

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

TURKEY POINT UNITS 3 & 4

DOCKET NOS. 50-250, 251

DADE COUNTY, FLORIDA

1-1-84 TO 6-30-84

PREPARED AUGUST 1984

DATA SUBMITTED BY: FLA. DHRS

DATA REVIEWED AND REPORT PREPARED BY: *J. L. Huls* 08-22-84

REPORT REVIEWED BY: *J. R. Law* 8/27/84

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 January 1, 1984 through June 30, 1984 is provided in Table 1.

1. THE MONITORING PROGRAM

Period Covered: This report covers the period from January 1, 1984 through June 30, 1984.

Analytical Responsibility: Radiological environmental 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 696 samples were collected from 46 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 January 1, 1984 - June 30, 1984, in addition to the samples identified in Table 1, fourteen (14) samples were submitted for comparative analysis by the DOE in accordance with the DHRS/DOE split-sampling program.

3. MISSING DATA

A description and explanation for 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 for 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 were 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 for 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 January 1, 1984 through June 30, 1984.

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 0.19% of the concentration which would be permitted continuously in unrestricted area waters (10CFR20, Appendix B, Table II.) The highest concentration of tritium observed in water samples outside of the closed cooling system was only about 0.01% of the unrestricted area concentration. Trend analyses indicate that there is no evidence of a 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 of the samples taken from within the closed cooling system. These results are consistent with past measurements and data indicate 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. SUMMARY AND CONCLUSIONS

- Continuous air sampling measurements are all within the normal range for background values.
- Continuous ambient radiation exposure rate measurements are all within the normal range for background values.
- Tritium concentrations in water samples collected around the Turkey Point Plant are consistent with past measurements. The highest observed tritium concentrations are found within the plant's closed cooling system. All measurements are well below the concentration permitted by 10CFR20 for unrestricted area waters.
- Radioactivity measured in sediment and biota samples taken from within the closed cooling system (inside the owner controlled area) is consistent with past measurements, with no discernable increase noted.
- Measurements for other media and samples are consistent with past measurements including those taken during the preoperational surveillance program.

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 to any member of the public.

Medium or Pathway Sampled	Unit	Analysis for	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-.033	T51: Homestead Bayfront Park (2 miles - NNW)	.016 (26/26)	.007-.033	.015 (26/26)	.006-.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	65 ⁴⁾	4.9 (65/65)	2.7-6.6	T64: Natoma Substation (22 miles - N)	6.2 (5/5)	5.4-6.6	6.2 (5/5)	5.4-6.6	
1.3 PRECIPITATION													
1. Rainwater	pCi/l	Gross B-DS	4	23 ⁴⁾	22 ⁴⁾	11.0 (11/22)	3.5-28.1	T72: Boy Scout Camp (Onsite - WSW)	14.1 (4/6)	6.7-23.1	8.3 (2/6)	8.1-8.4	
	"	Gross B-UDS			22 ⁴⁾	3.2 (1/22)	NA	T64: Natoma Substation (22 miles - N)	3.2 (1/6)	NA	3.2 (1/6)	NA	
	"	Tritium			23	ND	NA	NA	NA	NA	ND	NA	
	"	γ emitting ³⁾ isotopes			21 ⁴⁾	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 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDA

REPORTING PERIOD

JANUARY 1, 1984 - JUNE 30, 1984

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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

10 20

(Surface Water)	pCi/l	Tritium		20		240 (2/20)	230- 240	T95:Long Arsenieker Key (4 miles - SSE)	240 (1/2)	NA	NA	NA	
"		⁸⁹ Sr		20		ND	NA	NA	NA	NA	NA	NA	
"		⁹⁰ Sr		20		ND	NA	NA	NA	NA	NA	NA	
"		γ emitting ³⁾ isotopes		20		ND	NA	NA	NA	NA	NA	NA	

2. Closed Cooling
Canal

2 12

(Surface Water)	pCi/l	Tritium		12		4700 (12/12)	3300- 5700	T84:Closed Cooling Canal (Onsite- SW)	4900 (6/6)	4100- 5700	NA	NA	
"		⁸⁹ Sr		12		ND	NA	NA	NA	NA	NA	NA	
"		⁹⁰ Sr		12		ND	NA	NA	NA	NA	NA	NA	
"		γ emitting ³⁾ isotopes		12		ND	NA	NA	NA	NA	NA	NA	

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			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	420 (2/12)	330-500	T75 - Florida City Canal (2 miles - WNW)	420 (2/6)	330-500	NA	NA	
	"	Gross B-DS			12	138 (12/12)	3.1-340	T75: Florida City Canal (2 miles - WNW)	270 (6/6)	220-340	NA	NA	
	"	Gross B-UDS			12	ND	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	
	"	Gross B-DS			6	7.5 (6/6)	5.1-12.3	T57: Dolan's Farm (4 miles - NW)	11.0 (2/2)	9.7-12.3	NA	NA	
	"	Gross B-UDS			6	ND	NA	NA	NA	NA	NA	NA	
2. Ground Water Wells													
(Ground Water)	pCi/l	Tritium	6	12	12	260 (4/12)	210-310	T91: Groundwater well G-10A (2 miles - SW)	310 (1/2)	NA	NA	NA	
	"	⁸⁹ Sr			12	ND	NA	NA	NA	NA	NA	NA	
	"	⁹⁰ Sr			12	ND	NA	NA	NA	NA	NA	NA	
	"	γ emitting ³⁾ isotopes			12	ND	NA	NA	NA	NA	NA	NA	

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			Sites	Samples Anal., es	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾

3.0 BOTTOM SEDIMENTS1. Closed Cooling
Canal

2 4

(Sediment)	pCi/kg	⁸⁹ Sr	4	ND	NA	NA	NA	NA	NA	NA	NA
"	"	⁹⁰ Sr	4	ND	NA	NA	NA	NA	NA	NA	NA
"	"	γ emitting ³⁾ isotopes	4								
"	"	1. ⁵⁸ Co		154 (4/4)	45- 430	T84: Closed Cooling Canal (Onsite-SW)	240 (2/2)	60- 430	NA	NA	NA
"	"	2. ⁶⁰ Co		740 (4/4)	320- 1440	T84: Closed Cooling Canal (Onsite-SW)	1140 (2/2)	840- 1440	NA	NA	NA
"	"	3. ¹³⁷ Cs		36 (2/4)	35- 36	T85: Closed Cooling Canal (Onsite-SW)	36 (1/2)	NA	NA	NA	NA
"	"	4. ⁵⁴ Mn		30 (1/4)	NA	T84: Closed Cooling Canal (Onsite-SW)	30 (1/2)	NA	NA	NA	NA
"	"	5. ⁹⁵ Nb		80 (1/4)	NA	T84: Closed Cooling Canal (Onsite-SW)	80 (1/2)	NA	NA	NA	NA
"	"	6. ¹¹³ Sn		13 (1/4)	NA	T84: Closed Cooling Canal (Onsite-SW)	13 (1/2)	NA	NA	NA	NA

2. Estuarine
(Sediment)

7 7

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

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			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	6	ND	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr	6		6	ND	NA	NA	NA	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes	6		6	ND	NA	NA	NA	NA	NA	NA	NA

2. Fish, Carnivore

(Mixed Species)

pCi/kg	⁸⁹ Sr	6	8	6	ND	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr	6		6	ND	NA	NA	NA	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes	8		8								
"	1. ¹³⁷ Cs				200 (2/8)	160- 240	T84 - Closed Cooling Canal (Unsite - SW)	200 (2/2)	160- 240	NA	NA	NA
"	2. Others				ND	NA	NA	NA	NA	NA	NA	NA

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			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range ¹⁾	Mean ¹⁾	Range ¹⁾	
3. Fish, Herbivore (Mullet)	pCi/kg	⁸⁹ Sr	6	6	6	ND	NA	NA	NA	NA	NA	NA	
	"	⁹⁰ Sr			6	ND	NA	NA	NA	NA	NA	NA	
	"	γ emitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	
4. Turtle Grass (Turtle Grass)	pCi/kg	⁸⁹ Sr	6	6	6	ND	NA	NA	NA	NA	NA	NA	
	"	⁹⁰ Sr			6	ND	NA	NA	NA	NA	NA	NA	
	"	γ emitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	
5. Sponges (Sponge)	pCi/kg	γ emitting ³⁾ isotopes	6	6	6	ND	NA	NA	NA	NA	NA	NA	

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			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	ND	NA	NA	NA	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes			1	ND	NA	NA	NA	NA	NA	NA	NA

2. Food Crops

(Malanga, Corn
Potatoes)

pCi/kg	⁸⁹ Sr	3	3	3	ND	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr			3	2.3 (2/3)	1.0- 3.6	T52: Florida City Substation (7 miles W)	3.6 (1/1)	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes			3	ND	NA	NA	NA	NA	NA	NA	NA

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			Sites	Samples	Analyses	Mean ¹⁾	Range ¹⁾	Sample Location Distance & Direction	Mean ¹⁾	Range 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	7	ND	NA	NA	NA	NA	NA
	"	⁹⁰ Sr			7	3.6 (1/7)	NA	T58: Entrance Road (Onsite - NW)	3.6 (1/1)	NA	NA
	"	γ emitting ³⁾ isotopes			7	ND	NA	NA	NA	NA	NA

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			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	
		γ emitting ³⁾ isotopes			7								
	"	1. ¹³⁷ Cs				178 (7/7)	64- 260	T55: Silver Palm Drive (7 miles - NNW)	260 (1/1)	NA	64 (1/1)	NA	
	"	2. Others				ND	NA	NA	NA	NA	ND	NA	

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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

<u>DATE</u>	<u>LOCATION</u>	<u>SAMPLE TYPE</u>	<u>REASON MISSING</u>
02-14-84	T52	Precipitation	Insufficient Precipitation for sample at this location
02-14-84	T57	Precipitation	Sample was collected however sample volume was too small for gamma scan and gross beta analyses
05-15-84	T64	Direct Radiation	The TLD's were collected, but data was lost due to personnel error. TLD's were accidentally zeroed
06-15-84	T52	Precipitation	The gamma scan analysis could not be performed due to laboratory spillage accident

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