

# CATEGORY 1

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 RECIP. NAME RECIPIENT AFFILIATION *See Envrmtl Rpt.*

SUBJECT: 1995 Annual Radiological Environmental Operating Rept for  
 TPS units 3 & 4.

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L-96-094  
10 CFR §50.36b

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

Gentlemen:

Re: Turkey Point Units 3 and 4  
Docket Nos. 50-250 and 50-251  
1995 Annual Radiological  
Environmental Operating Report

Attached is the 1995 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, please contact us.

Very truly yours,

R. J. Hovey  
Vice President  
Turkey Point Plant

JAH

Attachment

cc: S. D. Ebnetter, Regional Administrator, Region II, USNRC  
T. P. Johnson, Senior Resident Inspector, USNRC,  
Turkey Point Plant

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1995

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 DHRS

Prepared by: *R. G. B...*

Reviewed by: *J. L. Donck*

9604260191

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

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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, 1995 to December 31, 1995.

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

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I. INTRODUCTION

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

II. RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

A. Purpose

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

B. Program Description

The Radiological Environmental Monitoring Program (REMP) for the Turkey Point Plant is conducted pursuant to Technical Specifications 3/4.12 of Turkey Point Unit 3 & 4 Technical Specifications.

1. Sample Locations, Types and Frequencies:

- a. Direct radiation gamma exposure rate is monitored continuously at 21 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.





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- 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.

2. Analytical Responsibility:

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

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



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D. Land Use Census

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

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.

E. Interlaboratory Comparison Program

The State of Florida HRS Environmental Radiation Control Laboratory participates in the Environmental Radioactivity Laboratory Intercomparison Studies Program conducted by the Environmental Protection Agency. Results from the Interlaboratory Comparison Program are provided in Attachment C.

III. DISCUSSION AND INTERPRETATION OF RESULTS

A. Reporting of Results

The Annual Radiological Environmental Operating Report contains the summaries, interpretations and information required by the Turkey Point Units 3 & 4 Technical Specifications. Table 1 provides a summary of the measurements made for the nuclides required by Technical Specifications, Table 3.12-2, 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.

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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 show 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 preoperational surveillance program. Direct radiation monitoring results are summarized in Table 1.

2. Air Particulates/Radioiodine:

Results of gross beta measurement are consistent with past measurements. No radioiodine was detected. The only identified isotopes are cosmic-ray produced Be-7 and naturally occurring K-40 and Pb-210 at levels consistent with past measurements.

3. Waterborne, Surface Water:

The results of radioactivity measurements in surface water samples are consistent with past measurements. Tritium was reported as present in the surface water samples collected from site T-81. 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 2% of the reporting value specified by Technical Specifications, Table 3.12-2.

4. Waterborne, Sediment:

The results are consistent with past measurements; only naturally occurring radionuclides were detected.

5. Waterborne, Food Products:

The results are consistent with past measurements; only naturally occurring radionuclides were detected.

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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 locations. The maximum value is about 35% of the Table 3.12-2 reporting level, the average value is about 7% of the reporting level. No other fission products were detected.

C. Conclusions

The data obtained through the Turkey Point Plant Radiological Environmental Monitoring Program verify 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 Technical Specifications, sampling of the direct exposure, inhalation, and ingestion pathways, performed by HRS, 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.



## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(County, State)

PATHWAY: DIRECT RADIATION

SAMPLES COLLECTED: TLD

UNITS: micro-R/hr

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup> Distance & Direction	Mean (f) <sup>b</sup> Range	
Exposure Rate, 84 <sup>d</sup>	---	5.27 (80/80) 4.37 - 8.16	NW-10 10 mi., NW	7.62 (4/4) 7.27 - 8.16	5.78 (4/4) 5.14 - 6.04

Number of Nonroutine Reported Measurements = 0

## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(County, State)

PATHWAY: AIRBORNE

SAMPLES COLLECTED: RADIOIODINE AND PARTICULATES

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

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup> Distance & Direction	Mean (f) <sup>b</sup> Range	
<sup>131</sup> I, 260	0.024	<MDA	---	---	<MDA
Gross Beta, 259	0.0025	0.012 (201/207) 0.003 - 0.024	T-72 <1 mi., WSW	0.012 (51/52) 0.003 - 0.024	0.013 (52/52) 0.004 - 0.025
Composite Gamma Isotopic, 20					
<sup>7</sup> Be	0.0052	0.1256 (16/16) 0.0904 - 0.1467	T-58 1 mi., NW	0.1317 (4/4) 0.099 - 0.1455	0.1303 (4/4) 0.1043 - 0.1446
<sup>210</sup> Pb	----	0.0116 (15/16) 0.0098 - 0.0135	T-72 <1 mile, WSW	0.0118 (4/4) 0.0105 - 0.0133	0.0135 (4/4) 0.0116 - 0.0159
<sup>134</sup> Cs	0.00069	<MDA	---	---	<MDA
<sup>137</sup> Cs	0.00066	<MDA	---	---	<MDA

Number of Nonroutine Reported Measurements = 0





## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(County, State)

PATHWAY: WATERBORNE

SAMPLES COLLECTED: SURFACE WATER

UNITS: pCi/L

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup> Distance & Direction	Mean (f) <sup>b</sup> Range	
Tritium, 36	230	144 (10/24) 119 - 345	T-81 6 mi., S	144 (10/12) 119 - 345	<MDA
Gamma Isotopic, 36					
<sup>40</sup> K	60	294 (24/24) 86 - 347	T-81 6 mi., S	246 (12/12) 86 - 347	181 (11/12) 94 - 249
<sup>54</sup> Mn	4	<MDA	---	---	<MDA
<sup>59</sup> Fe	8	<MDA	---	---	<MDA
<sup>58</sup> Co	4	<MDA	---	---	<MDA
<sup>60</sup> Co	4	<MDA	---	---	<MDA
<sup>65</sup> Zn	8	<MDA	---	---	<MDA
<sup>95</sup> Zr-Nb	7	<MDA	---	---	<MDA
<sup>131</sup> I	5	<MDA	---	---	<MDA
<sup>134</sup> Cs	5	<MDA	---	---	<MDA
<sup>137</sup> Cs	5	<MDA	---	---	<MDA
<sup>140</sup> Ba-La	11	<MDA	---	---	<MDA

Number of Nonroutine Reported Measurements = 0



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Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(County, State)

PATHWAY: WATERBORNE

SAMPLES COLLECTED: SHORELINE SEDIMENT

UNITS: pCi/kg, DRY

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 6					
<sup>7</sup> Be	100	408 (2/4) 378 - 438	T-42 <1 mi., ENE	438 (1/2)	142 (1/2)
<sup>40</sup> K	140	369 (4/4) 305 - 431	T-42 <1 mi., ENE	392 (2/2) 354 - 431	246 (2/2) 243 - 249
<sup>232</sup> Th	52	<MDA	-----	----	55 (1/2)
<sup>226</sup> Ra	49	809 (4/4) 645 - 965	T-42 <1 mi., ENE	860 (2/2) 754-965	110 (1/2)
<sup>238</sup> U	---	638 (1/4)	T-42 <1 mi., ENE	638 (1/2)	<MDA
<sup>58</sup> Co	9	<MDA	---	---	<MDA
<sup>60</sup> Co	12	<MDA	---	---	<MDA
<sup>134</sup> Cs	14	<MDA	---	---	<MDA
<sup>137</sup> Cs	12	<MDA	---	---	<MDA

Number of Nonroutine Reported Measurements = 0

## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251  
 Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
 (County, State)

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

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 4					
<sup>40</sup> K	130	1850 (2/2) 1798 - 1901	T-81 6 mi., S	1850 (2/2) 1798 - 1901	1552 (2/2) 1317 - 1787
<sup>226</sup> Ra	20	641 (2/2) 436 - 846	T-81 6 mi., S	641 (2/2) 436 - 846	<MDA
<sup>54</sup> Mn	9	<MDA	---	---	<MDA
<sup>59</sup> Fe	16	<MDA	---	---	<MDA
<sup>58</sup> Co	9	<MDA	---	---	<MDA
<sup>60</sup> Co	19	<MDA	---	---	<MDA
<sup>65</sup> Zn	17	<MDA	---	---	<MDA
<sup>134</sup> Cs	9	<MDA	---	---	<MDA
<sup>137</sup> Cs	9	<MDA	---	---	<MDA

Number of Nonroutine Reported Measurements = 0

## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(County, State)PATHWAY: INGESTION  
SAMPLES COLLECTED: FISH  
UNITS: pCi/kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup>	Mean (f) <sup>b</sup>	
			Distance & Direction	Range	
Gamma Isotopic, 4					
<sup>40</sup> K	130	2409 (2/2) 2198 - 2620	T-81 6 mi., S	2409 (2/2) 2198 - 2620	2590 (2/2) 2309 - 2870
<sup>54</sup> Mn	9	<MDA	---	---	<MDA
<sup>59</sup> Fe	16	<MDA	---	---	<MDA
<sup>58</sup> Co	9	<MDA	---	---	<MDA
<sup>60</sup> Co	10	<MDA	---	---	<MDA
<sup>65</sup> Zn	17	<MDA	---	---	<MDA
<sup>134</sup> Cs	9	<MDA	---	---	<MDA
<sup>137</sup> Cs	9	<MDA	---	---	<MDA

Number of Nonroutine Reported Measurements = 0



## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(County, State)

PATHWAY: INGESTION

SAMPLES COLLECTED: BROAD LEAF VEGETATION

UNITS: pCi/kg, WET

Type and Total Number of Analyses Performed	Lower Limit of Detection <sup>a</sup> (LLD)	All Indicator Locations Mean (f) Range	Location with Highest Annual Mean		Control Locations Mean (f) <sup>b</sup> Range
			Name <sup>c</sup> Distance & Direction	Mean (f) <sup>b</sup> Range	
Gamma Isotopic, 36					
<sup>7</sup> Be	71	2105 (24/24) 688 - 3635	T-40 3 mi., W	2114 (12/12) 1565 - 3408	1235 (12/12) 699 - 1779
<sup>40</sup> K	100	4146 (24/24) 2341 - 6175	T-41 2 mi., W/NW	4941 (12/12) 3576 - 6175	3943 (12/12) 3143 - 5511
<sup>137</sup> Cs	8	74 (23/24) 15 - 349	T-40 3 mi., W	91 (11/12) 15 - 349	<MDA
<sup>210</sup> Pb	---	827 (7/24) 574 - 1141	T-40 3 mi., W	961 (3/12) 715 - 1141	724 (1/12)
<sup>131</sup> I	9	<MDA	---	---	<MDA
<sup>134</sup> Cs	8	<MDA	---	---	<MDA

Number of Nonroutine Reported Measurements = 0





## ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM ANNUAL SUMMARY

Name of Facility Turkey Point Units 3 & 4, Docket No(s). 50-250 & 50-251  
Location of Facility Dade, Florida, Reporting Period January 1 - December 31, 1995  
(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 are based upon the average net response of two TLDs. (Thermoluminescent dosimeters).

MDA refers to minimum detectable activity.

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TABLE 1A  
DEVIATIONS/MISSING DATA

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A) Pathway: Direct Exposure - TLDs

Location (Sector, Dist. Miles)	Quarter & Date of Missing Data
SW-1	1, 12/7/94 to 3/15/95
SW-8	1, 12/7/94 to 3/15/95
W-5	3, 6/7/95 to 9/13/95
SSW-10	4, 9/13/95 to 12/13/95

Deviation: Failure to provide continuous monitoring.

Description of Problem: TLDs were missing when collection was attempted.

Corrective Action: Replaced TLDs.

B) Pathway: Airborne - Radioiodines & particulates, weekly sampling.

Location	Sampling Period	% Typ Sample
T-51 2 mi., NNW	3/21/95 to 3/28/95	97%
T-57 4 mi., NW	3/21/95 to 3/28/95	90%
T-57 4 mi., NW	12/7/95 to 12/12/95	96%
T-72 <1 mi., WSW	8/15/95 to 8/23/95	89%
T-72 <1 mi., WSW	8/23/95 to 8/29/95	96%

Deviation: Failure to provide continuous monitoring.

Description of Problem: Suspected power interruptions during sampling period, based upon integrated sample volume not meeting expectations.

Corrective Action: Verified operability of the sampling equipment; note, the sampling pumps self-start at the end of a power interruption.

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TABLE 1A  
DEVIATIONS/MISSING DATA

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C) Pathway: Airborne - Radioiodines & Particulates, weekly sampling

Location: T-57, 4 miles NW

Dates: 11/27/95 to 12/7/95

Deviation: Failure to provide continuous monitoring.

Description of Problem: Sampling station destroyed by abandoned car that was set on fire. Station destroyed about 22 hours into sampling period.

Corrective Action: Sampling station replaced and power restored.

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TABLE 1B

ANALYSES WITH LLDs ABOVE TABLE 4.12-1 DETECTION CAPABILITIES  
1/1/95 - 12/31/95

The values specified in Table 4.12-1, Detection Capabilities, were achieved for all samples.



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TABLE 2

LAND USE CENSUS

Distance to Nearest (a, b)

Sector	6/95 Milk (c) Animal	6/95 Residence	6/95 Garden (d)
N	L (e)	2.1/350 (g)	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	3.6/302 (h)	4.3/303
NW	L	L (g)	3.6/308
NNW	L	4.7/328	4.0/328

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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 2.1 miles bearing 350 degrees is recorded as 2.1/350.

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:

<u>Sector</u>	<u>Distance</u>	<u>Description</u>
N	1.8/349	24-hour Security Staffing Building
NW	3.5/304	24-hour Security Staffing
NNW	4.5/327	Mobile homes used for field offices
NNW	1.8/345	Security booth at park entrance

h. This house has been converted into a construction office



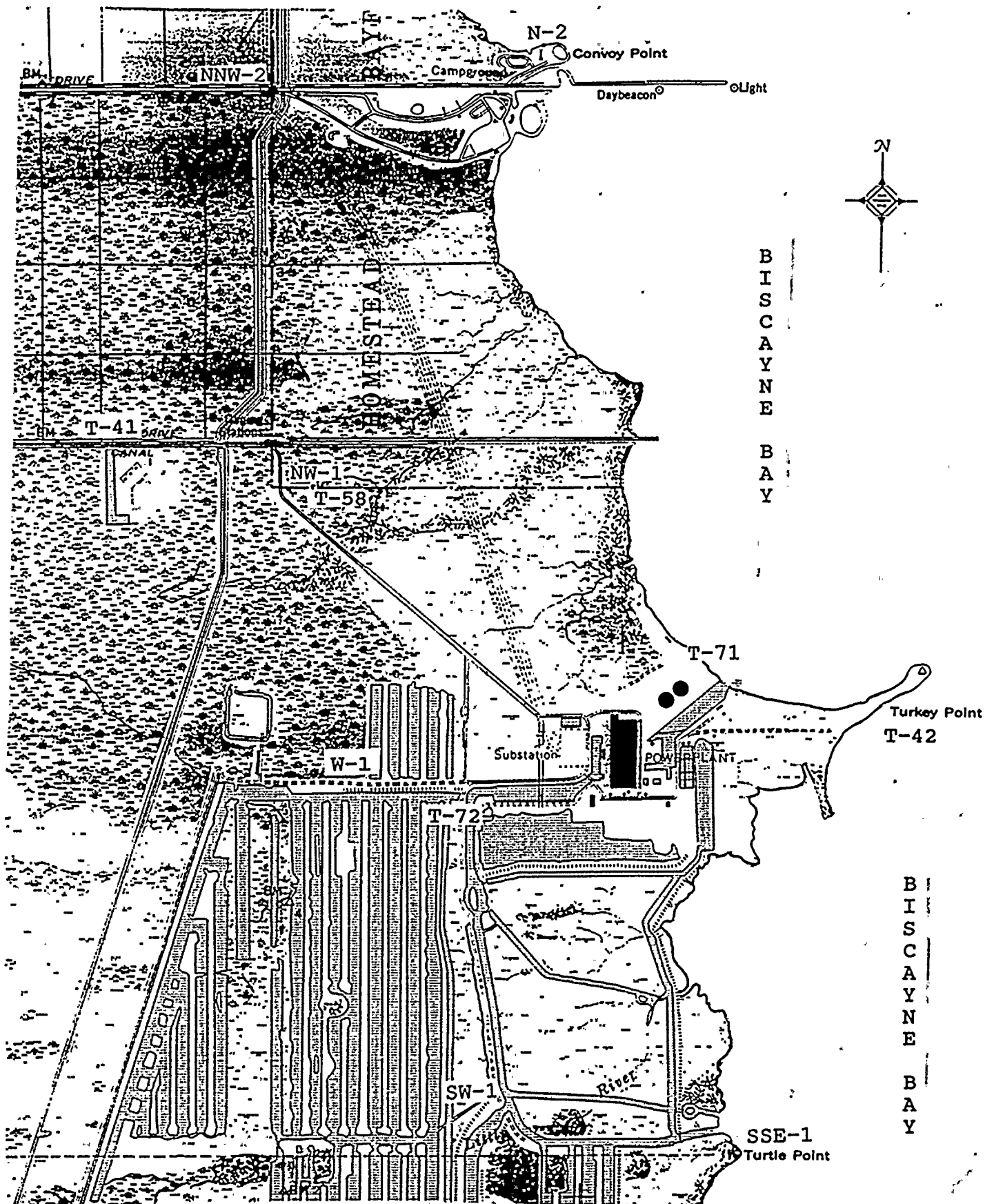


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ATTACHMENT A

KEY TO SAMPLE LOCATIONS

1995  
ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT  
TURKEY POINT PLANT, UNITS 3 & 4



Turkey Point Sampling Locations  
Plant Site Area



## 1995



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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT  
TURKEY POINT PLANT, UNITS 3 & 4

ATTACHMENT A

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

Location <sup>(a)</sup> <u>Name</u>	<u>Description</u>
N-2	Convoy 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
<u>Control</u>	
NNE-22	Natoma Substation

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

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

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-51	NNW	2	Entrance Area to Biscayne National Park
T-57	NW	4	SW 107th Avenue at Mowry Canal
T-58	NW	1	Turkey Point Entrance Road
T-72	WSW	<1	Just before entrance to Land Utilization's access gate.
<u>Control:</u>			
T-64	NNE	22	Natoma Substation





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

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-42	ENE	<1	Biscayne Bay at Turkey Point
T-81	S	6	Card Sound, near Mouth of Old Discharge Canal

Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park
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SAMPLES COLLECTED: SHORELINE SEDIMENT  
SAMPLE COLLECTION FREQUENCY: SEMI-ANNUALLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-42	ENE	<1	Biscayne Bay at Turkey Point
T-81	S	6	Card Sound, near Mouth of Old Discharge Canal

Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Plant, North to Matheson Hammock Park
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PATHWAY: INGESTION  
SAMPLES COLLECTED: CRUSTACEA AND FISH  
SAMPLE COLLECTION FREQUENCY: SEMI-ANNUALLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-81	S	6	Card Sound Vicinity of Turkey Point Facility

Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Park, North to Matheson Hammock Park
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SAMPLES COLLECTED: BROAD LEAF VEGETATION  
SAMPLE COLLECTION FREQUENCY: MONTHLY

<u>Location Name</u>	<u>Direction Sector</u>	<u>Approximate Distance (miles)</u>	<u>Description</u>
T-40	W	3	South of Palm Dr. on S.W. 117th Street Extension
T-41	WNW	2	Palm Dr., West of Old Missile Site near Plant Site Boundary

Control:

T-67	N, NNE	13-18	Near Biscayne Bay, Vicinity of Cutler Park, North to Matheson Hammock Park
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TURKEY POINT PLANT, UNITS 3 & 4

ATTACHMENT B

RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S

TURKEY POINT SITE

1995

First Quarter, 1995

Second Quarter, 1995

Third Quarter, 1995

Fourth Quarter, 1995

RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S  
TURKEY POINT SITE

First Quarter, 1995

Office of Radiation Control

Florida Department of Health  
and Rehabilitative Services

# TURKEY POINT SITE

## Technical Specifications Sampling

First Quarter, 1995

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	22	20
2. Airborne			
2.a Air Iodines	Weekly	5	65
2.b Air Particulates	Weekly	5	69*
3. Waterborne			
3.a Surface Water	Monthly	3	9
3.b Shoreline Sediment	Semiannually	3	3
4. Ingestion			
4.a Fish and Invertebrates			
4.a.1 Crustacea	Semiannually	2	1
4.a.2 Fish	Semiannually	2	2
4.b Food Products			
4.b.1 Broadleaf Vegetation	Monthly	3	9
			Total: 178

\* - Includes NRC split samples.

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 "non-detectable" (ND) or as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

1. DIRECT RADIATION - TLDs - (micro-R/hour)

<u>Sample Site</u>	<u>Deployment</u>	<u>12-07-94</u>
	<u>Collection</u>	<u>03-15-95</u>
N-2	6.28 ± 0.30	
N-7	5.68 ± 0.30	
N-10	5.38 ± 0.29	
NNW-2	5.32 ± 0.35	
NNW-10	5.72 ± 0.29	
NW-1	4.68 ± 0.36	
NW-5 (A)	5.25 ± 0.30	
NW-10	8.16 ± 0.26	
WNW-10	7.07 ± 0.30	
W-1	6.57 ± 0.36	
W-5 (A)	5.23 ± 0.30	
W-9	4.68 ± 0.30	
WSW-8	5.19 ± 0.30	
SW-1 (B)		
SW-8 (B)		
SSW-5	5.17 ± 0.36	
SSW-10	5.27 ± 0.30	
S-5 (A)	5.79 ± 0.36	
S-10	5.99 ± 0.30	
SSE-1	5.40 ± 0.36	
SSE-10	6.37 ± 0.31	
NNE-22	6.04 ± 0.36	

(A) - The dosimeters for sites NW-5, W-5, and S-5 were found lying on the ground. Also, the wooden siren pole formerly used at site W-5 had been replaced with a concrete pole.

(B) - The dosimeters for sites SW-1 and SW-8 were missing when collection was attempted.



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

Collection Date	Sample Site				
	T51	T57	T58	T64	T72
01-05-95	<0.02	<0.01	<0.01	<0.02	<0.01
01-11-95	<0.01	<0.01	<0.01	<0.01	<0.01
01-17-95	<0.01	<0.01	<0.01	<0.01	<0.01
01-23-95	<0.03	<0.03	<0.03	<0.03	<0.03
02-01-95	<0.02	<0.02	<0.02	<0.02	<0.02
02-06-95	<0.01	<0.01	<0.01	<0.01	<0.01
02-13-95	<0.02	<0.02	<0.02	<0.02	<0.02
02-21-95	<0.01	<0.01	<0.01	<0.01	<0.01
02-28-95	<0.01	<0.01	<0.01	<0.01	<0.01
03-06-95	<0.03	<0.03	<0.03	<0.03	<0.03
03-14-95	<0.01	<0.01	<0.01	<0.01	<0.01
03-21-95	<0.02	<0.03	<0.02	<0.02	<0.02
03-28-95	<0.02 (A)	<0.02 (B)	<0.02	<0.02	<0.02

(A) - We believe a power outage occurred during this sample.  
The equipment is estimated to have run for 164 hours  
out of the 169 total hours for this sampling interval.

(B) - We believe a power outage occurred during this sample.  
The equipment is estimated to have run for 170 hours  
out of the 189 total hours for this sampling interval.

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

Collection Date	Sample Site				
	T51	T57	T58	T64	T72
01-05-95	0.005 ± 0.002	0.004 ± 0.001	0.008 ± 0.002	0.008 ± 0.002	0.006 ± 0.002
01-11-95	0.015 ± 0.002	0.011 ± 0.002	0.012 ± 0.002	0.013 ± 0.002	0.017 ± 0.002
01-17-95	0.010 ± 0.002	0.004 ± 0.002	0.007 ± 0.002	0.007 ± 0.002	0.011 ± 0.002
01-23-95	0.018 ± 0.003	0.011 ± 0.002	0.015 ± 0.003	0.018 ± 0.003	0.012 ± 0.002
02-01-95	0.016 ± 0.002	0.017 ± 0.002	0.017 ± 0.002	0.018 ± 0.002	0.018 ± 0.002
02-06-95	0.015 ± 0.003	0.014 ± 0.003	*0.011 ± 0.003	0.018 ± 0.003	0.013 ± 0.003
02-13-95	0.008 ± 0.002	0.009 ± 0.002	*0.015 ± 0.002	0.014 ± 0.002	0.012 ± 0.002
02-21-95	0.004 ± 0.001	0.005 ± 0.001	*0.005 ± 0.001	0.007 ± 0.002	0.006 ± 0.001
02-28-95	0.011 ± 0.002	0.012 ± 0.002	*0.011 ± 0.002	0.013 ± 0.002	0.011 ± 0.002
03-06-95	0.008 ± 0.002	0.005 ± 0.002	0.007 ± 0.002	0.006 ± 0.002	0.005 ± 0.002
03-14-95	0.010 ± 0.002	0.012 ± 0.002	0.009 ± 0.002	0.011 ± 0.002	0.011 ± 0.002
03-21-95	0.009 ± 0.002	0.007 ± 0.002	0.011 ± 0.002	0.010 ± 0.002	0.009 ± 0.002
03-28-95	(A)0.017 ± 0.002	(B)0.014 ± 0.002	0.014 ± 0.002	0.017 ± 0.002	0.016 ± 0.002
Means:	0.011 ± 0.001	0.010 ± 0.001	0.011 ± 0.001	0.012 ± 0.001	0.011 ± 0.001

\* - NRC split samples.

- (A) - We believe a power outage occurred during this sample. The equipment is estimated to have run for 164 hours out of the 169 total hours for this sampling interval.
- (B) - We believe a power outage occurred during this sample. The equipment is estimated to have run for 170 hours out of the 189 total hours for this sampling interval.

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

First Quarter, 1995					
Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T51	0.1467 ± 0.0100	<0.0185	<0.0007	<0.0008	0.0104 ± 0.0026
T57	0.1589 ± 0.0115	<0.0173	<0.0010	<0.0009	0.0118 ± 0.0025
T58	0.1455 ± 0.0102	<0.0164	<0.0007	<0.0012	0.0100 ± 0.0023
T64	0.1446 ± 0.0120	<0.0163	<0.0008	<0.0009	0.0143 ± 0.0031
T72	0.1362 ± 0.0094	<0.0187	<0.0008	<0.0008	0.0133 ± 0.0027



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	01-18-95	<136	297 ± 28	<4	<3	<8	<5	<8	<6	<7	<4	<4	<5
	02-08-95	<145	194 ± 26	<4	<3	<8	<5	<8	<7	<7	<4	<5	<5
	03-09-95	<142	272 ± 35	<3	<3	<11	<4	<6	<8	<12	<3	<4	<7
T67	01-19-95	<135	153 ± 30	<3	<4	<8	<4	<7	<7	<10	<5	<4	<5
	02-09-95	<132	249 ± 30	<4	<5	<7	<5	<6	<7	<6	<4	<5	<5
	03-09-95	<142	94 ± 30	<4	<3	<5	<4	<7	<7	<12	<4	<4	<9
T81	01-18-95	186 ± 45	256 ± 32	<4	<4	<8	<4	<9	<6	<8	<4	<3	<5
	02-08-95	345 ± 47	265 ± 32	<3	<4	<9	<6	<7	<7	<9	<4	<4	<4
	03-09-95	175 ± 46	270 ± 31	<4	<5	<8	<5	<7	<8	<13	<4	<4	<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

SEDIMENT - (pCi/kg, dry weight)

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>Co-58</u>	<u>Co-60</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Th-232</u>
T42	01-09-95	<204	354 ± 72	<16	<13	<14	<16	965 ± 19	ND
T67	01-12-95	<94	243 ± 43	<8	<6	<8	<8	ND	ND
T81	01-09-95	<146	305 ± 62	<12	<11	<11	<11	871 ± 16	ND

4.a.1

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	First quarter attempts to collect this sample were not successful.									Efforts continue.	
T81	03-31-95	1901 ± 177	<19	<24	<53	<23	<51	<25	<24	436 ± 26	ND

4.a.2

FISH - Mixed Species - (pCi/kg, wet weight)

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	02-09-95	2309 ± 390	<54	<73	<151	<64	<128	<62	<60	ND	ND
T81	03-31-95	2198 ± 192	<20	<20	<55	<24	<44	<22	<25	ND	ND

4.b.1 BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>
T40	01-19-95	2314 ± 94	3783 ± 138	<19	<9	<15	ND
	02-09-95	1806 ± 86	3382 ± 124	<21	<8	115 ± 7	715 ± 276
	03-09-95	1618 ± 72	2341 ± 101	<19	<9	15 ± 4	ND
T41	01-19-95	2880 ± 90	5662 ± 164	<17	<10	23 ± 6	596 ± 244
	02-09-95	2244 ± 100	3576 ± 154	<31	<10	42 ± 7	ND
	03-09-95	688 ± 63	5439 ± 182	<24	<11	71 ± 9	ND
T67	01-19-95	1186 ± 60	3504 ± 123	<15	<9	<9	ND
	02-09-95	940 ± 58	3143 ± 117	<20	<9	<10	ND
	03-09-95	1055 ± 81	3947 ± 143	<23	<11	<10	ND

ND - Non-detectable.

RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S  
TURKEY POINT SITE

Second Quarter, 1995

Office of Radiation Control  
Florida Department of Health  
and Rehabilitative Services





# TURKEY POINT SITE

## Technical Specifications Sampling

Second Quarter, 1995

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	22	22
2. Airborne			
2.a Air Iodines	Weekly	5	65
2.b Air Particulates	Weekly	5	69*
3. Waterborne			
3.a Surface Water	Monthly	3	9
3.b Shoreline Sediment	Semiannually	0	0
4. Ingestion			
4.a Fish and Invertebrates			
4.a.1 Crustacea	Semiannually	1	1
4.a.2 Fish	Semiannually	0	0
4.b Food Products			
4.b.1 Broadleaf Vegetation	Monthly	3	10*
			<hr/> Total: 176

\* - Includes NRC split samples.

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 "non-detectable" (ND) or as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

1. DIRECT RADIATION - TLDS - (micro-R/hour)

<u>Sample Site</u>	<u>Deployment 03-15-95</u> <u>Collection 06-07-95</u>	<u>Sample Site</u>	<u>Deployment 03-15-95</u> <u>Collection 06-07-95</u>
N-2	5.44 ± 0.09	WSW-8	4.90 ± 0.09
N-7	4.53 ± 0.09		
N-10	4.30 ± 0.08	SW-1	4.75 ± 0.09
		SW-8	4.76 ± 0.09
NNW-2	4.13 ± 0.08		
NNW-10	5.63 ± 0.09	SSW-5	4.49 ± 0.08
		SSW-10 (A)	4.57 ± 0.08
NW-1	4.72 ± 0.09		
NW-5	4.40 ± 0.08	S-5	4.59 ± 0.09
NW-10	7.58 ± 0.10	S-10	5.45 ± 0.09
WNW-10	6.14 ± 0.09	SSE-1 (A)	4.76 ± 0.09
		SSE-10	5.69 ± 0.09
W-1	6.23 ± 0.09		
W-5	5.08 ± 0.09	NNE-22	5.98 ± 0.09
W-9	4.63 ± 0.09		

(A) - The dosimeters for sites SSW-10 and SSE-1 were found lying on the ground when they were collected.

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

<u>Collection Date</u>	<u>Sample Site</u>				
	<u>T51</u>	<u>T57</u>	<u>T58</u>	<u>T64</u>	<u>T72</u>
04-04-95	<0.02	<0.02	<0.02	<0.02	<0.02
04-11-95	<0.02	<0.03	<0.03	<0.02	<0.02
04-17-95	<0.02	<0.02	<0.02	<0.02	<0.02
04-24-95	<0.02	<0.02	<0.02	<0.02	<0.02
05-02-95	<0.02	<0.02	<0.02	<0.02	<0.02
05-10-95	<0.01	<0.01	<0.01	<0.01	<0.02
05-18-95	<0.01	<0.01	<0.01	<0.01	<0.01
05-25-95	<0.02	<0.02	<0.03	<0.03	<0.03
05-31-95	<0.02	<0.02	<0.02	<0.02	<0.02
06-06-95	<0.02	<0.02	<0.02	<0.02	<0.02
06-13-95	<0.02	<0.02	<0.02	<0.02	<0.02
06-19-95	<0.04	<0.04	<0.05	<0.04	<0.05
06-27-95	<0.01	<0.01	<0.01	<0.01	<0.01



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

Collection Date	Sample Site				
	T51	T57	T58	T64	T72
04-04-95	0.016 ± 0.002	0.018 ± 0.002	0.020 ± 0.002	0.021 ± 0.002	0.018 ± 0.002
04-11-95	0.013 ± 0.002	0.008 ± 0.002	0.015 ± 0.002	0.012 ± 0.002	0.009 ± 0.002
04-17-95	0.010 ± 0.002	0.014 ± 0.003	0.020 ± 0.003	0.011 ± 0.002	0.016 ± 0.003
04-24-95	0.021 ± 0.003	0.017 ± 0.002	0.022 ± 0.003	0.022 ± 0.003	0.020 ± 0.003
05-02-95	0.009 ± 0.002	0.012 ± 0.002	0.009 ± 0.002	0.016 ± 0.002	0.011 ± 0.002
05-10-95	0.010 ± 0.002	0.013 ± 0.002	*0.014 ± 0.002	0.019 ± 0.002	0.012 ± 0.002
05-18-95	0.017 ± 0.002	0.015 ± 0.002	*0.018 ± 0.002	0.012 ± 0.002	0.020 ± 0.002
05-25-95	0.013 ± 0.002	0.009 ± 0.002	*0.015 ± 0.002	0.014 ± 0.002	0.014 ± 0.002
05-31-95	0.010 ± 0.002	0.013 ± 0.002	*0.013 ± 0.002	0.011 ± 0.002	0.011 ± 0.002
06-06-95	0.007 ± 0.002	0.006 ± 0.002	0.007 ± 0.002	0.007 ± 0.002	0.009 ± 0.002
06-13-95	0.011 ± 0.002	0.010 ± 0.002	0.012 ± 0.002	0.018 ± 0.002	0.012 ± 0.002
06-19-95	0.005 ± 0.002	0.011 ± 0.002	0.006 ± 0.002	0.010 ± 0.002	0.007 ± 0.002
06-27-95	0.009 ± 0.002	0.010 ± 0.002	0.012 ± 0.002	0.011 ± 0.002	0.011 ± 0.002
Means:	0.012 ± 0.001	0.012 ± 0.001	0.014 ± 0.001	0.014 ± 0.001	0.013 ± 0.001

\* - NRC split samples.

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

Sample Site	Second Quarter, 1995				
	Be-7	K-40	Cs-134	Cs-137	Pb-210
T51	0.1214 ± 0.0095	<0.0159	<0.0010	<0.0007	0.0122 ± 0.0025
T57	0.1160 ± 0.0097	<0.0208	<0.0005	<0.0005	0.0123 ± 0.0026
T58	0.1381 ± 0.0101	<0.0203	<0.0008	<0.0008	0.0135 ± 0.0031
T64	0.1341 ± 0.0110	<0.0182	<0.0010	<0.0009	0.0116 ± 0.0028
T72	0.1145 ± 0.0101	<0.0138	<0.0008	<0.0010	0.0105 ± 0.0024

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	04-12-95	<137	265 ± 29	<3	<3	<7	<5	<7	<6	<7	<3	<4	<5
	05-10-95	<136	278 ± 34	<3	<3	<9	<3	<9	<6	<6	<4	<4	<5
	06-16-95	<139	273 ± 31	<4	<4	<8	<4	<9	<7	<10	<3	<4	<7
T67	04-14-95	<137	166 ± 35	<4	<4	<7	<5	<8	<7	<6	<4	<4	<6
	05-11-95	<136	226 ± 34	<4	<4	<6	<4	<9	<6	<6	<5	<3	<5
	06-16-95	<139	236 ± 32	<4	<4	<8	<4	<11	<7	<10	<4	<4	<6
T81	04-13-95	<147	347 ± 41	<4	<4	<6	<5	<8	<7	<8	<5	<4	<5
	05-11-95	201 ± 45	238 ± 30	<3	<4	<8	<4	<9	<6	<7	<3	<4	<5
	06-15-95	149 ± 45	266 ± 35	<5	<4	<10	<4	<6	<8	<10	<3	<4	<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.

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

<u>Sample Site</u>	<u>Collection Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	04-04-95	1787 ± 189	<20	<19	<46	<27	<52	<22	<20	ND	ND

4.b.1 BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>
T40	04-13-95	1842 ± 73	3112 ± 124	<14	<9	57 ± 6
	*05-11-95	1671 ± 73	2448 ± 105	<14	<9	62 ± 6
	06-15-95	1469 ± 91	3384 ± 143	<18	<11	74 ± 9
T41	04-13-95	1689 ± 81	5839 ± 174	<17	<11	58 ± 8
	05-11-95	1632 ± 83	6175 ± 177	<18	<12	37 ± 6
	06-15-95	1133 ± 75	4332 ± 135	<22	<9	33 ± 6
T67	04-14-95	1170 ± 69	4080 ± 141	<13	<10	<9
	05-11-95	699 ± 54	5511 ± 157	<15	<9	<10
	06-16-95	900 ± 61	3823 ± 134	<16	<8	<11

\* - NRC split sample.

ND - Non-detectable.





RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S  
TURKEY POINT SITE

Third Quarter, 1995

Office of Radiation Control

Florida Department of Health  
and Rehabilitative Services

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# TURKEY POINT SITE

## Technical Specifications Sampling

Third Quarter, 1995

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	22	21
2. Airborne			
2.a Air Iodines	Weekly	5	65
2.b Air Particulates	Weekly	5	69*
3. Waterborne			
3.a Surface Water	Monthly	3	9
3.b Shoreline Sediment	Semiannually	3	3
4. Ingestion			
4.a Fish and Invertebrates			
4.a.1 Crustacea	Semiannually	2	1
4.a.2 Fish	Semiannually	2	0
4.b Food Products			
4.b.1 Broadleaf Vegetation	Monthly	3	9
			<hr/>
			Total: 177

\* - Includes NRC split samples.

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 "non-detectable" (ND) or as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.



1. DIRECT RADIATION - TLDs - (micro-R/hour)

<u>Sample Site</u>	<u>Deployment Collection</u>	<u>06-07-95</u> <u>09-13-95</u>
N-2	5.02 ± 0.10	
N-7	4.54 ± 0.09	
N-10	4.95 ± 0.09	
NNW-2	4.10 ± 0.09	
NNW-10	5.53 ± 0.10	
NW-1	4.50 ± 0.09	
NW-5	4.53 ± 0.09	
NW-10	7.27 ± 0.11	
WNW-10	6.09 ± 0.10	
W-1	6.16 ± 0.10	
W-5 (A)		
W-9	4.57 ± 0.09	
WSW-8	4.69 ± 0.09	
SW-1	4.87 ± 0.10	
SW-8	4.63 ± 0.09	
SSW-5	4.55 ± 0.09	
SSW-10	4.85 ± 0.09	
S-5	4.32 ± 0.09	
S-10	5.17 ± 0.10	
SSE-1 (B)	4.91 ± 0.10	
SSE-10	5.55 ± 0.10	
NNE-22	5.14 ± 0.09	

(A) - The dosimeter for site W-5 was missing when collection was attempted.

(B) - The dosimeter for site SSE-1 was found lying on the ground.



2.a

IODINE-131 IN WEEKLY AIR FILTERS - (pCi/m<sup>3</sup>)

Collection Date	Sample Site				
	T51	T57	T58	T64	T72
07-06-95	<0.01	<0.01	<0.01	<0.01	<0.01
07-12-95	<0.02	<0.02	<0.02	<0.02	<0.02
07-17-95	<0.02	<0.02	<0.02	<0.02	<0.02
07-27-95	<0.01	<0.01	<0.01	<0.01	<0.01
08-02-95	<0.02	<0.02	<0.02	<0.02	<0.02
08-07-95	<0.02	<0.02	<0.02	<0.02	<0.02
08-15-95	<0.02	<0.02	<0.02	<0.02	<0.02
08-23-95	<0.02	<0.02	<0.02	<0.02	<0.02 (A)
08-29-95	<0.02	<0.02	<0.02	<0.02	<0.02 (B)
09-05-95	<0.02	<0.02	<0.02	<0.02	<0.02
09-12-95	<0.01	<0.01	<0.01	<0.01	<0.01
09-19-95	<0.02	<0.02	<0.02	<0.02	<0.02
09-25-95	<0.02	<0.02	<0.02	<0.02	<0.02

(A) - Electrical power was out at the end of this sample. The equipment is estimated to have run for 170 hours out of the 191 total hours for this sampling interval.

(B) - Electrical power was out at the start of this sample. The equipment is estimated to have run for 138 hours out of the 144 total hours for this sampling interval.





2.b

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

Collection Date	Sample Site				
	T51	T57	T58	T64	T72
07-06-95	0.016 ± 0.002	0.013 ± 0.002	0.014 ± 0.002	0.016 ± 0.002	0.016 ± 0.002
07-12-95	0.007 ± 0.002	0.003 ± 0.002	0.009 ± 0.002	0.015 ± 0.003	0.013 ± 0.002
07-17-95	<0.006	<0.007	0.006 ± 0.002	0.005 ± 0.002	0.008 ± 0.002
07-27-95	0.004 ± 0.001	0.005 ± 0.001	0.008 ± 0.002	0.008 ± 0.001	0.005 ± 0.001
08-02-95	0.008 ± 0.002	0.011 ± 0.002	*0.009 ± 0.002	0.012 ± 0.002	0.007 ± 0.002
08-07-95	0.024 ± 0.003	0.023 ± 0.003	*0.012 ± 0.002	0.011 ± 0.002	0.012 ± 0.002
08-15-95	0.012 ± 0.002	0.014 ± 0.002	*0.016 ± 0.002	0.017 ± 0.002	0.014 ± 0.002
08-23-95	0.020 ± 0.002	0.015 ± 0.002	*0.016 ± 0.002	0.016 ± 0.002	(A)0.022 ± 0.003
08-29-95	0.014 ± 0.002	0.016 ± 0.002	0.015 ± 0.003	0.016 ± 0.002	(B)0.018 ± 0.003
09-05-95	0.013 ± 0.002	0.009 ± 0.002	0.009 ± 0.002	0.022 ± 0.003	0.012 ± 0.002
09-12-95	0.007 ± 0.002	0.006 ± 0.002	0.005 ± 0.002	0.010 ± 0.002	0.008 ± 0.002
09-19-95	0.008 ± 0.002	0.012 ± 0.002	0.007 ± 0.002	0.007 ± 0.002	0.009 ± 0.002
09-25-95	0.007 ± 0.002	0.011 ± 0.002	0.009 ± 0.002	0.014 ± 0.002	0.011 ± 0.002
Means:	0.012 ± 0.001	0.012 ± 0.001	0.010 ± 0.001	0.013 ± 0.001	0.012 ± 0.001

\* - NRC split samples.

- (A) - Electrical power was out at the end of this sample. The equipment is estimated to have run for 170 hours out of the 191 total hours for this sampling interval.
- (B) - Electrical power was out at the start of this sample. The equipment is estimated to have run for 138 hours out of the 144 total hours for this sampling interval.

2.b

AIR PARTICULATES - GAMMA SCANS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Third Quarter, 1995					
Sample Site	Be-7	K-40	Cs-134	Cs-137	Pb-210
T51	0.1089 ± 0.0097	<0.0164	<0.0011	<0.0009	0.0127 ± 0.0026
T57	0.0954 ± 0.0116	<0.0156	<0.0010	<0.0006	ND
T58	0.0990 ± 0.0096	<0.0181	<0.0010	<0.0007	0.0112 ± 0.0026
T64	0.1043 ± 0.0081	<0.0154	<0.0007	<0.0005	0.0123 ± 0.0033
T72	0.0904 ± 0.0085	<0.0196	<0.0011	<0.0007	0.0124 ± 0.0025
					ND - Non-detectable.



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	07-20-95	<152	218 ± 31	<3	<3	<6	<4	<8	<5	<6	<4	<4	<5
	08-17-95	<144	254 ± 25	<3	<4	<7	<4	<7	<7	<6	<3	<5	<8
	09-06-95	<144	290 ± 29	<4	<3	<8	<4	<6	<7	<7	<3	<4	<5
T67	07-21-95	<152	225 ± 13	<1	<1	<3	<2	<3	<3	<2	<1	<1	<2
	08-18-95	<134	203 ± 31	<4	<3	<6	<4	<8	<6	<7	<5	<5	<5
	09-06-95	<144	186 ± 25	<4	<4	<8	<4	<10	<7	<7	<4	<4	<5
T81	07-19-95	<152	271 ± 32	<3	<3	<7	<4	<7	<7	<7	<4	<5	<5
	08-17-95	<153	195 ± 33	<4	<4	<8	<5	<7	<5	<6	<4	<4	<2
	09-06-95	<151	252 ± 29	<4	<3	<10	<4	<7	<6	<8	<4	<4	<6

(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

## SEDIMENT - (pCi/kg, dry weight)

Sample Site	Collection Date	Be-7	K-40	Co-58	Co-60	Cs-134	Cs-137	Others
T42	07-20-95	438 ± 69	431 ± 89	<12	<15	<13	<15	Ra-226: 754 ± 19 U-238: 638 ± 176
T67	07-18-95	142 ± 37	249 ± 45	<6	<4	<7	<7	Ra-226: 110 ± 7 Th-232: 55 ± 8
T81	07-19-95	378 ± 68	386 ± 60	<9	<11	<11	<12	Ra-226: 645 ± 15

4.a.1

## CRUSTACEA - Blue Crab - (pCi/kg, wet weight)

Sample	Collection										
<u>Site</u>	<u>Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	07-21-95	1317 ± 162	<16	<14	<35	<17	<37	<17	<19	ND	ND
T81	Third quarter attempts to collect this sample were not successful. Efforts continue.										

4.a.2

## FISH - Mixed Species - (pCi/kg, wet weight)

Sample Collection											
<u>Site</u>	<u>Date</u>	<u>K-40</u>	<u>Mn-54</u>	<u>Co-58</u>	<u>Fe-59</u>	<u>Co-60</u>	<u>Zn-65</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Ra-226</u>	<u>Ra-228</u>
T67	Third quarter attempts to collect this sample were not successful. Efforts continue.										
T81	Third quarter attempts to collect this sample were not successful. Efforts continue.										

ND - Non-detectable.



4.b.1 BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

<u>Sample Site</u>	<u>Collection Date</u>	<u>Be-7</u>	<u>K-40</u>	<u>I-131</u>	<u>Cs-134</u>	<u>Cs-137</u>	<u>Pb-210</u>
T40	07-24-95	1686 ± 80	5155 ± 154	<13	<8	81 ± 8	ND
	08-17-95	2873 ± 114	2820 ± 122	<14	<10	100 ± 10	1141 ± 224
	09-06-95	3408 ± 99	3185 ± 125	<26	<9	34 ± 6	ND
T41	07-24-95	2391 ± 89	5096 ± 159	<12	<9	74 ± 6	ND
	08-17-95	3252 ± 102	3815 ± 150	<18	<13	102 ± 8	908 ± 275
	09-06-95	3635 ± 108	4435 ± 143	<20	<10	109 ± 9	574 ± 215
T67	07-21-95	1411 ± 68	3858 ± 137	<14	<10	<10	ND
	08-18-95	1309 ± 70	3535 ± 128	<12	<9	<9	ND
	09-06-95	1779 ± 74	4746 ± 146	<21	<11	<11	724 ± 303

ND - Non-detectable.





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RADIOLOGICAL SURVEILLANCE OF  
FLORIDA POWER AND LIGHT COMPANY'S  
TURKEY POINT SITE

Fourth Quarter, 1995

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Office of Radiation Control

Florida Department of Health  
and Rehabilitative Services

# TURKEY POINT SITE

## Technical Specifications Sampling

Fourth Quarter, 1995

<u>Sample Type</u>	<u>Collection Frequency</u>	<u>Locations Sampled</u>	<u>Number of Samples</u>
1. Direct Radiation	Quarterly	22	21
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	0	0
4. Ingestion			
4.a Fish and Invertebrates			
4.a.1 Crustacea	Semiannually	1	1
4.a.2 Fish	Semiannually	2	2
4.b Food Products			
4.b.1 Broadleaf Vegetation	Monthly	3	9
			<hr/> Total: 171

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 "non-detectable" (ND) or as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.



1. DIRECT RADIATION - TLDs - (micro-R/hour)

<u>Sample Site</u>	<u>Deployment 09-13-95</u> <u>Collection 12-13-95</u>
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N-2	5.57 ± 0.11
N-7	4.63 ± 0.11
N-10	4.75 ± 0.10
NNW-2	4.46 ± 0.11
NNW-10	5.66 ± 0.11
NW-1 (A)	6.67 ± 0.12
NW-5	4.77 ± 0.11
NW-10	7.46 ± 0.12
WNW-10	6.29 ± 0.12
W-1	6.29 ± 0.12
W-5	4.75 ± 0.11
W-9	4.73 ± 0.11
WSW-8	4.76 ± 0.10
SW-1	4.81 ± 0.10
SW-8	4.60 ± 0.10
SSW-5	4.52 ± 0.11
SSW-10	(B)
S-5	4.37 ± 0.10
S-10	5.61 ± 0.11
SSE-1	4.45 ± 0.10
SSE-10	5.73 ± 0.11
NNE-22	5.97 ± 0.11

(A) - The result for site NW-1 is statistically high compared to the long-term average of 5.03 micro-R/hr there. This corresponds to a dose of approximately 3.6 millirem more than would be expected at this site during this deployment interval. Although this location is along the plant entrance road where shipments of radioactive materials would pass by, no specific explanation for this elevated reading is known.

(B) - The dosimeter for site SSW-10 was missing when collection was attempted.



Collection Date	Sample Site				
	T51	T57	T58	T64	T72
10-04-95	<0.01	<0.01	<0.01	<0.02	<0.01
10-11-95	<0.02	<0.02	<0.02	<0.01	<0.02
10-19-95	<0.02	<0.02	<0.02	<0.02	<0.02
10-25-95	<0.02	<0.02	<0.02	<0.02	<0.02
10-31-95	<0.02	<0.02	<0.02	<0.02	<0.02
11-06-95	<0.02	<0.02	<0.02	<0.02	<0.02
11-13-95	<0.02	<0.02	<0.02	<0.02	<0.02
11-20-95	<0.02	<0.02	<0.02	<0.02	<0.02
11-27-95	<0.01	<0.01	<0.01	<0.01	<0.01
12-07-95	<0.01	<0.07 (A)	<0.01	<0.01	<0.01
12-12-95	<0.04	<0.02 (B)	<0.03	<0.03	<0.04
12-19-95	<0.02	<0.02	<0.02	<0.03	<0.02
12-28-95	<0.02	<0.02	<0.01	<0.01	<0.01

(A) - Electrical power was out at the end of this sample. A car had been backed against this utility pole and had been set afire. The fire had damaged the utility pole, and one of the wires was down. The equipment is estimated to have run for 22 hours out of the 197 total hours for this sampling interval.

(B) - Electrical power was out at the start of this sample. The equipment is estimated to have run for 134 hours out of the 139 total hours for this sampling interval.



2.b

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

Collection Date	Sample Site				
	T51	T57	T58	T64	T72
10-04-95	0.007 ± 0.002	0.008 ± 0.002	0.006 ± 0.001	0.004 ± 0.002	0.007 ± 0.001
10-11-95	0.004 ± 0.002	0.004 ± 0.002	0.007 ± 0.002	0.006 ± 0.001	0.007 ± 0.002
10-19-95	0.007 ± 0.002	<0.005	0.004 ± 0.001	0.007 ± 0.002	0.003 ± 0.001
10-25-95	<0.006	<0.005	0.006 ± 0.002	0.007 ± 0.002	<0.007
10-31-95	0.012 ± 0.002	0.013 ± 0.002	0.015 ± 0.002	0.015 ± 0.002	0.010 ± 0.002
11-06-95	0.013 ± 0.002	0.009 ± 0.002	0.018 ± 0.002	0.015 ± 0.002	0.016 ± 0.002
11-13-95	0.018 ± 0.002	0.020 ± 0.002	0.014 ± 0.002	0.015 ± 0.002	0.015 ± 0.002
11-20-95	0.014 ± 0.002	0.020 ± 0.002	0.020 ± 0.002	0.015 ± 0.002	0.017 ± 0.002
11-27-95	0.018 ± 0.002	0.016 ± 0.002	0.015 ± 0.002	0.018 ± 0.002	0.020 ± 0.002
12-07-95	0.013 ± 0.002	(A)	0.015 ± 0.002	0.016 ± 0.002	0.015 ± 0.002
12-12-95	0.017 ± 0.003	(B) 0.014 ± 0.003	0.024 ± 0.003	0.019 ± 0.002	0.021 ± 0.003
12-19-95	0.011 ± 0.002	0.007 ± 0.002	0.007 ± 0.002	0.013 ± 0.003	0.009 ± 0.002
12-28-95	0.021 ± 0.002	0.020 ± 0.002	0.024 ± 0.002	0.025 ± 0.002	0.018 ± 0.002
Means:	0.013 ± 0.001	0.013 ± 0.001	0.013 ± 0.001	0.013 ± 0.001	0.013 ± 0.001

(A) - Electrical power was out at the end of this sample. A car had been backed against this utility pole and had been set afire. The fire had damaged the utility pole, and one of the wires was down. The particulate filter and its holder were missing when collection was attempted.

(B) - Electrical power was out at the start of this sample. The equipment is estimated to have run for 134 hours out of the 139 total hours for this sampling interval.

2.b

AIR PARTICULATES - GAMMA SCANS OF QUARTERLY COMPOSITES - (pCi/m<sup>3</sup>)

Sample Site	Fourth Quarter, 1995				
	Be-7	K-40	Cs-134	Cs-137	Pb-210
T51	0.1398 ± 0.0100	<0.0186	<0.0011	<0.0006	0.0112 ± 0.0030
T57	0.1191 ± 0.0091	<0.0167	<0.0007	<0.0008	0.0105 ± 0.0029
T58	0.1443 ± 0.0104	<0.0139	<0.0005	<0.0009	0.0098 ± 0.0039
T64	0.1382 ± 0.0105	<0.0135	<0.0008	<0.0008	0.0159 ± 0.0029
T72	0.1348 ± 0.0123	<0.0152	<0.0006	<0.0007	0.0109 ± 0.0028





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	10-12-95	<140	222 ± 30	<3	<4	<8	<5	<8	<7	<6	<3	<4	<6
	11-08-95	<145	162 ± 30	<4	<4	<8	<3	<7	<7	<7	<4	<4	<6
	12-08-95	<155	175 ± 27	<3	<4	<7	<5	<7	<6	<8	<5	<4	<5
T67	10-13-95	<140	174 ± 28	<3	<4	<9	<3	<7	<6	<7	<4	<4	<5
	11-09-95	<145	146 ± 30	<4	<4	<7	<5	<7	<5	<8	<3	<4	<6
	12-08-95	<149	117 ± 24	<4	<3	<7	<4	<8	<7	<9	<3	<3	<7
T81	10-12-95	<140	86 ± 29	<3	<3	<6	<4	<7	<6	<6	<4	<4	<5
	11-08-95	119 ± 46	242 ± 29	<4	<4	<8	<4	<8	<6	<7	<4	<4	<5
	12-08-95	260 ± 50	259 ± 31	<5	<4	<7	<4	<8	<6	<9	<3	<4	<6

(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.



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
T81	12-19-95	1798 ± 192	<25	<25	<61	<30	<49	<26	<26	846 ± 32	ND

4.a.2 FISH - (T67: Snapper) (T81: 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	12-01-95	2870 ± 157	<14	<15	<37	<18	<31	<15	<15	ND	ND
T81	12-18-95	2620 ± 74	<6	<7	<15	<7	<14	<7	<7	ND	ND

4.b.1 BROADLEAF VEGETATION - Brazilian Pepper - (pCi/kg, wet weight)

Sample Site	Collection Date	Be-7	K-40	I-131	Cs-134	Cs-137	Pb-210
T40	10-12-95	2171 ± 87	3830 ± 141	<17	<10	349 ± 12	ND
	11-09-95	2946 ± 94	2753 ± 112	<15	<9	52 ± 6	1027 ± 304
	12-08-95	1565 ± 80	4010 ± 134	<21	<10	62 ± 7	ND
T41	10-12-95	2737 ± 93	5220 ± 153	<15	<8	90 ± 8	831 ± 280
	11-09-95	1996 ± 78	5047 ± 147	<15	<8	31 ± 6	ND
	12-08-95	877 ± 57	4653 ± 150	<19	<11	31 ± 6	ND
T67	10-13-95	1191 ± 67	3539 ± 128	<12	<8	<9	ND
	11-09-95	1500 ± 81	3482 ± 141	<17	<11	<12	ND
	12-08-95	1678 ± 87	4145 ± 148	<22	<10	<10	ND

ND - Non-detectable.



1995  
ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT  
TURKEY POINT PLANT, UNITS 3 & 4

ATTACHMENT C

RESULTS FROM THE INTERLABORATORY  
COMPARISON PROGRAM 1995



FLORIDA DEPT. OF HRS - EPA INTERLABORATORY CROSS-CHECK PROGRAM DATA

January through June, 1995

Media	Nuclide	Collection Mon Day Yr	EPA Known	Units	Normal. Range	Mean of Analyses	N.D.K.	Action Level
WATER	Alpha	01 27 95	5	pCi/L	0.236	5.00	0.00	
WATER	Beta	01 27 95	5	pCi/L	0.236	7.33	0.81	
WATER	Co-60	06 09 95	40	pCi/L	0.236	39.00	-0.35	
WATER	Zn-65	06 09 95	76	pCi/L	0.517	82.67	1.44	
WATER	Ba-133	06 09 95	79	pCi/L	0.148	74.33	-1.01	
WATER	Cs-134	06 09 95	50	pCi/L	0.000	47.00	-1.04	
WATER	Cs-137	06 09 95	35	pCi/L	0.354	37.67	0.92	
WATER	H-3	03 10 95	7435	pCi/L	0.193	7355.00	-0.19	
WATER	I-131	02 03 95	100	pCi/L	0.118	97.00	-0.52	
WATER	Sr-89	01 13 95	20	pCi/L	0.354	14.33	-1.96	
WATER	Sr-90	01 13 95	15	pCi/L	0.236	10.33	-1.62	

NOTES:

Normal.: Normalized range. As defined in "Environmental Radioactivity Laboratory Intercomparison Studies Program Fiscal Year 1981 - 1982", Environmental Monitoring Systems Laboratory, U. S. Environmental Protection Agency, P. O. Box 93478, Las Vegas, Nevada, 89193-3478. EPA-600/4-81-004, February, 1981.

N.D.K.: Normalized deviation of the mean from the known value, as defined in EPA-600/4-81-004.

NDP: No data provided. No data was provided to EPA for inclusion in their report.

NA: Not available. Report containing this data has not yet been received from EPA, Las Vegas.



FLORIDA DEPT. OF HRS - EPA INTERLABORATORY CROSS-CHECK PROGRAM DATA

July through December, 1995

Media	Nuclide	Collection			EPA	Units	Normal.	Mean of	N.D.K.	Action
		Mon	Day	Yr	Known		Range	Analyses		Level
FILTER	Alpha	08	25	95	25	pCi/Fil	0.141	28.30	0.91	
FILTER	Beta	08	25	95	86.6	pCi/Fil	0.396	79.57	-1.22	
FILTER	Cs-137	08	25	95	25	pCi/Fil	0.000	28.00	1.04	
FILTER	Sr-90	08	25	95	30	pCi/Fil	0.709	21.33	-3.00	1
MILK	I-131	09	29	95	99	pCi/L	0.295	98.67	-0.06	
MILK	Cs-137	09	29	95	50	pCi/L	0.000	53.00	1.04	
MILK	K	09	29	95	1654	mg/L	0.306	1687.33	0.70	
MILK	Sr-89	09	29	95	20	pCi/L	0.945	12.00	-2.77	
MILK	Sr-90	09	29	95	15	pCi/L	0.945	16.00	0.35	
WATER	Alpha	07	21	95	27.5	pCi/L	0.231	23.33	-1.05	
WATER	Alpha	10	27	95	51.2	pCi/L	0.120	24.90	-3.56	2
WATER	Beta	07	21	95	19.4	pCi/L	0.567	23.60	1.45	
WATER	Beta	10	27	95	24.8	pCi/L	1.413	32.97	2.83	
WATER	Co-60	11	03	95	60	pCi/L	0.236	60.33	0.12	
WATER	Zn-65	11	03	95	125	pCi/L	0.409	134.67	1.29	
WATER	Ba-133	11	03	95	99	pCi/L	0.059	92.67	-1.10	
WATER	Cs-134	11	03	95	40	pCi/L	0.118	37.33	-0.92	
WATER	Cs-137	11	03	95	49	pCi/L	0.354	54.00	1.73	
WATER	H-3	08	04	95	4872	pCi/L			NDP	
WATER	I-131	10	06	95	148	pCi/L	0.039	148.67	0.08	
WATER	Sr-89	07	14	95	20	pCi/L	0.591	8.00	-4.16	3
WATER	Sr-90	07	14	95	8	pCi/L	0.118	9.33	0.46	

NOTES:

- Normal.: Normalized range. As defined in "Environmental Radioactivity Laboratory Intercomparison Studies Program Fiscal Year 1981 - 1982", Environmental Monitoring Systems Laboratory, U. S. Environmental Protection Agency, P. O. Box 93478, Las Vegas, Nevada, 89193-3478. EPA-600/4-81-004, February, 1981.
- N.D.K.: Normalized deviation of the mean from the known value, as defined in EPA-600/4-81-004.
- NDP: No data provided. No data was provided to EPA for inclusion in their report.
- NA: Not available. Report containing this data has not yet been received from EPA, Las Vegas.

ACTION LEVEL:

- (1) Cause: Chemical recoveries too low and inconsistent.  
Corrective Action: Try to improve recovery and consistency.
- (2) Cause: Please see attached note from EPA.  
Corrective Action: Try EPA's suggestions.
- (3) Cause: Insufficient number of counts on sample.  
Corrective Action: Count samples more time.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
NATIONAL EXPOSURE RESEARCH LABORATORY  
P.O. BOX 93478 • LAS VEGAS, NV 89193-3478

OFFICE OF  
RESEARCH AND DEVELOPMENT

A note regarding the Gross Alpha portion of the October 27, 1995  
Gross Alpha-Beta in Water Performance Evaluation Study:

Both the July 1995 and October 1995 Gross Alpha-Beta in Water Performance Evaluation (PE) Studies showed a significant difference between the grand average and the known value for the gross alpha. This strongly implies there is bias in the method. Our research indicates that matrix differences between the salt solids used to prepare the calibration curve and the salts in the sample are the source of the bias.

The attached figure illustrates the changes in efficiency due to salt composition and nuclide energy. The bottom curve was prepared with serial dilutions of laboratory tap water. Laboratory tap water is also used to add variable amounts of dissolved solids to the PE gross alpha/beta study samples. The second curve was prepared with serial dilutions of sodium sulfate solution. The top curve was prepared the same way as the second curve except that Am-241 was used as the alpha emitter. All the usual precautions apply. The curves reflect the efficiencies for our counter; the curves in the figure are illustrative only; and lastly, results for your laboratory may be different than shown in the figure.

At zero mass all the curves converge to the extent that the bias would not be noticeable in a PE study. As the mass of solids increases, the difference between the two Th-230 curves becomes pronounced. For sample masses between 30 and 40 mg, typical range for a 200 mL sample of the July 1995 or October 1995 study, the difference is between 50 to 70 percent.

To address the bias, we are recommending the procedure used in our laboratory. To a volume of sample equal to that used for analysis (100-150 mL) add 120 pCi of Th-230. Acidify the sample with 20-40 mL of concentrated nitric acid and evaporate by the procedure attached to the PE study report sheet. The volume of PE sample provided is sufficient to prepare triplicate 150 mL samples and duplicate spiked samples. Count the spikes until approximately 1600 counts above background are acquired to a maximum of 200 minutes. Background in this case will be that of the PE samples. Subtract the average count rate of the triplicate samples from the average count rate of the spikes and calculate the efficiency. Use this efficiency to calculate the concentration of gross alpha in the PE sample.



An alternate procedure. After counting the triplicates, redissolve/reslurry the solids of two of the samples in the planchet with dilute nitric acid (3-6M). Add the spike, mix well, redry and count the spikes. This technique, though simple on the surface, requires sufficient care so as not to lose sample volume, and that the Th-230 is thoroughly incorporated into the dissolved salts. We recommend this only for laboratories with a high degree of confidence in the analyst's ability to prepare the spikes by this technique.

You may use more or less spiked activity if you choose. The recommended activity of the spike and the maximum count time were determined to provide 5 percent precision at 95 percent confidence for the spike at an efficiency as low as 3 percent. For higher efficiencies the count time will be much shorter than 200 minutes. Additionally, we recommend several practice runs to gain experience with the technique you choose.

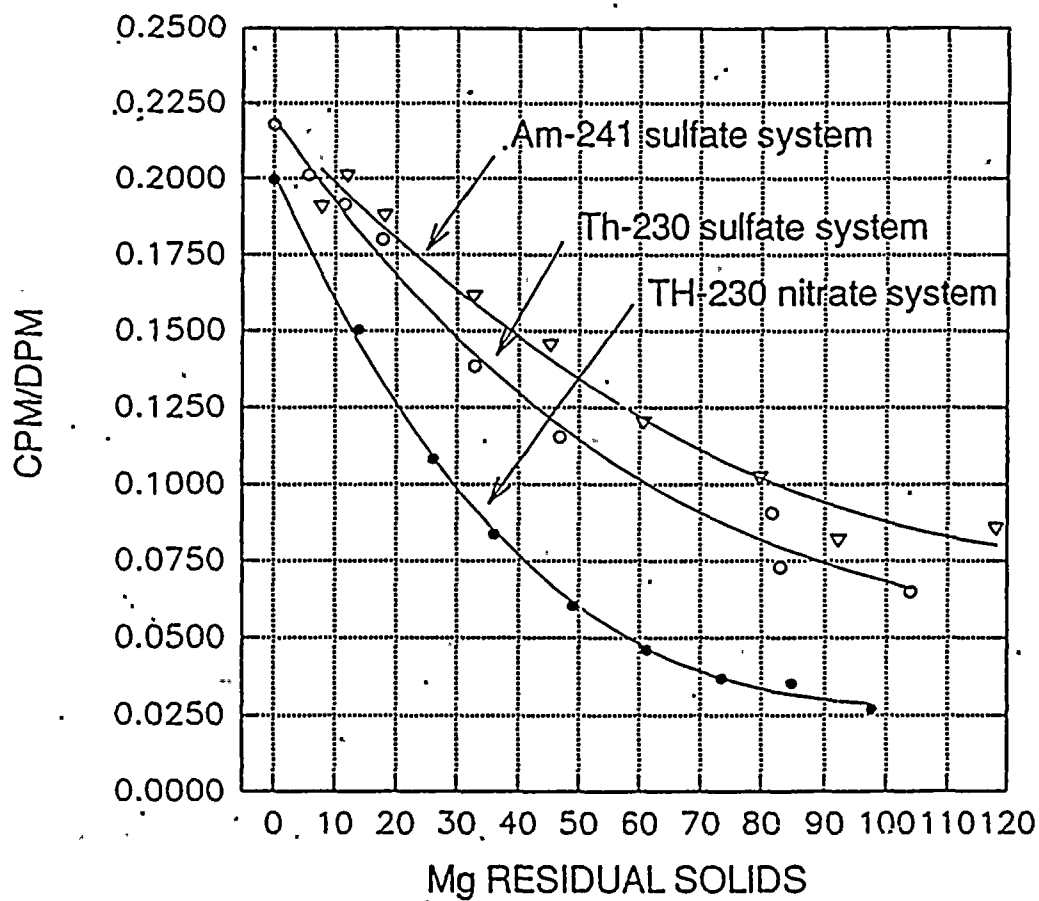
So, why not send out our laboratory tap water and have the participating laboratories prepare a curve? The tap water supplied to our laboratory varies in dissolved salt composition. This was observed during our verification of the July 1995 PE sample. Our QC samples showed a 40 percent bias when samples and spikes were quantified using a calibration curve. Repeat measurements demonstrated the bias was consistent and not due to analyst error. Therefore, preparing a curve with water from our laboratory does not guarantee that the bias will be eliminated.

Collectively these procedures are single point calibration techniques and are not prohibited by the approved methods. The curve concept was introduced in recognition of the variable dissolved solids of water in given geographical areas.

If you have any questions or comments please call Stephen Pia at 702 798-2102.



# ALPHA ATTENUATION CURVES FOR RADQA TENNELEC GP COUNTER



EQUATION:  $Y = A_0 + A_1X + A_2X^2 + A_3X^3$

Th-230 sulfate

$A_0 = 0.2199$

$A_1 = -2.914E-3$

$A_2 = 1.8422E-5$

$A_3 = -4.4449E-8$

Th-230 nitrate

$A_0 = 0.2016$

$A_1 = -4.495E-3$

$A_2 = 3.918E-5$

$A_3 = -1.154E-7$



U.S. AIR FORCE

