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RADIOACTIVE EFFLUENT RELEASE DATA
JULY 1984 THROUGH DECEMBER 1984

SUBMITTED BY
NUCLEAR CHEMISTRY DEPARTMENT
TURKEY POINT PLANT
FLORIDA POWER AND LIGHT COMPANY

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SEMIANNUAL REPORT OF RADIOACTIVE EFFLUENT RELEASES, PTP UNITS 3 & 4 7/84 - 12/84

Introduction

All liquid and airborne discharges to the environment during this reporting period were analyzed in accordance with Technical Specification requirements. The minimum frequency of analysis as required by Safety Guide 21 was met or exceeded.

Liquid Releases

Aliquots of representative pre-release samples were either isotopically analyzed for gamma emitting isotopes on a multichannel analyzer, or evaporated and analyzed for gross beta-gamma activity in a 2π gas flow proportional counter. The efficiency of the gas flow proportional counter is adjusted so that the activity determined by gross beta-gamma analysis approximates the isotopic activities determined by gamma spectrum analysis and selected beta determinations, exclusive of tritium and dissolved gases.

The above procedure was followed for all releases from the waste disposal system and for secondary system batch releases. Frequent periodic sampling and analysis were used to conservatively determine if any radioactivity was being released via the steam generator blowdown system.

The following comments will aid in the interpretation and evaluation of the liquid release data presented in Table I, pages 1 through 3.

1. The reported values in Table I, pages 1 and 2 include in their computation the quantity of radioactivity released from both the waste disposal system and the secondary system. The secondary system releases occurred when contaminated water which entered the plant storm drain system was released.
2. Weekly and monthly composite samples for the waste disposal system were prepared to give proportional weight to each liquid release made during the designated period of accumulation. The composites were analyzed for gamma emitting isotopes on a multichannel analyzer attached to a high resolution



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Ge(Li) detector, and for Sr-89 and Sr-90, using a chemical separation and subsequent beta determination with a 2π gas flow proportional counter. Tritium was determined by use of liquid scintillation techniques and gross alpha radioactivity was determined by use of a 2π gas flow proportional counter. All concentrations for radioactivity determined from analysis of a composite were multiplied by the total represented volume of the liquid waste released to determine the total quantity of each isotope and of gross alpha activity released during the compositing period.

3. At least one representative batch of liquid effluent from the waste disposal system was analyzed monthly for dissolved fission and activation gases by use of gamma spectrum analysis. The resulting isotope concentrations were multiplied by the total volume released for the month in order to estimate the total dissolved gases released. If more than one batch of effluent was analyzed, the concentrations were weighted in an appropriate manner. The results are totaled on a monthly basis in Table I, page 3.
4. Representative samples of secondary system batch releases were analyzed individually for gamma emitting isotopes. Tritium representative composite was made to determine if any tritium was being released due to primary to secondary leakage.
5. The applicable limit for release of radioactive material in liquid waste is five curies per quarter excluding tritium and dissolved gases.

Airborne Releases

Airborne releases to the atmosphere occurred from: release of gas decay tanks, the instrument bleedline, containment purges, and sporadic releases incidental to operation of the plant. The techniques employed in determining the radioactivity in airborne releases are:

- a) Gamma spectrum analysis for fission and activation gases,

- b) Removal of particulate material by filtration and subsequent gamma-spectrum analysis, Sr-89-90 determination, gross alpha analysis, and gross beta-gamma analysis,
- c) Absorption of halogen radionuclides on a charcoal filter and subsequent gamma-spectrum analysis, and
- d) Condensation of water vapor in a gas sample followed by analysis for tritium using liquid scintillation techniques.

All sporadic gas releases from the plant which were not accounted for by the above methods were conservatively estimated as curies of Xe-133 equivalent by use of the plant vent process monitor recorder chart and the current calibration curve for the monitor.

The following comments will aid in the interpretation and evaluation of the airborne release data presented in Table II.

1. Calculation of total radioactivity of noble gases, I-131, and particulates is based upon detectable radionuclides only.
2. The applicable limit for release of total radioactive materials in gaseous waste is 0.012 Ci/sec when averaged over the calendar quarter. The percent of the applicable limit for total gaseous release was computed as follows:

$$\% \text{ of Limit} = \frac{\text{Total curies released in gaseous waste during quarter} \times 100\%}{(.012 \text{ Ci/sec}) (\text{Seconds in quarter})}$$

3. The applicable limit for the release of I-131 and particulate radionuclides with half-lives greater than eight days in airborne waste is:

$$\sum \frac{Q_i}{MPC_i} \leq 10,000 \frac{\text{m}^3}{\text{sec}}, \text{ where } Q_i = \text{release rate of } i^{\text{th}} \text{ nuclide, Ci/sec}$$

and MPC_i = maximum permissible concentration of the i^{th} nuclide, Ci/m³

The release rate, Q_i , was determined by dividing the total activity released in C_i , for the i^{th} nuclide ($t_{1/2} > 8\text{d}$), during the calendar quarter by the seconds in the quarter.

MPC_i values were obtained from 10CFR20, Appendix B, Table II, Column 1. The MPC chosen was the most conservative value of either the soluble or insoluble MPC for each isotope.

The percent of applicable limit was determined as follows

$$\% \text{ of Limit} = \frac{\sum \frac{Q_i}{MPC_i} \times 100\%}{10,000 \text{ m}^3 / \text{sec}}$$

4. The maximum gaseous release rate for each month is listed in Table II, page 1, under Section A, Line 3. The applicable limit for maximum allowable release rate is $6.7 \text{ E}+04 \text{ } \mu\text{Ci/sec}$, averaged over one hour.
5. All values reported in Table II, pages 2 and 3, include the particulate, gaseous, and halogen activity released from the containments during purging, auxiliary building (leakage from pumps, valves, etc), and the gas waste disposal system. If a minimum detectable activity value was not calculated for an isotope, it will be listed as (—).

NUCLEAR CHEMISTRY PROCEDURE NC-3
PREPARATION OF THE MONTHLY "PRELIMINARY REPORT ON RADIOACTIVE RELEASES" AND THE
"RADIOACTIVE EFFLUENT RELEASES" PORTION OF THE SEMIANNUAL OPERATING REPORTTABLE I
Report of Radioactive Effluents: Liquid

A. Gross Radioactivity (β - γ)		JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1. Total Release	(mCi)	9.66E + 00	1.41E + 01	2.18E + 01	6.35E + 00	1.38E + 01	4.08E + 01
2. Avg Concentration During Releases	(μ Ci/ml)	1.60E - 10	2.48E - 10	2.51E - 10	1.31E - 10	2.70E - 10	1.01E - 09
3. Avg Concentration for Month	(μ Ci/ml)	3.01E - 11	5.24E - 11	6.59E - 11	2.76E - 11	5.36E - 11	1.67E - 10
4. Max Concentration Released	(μ Ci/ml)	2.6 E - 09	1.6 E - 09	1.9 E - 09	1.4 E - 09	4.8 E - 09	1.0 E - 08
5. Percent of Technical Specification Limit for Total Activity Released	(%)	9.11E - 01			1.22E + 00		
B. Tritium							
1. Total Release	(Ci)	1.32E + 02	9.46E + 01	1.28E + 02	6.92E + 01	6.35E + 01	7.35E + 01
2. Avg Concentration During Releases	(μ Ci/ml)	2.19E - 06	1.67E - 06	1.47E - 06	1.43E - 06	1.24E - 06	1.81E - 06
3. Avg Concentration for Month	(μ Ci/ml)	4.11E - 07	3.52E - 07	3.85E - 07	3.01E - 07	2.47E - 07	3.01E - 07
C. Dissolved Noble Gas							
1. Total Release	(mCi)	4.47E + 02	1.21E + 02	7.30E + 01	4.80E + 01	4.03E + 00	2.28E + 01
2. Avg Concentration During Releases	(μ Ci/ml)	7.43E - 09	2.11E - 09	8.42E - 10	9.90E - 10	7.89E - 11	5.62E - 10
3. Avg Concentration for Month	(μ Ci/ml)	1.39E - 09	4.46E - 10	2.21E - 10	2.08E - 10	1.57E - 11	9.35E - 11
D. Gross Alpha Radioactivity							
1. Total Release	(mCi)	(<9.84E - 09)	(<3.31E - 09)	(<6.80E - 09)	(<1.00E - 08)	(<9.86E - 09)	(<6.06E - 08)
2. Avg Concentration During Releases	(μ Ci/ml)	(<4.14E - 13)	(<1.31E - 13)	(<2.78E - 13)	(<4.59E - 13)	(<4.13E - 13)	(<3.33E - 12)
3. Avg Concentration for Month	(μ Ci/ml)	(<7.76E - 14)	(<2.77E - 14)	(<7.28E - 14)	(<9.65E - 14)	(<8.20E - 14)	(<5.53E - 13)
E. Volumes							
1. Vol of Liquid Waste to Discharge	(Liters)	2.53E + 06	2.25E + 06	3.55E + 06	2.22E + 06	2.14E + 06	2.22E + 06
2. Vol of Dilution Water During Rel.	(Liters)	6.02E + 10	5.68E + 10	8.67E + 10	4.84E + 10	5.11E + 10	4.05E + 10
3. Vol of Dilution Water for Month	(Liters)	3.21E + 11	2.69E + 11	3.31E + 11	2.30E + 11	2.57E + 11	2.44E + 11

NOTE: Numbers in parentheses represent maximum sensitivity in μ Ci/ml.

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TABLE I
Report of Radioactive Effluents: Liquid - Total

Isotope	Unit	July	August	September	October	November	December
Ag-110M	mCi	2.32E-01	1.06E-01	1.34E-01	(<4.3 E-08)	8.04E-02	1.01E-01
Ba-140	mCi	(<7.6 E-07)	(<5.8 E-07)	(<4.4 E-07)	(<2.3 E-07)	(<5.1 E-07)	(<5.7 E-07)
Co-57	mCi	(<5.8 E-08)	(<7.5 E-08)	(<4.9 E-08)	(<2.6 E-08)	(<3.7 E-08)	1.97E-02
Co-58	mCi	2.47E+00	9.84E-01	1.20E+00	1.65E+00	5.52E+00	1.50E+01
Co-60	mCi	2.72E+00	2.66E+00	2.93E+00	1.18E+00	2.27E+00	1.62E+01
Cr-51	mCi	7.06E-01	3.30E-01	(<6.5 E-07)	4.24E-01	1.06E+00	(<1.5 E-06)
Cs-134	mCi	9.50E-01	2.64E-01	3.20E+00	3.66E-01	9.33E-01	2.22E+00
Cs-137	mCi	1.50E+00	4.36E-01	7.07E+00	7.70E-01	1.91E+00	4.28E+00
Fe-59	mCi	(<2.1 E-07)	(<2.0 E-07)	(<1.1 E-07)	(<9.6 E-08)	1.17E-01	1.70E-01
I-131	mCi	5.56E-02	(<1.6 E-07)	1.67E-01	7.28E-01	1.12E-01	(<2.8 E-07)
La-140	mCi	6.52E-02	1.44E-02	(<3.4 E-08)	(<2.3 E-08)	(<4.2 E-08)	2.12E-02
Mn-54	mCi	6.54E-02	(<1.1 E-07)	4.97E-02	(<3.8 E-08)	2.00E-01	1.01E+00
Nb-95	mCi	(<1.2 E-07)	(<1.1 E-07)	(<5.7 E-08)	3.79E-02	(<7.7 E-08)	2.37E-02
Ru-103	mCi	(<1.2 E-07)	(<9.6 E-08)	(<9.2 E-08)	(<4.9 E-08)	3.63E-02	(<2.3 E-07)
Sb-124	mCi	(<1.3E -07)	5.51E-01	4.03E-01	(3.8 E-08)	2.52E-01	(<1.5 E-07)
Sb-125	mCi	7.58E-01	8.73E+00	6.70E+00	1.13E+00	1.27E+00	1.77E+00
Sr-89	mCi	1.44E-01	2.19E-02	(<8.42E-09)	5.99E-02	(<9.08E-09)	7.19E-02
Total	mCi	9.66E+00	1.41E+01	2.18E+01	6.35E+00	1.38E+01	4.08E+01

NOTE: Numbers in parentheses represent maximum sensitivity in $\mu\text{Ci/ml}$.

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TABLE I
Report of Radioactive Effluents: Liquid - Dissolved Gas

Total		July	August	September	October	November	December
Kr 85	mCi	(<1.01E-05)	(<6.6 E-06)	(<8.59E-06)	(<1.95E-05)	(<7.18E-06)	(<1.29E-05)
Kr 85m	mCi	2.38E-01	(<6.9E-08)	(<5.11E-08)	(<1.00E-07)	(<5.04E-08)	(<6.44E-08)
Xe-131m	mCi	3.11E+00	(<1.17E-06)	(<1.42E-06)	(<2.88E-06)	(<9.54E-07)	(<1.23E-06)
Xe-133	mCi	4.28E+02	1.18E+02	7.10E+01	4.80E+01	2.91E+00	2.26E+01
Xe-133m	mCi	6.81E+00	1.39E+00	1.24E+00	(<6.42E-07)	(<2.18E-07)	(<2.88E-07)
Xe-135	mCi	8.69E+00	1.44E+00	7.31E-01	(<8.16E-08)	7.49E-01	1.73E-01
	mCi						
	mCi						
	mCi						
	mCi						
	mCi						

NOTE: Numbers in parentheses represent maximum sensitivity in $\mu\text{Ci/ml}$.

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7/30/81

PAGE 1

TABLE II
Report of Radioactive Effluents: Airborne

A. Fission and Activation Gases	July	August	September	October	November	December
1. Total Release (Ci)	9.98E+02	4.16E+02	1.01E+03	1.39E+02	8.17E+01	1.55E+02
2. Avg Release Rate for Period (μ Ci/sec)	3.30E+02	1.73E+02	3.34E+02	5.74E+01	3.38E+01	5.44E+01
*3. Max Release Rate for Period (μ Ci/sec)	5.19E+03	4.53E+03	7.75E+03	1.57E+03	1.53E+04	2.97E+03

*Maximum airborne release rate averaged over one hour for each month. Technical Specifications limit is 6.7 E+04 μ Ci/s averaged over one hour.

B. Iodine - 131						
1. Total Iodine - 131 (Ci)	2.50E-03	1.10E-03	1.70E-03	5.63E-03	1.24E-03	6.69E-04
2. Avg Release Rate for Period (μ Ci/sec)	8.28E-04	4.55E-04	5.63E-04	2.33E-03	5.12E-04	2.35E-04

C. Particulates						
1. Particulates (with $t_{1/2} > 8$ days) (Ci)	2.58E-05	8.94E-06	1.37E-05	1.25E-05	2.27E-06	5.83E-06
2. Avg Release Rate for Period (μ Ci/sec)	8.54E-06	3.69E-06	4.54E-06	5.17E-06	9.38E-07	2.01E-06
3. Gross Alpha Radioactivity (Ci)	9.02E-08	1.08E-07	1.10E-07	2.60E-08	7.83E-08	4.80E-08

D. Tritium						
1. Total Release (Ci)	1.01E-01	2.68E-02	9.32E-03	1.78E-02	2.29E-02	2.57E-02
2. Avg Release Rate for Period (μ Ci/sec)	3.34E-02	1.11E-02	3.09E-03	7.36E-03	9.46E-03	9.02E-03

E. Percent of Applicable Limit		
1. Fission and Activation Gases (%)	2.54E+00	3.94E-01
2. I-131 and Part ($t_{1/2} > 8d$) (%)	6.68E-02	9.48E-02

NOTE: Numbers in parentheses represent maximum sensitivity in μ Ci/ml.

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TABLE II
Airborne Releases - Particulates

Isotope	Unit	July	August	September	October	November	December
Ba-140	Ci	(<1.5 E-13)	(<1.3 E-13)	(<4.8 E-14)	(<6.0 E-14)	(<5.4 E-14)	(<5.6 E-14)
Co-58	Ci	1.3E-06	1.14E-06	2.34E-06	5.61E-06	(<1.6E -14)	3.29E-06
Co-60	Ci	1.15E-05	4.42E-06	5.40E-06	8.04E-07	2.4 E-07	(<3.5E-14)
Cs-134	Ci	1.6 E-06	(<3.5 E-14)	1.34E-06	(<2.2 E-14)	(<2.1 E-14)	(<7.2 E-14)
Cs-137	Ci	6.0 E-06	2.89E-06	2.86E-06	2.91E-06	7.5 E-07	2.06E-06
I-131	Ci	1.2 E-06	(<3.0 E-14)	1.75E-06	2.47E-06	6.1E-07	3.70E-07
La-140	Ci	3.7 E-06	(<4.4 E-14)	(<1.0 E-14)	(<1.8 E-14)	(<1.8 E-14)	(<2.1 E-14)
Sr-89	Ci	4.88E-07	4.88E-07	(<8.11E-06)	6.7 E-07	6.7 E-07	1.08 E-07
Total	Ci	2.58E-05	8.94E-06	1.37E-05	1.25E-05	2.27E-06	5.83E-06

NOTE: Numbers in parentheses represent maximum sensitivity in $\mu\text{Ci/ml}$.

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TABLE II
Airborne Releases - Gaseous

Fission and Activation Gases		July	August	September	October	November	December
Isotope	Unit						
Ar-41	Ci	6.01E-01	2.53E-01	6.20E-01	1.94E-01	5.74E-01	6.83E-01
Kr-85	Ci	5.01E+00	3.17E+00	4.39E+00	5.75E+00	2.27E+00	9.39E+00
Kr-85m	Ci	5.38E-02	1.77E-02	2.99E-02	1.13E-02	4.00E-03	8.51E-03
Kr-87	Ci	(<9.21E-05)	(<3.11E-05)	(<3.93E-06)	(<6.57E-05)	(<5.02E-05)	3.34E-06
Kr-88	Ci	7.38E-03	5.23E-03	4.42E-04	1.87E-05	1.78E-05	(<9.23E-05)
Xe-131m	Ci	2.29E+00	1.50E+00	1.97E+00	1.31E+00	2.61E-01	1.12E+00
Xe-133	Ci	9.86E+02	4.09E+02	1.00E+03	1.31E+02	7.74E+01	1.42E+02
Xe-133m	Ci	1.81E+00	1.79E+00	1.95E+00	2.00E-01	8.00E-01	5.46E-01
Xe-135	Ci	2.38E+00	6.86E-01	7.82E-01	4.21E-01	3.95E-01	4.04E-01
Xe-135m	Ci	(<2.99E-04)	(<4.93E-05)	(<7.41E-05)	(<9.05E-05)	(<8.06E-05)	7.69E-05
Xe-138	Ci	(<1.37E-03)	(<9.75E-05)	(<9.32E-05)	(<9.03E-05)	(<8.18E-05)	(<8.46E-05)
Total	Ci	9.98E+02	4.16E+02	1.01E+03	1.39E+02	8.17E+01	1.55E+02

Halogens (Gaseous)		July	August	September	October	November	December
Isotope	Unit						
I-131	Ci	2.5 E-03	1.10E-03	1.70E-03	5.63E-03	1.24E-03	6.69E-04
I-133	Ci	7.4 E-04	4.45E-04	5.46E-04	1.12E-04	4.45E-04	1.18E-04
I-135	Ci	(<2.1 E-13)	(<1.9 E-13)	(<3.2 E-13)	(<1.6 E-13)	(<2.3 E-13)	(<2.1 E-13)
Br-82	Ci	1.49E-04	1.74E-04	6.54E-05	(<9.3 E-14)	1.59E-04	4.97E-05
Total	Ci	2.39E-03	1.72E-03	2.31E-03	5.74E-03	1.84E-03	8.37E-04

Note: Numbers in parentheses represent maximum sensitivity in $\mu\text{Ci/ml}$.



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TURKEY POINT UNITS NO. 3 & 4
RADIOACTIVE EFFLUENT RELEASE DATA
JULY 1984 THROUGH DECEMBER 1984
SOLID WASTE

<u>DATE OF SHIPMENT</u>	<u>CURIES</u>	<u>CUBIC FEET</u>	<u>SHIPPED TO:</u>
07-06-84	151.4	84	BARNWELL, S.C.
07-13-84	75.93	84	BARNWELL, S.C.
07-16-84	1.508	200	BARNWELL, S.C.
07-18-84	.094	1050	HANFORD, WA.
07-20-84	4.379	170	BARNWELL, S.C.
08-06-84	60.8	84	BARNWELL, S.C.
08-07-84	1.963	170	BARNWELL, S.C.
08-09-84	.548	170	BARNWELL, S.C.
08-22-84	.122	1050	BARNWELL, S.C.
09-12-84	.040	1050	BARNWELL, S.C.
09-17-84	154.42	84	BARNWELL, S.C.
09-27-84	.073	1050	HANFORD, WA.
10-04-84	.044	1050	BARNWELL, S.C.
10-10-84	.048	1050	HANFORD, WA.
10-22-84	1.192	84	BARNWELL, S.C.
10-25-84	.134	1050	HANFORD, WA.
11-01-84	3.002	170	BARNWELL, S.C.
11-08-84	4.201	170	BARNWELL, S.C.
11-13-84	2.510	170	BARNWELL, S.C.
11-20-84	.098	1050	BARNWELL, S.C.
12-04-84	.036	1050	HANFORD, WA.
12-11-84	9.114	170	BARNWELL, S.C.
12-21-84	.056	1050	BARNWELL, S.C.

23 SHIPMENTS

471.712 CURIES

12,310 CUBIC FEET

ON SITE AS OF
JANUARY 1, 1985

20.200 CURIES

3830 CUBIC FEET

RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

TURKEY POINT UNITS 3 & 4

DOCKET NOS. 50-250, 251

DADE COUNTY, FLORIDA

7-1-84 TO 12-31-84

PREPARED FEBRUARY 1984

DATA SUBMITTED BY: FLA. DHRS

DATA REVIEWED AND REPORT PREPARED BY: RJ Gould 02/25/85

REPORT REVIEWED BY: JL Ranch 02/25/85



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, 1984 through December 31, 1984 is provided in Table 1.

1. THE MONITORING PROGRAM

Period Covered: This report covers the period from July 1, 1984 through December 31, 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.

* The contents and format of this report conform to the Technical Specifications that were in effect during the period, July 1, 1984 - December 31, 1984.

Number of Samples: During this surveillance period, a total of 694 samples were collected from 46 different sample 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 yielding 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, 1984 - December 31, 1984, in addition to the samples identified in Table 1, twelve (12) 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. Air samples from this reporting period were within the range expected 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 expected for background measurements. Table 1 provides a summary of these results.

Other Samples: In addition to the samples described above, several other environmental samples were collected from areas around the Turkey Point Nuclear Plant. These samples included 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, 1984 through December 31, 1984.

As in the past, tritium was the predominant radionuclide to be detected in samples around the Turkey Point Plant. The highest values for tritium were from 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 tritium observed in samples from outside of the closed cooling system was only about 0.01% of the unrestricted area concentration. Trend analysis indicates that tritium is not increasing.

In addition to waterborne tritium, trace concentrations of fission and activation products were 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 build-up in the environment when compared to past measurements, including samples collected during the preoperational surveillance program, and elsewhere within the State of Florida.

5. DAIRY HERD SURVEY

The results of a Dairy Herd Survey conducted by the Department of Health and Rehabilitative Services in August 1984 is provided in Table 2, Dairy Herd Survey Summary.

6. SUMMARY AND CONCLUSIONS

July 1, - December 31, 1984

- Continuous air sampling measurements are all within the range expected for background values.
- Continuous ambient radiation exposure rate measurements are all within the range expected for background values.
- Tritium concentrations in water samples collected around the Turkey Point Plant are consistent with past measurements and are not increasing. 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 from within the closed cooling system 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 concentrations of all radionuclides reported in Table 1 are 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 substantiates 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.

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, 1984 - DECEMBER 31, 1984

Page 1 of 10

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 <u>AIR</u>													
1. Particulates	pCi/m ³	Gross B	8	208	208	.014 (208/208)	.006-.042	T51: Homestead Bayfront Park (2 miles - NNW)	.015 (26/26)	.007-.042	.014 (26/26)	.006-.020	
2. Radioiodine	pCi/m ³	¹³¹ I	8	208	208	ND	NA	NA	NA	NA	ND	NA	
1.2 <u>DIRECT RADIATION</u>													
1. TLD	uRem/hr	Exposure Rate	11	132	66	4.7 (66/66)	2.4-6.9	T64: Natoma Substation (22 miles - N)	6.2 (6/6)	4.9-6.9	6.2 (6/6)	4.9-6.9	
1.3 <u>PRECIPITATION</u>													
1. Rainwater	pCi/l	Gross B-DS	4	23 ⁴⁾	23	4.0 (7/23)	3.3-5.2	T57: Dolan's Farm (4 miles - NW)	4.2 (2/6)	4.2-4.2	3.3 (1/6)	NA	
	"	Gross B-UDS			23	ND	NA	NA	NA	NA	ND	NA	
	"	Tritium			23	250 (1/23)	NA	T72: Boy Scout Camp (On-Site - WSW)	250 (1/5)	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 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1984 - DECEMBER 31, 1984

Page 2 of 10

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			270 (1/20)	NA	T81:Card Sound (6 miles - S)	270 (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			6100 (12/12)	5400- 6800	T84:Closed Cooling Canal (Onsite- SW)	6200 (6/6)	5800- 6500	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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UDS - Undissolved Solids

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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

JULY 1, 1984 - DECEMBER 31, 1984

Page 3 of 10

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			2	12									
(Surface Water)	pCi/l	Tritium			12	330 (1/12)	NA	T75 - Florida City Canal (2 miles - WNW)	330 (1/6)	NA	NA	NA	
	"	Gross B-DS			12	150 (12/12)	3.0- 370	T75: Florida City Canal (2 miles - WNW)	300 (6/6)	250- 370	NA	NA	
	"	Gross B-UDS			12	ND	NA	NA	NA	NA	NA	NA	
2.2 <u>WELLS</u>													
1. Potable Well Water			3	6									
(Drinking Water)	pCi/l	Tritium			6	ND	NA	NA	NA	NA	NA	NA	
	"	Gross B-DS			6	6.8 (6/6)	5.4-8.2	T57: Dolan's Farm (4 miles - NW)	7.0 (2/2)	6.7-7.4	NA	NA	
	"	Gross B-UDS			6	ND	NA	NA	NA	NA	NA	NA	
2. Ground Water Wells			6	12									
(Ground Water)	pCi/l	Tritium			12	280 (1/12)	NA	T87: Groundwater well E-10 (2 miles - S)	280 (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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UDS - Undissolved Solids

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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

JULY 1, 1984 - DECEMBER 31, 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⁾	

3.0 BOTTOM SEDIMENTS1. Closed Cooling
Canal

2 4

(Sediment)	pCi/kg	⁸⁹ Sr	4	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	"	⁹⁰ Sr	4	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	"	γ emitting ³⁾ isotopes	4									
1. ⁶⁰ Co				290 (4/4)	220- 370	T84: Closed Cooling Canal (Onsite-SW)	330 (2/2)	290- 370	NA	NA	NA	NA
2. ¹³⁷ Cs				25 (3/4)	24- 25	T84: Closed Cooling Canal (Onsite-SW)	25 (1/2)	NA	NA	NA	NA	NA
3. ⁹⁵ Nb				46 (1/4)	NA	T84: Closed Cooling Canal (Onsite-SW)	46 (1/2)	NA	NA	NA	NA	NA

2. Estuarine
(Sediment)

7 7

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

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TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1984 - DECEMBER 31, 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⁾	

4.0 AQUATIC BIOTA

1. Crustacea

(Blue Crab)

pCi/kg	⁸⁹ Sr	6	6	5 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr			5 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	NA	NA

2. Fish, Carnivore

(Mixed Species)

pCi/kg	⁸⁹ Sr	7	7	5 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr			5 ⁴⁾	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	γ emitting ³⁾ isotopes			7									
"	1. ¹³⁷ Cs				140 (1/7)	NA	T84 - Closed Cooling Canal (Onsite - SW)	140 (1/1)	NA	NA	NA	NA	NA
"	2. ¹³⁴ Cs				20 (1/7)	NA	T84 - Closed Cooling Canal (Onsite - SW)	20 (1/1)	NA	NA	NA	NA	NA
"	3. ⁶⁰ Co				28 (1/7)	NA	T84-Closed Cooling Canal (Onsite - SW)	28 (1/1)	NA	NA	NA	NA	NA

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NA - Not Applicable

TABLE 1

ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4 DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1984 - DECEMBER 31, 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⁾	
3. Fish, Herbivore (Mullet)			6	6									
	pCi/kg	⁸⁹ Sr			4)	ND	NA	NA	NA	NA	NA	NA	
	"	⁹⁰ Sr			5)	ND	NA	NA	NA	NA	NA	NA	
	"	γ emitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	
4. Turtle Grass (Turtle Grass)			6	6									
	pCi/kg	⁸⁹ Sr			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)			6	6									
	pCi/kg	γ emitting ³⁾ isotopes			6	ND	NA	NA	NA	NA	NA	NA	

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ENVIRONMENTAL RADIOLOGICAL MONITORING PROGRAM SUMMARY

NAME OF FACILITY TURKEY POINT PLANT UNITS 3 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JULY 1, 1984 - DECEMBER 31, 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⁾	

5.0 TERRESTRIAL

1. Small Animal

(Raccoon)

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

2. Food Crops

(Malanga,
Sorghum)

pCi/kg	⁸⁹ Sr	3	3	3	ND	NA	NA	NA	NA	NA	NA	NA	NA
"	⁹⁰ Sr			3	4.2 (3/3)	4.1- 4.3	T57: Dolan's Farm (4 miles - NW)	4.3 (1/1)	NA	NA	NA	NA	NA
	γ emitting ³⁾ isotopes			3	ND	NA	NA	NA	NA	NA	NA	NA	NA

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UDS - Undissolved Solids

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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, 1984 - DECEMBER 31, 1984

Page 8 of 10

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. Milk (Goat Milk)	pCi/l	γ emitting ³⁾ isotopes	1	2	2								
	"	1. ¹³¹ I				ND	NA	NA	NA	NA	NA	NA	
	"	2. ¹³⁷ Cs				11 (1/2)	NA	T99: 24000 SW 167 Ave (11 miles - NW)	11 (1/2)	NA	NA	NA	
	"	3. Others				ND	NA	NA	NA	NA	NA	NA	
4. Vegetation (Mangrove leaves)	pCi/kg	⁸⁹ Sr	7	7	7	ND	NA	NA	NA	NA	ND	NA	
	"	⁹⁰ Sr			7	4.7 (1/7)	NA	T58: Entrance Road (Onsite - NW)	4.7 (1/1)	NA	ND	NA	
	"	γ emitting ³⁾ isotopes			7								
	"	1. ¹³⁷ Cs				7 (1/7)	NA	T51: Homestead Bayfront Park (2 miles - NNW)	7 (1/1)	NA	ND	NA	

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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

JULY 1, 1984 - DECEMBER 31, 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⁾	
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				172 (7/7)	39- 390	T56: Princeton Substation (8 miles - NNW)	390 (1/1)	NA	39 (1/1)	NA
	"	2.Others				ND	NA	NA	NA	NA	ND	NA

DS - Dissolved Solids

UDS - 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), Beryllium-7 (^7Be) and Uranium ($^{235}, ^{238}\text{U}$) which are naturally occurring radioisotopes commonly found in the Florida environment.
- 4) Missing Data

<u>DATE</u>	<u>LOCATION*</u>	<u>SAMPLE TYPE</u>	<u>REASON MISSING</u>
12-18-84	T72	Precipitation	Insufficient Precipitation for sample at this location

The following $^{89,90}\text{Sr}$ sample results are missing because of incomplete analyses. If positive results are obtained, they will be provided in a supplement to this report.

12-10-84	T81	Fish, Herbivore	Incomplete $^{89,90}\text{Sr}$ analysis
12-27-84	T81	Fish, Carnivore	Incomplete $^{89,90}\text{Sr}$ analysis
12-27-84	T81	Crustacea	Incomplete $^{89,90}\text{Sr}$ analysis

- * A key to the sample locations is provided in Turkey Point Units 3 & 4 Technical Specifications.

TABLE 2
 Turkey Point Plant
 Unit Nos. 3 & 4
 Dairy Herd Survey Summary
 August 1-3, 1984

The following information is summarized from a Dairy Herd Survey that was conducted by the State of Florida, Department of Health and Rehabilitative Services.

COWS

(Potentially) milk producing cows were observed at the following referenced locations.

<u>Sector</u>	<u>Distance (miles) from plant</u>	<u>No. Observed</u>	<u>Address</u>
NNW	11.6	5	0.1 mile West of intersection of S.W. 248 St. and S.W. 117 Ave.
NW	10.2	5	Corner of SW 264 St. and SW 167 Ave.
NW	13.0	2	17905 SW 216 St.
NW	15.3	4	20600 SW 198 Ave.
NW	15.7	10	0.05 miles South of 21250 SW 198 Ave.
NW	15.8	1	21401 SW 216 St.
WNW	14.2	1	25000 SW 207 Ave.
WNW	14.3	1	One block North of SW 248 St. at House No. 20790
WNW	15.0	2	24745 SW 217 Ave.

Goats

(Potentially) milk producing goats were observed at the following referenced locations.

<u>Sector</u>	<u>Distance (miles) from plant</u>	<u>No. Observed</u>	<u>Address</u>
NNW	9.8	60	13401 SW 224 St.
NW	10.2	5	Corner of SW 264 St. and SW 167 Ave.
*NW	11.2	3	24000 SW 167 Ave.
NW	11.2	5	16630 SW 234 St.
NW	14.0	6	0.2 miles West of intersection of SW 192 Ave. and SW 216 St.
NW	15.8	17	21401 SW 216 St.
WNW	15.2	Count not available	24401 SW 217 Ave.
WNW	19.8	1	25254 SW 207 Ave.
WNW	20.1	8	20930 SW 248 St.

*Site of HRS milk sample.

