

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

TURKEY POINT UNITS 3 & 4

DOCKET NOS. 50-250, 251

DADE COUNTY, FLORIDA

7-1-83 TO 12-31-83

PREPARED FEBRUARY 1984

8504090464 840301
PDR ADOCK 05000250
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I. INTRODUCTION

This report is submitted pursuant to Section 6.9 of the Turkey Point Plant Units 3 & 4 Technical Specifications and provides information and results for environmental samples specified by Table 4.12-1.

Radiological environmental surveillance for the Turkey Point Plant is conducted in accordance with Section 4.12 of the plant's Technical Specifications. A summary of the samples collected and analyses performed during the period July 1, 1983 through December 31, 1983 is provided in Table 1.

1. THE MONITORING PROGRAM

Period Covered: This report covers the period from July 1, 1983 through December 31, 1983.

Analytical Responsibility: Environmental radiological monitoring for the Turkey Point Plant is conducted by the State of Florida, Department of Health and Rehabilitative Services (DHRS). Samples are collected and analyzed by DHRS personnel.

Number of Samples: During the period, a total of 702 samples were collected from 37 different locations to be analyzed for radioactivity. Table 1 summarizes the highest, lowest and mean results for all sample locations, and where applicable the highest, lowest and mean results for the sample locations which yielded the highest mean levels. The values in Table 1 are based upon only those analyses which yielded detectable measurements.

Split-Sample: During the period July 1, 1983 - December 31, 1983, in addition to the samples identified in Table 1, 10 samples were submitted for comparative analysis by the DOE in accordance with the DHRS/DOE split-sampling program.

3. MISSING DATA

Due to the length of time required to perform the analyses, several ^{89}Sr , ^{90}Sr results were not available for this report. When completed, these results will be provided in a supplemental report. Based on past experience, the missing data is not expected to alter any of the conclusions of this report.

A description and explanation for these and other missing data is contained in Table 1.

4. DISCUSSION AND INTERPRETATION OF DATA

Air Monitoring: Continuous air sampling was conducted at 8 different locations surrounding the Turkey Point Plant. Samples were collected and analyzed by Florida DHRS for gross radioactivity and radioiodines (I-131) on a weekly basis. All samples from this reporting period were within the normal range of background measurements. Table 1 provides a summary of these results.

Direct Radiation Monitoring: Continuous monitoring of ambient radiation exposure rate was provided routinely at eleven different sample locations surrounding the Turkey Point Plant. Samples are collected and analyzed by Florida DHRS on a monthly basis. Results are based upon the average readings of two dosimeters at each location. All results from this reporting period were within the normal range of background measurements. Table 1 provides a summary of these results.

Other Samples: In addition to the samples described above, several other environmental samples are routinely collected from areas around the Turkey Point Nuclear Plant. These samples include precipitation, surface water, drinking water, sediment, fish, crustacea, food crops, vegetation, milk, soil and other terrestrial biota. Table 1 provides a summary of the results of these samples from July 1, 1983 through December 31, 1983.

As in the past, tritium was the predominant radionuclide to be detected in water samples from around the Turkey Point Plant, with the highest levels found in water samples taken from within the plant's closed cooling system. The highest tritium concentration measured during this surveillance period was only about 0.23% of the concentration which would be permitted continuously in unrestricted area waters (10CFR20, Appendix B, Table II.) The highest concentration of tritium observed in samples outside of the closed cooling system was only about 0.07% of the unrestricted area concentration. Trend analyses indicate no evidence of continued buildup of tritium around the Turkey Point Plant.

In addition to waterborne tritium, trace concentrations of fission and activation products continue to be detected in some samples taken from within the closed cooling system. These results are consistent with past measurements and data indicate there is no discernable increase in radioactivity in these samples.

The results of radiological measurements for other media and other locations surrounding the Turkey Point Plant do not yield evidence of buildup in the environment when compared to past measurements, including samples collected during the preoperational surveillance program, and elsewhere within the State of Florida.

5. CONCLUSIONS

The concentration of all radionuclides reported in Table 1 is much less than that permitted for release to unrestricted areas as specified in 10 CFR 20, Appendix B, Table II. The Radiological Environmental Monitoring Program establishes that radioactivity released as a result of operation of the Turkey Point Plant Units 3 & 4 is not contributing significantly to the radiation exposure of any individual or population group.

TABLE 1
ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY
NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4 DOCKET NO. 50-250, 251
LOCATION OF FACILITY DADE COUNTY FLORIDA REPORTING PERIOD JULY 1, 1983 - DECEMBER 31, 1983

Page 1 of 11

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾	
1.1 AIR													
1. Particulates	pCi/m ³	Gross B	8	208	208	.015 (208/208)	.005-.035	T56:Princeton Substation (8 miles - NNW)	.017 (26/26)	.008-.035	.014 (26/26)	.008-.023	
2. Radioiodine	pCi/m ³	¹³¹ I	8	208	208	ND	NA	NA	NA	NA	ND	NA	
1.2 DIRECT RADIATION													
1. TLD	uRem/hr	Exposure Rate	11	132	66	4.5 (66/66)	2.3-5.8	T64: Natoma Substation (22 miles - N)	5.6 (6/6)	5.4-5.8	5.6 (6/6)	5.4-5.8	
1.3 PRECIPITATION													
1. Rainwater	pCi/l	Gross B-DS	4	23 ⁴⁾	19 ⁴⁾	4.1 (2/19)	4.0-4.1	T57: Dolan's Farm (4 miles -NW)	4.1 (1/5)	NA	ND	NA	
	"	Gross B-UDS			19 ⁴⁾	ND	NA	NA	NA	NA	ND	NA	
	"	Tritium			23	200 (1/23)	NA	T72:Boy Scout Camp (Unsite - SW)	200 (1/6)	NA	ND	NA	
	"	γ emitting ³⁾ isotopes			23	ND	NA	NA	NA	NA	ND	NA	

DS - Dissolved Solids

UDS - Undissolved Solids

ND - Not Detectable

NA - Not Applicable

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4DUCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1983 - DECEMBER 31, 1983

Page 2 of 11

Medium or Pathway Sampled	Unit	Analysis for	Number of		All Indicator Locations		Location with Highest Mean			Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾

2.1 SURFACE WATERS

1. Estuarine

(Surface Water)

pCi/l	Tritium	10	20	20	2100 (1/20)	NA	T81: Card Sound (6 miles - S)	2100 (1/2)	NA	NA	NA	
"	⁸⁹ Sr			10 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
"	⁹⁰ Sr			10 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
"	γ emitting ³⁾ isotopes			20	ND	NA	NA	NA	NA	NA	NA	

2. Closed Cooling
Canal

(Surface Water)

pCi/l	Tritium	2	12	12	5100 (12/12)	4300- 6800	T94: Closed Cooling Canal (Onsite- SW)	5200 (6/6)	4400- 6800	NA	NA	
"	⁸⁹ Sr			6 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
"	⁹⁰ Sr			6 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
"	γ emitting ³⁾ isotopes			12	ND	NA	NA	NA	NA	NA	NA	

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TABLE 1

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NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1983 - DECEMBER 31, 1983

Page 3 of 3

Medium or Pathway Sampled	Unit	Analysis for	Number of		All Indicator Locations		Location with Highest Mean			Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾	
3. Fresh Water Drainage Canals												
(Surface Water)	pCi/l	Tritium	2	12	12	380 (5/12)	220-560	T75 - Florida City Canal (2 miles - WNW)	380 (5/6)	220-560	NA NA	NA NA
	"	Gross B-DS		10 ⁴⁾	10 ⁴⁾	186 6/10	5-290	T75: Florida City Canal (2 miles - WNW)	220 (5/5)	160-290	NA NA	NA NA
	"	Gross B-UDS		10 ⁴⁾	10 ⁴⁾	ND	NA	NA	NA	NA	NA NA	NA NA
2.2 WELLS												
1. Potable Well Water												
(Drinking Water)	pCi/l	Tritium	3	6	6	ND	NA	NA	NA	NA	NA NA	NA NA
	"	Gross B-DS		6	6	7.1 (4/6)	5-10	T57: Dolan's Farm (4 miles - NW)	8.9 (2/2)	7.7-10	NA NA	NA NA
	"	Gross B-UDS		6	6	ND	NA	NA	NA	NA	NA NA	NA NA
2. Ground Water Wells												
(Ground Water)	pCi/l	Tritium	6	12	12	660 (4/12)	260-1150	T88-Groundwater Well E-14 (5 Miles - S)	870 (2/2)	580-1150	NA NA	NA NA
	"	⁸⁹ Sr		6 ⁴⁾	6 ⁴⁾	ND	NA	NA	NA	NA	NA NA	NA NA
	"	⁹⁰ Sr		6 ⁴⁾	6 ⁴⁾	ND	NA	NA	NA	NA	NA NA	NA NA
	"	emitting ³⁾ isotopes		12	12	ND	NA	NA	NA	NA	NA NA	NA NA

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NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1983 - DECEMBER 31, 1983

Page 4 of 11

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control ²⁾ Location	No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾

3.0 BOTTOM SEDIMENTS1. Closed Cooling
Canal

(Sediment)	pCi/kg	⁸⁹ Sr	2	4	2 ⁴⁾	ND	NA	NA	NA	NA	NA	NA
"	"	⁹⁰ Sr			2 ⁴⁾	ND	NA	NA	NA	NA	NA	NA
"	"	γ emitting ³⁾ isotopes			4							
"	"	1. ⁶⁰ Co				316 (4/4)	290-370	T85-Closed Cooling Canal (Onsite - SW)	33/ (2/2)	303-370	NA	NA
"	"	2. Others				ND	NA	NA	NA	NA	NA	NA

2. Estuarine

(Sediment)

	pCi/kg	⁸⁹ Sr	7	7	7	ND	NA	NA	NA	NA	NA	NA
"	"	⁹⁰ Sr			7	ND	NA	NA	NA	NA	NA	NA
"	"	γ emitting ³⁾ isotopes			7	ND	NA	NA	NA	NA	NA	NA

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Page 5 of 1

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾	

4.0 AQUATIC BIOTA

1. Crustacea

(Blue Crab)

pCi/kg	⁸⁹ Sr	6	6	1 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr			1 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA
"	Yemitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	NA

2. Fish, Carnivore

(Mixed Species)

pCi/kg	⁸⁹ Sr	7	9	6 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr			6 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA
"	Yemitting ³⁾ isotopes			8								
"	1. ¹³⁴ Cs				65 (1/8)	NA	T84 - Closed Cooling Canal (Unsite - SW)	65 (1/2)	NA	NA	NA	NA
"	2. ¹³⁷ Cs				300 (2/8)	260- 340	T84 - Closed Cooling Canal (Unsite - SW)	300 (2/2)	260- 340	NA	NA	NA

TABLE 1

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Page 6 of 11

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean				Control ²⁾ Location	No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾	
3. Fish, Herbivore (Mullet)			6	6									
	pCi/kg	⁸⁹ Sr			5 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
	"	⁹⁰ Sr			5 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
	"	Yenitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	
4. Turtle Grass (Turtle Grass)			6	6									
	pCi/kg	⁸⁹ Sr			4 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
	"	⁹⁰ Sr			4 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	
	"	Yenitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	
5. Sponges (Sponge)			6	6									
	pCi/kg	Yenitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	

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NA - Not Applicable



200

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TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

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Page 7 of 11

Medium or Pathway Sampled	Unit	Analysis for	Number of		All Indicator Locations		Location with Highest Mean			Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾

5.0 TERRESTRIAL

1. Small Animal

(Raccoon)

pCi/kg	⁸⁹ Sr	1	1	1	ND	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr	1		1	ND	NA	NA	NA	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes	1		1	ND	NA	NA	NA	NA	NA	NA	NA

2. Food Crops

(Malanga,
Sugar Cane)

pCi/kg	⁸⁹ Sr	3	3	0 ⁴⁾								
"	⁹⁰ Sr			0 ⁴⁾								
"	γ emitting ³⁾ isotopes	3		3	ND	NA	NA	NA	NA	NA	NA	NA

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Page 8 of 11

Medium or Pathway Sampled.	Unit	Analysis for	Number of		All Indicator Locations		Location with Highest Mean		Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	
3. Milk (Goat Milk)	pCi/l	γ emitting ³⁾ isotopes	1	1	1						
	"	1. ¹³¹ I				ND	NA	NA	NA	NA	NA
	"	2. ¹³⁷ Cs				ND	NA	NA	NA	NA	NA
	"	3. Others				ND	NA	NA	NA	NA	NA
4. Vegetation (Mangrove leaves)	pCi/kg	⁸⁹ Sr	7	7	5 ⁴⁾	ND	NA	NA	NA	ND	NA
	"	⁹⁰ Sr			5 ⁴⁾	5.3 (1/5)	NA	T58: Entrance Road (Unsite - NW)	5.3 (1/1)	ND	NA
	"	γ emitting ³⁾ isotopes			7	ND	NA	NA	NA	ND	NA

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Page 9 of 11

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control ²⁾ Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾	
5. Soil			7	7									
(Soil)	pCi/kg	⁸⁹ Sr...			7	ND	NA	NA	NA	NA	ND	NA	
	"	⁹⁰ Sr...			7	ND	NA	NA	NA	NA	ND	NA	
		Y emitting ³⁾ isotopes			7								
	"	1. ¹³⁷ Cs				170 (6/7)	71-300	T56: Princeton Substation 300 (8 miles - NNW)	NA (1/1)	NA	71 (1/1)	NA	
	"	2. Others				ND	NA	NA	NA	NA	ND	NA	

DS - Dissolved Solids

UOS - Undissolved Solids

ND - Not Detectable

NA - Not Applicable

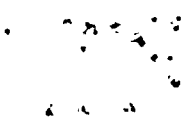


TABLE 1

NOTES

- 1) Mean and Range values based upon data with detectable results only.
(/) Indicates the number of analyses with detectable results compared to the number of analyses performed.
- 2) Control location - T64, Florida Power & Light Company - Natoma Substation (22 Miles - N).
- 3) Excluding Potassium - 40 (^{40}K), Radon - 226 (^{226}Ra), Thorium - 232 (^{232}Th) and Beryllium-7 (^7Be) which are naturally occurring radioisotopes commonly found in many environmental specimens.
- 4) Missing Data

a. Precipitation Sample

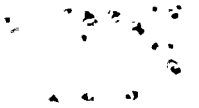
On 11/16/83, a precipitation sample was missed at location T72* because the rain collection barrel had rusted through allowing the sample to leak out. The barrel was replaced and samples were collected at the next scheduled sample period.

b. Gross Beta

Analyses for gross beta for the following samples were incomplete at the time of this report.

<u>Date</u>	<u>Media</u>	<u>Location*</u>
12/13/83	Precipitation	T52
12/13/83	Precipitation	T57
12/13/83	Precipitation	T64
12/13/83	Precipitation	T72
12/13/83	Fresh Water Canal	T75
12/13/83	Fresh Water Canal	T96

* Key to sample locations is provided in Turkey Point Units 3 & 4 Technical Specifications.



b.- 89Sr, 90Sr

Analyses for ⁸⁹Sr and ⁹⁰Sr for the following samples were incomplete at the time of this report.

<u>Date</u>	<u>Media</u>	<u>Location*</u>
07/13/83	Food Crop	T55
08/11/83	Turtle Grass	T66
08/24/83	Food Crop	T52
08/26/83	Crustacea	T95
10/10/83	Estuarine Water	T71
10/10/83	Cooling Canal Water	T84
10/10/83	Cooling Canal Water	T97
10/10/83	Cooling Canal Sediment	T84
10/20/83	Estuarine Water	T69
10/20/83	Estuarine Water	T93
10/20/83	Estuarine Water	T94
10/20/83	Estuarine Water	T95
10/27/83	Estuarine Water	T86
10/27/83	Mangrove Leaves	T86
10/28/83	Estuarine Water	T51
10/28/83	Estuarine Water	T67
10/28/83	Cooling Canal Sediment	T85
10/28/83	Mangrove Leaves	T51
11/02/83	Ground Water	T87
11/02/83	Ground Water	T88
11/02/83	Ground Water	T89
11/02/83	Ground Water	T90
11/02/83	Ground Water	T91
11/02/83	Ground Water	T92
11/08/83	Crustacea	T66
11/08/83	Crustacea	T69
11/08/83	Crustacea	T94
11/16/83	Estuarine Water	T66
11/16/83	Cooling Canal Water	T84
11/16/83	Cooling Canal Water	T97
12/01/83	Estuarine Water	T81
12/01/83	Turtle Grass	T81
12/13/83	Cooling Canal Water	T84
12/13/83	Cooling Canal Water	T97
12/13/83	Crustacea	T81
12/13/83	Fish, Carnivore	T81
12/13/83	Food Crop	T57
12/19/83	Fish, Herbivore	T81

* Key to sample locations is provided in Turkey Point Units 3 & 4 Technical Specifications.

