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RADIOLOGICAL ENVIRONMENTAL MONITORING REPORT

TURKEY POINT UNITS 3 & 4

DOCKET NOS. 50-250, 251

DADE COUNTY, FLORIDA

1-1-82 TO 6-30-82

PREPARED AUGUST 1982

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## 1. INTRODUCTION

This report is submitted pursuant to Section 6.9 of the Turkey Point Plant Units 3 & 4 Technical Specifications.

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, 1982 through June 30, 1982 is provided in Table 1.

## 2. THE MONITORING PROGRAM

Period Covered: This report covers the period from January 1, 1982 through June 30, 1982.

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

Number of Samples: During the period, a total of 687 samples were collected from 35 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.

For any sample yielding detectable results, the number of samples with detectable results compared to the total number of samples collected for that analysis is also indicated.

Split-Sample: During the period January 1, 1982 - June 30, 1982, 14 samples were collected for comparative analysis by the DOE in accordance with the DHRS/DOE split-sampling program.

Missing Data: Radiation exposure rates on samples collected during January, February and March 1982 have not been reported by DHRS for the locations specified by Table 4.12-1 of the plant's Technical Specifications. See Section 3 of this report for more detailed information.

### 3. DISCUSSION AND INTERPRETATION OF DATA

Air Monitoring: Continuous air sampling is conducted at 8 different locations surrounding the Turkey Point Plant. Samples are 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 is provided routinely at eleven different sample locations surrounding the Turkey Point Plant. Samples are collected and analyzed by Florida DHRS on a monthly basis.

Due to an instrument malfunction which produced suspiciously low readings in some samples, the reporting of all readings for the TLD samples collected during the first three months of this period has been deferred until the results have been carefully studied as to their validity. In addition to the eleven sample locations monitored for exposure rate on a monthly basis however, Florida DHRS has an additional forty two dosimeters (two at each of twenty-one locations) deployed around Turkey Point Plant. These samples are collected and analyzed by DHRS semi-annually. Results for these dosimeters which were collected and analyzed in March are all within the normal range of background. The period covered overlaps the period of unreported data. These results are reported in Table 1.

Results from the second three months of this period are all within normal range of background measurements. Table 1 provides a summary of these results.

#### OTHER SAMPLES

In addition to the air and dosimeter samples previously discussed, several other environmental samples are collected from areas surrounding the Turkey Point Plant. Samples of water, drinking water, sediment, aquatic biota and terrestrial samples including food crops, soil, vegetation and other terrestrial biota are collected and analyzed by DHRS personnel.

These results for the period January 1, - June 30, 1982, are summarized in Table 1. Except as noted below, the results of all environmental sampling



indicates that radioactivity levels in the area around the Turkey Point Plant are within the normal range of background measurements.

The average concentration of tritium in water samples collected from the Turkey Point closed cooling canal system during this period was 3970 pCi/l.

Because some interchange occurs with the groundwater, tritium was sometimes detected, although at much lower concentrations, in water samples from sites adjacent to the cooling system. Other than naturally occurring radioactivity and tritium, no other isotopes were detected in any of these water samples. Low levels of cobalt and cesium were found however, in some samples of bottom sediment collected from inside the closed cooling system. These observations are consistent with what has been observed from previous surveillance periods, with no evidence of a continuing buildup.

The concentration of tritium in the Turkey Point closed cooling system is equivalent to approximately 0.13 percent of the unrestricted area concentration limit specified by 10CFR 20.106. Further, although the Turkey Point cooling system is saline and therefore not fit as a source of drinking water, the concentration of radioactivity is still well below established federal standards for community drinking water systems.

#### 4. 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 & 4DOCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
<b>1.1 AIR</b>			<u>8</u>	<u>415</u>									
1. Particulates	pCi/m <sup>3</sup>	Gross B	8	207	207 <sup>5)6)</sup>	.019 (207/207)	.001-.048	T64-Natoma Substation (22 miles - N)	.020 (26/26)	.001-.039	.020 (26/26)	.001-.039	
2. Radioiodine	pCi/m <sup>3</sup>	<sup>131</sup> I	8	208	208 <sup>5)</sup>	ND	NA	NA	NA	NA	ND	NA	
<b>1.2 DIRECT RADIATION</b>			<u>11</u>	<u>132</u>									
1. TLD	uRem/hr	Exposure Rate	11	132	66 <sup>3)7)</sup>	4.8 (66/66)	2.3-6.3	T64-Natoma Substation (22 miles - N)	6.0 (6/6)	5.5-6.3	6.0 (6/6)	5.5-6.3	
<b>1.3 PRECIPITATION</b>			<u>4</u>	<u>17</u>									
1. Rainwater			4	17									
Rainwater	pCi/l	Gross B-DS			17	5.7 (12/17)	1.0-22.8	T52-Florida City Substation (7 Miles-W)	9.6 (5/5)	1.5-22.8	1.8 (2/3)	1.0-2.7	
	"	Gross B-UDS			17	4.3 (2/17)	2.7-5.9	T52-Florida City Substation (7 Miles-W)	4.3 (2/5)	2.7-5.9	ND	NA	
	"	Tritium			17	ND	NA	NA	NA	NA	ND	NA	
	"	Y-emitting <sup>4)</sup> isotopes			17	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 JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
2.1 <u>SURFACE WATERS</u>			<u>14</u>	<u>44</u>									
1. Estuarine			10	20									
Surface Water	pCi/l	Tritium			20	260 (1/20)	NA	T81 - Card Sound (6 miles - S)	260 (1/2)	NA	NA	NA	
	"	<sup>89</sup> Sr			20	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			20	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			20	ND	NA	NA	NA	NA	NA	NA	
2. Cooling Canal			2	12 <sup>5)</sup>									
Surface Water	pCi/l	Tritium			12	3970 (12/12)	3000-5800	T84-Closed Cooling Canal (Onsite - SW)	4083 (6/6)	3100-5800	NA	NA	
	"	<sup>89</sup> Sr			12	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			12	1.1 (1/12)	NA	T97 - Loch Rosetta (Onsite - E)	1.1 (1/6)	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			12	ND	NA	NA	NA	NA	NA	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 JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
3. Fresh Water Drainage Canals													
Surface Water	pCi/l	Gross B-DS	2	12	12	138.5 (12/12)	3.3-330	T75 - Florida City Canal (2 miles - WNW)	270 (6/6)	210-330	NA	NA	
	"	Gross B-UDS			12	10.8 (1/12)	NA	T96 - Model land canal (4 miles - SW)	10.8 (1/6)	NA	NA	NA	
	"	Tritium			12	440 (5/12)	270-630	T75-Fla. City Canal (2 Miles - WNW)	440 (5/6)	270-630	NA	NA	
2.2 WELLS			9	18									
1. Potable Well Water			3	6									
Drinking Water	pCi/l	Gross B-DS			6	7.2 (6/6)	4.3-10.3	T57-Dolan's Farm (4 Miles - NW)	9.5 (2/2)	8.7-10.3	NA	NA	
	"	Gross B-UDS			6	ND	NA	NA	NA	NA	NA	NA	
	"	Tritium			6	ND	NA	NA	NA	NA	NA	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 JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
2. Ground Water			6	12									
Ground Water Wells	pCi/l	Tritium			12	710 (5/12)	350-1340	T87-Groundwater Well E-10 (2 Miles - S)	2600 (2/2)	NA 1340	NA	NA	
	"	<sup>89</sup> Sr			12	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			12	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			12	ND	NA	NA	NA	NA	NA	NA	
3.0 BOTTOM SEDIMENTS			9	11									
1. Cooling Canal			2	4									
Bottom Sediments	pCi/kg	<sup>89</sup> Sr			4	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			4	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			4								
	"	1. <sup>60</sup> Co				398 (3/4)	353-460	T84-Closed Cooling Canal (Onsite - SW)	420 (2/2)	380-460	NA	NA	
	"	2. <sup>58</sup> Co				250 (1/4)	NA	T84-Closed Cooling Canal (Onsite - SW)	250 (1/4)	NA	NA	NA	
	"	3. <sup>144</sup> Ce				310 (1/4)	NA	T84-Closed Cooling Canal (Onsite - SW)	310 (1/4)	NA	NA	NA	
	"	4. Others				ND	NA	NA	NA	NA	NA	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 & 4BUCKET NO. 50-250, 251LOCATION OF FACILITY DADE COUNTY FLORIDAREPORTING PERIOD JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
2. Estuarine Bottom Sediments	pCi/kg	<sup>89</sup> Sr	7	7	7	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			7	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			7	ND	NA	NA	NA	NA	NA	NA	
4.0 <u>AQUATIC BIOTA</u>			<u>9</u>	<u>32</u>									
1. Crustacea (Blue Crab)	pCi/kg	<sup>89</sup> Sr	6	6	6	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			6	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			6	ND	NA	NA	NA	NA	NA	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 JANUARY 1, 1982 -- JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
2. Fish, Carnivore (Mixed Species)	pCi/kg	<sup>89</sup> Sr <sup>90</sup> Sr	7	8	6 6	ND 38 (2/8)	NA 36- 41	NA T66 - Card Sound, North of Causeway (10 miles - SSW)	NA 41 (1/1)	NA NA	NA NA	NA NA	
	"	Y emitting <sup>4)</sup> isotopes			8								
	"	1. <sup>137</sup> Cs				85 (2/8)	70- 100	T84 - Closed Cooling Canal (Onsite - SW)	85 (2/2)	70- 100	NA	NA	
	"	2. Others				ND	NA	NA	NA	NA	NA	NA	
3. Fish, Herbivore (Mullet)	pCi/kg	<sup>89</sup> Sr	6	6		ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			6	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			6	ND	NA	NA	NA	NA	NA	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 JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
4. Turtle Grass			6	6									
Turtle Grass	pCi/kg	<sup>89</sup> Sr			6	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			6	ND	NA	NA	NA	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			6	ND	NA	NA	NA	NA	NA	NA	
5. Sponges			6	6									
Sponge	pCi/kg	Y emitting <sup>4)</sup> isotopes			6								
	"	1. <sup>95</sup> Zr				130 (3/6)	70-170	T93-Pelican Bank (1.5 miles - E)	170- (1/1)	NA	NA	NA	
	"	2. Others				ND	NA	NA	NA	NA	NA	NA	
5.0 TERRESTRIAL			12	18									
1. Small Animal (Opossum)			1	1									
	pCi/kg	<sup>89</sup> Sr			1	ND	NA	NA	NA	NA	NA	NA	
	"	<sup>90</sup> Sr			1	13 (1/1)	NA	T58 - Entrance Road (0 Miles - W)	13 (1/1)	NA	NA	NA	
	"	Y emitting <sup>4)</sup> isotopes			1								
	"	1. <sup>137</sup> Cs				57 (1/1)	NA	T58 - Entrance Road (0 Miles - W)	57 (1/1)	NA	NA	NA	
	"	2. Others				ND	NA	NA	NA	NA	NA	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 JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location.		No. of Nonroutine Reported Measurements	
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>		
2. Food Crops (Potatoes)	pCi/kg	<sup>89</sup> Sr	3	3 <sup>5)</sup>	3	ND	NA	NA	NA	NA	NA	NA		
	"	<sup>90</sup> Sr			3	2.9 (2/3)	2.2-3.6	T57 - Dolan's Farm (4 Miles - NW)	3.6 (1/1)	NA	NA	NA		
	"	Y emitting <sup>4)</sup> isotopes			3	ND	NA	NA	NA	NA	NA	NA		
3. Vegetation (Mangrove Leaves)	pCi/kg	<sup>89</sup> Sr	7	7	7	ND	NA	NA	NA	NA	ND	NA		
	"	<sup>90</sup> Sr			7	ND	NA	NA	NA	NA	NA	ND		NA
	"	Y emitting <sup>4)</sup> isotopes			7	ND	NA	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 JANUARY 1, 1982 - JUNE 30, 1982

Medium or Pathway Sampled	Unit	Analysis for	Number of			All Indicator Locations		Location with Highest Mean			Control <sup>2)</sup> Location		No. of Nonroutine Reported Measurements
			Sites	Samples	Analyses	Mean <sup>1)</sup>	Range <sup>1)</sup>	Sample Location Distance & Direction	Mean <sup>1)</sup>	Range <sup>1)</sup>	Mean <sup>1)</sup>	Range <sup>1)</sup>	
4. Ground Samples (Soil)	pCi/kg	<sup>89</sup> Sr	7	7	7	ND	NA	NA	NA	NA	ND	NA	
	"	<sup>90</sup> Sr			7	ND	NA	NA	NA	NA	ND	NA	
	"	Y emitting <sup>4)</sup> isotopes			7								
	"	1. <sup>137</sup> Cs				193 (6/7)	110-320	T55-Silver Palm Dr. E of Allapatah Rd. (7 miles - NNW)	320 (1/1)	NA	ND	NA	
	"	2. <sup>58</sup> Co				140 (1/7)	NA	T56-Princeton Substation (8 miles-NW)	140 (1/1)	NA	ND	NA	
	"	3. 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.

Numbers in parentheses indicate the ratio of analyses which yielded detectable results to the total number of analyses performed for that medium.

2. Control location - T64, Florida Power & Light Company - Natoma Substation (22 Miles - N)
3. Due to an instrument malfunction which produced suspiciously low readings in some samples, exposure rates for all samples collected during the first three months of this period have not yet been reported. This data is still being evaluated by Florida DHRS. In addition to the eleven locations monitored monthly however, DHRS has twenty-one TLD dosimeters deployed around the Turkey Point Plant at distances of one, five and ten miles radially. A summary of that data which overlaps the period of unreported data is provided below:

Exposure Period	No. of Samples	Mean	Range	Sample Location with Highest Reading
8/5/81-3/16/82	20*	6.032uR/hr	3.5-8.8uR/hr	10 Miles - Northwest

The above results are considered to be within the normal range of background radiation for Florida

4. Excluding Potassium - 40 ( $^{40}\text{K}$ ), Radon - 226 ( $^{226}\text{Ra}$ ) and Thorium - 232 ( $^{232}\text{Th}$ ) which are naturally occurring radioisotopes detectable in many environmental specimens.
5. Does not include split samples analyzed by DOE.
6. Particulate filter at one location missing upon sample collection: T-56 (Princeton substation - 8 miles NNW) - 2/10/82.
7. Exposure rate is based upon average readings of two TLD's.

\* The TLD's from one location (10 miles west) were missing at time of sample collection.

# RADIOACTIVE WASTE REPORT

January 1, 1982 to June 30, 1982

<u>Date of Shipment</u>	<u>Curies</u>	<u>Cu. Ft.</u>	<u>Disposition</u>
1-06-82	0.13077	170	Buried in Barnwell, SC
1-08-82	0.234	170	"
1-11-82	0.370	200	"
1-12-82	407.000	84	"
1-14-82	0.370	200	"
1-18-82	0.260	1050	Buried in Washington
1-19-82	2.200	200	Buried in Barnwell, SC
1-20-82	0.380	1050	Buried in Washington
1-21-82	0.822	170	Buried in Barnwell, SC
1-22-82	0.197	1050	Buried in Washington
1-22-82	1.380	170	Buried in Barnwell, SC
1-29-82	197.620	84	"
2-02-82	0.605	170	"
2-03-82	0.312	1050	Buried in Washington
2-04-82	0.169	170	Buried in Barnwell, SC
2-05-82	0.120	1050	Buried in Washington
2-09-82	0.206	1050	"
2-11-82	0.609	170	Buried in Barnwell, SC
2-13-82	0.445	170	"
2-16-82	0.24587	1050	Buried in Washington
2-18-82	0.371	170	Buried in Barnwell, SC
2-19-82	0.291	1050	Buried in Washington
3-03-82	0.176	1050	Buried in Barnwell, SC
3-17-82	1.146	170	"
3-19-82	0.484	170	"
3-23-82	0.770	85	"
4-05-82	0.160	1050	Buried in Washington
4-06-82	0.925	200	Buried in Barnwell, SC
4-07-82	0.107	1050	Buried in Washington
4-09-82	0.108	1050	"
4-12-82	2.504	170	Buried in Barnwell, SC
4-14-82	1.158	100	"
4-20-82	139.500	84	"
4-28-82	0.072	1050	Buried in Washington
4-29-82	0.172	1050	"
5-11-82	0.020	840	Buried in Barnwell, SC
5-26-82	0.079	1050	Buried in Washington
5-28-82	74.400	84	Buried in Barnwell, SC
6-21-82	2.610	170	"
6-23-82	1.911	170	"
40 Shipments	840.6396	20291	
On site as of July 1, 1982	8.852	1210	





## SEMIANNUAL REPORT OF RADIOACTIVE EFFLUENT RELEASES, PTP UNITS 3 & 4 1/82 - 6/82

### 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  $2\pi$  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 estimate the quantity of radioactivity 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 8.

1. The reported values in Table I, page 1, 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 was blown down from the steam generators during primary to secondary leakage conditions, or when the generators were drained for repair or refueling. Activity that entered the plant storm drain system was also included in the secondary system activity released and in the total activity released.

2. The reported values in Table I, pages 2 and 3 are the total quantities of radioactivity for individual nuclides released from the waste disposal system and the secondary system together. The values in Table I, pages 4 and 5 are for the waste disposal system only and pages 6 and 7 are for the secondary system only.
3. During primary to secondary leakage, release of several short-lived nuclides from the secondary system occurs. These short-lived nuclides are not generally detected in batch released from the waste disposal system due to the long holdup time of processed water. Only those isotopes that were detected in the secondary system releases were reported. All non-detectable isotopes are listed as (--).
4. 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 Ge(Li) detector, and for Sr-89 and Sr-90, using a chemical separation and subsequent beta determination with a  $2\pi$  gas flow proportional counter. Tritium was determined by use of liquid scintillation techniques and gross alpha radioactivity was determined by use of a  $2\pi$  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.
5. 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 8. Dissolved gases, if any, from secondary system releases were determined from the samples of the individual releases. Isotopic concentrations were multiplied by the volume released to determine the quantity of radiogas nuclides released.

6. Representative samples of secondary system batch releases were analyzed individually for gamma emitting isotopes. Analysis of a representative composite for tritium was made for releases which occurred due to primary to secondary leakage.
7. 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 the secondary system during conditions of primary to secondary leakage. 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 maximum rated capacity for the hogging jets and the maximum measured flow rate for the condenser air ejectors, and an estimate of the rate of exhaust from the atmospheric dumps were used to conservatively estimate the airborne releases from the secondary system whenever applicable.

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:

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

and  $\text{MPC}_i$  = maximum permissible concentration of the  $i^{\text{th}}$  nuclide, Ci/m<sup>3</sup>

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

MPC<sub>i</sub> 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:

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

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 E+04  $\mu\text{Ci/sec}$ , average 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), the gas waste disposal system and the secondary system during conditions of primary to secondary system leakage. If a minimum detectable activity value was not calculated for an isotope, it will be listed as (--).





TABLE I  
Report of Radioactive Effluents: Liquid

A. Gross Radioactivity		January	February	March	April	May	June
1. Total Release	(mCi)	9.96 E+01	1.27 E+02	2.61 E+02 <sup>c</sup>	6.19 E+01	5.47 E+02 <sup>d</sup>	1.94 E+0
2. Avg Concentration During Releases	(μCi/ml)	5.8 E-10 <sup>f</sup>	7.7 E-10	2.0 E-09	3.1 E-10	1.8 E-09	7.4 E-1
3. Avg Concentration for Month	(μCi/ml)	4.6 E-10	7.7 E-10	1.9 E-09	3.1 E-10	1.8 E-09	7.4 E-1
4. Max Concentration Released	(μCi/ml)	8.2 E-08 <sup>a</sup>	5.4 E-08 <sup>b</sup>	2.7 E-08	2.7 E-09	4.8 E-08 <sup>e</sup>	3.5 E-0
5. Percent of Technical Specification Limit for Total Activity Released	(%)	9.8 E+00			1.61 E+01		
B. Tritium							
1. Total Release	(Ci)	2.61 E+01	5.66 E+01	4.11 E+01	4.20 E+01	8.55 E+01	5.90 E+0
2. Avg Concentration During Releases	(μCi/ml)	1.5 E-07	3.4 E-07	3.1 E-07	2.1 E-07	2.8 E-07	2.3 E-0
3. Avg Concentration for Month	(μCi/ml)	1.2 E-07	3.4 E-07	3.0 E-07	2.1 E-07	2.8 E-07	2.3 E-0
C. Dissolved Noble Gas							
1. Total Release	(mCi)	6.53 E+00	2.87 E+01	8.34 E-01	1.63 E+02	6.62 E+01	1.15 E+0
2. Avg Concentration During Releases	(μCi/ml)	3.8 E-11	1.7 E-10	6.3 E-12	8.1 E-10	2.1 E-10	4.4 E-1
3. Avg Concentration for Month	(μCi/ml)	3.0 E-11	1.7 E-10	6.1 E-12	8.1 E-10	2.1 E-10	4.4 E-1
D. Gross Alpha Radioactivity							
1. Total Release	(mCi)	(<2.9 E-08)	(<2.2 E-08)	(<1.8 E-08)	(<1.9 E-08)	3.38 E-02	1.03 E-0
2. Avg Concentration During Releases	(μCi/ml)	(<1.7 E-19)	(<1.3 E-19)	(<1.4 E-19)	(<9.4 E-20)	1.1 E-13	3.9 E-1
3. Avg Concentration for Month	(μCi/ml)	(<1.3 E-19)	(<1.3 E-19)	(<1.3 E-19)	(<9.4 E-20)	1.1 E-13	3.9 E-1
E. Volumes							
1. Vol of Liquid Waste to Discharge	(Liters)	1.71 E+07	1.88 E+07	1.28 E+07	1.19 E+07	3.04 E+07	1.74 E+0
2. Vol of Dilution Water During Rel.	(Liters)	1.71 E+11	1.65 E+11	1.32 E+11	2.02 E+11	3.08 E+11	2.61 E+0
3. Vol of Dilution Water for Month	(Liters)	2.18 E+11	1.65 E+11	1.37 E+11	2.02 E+11	3.08 E+11	2.61 E+0

NOTE:

Numbers in parentheses represent maximum sensitivity in μCi/ml.

a - C/MPC = 0.0014

c - includes 122 mCi from #4 RWST overflow; R.O. #251-82-02.

d - includes 232 mCi of Na-24 used in steam generator moisture carryover test

e - C/MPC = 0.0053

f - C/MPC = 0.093

TABLE I  
Report of Radioactive Effluents: Liquid Total

Isotope	Unit	January	February	March	April	May	June
Ag-110m	mCi	3.89 E+00	1.26 E+00	1.11 E+00	1.29 E-01	8.04 E-02	2.93 E-02
Ba-140	mCi	(<1.1 E-06)	(<8.4 E-07)	(<5.1 E-07)	(<2.8 E-07)	(<2.1 E-07)	(<1.5 E-07)
Co-57	mCi	1.64 E-01	1.46 E-01	2.3 E-01	(<2.6 E-08)	(<2.0 E-08)	(<1.8 E-08)
Co-58	mCi	4.07 E+01	2.57 E+01	6.72 E+01	1.34 E+00	6.71 E-01	2.12 E+00
Co-60	mCi	3.66 E+01	3.98 E+01	5.69 E+01	2.31 E+00	3.51 E+00	3.42 E+00
Cr-51	mCi	8.49 E+00	7.69 E+00	5.34 E+00	1.89 E-01	(<2.5 E-07)	8.06 E-02
Cs-134	mCi	2.16 E-02	8.51 E-01	1.35 E+00	4.72 E-01	2.28 E+00	3.39 E+00
Cs-136	mCi	(<3.1 E-07)	(<3.2 E-07)	3.34 E-01	(<1.0 E-07)	8.10 E-01	1.10 E+00
Cs-137	mCi	4.07 E-01	1.69 E+00	3.62 E+00	1.03 E+00	4.33 E+00	7.24 E+00
Cs-138	mCi	- -	- -	1.81 E-01	8.1 E-02	3.68 E+00	1.58 E+00
F -18	mCi	2.24 E-01	5.2 E-01	1.33 E+00	1.30 E+00	8.53 E+00	1.34 E+00
Fe-59	mCi	4.38 E-01	1.46 E-01	(<1.9 E-07)	(<1.4 E-07)	(<8.7 E-08)	(<7.0 E-08)
I -131	mCi	3.28 E-01	1.56 E+01	9.30 E+01	3.52 E+01	1.88 E+02	1.38 E+02
I -132	mCi	- -	2.23 E-01	6.39 E-01	1.03 E+00	4.99 E+00	7.63 E-01
I -133	mCi	8.1 E-02	5.39 E+00	2.19 E+01	1.45 E+01	7.77 E+01	3.12 E+01
I -134	mCi	- -	- -	- -	1.05 E-01	1.89 E+00	4.40 E-01
I -135	mCi	- -	7.4 E-01	4.10 E+00	3.81 E+00	1.67 E+01	2.80 E+00
La-140	mCi	(<7.9 E-08)	3.39 E-02	(<4.4 E-08)	(<3.0 E-08)	(<2.8 E-08)	(<1.7 E-08)

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

TABLE I  
Report of Radioactive Effluents: Liquid Total

Isotope	Unit	January	February	March	April	May	June
Mn-54	mCi	2.02 E+00	7.60 E-01	6.73 E-01	5.54 E-02	6.01 E-02	9.20 E-02
Mo-99/Tc-99m	mCi	(<6.1 E-07)	3.99 E-01	(<5.7 E-07)	(<1.3 E-07)	(<1.6 E-07)	3.22 E-01
Na-24	mCi	- -	- -	4.1 E-02	- -	2.33 E+02	3.5 E-02
Nb-95	mCi	3.29 E+00	4.98 E-01	7.5 E-01	1.07 E-01	5.06 E-02	(<3.6 E-08)
Sb-124	mCi	3.41 E-01	8.87 E+00	6.98 E-01	(<5.9 E-08)	(<4.5 E-08)	(<4.6 E-08)
Sb-125	mCi	1.25 E+00	1.46 E+01	1.78 E+00	8.54 E-02	5.65 E-02	(<8.2 E-08)
Sr-89	mCi	1.4 E-01	1.8 E+00	(<7.5 E-09)	1.56 E-01	6.93 E-01	2.01 E-01
Sr-90	mCi	3.8 E-02	(<5.7 E-09)	3.14 E-02	2.79 E-02	1.05 E-01	8.4 E-03
Zn-65	mCi	5.04 E-01	(<4.4 E-07)	(<2.1 E-07)	(<1.5 E-07)	(<1.0 E-07)	(<6.8 E-08)
Zr-95	mCi	6.87 E-01	(<3.0 E-07)	9.37 E-02	(<1.1 E-07)	(<7.2 E-08)	(<5.0 E-08)
Total	mCi	9.96 E+01	1.27 E+02	2.61 E+02	6.19 E+01	5.47 E+02	1.94 E+02

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



TABLE I  
Report of Radioactive Effluents: Liquid - Waste Disposal System

Isotope	Unit	January	February	March	April	May	June
Ag-110m	mCi	3.89 E+00	1.26 E+00	7.91 E-01	1.29 E-01	8.04 E-02	2.93 E-02
Ba-140	mCi	(<1.1 E-06)	(<8.4 E-07)	(<5.1 E-07)	(<2.8 E-07)	(<2.1 E-07)	(<1.5 E-07)
Co-57	mCi	1.64 E-01	1.46 E-01	(<4.6 E-08)	(<2.6 E-08)	(<2.0 E-08)	(<1.8 E-08)
Co-58	mCi	4.07 E+01	2.52 E+01	4.10 E+00	1.31 E+00	5.72 E-01	1.40 E+00
Co-60	mCi	3.61 E+01	3.80 E+01	6.48 E+00	1.99 E+00	2.09 E+00	1.41 E+00
Cr-51	mCi	8.49 E+00	7.69 E+00	1.14 E+00	1.89 E-01	(<2.5 E-07)	8.06 E-02
Cs-134	mCi	2.16 E-02	(<2.2 E-07)	9.69 E-01	(<7.0 E-08)	1.56 E-02	2.69 E-01
Cs-136	mCi	(<3.1 E-07)	(<3.2 E-07)	2.60 E-01	(<1.0 E-07)	(<8.1 E-08)	(<5.9 E-08)
Cs-137	mCi	3.89 E-01	4.97 E-01	2.06 E+00	9.64 E-02	1.23 E-01	5.38 E-01
Fe-59	mCi	4.38 E-01	1.46 E-01	(<1.9 E-07)	(<1.4 E-07)	(<8.7 E-08)	(<7.0 E-08)
I -131	mCi	(<2.4 E-07)	2.08 E+00	3.68 E+00	3.77 E-01	4.08 E-01	6.75 E-01
La-140	mCi	(<7.9 E-08)	3.39 E-02	(<4.4 E-08)	(<3.0 E-08)	(<2.8 E-08)	(<1.7 E-08)
Mn-54	mCi	2.02 E+00	7.60 E-01	2.13 E-01	5.54 E-02	6.01 E-02	9.20 E-02
Mo-99/Tc-99m	mCi	(<6.1 E-07)	3.99 E-01	(<5.7 E-07)	(<1.3 E-07)	(<1.6 E-07)	3.22 E-01
Nb-95	mCi	3.29 E+00	4.98 E-01	(<1.2 E-07)	1.07 E-01	5.06 E-02	(<3.6 E-08)
Sb-124	mCi	3.41 E-01	8.87 E+00	1.98 E-01	(<5.9 E-08)	(<4.5 E-08)	(<4.6 E-08)
Sb-125	mCi	1.25 E+00	1.46 E+01	5.75 E-01	8.54 E-02	5.65 E-02	(<8.2 E-08)
Sr-89	mCi	1.4 E-01	1.8 E+00	(<7.5 E-09)	6.66 E-02	2.21 E-01	1.50 E-01

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

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 - Waste Disposal System

Isotope	Unit	January	February	March	April	May	June
Cr-90	mCi	3.8 E-02	(<5.7 E-09)	3.14 E-02	2.31 E-02	7.96 E-02	(<4.9 E-09)
Cr-65	mCi	5.04 E-01	(<4.4 E-07)	(<2.1 E-07)	(<1.5 E-07)	(<1.0 E-07)	(<6.8 E-08)
Cr-95	mCi	6.87 E-01	(<3.0 E-07)	9.37 E-02	(<1.1 E-07)	(<7.2 E-08)	(<5.0 E-08)
Total	mCi	9.85 E+01	1.02 E+02	2.06 E+01	4.42 E+00	3.76 E+00	4.97 E+00

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

TABLE I  
Report of Radioactive Effluents: Liquid - Secondary System

Isotope	Unit	January	February	March	April	May	June
Ag-110m	mCi	- -	- -	3.2 E-01	- -	- -	- -
Co-57	mCi	- -	- -	2.3 E-01	- -	- -	- -
Co-58	mCi	6.0 E-03	5.1 E-01	6.31 E+01	2.66 E-02	9.9 E-02	7.23 E-01
Co-60	mCi	4.85 E-01	1.76 E+00	5.04 E+01	3.21 E-01	1.42 E+00	2.01 E+00
Cr-51	mCi	- -	- -	4.2 E+00	- -	- -	-
Cs-134	mCi	- -	8.51 E-01	3.82 E-01	4.72 E-01	2.26 E+00	3.12 E+00
Cs-136	mCi	- -	- -	7.4 E-02	- -	8.10 E-01	1.10 E+00
Cs-137	mCi	1.8 E-02	1.19 E+00	1.56 E+00	9.34 E-01	4.21 E+00	6.70 E+00
Cs-138	mCi	- -	- -	1.81 E-01	8.1 E-02	3.68 E+00	1.58 E+00
F-18	mCi	2.24 E-01	5.2 E-01	1.33 E+00	1.30 E+00	8.53 E+00	1.34 E+00
I-131	mCi	3.28 E-01	1.35 E+01	8.93 E+01	3.48 E+01	1.88 E+02	1.37 E+02
I-132	mCi	- -	2.23 E-01	6.39 E-01	1.03 E+00	4.99 E+00	7.63 E-01
I-133	mCi	8.1 E-02	5.39 E+00	2.19 E+01	1.45 E+01	7.77 E+01	3.12 E+01
I-134	mCi	- -	- -	- -	1.05 E-01	1.89 E+00	4.40 E-01
I-135	mCi	- -	7.4 E-01	4.10 E+00	3.81 E+00	1.67 E+01	2.80 E+00
Mn-54	mCi	- -	- -	4.6 E-01	- -	- -	- -
Na-24	mCi	- -	- -	4.1 E-02	- -	2.33 E+02	3.5 E-02
Nb-95	mCi	- -	- -	7.5 E-01	- -	- -	- -

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





TABLE I  
Report of Radioactive Effluents: Liquid - Secondary System

Isotope	Unit	January	February	March	April	May	June
Sb-124	mCi	- -	- -	5.0 E-01	- -	- -	- -
Sb-125	mCi	- -	- -	1.2 E+00	- -	- -	- -
Sr-89	mCi	- -	- -	- -	8.9 E-02	4.72 E-01	5.05 E-02
Sr-90	mCi	- -	- -	- -	4.8 E-03	2.53 E-02	8.4 E-03
Total	mCi	1.14 E+00	2.47 E+01	2.41 E+02	5.75 E+01	5.44 E+02	1.89 E+02

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

TABLE I

Secondary System							
Kr-85	mCi	-	-	-	-	-	-
Xe-131m	mCi	-	-	-	-	-	-
Xe-133	mCi	-	-	-	-	-	-
Xe-133m	mCi	-	-	-	-	-	-
Xe-135	mCi	-	-	-	-	-	-

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



TABLE II  
Report of Radioactive Effluents: Airborne

A. Fission and Activation Gases	January	February	March	April	May	June
1. Total Release (Ci)	5.01 E+02	9.57 E+02	2.32 E+03	1.52 E+03	1.61 E+03	3.44 E+03
2. Avg Release Rate for Period ( $\mu$ Ci/sec)	2.1 E+02	4.0 E+02	9.6 E+02	6.3 E+02	5.3 E+02	1.4 E+03
*3. Max Release Rate for Period ( $\mu$ Ci/sec)	3.0 E+04	2.8 E+03	4.0 E+04	3.6 E+04	4.5 E+04	4.0 E+04
*Maximum airborne release rate averaged over one hour for each month. Technical Specifications limit is 6.7 E+04 $\mu$ Ci/s averaged over one hour.						
B. Iodine - 131						
1. Total Iodine - 131 (Ci)	4.3 E-04	1.6 E-03	6.0 E-03	9.0 E-03	2.6 E-02	4.3 E-02
2. Avg Release Rate for Period ( $\mu$ Ci/sec)	1.4 E-04	6.6 E-04	2.5 E-03	3.7 E-03	8.6 E-03	1.8 E-02
C. Particulates						
1. Particulates (with $t_{1/2} > 8$ days) (Ci)	3.8 E-05	1.36 E-05	1.3 E-04	1.3 E-04	2.7 E-04	3.1 E-04
2. Avg Release Rate for Period ( $\mu$ Ci/sec)	1.3 E-05	5.62 E-06	5.4 E-05	5.4 E-05	8.9 E-05	1.3 E-04
3. Gross Alpha Radioactivity (Ci)	1.6 E-09	(<9.2 E-17)	(<1.5 E-16)	6.6 E-09	5.4 E-09	2.0 E-08
D. Tritium						
1. Total Release (Ci)	6.73 E-02	2.9 E-02	7.33 E-02	5.62 E-02	1.83 E-01	9.44 E-01
2. Avg Release Rate for Period ( $\mu$ Ci/sec)	2.23 E-02	1.2 E-02	3.03 E-02	2.32 E-02	6.06 E-02	3.90 E-01
E. Percent of Applicable Limit	Quarter I			Quarter II		
1. Fission and Activation Gases (%)	4.0 E+00			7.0 E+00		
2. I-131 and Part ( $t_{1/2} > 8d$ ) (%)	1.0 E-01			9.9 E-01		

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

TABLE II  
Airborne Releases - Particulates

Isotope	Unit	January	February	March	April	May	June
Ba-140	Ci	(<6.7 E-14)	(<6.3 E-14)	(<6.0 E-14)	(<9.3 E-14)	(<1.3 E-13)	(<1.1 E-13)
Co-57	Ci	(<8.7 E-15)	(<7.2 E-15)	(<8.7 E-15)	(<8.4 E-15)	(<1.3 E-14)	3.6 E-07
Co-58	Ci	1.8 E-06	1.2 E-06	(<2.1 E-14)	5.5 E-07	1.4 E-06	1.1 E-04
Co-60	Ci	3.1 E-05	5.3 E-06	1.3 E-04	1.0 E-04	1.3 E-04	1.3 E-04
Cr-51	Ci	(<1.2 E-13)	(<1.0 E-13)	(<1.1 E-13)	(<1.3 E-13)	(<1.9 E-13)	5.8 E-06
Cs-134	Ci	(<2.9 E-14)	4.8 E-07	(<2.6 E-14)	9.6 E-06	2.3 E-05	5.8 E-06
Cs-136	Ci	(<4.8 E-14)	(<3.0 E-14)	(<2.0 E-14)	(<3.6 E-14)	4.2 E-06	7.0 E-07
Cs-137	Ci	2.0 E-06	1.0 E-06	(<1.6 E-14)	1.6 E-05	4.0 E-05	1.6 E-05
I-131	Ci	6.7 E-07	4.8 E-06	9.9 E-07	4.3 E-06	5.6 E-05	2.9 E-05
La-140	Ci	(<2.6 E-14)	(<3.1 E-14)	(<2.9 E-14)	(<4.0 E-14)	(<4.2 E-14)	(<2.2 E-14)
Mn-54	Ci	3.9 E-07	(<1.8 E-14)	(<1.6 E-14)	(<3.6 E-14)	3.9 E-06	3.4 E-06
Nb-95	Ci	(<1.8 E-14)	(<2.4 E-14)	(<1.9 E-14)	(<2.3 E-14)	(<2.1 E-14)	3.0 E-06
Sr-89	Ci	7.2 E-07	8.0 E-07	1.1 E-06	2.1 E-06	1.2 E-05	1.2 E-06
Sr-90	Ci	2.3 E-08	2.3 E-08	2.3 E-08	4.9 E-08	4.9 E-08	4.9 E-08
Zn-65	Ci	9.6 E-07	(<4.2 E-14)	(<7.2 E-14)	(<5.1 E-14)	(<6.9 E-14)	(<4.7 E-14)
Total	Ci	3.8 E-05	1.36 E-05	1.3 E-04	1.3 E-04	2.7 E-04	3.1 E-04

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



TABLE II  
Airborne Releases - Gaseous

Fission and Activation Gases		January	February	March	April	May	June
Isotope	Unit						
Ar-41	Ci	7.83 E-01	2.6 E-01	2.94 E+00	5.27 E+00	2.27 E+01	3.42 E+00
Kr-85	Ci	(<8.4 E-05)	(<8.7 E-05)	(<8.6 E-05)	3.29 E-01	9.43 E-02	2.05 E-01
Kr-85m	Ci	6.72 E-02	1.6 E-02	3.89 E-02	2.03 E-01	1.38 E+00	5.34 E-01
Kr-87	Ci	(<8.8 E-07)	(<8.6 E-07)	(<8.9 E-07)	1.08 E-01	9.07 E-01	1.67 E-01
Kr-88	Ci	(<8.4 E-07)	(<9.8 E-07)	(<8.6 E-07)	2.00 E-01	1.82 E+00	5.89 E-01
Xe-131m	Ci	1.48 E+00	2.9 E-01	1.98 E+00	1.88 E+00	5.50 E+00	1.57 E+00
Xe-133	Ci	4.95 E+02	9.56 E+02	2.31 E+03	1.51 E+03	1.55 E+03	3.42 E+03
Xe-133m	Ci	1.41 E+00	3.7 E-01	1.52 E+00	1.81 E+00	1.10 E+01	4.88 E+00
Xe-135	Ci	1.74 E+00	4.3 E-01	8.35 E-01	2.92 E+00	1.58 E+01	7.95 E+00
Xe-135m	Ci	(<4.0 E-06)	(<3.7 E-06)	4.8 E-04	3.21 E-01	3.26 E+00	3.35 E-01
Xe-138	Ci	(<7.1 E-06)	(<8.1 E-06)	(<8.9 E-06)	8.97 E-02	6.50 E-01	6.61 E-02
Total	Ci	5.01 E+02	9.57 E+02	2.32 E+03	1.52 E+03	1.61 E+03	3.44 E+03
Halogens (Gaseous)		January	February	March	April	May	June
Isotope	Unit						
I-131	Ci	4.3 E-04	1.6 E-03	6.0 E-03	9.0 E-03	2.6 E-02	4.3 E-02
I-133	Ci	9.3 E-04	3.1 E-04	2.2 E-03	3.4 E-03	1.1 E-02	1.0 E-02
I-135	Ci	2.6 E-04	4.0 E-05	6.2 E-04	2.0 E-04	2.4 E-03	9.0 E-05
Br-82	Ci	1.3 E-04	(<6.3 E-14)	(<5.8 E-14)	5.5 E-04	8.7 E-04	1.6 E-04
Total	Ci	1.75 E-03	1.95 E-03	8.82 E-03	1.32 E-02	4.03 E-02	5.33 E-02

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

