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L-2010-077
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
2009 Annual Radiological
Environmental Operating Report

Enclosed is the 2009 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 Robert J. Tomonto at (305) 246-7327.

Sincerely,

Michael W. Kiley
Vice President
Turkey Point Nuclear Plant

SM

Enclosure

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

IE25
NRR

# 2009

# ANNUAL

# RADIOLOGICAL ENVIRONMENTAL

# OPERATING REPORT

## TURKEY POINT PLANT

## UNITS 3 & 4

## LICENSE NOS. DPR-31, DPR-41

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

Data Submitted by: Florida DOH

Prepared by: 4-5-2010

Reviewed by: 4-5-2010

**2009**
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**
**TURKEY POINT PLANT – UNITS 3 & 4**

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**2009**
**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, 2009 to December 31, 2009.

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

# 2009
# 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 and 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 Turkey Point Units 3 and 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.

### 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 22 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 three locations. Samples are collected and analyzed monthly. Analyses include gamma isotopic and tritium measurements.

d. Shoreline sediment samples are collected from three locations coinciding with the locations for surface water samples. Samples are collected and analyzed semi-annually. Sediment samples are analyzed by gamma isotopic measurements.

e. Fish and invertebrate samples are collected from two locations coinciding with two of the locations for surface water samples. Samples are collected and analyzed semi-annually. Fish and invertebrate samples are analyzed by gamma isotopic measurements.

f. Broad leaf vegetation samples are collected from three locations. Samples are collected and analyzed monthly. Broad leaf vegetation samples are analyzed by gamma isotopic measurements.

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

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

2. Analytical Responsibility:

Radiological environmental monitoring for the Turkey Point Plant is conducted by the State of Florida, Department of Health (DOH). Samples are collected and analyzed by DOH personnel.

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

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

C. Analytical Results

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

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 intercomparison 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.

## 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 exposure rates that were observed during the pre-operational surveillance program. Direct radiation monitoring results are summarized in Table 1.

2. Air Particulates/Radioiodine:

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.

3. Waterborne, Surface Water:

The results of radioactivity measurements in surface water samples are consistent with past measurements. Tritium was reported as present in seven of 24 indicator location and two of 12 control location surface water samples collected. These results are consistent with the known subsurface interchange that occurs between the closed cooling canal and its surrounding waters, and the pressure gradients caused by the flow of aquifer subsurface waters in South Florida. The highest reported tritium is less than 14% of the required detection level specified by ODCM Table 5.1-3.

4. Waterborne, Sediment:

Cs-137 was detected as present in one indicator location and the control location. The highest level seen was at the Control location and was less than 16% of the required detection level specified by ODCM Table 5.1-3. No other fission products were detected.

5. Waterborne, Food Products:

The results are consistent with past measurements. Cs-137 was detected in the indicator location samples. The highest concentration was less than 19% of the required detection level specified by ODCM Table 5.1-3. No other fission products were detected.

6. Broad Leaf Vegetation

The results of radioactivity measurements are consistent with past measurements. Cs-137 was detected, as in the past, in samples collected from the indicator and control locations. The maximum concentration reported was less than 9% of the reporting level specified by ODCM Table 5.1-2. No other fission products were detected.

7. Land Use Census

There were no additions to the land use relative 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% greater than locations currently being sampled in the radiological environmental monitoring program were identified by the land use census.

8. Interlaboratory Comparison Program

The State laboratory participated in MAPEP 20 and 21.

In MAPEP 20, the results for Water, Air Filter Gross Beta, mixed gamma emitters in Air Filters, Soil and Vegetation matrices for those nuclides associated with nuclear power plant operation and using analytical methods used in the REMP are acceptable.

In MAPEP 21, the results for Water, Air Filter Gross Beta, mixed gamma emitters in Air Filters, Soil and Vegetation matrices for those nuclides associated with nuclear power plant operation and using analytical methods used in the REMP are acceptable.

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.

Additionally, supplemental to the ODCM program, sampling of the direct exposure, inhalation, and ingestion pathways, performed by 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.

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida, Reporting Period January 1 - December 31, 2009
(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: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| Exposure Rate,88[d] | --- | 5.1 (84/84)<br>4.0 - 7.9 | NW-10<br>10 mi., NW | 7.4 (4/4)<br>6.9 - 7.9 | 5.6 (4/4)<br>5.2 - 5.8 |

Number of Non-routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida, Reporting Period January 1 - December 31, 2009
(County, State)

PATHWAY: AIRBORNE
SAMPLES COLLECTED: RADIOIODINE AND PARTICULATES
UNITS: $pCi/m^3$

| 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: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| $^{131}I$, 260 | 0.024 | < MDA | --- | --- | < MDA |
| Gross Beta, 259 | 0.0025 | 0.014 (206/207)<br>0.005 - 0.027 | T-51<br>2 mi., NNW | 0.014 (51/51)<br>0.005 - 0.025 | 0.014 (52/52)<br>0.005 - 0.027 |
| Composite Gamma Isotopic, 20 | | | | | |
| $^{7}Be$ | 0.0052 | 0.1534 (20/20)<br>0.0942 - 0.2841 | T-72<br>< 1 mi., WSW | 0.1642 ( 4/4)<br>0.1141 - 0.2841 | 0.1543 ( 4/4)<br>0.0942 - 0.2671 |
| $^{40}K$ | --- | < MDA | --- | --- | < MDA |
| $^{134}Cs$ | 0.00069 | < MDA | --- | --- | < MDA |
| $^{137}Cs$ | 0.00066 | < MDA | --- | --- | < MDA |
| $^{210}Pb$ | --- | 0.0181 (10/20)<br>0.0110 - 0.0352 | T-51<br>2 mi., NNW | 0.0207 ( 4/4)<br>0.0132 – 0.0352 | 0.0138 ( 2/4)<br>0.0121 – 0.0154 |

Number of Non-routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida, Reporting Period January 1 - December 31, 2009
(County, State)

PATHWAY: WATERBORNE
SAMPLES COLLECTED: SURFACE WATER
UNITS: pCi/L

| 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: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| Tritium, 36 | 172 | 165 ( 7/24)<br>112 - 405 | T-81<br>6 mi., S | 172 (6/12)<br>112 - 405 | 99 (2/12)<br>92 - 105 |
| Gamma Isotopic, 36 | | | | | |
| $^{40}K$ | 60 | 305 (24/24)<br>239 - 460 | T-81<br>6 mi., S | 319 (12/12)<br>239 - 460 | 227 (12/12)<br>107 - 379 |
| $^{54}Mn$ | 4 | < MDA | --- | --- | < MDA |
| $^{59}Fe$ | 8 | < MDA | --- | --- | < MDA |
| $^{58}Co$ | 4 | < MDA | --- | --- | < MDA |
| $^{60}Co$ | 4 | < MDA | --- | --- | < MDA |
| $^{65}Zn$ | 8 | < MDA | --- | --- | < MDA |
| $^{95}Zr$-Nb | 7 | < MDA | --- | --- | < MDA |
| $^{131}I$ | 5 | < MDA | --- | --- | < MDA |
| $^{134}Cs$ | 5 | < MDA | --- | --- | < MDA |
| $^{137}Cs$ | 5 | < MDA | --- | --- | < MDA |
| $^{140}Ba$-La | 11 | < MDA | --- | --- | < MDA |

Number of Non-routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4 , Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida , Reporting Period January 1 - December 31, 2009
(County, State)

PATHWAY: WATERBORNE
SAMPLES COLLECTED: SHORELINE SEDIMENT
UNITS: pCi/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: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| Gamma Isotopic, 6 | | | | | |
| $^{7}Be$ | 100 | 250 (1/2) | T-81<br>6 mi., S | 250 (1/2) | 136 (1/2) |
| $^{40}K$ | 140 | 260 (3/4)<br>251 - 269 | T-81<br>6 mi., S | 264 (2/2)<br>259 – 269 | 252 (2/2)<br>152 - 353 |
| $^{58}Co$ | 9 | <MDA | --- | --- | < MDA |
| $^{60}Co$ | 12 | <MDA | --- | --- | < MDA |
| $^{134}Cs$ | 14 | <MDA | --- | --- | < MDA |
| $^{137}Cs$ | 12 | 28 (1/2) | T-42<br>< 1 mi., ENE | 28 (1/2) | 16 (2/2)<br>12 - 19 |
| $^{210}Pb$ | --- | <MDA | --- | --- | 301 (1/2) |
| $^{226}Ra$ | 49 | 1180 (4/4)<br>544 - 1546 | T-81<br>6 mi., S | 1543 (2/2)<br>1540 - 1546 | 663 (2/2)<br>577 - 749 |
| $^{235}U$ | --- | <MDA | --- | --- | 61 (1/2)A |
| $^{238}U$ | --- | 809 (3/4)<br>741 - 871 | T-81<br>6 mi., S | 871 (1/2) | 239 (1/2) |

Number of Non-routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida, Reporting Period January 1 - December 31, 2009
(County, State)

PATHWAY: INGESTION
SAMPLES COLLECTED: CRUSTACEA
UNITS: pCi/kg, WET

| Type and Total Number of Analyses Performed | Lower Limit of Detection[a] (LLD) | All Indicator Locations Mean (f) Range | Location with Highest Annual Mean: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| Gamma Isotopic, 2 | | | | | |
| $^{40}K$ | 130 | 1189 (1/2) | T-81 6 mi., S | 1189 (1/2) | 559 (1/2) |
| $^{226}Ra$ | 20 | 752 (1/2) | T-81 6 mi., S | 752 (1/2) | < MDA |
| $^{54}Mn$ | 9 | < MDA | --- | --- | < MDA |
| $^{59}Fe$ | 16 | < MDA | --- | --- | < MDA |
| $^{58}Co$ | 9 | < MDA | --- | --- | < MDA |
| $^{60}Co$ | 19 | < MDA | --- | --- | < MDA |
| $^{65}Zn$ | 17 | < MDA | --- | --- | < MDA |
| $^{134}Cs$ | 9 | < MDA | --- | --- | < MDA |
| $^{137}Cs$ | 9 | < MDA | --- | --- | < MDA |

Number of Non-routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4 , Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida , Reporting Period January 1 - December 31, 2009
(County, State)

PATHWAY: INGESTION
SAMPLES COLLECTED: FISH
UNITS: pCi/kg, WET

| Type and Total Number of Analyses Performed | Lower Limit of Detection[a] (LLD) | All Indicator Locations Mean (f) Range | Location with Highest Annual Mean: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| Gamma Isotopic, 4 | | | | | |
| $^{7}Be$ | --- | <MDA | --- | --- | <MDA |
| $^{40}K$ | 130 | 2274 (2/2)<br>1765- 2783 | T-81<br>6 mi., S | 2274 (2/2)<br>1765- 2783 | 2047 (2/2)<br>1780 - 2314 |
| $^{54}Mn$ | 9 | <MDA | --- | --- | <MDA |
| $^{59}Fe$ | 16 | <MDA | --- | --- | <MDA |
| $^{58}Co$ | 9 | <MDA | --- | --- | <MDA |
| $^{60}Co$ | 10 | <MDA | --- | --- | <MDA |
| $^{65}Zn$ | 17 | <MDA | --- | --- | <MDA |
| $^{134}Cs$ | 9 | <MDA | --- | --- | <MDA |
| $^{137}Cs$ | 9 | 16 (2/2)<br>4 - 28 | T-81<br>6 mi., S | 16 (2/2)<br>4 - 28 | <MDA |
| $^{226}Ra$ | 20 | 217 (2/2)<br>99 - 335 | T-81<br>6 mi., S | 217 (2/2)<br>99 - 335 | <MDA |
| $^{238}U$ | --- | <MDA | --- | --- | <MDA |

Number of Non-routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida, Reporting Period January 1 - December 31, 2009
(County, State)

PATHWAY: INGESTION
SAMPLES COLLECTED: BROAD LEAF VEGETATION
UNITS: pCi/kg, WET

| Type and Total Number of Analyses Performed | Lower Limit of Detection[a] (LLD) | All Indicator Locations Mean (f)Range | Location with Highest Annual Mean: Name[c] Distance & Direction | Location with Highest Annual Mean: Mean (f)[b] Range | Control Locations Mean (f)[b] Range |
|---|---|---|---|---|---|
| Gamma Isotopic, 36 | | | | | |
| $^{7}Be$ | 71 | 1714 (24/24)<br>409 - 3266 | T-40<br>3 mi., W | 1740 (12/12)<br>465 - 3266 | 1292 (12/12)<br>605 - 2206 |
| $^{40}K$ | 100 | 4687 (24/24)<br>2826 - 7342 | T-41<br>2 mi., W/NW | 5766 (12/12)<br>3838 - 7342 | 3881 (12/12)<br>2192 - 6305 |
| $^{58}Co$ | 9 | <MDA | --- | --- | <MDA |
| $^{60}Co$ | 10 | <MDA | --- | --- | <MDA |
| $^{131}I$ | 9 | <MDA | --- | --- | <MDA |
| $^{134}Cs$ | 8 | <MDA | --- | --- | <MDA |
| $^{137}Cs$ | 8 | 49 (23/24)<br>17 - 164 | T-41<br>2 mi., W/NW | 50 (12/12)<br>18 - 90 | 51 (1/12) |
| $^{210}Pb$ | --- | 319 (7/24)<br>199 – 388 | T-40<br>3 mi., W | 365 (3/12)<br>345 - 388 | 308 (2/12)<br>270 - 345 |
| $^{226}Ra$ | --- | 427 (3/24)<br>49 - 740 | T-40<br>3 mi., W | 493 (1/12) | 319 (3/12)<br>160 - 516 |

Number of Non routine Reported Measurements = 0

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY
Name of Facility Turkey Point Units 3 & 4 , Docket No(s). 50-250 & 50-251
Location of Facility Miami-Dade, Florida , Reporting Period January 1 - December 31, 2009
(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

| | | |
|---|---|---|
| A) | Pathway: | Airborne – Particulates and iodines |
| | Location: | T-57 , 4 miles NW |
| | Dates: | 2-Mar-09 to 10-Mar-09 |
| | Deviation: | Failure to provide continuous monitoring. |
| | Description of Problem: | Intermittent power failure during sampling period; estimated run time of 139 hours of the 164 hour sampling period. |
| | Corrective Action | Verified equipment as operable; no repairs needed. |
| B) | Pathway: | Airborne – Particulates and iodines |
| | Location: | T-51 , 2 miles NW |
| | Dates: | 2-Mar-09 to 10-Mar-09 |
| | Deviation: | Failure to provide continuous monitoring. |
| | Description of Problem: | Particulate filter found missing during collection; iodine filter intact. |
| | Corrective Action | Verified operability of particulate filter holder. |
| C) | Pathway | Ingestion - Crustacea |
| | Location: | T-81 , 6 miles S |
| | Dates: | Second half 2009 |
| | Deviation: | Failure to collect sample specified in ODCM |
| | Description of Problem: | Lack of crustacean sample. Repeated sampling yielded insufficient sample to perform an assay.<br>Crustaceans may be over harvested, even local vendors, used to supplement the sampling program, can not provide material at reasonable cost. |
| | Corrective Action | Continue attempts to collect sufficient sample mass. |

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TABLE 1B

ANALYSIS WITH LLDs ABOVE ODCM TABLE 5.1-3 DETECTION CAPABILITIES
1/1/2009 – 12/31/2009

The values specified in ODCM Table 5.1-3, Detection Capabilities, were achieved for all samples.

TABLE 2

LAND USE CENSUS

Distance to Nearest (a, b)

| Sector | 8/09 Milk (c) Animal | 8/09 Residence (g) | 8/09 Garden (d) |
|---|---|---|---|
| N | L (e) | 2.0 / 354 | L |
| NNE | O (f) | O | O |
| NE | O | O | O |
| ENE | O | O | O |
| E | O | O | O |
| ESE | O | O | O |
| SE | O | O | O |
| SSE | O | O | O |
| S | L | L | L |
| SSW | L | L | L |
| SW | L | L | L |
| WSW | L | L | L |
| W | L | L | L |
| WNW | L | 3.7 / 302 | 4.5 / 303 |
| NW | L | 3.7 / 311 | L |
| NNW | L | L | 4.6 / 327 |

## TABLE 2

## LAND USE CENSUS

### NOTES

a. All categories surveyed out to 5 miles radius from the Turkey Point Plant.

b. The following format is used to denote the location:

distance (miles)/bearing (degrees)

For example, a residence located in the north sector at a distance of 2.0 miles bearing 354 degrees is recorded as 2.0 / 354.

c. Potential milk animal locations.

d. Gardens with an estimated growing area of 500 square feet or more.

e. L denotes that the sector area is predominantly a land area unoccupied by the category type.

f. O denotes that the sector area is predominantly an ocean area.

g. Non-residential occupied buildings in these sectors include the following:

| Sector | Distance | Description |
|---|---|---|
| N | 1.9 / 349 | 24-hour Security Staff Building |
| NNW | 1.9 / 349 | Security booth at park entrance |
| NNW | 4.6 / 327 | Livable house, does not appear to be occupied. |

# ATTACHMENT A

## KEY TO SAMPLE LOCATIONS

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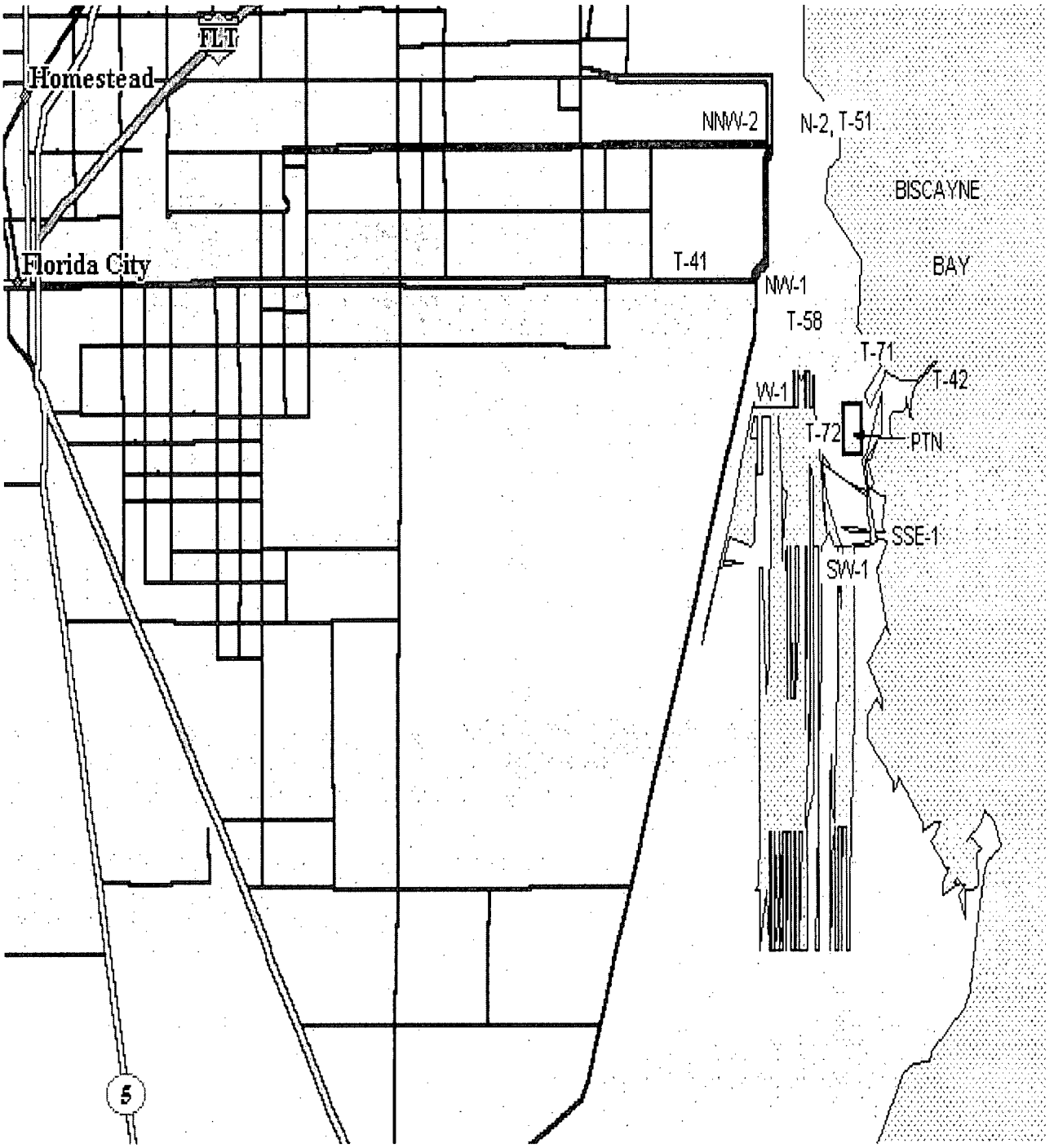
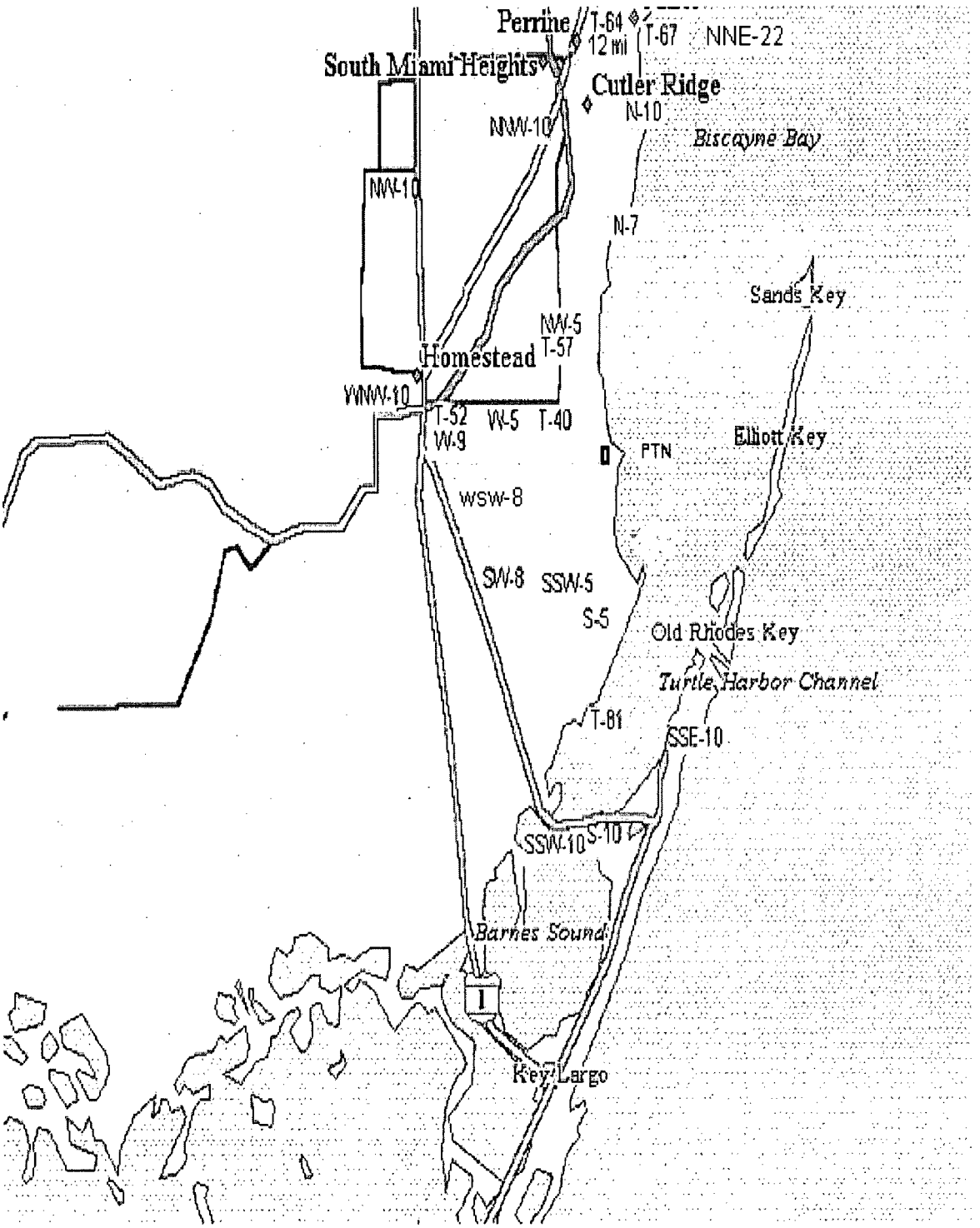
## NEAR SITE SAMPLING LOCATIONS



## DISTANT REMP SAMPLING LOCATIONS



## ATTACHMENT A



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

| Location [a] Name | Description |
|---|---|
| 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-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 |
| Control | |
| NNE-22 | Natoma Substation , 2475 SW 16 Ct. |

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

ATTACHMENT A



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

| Location Name | Direction Sector | Approximate Distance (miles) | Description |
|---|---|---|---|
| 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-52 | W | 9 | Supplemental location used to compensate, per ODCM, for temporary loss of T-57. |
| T-72 | WSW | <1 | Just before entrance to Land Utilization's access gate. |
| Control: | | | |
| T-64 | NNE | 22 | Natoma Substation , 2475 SW 16 Ct. |

ATTACHMENT A



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

| Location Name | Direction Sector | Approximate Distance (miles) | Description |
|---|---|---|---|
| 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 |

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

| Location Name | Direction Sector | Approximate Distance (miles) | Description |
|---|---|---|---|
| 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 |

ATTACHMENT A



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

| Location Name | Direction Sector | Approximate Distance (miles) | Description |
|---|---|---|---|
| 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 |

SAMPLES COLLECTED: BROAD LEAF VEGETATION
SAMPLE COLLECTION FREQUENCY: MONTHLY

| Location Name | Direction Sector | Approximate Distance (miles) | Description |
|---|---|---|---|
| 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 |

**2009**
**ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT**
**TURKEY POINT PLANT – UNITS 3 & 4**

ATTACHMENT B

RADIOLOGICAL SURVEILLANCE OF

FLORIDA POWER AND LIGHT COMPANY'S

TURKEY POINT SITE

2009

First Quarter, 2009

Second Quarter, 2009

Third Quarter, 2009

Fourth Quarter, 2009

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

## First Quarter, 2009

| Sample Type | Collection Frequency | Locations Sampled | Number of Samples |
|---|---|---|---|
| 1. Direct Radiation | Quarterly | 22 | 22 |
| 2. Airborne | | | |
| 2.a. Air Iodines | Weekly | 5 | 65 |
| 2.b. Air Particulates | Weekly | 5 | 65 |
| 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 | 2 |
| 4.a.2. Fish | Semiannually | 2 | 2 |
| 4.b. Broadleaf Vegetation | Monthly | 3 | 9 |
| | | | Total: 177 |

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 - TLDs - (μR/hour)

| Sample Site | Deployment 16-Dec-08 Collection 10-Mar-09 | Sample Site | Deployment 16-Dec-08 Collection 10-Mar-09 |
|---|---|---|---|
| N-2 | 5.4 ± 0.5 | WSW-8 | 4.8 ± 0.3 |
| N-7 | 4.3 ± 0.4 | | |
| N-10 | 5.2 ± 0.8 | SW-1 | 4.6 ± 0.4 |
| | | SW-8 | 5.3 ± 0.4 |
| NNW-2 | 4.0 ± 0.5 | | |
| NNW-10 | 5.6 ± 0.6 | SSW-5 | 4.5 ± 0.4 |
| | | SSW-10 | 4.8 ± 0.5 |
| NW-1 | 6.3 ± 0.6 | | |
| NW-5 | 4.4 ± 0.4 | S-5 | 4.5 ± 0.3 |
| NW-10 | 7.9 ± 0.9 | S-10 | 5.4 ± 0.4 |
| WNW-10 | 6.6 ± 0.5 | SSE-1 | 4.4 ± 0.4 |
| | | SSE-10 | 5.2 ± 0.5 |
| W-1 | 6.4 ± 0.6 | | |
| W-5 | 4.8 ± 0.3 | NNE-22 | 5.6 ± 0.3 |
| W-9 | 4.8 ± 0.4 | | |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 06-Jan-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 12-Jan-09 | <0.03 | <0.03 | <0.03 | <0.02 | <0.03 |
| 20-Jan-09 | <0.01 | <0.01 | <0.01 | <0.02 | <0.01 |
| 26-Jan-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 02-Feb-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 09-Feb-09 | <0.03 | <0.03 | <0.02 | <0.02 | <0.03 |
| 16-Feb-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 24-Feb-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 02-Mar-09 | <0.04 | <0.03 | <0.03 | <0.03 | <0.04 |
| 10-Mar-09 | <0.02 | <0.03(A) | <0.02 | <0.02 | <0.02 |
| 18-Mar-09 | <0.03 | <0.03 | <0.02 | <0.03 | <0.02 |
| 24-Mar-09 | <0.03 | <0.03 | <0.03 | <0.02 | <0.03 |
| 31-Mar-09 | <0.02 | <0.02 | <0.02 | <0.03 | <0.02 |

(A) Estimated run time 138.6 out of 163.7 hours. No explanation for reduced run time.

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 06-Jan-09 | 0.012 ± 0.002 | 0.017 ± 0.002 | 0.017 ± 0.002 | 0.018 ± 0.002 | 0.015 ± 0.002 |
| 12-Jan-09 | 0.016 ± 0.002 | 0.016 ± 0.002 | 0.013 ± 0.002 | 0.021 ± 0.002 | 0.014 ± 0.002 |
| 20-Jan-09 | 0.020 ± 0.002 | 0.018 ± 0.002 | 0.019 ± 0.002 | 0.016 ± 0.002 | 0.014 ± 0.002 |
| 26-Jan-09 | 0.023 ± 0.003 | 0.020 ± 0.003 | 0.020 ± 0.003 | 0.019 ± 0.002 | 0.016 ± 0.002 |
| 02-Feb-09 | 0.016 ± 0.002 | 0.013 ± 0.002 | 0.013 ± 0.002 | 0.016 ± 0.002 | 0.014 ± 0.002 |
| 09-Feb-09 | 0.021 ± 0.002 | 0.023 ± 0.002 | 0.019 ± 0.002 | 0.019 ± 0.002 | 0.017 ± 0.002 |
| 16-Feb-09 | 0.014 ± 0.002 | 0.011 ± 0.002 | 0.013 ± 0.002 | 0.015 ± 0.002 | 0.015 ± 0.002 |
| 24-Feb-09 | 0.017 ± 0.002 | 0.027 ± 0.002 | 0.021 ± 0.002 | 0.027 ± 0.002 | 0.024 ± 0.002 |
| 02-Mar-09 | 0.017 ± 0.002 | 0.018 ± 0.002 | 0.018 ± 0.002 | 0.012 ± 0.002 | 0.018 ± 0.002 |
| 10-Mar-09 | 0.025 ± 0.002 | 0.024 ± 0.003(A) | 0.020 ± 0.002 | 0.019 ± 0.002 | 0.019 ± 0.002 |
| 18-Mar-09 | 0.019 ± 0.002 | 0.015 ± 0.002 | 0.018 ± 0.002 | 0.020 ± 0.002 | 0.020 ± 0.002 |
| 24-Mar-09 | 0.016 ± 0.002 | 0.010 ± 0.002 | 0.012 ± 0.002 | 0.010 ± 0.002 | 0.014 ± 0.002 |
| 31-Mar-09 | 0.015 ± 0.002 | 0.014 ± 0.002 | 0.015 ± 0.002 | 0.017 ± 0.002 | 0.016 ± 0.002 |
| Average: | 0.018 ± 0.001 | 0.017 ± 0.001 | 0.017 ± 0.001 | 0.018 ± 0.001 | 0.017 ± 0.001 |

(A) Estimated run time 138.6 out of 163.7 hours. No explanation for reduced run time.

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

| Sample Site | Be-7 | K-40 | Cs-134 | Cs-137 | Pb-210 |
|---|---|---|---|---|---|
| T51 | 0.2764 ± 0.0276 | <0.0170 | <0.0020 | <0.0014 | 0.0188 ± 0.0027 |
| T57 | 0.2639 ± 0.0160 | <0.0202 | <0.0016 | <0.0007 | 0.0256 ± 0.0049 |
| T58 | 0.2591 ± 0.0172 | <0.0252 | <0.0019 | <0.0014 | <0.0501 |
| T64 | 0.2671 ± 0.0153 | <0.0230 | <0.0014 | <0.0011 | <0.0453 |
| T72 | 0.2841 ± 0.0161 | <0.0247 | <0.0017 | <0.0016 | <0.0491 |

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

| Sample Site | Collection Date | H-3 | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Zr-95 Nb-95 (A) | I-131 | Cs-134 | Cs-137 | Ba-140 La-140 (B) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T42 | 20-Jan-09 | <143 | 255 ± 45 | <6 | <5 | <10 | <6 | <13 | <9 | <9 | <6 | <8 | <8 |
| | 16-Feb-09 | <131 | 276 ± 73 | <4 | <3 | <7 | <4 | <8 | <6 | <6 | <4 | <4 | <5 |
| | 11-Mar-09 | <131 | 394 ± 37 | <4 | <3 | <8 | <4 | <9 | <7 | <6 | <4 | <4 | <6 |
| T67 | 20-Jan-09 | <143 | 248 ± 30 | <4 | <3 | <7 | <5 | <9 | <6 | <6 | <5 | <4 | <6 |
| | 17-Feb-09 | <131 | 379 ± 30 | <3 | <3 | <9 | <4 | <7 | <7 | <7 | <5 | <4 | <6 |
| | 11-Mar-09 | <131 | 250 ± 31 | <4 | <4 | <8 | <4 | <8 | <7 | <6 | <5 | <4 | <5 |
| T81 | 20-Jan-09 | <143 | 318 ± 33 | <3 | <3 | <5 | <3 | <6 | <5 | <4 | <3 | <3 | <4 |
| | 16-Feb-09 | <131 | 460 ± 34 | <3 | <4 | <10 | <5 | <9 | <7 | <8 | <5 | <4 | <4 |
| | 09-Mar-09 | <131 | 321 ± 22 | <3 | <4 | <7 | <3 | <8 | <6 | <6 | <4 | <3 | <5 |

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

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

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

| Sample Site | Collection Date | Be-7 | K-40 | Co-58 | Co-60 | Cs-134 | Cs-137 | Pb-210 | Ra-226 | Th-232 | U-235 | U-238 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T42 | 21-Jan-09 | <142 | <259 | <12 | <16 | <14 | 28 ± 7 | <1113 | 544 ± 154 | <69 | <101 | 814 ± 112 |
| T67 | 22-Jan-09 | 136 ± 24 | 353 ± 45 | <6 | <7 | <6 | 19 ± 3 | <469 | 577 ± 67 | <29 | 61 ± 23 | 477 ± 50 |
| T81 | 21-Jan-09 | <118 | 269 ± 61 | <11 | <11 | <12 | <10 | <785 | 1540 ± 184 | <45 | <116 | <747 |

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

| Sample Site | Collection Date | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | 28-Jan-09 | 599 ± 51 | <9 | <11 | <24 | <9 | <18 | <10 | <8 | <155 | <34 |
| T81 | 10-Jan-09 | 1189 ± 96 | <10 | <11 | <24 | <11 | <23 | <12 | <11 | 752 ± 87 | <46 |

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

| Sample Site | Collection Date | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | 04-Feb-09 | 1170 ± 60 | <15 | <16 | <36 | <16 | <30 | <17 | <14 | <298 | <47 |
| T81 | 02-Feb-09 | 1765 ± 109 | <13 | <15 | <36 | <19 | <32 | <16 | 28 ± 7 | 335 ± 134 | <55 |

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 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|
| T40 | 20-Jan-09 | 1006 ± 95 | 3825 ± 221 | <26 | <18 | 54 ± 13 | <2472 | <339 | <64 |
| | 17-Feb-09 | 999 ± 65 | 3852 ± 162 | <21 | <12 | 42 ± 7 | <825 | <285 | <37 |
| | 09-Mar-09 | 1133 ± 101 | 3650 ± 215 | <27 | <21 | 47 ± 7 | <2402 | <373 | <78 |
| T41 | 20-Jan-09 | 1361 ± 79 | 5429 ± 221 | <23 | <18 | 32 ± 8 | <1913 | <295 | <59 |
| | 17-Feb-09 | 1110 ± 89 | 5234 ± 301 | <18 | <12 | 18 ± 2 | 303 ± 41 | <248 | <40 |
| | 09-Mar-09 | 879 ± 151 | 6773 ± 312 | <33 | <25 | 72 ± 11 | <3040 | <424 | <84 |
| T67 | 20-Jan-09 | 952 ± 88 | 2938 ± 141 | <20 | <13 | 51 ± 7 | <944 | <286 | <46 |
| | 17-Feb-09 | 777 ± 70 | 2192 ± 142 | <19 | <15 | <14 | <1964 | <271 | <52 |
| | 11-Mar-09 | 605 ± 35 | 2421 ± 111 | <15 | <11 | <11 | 270 ± 39 | 160 ± 35 | <41 |

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

## Second Quarter, 2009

| Sample Type | Collection Frequency | Locations Sampled | Number of Samples |
|---|---|---|---|
| 1. Direct Radiation | Quarterly | 22 | 22 |
| 2. Airborne | | | |
| 2.a. Air Iodines | Weekly | 5 | 65 |
| 2.b. Air Particulates | Weekly | 5 | 64 |
| 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 | 0 |
| 4.a.2. Fish | Semiannually | 2 | 0 |
| 4.b. Broadleaf Vegetation | Monthly | 3 | 9 |
| | | | Total: 169 |

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 and with greater than a 50% error term 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 - TLDs - (μR/hour)

| Sample Site | Deployment 10-Mar-09 Collection 15-June-09 |
|---|---|
| N-2 | 5.0 ± 0.5 |
| N-7 | 4.0 ± 0.6 |
| N-10 | 5.0 ± 0.4 |
| NNW-2 | 4.3 ± 0.4 |
| NNW-10 | 5.1 ± 0.4 |
| NW-1 | 6.0 ± 0.4 |
| NW-5 | 4.1 ± 0.4 |
| NW-10 | 7.7 ± 0.8 |
| WNW-10 | 6.2 ± 0.6 |
| W-1 | 6.4 ± 0.5 |
| W-5 | 5.0 ± 0.5 |
| W-9 | 5.2 ± 0.5 |

| Sample Site | Deployment 10-Mar-09 Collection 15-June-09 |
|---|---|
| WSW-8 | 5.3 ± 0.5 |
| SW-1 | 4.7 ± 0.3 |
| SW-8 | 5.1 ± 0.5 |
| SSW-5 | 4.6 ± 0.4 |
| SSW-10 | 4.7 ± 0.5 |
| S-5 | 4.3 ± 0.4 |
| S-10 | 5.5 ± 0.6 |
| SSE-1 | 4.6 ± 0.4 |
| SSE-10 | 5.2 ± 0.4 |
| NNE-22 | 5.2 ± 0.6 |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 08-Apr-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 14-Apr-09 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 21-Apr-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 29-Apr-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 06-May-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 12-May-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 18-May-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 26-May-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 03-Jun-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 10-Jun-09 | <0.03 | <0.02 | <0.03 | <0.02 | <0.03 |
| 17-Jun-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 24-Jun-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 29-Jun-09 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 08-Apr-09 | 0.012 ± 0.002 | 0.011 ± 0.002 | 0.012 ± 0.002 | 0.014 ± 0.002 | 0.012 ± 0.002 |
| 14-Apr-09 | 0.024 ± 0.003 | 0.020 ± 0.003 | 0.022 ± 0.003 | 0.022 ± 0.003 | 0.020 ± 0.003 |
| 21-Apr-09 | 0.011 ± 0.002 | 0.014 ± 0.002 | 0.010 ± 0.002 | 0.010 ± 0.002 | 0.017 ± 0.002 |
| 29-Apr-09 | 0.023 ± 0.002 | 0.020 ± 0.002 | 0.018 ± 0.002 | 0.017 ± 0.002 | 0.017 ± 0.002 |
| 06-May-09 | 0.014 ± 0.002 | 0.014 ± 0.002 | 0.015 ± 0.002 | 0.017 ± 0.002 | 0.012 ± 0.002 |
| 12-May-09 | 0.009 ± 0.002 | 0.006 ± 0.002 | 0.010 ± 0.002 | 0.009 ± 0.002 | 0.008 ± 0.002 |
| 18-May-09 | 0.011 ± 0.002 | 0.011 ± 0.002 | 0.008 ± 0.002 | 0.006 ± 0.002 | 0.005 ± 0.002 |
| 26-May-09 | 0.008 ± 0.002 | 0.006 ± 0.001 | 0.008 ± 0.002 | 0.006 ± 0.001 | 0.009 ± 0.002 |
| 03-Jun-09 | 0.016 ± 0.002 | 0.015 ± 0.002 | 0.009 ± 0.002 | 0.010 ± 0.002 | 0.017 ± 0.002 |
| 10-Jun-09 | 0.009 ± 0.002 | 0.011 ± 0.002 | 0.007 ± 0.002 | 0.010 ± 0.002 | 0.007 ± 0.002 |
| 17-Jun-09 | (A) | 0.017 ± 0.002 | 0.017 ± 0.002 | 0.017 ± 0.002 | 0.018 ± 0.002 |
| 24-Jun-09 | 0.014 ± 0.002 | 0.019 ± 0.002 | 0.020 ± 0.002 | 0.022 ± 0.003 | 0.018 ± 0.002 |
| 29-Jun-09 | 0.015 ± 0.003 | 0.016 ± 0.003 | 0.013 ± 0.003 | 0.011 ± 0.002 | 0.007 ± 0.002 |
| Average: | 0.014 ± 0.001 | 0.018 ± 0.001 | 0.016 ± 0.001 | 0.016 ± 0.001 | 0.012 ± 0.001 |

(A) Air particulate filter missing at time of collection; appeared to be tampered with; no data available.

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

| Sample Site | Be-7 | K-40 | Cs-134 | Cs-137 | Pb-210 |
|---|---|---|---|---|---|
| T51 | 0.0950 ± 0.0121 | <0.0295 | <0.0029 | <0.0022 | 0.0132 ± 0.0037 |
| T57 | 0.0996 ± 0.0120 | <0.0359 | <0.0030 | <0.0027 | 0.0110 ± 0.0034 |
| T58 | 0.1164 ± 0.0159 | <0.0384 | <0.0021 | <0.0021 | <0.0158 |
| T64 | 0.1154 ± 0.0082 | <0.0194 | <0.0020 | <0.0016 | 0.0121 ± 0.0023 |
| T72 | 0.1170 ± 0.0131 | <0.0371 | <0.0032 | <0.0018 | 0.0160 ± 0.0039 |

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-Apr-09 | <143 | 346 ± 23 | <4 | <3 | <7 | <4 | <10 | <6 | <4 | <4 | <4 | <8 |
| | 11-May-09 | <154 | 330 ± 14 | <1 | <1 | <3 | <2 | <3 | <2 | <2 | <1 | <2 | <3 |
| | 16-Jun-09 | <146 | 280 ± 11 | <1 | <1 | <3 | <2 | <3 | <2 | <2 | <2 | <2 | <4 |
| T67 | 14-Apr-09 | <143 | 376 ± 32 | <3 | <4 | <8 | <4 | <8 | <7 | <5 | <4 | <4 | <8 |
| | 11-May-09 | 105 ± 44 | 205 ± 18 | <3 | <3 | <6 | <4 | <8 | <5 | <4 | <4 | <4 | <6 |
| | 16-Jun-09 | <146 | 109 ± 13 | <3 | <3 | <7 | <4 | <10 | <6 | <4 | <4 | <3 | <8 |
| T81 | 13-Apr-09 | 118 ± 46 | 444 ± 37 | <4 | <4 | <8 | <4 | <8 | <7 | <6 | <4 | <3 | <5 |
| | 11-May-09 | 115 ± 45 | 418 ± 39 | <3 | <3 | <8 | <4 | <8 | <7 | <6 | <5 | <5 | <5 |
| | 15-Jun-09 | <146 | 247 ± 20 | <3 | <3 | <8 | <4 | <9 | <6 | <4 | <3 | <3 | <7 |

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

(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 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | This sample was previously collected. | | | | | | | | | | |
| T81 | This sample was previously collected. | | | | | | | | | | |

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

| Sample Site | Collection Date | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | This sample was previously collected. | | | | | | | | | | |
| T81 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| T40 | 15-Apr-09 | 1672 ± 55 | 3454 ± 107 | <9 | <10 | 25 ± 6 | <1233 | <44 | <196 | <37 |
| | 12-May-09 | 465 ± 102 | 3926 ± 207 | <21 | <24 | <29 | <1958 | <95 | <388 | <88 |
| | 16-Jun-09 | 2242 ± 75 | 3100 ± 128 | <11 | <10 | 20 ± 2 | 363 ± 40 | <18 | <233 | <34 |
| T41 | 15-Apr-09 | 1625 ± 46 | 4643 ± 161 | <6 | <6 | 19 ± 1 | 364 ± 24 | <10 | 49 ± 15 | <20 |
| | 12-May-09 | 409 ± 45 | 7210 ± 132 | <9 | <11 | 80 ± 6 | <816 | <41 | <177 | <37 |
| | 16-Jun-09 | 1607 ± 43 | 5735 ± 194 | <5 | <5 | 65 ± 2 | 274 ± 19 | <9 | <107 | <17 |
| T67 | 14-Apr-09 | 878 ± 85 | 6305 ± 270 | <18 | <20 | <20 | <2113 | <80 | 281 ± 124 | <66 |
| | 11-May-09 | 1048 ± 83 | 3397 ± 209 | <18 | <23 | <21 | <1663 | <86 | <374 | <73 |
| | 16-Jun-09 | 2206 ± 104 | 3369 ± 158 | <15 | <15 | <13 | <833 | <109 | <312 | <56 |

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

## Third Quarter, 2009

| Sample Type | Collection Frequency | Locations Sampled | Number of Samples |
|---|---|---|---|
| 1. Direct Radiation | Quarterly | 22 | 22 |
| 2. Airborne | | | |
| 2.a. Air Iodines | Weekly | 5 | 65 |
| 2.b. Air Particulates | Weekly | 5 | 65 |
| 3. Waterborne | | | |
| 3.a. Surface Water | Monthly | 3 | 9 |
| 3.b. Shoreline Sediment | Semiannually | 3 | 3 |
| 4. Ingestion | | | |
| 4.a. Fish and Invertebrates | | | |
| 4.a.1. Crustacea | Semiannually | 2 | 0 |
| 4.a.2. Fish | Semiannually | 2 | 2 |
| 4.b. Broadleaf Vegetation | Monthly | 3 | 9 |
| | | | Total: 175 |

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 - TLDs - (μR/hour)

| Sample Site | Deployment 15-Jun-09 Collection 23-Sep-09 |
|---|---|
| N-2 | 4.8 ± 0.6 |
| N-7 | 4.2 ± 0.4 |
| N-10 | 4.8 ± 0.5 |
| NNW-2 | 4.0 ± 0.4 |
| NNW-10 | 4.9 ± 0.4 |
| NW-1 | 5.9 ± 0.6 |
| NW-5 | 4.2 ± 0.4 |
| NW-10 | 7.2 ± 0.9 |
| WNW-10 | 6.1 ± 0.5 |
| W-1 | 6.4 ± 0.8 |
| W-5 | 4.8 ± 0.5 |
| W-9 | 4.4 ± 0.5 |

| Sample Site | Deployment 15-Jun-09 Collection 23-Sep-09 |
|---|---|
| WSW-8 | 4.9 ± 0.6 |
| SW-1 | 4.9 ± 0.5 |
| SW-8 | 5.1 ± 0.6 |
| SSW-5 | 4.7 ± 0.4 |
| SSW-10 | 4.6 ± 0.4 |
| S-5 | 4.2 ± 0.5 |
| S-10 | 5.2 ± 0.5 |
| SSE-1 | 4.4 ± 0.4 |
| SSE-10 | 5.5 ± 0.6 |
| NNE-22 | 5.8 ± 0.6 |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 08-Jul-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 14-Jul-09 | <0.03 | <0.02 | <0.03 | <0.02 | <0.03 |
| 21-Jul-09 | <0.02 | <0.03 | <0.02 | <0.03 | <0.02 |
| 28-Jul-09 | <0.03 | <0.02 | <0.02 | <0.03 | <0.02 |
| 04-Aug-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 10-Aug-09 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 17-Aug-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 24-Aug-09 | <0.02 | <0.02 | <0.02 | <0.01 | <0.02 |
| 01-Sep-09 | <0.02 | <0.02 | <0.02 | <0.03 | <0.02 |
| 09-Sep-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 15-Sep-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 22-Sep-09 | <0.03 | <0.02 | <0.03 | <0.02 | <0.02 |
| 29-Sep-09 | <0.03 | <0.03 | <0.02 | <0.02 | <0.03 |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 08-Jul-09 | 0.019 ± 0.002 | 0.016 ± 0.002 | 0.018 ± 0.002 | 0.014 ± 0.002 | 0.016 ± 0.002 |
| 14-Jul-09 | 0.020 ± 0.003 | 0.018 ± 0.002 | 0.021 ± 0.002 | 0.020 ± 0.002 | 0.020 ± 0.002 |
| 21-Jul-09 | 0.017 ± 0.002 | 0.014 ± 0.002 | 0.017 ± 0.002 | 0.016 ± 0.002 | 0.017 ± 0.002 |
| 28-Jul-09 | 0.009 ± 0.002 | 0.011 ± 0.002 | 0.008 ± 0.002 | 0.013 ± 0.002 | 0.011 ± 0.002 |
| 04-Aug-09 | 0.014 ± 0.002 | 0.016 ± 0.002 | 0.019 ± 0.002 | 0.015 ± 0.002 | 0.016 ± 0.002 |
| 10-Aug-09 | 0.018 ± 0.003 | 0.022 ± 0.003 | 0.020 ± 0.003 | 0.015 ± 0.002 | 0.017 ± 0.002 |
| 17-Aug-09 | 0.017 ± 0.002 | 0.021 ± 0.002 | 0.014 ± 0.002 | 0.016 ± 0.002 | 0.018 ± 0.002 |
| 24-Aug-09 | 0.017 ± 0.002 | 0.012 ± 0.002 | 0.011 ± 0.002 | 0.014 ± 0.002 | 0.013 ± 0.002 |
| 01-Sep-09 | 0.015 ± 0.002 | 0.012 ± 0.002 | 0.013 ± 0.002 | 0.016 ± 0.002 | 0.013 ± 0.002 |
| 09-Sep-09 | 0.009 ± 0.002 | 0.005 ± 0.001 | 0.009 ± 0.002 | 0.008 ± 0.002 | 0.009 ± 0.002 |
| 15-Sep-09 | 0.008 ± 0.002 | 0.008 ± 0.002 | 0.010 ± 0.002 | 0.007 ± 0.002 | 0.006 ± 0.002 |
| 22-Sep-09 | 0.013 ± 0.002 | 0.009 ± 0.002 | 0.011 ± 0.002 | 0.010 ± 0.002 | 0.011 ± 0.002 |
| 29-Sep-09 | 0.007 ± 0.002 | <0.008 | 0.007 ± 0.002 | 0.005 ± 0.002 | 0.007 ± 0.002 |
| Average: | 0.014 ± 0.001 | <0.013 | 0.014 ± 0.001 | 0.013 ± 0.001 | 0.013 ± 0.001 |

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

| Sample Site | Be-7 | K-40 | Cs-134 | Cs-137 | Pb-210 |
|---|---|---|---|---|---|
| T51 | 0.1012 ± 0.0120 | <0.0247 | <0.0032 | <0.0027 | 0.0154 ± 0.0038 |
| T57 | 0.0942 ± 0.0116 | <0.0299 | <0.0032 | <0.0023 | 0.0154 ± 0.0039 |
| T58 | 0.0965 ± 0.0167 | <0.0282 | <0.0025 | <0.0019 | <0.0180 |
| T64 | 0.0942 ± 0.0116 | <0.0299 | <0.0032 | <0.0023 | 0.0154 ± 0.0039 |
| T72 | 0.1141 ± 0.0133 | <0.0290 | <0.0016 | <0.0012 | <0.0369 |

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 | 15-Jul-09 | <153 | 262 ± 11 | <1 | <1 | <3 | <2 | <3 | <2 | <2 | <1 | <1 | <3 |
| | 11-Aug-09 | <159 | 291 ± 22 | <4 | <4 | <7 | <4 | <8 | <5 | <4 | <3 | <4 | <7 |
| | 23-Sep-09 | <157 | 282 ± 26 | <4 | <4 | <9 | <4 | <7 | <6 | <14 | <4 | <3 | <7 |
| T67 | 15-Jul-09 | <153 | 107 ± 24 | <3 | <4 | <7 | <4 | <8 | <6 | <5 | <4 | <4 | <7 |
| | 11-Aug-09 | <159 | 192 ± 26 | <4 | <4 | <7 | <4 | <7 | <6 | <5 | <5 | <4 | <7 |
| | 22-Sep-09 | <157 | 187 ± 29 | <4 | <3 | <7 | <4 | <9 | <6 | <5 | <5 | <5 | <14 |
| T81 | 14-Jul-09 | 149 ± 49 | 265 ± 20 | <3 | <3 | <7 | <3 | <8 | <6 | <4 | <4 | <3 | <6 |
| | 11-Aug-09 | 405 ± 59 | 280 ± 21 | <3 | <3 | <7 | <4 | <8 | <6 | <4 | <4 | <3 | <6 |
| | 23-Sep-09 | <157 | 326 ± 34 | <3 | <3 | <7 | <4 | <8 | <6 | <5 | <5 | <4 | <13 |

(A) - These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLDs.
(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-238 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T42 | 15-Jul-09 | <76 | 251 ± 39 | <9 | <9 | <9 | <8 | <609 | 1088 ± 124 | <35 | 741 ± 86 |
| T67 | 15-Jul-09 | <80 | 152 ± 22 | <10 | <9 | <9 | 12 ± 2 | 301 ± 74 | 749 ± 73 | <35 | 293 ± 19 |
| T81 | 14-Jul-09 | 250 ± 44 | 259 ± 46 | <8 | <10 | <10 | <9 | <676 | 1546 ± 194 | <33 | 871 ± 105 |

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

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

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

| Sample Site | Collection Date | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | 24-Sep-09 | 2314 ± 158 | <24 | <22 | <52 | <27 | <55 | <29 | <26 | <501 | <79 |
| T81 | 24-Sep-09 | 2783 ± 92 | <10 | <9 | <20 | <10 | <22 | <11 | 4 ± 1 | 99 ± 25 | <33 |

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

| Sample Site | Collection Date | Be-7 | K-40 | I-131 | Cs-134 | Cs-137 | Pb-210 | Pb-212 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|
| T40 | 16-Jul-09 | 1681 ± 67 | 3124 ± 140 | <13 | <13 | 17 ± 3 | 388 ± 49 | <24 | <283 | <44 |
| | 12-Aug-09 | 1602 ± 62 | 2826 ± 125 | <11 | <11 | 17 ± 2 | 345 ± 42 | <19 | <255 | <38 |
| | 23-Sep-09 | 3266 ± 130 | 4389 ± 214 | <17 | <19 | 164 ± 14 | <1986 | <95 | <346 | <60 |
| T41 | 16-Jul-09 | 2257 ± 98 | 7342 ± 227 | <14 | <14 | 40 ± 7 | <896 | <101 | <308 | <47 |
| | 12-Aug-09 | 1518 ± 59 | 3838 ± 152 | <12 | <12 | 36 ± 3 | 199 ± 36 | <19 | <250 | <37 |
| | 23-Sep-09 | 3020 ± 140 | 5497 ± 229 | <17 | <17 | 47 ± 10 | <2032 | <86 | <316 | <66 |
| T67 | 15-Jul-09 | 1709 ± 61 | 4736 ± 172 | <10 | <10 | <9 | 345 ± 40 | <17 | <215 | <33 |
| | 11-Aug-09 | 1728 ± 94 | 4899 ± 175 | <14 | <13 | <12 | <778 | <91 | <280 | <46 |
| | 22-Sep-09 | 1622 ± 99 | 4049 ± 199 | <16 | <13 | <15 | <1806 | <81 | <324 | <58 |

# TURKEY POINT SITE

## Offsite Dose Calculation Manual Sampling

## Fourth Quarter, 2009

| Sample Type | Collection Frequency | Locations Sampled | Number of Samples |
|---|---|---|---|
| 1. Direct Radiation | Quarterly | 22 | 22 |
| 2. Airborne | | | |
| 2.a. Air Iodines | Weekly | 5 | 65 |
| 2.b. Air Particulates | Weekly | 5 | 65 |
| 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 | 0 |
| 4.a.2. Fish | Semiannually | 2 | 0 |
| 4.b. Broadleaf Vegetation | Monthly | 3 | 9 |
| | | | Total: 170 |

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 - TLDs - (μR/hour)

| Sample Site | Deployment 23-Sep-09 Collection 09-Dec-09 |
|---|---|
| N-2 | 4.9 ± 0.4 |
| N-7 | 4.0 ± 0.5 |
| N-10 | 4.7 ± 0.5 |
| NNW-2 | 4.0 ± 0.5 |
| NNW-10 | 5.3 ± 0.7 |
| NW-1 | 5.9 ± 0.6 |
| NW-5 | 4.3 ± 0.5 |
| NW-10 | 6.9 ± 0.8 |
| WNW-10 | 6.2 ± 0.5 |
| W-1 | 6.6 ± 0.5 |
| W-5 | 5.3 ± 0.6 |
| W-9 | 5.0 ± 0.6 |

| Sample Site | Deployment 23-Sep-09 Collection 09-Dec-09 |
|---|---|
| WSW-8 | 4.7 ± 0.4 |
| SW-1 | 4.7 ± 0.5 |
| SW-8 | 5.5 ± 0.6 |
| SSW-5 | 4.8 ± 0.5 |
| SSW-10 | 4.9 ± 0.5 |
| S-5 | 4.5 ± 0.5 |
| S-10 | 5.5 ± 0.6 |
| SSE-1 | 4.6 ± 0.5 |
| SSE-10 | 5.4 ± 0.6 |
| NNE-22 | 5.6 ± 0.6 |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 06-Oct-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 13-Oct-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 19-Oct-09 | <0.03 | <0.03 | <0.03 | <0.02 | <0.03 |
| 27-Oct-09 | <0.02 | <0.02 | <0.03 | <0.03 | <0.02 |
| 04-Nov-09 | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| 10-Nov-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 17-Nov-09 | <0.01 | <0.01 | <0.02 | <0.01 | <0.02 |
| 25-Nov-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 01-Dec-09 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 08-Dec-09 | <0.01 | <0.01 | <0.02 | <0.01 | <0.01 |
| 15-Dec-09 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 22-Dec-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.03 |
| 29-Dec-09 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |

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

| Collection Date | T51 | T57 | T58 | T64 | T72 |
|---|---|---|---|---|---|
| 06-Oct-09 | 0.011 ± 0.002 | 0.011 ± 0.002 | 0.016 ± 0.002 | 0.016 ± 0.002 | 0.013 ± 0.002 |
| 13-Oct-09 | 0.012 ± 0.002 | 0.015 ± 0.002 | 0.013 ± 0.002 | 0.008 ± 0.002 | 0.012 ± 0.002 |
| 19-Oct-09 | 0.005 ± 0.002 | 0.013 ± 0.002 | 0.012 ± 0.002 | 0.016 ± 0.002 | 0.010 ± 0.002 |
| 27-Oct-09 | 0.010 ± 0.002 | 0.012 ± 0.002 | 0.007 ± 0.002 | 0.010 ± 0.002 | 0.008 ± 0.002 |
| 04-Nov-09 | 0.012 ± 0.002 | 0.009 ± 0.002 | 0.009 ± 0.002 | 0.007 ± 0.002 | 0.009 ± 0.002 |
| 10-Nov-09 | 0.016 ± 0.002 | 0.016 ± 0.002 | 0.019 ± 0.003 | 0.017 ± 0.002 | 0.016 ± 0.002 |
| 17-Nov-09 | 0.011 ± 0.002 | 0.006 ± 0.002 | 0.006 ± 0.002 | 0.011 ± 0.002 | 0.008 ± 0.002 |
| 25-Nov-09 | 0.008 ± 0.002 | 0.009 ± 0.002 | 0.011 ± 0.002 | 0.008 ± 0.002 | 0.010 ± 0.002 |
| 01-Dec-09 | 0.017 ± 0.002 | 0.017 ± 0.002 | 0.017 ± 0.002 | 0.019 ± 0.002 | 0.020 ± 0.002 |
| 08-Dec-09 | 0.014 ± 0.002 | 0.014 ± 0.002 | 0.012 ± 0.002 | 0.018 ± 0.002 | 0.017 ± 0.002 |
| 15-Dec-09 | 0.008 ± 0.002 | 0.006 ± 0.002 | 0.005 ± 0.002 | 0.011 ± 0.002 | 0.005 ± 0.002 |
| 22-Dec-09 | 0.013 ± 0.002 | 0.008 ± 0.002 | 0.013 ± 0.002 | 0.012 ± 0.002 | 0.012 ± 0.002 |
| 29-Dec-09 | 0.018 ± 0.002 | 0.018 ± 0.002 | 0.020 ± 0.002 | 0.024 ± 0.002 | 0.020 ± 0.002 |
| Average: | 0.012 ± 0.001 | 0.012 ± 0.001 | 0.012 ± 0.001 | 0.014 ± 0.001 | 0.012 ± 0.001 |

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

| Sample Site | Be-7 | K-40 | Cs-134 | Cs-137 | Pb-210 |
|---|---|---|---|---|---|
| T51 | 0.1390 ± 0.0046 | <0.0083 | <0.0005 | <0.0004 | 0.0352 ± 0.0051 |
| T57 | 0.1456 ± 0.0128 | <0.0212 | <0.0018 | <0.0014 | <0.0486 |
| T58 | 0.1113 ± 0.0072 | <0.0180 | <0.0017 | <0.0015 | 0.0123 ± 0.0022 |
| T64 | 0.1406 ± 0.0083 | <0.0147 | <0.0010 | <0.0007 | <0.0273 |
| T72 | 0.1414 ± 0.0111 | <0.0180 | <0.0014 | <0.0010 | 0.0182 ± 0.0035 |

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

| Sample Site | Collection Date | H-3 | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Zr-95 Nb-95 (A) | I-131 | Cs-134 | Cs-137 | Ba-140 La-140 (B) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T42 | 27-Oct-09 | 122 ± 49 | 261 ± 10 | <1 | <1 | <3 | <1 | <3 | <2 | <2 | <1 | <1 | <5 |
| | 16-Nov-09 | <144 | 245 ± 19 | <3 | <3 | <8 | <4 | <9 | <5 | <4 | <4 | <4 | <13 |
| | 10-Dec-09 | <137 | 253 ± 32 | <3 | <4 | <8 | <5 | <8 | <6 | <4 | <5 | <4 | <14 |
| T67 | 19-Oct-09 | <150 | 287 ± 29 | <4 | <3 | <7 | <5 | <8 | <7 | <6 | <4 | <4 | <15 |
| | 16-Nov-09 | <144 | 271 ± 37 | <4 | <4 | <8 | <5 | <7 | <7 | <6 | <4 | <5 | <14 |
| | 09-Dec-09 | 92 ± 26 | 112 ± 34 | <5 | <6 | <11 | <5 | <14 | <10 | <6 | <7 | <6 | <12 |
| T81 | 19-Oct-09 | 134 ± 49 | 265 ± 21 | <4 | <3 | <8 | <4 | <8 | <6 | <5 | <3 | <3 | <6 |
| | 16-Nov-09 | <144 | 239 ± 19 | <4 | <3 | <7 | <4 | <8 | <6 | <4 | <4 | <3 | <14 |
| | 09-Dec-09 | 112 ± 26 | 250 ± 20 | <3 | <3 | <7 | <4 | <9 | <6 | <4 | <4 | <3 | <13 |

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

(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: |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T42 | This sample was previously collected. | | | | | | | | | | |
| T67 | This sample was previously collected. | | | | | | | | | | |
| T81 | This sample was previously collected. | | | | | | | | | | |

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

| Sample Site | Collection Date | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | There was no sample available this quarter. | | | | | | | | | | |
| T81 | There was no sample available this quarter. | | | | | | | | | | |

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

| Sample Site | Collection Date | K-40 | Mn-54 | Co-58 | Fe-59 | Co-60 | Zn-65 | Cs-134 | Cs-137 | Ra-226 | Ra-228 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T67 | This sample was previously collected. | | | | | | | | | | |
| T81 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|
| T40 | 21-Oct-09 | 1407 ± 101 | 3512 ± 211 | <16 | <21 | 80 ± 10 | <1701 | <93 | 493 ± 222 | <62 |
| | 17-Nov-09 | 2121 ± 109 | 3850 ± 216 | <14 | <18 | 32 ± 7 | <1934 | <86 | <347 | <71 |
| | 09-Dec-09 | 3050 ± 124 | 3790 ± 162 | <14 | <12 | 32 ± 5 | <784 | <104 | <353 | <55 |
| T41 | 21-Oct-09 | 2089 ± 134 | 5992 ± 276 | <22 | <21 | 38 ± 10 | <2060 | <111 | 740 ± 209 | <81 |
| | 17-Nov-09 | 1738 ± 108 | 4985 ± 245 | <18 | <18 | 59 ± 8 | <1822 | <88 | <304 | <69 |
| | 08-Dec-09 | 2876 ± 126 | 6508 ± 267 | <21 | <21 | 90 ± 12 | <1954 | <94 | <375 | <81 |
| T67 | 19-Oct-09 | 1518 ± 105 | 6299 ± 284 | <23 | <25 | <21 | <1878 | <87 | <358 | <81 |
| | 16-Nov-09 | 1016 ± 81 | 3141 ± 196 | <16 | <13 | <15 | <1801 | <84 | <329 | <66 |
| | 09-Dec-09 | 1450 ± 109 | 2822 ± 194 | <17 | <18 | <16 | <1475 | <86 | 516 ± 115 | <79 |

# ATTACHMENT C

RESULTS FROM THE 2009

INTERLABORATORY COMPARISON PROGRAM

CONDUCTED BY

DEPARTMENT OF ENERGY

# 2009
# ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
# TURKEY POINT PLANT – UNITS 3 & 4

DOE-MAPEP 20 RESULTS

| Radionuclide | Result | Ref. Value | Flag (Evaluation) | Acceptance Range |
|---|---|---|---|---|
| **Matrix:** RdF Air Filter Bq/filter | | | | |
| MN54 | 2.22 | 2.2709 | A | 1.5896 – 2.9522 |
| CO57 | 1.15 | 1.30 | A | 0.91 – 1.69 |
| CO60 | 1.14 | 1.22 | A | 0.85 – 1.59 |
| ZN65 | 1.34 | 1.36 | A | 0.95 – 1.77 |
| CS134 | 2.88 | 2.93 | A | 2.05 – 3.81 |
| CS137 | 1.45 | 1.52 | A | 1.06 – 1.98 |
| **Matrix:** GrF Air Filter Bq/filter | | | | |
| Gross Beta | 1.54 | 1.27 | A | 0.64 – 1.91 |
| **Matrix:** MaS Soil Bq/kg | | | | |
| K40 | 652.74 | 570 | A | 399 - 741 |
| MN54 | 347.54 | 307 | A | 215 - 399 |
| CO57 | 0.05 | | A | Blank, no activity |
| CO60 | 4.48 | 4.113 | A | Performance assay |
| ZN65 | 278.17 | 242 | A | 169 - 315 |
| CS134 | 452.51 | 467 | A | 327 - 607 |
| CS137 | 660.6 | 605 | A | 424 – 787 |
| **Matrix:** MaW Water Bq/L | | | | |
| H3 | 344.72 | 330.9 | A | 231.6 – 430.2 |
| MN54 | 15.43 | 14.66 | A | 10.06 – 19.06 |
| CO57 | 18.04 | 18.9 | A | 13.2 – 24.6 |
| CO60 | 17.13 | 17.21 | A | 12.05 – 22.37 |
| NI63 | 44.57 | 53.50 | A | 37.45 – 69.55 |
| ZN65 | 14.7 | 13.6 | A | 9.5 – 17.7 |
| CS134 | 21.18 | 22.5 | A | 15.8 – 29.3 |
| CS137 | -0.14 | | A | Cs137 interference from Cs-134 test |
| **Matrix:** RdV Vegetation, Bq/sample : | | | | |
| MN54 | 2.19 | 2.30 | A | 1.61 – 2.99 |
| CO57 | 2.27 | 2.36 | A | 1.65 – 3.07 |
| CO60 | 0.08 | - - - | A | A lower delectability eval. |
| ZN65 | 1.33 | 1.354 | A | 0.948 – 1.760 |
| CS134 | 3.25 | 3.40 | A | 2.38 – 4.42 |
| CS137 | 0.9 | 0.93 | A | 0.65 – 1.21 |

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

# 2009
# ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
# TURKEY POINT PLANT – UNITS 3 & 4

DOE-MAPEP21 RESULTS

| Radionuclide | Result | Ref. Value | Flag (Evaluation) | Acceptance Range |
|---|---|---|---|---|
| **Matrix:** RdF Air Filter Bq/filter | | | | |
| MN54 | 6.31 | 5.49 | A | 3.84 – 7.14 |
| CO57 | 6.12 | 6.48 | A | 4.54 – 8.42 |
| CO60 | 1.05 | 1.03 | A | 0.72 – 1.34 |
| ZN65 | 4.69 | 3.93 | A | 2.75 – 5.11 |
| CS134 | - 0.06 | | A | Blank, no activity |
| CS137 | 1.55 | 1.40 | A | 0.98 – 1.82 |
| **Matrix:** GrF Air Filter Bq/filter | | | | |
| Gross Beta | 1.484 | 1.32 | A | 0.66 – 1.98 |
| **Matrix:** MaS Soil Bq/kg | | | | |
| K40 | 403.97 | 375 | A | 263 - 488 |
| MN54 | 873.6 | 796 | A | 557 - 1035 |
| CO57 | 632.79 | 586 | A | 410 - 762 |
| CO60 | 343.70 | 327 | A | 229 - 425 |
| ZN65 | 1354.41 | 1178 | A | 825 - 1531 |
| CS134 | 2.32 | | A | Blank, no activity |
| CS137 | 712.12 | 669 | A | 468 - 870 |
| **Matrix:** MaW Water Bq/L | | | | |
| H3 | 508.91 | 634.1 | A | 443.9 – 824.3 |
| MN54 | 0.066 | | A | Blank, no activity |
| CO57 | 34.53 | 36.6 | A | 25.6 – 47.6 |
| CO60 | 15.28 | 15.4 | A | 10.8 – 20.0 |
| ZN65 | 29.79 | 26.9 | A | 18.8 – 35.0 |
| SR90 | 14.2 | 12.99 | A | 9.09 – 16.89 |
| CS134 | 29.44 | 32.2 | A | 22.5 – 41.9 |
| CS137 | 41.88 | 41.2 | A | 28.8 – 53.6 |
| **Matrix:** RdV Vegetation, Bq/sample : | | | | |
| MN54 | 7.10 | 7.9 | A | 5.5 – 10.3 |
| CO57 | 7.39 | 8.0 | A | 5.6 – 10.4 |
| CO60 | 2.33 | 2.57 | A | 1.80 – 3.34 |
| ZN65 | 0.14 | | A | Blank, no activity |
| CS134 | -0.13 | | A | Blank, no activity |
| CS137 | 2.09 | 2.43 | A | 1.7 – 3.16 |

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

# ATTACHMENT D

Industry Initiative

Ground Water Protection Program

Tritium in Ground Water Monitoring

2009

# 2009
# ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
# TURKEY POINT PLANT – UNITS 3 & 4

A. Description of Program:

The Ground Water Protection Program, Industry Initiative, is described in the FPL EV-AA-100 series of procedures; site wells and sampling is described in site procedures 0-NCAP-103 and 0-NCSP-004.

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

Sample assay is performed by a private contractor. This contractor provides other radiological assay for the effluents & rad-waste program; this affords QA for the Industry Initiative monitoring program.

B. Discussion

The Turkey Point Nuclear site is surrounded on three sides by the closed cooling canal system. This canal system, in addition to being the source of tertiary cooling, is the body of water receiving permitted liquid radiological waste; the canal system tritium level averages about 4,000 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.

38 wells in 22 locations were involved in 2009 monitoring program; some locations have multiple (two or three) depths.

Samples are analyzed for Tritium & Gamma emitters.

150 'routine' samples were collected; 14 non-routine samples were collected.

Six of the 14 non-routine samples were follow-ups to suspected cross-contamination or sample mislabeling, the results, from one cluster well with three depths, had atypically high results: two sets of follow-up sample were collected & analyzed. The results of the re-sampling were more in line with expectations.

The remaining eight non-routine samples, two from four wells, were collected when leakage from the U4 Spent Fuel Pool (SFP) Transfer Canal in to the Transfer Canal Liner was noted. The wells are down gradient from the SFP. No abnormal levels of tritium, or other fission products, were detected. The increased sample frequency was secured when the transfer canal was drained.

C. Results

Tritium was detected in those locations reasonably affected by the cooling canal.
Range of results: 360 to 4360 pCi/L (77 of 162 samples). For reference, cooling canal varies Tritium values vary from 4,000 to 5,000 pCi/L.

Tabular results follow:

C. Results, continued

## Turkey Point 2009 Well Sampling Results, pCi/L

Note: -- denotes less than detectable, Typical MDAs K-40: 90 pCi/L Cs-137: 7 pCi/L

| Well number | First Quarter 2009 | | | Second Quarter 2009 | | | Third Quarter 2009 | | | Fourth Quarter 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 | 710 | -- | 15.8 | 630 | -- | -- | 600 | -- | 11.7 | <350 | -- | 15.3 |
| CD-1 | 830 | 176 | -- | 760 | -- | -- | 550 | -- | -- | <350 | 94 | -- |
| P-94-2 | 770 | 118 | -- | 740 | -- | -- | 760 | -- | -- | <350 | 262 | -- |
| P-94-4 | 440 | -- | -- | 760 | -- | 6.4 | <360 | -- | -- | 820 | -- | -- |
| 11/24/09 liner leak | | | | | | | | | | 1100 | -- | -- |
| 12/15/09 liner leak | | | | | | | | | | < 240 | -- | 11.8 |
| STP-1 | 560 | -- | -- | 440 | -- | -- | <330 | -- | -- | <350 | 71 | -- |
| L-3 top | <350 | -- | -- | <350 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| L-3 bottom | 4690 | 539 | -- | 4500 | 558 | -- | 4250 | 574 | -- | 4330 | 522 | -- |
| L-5 top | <360 | -- | -- | <350 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| L-5 bottom | 3430 | 472 | -- | 3480 | 472 | -- | 3330 | 492 | -- | 3510 | 488 | -- |
| G-21 top | <360 | -- | -- | <350 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| G-21 bottom | <360 | -- | -- | <350 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| G-28 top | <360 | -- | -- | <350 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| G-28 bottom | 370 | 149 | -- | 460 | 132 | -- | <330 | 107 | -- | <350 | 132 | -- |
| G-35 Top | | | | | Well added 3rd Q | | <360 | -- | -- | <350 | -- | -- |
| G-35 Bottom | | | | | Well added 3rd Q | | <360 | -- | -- | <350 | 76 | -- |
| PTN-MW-1s | <350 | -- | -- | <340 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| PTN-MW-1i | 440 | 304 | -- | <340 | 289 | -- | <330 | 280 | -- | <350 | 291 | -- |
| PTN-MW-1d | 1960 | 433 | -- | 1820 | 456 | -- | 1200 | 318 | -- | 1690 | 411 | -- |
| PTN-MW-2s | <350 | -- | -- | <350 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| PTN-MW-3s | <360 | -- | -- | <340 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| PTN-MW-4s | <360 | -- | -- | 440 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| PTN-MW-4i | 3160 | 436 | -- | 3060 | 375 | -- | 3300 | 347 | -- | 3560 | 550 | -- |
| PTN-MW-4d | 3620 | 542 | -- | 3880 | 493 | -- | 3870 | 543 | -- | 4150 | 566 | -- |

C. Results (continued)

## Turkey Point 2009 Well Sampling Results, pCi/L

Note: -- denotes less than detectable, Typical MDAs K-40: 90 pCi/L Cs-137: 7 pCi/L

| Well number | First Quarter 2009 | | | Second Quarter 2009 | | | Third Quarter 2009 | | | Fourth Quarter 2009 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | H-3 | K-40 | Cs-137 | H-3 | K-40 | Cs-137 | H-3 | K-40 | Cs-137 | H-3 | K-40 | Cs-137 |
| PTN-MW-5s | <370 | 152 | -- | <350 | 119 | -- | <330 | 201 | -- | <350 | 338 | -- |
| PTN-MW-5i | <360 | 290 | -- | 380 | 431 | -- | <330 | 381 | -- | 980 | 388 | -- |
| PTN-MW-5d | 2450 | 329 | -- | 3010 | 530 | -- | 3050 | 599 | -- | 2760 | 602 | -- |
| PTN-MW-6s | <360 | -- | -- | <330 | * | -- | <330 | -- | -- | <350 | -- | -- |
| PTN-MW-6d | 640 | 316 | -- | 630 | 280 | -- | 1010 | 437 | -- | 1120 | 374 | -- |
| PTN-MW-7s | <360 | -- | -- | 1370 | -- | -- | 380 | -- | -- | 450 | -- | -- |
| 6/18/09 resample | | | | <350 | -- | -- | | | | | | |
| 6/30/09 resample | | | | 550 | -- | -- | | | | | | |
| PTN-MW-7i | 800 | 131 | -- | 400 | 247 | -- | 1250 | 172 | -- | <350 | 257 | -- |
| 6/18/09 resample | | | | 1080 | 260 | -- | | | | | | |
| 6/30/09 resample | | | | 1620 | -- | -- | | | | | | |
| PTN-MW-7d | 930 | 419 | -- | <330 | -- | -- | 2180 | 414 | -- | 1900 | 406 | -- |
| 6/18/09 resample | | | | 2120 | 374 | -- | | | | | | |
| 6/30/09 resample | | | | 1900 | -- | -- | | | | | | |
| PTN-MW-8s | <360 | -- | -- | <340 | -- | -- | <360 | -- | -- | <350 | -- | -- |
| 11/24/09 liner leak | | | | | | | | | | 560 | -- | -- |
| 12/15/09 liner leak | | | | | | | | | | 765 | -- | -- |
| PTN-MW-9s | Could not access well | | | 780 | -- | -- | <360 | -- | 2.63 | <350 | -- | -- |
| 11/24/09 liner leak | | | | | | | | | | 490 | -- | -- |
| 12/15/09 liner leak | | | | | | | | | | 541 | -- | -- |
| PTN-MW-10s | <360 | 80 | 7.5 | <330 | -- | -- | <330 | -- | -- | <350 | -- | -- |
| PTN-MW-10i | 1820 | 256 | -- | 1630 | 281 | -- | 1660 | 249 | -- | 1390 | 245 | -- |
| PTN-MW-10d | 1720 | 308 | -- | 2330 | 405 | -- | 3150 | 463 | -- | 3230 | 382 | -- |
| PTN-MW-11s | <360 | -- | -- | 580 | -- | -- | <360 | -- | -- | <350 | 64 | -- |
| 11/24/09 liner leak | | | | | | | | | | 560 | -- | -- |
| 12/15/09 liner leak | | | | | | | | | | 314 | -- | -- |
| PTN-MW-12s | <360 | -- | -- | 360 | -- | -- | <330 | -- | -- | 560 | -- | -- |

Description of Well locations follows:

D. List of wells and their locations

| Well Name | **Location** |
|---|---|
| PTN-MW-1s<br>PTN-MW-1i<br>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<br>PTN-MW-4i<br>PTN-MW-4d | SW corner of parking lot South of Training Bldg |
| PTN-MW-5s<br>PTN-MW-5i<br>PTN-MW-5d | SW of CRF, by canal |
| PTN-MW-6s<br>PTN-MW-6d | NE of site in the berm for fossil oil tanks |
| PTN-MW-7s<br>PTN-MW-7i<br>PTN-MW-7d | NE of RCA, by Neutralization Tank |
| PTN-MW-8s | Near U3 RWST |
| PTN-MW-9s | Near U4 RWST |
| PTN-MW-10s<br>PTN-MW-10i<br>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 |
| L-3 (1) | On Levee 31 dike |
| L-5 (1) | On Levee 31 dike |
| G-21 (1) | On 137th Avenue |
| G-28 (1) | On 137th Avenue |
| G-35 | Card Sound Road |

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

Maps depicting the well locations and the back up well locations follow:

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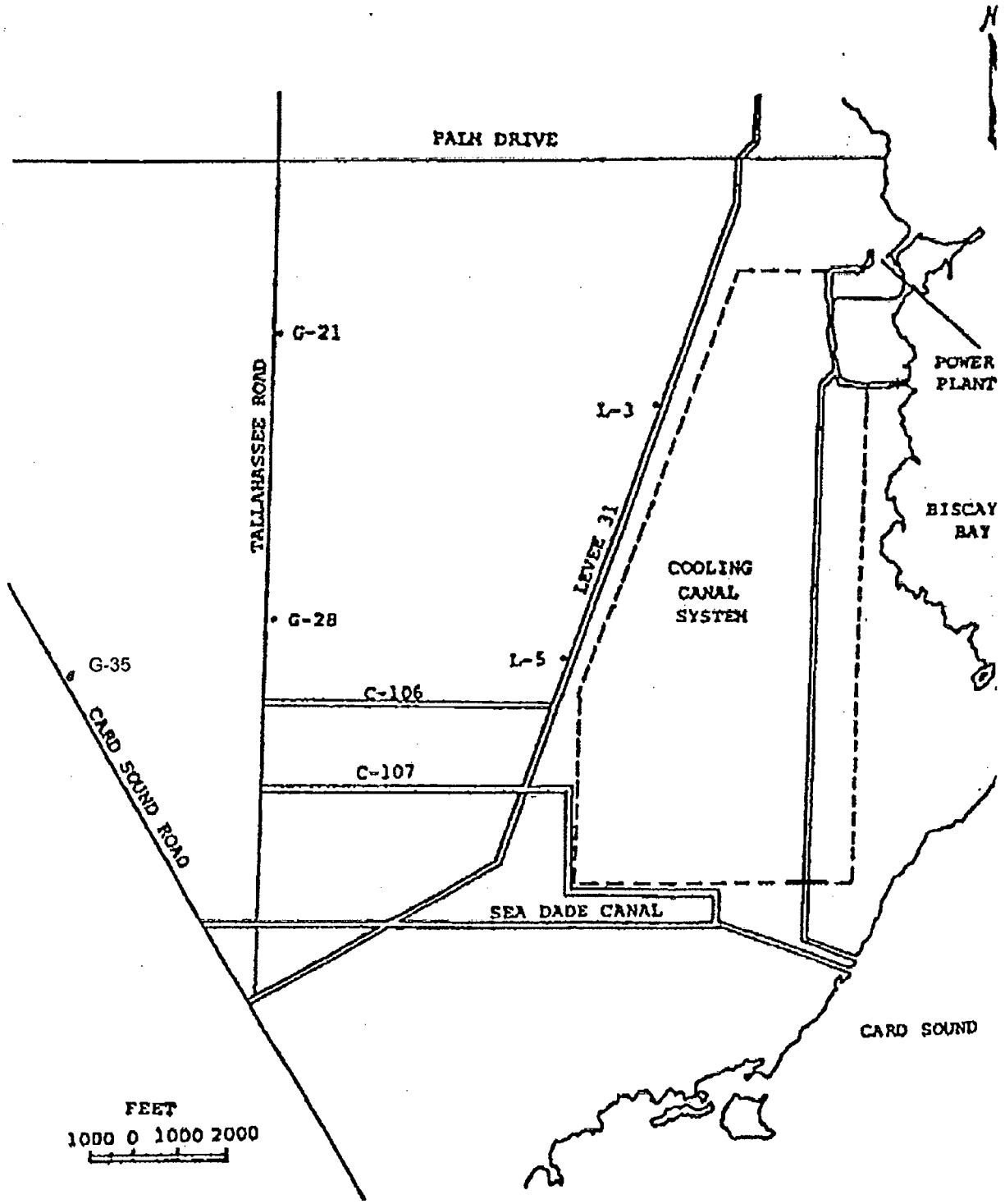
Offsite H3 Monitoring Wells



# 2009
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# TURKEY POINT PLANT – UNITS 3 & 4
Onsite H3 Monitoring and Back Up Wells

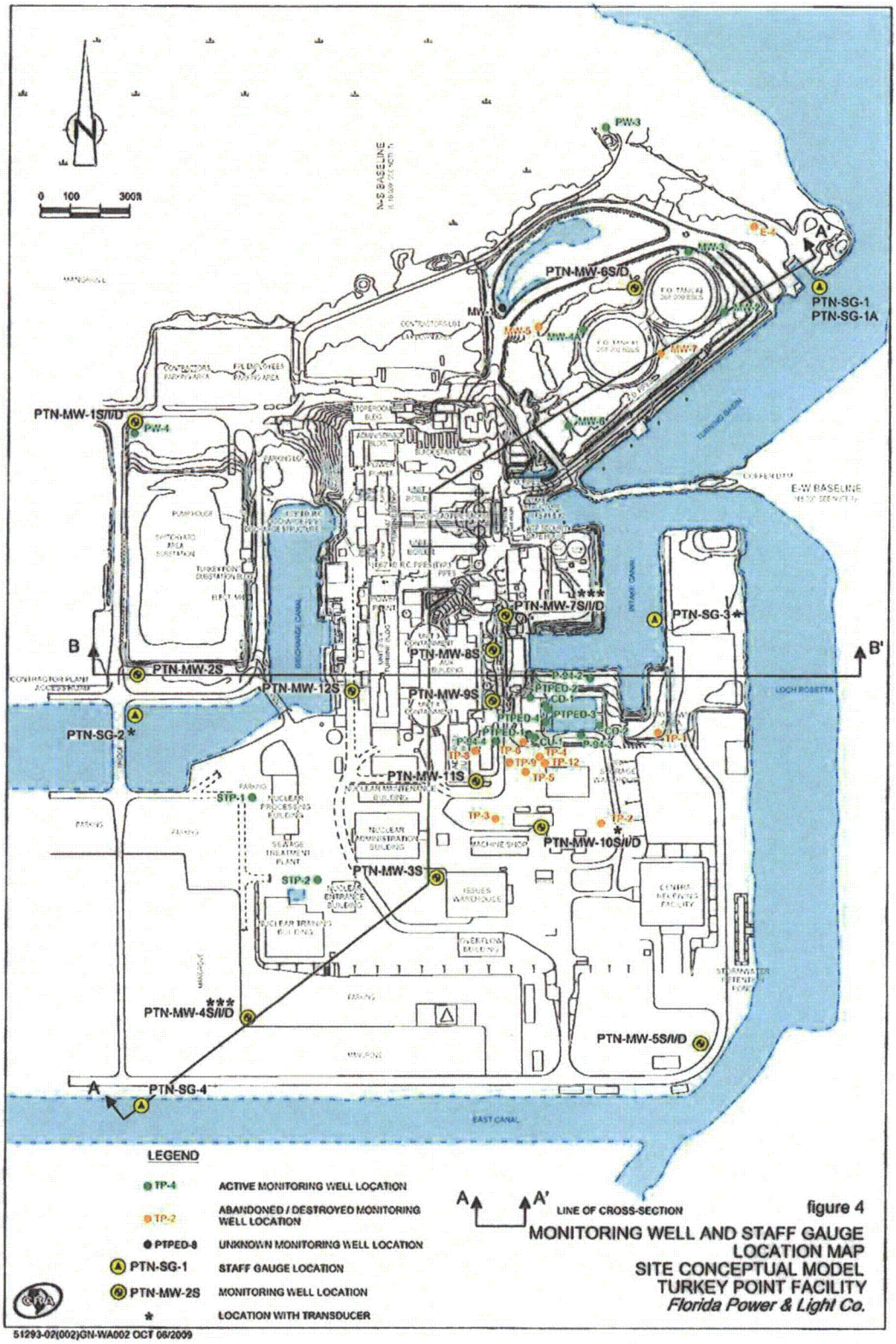


figure 4
MONITORING WELL AND STAFF GAUGE LOCATION MAP
SITE CONCEPTUAL MODEL
TURKEY POINT FACILITY
*Florida Power & Light Co.*

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