and principle gamma emitters; tritium is the only fission product identified. Naturally occurring K-40 is occasionally identified.
2. Laboratory H3 MDA is about 150 pCi/liter

Map depicting the well locations follows.

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RADIOLOGICAL ENVIRONMENTAL SAMPLING LOCATIONS
IN SUPPORT OF THE INDUSTRY INITIATIVE

