RADIOACTIVE EFFLUENT RELEASE DATA

JANUARY 1984 THROUGH JUNE 1984

SUBMITTED BY

NUCLEAR CHEMISTRY DEPARTMENT

TURKEY POINT PLANT

FLORIDA POWER AND LIGHT COMPANY

DISTRIBUTION

J.L. DANEK
A.J. GOULD (3)
D.D. GRANDAGE
E.R. LAPIERRE
J.S. WADE, JR.
R.J. FRECHETTE
FILE

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SEMIANNUAL REPORT OF RADIOACTIVE EFFLUENT RELEASES, PTP UNITS 3 & 4 1/84 - 6/84

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 4.

1. The reported values in Table I, page 1, 2, and 3 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 emmitting 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 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 4.

4. Representative samples of secondary system batch releases were analyzed individually for gamma emitting isotopes. Tritium analysis of a representative composite was made to determine if any tritium was being released 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 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:

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

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

$$\Sigma \frac{Q_i}{MPC_i} \leq 10{,}000 \frac{m^3}{sec}$$, where Q_i = release rate of i^{th} nuclide, Ci/sec and MPC_i = maximum permissible concentration of the i^{th} nuclide, Ci/m^3

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

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

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 E+04 µCi/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 (--).

TABLE I
Report of Radioactive Effluents: Liquid

A. Gross Radioactivity (β-γ)		January	February	March	April	May	June
1. Total Release	(mCi)	2.75 E+01	8.45 E+00	3.03 E+01	2.03 E+01	1.39 E+01	2.00 E+01
2. Avg Concentration During Releases	(μCi/ml)	4.00 E-10	2.62 E-10	6.56 E-10	4.70 E-10	3.95 E-10	4.10 E-10
3. Avg Concentration for Month	(μCi/ml)	8.66 E-11	3.60 E-11	1.80 E-10	1.11 E-10	9.49 E-11	7.38 E-11
4. Max Concentration Released	(μCi/ml)	1.7 E-08	7.90 E-09	3.2 E-08	7.1 E-09	4.5 E-09	6.40 E-09
5. Percent of Technical Specification Limit for Total Activity Released	(%)		1.33 E+00			1.08 E+00	
B. Tritium							
1. Total Release	(Ci)	7.35 E+01	5.43 E+01	5.10 E+01	3.62 E+01	6.79 E+01	4.65 E+01
2. Avg Concentration During Releases	(μCi/ml)	1.07 E-06	1.69 E-06	1.14 E-06	8.40 E-07	1.93 E-06	9.53 E-07
3. Avg Concentration for Month	(μCi/ml)	2.31 E-07	2.31 E-07	3.13 E-07	1.99 E-07	4.65 E-07	1.72 E-07
C. Dissolved Noble Gas							
1. Total Release	(mCi)	1.96 E+03	1.19 E+02	9.23 E+02	3.03 E+00	(<1.27 E-05)	1.16 E+01
2. Avg Concentration During Releases	(μCi/ml)	2.85 E-08	3.69 E-09	2.07 E-08	7.03 E-11	(<3.62 E-16)	2.38 E-10
3. Avg Concentration for Month	(μCi/ml)	6.16 E-09	5.06 E-10	5.66 E-09	1.66 E-11	(<8.70 E-17)	4.28 E-11
D. Gross Alpha Radioactivity							
1. Total Release	(mCi)	(<6.61 E-09)	(<9.84 E-09)	(<6.56 E-09)	(<1.20 E-08)	(<1.22 E-08)	(<6.87 E-09)
2. Avg Concentration During Releases	(μCi/ml)	(<2.88 E-13)	(<4.41 E-13)	(<4.30 E-13)	(<8.69 E-13)	(<8.89 E-13)	(<2.64 [illegible]-13)
3. Avg Concentration for Month	(μCi/ml)	(<6.23 E-14)	(<6.04 E-14)	(<1.18 E-13)	(<2.06 E-13)	(<2.14 E-13)	(<4.76 E-14)
E. Volumes							
1. Vol of Liquid Waste to Discharge	(Liters)	6.90 E+06	1.48 E+06	1.32 E+07	5.05 E+06	3.56 E+06	1.88 E+06
2. Vol of Dilution Water During Rel.	(Liters)	6.88 E+10	3.22 E+10	4.46 E+10	4.31 E+10	3.51 E+10	4.88 E+10
3. Vol of Dilution Water for Month	(Liters)	3.18 E+11	2.35 E+11	1.63 E+11	1.82 E+11	1.46 E+11	2.71 E+11

NOTE: Numbers in parentheses represent maximum sensitivity in μCi/ml.

TABLE I
Report of Radioactive Effluents: Liquid - Total

Isotope	Unit	January	February	March	April	May	June
Ag-110m	mCi	1.65 E-01	(<7.7 E-08)	3.74 E-01	7.17 E-02	5.77 E-02	4.30 E-01
Ba-140	mCi	(<7.5 E-07)	(<3.7 E-07)	(<7.0 E-07)	(<5.0 E-07)	(<4.3 E-07)	(<2.2 E-06)
Co-57	mCi	4.98 E-02	(<3.5 E-08)	(<5.0 E-08)	(<4.1 E-08)	(<3.7 E-08)	(<7.0 E-08)
Co-58	mCi	5.94 E+00	2.89 E+00	9.50 E+00	1.05 E+01	6.96 E+00	9.49 E+00
Co-60	mCi	1.51 E+01	3.66 E+00	6.52 E+00	6.32 E+00	3.60 E+00	6.26 E+00
Cr-51	mCi	1.39 E+00	(<5.0 E-07)	4.05 E+00	1.44 E-01	7.42 E-01	6.34 E-01
Cs-134	mCi	1.06 E+00	4.66 E-01	1.29 E+00	7.20 E-01	5.29 E-01	1.69 E-01
Cs-136	mCi	4.59 E-02	(<1.3 E-07)	(<1.8 E-07)	(<1.9 E-07)	(<1.1 E-07)	(<6.5 E-07)
Cs-137	mCi	2.18 E+00	7.81 E-01	2.43 E+00	1.36 E-00	9.83 E-01	2.29 E-01
Fe-59	mCi	(<3.8 E-07)	(<1.7 E-07)	1.73 E-01	(<1.8 E-07)	(<1.4 E-07)	(<3.5 E-07)
I-131	mCi	1.27 E-01	1.20 E-01	1.77 E+00	8.69 E-02	(<1.0 E-07)	1.18 E-01
La-140	mCi	(<5.8 E-08)	(<4.0 E-08)	6.65 E-02	(<4.8 E-08)	(<4.0 E-08)	(<2.0 E-07)
Mn-54	mCi	1.04 E-01	(<6.9 E-08)	3.56 E-01	4.45 E-02	1.27 E-01	8.05 E-02
Mo-99/Tc-99m	mCi	(<6.0 E-07)	(<1.5 E-07)	8.56 E-01	(<7.5 E-07)	(<3.8 E-07)	(<9.9 E-07)
Nb-95	mCi	4.05 E-01	(<7.3 E-08)	6.83 E-01	1.29 E-01	2.07 E-01	3.34 E-01
Ru-103	mCi	1.23 E-01	(<7.5 E-08)	8.32 E-02	(<8.7 E-08)	2.73 E-02	(<1.7 E-07)
Sb-124	mCi	(<7.9 E-08)	(<4.9 E-08)	1.34 E-01	(<5.2 E-08)	(<6.3 E-08)	4.40 E-01
Sb-125	mCi	1.66 E-01	4.21 E-01	1.71 E+00	3.13 E-01	4.89 E-01	1.65 E+00

NOTE: Numbers in parentheses represent maximum sensitivity in µCi/ml.

TABLE I
Report of Radioactive Effluents: Liquid - Total

Isotope	Unit	January	February	March	April	May	June
Sr-89	mCi	2.71 E-01	1.22 E-01	8.67 E-02	5.17 E-01	(<6.31 E-09)	1.33 E-01
Sr-90	mCi	2.2 E-02	(<4.34 E-09)	(<6.58 E-09)	(<1.16 E-08)	7.39 E-02	(<6.99 E-09)
Te-132	mCi	(<3.4 E-07)	(<8.9 E-08)	(<4.3 E-07)	9.04 E-02	(<1.8 E-07)	(<5.1 E-07)
Y-88	mCi	7.38 E-02	---	---	---	---	---
Zn-65	mCi	(<3.8 E-07)	(<1.7 E-07)	2.59 E-01	(<1.7 E-07)	(<1.5 E-07)	(<2.9 E-07)
Zr-95	mCi	2.96 E-01	(<1.2 E-07)	(<1.8 E-07)	(<1.3 E-07)	6.37 E-02	(<2.2 E-07)
TOTAL	mCi	2.75 E+01	8.45 E+00	3.03 E+01	2.03 E+01	1.39 E+01	2.00 E+01

NOTE: Numbers in parentheses represent maximum sensitivity in μCi/ml.

TABLE I
Report of Radioactive Effluents: Liquid - Dissolved Gas

Total		January	February	March	April	May	June
Ar-41	mCi	(<3.19 E-07)	(<8.66 E-08)	1.56 E+00	(<1.53 E-07)	(<8.14 E-08)	(<5.19 E-08)
Kr-85	mCi	(<4.89 E-05)	(<1.66 E-05)	(<3.05 E-05)	(<2.06 E-05)	(<1.27 E-05)	(<2.20 E-05)
Kr-85m	mCi	4.14 E-01	(<8.42 E-08)	3.17 E+00	(<5.26 E-08)	(<4.84 E-08)	(<4.65 E-08)
Kr-87	mCi	(<8.57 E-07)	(<2.82 E-07)	9.93 E+00	(<5.64 E-07)	(<3.38 E-07)	(<2.03 E-07)
Kr-88	mCi	(<6.06 E-07)	(<3.28 E-07)	7.65 E+00	(<2.92 E-07)	(<2.26 E-07)	(<1.79 E-07)
Xe-131m	mCi	1.42 E+01	(<3.04 E-06)	1.12 E+02	(<1.36 E-06)	(<1.27 E-06)	(<1.40 E-06)
Xe-133	mCi	1.92 E+03	1.18 E+02	7.18 E+02	2.71 E+00	(<1.09 E-07)	9.48 E+00
Xe-133m	mCi	2.00 E+01	1.13 E+00	2.61 E+01	(<3.49 E-07)	(<3.50 E-07)	(<3.71 E-07)
Xe-135	mCi	5.91 E+00	9.48 E-02	4.46 E+01	3.24 E-01	(<4.61 E-08)	2.09 E+00
	mCi						

NOTE: Numbers in parentheses represent maximum sensitivity in µCi/ml.

TABLE II
Report of Radioactive Effluents: Airborne

A. Fission and Activation Gases		January	February	March	April	May	June
1. Total Release	(Ci)	3.51 E+03	2.04 E+03	1.25 E+03	1.50 E+02	2.00 E+02	1.63 E+03
2. Avg Release Rate for Period	(μCi/sec)	1.16 E+03	8.42 E+02	5.17 E+02	4.96 E+01	8.27 E+01	6.74 E+02
*3. Max Release Rate for Period	(μCi/sec)	3.25 E+03	3.14 E+03	2.48 E+04	2.31 E+03	4.86 E+03	3.17 E+03

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

B. Iodine - 131							
1. Total Iodine - 131	(Ci)	6.89 E-04	1.49 E-03	8.96 E-03	1.29 E-03	7.34 E-05	1.91 E-03
2. Avg Release Rate for Period	(μCi/sec)	2.28 E-05	6.16 E-04	3.70 E-03	4.27 E-04	3.03 E-05	7.89 E-04

C. Particulates							
1. Particulates (with $t_{1/2}$ >8 days)	(Ci)	3.52 E-05	1.56 E-05	1.17 E-04	1.47 E-04	6.08 E-05	7.29 E-06
2. Avg Release Rate for Period	(μCi/sec)	1.17 E-05	6.45 E-06	4.83 E-05	4.87 E-05	2.51 E-05	3.01 E-06
3. Gross Alpha Radioactivity	(Ci)	1.62 E-07	1.49 E-07	1.40 E-07	7.81 E-08	7.26 E-08	3.73 E-08

D. Tritium							
1. Total Release	(Ci)	5.55 E-02	1.75 E-02	2.87 E-02	5.68 E-03	7.14 E-03	7.76 E-03
2. Avg Release Rate for Period	(μCi/sec)	1.84 E-02	7.23 E-03	1.19 E-02	1.88 E-03	2.95 E-03	3.21 E-03

E. Percent of Applicable Limit			
1. Fission and Activation Gases	(%)	7.21 E+00	2.10 E+00
2. I-131 and Part (t1/2>8d)	(%)	1.42 E-01	4.20 E-02

NOTE: Numbers in parentheses represent maximum sensitivity in μCi/ml.

TABLE II
Airborne Releases - Particulates

Isotope	Unit	January	February	March	April	May	June
Ag-110	Ci	(<2.4 E-14)	(<2.1 E-14)	(<3.0 E-14)	(<2.7 E-14)	1.04 E-06	(<2.1 E-14)
Ba-140	Ci	(<1.0 E-13)	2.75 E-06	3.30 E-06	5.02 E-06	(<8.5 E-14)	(<7.7 E-14)
Co-58	Ci	1.62 E-05	2.87 E-06	2.93 E-05	6.65 E-05	2.23 E-05	5.47 E-07
Co-60	Ci	8.70 E-06	4.24 E-06	1.66 E-05	3.49 E-05	2.26 E-05	4.25 E-06
Cr-51	Ci	3.20 E-06	(<1.2 E-13)	6.00 E-06	2.23 E-05	(<1.2 E-13)	(<9.8 E-14)
Cs-134	Ci	2.40 E-06	(<3.4 E-14)	8.76 E-06	6.20 E-07	3.69 E-06	(<1.9 E-14)
Cs-136	Ci	(<3.6 E-14)	(<3.6 E-14)	3.55 E-06	(<4.6 E-14)	(<3.3 E-14)	(<3.3 E-14)
Cs-137	Ci	4.23 E-06	2.00 E-06	1.37 E-05	5.03 E-06	9.03 E-06	2.21 E-06
I-131	Ci	(<1.7 E-14)	2.2 E-06	2.79 E-05	1.09 E-06	(<1.5 E-14)	(<1.6 E-14)
La-140	Ci	(<4.5 E-14)	(<4.4 E-14)	6.03 E-06	4.69 E-06	(<1.8 E-14)	(<3.3 E-14)
Mn-54	Ci	(<2.5 E-14)	9.44 E-07	(<3.1 E-14)	3.11 E-06	(<2.4 E-14)	(<1.8 E-14)
Nb-95	Ci	(<2.3 E-14)	(<2.6 E-14)	1.22 E-06	(<3.8 E-14)	(<2.7 E-14)	(<2.0 E-14)
Ru-103	Ci	(<2.1 E-14)	(<2.0 E-14)	(<2.7 E-14)	1.04 E-06	(<2.0 E-14)	(<1.8 E-14)
Sn-117m	Ci	(<7.9 E-15)	(<8.9 E-15)	(<1.1 E-14)	5.84 E-07	(<7.0 E-15)	(<7.2 E-15)
Sr-89	Ci	2.75 E-07	5.35 E-07	9.38 E-07	2.14 E-06	2.14 E-06	2.86 E-07
Sr-90	Ci	1.45 E-07	2.21 E-08	2.21 E-08	(<5.77 E-16)	(<5.77 E-16)	(<7.92 E-16)
TOTAL	Ci	3.52 E-05	1.56 E-05	1.17 E-04	1.47 E-04	6.08 E-05	7.29 E-06

NOTE: Numbers in parentheses represent maximum sensitivity in μCi/ml.

TABLE II
Airborne Releases - Gaseous

Fission and Activation Gases Isotope	Unit	January	February	March	April	May	June
Ar-41	Ci	2.67 E-01	2.32 E-01	5.94 E-01	1.36 E-01	1.19 E-01	2.46 E-01
Kr-85	Ci	5.24 E+00	1.28 E+00	5.27 E+00	2.80 E-01	2.10 E+00	1.32 E+00
Kr-85m	Ci	4.26 E-02	1.11 E-01	4.85 E-01	6.60 E-03	4.20 E-03	1.75 E-02
Kr-87	Ci	3.98 E-04	5.28 E-03	7.41 E-02	(<2.96 E-05)	(<3.49 E-05)	(<3.68 E-0[illegible])
Kr-88	Ci	3.08 E-02	6.68 E-02	4.78 E-01	(<3.67 E-05)	(<4.67 E-05)	(<3.08 E-05)
Xe-131m	Ci	1.41 E+00	1.62 E+00	4.20 E+00	3.04 E-02	2.89 E-01	1.61 E-01
Xe-133	Ci	3.50 E+03	2.03 E+03	1.23 E+03	1.49 E+02	1.98 E+02	1.63 E+03
Xe-133m	Ci	1.51 E+00	2.23 E+00	2.95 E+00	2.81 E-02	2.08 E-02	1.97 E-01
Xe-135	Ci	1.08 E+00	2.55 E+00	6.51 E+00	9.68 E-02	1.10 E-01	4.19 E-01
Xe-135m	Ci	---	---	----	----	---	----
Xe-138	Ci	------	------	-----	--------	-----	-------
Total	Ci	3.51 E+03	2.04 E+03	1.25 E+03	1.50 E+02	2.00 E+02	1.63 E+[illegible]

Halogens (Gaseous) Isotope	Unit	January	February	March	April	May	June
I-131	Ci	6.89 E-04	1.49 E-03	8.96 E-03	1.29 E-03	7.34 E-05	1.91 E-03
I-133	Ci	9.26 E-04	4.68 E-03	5.69 E-03	2.09 E-04	4.24 E-05	5.19 E-03
I-135	Ci	8.50 E-04	3.96 E-04	9.90 E-04	(<1.7 E-13)	(<1.3 E-13)	5.45 E-03
Br-82	Ci	1.57 E-05	3.94 E-05	1.90 E-04	(<5.6 E-14)	(<4.6 E-14)	1.33 E-04
Total	Ci	2.48 E-03	6.61 E-03	1.58 E-02	1.50 E-03	1.16 E-04	1.27 E-02

Note: Numbers in parentheses represent maximum sensitivity in µCi/ml.

TURKEY POINT UNIT NOS. 3 & 4

RADIOACTIVE EFFLUENT RELEASE DATA

JANUARY 1984 THROUGH JUNE 1984

SOLID WASTE

DATE OF SHIPMENT	CURIES	CUBIC FEET	SHIPPED TO
01-12-84	4.55	170	BARNWELL,S.C.
01-16-84	.393	170	BARNWELL,S.C.
01-19-84	10.75	170	BARNWELL,S.C.
01-23-84	2.206	200	BARNWELL,S.C.
01-24-84	.04826	1050	BARNWELL,S.C.
01-26-84	2.819	200	BARNWELL,S.C.
02-07-84	.15816	1050	HANFORD,WA.
02-14-84	.08123	1050	HANFORD,WA.
02-24-84	488.0	84	BARNWELL,S.C.
03-02-84	.061605	1050	HANFORD,WA.
03-16-84	.19249	1050	HANFORD,WA.
03-22-84	.08761	1050	HANFORD,WA.
03-22-84	.38113	170	BARNWELL,S.C.
04-10-84	5.7638	170	BARNWELL,S.C.
04-13-84	10.972	170	BARNWELL,S.C.
04-17-84	10.32388	195	BARNWELL,S.C.
04-20-84	195.085	84	BARNWELL,S.C.
04-24-84	.11479	1050	HANFORD,WA.
04-30-84	143.90	84	BARNWELL,S.C.
05-01-84	.22878	1050	HANFORD,WA.
05-04-84	.04375	1050	HANFORD,WA.
05-08-84	7.06815	170	BARNWELL,S.C.
05-10-84	134.564	84	BARNWELL,S.C.
05-14-84	.76896	84	BARNWELL,S.C.
05-16-84	.156485	1050	HANFORD,WA.
05-20-84	150.700	84	BARNWELL,S.C.
05-22-84	.14769	1050	HANFORD,WA.
05-23-84	.309464	1050	HANFORD,WA.
05-25-84	13.491	195	BARNWELL,S.C.
05-30-84	1.5442	170	BARNWELL,S.C.
06-04-84	10.89047	195	BARNWELL,S.C.
06-07-84	2.404927	1050	BARNWELL,S.C.
06-08-84	90.33	84	BARNWELL,S.C.
06-13-84	.32818	1050	HANFORD,WA.
06-15-84	149.72	84	BARNWELL,S.C.
35 shipments	1438.584 Ci	17717 Cubic Feet	
On site as of July 1, 1984:	16.77 Ci	6730 Cubic Feet	

TURKEY POINT UNITS 3 AND 4

PROCESS CONTROL PROGRAM

Pursuant to Turkey Point Units 3 & 4 Operating Procedures, the Turkey Point Plant Process Control Program (PCP), which was revised and approved by the Plant Nuclear Safety Committee (PNSC) on June 19, 1984, is herewith attached.

Affected (revised) sections of the PCP involve the addition of statements contained in the following:

Step 4.2 - Added to prohibit solidification of the liner waste without a PCP approved by NRC and/or the PNSC.

Step 4.3 - Added to prohibit the use of containers other than High Integrity Containers (HIC) for Class B and C wastes without PNSC approval. Step 4.3 ensures that liner wastes exceeding Class A limits will meet the requirements of 10CFR 61.56 (b) and the burial site.

Step 4.4 - Added to ensure that the liner wastes will be compatible with the container in meeting the requirements of 10CFR 61.56 and the burial site.

The above changes to the Turkey Point Units 3 & 4 PCP reflect guidance contained in the letter to all operating reactors and applicants for operating licenses (4-30-84), and increase the assurance that the liner waste forms will exhibit properties that meet the requirements of 10CFR 61 and of the low level radioactive waste disposal site at the time of disposal. Consequently, these changes do not constitute a reduction in the overall conformance of dewatered bead resin to existing criteria for radioactive wastes.

Verification that the PCP changes were approved by PNSC is contained on the cover sheet of the attached PCP procedure.

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FLORIDA POWER AND LIGHT COMPANY
TURKEY POINT UNITS 3 AND 4
OPERATING PROCEDURE 11550.48
HEALTH PHYSICS PROCEDURE HP-48
JUNE 19, 1984

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CONTROLLED DOCUMENT

1.0 Title:

PROCESS CONTROL PROGRAM FOR DEWATERING RADIOACTIVE WASTE LINERS

2.0 Approval and List of Effective Pages:

2.1 Approval:

Change Dated 6/19/84 Reviewed by Plant Nuclear Safety Committee: 84-120

and Approved by Plant Manager - Nuclear: 6/19/84

2.2 List of Effective Pages:

Page	Date	Page	Date	Page	Date	Page	Date
1	6/19/84	3	6/19/84	5	6/19/84	7	6/19/84
2	6/19/84	4	6/19/84	6	6/19/84	8	6/19/84

3.0 Purpose:

The Turkey Point Process Control Program (PCP) implements requirements of the Turkey Point 3 and 4 technical specifications and provides instructions for the removal of free standing water from liners containing radioactive bead resin or charcoal.

3.1 Discussion:

The PCP contains provisions to assure that dewatering of radioactive bead resin and charcoal results in a waste form with characteristics that meet the requirements of 10 CFR 61 as implemented by 10 CFR 20 and of the low level radioactive waste disposal site. The Process Control Program includes in addition to this procedure, the following related documents:

3.1.1 Dewatering Procedure for CNSI Conical-Bottom High Integrity Containers. CNSI No. FO-OP-003..

3.1.2 Test Procedure and lab record sheet for dewatering conical bottom resin liners. CNSI Project No. 11038.

3.1.3 Dewatering procedure for the 24-inch diameter pressure demineralizing vessel containing ion-excange resin CNSI No. FO-OP-004.

3.1.4 CNSI Test Data, Engineering Project-11475

3.1.5 Turkey Point HN-100 liner dewatering test report and correspondence dated February 4, 1981

COPY

3.1.6 Hittman liner dewatering reprot No. I-843-3

3.1.7 Hittman Process Control Program for dewatering ion-exchange resin and activated charcoal filter media to 1/2% drainable liquid. No. STD-P-04-002

3.2 Authority:

The authority and responsibility to perform the requirments of this procedure come from 10 CFR 20, 10 CFR 61, Turkey Point Plant units 3 and 4 technical specifications, and disposal site criteria.

3.3 Definitions:

3.3.1 Dewatering: The process of removing "Free Standing" water from a final disposal package.

3.3.2 "Free Standing Water": Liquid which is not retained by the waste form.

3.3.3 Process Control Program (PCP): The Process Control Program shall contain the provisions, based on full scale testing, to assure that dewatering of radioactive bead resin or charcoal results in a waste form with the properties that meet the requirements of 10 CFR 61 (as implemented by 10 CFR 20) and of the low level radioactive waste disposal site.

4.0 Precautions:

4.1 Instructions used for the dewatering of liners which establish the conditions that must be met shall be based on full scale testing. This is to provide reasonable assurance that the dewatering will result in volumes of free standing water, at the time of disposal, within the limits of 10 CFR, Part 61 as implemented by 10 CFR 20 and of the low level radioactive waste disposal site.

4.2 Solidification of radioactive waste shall not be performed without PNSC approved procedure. It is permissable to solidify waste using a process which contains a Process Control Program (PCP) which has been approved by the NRC as satisfying the waste form requirements of 10 CFR 61. Any PCP submitted for PNSC approval must contain sufficient information to document that the final waste form will meet the requirements of 10 CFR 61.

4.3 Class "B" and "C" radioactive waste (as determined by 10 CFR 61 and Operating Procedure 11550.40) may be transferred to the disposal site in an approved High Integrity Container (HIC). No other containers may be used without PNSC approval. Do not use High Integrity Containers for radioactive material that could chemically or physically damage or otherwise exceed the allowable limits of the HIC.

4.4 Do not use High Integrity Containers for radioactive material that could chemically or physically damage or otherwise exceed the allowable limits of the HIC.

4.5 All changes to Turkey Point Plant Process Control Program must be reviewed and approved by the PNSC before they become effective.

4.6 All changes to the Turkey Point Plant Process Control Program must be submitted to the NRC in the Semiannual Radioactive Effluent Release Report for the period in which the change(s) was made. This submittal must contain the following:

4.6.1 Sufficiently detailed information to support the rationale for the change.

4.6.2 A determination that the change did not reduce the overall conformance of the dewatered bead resins to existing criteria for stabilized waste form.

4.6.3 Documentation of the fact that the change has been reviewed and found acceptable by the PNSC.

4.7 Disposal of radioactive bead resin is limited to the following containers:

4.7.1 CNSI Conical Bottom High Integrity Container Type PL6-80CR

4.7.2 CNSI Conical Bottom High Integrity Container Type PL14-195CR

4.7.3 HN 100 Steel Liner

4.7.4 CNSI 24-inch Diameter Pressure Demineralizer Liner

COPY

4.8 Disposal of charcoal filter media is limited to the following container:

4.8.1 HN 100 Steel Liner

4.9 Personnel performing dewatering procedure should be aware that strong oxidizing agents such as nitric acid, when in contact with organic ion-exchange material and in the presence of air, may produce a slightly degraded resin in an exothermic reaction, up to an explosion. The first indication of an exothermic reaction due to the presence of oxidizing agents is some fuming and a slight rise in temperature on the outside of the container. If this condition is found when dewatering a vessel, the immediate action to be taken is to refill the vessel with water. This will eliminate one of the ingredients necessary for the reaction (air) and will dissipate the majority of the heat, returning the temperature of the vessel to ambient. This is a stable condition. Then your immediate supervisor must be notified.

5.0 Responsibilities:

5.1 It is the responsibility of the Plant Manager to assure that all necessary procedures, equipment and support are provided to properly implement the PCP.

5.2 It is the responsibility of the Health Physics Supervisor or his designee to assure that all liners will be dewatered in accordance with the PCP.

6.0 References:

6.1 Turkey Point units 3 and 4 Technical Specifications

6.2 Dewatering Procedure for CNSI Conical Bottom High Integrity Containers No. FO-OP-003

6.3 Test Procedure and Lab Record Sheet for dewatering conical bottom resin liners. CNSI Project No. 11038

6.4 Dewatering Procedure for the 24-inch diameter pressure demineralizing vessel containing ion-excange resin CNSI No. FO-OP-004

6.5 CSNI Test Data, Engineering Project - 11475

6.6 Turkey Point HN-100 liner dewatering test report and correspondence dated February 4, 1981

6.7 Hittman Liner Dewatering Report No. I-843-3

6.8 Hittman Process Control Program for dewatering ion-exchange resin and activated charcoal filter media to 1/2% drainable liquid. No. STD-P-04-002.

6.9 Operating Procedure 11550.40 "Shipping and Receiving Radioactive Material."

6.10 10 CFR 49

6.11 10 CFR 61

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6.12 Operating Procedure 5333.1 "WDS - Transfering Spent Storage Tank To Shielded Shipping Cask."

7.0 Records and Notifications:

7.1 Records shall be maintained as required by this procedure and Operating Procedure 11550.40 "Shipping and Receiving Radioactive Material".

7.2 If it is suspected that the free standing water requirements may be not met for any container shipped to a disposal site, notify the Plant Manager and the Health Physics Supervisor.

7.3 If the Process Control Procedures have not been followed or if free standing water is suspected in the final shipping container in amounts greater than allowed by regulations, notify the Health Physics Supervisor or his designee.

7.4 The following are Quality Assurance records when completed and, therefore, shall be retained in accordance with Administrative Procedure 0190.14, Document Control and Quality Assurance Records.

7.4.1 Specification Container Shipping Release Form (HP-72C)

7.4.2 User Checklist for High Integrity Container (HP-115)

7.4.3 Certification Statement for Disposal of Enviro-Safe High Integrity Container (HP-117)

7.4.4 CNSI Conical Bottom Enviro-Safe High Integrity Container Dewatering Completion Record to 1% FSW (HP-116)

7.4.5 CNSI 24-inch Diameter Container Dewatering Record (HP-116.1)

8.0 Instructions:

8.1 In lieu of dewatering, radioactive resin or charcoal may be shipped for disposal if a visual inspection of the media during transfer, and of the final shipping container after loading, can be conducted in a manner that will assure that the free standing liquid volume present will meet shipping, transportation and disposal site requirements.

8.2 Prior to disposal, each container shall be tested for free standing liquids in accordance with the Process Control Program to assure that it meets shipping, transportation, and disposal site requirements.

8.3 If the final waste form does not meet disposal site or shipping and transportation requirements, suspend shipment for the inadequately dewatered liner and correct the Process Control Program, the procedures and/or the dewatering system as necessary to prevent recurrence.

8.4 If the dewatering is not performed in accordance with the Process Control Program, and the dewatered liner has not been shipped for disposal, verify that each container meets burial site and shipping requirements and take appropriate administrative action to prevent recurrence.

8.5 Dewatering of Chem-Nuclear Conical Bottom High Integrity Containers (containing bead type ion-exchange resin)

8.5.1 Obtain a positive displacement, air generated diaphram pump such as a Warren-Rupp Sandpiper with either 1-1/2" or 2" diameter inlet/outlet connections.

8.5.2 Connect suction of pump to the proper dewatering connections on the resin liner with a pressure tested hose of at least 1-1/2" in diameter.

8.5.3 Blow out service air lines to clear any trapped liquids and then connect to the dewatering pump.

8.5.4 Connect discharge line to the pump.

8.5.5 Route the discharge of pump to approved drain line; either a floor drain or other Radwaste System as approved by Operations.

8.5.6 Perform a functional test of pumps and hose(s) before actual resin bead transfer as per FPL Operating Procedure 5333.1. (Ref. 6.12)

8.5.7 Transfer resin to the disposal container as per FPL Operating Procedure 5333.1. (Ref. 6.12)

8.5.8 When all transfer and flushing operations are complete, close the fill valves on the discharge line inside the South Filling Room. Record the time dewatering started on the HP-116 Form. (Ref. 7.4.4)

8.5.9 Start the dewatering pump and run at ≥ 2 strokes per second for a minimum of eight (8) hours. Stop the pump and record the time on the HP-116 Form.

8.5.10 Let vessel stand for a minimum of 16 hours. Start the dewatering pump and run at > 2 strokes per second and run for at least eight (8) hours. Record times on HP-116.

8.5.11 Let the vessel stand for a minimum of 16 hours. Obtain a container such as bucket or a drum to catch discharge of pump.

CAUTION: Water will be highly radioactive.

8.5.12 Start the dewatering pump and run for eight (8) hour minimum. Before securing the pump, lift the suction hose to remove any pockets of water trapped in the hose. Measure the volume of water collected during this cycle. If the volume of water collected is greater than 2000 ml, repeat the dewatering cycle of 16 hours standing and eight (8) hours pumping until less than 2000 ml of water is collected. If the volume of water is less than 2000 ml, dewatering is complete. Record the volume of water collected with the start and stop times for dewatering on Form HP-116. (Ref. 7.44)

NOTE: The dewatering record HP-116 (i.e. CNSI High Integrity Container Dewatering Record to < 1% F.S.W.) must be completed and approved by the Radwaste Supervisor or his designee. The completed form will also be included in the shipping papers.

8.5.13 Disconnect hoses from liner and prepare the liner and cask for shipment. Secure the container as per the manufacturers instructions.

8.6 Dewatering of Chem-Nuclear 24 inch Diameter Pressure Demineralizer Liner.

8.6.1 Upon completion of waste processing, remove liner from service.

8.6.2 Set the liner in a level position.

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8.6.3 Connect the suction hose to the dewatering connection on the liner and to the inlet of positive displacement, air operated diaphram pump. Route the pump discharge to approved drain line or floor drain.

8.6.4 Start the dewatering pump and run at ≥ 2 strokes per second.

8.6.5 Continue pumping for a minimum of 4 hours, then shut off the pump. Enter the start and stop time on the form, HP-116.1. (Ref. 7.4.5)

8.6.6 Wait a minimum of 24 hours after securing the pump, then restart the pump. Enter the time on Form HP-116.1.

8.6.7 Adjust the pump air supply to establish a minimum pumping rate of 2 strokes per second.

8.6.8 Continue pumping for a minimum of 1 hour, then secure the pump. Enter the time on Form HP-116.1.

8.6.9 Measure the water collected with a graduated cylinder.

8.6.10 If more than 500 mls are collected and measured in the previous step, let the vessel stand for a minimum of 24 hours and repeat Steps 8.2.6 thru 8.2.9. Continue to repeat the waiting/pumping cycle until less than 500 mls are collected during the pumping steps. Enter volume and times on Form HP-116.1.

NOTE: The Dewatering Record HP-116.1 (i.e. CNSI 24 inch Diameter Container Dewatering Record to < 0.5% F.S.W.) must be completed and approved by the Radwaste Supervisor or his designee. The completed form will also be included in the shipping papers.

8.6.11 The final dewatering shall be performed within 72 hours of shipping liner for disposal.

8.7 Dewatering of Hittman HN 100 with bottom drain.

8.7.1 Upon completion of waste processing remove the liner from service.

8.7.2 Set in tipped configuration (Approx. 10° with bottom drain at low point).

8.7.3 Connect the dewatering line to the suction side of a positive displacement, air operated diaphram pump and to the connection on the bottom drain of the Hittman Liner. Remove vent cap cover.

8.7.4 Start the dewatering pump and run at ≥ 2 strokes per second for 24 hours. Stop the pump after 24 hours.

8.7.5 Let the liner stand for 16 hours.

8.7.6 Obtain a container to collect discharge of pump. COPY

CAUTION: Water will be highly radioactive.

8.7.7 Start the pump and collect discharge for 8 hours. Before securing the pump, lift the suction hose to remove any trapped water in the line.

8.7.8 If collected water is greater than 500 ml, repeat Steps 8.7.5 thru 8.7.7 until less than 500 ml is collected.

8.7.9 If collected water is less than 500 ml, proceed to Step 8.7.10.

8.7.10 Remove the dewatering line from the bottom drain and attach the line to the underdrain connection located on the top of the liner.

8.7.11 Obtain a container to collect discharge of pump.

8.7.12 Run pump for 8 hours collecting all pump discharge. Before securing the pump, lift the suction hose to remove any trapped water in the line.

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8.7.13 If collected water is greater than 500 ml, reconnect the suction hose to the bottom drain and repeat all Steps from 8.7.5 thru 8.7.12.

8.7.14 If collected water is less than 500 ml, proceed to Step 8.7.15. The final dewatering shall be performed within 72 hours of shipping liner for disposal.

8.7.15 Disconnect the dewatering line and ensure that the plug is secured in the bottom drain.

8.7.16 Install the vent cap covers and the top cover on the liner. Secure the liner for shipment.

8.7.17 Complete the Hittman Liner Dewatering Record on page 4 of HP-72C (Ref. 7.4.1) with all the required data.