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April 25,2002
IPN-02-033

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Stop O-P1-17
Washington, D.C. 20555

SUBJECT: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
License No. DPR-64
Annual Radioactive Effluent Release Report -
For The Period January 1, 2001 Through December 31, 2001

Reference: Entergy letter (IPN-01-033) R. J. Barrett to NRC "Annual Radioactive Effluent Release Report – For the Period January 1, 2000 through December 31, 2000" dated April 19, 2001.

Dear Sir:

Enclosed is the Annual Report of Radioactivity in Solid Wastes and Releases of Radioactive Material in Liquid and Gaseous Effluents for Indian Point 3 as required by Technical Specifications Section 5.6.3. The enclosed report covers the period January 1, 2001 through December 31, 2001 for Indian Point 3. It would include those releases from Indian Point 1 or 2 resulting from processing waste from Indian Point 3, if this pathway were utilized. During this reporting period, no waste was transferred from Indian Point 3 to Indian Point 1 or 2.

Attachment I contains the Radioactive Effluent Release Report for 2001. Included in this report is the justification package for the Offsite Dose Calculation Manual, Revision15 and the corrected justification package to Revision 6 of the Process Control Program. Attachment II contains Revision 15 to the Offsite Dose Calculation Manual. The current revision of the Process Control Program is Revision 7, which was submitted to the Nuclear Regulatory Commission in the reference listed above.

Entergy is making no new commitments in this letter. If you have any questions, please contact Mr. Steve Sandike at (914) 736-8455.

Very truly yours,

R. J. Barrett
Vice President, Operations – IP3
Indian Point 3 Nuclear Power Plant

IE25

Attachments

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ATTACHMENT I TO IPN-02-033

RADIOACTIVE EFFLUENT RELEASE REPORT FOR 2001

Entergy Nuclear Operations, Inc.
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

Radioactive Effluent Release Report: 2001

Facility Indian Point 3

Licensee Entergy Nuclear Northeast

This information is provided in accordance with the requirements of Regulatory Guide 1.21. The numbered sections of this report reference corresponding sections of the subject Regulatory Guide, pages 10 to 12.

A. Supplemental Information

1. Regulatory Limits

Indian Point 3 is presently subject to limits on radioactive waste releases that are set forth in the Offsite Dose Calculation Manual, Parts I and II, per the Technical Specifications. ODCM Part I, also known as the Radiological Effluent Controls (or RECS) is prescribed by Technical Specification Section 5.5.1, while the ODCM Part II is defined in Section 5.5.4. The percentages of the Technical Specification limits reported in Tables 1A and 2A are the percent of the ODCM quarterly limits. If more than one limit applies to the release, the most restrictive limit is reported.

2. Maximum Permissible Concentration

a) Airborne Releases

Maximum concentrations and compliance with 10CFR20 release rate limits are controlled by the application of Radiation Monitor setpoints, preliminary grab sampling, and conservative procedural guidance for batch and continuous releases. These measures, in conjunction with plant design, preclude approaching release rate limits, per the ODCM.

b) Liquid Effluents

Proximity to the 10 CFR 20 release rate limits is controlled for each release by the application of a calculated Allowed Diluted Concentration (ADC) and Radiation Monitor setpoints. The ADC is calculated as a function of the "10 times EC" limit, and includes limitations from Beta emitters. These measures, along with an administrative activity limit for effluent waste tanks, preclude approaching release rate limits, per the ODCM.

3. Average Energy

The average energies ($\bar{E}$) of the radionuclide mixtures in releases of fission and activation gases were as follows:

1st Quarter	$\bar{E}_\beta$ =	1.42E-01 Mev/dis	$\bar{E}_\gamma$ =	7.19E-02 Mev/dis
2nd Quarter	$\bar{E}_\beta$ =	1.62E-01 Mev/dis	$\bar{E}_\gamma$ =	9.66E-02 Mev/dis
3rd Quarter	$\bar{E}_\beta$ =	2.98E-01 Mev/dis	$\bar{E}_\gamma$ =	6.55E-01 Mev/dis
4th Quarter	$\bar{E}_\beta$ =	2.97E-01 Mev/dis	$\bar{E}_\gamma$ =	6.53E-01 Mev/dis

4. Measurements and Approximations of Total Radioactivity

a) Fission and Activation Gases

Analyses of effluent gases have been performed in compliance with the requirements of Table 3.4.1-1 of the RECS (ODCM Part I). In the case of isolated tanks (batch releases), the total activity discharged is based on an isotopic analysis of each batch with the volume of gas in the batch corrected to standard temperature and pressure.

Vapor containment purge and pressure relief (vent) discharges routinely total less than 150 hours/quarter in duration have been treated as batch releases. However, both types of releases from the Vapor Containment are performed randomly with regard to time of day and duration (release periods were not dependant solely on time of day or atmospheric condition). Therefore, determination of doses due to Vapor Containment releases includes the use of annual average dispersion data, as defined in NUREG 0133, Section 3.3.

At least one complete isotopic concentration analysis of containment air is performed monthly. This analysis is used in conjunction with a process monitor to obtain the isotopic mixture and quantification of each pressure relief. Isotopic analyses for each vapor containment purge are taken prior to and during the purge. This information is combined with the volume of air in each discharge to calculate the quantity of activity released from these discharges.

The continuous building discharges are based on weekly samples of ventilation air analyzed for isotopic content. This information is combined with total air volume discharged and the process radiation monitor readings to determine the quantity of activity from continuous discharges.

When no noble gas activity is identified for an entire quarter, a "less than" value is reported. This value is determined from the established Xe-133 minimum detectable concentration and the total volume of air released from all continuous release points.

b/c) Iodines and Particulates

Iodine-131 and particulate releases are quantified by collecting a continuous sample of ventilation air on a TEDA impregnated, activated charcoal cartridge and a glass-fiber filter paper. These samples are changed weekly as required in Table 3.4.1-1 of the RECS. The concentration of isotopes found by analysis of these samples is combined with the volume of air discharged during the sampling period to calculate the quantity of activity discharged.

For other iodine isotopes, concentrations are determined monthly on a 24-hour sample. The concentration of each isotope is analytically determined by ratioing the activities with weekly media for I-131. This activity is combined with the volume of air discharged during the sampling period to calculate the quantity of activity discharged.

A compositing method of analyzing for gross alpha is used to improve efficiency. When no Gross Alpha or Iodine-131 is identified for an entire quarter, a "less than" value is reported (in curies) on Table 1A. This value is derived from established minimum detectable concentrations and the total volume of air released from all continuous release points. This method generates a more accurate Minimum Detectable total curie level than summing MDCs and occasional false positives at the critical level. The values demonstrate that the RECS/ODCM required LLDs are not challenged.

d) Liquid Effluents

A sample of each batch discharge is taken and an isotopic analysis is performed in compliance with requirements specified in Table 3.3.1-1 of the RECS. Proportional composite samples of continuous discharges are taken and analyzed in compliance with this table as well. Isotopic concentration data are combined with the information on volume discharged to determine the amount of each isotope discharged.

5. Batch Releases

a) **Liquid Releases**		Qtr 1	Qtr 2	Qtr 3	Qtr 4	2001
Number of Batch Releases		33	63	25	20	141
Total Time Period	(min)	3.64E+3	7.19E+3	2.73E+3	2.22E+3	1.58E+4
Maximum Time Period	(min)	1.41E+2	2.01E+2	1.24E+2	1.27E+2	2.01E+2
Average Time Period	(min)	1.10E+2	1.14E+2	1.09E+2	1.11E+2	1.12E+2
Minimum Time Period	(min)	9.00E+1	9.50E+1	8.00E+1	9.80E+1	8.00E+1

Average Stream Flow :

Hudson River flow information is obtained from the Department of the Interior, United States Geological Survey (USGS). These data are received after review from the USGS, approximately 18 months after initial data collection. This information is included in the effluents report as the data become available.

Estimated Average Stream Flows of the Hudson River at Indian Point

Year	Quarter	Flow (cfs)
1999	Fourth	13,300
2000	First	27,200
2000	Second	38,333
2000	Third	15,133

b) **Airborne Releases**		Qtr 1	Qtr 2	Qtr 3	Qtr 4	2001
Number of Batch Releases		38	33	28	24	123
Total Time Period	(min)	7.03E+03	4.98E+03	4.33E+03	4.24E+03	2.06E+04
Maximum Time Period	(min)	3.89E+02	4.80E+02	3.12E+02	2.98E+02	4.80E+02
Average Time Period	(min)	1.85E+02	1.51E+02	1.55E+02	1.77E+02	1.67E+02
Minimum Time Period	(min)	4.00E+00	6.00E+00	1.00E+00	1.00E+00	1.00E+00

6. Abnormal Releases

a) Liquid
None

b) Gaseous
None

7. ODCM Reporting Requirements

The ODCM (RECS) Sections 2.1.B and 2.2.B require reporting of prolonged outages of effluent monitoring equipment. Also required in this report is notification of any changes in the land use census, the Radiological Environmental Monitoring Program (REMP), or exceeding the total curie content limitations in outdoor tanks (RECS 2.10 and 2.11).

During this reporting period, no required ODCM or Technical Specification Effluent Monitoring equipment was out of service for periods greater than 30 consecutive days.

During this reporting period, no tank curie limits in outdoor tanks were exceeded.

The Offsite Dose Calculation Manual and the Process Control Program were updated during this reporting period. Changes are identified in Section G.

Indian Point 3

RADIOACTIVE EFFLUENT RELEASE REPORT

B. GASEOUS EFFLUENTS

2001

TABLE 1A

RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2001)

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

A. Fission & Activation Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2001	Est. Total % Error
1. Total Release	Ci	2.53E+00	3.02E+00	5.84E-02	7.10E-02	5.68E+00	± 25
2. Average release rate	uCi/sec	3.25E-01	3.84E-01	7.35E-03	8.93E-03	1.80E-01	
3. Percent of ODCM limit (Noble Gases only)	%	4.28E-03	5.83E-03	1.93E-04	2.35E-04	5.26E-03	

B. Iodines							
1. Total Iodine-131	Ci	<3.00E-6	6.92E-05	1.63E-07	< 3.00E-6	6.94E-05	± 25
2. Average release rate	uCi/sec	<3.812E-7	8.80E-06	2.05E-08	< 3.77E-7	2.19E-06	

C. Particulates							
1. Total Release, with half-life > 8 days	Ci	N/D	1.67E-06	N/D	N/D	1.67E-06	± 25
2. Average release rate	uCi/sec	N/D	2.12E-07	N/D	N/D	2.12E-07	
3. Gross Alpha	Ci	< 2.71E-5	< 2.77E-5	< 2.80E-5	< 2.88 E-5	< 1.12E-4	± 25

D. Tritium							
1. Total release	Ci	3.60E-01	4.57E-01	1.12E+00	1.43E+00	3.37E+00	± 25
2. Average release rate	uCi/sec	4.63E-02	5.81E-02	1.41E-01	1.80E-01	1.06E-01	

E. Percent ODCM limit, I&P with half-life > 8 days, H-3	%	7.00E-04	9.85E-03	2.20E-03	2.77E-03	7.77E-03	± 25

N/D = None Detected

TABLE 1C

RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2001)
CONTINUOUS GASEOUS EFFLUENTS - GROUND RELEASES

Nuclides Released

1) Fission Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2001
Kr-85m	Ci		1.86E-02			1.86E-02
Kr-85	Ci					
Kr-87	Ci					
Kr-88	Ci					
Xe-131m	Ci					
Xe-133m	Ci					
Xe-133	Ci	2.33E+00	1.29E+00			3.62E+00
Xe-135m	Ci					
Xe-135	Ci		2.63E-01			2.63E-01
Xe-138	Ci					
Ar-41	Ci					
Total for Period	Ci	2.33E+00	1.57E+00	0.00E+00	0.00E+00	3.90E+00

2) Iodines						
I-131	Ci	<3.00E-6	6.92E-05	<2.98E-06	< 3.01E-06	6.92E-05
I-133	Ci	N/D	5.60E-07	N/D	N/D	5.60E-07
I-135	Ci	N/D	N/D	N/D	N/D	N/D
Total for Period	Ci	<3.00E-6	6.98E-05	<2.98E-06	< 3.01E-06	6.98E-05

3) Particulates						
Total for Period	Ci	N/D	1.67E-06	N/D	N/D	1.67E-06

N/D= None Detected

TABLE 1C

RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2001)
BATCH GASEOUS EFFLUENTS - GROUND RELEASES

Nuclides Released

1) Fission Gases	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2001
Ar-41	Ci	5.28E-02	7.88E-02	2.87E-02	3.47E-02	1.95E-01
Kr-85	Ci	5.32E-03	4.47E-02			5.00E-02
Kr-85m	Ci		3.50E-04		4.56E-04	8.06E-04
Kr-87	Ci					
Kr-88	Ci		5.34E-04			5.34E-04
Xe-131m	Ci		2.22E-02			2.22E-02
Xe-133	Ci	1.44E-01	1.29E+00	2.94E-02	3.58E-02	1.50E+00
Xe-133m	Ci		2.06E-05			2.06E-05
Xe-135	Ci	2.28E-03	8.55E-03	2.68E-04		1.11E-02
Xe-135m	Ci					
Total for Period	Ci	2.04E-01	1.45E+00	5.84E-02	7.10E-02	1.78E+00

2) Iodines						
I-131	Ci	N/D	N/D	1.63E-07	N/D	1.63E-07
I-133	Ci	N/D	N/D	1.79E-07	N/D	1.79E-07
I-135	Ci	N/D	N/D	6.50E-10	N/D	6.50E-10
Total for Period	Ci	N/D	N/D	3.43E-07	N/D	3.43E-07

3) Particulates						
Total for Period	Ci	N/D	N/D	N/D	N/D	N/D

N/D= None Detected

Indian Point 3

RADIOACTIVE EFFLUENT REPORT

C. LIQUID EFFLUENTS

2001

TABLE 2A

RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2001)

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

A. Fission & Activation Products	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2001	Est. Total % Error
1. Total Release (not including Tritium, Gr Alpha, & Gases)	Ci	2.70E-02	5.14E-02	3.64E-02	1.20E-02	1.27E-01	± 25
2. Average Diluted Conc	uCi/ml	1.02E-10	1.59E-10	8.43E-11	3.05E-11	8.96E-11	

B. Tritium

1. Total Release	Ci	2.51E+02	1.70E+02	2.29E+01	3.77E+01	4.82E+02	± 25
2. Average Diluted Conc	uCi/ml	9.44E-07	5.26E-07	5.30E-08	9.57E-08	3.40E-07	

C. Dissolved & Entrained Gases

1. Total Release	Ci	2.03E-02	4.95E-02	5.81E-05	1.92E-05	6.99E-02	± 25
2. AverageDiluted Conc	uCi/ml	7.63E-11	1.53E-10	1.34E-13	4.87E-14	4.94E-11	

D. Gross Alpha

1. Total Release	Ci	< 5.84E-5	<1.30E-4	<3.91E-5	<2.12E-5	<2.48E-4	± 25

E. Volume of Waste Released	liters	8.56E+05	1.65E+06	6.48E+05	5.07E+05	3.66E+06	± 25

F. Volume of Dilution Water	liters	2.66E+11	3.23E+11	4.32E+11	3.94E+11	1.42E+12	± 10

E. Percent of the ODCM Liquid Effluent limit	%	2.85E-02	2.06E-02	1.09E-02	1.04E-02	2.81E-02	± 25

RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2001)

TABLE 2B

Nuclides Released	Units	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Year 2001
Cr-51	Ci		3.13E-05	8.09E-04		8.40E-04
Mn-54	Ci	2.58E-04	1.16E-04	2.09E-04	2.83E-05	6.11E-04
Fe-55	Ci	1.14E-03	8.19E-04	1.23E-03	8.95E-04	4.08E-03
Co-57	Ci	7.90E-06	1.46E-05	4.91E-05		7.16E-05
Co-58	Ci	1.78E-03	3.11E-02	2.53E-02	5.37E-03	6.35E-02
Co-60	Ci	4.34E-03	5.90E-03	2.36E-03	1.15E-03	1.38E-02
Ni-63	Ci	1.09E-02	9.28E-03	2.31E-03	2.03E-03	2.45E-02
Sr-90	Ci		1.42E-05			1.42E-05
Zr-95	Ci	1.57E-04	5.75E-06	1.62E-04	2.00E-05	3.45E-04
Nb-95	Ci	4.23E-04	9.47E-05	6.69E-04	1.36E-04	1.32E-03
Ag-110m	Ci	2.12E-04	3.33E-04	2.35E-03	2.00E-03	4.90E-03
Sb-124	Ci	4.18E-04	3.04E-04	3.57E-04	9.83E-05	1.18E-03
Sb-125	Ci	6.25E-03	2.59E-05	2.08E-04	2.60E-04	6.74E-03
Te-123m	Ci		2.56E-03	3.25E-04		2.89E-03
I-131	Ci	1.89E-05				1.89E-05
Cs-134	Ci	3.23E-04	7.82E-05			4.01E-04
Cs-137	Ci	7.87E-04	7.58E-04	4.82E-06	1.47E-05	1.56E-03
La-140	Ci		2.50E-05			2.50E-05
Total for Period	Ci	2.70E-02	5.14E-02	3.64E-02	1.20E-02	1.27E-01
Xe-131m	Ci		6.83E-04			6.83E-04
Xe-133m	CI	3.45E-05	2.06E-04			2.41E-04
Xe-133	Ci	2.03E-02	4.86E-02	5.81E-05	1.92E-05	6.90E-02
Xe-135	Ci		1.04E-05			1.04E-05
Kr-85m	Ci					0.00E+00
Total for Period	Ci	2.03E-02	4.95E-02	5.81E-05	1.92E-05	6.99E-02

BATCH LIQUID RADIOACTIVE EFFLUENT REPORT (Jan - Dec 2001

Indian Point 3

RADIOACTIVE EFFLUENT REPORT

D. SOLID WASTE

2001

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Waste Stream : Resins, Filters, and Evap Bottoms BR D NA PRIMARY

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/- 25%
B	2.41E+02	6.81E+00	3.43E+02	+/- 25%
C	0.00E+00	0.00E+00	0.00E+00	+/- 25%
All	2.41E+02	6.81E+00	3.43E+02	+/- 25%

Waste Stream : Dry Active Waste DAW/B-25 BOX

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	%Error (Ci)
A	1.23E+04	3.48E+02	3.37E-01	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	1.23E+04	3.48E+02	3.37E-01	+/-25%

Waste Stream : Irradiated Components

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	0.00E+00	0.00E+00	0.00E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	0.00E+00	0.00E+00	0.00E+00	+/-25%
All	0.00E+00	0.00E+00	0.00E+00	+/-25%

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Waste Stream : Other Waste Combined Packages

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	2.56E+03	7.25E+01	2.04E+00	+/-25%
B	0.00E+00	0.00E+00	0.00E+00	+/-25%
C	1.58E+02	4.48E+00	1.91E+01	+/-25%
All	2.72E+03	7.70E+01	2.11E+01	+/-25%

Waste Stream : Sum of All 4 Categories
Combined Packages DAW/B-25 BOX, DAW/SEALAND, BR D NA PRIMARY

Waste Class	Volume Ft^3	Volume M^3	Curies Shipped	% Error (Ci)
A	1.48E+04	4.20E+02	2.38E+00	+/-25%
B	2.41E+02	6.81E+00	3.43E+02	+/-25%
C	1.58E+02	4.48E+00	1.91E+01	+/-25%
All	1.52E+04	4.32E+02	3.65E+02	+/-25%

Combined Waste Type Shipment, Major Volume Waste Type Shown

Number of Shipments	Mode of Transportation	Destination
3	HITTMAN TRANSPORTATION	Barnwell Waste Management Facility
13	HITTMAN	GTS---DURATEK

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Resins, Filters, and Evap Bottom **Waste Class B**

Nuclide Name	Percent Abundance	Curies
Mn-54	1.265%	4.34E+00
Fe-55	6.030%	2.07E+01
Co-57	0.261%	8.96E-01
Co-58	74.414%	2.55E+02
Co-60	4.473%	1.54E+01
Ni-59	0.040%	1.39E-01
Ni-63	7.163%	2.46E+01
Sr-89	0.080%	2.74E-01
Sr-90	0.068%	2.34E-01
Ag-110m	0.241%	8.27E-01
Sb-124	0.827%	2.84E+00
Sb-125	0.752%	2.58E+00
Cs-134	2.125%	7.30E+00
Cs-137	2.245%	7.71E+00
Ce-144	0.006%	2.14E-02
Pu-238	0.000%	9.58E-04
Pu-239	0.000%	2.34E-04
Pu-241	0.007%	2.57E-02
Am-241	0.000%	4.17E-04
Cm-242	0.000%	1.81E-04
Cm-243	0.000%	1.16E-03

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Resins, Filters, and Evap Bottom **Waste Class All**

Nuclide Name	Percent Abundance	Curies
Mn-54	1.265%	4.34E+00
Fe-55	6.030%	2.07E+01
Co-57	0.261%	8.96E-01
Co-58	74.414%	2.55E+02
Co-60	4.473%	1.54E+01
Ni-59	0.040%	1.39E-01
Ni-63	7.163%	2.46E+01
Sr-89	0.080%	2.74E-01
Sr-90	0.068%	2.34E-01
Ag-110m	0.241%	8.27E-01
Sb-124	0.827%	2.84E+00
Sb-125	0.752%	2.58E+00
Cs-134	2.125%	7.30E+00
Cs-137	2.245%	7.71E+00
Ce-144	0.006%	2.14E-02
Pu-238	0.000%	9.58E-04
Pu-239	0.000%	2.34E-04
Pu-241	0.007%	2.57E-02
Am-241	0.000%	4.17E-04
Cm-242	0.000%	1.81E-04
Cm-243	0.000%	1.16E-03

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Dry Active Waste **Waste Class A**

Nuclide Name	Percent Abundance	Curies
H-3	1.979%	6.68E-03
Be-7	0.255%	8.59E-04
Cr-51	2.275%	7.67E-03
Mn-54	0.425%	1.43E-03
Fe-55	2.893%	9.76E-03
Co-58	3.229%	1.09E-02
Co-60	18.432%	6.22E-02
Ni-63	56.516%	1.91E-01
Sr-90	0.020%	6.84E-05
Zr-95	1.697%	5.73E-03
Nb-95	3.097%	1.04E-02
Ag-110m	0.037%	1.24E-04
Sb-125	0.149%	5.02E-04
Cs-134	0.419%	1.42E-03
Cs-137	8.372%	2.82E-02
Ce-144	0.054%	1.82E-04
Pu-239	0.023%	7.67E-05
Pu-241	0.045%	1.52E-04
Cm-242	0.082%	2.77E-04

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Dry Active Waste **Waste Class All**

Nuclide Name	Percent Abundance	Curies
H-3	1.979%	6.68E-03
Be-7	0.255%	8.59E-04
Cr-51	2.275%	7.67E-03
Mn-54	0.425%	1.43E-03
Fe-55	2.893%	9.76E-03
Co-58	3.229%	1.09E-02
Co-60	18.432%	6.22E-02
Ni-63	56.516%	1.91E-01
Sr-90	0.020%	6.84E-05
Zr-95	1.697%	5.73E-03
Nb-95	3.097%	1.04E-02
Ag-110m	0.037%	1.24E-04
Sb-125	0.149%	5.02E-04
Cs-134	0.419%	1.42E-03
Cs-137	8.372%	2.82E-02
Ce-144	0.054%	1.82E-04
Pu-239	0.023%	7.67E-05
Pu-241	0.045%	1.52E-04
Cm-242	0.082%	2.77E-04

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Other Waste **Waste Class A**

Nuclide Name	Percent Abundance	Curies
H-3	0.494%	1.01E-02
Be-7	0.036%	7.36E-04
Cr-51	1.188%	2.43E-02
Mn-54	0.395%	8.07E-03
Fe-55	2.759%	5.64E-02
Co-58	3.186%	6.51E-02
Co-60	19.033%	3.89E-01
Ni-63	61.833%	1.26E+00
Sr-90	0.005%	1.04E-04
Zr-95	0.500%	1.02E-02
Nb-95	0.896%	1.83E-02
Ag-110m	0.008%	1.69E-04
Sb-125	0.037%	7.61E-04
Cs-134	0.427%	8.73E-03
Cs-137	9.043%	1.85E-01
Ce-144	0.029%	6.02E-04
Pu-239	0.026%	5.27E-04
Pu-241	0.011%	2.30E-04
Cm-242	0.095%	1.93E-03

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Other Waste **Waste Class C**

Nuclide Name	Percent Abundance	Curies
H-3	0.026%	5.05E-03
C-14	0.363%	6.93E-02
Cr-51	1.292%	2.47E-01
Mn-54	2.522%	4.81E-01
Fe-55	11.168%	2.13E+00
Fe-59	0.159%	3.04E-02
Co-57	0.241%	4.60E-02
Co-58	35.813%	6.83E+00
Co-60	31.797%	6.07E+00
Ni-59	0.052%	9.92E-03
Ni-63	4.994%	9.53E-01
Zn-65	0.351%	6.70E-02
Sr-89	0.000%	2.09E-05
Sr-90	0.000%	5.21E-05
Zr-95	1.779%	3.39E-01
Nb-95	0.991%	1.89E-01
Tc-99	0.010%	1.96E-03
Ru-103	0.005%	9.97E-04
Ag-110m	0.656%	1.25E-01
Sn-113	0.317%	6.05E-02
Sb-124	0.294%	5.61E-02
Sb-125	1.550%	2.96E-01
I-131	0.000%	1.13E-07
Cs-134	1.283%	2.45E-01
Cs-137	1.466%	2.80E-01
Ce-144	2.841%	5.42E-01
Np-237	0.000%	2.01E-06
Pu-238	0.000%	7.77E-05
Pu-239	0.000%	1.82E-05
Pu-241	0.025%	4.83E-03
Am-241	0.000%	3.14E-05
Cm-242	0.000%	8.94E-05
Cm-243	0.001%	1.05E-04

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Other Waste **Waste Class All**

Nuclide Name	Percent Abundance	Curies
H-3	0.072%	1.51E-02
Be-7	0.003%	7.36E-04
C-14	0.328%	6.93E-02
Cr-51	1.282%	2.71E-01
Mn-54	2.316%	4.89E-01
Fe-55	10.354%	2.19E+00
Fe-59	0.144%	3.04E-02
Co-57	0.218%	4.60E-02
Co-58	32.655%	6.90E+00
Co-60	30.561%	6.45E+00
Ni-59	0.047%	9.92E-03
Ni-63	10.497%	2.22E+00
Zn-65	0.317%	6.70E-02
Sr-89	0.000%	2.09E-05
Sr-90	0.001%	1.56E-04
Zr-95	1.655%	3.50E-01
Nb-95	0.981%	2.07E-01
Tc-99	0.009%	1.96E-03
Ru-103	0.005%	9.97E-04
Ag-110m	0.593%	1.25E-01
Sn-113	0.286%	6.05E-02
Sb-124	0.266%	5.61E-02
Sb-125	1.404%	2.96E-01
I-131	0.000%	1.13E-07
Cs-134	1.200%	2.53E-01
Cs-137	2.200%	4.65E-01
Ce-144	2.569%	5.43E-01
Np-237	0.000%	2.01E-06
Pu-238	0.000%	7.77E-05
Pu-239	0.003%	5.45E-04
Pu-241	0.024%	5.06E-03
Am-241	0.000%	3.14E-05
Cm-242	0.010%	2.02E-03
Cm-243	0.000%	1.05E-04

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Sum of All 4 Categories **Waste Class A**

Nuclide Name	Percent Abundance	Curies
H-3	0.704%	1.68E-02
Be-7	0.067%	1.59E-03
Cr-51	1.342%	3.20E-02
Mn-54	0.399%	9.51E-03
Fe-55	2.778%	6.62E-02
Co-58	3.192%	7.60E-02
Co-60	18.948%	4.51E-01
Ni-63	61.080%	1.45E+00
Sr-90	0.007%	1.72E-04
Zr-95	0.669%	1.59E-02
Nb-95	1.207%	2.88E-02
Ag-110m	0.012%	2.93E-04
Sb-125	0.053%	1.26E-03
Cs-134	0.426%	1.01E-02
Cs-137	8.948%	2.13E-01
Ce-144	0.033%	7.84E-04
Pu-239	0.025%	6.04E-04
Pu-241	0.016%	3.82E-04
Cm-242	0.093%	2.21E-03

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Sum of All 4 Categories **Waste Class B**

Nuclide Name	Percent Abundance	Curies
Mn-54	1.265%	4.34E+00
Fe-55	6.030%	2.07E+01
Co-57	0.261%	8.96E-01
Co-58	74.414%	2.55E+02
Co-60	4.473%	1.54E+01
Ni-59	0.040%	1.39E-01
Ni-63	7.163%	2.46E+01
Sr-89	0.080%	2.74E-01
Sr-90	0.068%	2.34E-01
Ag-110m	0.241%	8.27E-01
Sb-124	0.827%	2.84E+00
Sb-125	0.752%	2.58E+00
Cs-134	2.125%	7.30E+00
Cs-137	2.245%	7.71E+00
Ce-144	0.006%	2.14E-02
Pu-238	0.000%	9.58E-04
Pu-239	0.000%	2.34E-04
Pu-241	0.007%	2.57E-02
Am-241	0.000%	4.17E-04
Cm-242	0.000%	1.81E-04
Cm-243	0.000%	1.16E-03

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Sum of All 4 Categories **Waste Class C**

Nuclide Name	Percent Abundance	Curies
H-3	0.026%	5.05E-03
C-14	0.363%	6.93E-02
Cr-51	1.292%	2.47E-01
Mn-54	2.522%	4.81E-01
Fe-55	11.168%	2.13E+00
Fe-59	0.159%	3.04E-02
Co-57	0.241%	4.60E-02
Co-58	35.813%	6.83E+00
Co-60	31.797%	6.07E+00
Ni-59	0.052%	9.92E-03
Ni-63	4.994%	9.53E-01
Zn-65	0.351%	6.70E-02
Sr-89	0.000%	2.09E-05
Sr-90	0.000%	5.21E-05
Zr-95	1.779%	3.39E-01
Nb-95	0.991%	1.89E-01
Tc-99	0.010%	1.96E-03
Ru-103	0.005%	9.97E-04
Ag-110m	0.656%	1.25E-01
Sn-113	0.317%	6.05E-02
Sb-124	0.294%	5.61E-02
Sb-125	1.550%	2.96E-01
I-131	0.000%	1.13E-07
Cs-134	1.283%	2.45E-01
Cs-137	1.466%	2.80E-01
Ce-144	2.841%	5.42E-01
Np-237	0.000%	2.01E-06
Pu-238	0.000%	7.77E-05
Pu-239	0.000%	1.82E-05
Pu-241	0.025%	4.83E-03
Am-241	0.000%	3.14E-05
Cm-242	0.000%	8.94E-05
Cm-243	0.001%	1.05E-04

Solid Waste Shipped Offsite for Disposal
and Estimates of Major Nuclides
by Waste Class and Stream
01/01/2001 to 12/31/2001
Percent Cutoff: 0

Sum of All 4 Categories **Waste Class All**

Nuclide Name	Percent Abundance	Curies
H-3	0.006%	2.18E-02
Be-7	0.000%	1.59E-03
C-14	0.019%	6.93E-02
Cr-51	0.076%	2.78E-01
Mn-54	1.325%	4.83E+00
Fe-55	6.278%	2.29E+01
Fe-59	0.008%	3.04E-02
Co-57	0.258%	9.42E-01
Co-58	71.931%	2.62E+02
Co-60	5.997%	2.19E+01
Ni-59	0.041%	1.49E-01
Ni-63	7.401%	2.70E+01
Zn-65	0.018%	6.70E-02
Sr-89	0.075%	2.74E-01
Sr-90	0.064%	2.34E-01
Zr-95	0.097%	3.55E-01
Nb-95	0.060%	2.18E-01
Tc-99	0.001%	1.96E-03
Ru-103	0.000%	9.97E-04
Ag-110m	0.261%	9.52E-01
Sn-113	0.017%	6.05E-02
Sb-124	0.794%	2.90E+00
Sb-125	0.789%	2.88E+00
I-131	0.000%	1.13E-07
Cs-134	2.070%	7.55E+00
Cs-137	2.248%	8.20E+00
Ce-144	0.155%	5.64E-01
Np-237	0.000%	2.01E-06
Pu-238	0.000%	1.04E-03
Pu-239	0.000%	8.56E-04
Pu-241	0.008%	3.09E-02
Am-241	0.000%	4.48E-04
Cm-242	0.001%	2.48E-03
Cm-243	0.000%	1.27E-03

Indian Point 3

RADIOACTIVE EFFLUENT REPORT

E. RADIOLOGICAL IMPACT ON MAN

Jan 1, 2001 - Dec 31, 2001

RADIOLOGICAL IMPACT ON MAN

The radiological impact on man is determined by conservatively calculating doses to a hypothetical maximally exposed individual offsite based on plant effluents. These calculations are divided into 3 categories: Noble Gases, Particulates and Iodine, and Liquid Releases (fish and invertebrate consumption).

An annual average dispersion factor is used in the calculations, the details of which are presented in the Offsite Dose Calculation Manual (ODCM).

The computer code used to perform gaseous dose calculations incorporates the models and parameters presented in the Indian Point 3 ODCM, which utilizes the assumptions in Regulatory Guide 1.109 and NUREG 0133.

These doses were calculated using radioactive releases from the Indian Point #3 Nuclear Power Plant. Although Indian Point is a multi-unit site owned and operated by Entergy Nuclear Northeast, doses resulting from releases from Indian Point Units 1 and 2 are independently reported.

Doses to individuals from liquid pathways for the fish and invertebrate consumption pathways are computed using the methodology and parameters in the Indian Point 3 ODCM, which incorporates the calculational models that are present in Regulatory Guide 1.109 and NUREG 0133 where site specific data do not exist.

Carbon 14 release concentration and resulting dose have been estimated using data generated at IP3 from August 1980 to June 1982 after a study conducted by the NY State Department of Health. These estimates are consistent with NUREG 0017, Rev. 1. The maximum expected annual dose from Carbon 14 releases at IP3 has been calculated using the maximum dependable gross electrical capacity of Indian Point 3, which is 1000 MW(e) maintained for the entire year. The resultant worst case doses are based upon site specific assumptions of source term released for an entire year at 1000 MW(e) output, as outlined in the ODCM.

The annual dose to the maximally exposed individual (child) from gaseous releases of Carbon-14 is 0.254 mRem to the critical organ (bone) and 0.0508 mRem to the total body. The annual dose to the maximally exposed individual (child) from liquid releases of Carbon-14 is 0.00583 mRem to the critical organ (bone) and 0.00117 mRem to the total body.

Doses to members of the public from airborne and liquid releases are minimal due to the relatively insignificant total duration of these individuals on site. Their doses can be calculated from standard ODCM methodology, with typical occupancy factors employed. These factors are determined by comparing the expected hours on site to 8760 hours (the number of hours in a year, used in calculations in the ODCM).

example 1: Several students visit the site for an 8-hour guided tour. Their occupancy factor is: 8 / 8760 or **.0009**.

example 2: A man drives his wife to work and drops her off at the security gate each morning, with a total stay-time on site for 2 minutes per day. His occupancy factor is calculated as follows:

2 min/60 min per hour =.0333 hr ; 0.0333 / 8760 = **3.8E-6**

These factors, when multiplied by doses calculated per the ODCM, demonstrate that dose to MEMBERS OF THE PUBLIC within the site boundary is negligible, despite a potential reduction in the atmospheric dispersion.

INDIAN POINT 3 NUCLEAR POWER PLANT
RADIOLOGICAL IMPACT ON MAN
JANUARY - DECEMBER 2001

Maximum exposed individual doses in mrem or mrad

A. LIQUID DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Organ Dose	(mrem)	1.42E-03	1.03E-03	5.43E-04	5.18E-04	2.81E-03
Applicable Limit	(mrem)	5	5	5	5	10
Percent of Limit	(%)	2.85E-02	2.06E-02	1.09E-02	1.04E-02	2.81E-02
Age Group		Child	Child	Adult	Adult	Child
Critical Organ		Bone	Bone	GILLI	GILLI	Bone

Adult Total Body	(mrem)	2.85E-04	2.29E-04	3.78E-05	3.34E-05	5.85E-04
Applicable Limit	(mrem)	1.5	1.5	1.5	1.5	3
Percent of Limit	(%)	1.90E-02	1.53E-02	2.52E-03	2.23E-03	1.95E-02

B. AIRBORNE NOBLE GAS DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Gamma Air	(mrad)	1.35E-04	2.10E-04	1.92E-05	2.33E-05	3.88E-04
Applicable Limit	(mrad)	5	5	5	5	10
Percent of Limit	(%)	2.71E-03	4.20E-03	3.83E-04	4.65E-04	3.88E-03

Beta Air	(mrad)	4.28E-04	5.83E-04	1.93E-05	2.35E-05	1.05E-03
Applicable Limit	(mrad)	10	10	10	10	20
Percent of Limit	(%)	4.28E-03	5.83E-03	1.93E-04	2.35E-04	5.26E-03

C. AIRBORNE IODINE and PARTICULATE DOSES

		Qtr 1	Qtr 2	Qtr 3	Qtr 4	ANNUAL
Iodine/Part	(mrem)	5.25E-05	7.39E-04	1.65E-04	2.08E-04	1.17E-03
Applicable Limit	(mrem)	7.5	7.5	7.5	7.5	15
Percent of Limit	(%)	7.00E-04	9.85E-03	2.20E-03	2.77E-03	7.77E-03

Age Group		Child	Child	Child	Child	Child
Critical Organ		Liver	Thyroid	Thyroid	Liver	Thyroid

Indian Point 3

RADIOLOGICAL EFFLUENT REPORT

F. METEOROLOGICAL DATA

Jan 1, 2001 - Dec 31, 2001

This data is stored onsite and is available electronically or in writing, upon request.

Indian Point 3

RADIOACTIVE EFFLUENT REPORT

G. OFFSITE DOSE CALCULATION MANUAL,
PROCESS CONTROL PROGRAM, OR LAND USE CENSUS LOCATION CHANGES

2001

The ODCM was upgraded to Rev 15, effective Dec 14, 2001.
See the attached justification package.

Minor changes in the REMP and locations for dose calculations and/or environmental monitoring are also identified in the ODCM Rev 15 package.

The PCP was not upgraded in this period and remains at Revision 7.
However, a corrected justification package for Revision 6 is included herein, due to the previously reported package describing Revision 5 changes, in error.

ODCM Revision 15
Brief Summary of Changes:

1) Added reference of an updated NUREG to existing Reference 5 (0324 updated with CR 2919).

2) Added NUREGs 1301 and 1431 for GL89-01 and ITS improvements, & 2 new references (#22-25).

3) Added 10CFR20 sub paragraph reference in RECS Section 1.5 to indicate use of the NEW part 20.

4) Slightly modified RECS Section 1.8 to more clearly indicate new part 20 EC's *10.

5) Modified definitions of MEMBER OF THE PUBLIC and UNRESTRICTED AREA to match NUREG 0472 definitions.

6) Removed superfluous word "administered" and added "10CFR" to OCCUPATIONAL DOSE in Sec 1.10.

7) Updated Tables2.1-1 and 3.1-1, splitting sections 1 and 2, adding tanks in Section 5, and using a full word for sample periodicity requirements, rather than a symbol (to eliminate confusion and simplify).

8) Updated Tables in RECS to use footnote letters (a,b,c, ...) instead of stars (*, **, *** ...)

9) Added footnote "e" to Table 2.1-1 to identify SG Blowdown monitoring requirements in Modes 1-4 only, and modified ACTION 2 to use lower case for Dose Equivalent Iodine, (not a reserved word in RECS).

10) Modified the 5th footnote in Table 3.1-1 for (R-61) and Added a 6th footnote for SG Blowdown in Modes 1-4.

11) Added footnote d to Table 2.2-1 for the Admin Bldg flow rate monitor (not used in favor of design fan flow).

12) Used words in Table 3.2-1 for periodicity, consolidated notes (a-e), and updated Sec 3.d. to reference the Admin Bldg flow rate monitor does not exist per footnote c..

13) Added 10CFR20 sub paragraph in RECS 2.3.1 to show use of NEW part 20.

14)Split Table 3.3.1-1 to show release types separately, more in line with NUREG 1301.

15)Modified footnote f in Table 3.3.1-1 so as to apply only during a Pri to Sec leak, and added note g for Betas.

16)Added potable water NOTE at bottom Sec 2.3.2 (old rev) into body of text of Sec 2.3.2 (this rev).

17)Modified Table 3.4.1-1 to spell out periodicity requirements and split VC Purge from VC Press Relief.

18)Added footnotes h and I to Table 3.4.1-1 for Pri to Sec leaks and VC Press Reliefs.

19)Added "etc" to list of areas requiring 40CFR190 dose calcs, per NUREG 1301 in RECS 2.6.A, 3.6.B & 4-5.

20)Removed the phrase "that has been approved by the commission" from Sec 2.9, Control for REMP Interlab Comparison Program Control (ACTS 01-58365).

21)Modified the due date of the REMP report to the commission as May 15th in Sec 5.3 (not May 1).

22)Added words to ODCM Part II, Section 1.2.1 & 1.2.2, covering the inherent safety factors incorporated with the setpoint calcs for 10CFR20 compliance (no "safety factor" required to be added to final calc).

23)Modified Sec 1.2.1.5 to better describe sharing of the total airborne release rate setpoint.

24)Modified Table 1-1 to place applicable NOTES in the alarm setpoint column and added Note 4 as the Basis for R-61 and the quantifiable definition of a Primary to Secondary Leak.

25)Improved readability of site map on page 1-4 and made more current.

26)Added derivation and more explanation to "ADC" in Section 2.2.6, including an equation for MPCWt.

27)Changed all occurrences of NYPA and Con Ed to Units 3 and 2.

28)Eliminated redundant references in Section 2 of ODCM Part II to the original licensing basis (NUREG 0472, Rev 3, Draft 6), as this is reference is historically included in References 6, 23, and 23.

29)Added CPF tanks to ODCM Part II, Section 2.1.11.

30)Modified Section 2.1.12 to more clearly show how SG composite activity is calculated.

31)Split Section 2.1.13 to separate service water from liquid waste and removed last sentence, which could have incorrectly been misconstrued to suggest sampling liquid waste from the service water line.

32)Updated Sec 2.1.16 for Turbine Hall Drains to more accurately describe how effluents would be quantified.

33)Enhanced NOTE after 2.2.3 to show how conservatism is employed in different directions for the choice of flow rates while recircing or discharging liquid waste through monitor tanks to the river

34)Expanded description of 31-day dose projection in Sections 2.3.2 and 3.2.4.

35)Added potable water pathway discussion from RECS 3.3.2 to ODCM Part II, Sec 2.4.1.

36)Clarified TOTAL and NEAR FIELD dilution factors in Section 2.4.2.

37)Added "Fresh Water Fish" & "Salt Water Invertebrates" to descriptions in 2.4.3.1.

38)Corrected reference in Sec 2.6.2 to indicate the new Bii value for Ag-110m = 5000, vice 3300 (ERDA 660) and updated Tables 2-1 through 2-4 as a result of the updated Ag-110 BioAccumulation value.

39)Added words under the Bases section describing the REMP (RECS Page 4-5), requiring isotopes in REMP to be compared with the Effluents Report, for verification.

40)Updated Figures 2-1 and 3-1 describing liquid and airborne effluents.

41)Enhanced Step 3.1.9 to more accurately describe quantification methods of VC Press Reliefs.

42)Added Step 3.1.20 to identify the ground level releases (MT Vent and Gland Seal). All others mixed mode.

43)Corrected typos for Li in Step 3.3.1.1 and 3.4.3.2 (skin dose factor due to beta emissions, not gamma).

44)Used "<" signs instead of "=" in Section 3.3.1.1 and 3.4.1.4 to ensure setpoint is BELOW part 20.

45)Used a dotted Q for referencing uCi/sec, and a tilde-Q for microcuries, throughout Section 3.

46)Clarified equation in Sections 3.3.3.2 and 3.3.4.4 to use the Summation sign properly.

47)Added words in Section 3.3.4.4 description of Wn(dep) to use X/Q (not D/Q) for H-3 dose calculations.

48)Replaced the word "annual" with the word "historical" in Section 3.5.5 and corrected typo, NUREG 0133 is Reference 1, not 5.

49)Modified 3.6 to identify Section 3.5 for reference, instead of using "listed above".

50)Added Steps 3.7 and 3.8 to cover the required examples of direct radiation calculations and calculations showing the neglibile gaseous effluent dose to members of the public visiting the site (occupancy factors).

51)Corrected typo on Table 3-8, bottom mixture, which is the TIME AVERAGED mixture, not instantaneous. Also used a bar over the letters on the far right, as these are averaged values.

52)Updated App 3-A to use the Q-dot notation and "K-bar" (vice K eff).

53)Modified the LLD equation in App B to use the constant 2.22E6 dpm/uCi, instead of 3.7E4 dps/uCi.

54)Updated Table 4-1 and Figure 4-2 from the REMP report for consistency.

55)Added footnotes i and j to Table 2-7-1 of the RECS, and repositioned footnote notation to the exact word group for which it applies in the table (for clarity).

Each change is discussed in detail on the following pages.

ODCM Revision 15, Item 1 of 55

OBJECTIVE:

Add reference of an updated NUREG to existing Reference #5 (NUREG 0324).

DESCRIPTION OF CHANGES:

Added CR 2919 parenthetically to Reference 5.

IMPACT:

None

JUSTIFICATION:

NUREG-0324 was updated by NUREG CR 2919. Since NUREG-0324 is referenced in ODCM, Part II, Section 3.5.5, the update was added to Reference 5 to preclude potential confusion in any subsequent document search.

ODCM Revision 15, Item 2 of 55

OBJECTIVE:

Add NUREGs 1301 and 1431 for the Gen Letter 89-01 and Improved Technical Specification projects, and two new references (#22 - #25).

DESCRIPTION OF CHANGES:

Added NUREG 1301 to Reference 22 per Gen Letter 89-01. Added NUREG 1431 to #23 per Amm 205 and ITS. Added ERDA 660 (an ORNL publication) and IAEA No. 57 as References #24 and #25, supporting the site-specific BioAccumulation Factors in ODCM, Part II, Section 2.6.

IMPACT:

None

JUSTIFICATION:

These documents support approved prior changes and are included as reference.

ODCM Revision 15, Item 3 of 55

OBJECTIVE:

Add sub-section to 10CFR20 reference in RECS 1.5 to indicate use of the NEW part20.

DESCRIPTION OF CHANGES:

Added 10CFR20 subparagraph 1302 to demonstrate use of the NEW part 20.

IMPACT:

None

JUSTIFICATION:

Demonstrates compliance with NEW 10CFR20.

ODCM Revision 15, Item 4 of 55

OBJECTIVE:

Ensure RECS 1.8 clearly indicates use of the NEW 10CFR20.

DESCRIPTION OF CHANGES:

Added "liquid" and subparagraph 1302 to show compliance with NEW part 20.

IMPACT:

None

JUSTIFICATION:

Demonstrates compliance with NEW 10CFR20.

ODCM Revision 15, Item 5 of 55

OBJECTIVE:

Modify definitions of MEMBER OF THE PUBLIC and UNRESTRICTED AREA to match NUREG 0472 (and so as to preclude confusion with 10CFR20 definition).

DESCRIPTION OF CHANGES:

Modified RECS Section 1.9 and 1.19 to match the effluent concern of NUREG 0472.

IMPACT:

None

JUSTIFICATION:

The wording in the previous revisions was taken directly from 10CFR20. Since this regulation does not adequately address the effluent concern for definition of MEMBERS OF THE PUBLIC and UNRESTRICTED AREA, the more applicable definitions of NUREGs 0472 and 1301 were used. These definitions also comply with 40CFR190 and are in keeping with industry standards. This improved definition is also explained in ODCM Part II, Section 1.3, defining the purpose of the site map on the following page.

ODCM Revision 15, Item 6 of 55

OBJECTIVE:

Removed superfluous word "administered" and added "10CFR" to OCCUPATIONAL DOSE in Sec 1.10.

DESCRIPTION OF CHANGES:

The word "administered" was removed and "10CFR" was added to the definition of OCCUPATIONAL DOSE in Sec 1.10.

IMPACT:

None

JUSTIFICATION:

Typographical.

ODCM Revision 15, Item 7 of 55

OBJECTIVE:

Update Tables 2.1-1 and 3.1-1 for clarity.

DESCRIPTION OF CHANGES:

Split sections 1 into a,b,c, separating Liquid Radwaste, the CPF, and SG Blowdown lines, as they each have different requirements.

Split section 2 into a and b, because R-16A and R16B collectively monitor service water from Fan Cooler units, while R23 independently measures service water from component cooling.

Added tanks in Section 5 from the CPF for which the 10-curie limit applies.

Used full words for sample periodicity requirements, rather than a symbol.

IMPACT:

Condensate Polisher Facility waste tank level indicating devices require calibration at least every 24 months. These instruments need to be added to site periodic calibration lists.

JUSTIFICATION:

Splitting sub-parts of these tables improves clarity of intent and does not change existing regulations.

The two additional outdoor tanks from the CPF were added to Section 5 due to the remote possibility of experiencing a buildup of activity in the CPF if the plant were to be run for an extended period of time with a primary to secondary leak. Should this become the case, these tanks would fall under the NUREG 0133 limitation of 10 curies in outdoor, unprotected tanks.

The use of full words instead of symbols is a typographical change for clarity.

ODCM Revision 15, Item 8 of 55

OBJECTIVE:

Updated the tables in RECS to use footnote letters (a,b,c, ...) instead of stars (*, **, *** ...)

DESCRIPTION OF CHANGES:

Used letters instead of the "stars" for clarity in all RECS tables

IMPACT:

None

JUSTIFICATION:

Typographical

ODCM Revision 15, Item 9 of 55

OBJECTIVE:

Added footnote "e" to Table 2.1-1 to identify SG Blowdown monitoring requirements in Modes 1-4 only. Also use lower case Dose Equivalent Iodine, vice upper case.

DESCRIPTION OF CHANGES:

Added this footnote onto 1c from Table 2.1-1 to clarify the requirement for R-19. The monitor is required for SG Blowdown, not batch draindowns in Mode 5 or 6, per NUREG 0472. Since Dose Equivalent Iodine is NOT a reserved word in RECS, used lower case in Action 2.

IMPACT:

None

JUSTIFICATION:

The NUREG failed to mention any pathway from SG draindowns in Mode 5 or 6. As a result, earlier versions of these requirements were improperly construed to require R-19 to be in service while draining Steam Generators with no motive force for ingress from the primary system. After many years of failed attempts, it was determined that there was no credible delivery system to bring SG water to R-19 in Mode 5 or 6. Subsequent investigation led to the conclusion that this was not the intent of the original plant design, nor the original technical specifications. Since there is no credible pathway of contamination in Mode 5 or 6, batch releases of SG draindowns are conducted by sampling prior to and during the release, in lieu of the use of a rad monitor. These changes reflect current practice and eliminate confusion.

ODCM Revision 15, Item 10 of 55

OBJECTIVE:

Modified the 5th footnote in Table 3.1-1 (R-61) and added a 6th footnote for SG Blowdown in Modes 1-4.

DESCRIPTION OF CHANGES:

Added footnotes e and f to the table, as they apply to the CPF effluent line (1b) and the tank level indicating devices (5e, 5f). Footnote "e" identifies the requirement to the CPF after a primary to secondary leak. Attachment "f" provides applicability for R-19 (Modes 1-4 only).

IMPACT:

None

JUSTIFICATION:

Part 1c was added to the table to better differentiate the blowdown requirements from the draindown requirements. Parts 5e and 5f were added to ensure the tank level indicating devices are calibrated.

ODCM Revision 15, Item 11 of 55

OBJECTIVE:

Add footnotes to Tables 2.2-1 and 3.2-1 for the Admin Bldg flow rate monitor (which is not used in favor of design fan flow).

DESCRIPTION OF CHANGES:

The footnotes state that the Admin Bldg ventilation system does not use a flow rate instrument. Design flowrate is used per ODCM Part II, Sec 3.1.13. Since there is no instrument, the "minimum channels operable" and the surveillance criteria do not apply to this ventilation system.

IMPACT:

None

JUSTIFICATION:

This exception was already described in the ODCM Part II (Sec 3.1.13). It is placed here in the RECS as well for consistency.

ODCM Revision 15, Item 12 of 55

OBJECTIVE:

Used full words for periodicity in Table 3.2-1 and consolidated notes (a-e)

DESCRIPTION OF CHANGES:

Footnotes were mixed between the use of stars and numbers. Both stars and numbers were reorganized as letters with no change to the requirements, other than the addition of the footnote identifying the absence of the Admin Bldg flow rate monitor.

Additionally, the periodicity requirements were changed to whole words, rather than symbols.

IMPACT:

None

JUSTIFICATION:

Typographical

ODCM Revision 15, Item 13 of 55

OBJECTIVE:

Add 10CFR20 sub-paragraph in RECS 2.3.1 for NEW part 20.

DESCRIPTION OF CHANGES:

Added sub-paragraph (1302) to 10CFR20 reference in Section 2.3.1 to show use of the NEW 10CFR20.

IMPACT:

None

JUSTIFICATION:

Demonstrates compliance with new 10CFR20.

ODCM Revision 15, Item 14 of 55

OBJECTIVE:

Split Table 3.3.1-1 to show release types separately, more in line with NUREG 1301.

DESCRIPTION OF CHANGES:

Added specific examples of release types to both group A and B in the table, and added group C and D (Service Water, Turbine Hall Drains, SG Feedwater).

IMPACT:

None

JUSTIFICATION:

This upgrade is more in line with the later replacements to NUREG 0472 (NUREG 1301). Although this update is NOT intended as a change or enhancement to our licensing basis, some attributes of NUREG 1301 can be included in our current specifications to aid in clarity, with no change to our commitments. Specifically, these changes preclude the possibility of inappropriately using the SG section to apply for Service Water, for example.

ODCM Revision 15, Item 15 of 55

OBJECTIVE:

Modify footnote f in Table 3.3.1-1 so as to apply only during a Pri to Sec leak. Add a note describing the requirement for Beta emitter analyses for service water and turbine hall drains.

DESCRIPTION OF CHANGES:

Footnote "f" was modified to clarify that SG Feedwater and Turbine Hall Drains need only be monitored when Primary to Secondary Leak exists per ODCM Part II, Section 1, Table 1-1, note 4.

IMPACT:

None

JUSTIFICATION:

These upgrades clarify existing regulation. They do not challenge our licensing basis, but are more specific for all release points and are in keeping with NUREG 1301.

ODCM Revision 15, Item 16 of 55

OBJECTIVE:

Add potable water NOTE at bottom Section 2.3.2 (old rev) into body of text of Section 2.3.2 (this rev).

DESCRIPTION OF CHANGES:

Moved the note into the ACTION section of the CONTROL, for simplification and clarity.

IMPACT:

None

JUSTIFICATION:

Typographical

ODCM Revision 15, Item 17 of 55

OBJECTIVE:

Update Table 3.4.1-1 to be more clear and to include the VC Press Reliefs.

DESCRIPTION OF CHANGES:

Modified Table 3.4.1-1 to spell out periodicity requirements in place of symbols (A,D,W, etc). Split VC Purge from VC Press Relief. Included a footnote "i" which describes the VC sampling periodicity.

IMPACT:

None

JUSTIFICATION:

Sampling the VC for VC Pressure Reliefs was not previously covered in the RETS or the RECS after Amendment 51. This section of the Table was split to show that although sampling for a VC Purge is well defined, a Press Relief sample is best performed monthly to ensure proper quantification.

ODCM Revision 15, Item 18 of 55

OBJECTIVE:

Add footnotes h and I to Table 3.4.1-1 for Pri to Sec leaks and VC Press Reliefs.

DESCRIPTION OF CHANGES:

The need to sample for Iodine and Tritium from the Condenser during a primary to secondary leak is covered in footnote "h", while footnote "i" was added to describe VC Noble gas release quantification and sampling.

IMPACT:

None

JUSTIFICATION:

The Condenser Air Ejector release pathway requires measurement for Noble Gas, Iodine and Tritium, per ODCM Part II, Section 3.1.18. Iodine and Tritium were added to this table in the RECS for consistency.

The methodology for sampling and quantifying pressure reliefs from Containment have not changed and are consistent with both plant procedures and industry standard. A noble gas radiation monitor is used to scale each release as compared to a known isotopic mixture from a sample. This method provides the most accurate and efficient means to quantify this release. A brief discussion of the sampling and ratioing is added here for completeness.

ODCM Revision 15, Item 19 of 55

OBJECTIVE:

Add "etc" to list of areas requiring 40CFR190 dose calcs, per NUREG 1301 in RECS 2.6.A, 3.6.B, and page 4-5 of the Bases.

DESCRIPTION OF CHANGES:

Added "etc" per NUREG 1301, directly after the provided examples in the list.

IMPACT:

None

JUSTIFICATION:

This improved wording ensures areas such as the SG Mausoleum are included in 40CFR190 required dose calculations. NUREG 0472 lacks this word; however, calculations were performed nonetheless. The added word was included in NUREG 1301 for purposes of implementing Gen Letter 89-01. This improvement was omitted in error in ODCM Revision 12 because Indian Point 3 licensing basis was maintained as NUREG 0472 and did not attempt to fully implement all parts of NUREG 1301. Due to its potential significance, it is included in this revision for completeness.

ODCM Revision 15, Item 20 of 55

OBJECTIVE:

Remove the phrase "that has been approved by the commission" from Sec 2.9, Control for REMP Interlab Comparison Program Control.

DESCRIPTION OF CHANGES:

Removed only the phrase "that has been approved by the commission" from Sec 2.9, Control for REMP Interlab Comparison Program Control.

IMPACT:

None

JUSTIFICATION:

This incorrect wording was carried forward from early versions of the ODCM. Currently, the commission does not approve programs; they only review them.

ODCM Revision 15, Item 21 of 55

OBJECTIVE:

Modified the due date of the REMP report to the commission as May 15th in Section 5.3 (not May 1 like the Effluent Report).

DESCRIPTION OF CHANGES:

The REMP report's due date was corrected to May 15th.

IMPACT:

None

JUSTIFICATION:

Typographical, per Improved Technical Specifications

ODCM Revision 15, Item 22 of 55

OBJECTIVE:

Add words to demonstrate the inherent "safety factor" in monitor setpoint calculations in ODCM, Part II , Section 1.2.1 and 1.2.2.

DESCRIPTION OF CHANGES:

Added words in Sections 1.2.1 and 1.2.2 to identify the inherent conservatism in the bases for monitor setpoints, and that this method covers the typical "safety factor" associated with monitors used to ensure compliance with 10CFR20 release rate limits.

IMPACT:

None

JUSTIFICATION:

The added wording demonstrates how the safety factor is included in existing calculations, and that a separate additional factor is not required.

ODCM Revision 15, Item 23 of 55

OBJECTIVE:

Modified ODCM, Part II , Sec 1.2.1.5 to better describe sharing of the total airborne release rate setpoint.

DESCRIPTION OF CHANGES:

Added words to identify that the unit vent is routinely set at the annual limit, leaving other remote pathways 1% of the instantaneous (10CFR20) limit as a basis for their setpoints.

IMPACT:

None

JUSTIFICATION:

The improved wording is consistent with current policy and procedures. Rates are apportioned if the remote pathways become significant when compared to the plant vent release rate. Restricting these remote pathways to 1% of the instantaneous (10CFR20) limit, while the Plant Vent is routinely conservatively set at 10% of the instantaneous limit (the annual limit), ensures 10CFR20 limits will not be challenged.

ODCM Revision 15, Item 24 of 55

OBJECTIVE:

Modify ODCM Part II, Section 1, Table 1-1 to increase clarity.

DESCRIPTION OF CHANGES:

Modified Table 1-1 as follows:

- Placed applicable NOTES in the alarm setpoint column to increase clarity
- Added Note 4 as the Basis for R-61 limitations
- Added a quantifiable definition of a Primary to Secondary Leak.

IMPACT:

References in plant procedures (AP-11, etc) which define a "declared" primary to secondary leak existing, now reference Note 4 of this table, which quantitatively pinpoints the criteria. This declaration is significant for initiating surveillances in the secondary system, for example.

JUSTIFICATION:

The notes in the alarm setpoint box allow for greater clarity in describing the alarm basis. Note 4 is in keeping with the old RETS and the new Improved Technical Specifications, making it more clear as to when the conditions of a primary to secondary leak exist. This wording allows plant staff and lower tier procedures to accurately instruct the initiation of surveillances at the onset of a Primary to Secondary Leak. There is no change to the licensing basis for adding these trigger levels.

ODCM Revision 15, Item 25 of 55

OBJECTIVE:

Update and improve readability of the site map on page 1-4 of ODCM Part II.

DESCRIPTION OF CHANGES:

Eliminated all occurrences of NYPA and Con Ed.
Restricted Areas inside the site boundary are identified.

IMPACT:

None

JUSTIFICATION:

Typographical, as a result of consolidating with Entergy Nuclear Northeast.

ODCM Revision 15, Item 26 of 55

OBJECTIVE:

Add derivation of "ADC" and "MPCWt" in Section 2.2.6.

DESCRIPTION OF CHANGES:

Added equations leading to the final ADC equation provided in earlier revisions and demonstrated, by equation, the definition of MPCWt.

IMPACT:

None

JUSTIFICATION:

Typographical, for increased clarity while reviewing these criteria.

ODCM Revision 15, Item 27 of 55

OBJECTIVE:

Update references to "NYPA" or "Con Ed".

DESCRIPTION OF CHANGES:

Changed all occurrences of NYPA and Con Ed to Units 3 and 2.

IMPACT:

None

JUSTIFICATION:

Typographical, as a result of consolidating with Entergy Nuclear Northeast

ODCM Revision 15, Item 28 of 55

OBJECTIVE:

Eliminate redundant references in Section 2 of ODCM Part II to the original licensing basis (NUREG 0472, Rev 3, Draft #6).

DESCRIPTION OF CHANGES:

Eliminated from the text, as this reference is historically included in References 6, 23, and 23.

IMPACT:

None

JUSTIFICATION:

Typographical. Superfluous redundant references listed.

ODCM Revision 15, Item 29 of 55

OBJECTIVE:

Add CPF tanks to ODCM Part II, Section 2.1.11.

DESCRIPTION OF CHANGES:

Added the Condensate Polisher Facility (CPF) outdoor tanks for Total Dissolved Solids to the list of those tanks included in the 10-curie rule. Calculated a maximum concentration in the tank from tank capacity.

IMPACT:

None

JUSTIFICATION:

These tanks are outdoors, with no liners, dikes, etc. It is conceivable, in a sustained primary to secondary, that 10 curies or more may be directed to the polisher resin beds, and eventually into one of these tanks. The tanks were added to this section to demonstrate the calculated concentration limit, per RECS 2.10, should this condition ever exist.

ODCM Revision 15, Item 30 of 55

OBJECTIVE:

Modify Section 2.1.12 to clarify SG compositing.

DESCRIPTION OF CHANGES:

Modified Section 2.1.12 to more clearly show how SG composite activity determination was replaced with sampling and converting to activity released with measured individual blowdown flowrates.

IMPACT:

None

JUSTIFICATION:

This wording and equation were improved to be more clear. There are no changes to the instruction, lower tier procedures, or the licensing basis.

ODCM Revision 15, Item 31 of 55

OBJECTIVE:

Modify Section 2.1.13 to separate service water from liquid waste.

DESCRIPTION OF CHANGES:

Made separate sections under 2.1.13; one for Service Water, one for Liquid Waste. Removed last sentence, which could have incorrectly been misconstrued to suggest sampling liquid waste from the service water line.

IMPACT:

None

JUSTIFICATION:

The wording in this section reflected an historical period when no service water monitor was available on the Component Cooling water service water header. In that time, a leak from reactor coolant, into component cooling would have been detected by component cooling monitors. A subsequent leak from component cooling into service water (an effluent pathway) would not have been detected without sampling. This condition was corrected in 1991-1992 time frame. The wording in this section still allowed samples of the potentially affected stream in the service water header, vice the actual system leaking (component cooling). Since the intermediate system as well as the final effluent system are both monitored (R-17A, R17B, and R-23), the sentence allowing sampling of service water for potential RCS to component cooling leaks was removed.

ODCM Revision 15, Item 32 of 55

OBJECTIVE:

Updated Sec 2.1.16 regarding quantification of Turbine Hall Drains.

DESCRIPTION OF CHANGES:

Modified this section as follows:

- more accurately described the word equation for calculating activity
- identified that quantification of this pathway initiates at the onset of a declared Primary to Secondary Leak
- added a trigger level of approximately 1E-4 at which processing should begin to preclude approaching the 31-day dose projection limits.

IMPACT:

None

JUSTIFICATION:

Controls exist for processing secondary fluid at 1.4E-4 uCi/ml of fission or activation products in the secondary. This improvement ensures that quantification begins in time to determine whether or not the 31-day dose projection limits are in jeopardy. The trigger level was derived from operating for 31 days at 35-gpm turbine hall leakoff to the river, per memo IP-CHM-01-081.

ODCM Revision 15, Item 33 of 55

OBJECTIVE:

Enhance the NOTE after 2.2.3 to provide a basis for the default Monitor Tank flow rates.

DESCRIPTION OF CHANGES:

Modified the note to show how conservatism is employed in different directions for the choice of flow rates while recircing or discharging liquid waste through monitor tanks to the river.

IMPACT:

None

JUSTIFICATION:

The recirculation flow rate is more conservative with a slower rate, assuming a longer time needed to reach a two-tank-volume turnover. For releases to the river, a faster flow rate is more conservative, with regard to minimizing approaches to the 10CFR20 limits. Therefore, the tested value of 135 gpm (IP-CHM-95-169) is adjusted in the appropriate direction for each function, for conservatism. No changes were made to plant procedures or policies. These words were added for clarity only.

ODCM Revision 15, Item 34 of 55

OBJECTIVE:

Expand description of the required 31-day dose projection methodology for liquid and gaseous releases.

DESCRIPTION OF CHANGES:

Added words in Section 2.3.2 and 3.2.4 to specify (by equation) how 31-day doses are projected.

IMPACT:

None

JUSTIFICATION:

This methodology is suggested in NUREG 0133 and has been the method used at IP3 in lower tier procedures. The method was copied from these procedures and included in this revision of the ODCM due to the RECS requirement (RECS 3.3.3 and 3.4.4) stating that the "methodology and parameters" should be in the ODCM.

ODCM Revision 15, Item 35 of 55

OBJECTIVE:

Add potable water pathway discussion from RECS 3.3.2 to ODCM Part II, Sec 2.4.1.

DESCRIPTION OF CHANGES:

Added words from the RECS, stating that the potable water pathway does not apply.

IMPACT:

None

JUSTIFICATION:

Typographical. Per the land use census, there is no potable pathway.

ODCM Revision 15, Item 36 of 55

OBJECTIVE:

Clarify TOTAL and NEAR FIELD dilution factors in Section 2.4.2.

DESCRIPTION OF CHANGES:

Changed reference of "near field" to "total" dilution, and clarified the applicable factor as the NEAR FIELD dilution factors in Section 2.4.2.

IMPACT:

None

JUSTIFICATION:

These terms were confused in earlier revisions and they are specified here per NUREG 0133.

ODCM Revision 15, Item 37 of 55

OBJECTIVE:

Clarify BioAccumulation Factors in Section 2.4.3.1.

DESCRIPTION OF CHANGES:

Added "Fresh Water Fish" and "Salt Water Invertebrates" to the discussion following the equation in Section 2.4.3.1, to ensure each term is fully defined.

IMPACT:

None

JUSTIFICATION:

Better defines existing factors, showing the two specific pathways by name.

ODCM Revision 15, Item 38 of 55

OBJECTIVE:

Update the reference in Section 2.6.2 from the draft Reg Guide and update the BioAccumulation factor for Ag-110m.

DESCRIPTION OF CHANGES:

Updated the reference to the ERDA 660 document and the associated Salt Water Invertebrate BioAccumulation factor for Silver to 5000 (from 3300). The factor for Fresh Water Fish remains unchanged at 2.3. Also updated the slightly modified Tables 2-1 through 2-4 as a result.

IMPACT:

Software tables will need to be updated. While this change does NOT constitute a change to the software code (tables in RETDAS can be updated and periodically verified as correct per station procedures), it should be performed in concert with final approval of this revision to the ODCM. (ACTS 01-58128).

Historical releases and the levels of Ag-110m in liquid effluents indicate this increase in the BioAccumulation Factor does not significantly affect previous dose calculations. Future calculations will use the improved value as a result of lessons learned from the ERDA study.

JUSTIFICATION:

This increase in Silver's BioAccumulation Factor is suggested as a result of a request from ERDA to ORNL and their study regarding Silver's factor (ORNL 4992). Since Reg Guide 1.109, Revision 1 does NOT include suggested factors for Silver, the earlier value of 3300 was selected from the draft Reg Guide 1.109, which is an older and less defendable source document than the ERDA publication.

Since Ag-110m is a common isotope released in liquid effluents at IP3, the ERDA document (660) is newer, more conservative, and in agreement with independent ICRP values, the new factor was added to this revision of the ODCM and subsequent tables were updated.

ODCM Revision 15, Item 39 of 55

OBJECTIVE:

Add step to require isotopes in REMP to be compared with the Effluents Report

DESCRIPTION OF CHANGES:

Added words under the Bases section describing the REMP (RECS Page 4-5), requiring isotopes in REMP to be compared with the Effluents Report, for verification.

IMPACT:

None

JUSTIFICATION:

This comparison is expected, and routinely performed per department procedures. It is added to the ODCM to ensure capture.

ODCM Revision 15, Item 40 of 55

OBJECTIVE:

Update release point figures

DESCRIPTION OF CHANGES:

Updated Figures 2-1 and 3-1 describing liquid and airborne effluents. Labeled continuous airborne release points. Depicted R-61 and Condensate Polisher on the liquid release point figure.

IMPACT:

None

JUSTIFICATION:

Information only. The purpose of these drawings is to plainly identify each significant release point.

ODCM Revision 15, Item 41 of 55

OBJECTIVE:

Improve description of quantification methods of VC Press Reliefs.

DESCRIPTION OF CHANGES:

Enhanced Step 3.1.9 to more accurately describe quantification methods of VC Press Reliefs.

IMPACT:

None

JUSTIFICATION:

Identified methodology performed as per NUREG 0133 and industry standard practice.

ODCM Revision 15, Item 42 of 55

OBJECTIVE:

Add step to differentiate the ground level releases from mixed mode.

DESCRIPTION OF CHANGES:

Added Step 3.1.20 to identify the ground level releases (MT Vent and Gland Seal). All others mixed mode.

IMPACT:

None

JUSTIFICATION:

This step was added to identify the quantification methodology required, based on the release point orientation to the plant stack and building height, per NUREG 0133.

ODCM Revision 15, Item 43 of 55

OBJECTIVE:

Correct typographical errors in the airborne dose factor description section.

DESCRIPTION OF CHANGES:

Corrected Steps 3.3.1.1 and 3.4.3.2, which incorrectly identified Li as a skin dose factor due to gamma. The correct verbiage is "due to beta emissions".

IMPACT:

None

JUSTIFICATION:

Typographical error corrected.

ODCM Revision 15, Item 44 of 55

OBJECTIVE:

Replace equal sign with less than or equal to signs in Section 3.3.1.1. and 3.4.1.4 to ensure compliance with 10CFR20.

DESCRIPTION OF CHANGES:

Used "<" instead of "=" to ensure setpoints comply with part 20 requirements.

IMPACT:

None

JUSTIFICATION:

Typographical, improves clarity for 10CFR20 compliance.

ODCM Revision 15, Item 45 of 55

OBJECTIVE:

Improve the nomenclature in the equations for uCi/sec and uCi throughout Section 3 of the ODCM, Part II.

DESCRIPTION OF CHANGES:

Used to denote uCi/sec and to denote uCi throughout the section.

IMPACT:

None

JUSTIFICATION:

Typographical, improves clarity and in keeping with general math and physics notation.

ODCM Revision 15, Item 46 of 55

OBJECTIVE:

Clarify equations in Sections 3.3.3.2 and 3.3.4.4 to use a proper summation sign.

DESCRIPTION OF CHANGES:

Inserted the summation sign into the equation and removed words to sum the equation over all nuclides in the previous paragraph.

IMPACT:

None

JUSTIFICATION:

Typographical. Correctly representing the equation.

ODCM Revision 15, Item 47 of 55

OBJECTIVE:

Add words to Section 3.3.4.4 to ensure the X/Q (not D/Q) is used for H-3 quantification.

DESCRIPTION OF CHANGES:

Added exclusionary phrase in the description of Wn(dep) and wn(dep) under Section 3.3.4.4, to ensure the X/Q is used for Tritium.

IMPACT:

None

JUSTIFICATION:

Clarifies compliance with NUREG 0133 calculational methodology already incorporated into plant procedures and software. Although historical calculations were performed correctly, previous revisions of the ODCM discussed this exception for Tritium in the effected text, but did not include a specific mathematical expression in the equation. This improvement ensures the correct parameter is used for Tritium calculations at the nearest resident.

ODCM Revision 15, Item 48 of 55

OBJECTIVE:

Replace the word "annual" with "historical" in Section 3.5.5 and correct typographical error referring to Reference 5 (should be 1).

DESCRIPTION OF CHANGES:

Replace "annual" with "historical" in the description of ANMX in Section 3.5.5. Corrected the reference to NUREG 0133 as Reference 1 (not 5).

IMPACT:

None

JUSTIFICATION:

It is more correct to use "historical" in this reference, as Met data is not required to be re-evaluated annually (in lieu of ten year evaluations).

ODCM Revision 15, Item 49 of 55

OBJECTIVE:

Modify Section 3.6 to reference Section 3.5 by number.

DESCRIPTION OF CHANGES:

Changed reference in Section 3.6 from "listed above" to identify Section 3.5.

IMPACT:

None

JUSTIFICATION:

Typographical for clarity.

ODCM Revision 15, Item 50 of 55

OBJECTIVE:

Add Steps to cover the required examples of direct radiation calculations and calculations showing the negligible gaseous effluent dose to members of the public visiting the site (occupancy factors).

DESCRIPTION OF CHANGES:

Added Steps 3.7 and 3.8 to ODCM, Part II, to cover these examples.

IMPACT:

None

JUSTIFICATION:

These sections were added due to a reference in RECS 3.6.B (Total Dose Surveillance Requirement) and RECS bases discussion (Sec 4) regarding gaseous effluents. According to these sections of the RECS, both the direct shine component of total dose calculations and the proof of negligible gaseous effluent dose to members of the public visiting the site should have examples supplied in the ODCM. Rather than refer soley to RES calculations, examples were added to the ODCM, Part II, in order to be more fully compliant with these sections of the RECS.

ODCM Revision 15, Item 51 of 55

OBJECTIVE:

Correct the typographical error on Table 3-8.

DESCRIPTION OF CHANGES:

Corrected typo on Table 3-8, bottom mixture, which is the TIME AVERAGED mixture, not instantaneous. Also added a bar over the dose factors at the right of the table.

IMPACT:

None

JUSTIFICATION:

Typographical correction. The bar over the dose factors more accurately represents these factors as averages.

ODCM Revision 15, Item 52 of 55

OBJECTIVE:

Update Appendix 3-A to use the Q-dot notation for uCi/sec and K-bar (vice K eff).

DESCRIPTION OF CHANGES:

Used to denote uCi/sec and changed "K-eff" (inappropriate) to "K-bar".

IMPACT:

None

JUSTIFICATION:

Typographical

ODCM Revision 15, Item 53 of 55

OBJECTIVE:

Modify the LLD equation description to ensure unit analysis is accurate.

DESCRIPTION OF CHANGES:

Modified the LLD equation description in Appendix B to include 2.22E6 dpm/uCi (vice 3.7E4 dps/uCi).

IMPACT:

None

JUSTIFICATION:

While these terms are identical, the units of the equation are in minutes, so it is more correct to use 2.22E6 dpm/uCi.

ODCM Revision 15, Item 54 of 55

OBJECTIVE:

Correct typographical errors on Table 4-1 and update Figure 4-2.

DESCRIPTION OF CHANGES:

Updated Table 4-1 and Figure 4-2 per the REMP and Unit 2 procedures, using specific location names matching all references to monitoring locations.

IMPACT:

None

JUSTIFICATION:

Typographical correction to be consistent with REMP procedures.

ODCM Revision 15, Item 55 of 55

OBJECTIVE:

Improve the clarity of Table 2.7-1 and add footnotes for milk and broad leaf vegetation sampling.

DESCRIPTION OF CHANGES:

Added footnotes i and j to Table 2-7-1 of the RECS, and repositioned footnote notation to the exact word group for which it applies in the table. The two added footnotes describe specific sampling criteria found in the REMP implementation procedures.

IMPACT:

None

JUSTIFICATION:

Typographical improvements in clarity, to be consistent with REMP procedures.

PCP Revision 6

The current revision of the PCP at Indian Point 3 is Revision 7, as submitted in the 2000 report. In the same report (year 2000), a justification package was also submitted for Revision 6, as both revisions were accomplished in year 2000. The package for Revision 6, however, was inadvertently omitted, with Revision 5 package sent instead.

Due to the fact the Revision 6 justification package was not properly forwarded in 2000, it is included herein. The PCP currently remains at Revision 7, as was accurately forwarded, along with the full copy of the Process Control Program in the 2000 report. There were no changes to the PCP in year 2001.

This report summarizes the changes incorporated into Revision 6 of the Solid Radioactive Waste Process Control program (PCP). This revision is a result of implementation of Generic letter 89-01 as specified in the Facility Operating License DPR-64 amendment199 issued 2/7/00. Each change is listed with a justification for the change and it's impact on the process control program. When the impact is described as "None" it is to be interpreted as having no impact on the process control program or compliance with regulatory requirements.

1. a. Description
Added the following definition for solidification.

"The conversion of wet waste into a free-standing monolith by the addition of an agent so that the waste meets the stability and the free-standing liquid requirements of the disposal site."

b. Justification
The definition for solidification was removed from Appendix B of technical specifications. This definition has been revised to distinguish solidification from other methods used to process wet waste into a form meeting burial site stability requirements.

c. Impact
None.

2. a. Description
Added verbiage to the purpose section as follows:

"To ensure the safe operation of the solid radwaste system, the solid radwaste system will be used in accordance with this Process Control Program to process wet radioactive wastes to meet shipping and burial ground requirements." and

"The Process Control Program implements the requirements of 10CFR50.36a and General Design Criteria 60 of Appendix A to 10CFR Part 50. The process parameters included in the Process Control Program may include but are not limited to waste type, waste pH, waste/liquid/solidification agent/catalyst ratios, waste oil content, waste principal chemical constituents, and mixing and curing times."

b. Justification
This information was moved from technical specifications and provides no new requirements, but further clarifies the purpose of the PCP.

c. Impact
None.

3. a. Description
Added a statement prohibiting the shipment of defectively processed or packaged materials to section 4, Responsibilities.

b. Justification
This information was moved from technical specifications and provides no new requirements, but clearly states current requirements.

c. Impact
None.

4. a. Description
Added a statement prohibiting the shipment of defectively processed or packaged materials to section 7.

b. Justification
This information was moved from technical specifications and provides no new requirements, but clearly states current requirements.

c. Impact
None.

5. a. Description
Added limitations on solidification as follows:

"IF solidification is required in the future, THEN at least one representative test specimen from at least every 10th batch of each type of wet radioactive waste will be checked to verify solidification. IF any specimen fails to verify solidification, the solidification of the batch under test SHALL be suspended until such time as additional test specimens can be obtained, alternative solidification parameters can be determined, and a subsequent test verifies solidification. IF the initial test specimen from a batch of waste fails to verify solidification, THEN provide for the collection and testing of representative test specimens from each consecutive batch of the same type of wet waste until at least 3 consecutive initial test specimens demonstrates solidification. The process SHALL be modified as required to assure solidification of subsequent batches of wet waste."

b. Justification
This requirement was moved from technical specifications.

c. Impact
Current and planned future practices do not include solidification of wet waste. If solidification is required in the future this requirement will provide reasonable assurance that processes used yield waste meeting burial site stability requirements.

6. a. Description
Added section 9.8 for reporting requirements as follows:

"In accordance with Technical Specification Appendix B 4.3.2.1 AND the REC section 5.1, ENSURE that the Annual Radioactive Effluent Release Report includes a summary of the quantities of solid radioactive waste released from the unit."

"Licensee initiated major changes to the radioactive waste systems SHALL be reported to the Commission in the Annual Radioactive Effluent Release Report for the year in which the change evaluation was received by the PORC. The discussion of each change SHALL contain those items noted in the REC section 5.1"

b. Justification
This addition will ensure consistency between reporting requirements in T.S. 4.3.2.1 and REC 5.1.

c. Impact
This change reflects current practices and technical specifications requirements and so has no impact on the PCP.

7. a. Description
Added Generic Letter 89-01 and the resulting NYPA response, IPN-99-079, to Section 3, References.

b. Justification
This change is administrative in nature and is in accordance with current plant practices.

c. Impact
None.

8. a. Description
Revised wording in Step 9.1.1 as follows:

> In the statement "Solidification/encapsulation methods include the following:" , the words "Solidification/encapsulation" are replaced with the words "Waste Processing".

The statement now reads "Waste Processing methods include the following:"

b. Justification
This change is intended to improve the clarity of this statement.

c. Impact
None.

ATTACHMENT II TO IPN-02-033

OFFSITE DOSE CALCULATION MANUAL, REVISION 15

Entergy Nuclear Operations, Inc.
Indian Point 3 Nuclear Power Plant
Docket No. 50-286

CONTROLLED

COPY # 2

TITLE: OFFSITE DOSE CALCULATION MANUAL REV. 15

WRITTEN BY: Steve Sandike 12/3/01

REVIEWED BY: MATT KUERS 12/4/01

PORC REVIEW: *01-047

APPROVED BY: 12-5-01

EFFECTIVE DATE: 12-14-01

INDIAN POINT 3

OFFSITE DOSE CALCULATION MANUAL

Revision 15

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REFERENCES

1. U.S. Nuclear Regulatory Commission, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants", USNRC Report NUREG-0133, Washington D.C. 20555, October 1978.

2. M.E. Wrenn and J. W. Lentsch, "The Fate of Gamma-Emitting Radionuclides Released into the Hudson River Estuary and an Evaluation of Their Environmental Significance", New York University Medical Center, Institute of Environmental Medicine, 1974.

3. Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I, Revisions 1 and 0 (original draft for information only), USNRC Washington D.C. 20555, October 1977.

4. "An Evaluation to Demonstrate the Compliance of the Indian Point Reactors with the Design Objectives of 10CFR50, Appendix I", Consolidated Edison Company of New York, Inc. and Power Authority of the State of New York, February 1977.

5. U.S. Nuclear Regulatory Commission, "XOQDOQ Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations", USNRC Report NUREG-0324, Washington D.C. 10555, September 1977. (Later updated by NUREG CR 2919). [12]

6. "Semi-Annual Report of Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents for Indian Point Three", Power Authority of the State of New York, January 1, 1978 to June 30, 1980.

7. "Environmental Technical Specification Requirements for Indian Point Nuclear Generating Unit Number 3", Power Authority of the State of New York, December 12, 1975.

8. U.S. Nuclear Regulatory Commission, "Radiological Effluent Technical Specification for PWR's", USNRC Report NUREG-0472, Washington D.C. 20555.

9. Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix ", Revision 1, USNRC, Washington D.C. 10555, October 1977.

10. AP-11 - Indian Point No. 3 Nuclear Power Plant Administrative Procedure, "Radioactive Effluents Control Program".

11. NUREG/CR-4007, 1984, "Lower Limit of Detection: Definition and Elaboration of a Proposed Position for Radiological Effluent and Environmental Measurements".

12. New York University Medical Center, "Radioecological Studies of the Hudson River Progress Report (1986-1987)", N.Y.U. New York, New York 10016, March 1988.

13. IPI-DM-153, "Antimony Dose Factors", IPS Memorandum to M. Kerns from D. Mayer, August 8, 1988.

14. New York University Medical Center, "Radiological Studies of the Hudson River Progress Report (1987-1988)", N.Y.U. New York, New York 10016, September 1988.

REFERENCES

15. USNRC Regulatory Guide 1.111, "Methods of Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," U.S. Nuclear Regulatory Commission (October 1977, Rev. 1).

16. CRE Computer Code AEOLUS-3, "A Computer Code for the Determination of Atmospheric Dispersion and Deposition of Nuclear Power Plant Effluents During Continuous, Intermittent and Accident Conditions in Open-Terrain Sites, Coastal Sites and Deep-River Valleys," RAD-004, Version 1, Level 2 (June 1991).

17. CRE Engineering Calculation IP3-CALC-RAD-00001, "IP3 - Revised ODCM Atmospheric Dispersion Parameters (Multi-Year Hourly Data, Mixed-Mode Releases and Valley Effects)," by John N. Hamawi (July 1991).

18. USNRC Regulatory Guide 1.23, "Onsite Meteorological Programs," U.S. Nuclear Regulatory Commission (2/17/72) (and proposed revisions).

19. USNRC Regulatory Guide 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," U.S. Nuclear Regulatory Commission (August 1979).

20. D. H. Slade, Ed., "Meteorology and Atomic Energy - 1968," USAEC, TID-24190 (1968).

21. WCRE-93-157, "IP3-Annual Average Atmospheric Dispersion and Deposition factors for Ground-Level Release, December , 1993 Memorandum Hamawi to Mayer.

22 NRC Generic Letter 89-01 (Technical Specification Amendment 199) with NUREG 1301.

23. Improved Technical Specifications from NUREG 1431, Amendment 205, Feb 2001.

24. ERDA 660 (ORNL-4992), "A Methodology for Calculating Radiation Doses from Radioactivity Released to the Environment ".

25. International Atomic Energy Agency, Generic Models and Parameters for Assessing the Environmental Transfer of Radionuclides from Routine Releases: Exposures of Critical Groups, Safety Series No. 57, IAEA, Vienna (1978). 12

26. IP3-CALC-RAD-00013, "Radiological Analysis of Site Boundary Gamma Dose from Onsite Radioactive Material Holding Areas".

27. MicroShield Manual and Calculations, Grove Engineering.

28. M020.02, Calculations for Steam Generator Storage Facility Site Boundary Dose.

29. NYPA 3899.001, Calculations for Direct Shine Dose from the Interim Radioactive Waste Storage Facility.

OFFSITE DOSE CALCULATION MANUAL

PART I

RADIOLOGICAL EFFLUENT CONTROLS

(RECS)

Revision 15

1.0 DEFINITIONS

1.1 ACTION

That part of a Control that prescribes remedial measures required under designated conditions.

1.2 CHANNEL CALIBRATION

Adjustment of channel output such that it responds, with acceptable range and accuracy, to known values of the parameter which the channel measures. Calibration shall encompass the entire channel, including alarm or trip, and shall be deemed to include the channel functional test.

1.3 CHANNEL CHECK

A qualitative determination of acceptable operability by observation of channel behavior during operation. This determination shall include, where possible, comparison of the channel with other independent channels measuring the same variable.

1.4 CHANNEL FUNCTIONAL TEST

Injection of a simulated signal into the channel to verify that it is operable, including alarm and/or trip initiating action.

1.5 EFFLUENT CONCENTRATION

The EFFLUENT CONCENTRATION is that maximum concentration limit of each radionuclide specified in Table 2 of Appencix B to 10 CFR 20 in accordance with 10CFR20.1302(2)(i). |121

1.6 GASEOUS RADWASTE TREATMENT SYSTEM

A GASEOUS RADWASTE TREATMENT SYSTEM is any system designed and installed to reduce radioactive gaseous effluents by collecting primary coolant system offgases from the primary system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

1.7 LIQUID RADWASTE TREATMENT SYSTEM

A LIQUID RADWASTE TREATMENT SYSTEM is any system designed and installed to reduce radioactive liquid effluents by collecting liquid radwaste and providing for processing capability and/or holdup for the purpose of reducing and monitoring the total radioactivity prior to release to the environment.

1.8 MAXIMUM PERMISSIBLE CONCENTRATION WATER (MPCW)

MPCW is that concentration of a radionuclide equal to 10 times the liquid EFFLUENT CONCENTRATION(s) specified in column 2, Table 2 of Appendix B to 10CFR20. |121

1.9 MEMBER(S) OF THE PUBLIC

MEMBER(S) OF THE PUBLIC means any individual who is not occupationally associated with the plant. Excluded from this category are utility employees, its contractors or vendors, and delivery or service personnel. Included in this category are persons using the site for recreation or occupation not associated with the plant. |12/1

1.10 OCCUPATIONAL DOSE

Occupational dose means the dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released in accordance with 10CFR35.75, from voluntary participation in medical research programs, or as a member of the public. |12/1

1.11 OFFSITE DOSE CALCULATION MANUAL (ODCM)

The OFFSITE DOSE CALCULATION MANUAL shall contain the current methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Radiological Environmental Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluent Controls (RECS) and Radiological Environmental Monitoring Programs (REMP) required by Technical Specification 5.5.1 and 5.5.4 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Radioactive Effluent Release Reports required by Technical Specifications 5.6.2 and 5.6.3.

1.12 OPERABLE - OPERABILITY

Properly installed in the system and capable of performing the intended functions in the intended manner as verified by testing and tested at the frequency required by the Radiological Effluent Controls. Implicit in this definition shall be the assumption that all necessary attendant controls, electrical power source, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component or device to perform its function(s) are also capable of performing their related support function(s).

1.13 PROCESS CONTROL PROGRAM (PCP)

The PROCESS CONTROL PROGRAM shall contain the current formulas, sampling, analyses, tests, and determinations to be made to ensure that the processing and packaging of solid radioactive wastes based on demonstrated processing of actual or simulated wet solid wastes will be accomplished in such a way as to assure compliance with 10 CFR Parts 20, 61 and 71 and Federal and State regulations and other requirements governing the disposal of solid radioactive waste. The PCP is further described in RECS 5.5.

1.14 PURGE - PURGING

PURGE or PURGING is the controlled process of discharging air or gas from a confinement in such a manner that replacement air or gas is required to purify the confinement.

1.15 RATED THERMAL POWER (RTP)

RTP shall be a total reactor core heat transfer rate to the reactor coolant of 3025 MWt. ("Rated Power" and "Rated Thermal Power" are used interchangeably throughout the Technical Specifications).

1.16 SITE BOUNDARY

The SITE BOUNDARY (ODCM Part II, Figure 1-1) means that line beyond which the land or property is not owned, leased, or otherwise controlled by either site licensee.

1.17 SOURCE CHECK

A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a source of increased radioactivity.

1.18 THERMAL POWER

THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

1.19 UNRESTRICTED AREA

An UNRESTRICTED AREA (ODCM Part II, Figure 1-1) means an area at or beyond the SITE BOUNDARY, access to which is neither limited nor controlled by the licensee for purposes of radiation protection, or a similarly uncontrolled area within the SITE BOUNDARY that is used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes. 12/1

1.20 VENTILATION EXHAUST TREATMENT SYSTEM

A VENTILATION EXHAUST TREATMENT SYSTEM is any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal absorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment. Such a system is not considered to have any effect on noble gas effluents. Engineered Safety Feature (ESF) atmospheric cleanup systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.

2/3.0 RADIOLOGICAL EFFLUENT CONTROLS AND SURVEILLANCE REQUIREMENTS

2.1 Radioactive Liquid Effluent Monitoring Instrumentation

CONTROL:

In accordance with Technical Specification 5.5.4, the radioactive liquid effluent monitoring instrumentation channels shown in Table 2.1-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Control 2.3.1 are not exceeded. The alarm/trip setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

APPLICABILITY: As shown in Table 2.1-1.

ACTION:

A. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above Control, immediately suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable, or change the setpoint so it is acceptably conservative.

B. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 2.1-1. Exert best efforts to return the instruments to OPERABLE status within 30 days and if unsuccessful, explain in the next Annual Radioactive Effluent Release Report, pursuant to RECS 5.2, why the inoperability was not corrected within this time frame.

C. Report all deviations in the Annual Radioactive Effluent Release Report.

3.1 SURVEILLANCE REQUIREMENTS:

Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 3.1-1.

TABLE 2.1-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION		
INSTRUMENT	**MINIMUM CHANNELS OPERABLE [a]**	**ACTION**
1. GROSS RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC TERMINATION OF RELEASE		
a. Liquid Radwaste Processing Effluent Line (R-18)	(1)	1
b. Condensate Polisher Facility (CPF) Waste Line (R-61) [b]	(1)	1
c. Steam Generator Blowdown (R-19) [e]	(1)	2
2. GROSS BETA OR GAMMA RADIOACTIVITY MONITORS PROVIDING ALARM BUT NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE		
a. Service Water System Effluent Line (R-16A, R-16B)	(1)	3
b. Service Water System EffluentLine (R-23)	(1)	3
3. FLOW RATE MEASUREMENT DEVICES		
a. Liquid Radwaste Effluent Line	(1)	4
b. Steam Generator Blowdown Effluent Line	(1)	4
4. RADIOACTIVITY RECORDERS [c]		
a. Liquid Radwaste Effluent Line	(1)	1
b. Steam Generator Blowdown Effluent Line	(1)	2
5. TANK LEVEL INDICATING DEVICES [d]		
a. Refueling Water Storage Tank	(1)	5
b. Primary Water Storage Tank	(1)	5
c. Monitor Tank #31	(1)	5
d. Monitor Tank #32	(1)	5
e. CPF High Total Dissolved Solids Tank [b]	(1)	5
f. CPF Low Total Dissolved Solids Tank [b]	(1)	5

TABLE 2.1-1 *(Continued)*

TABLE NOTATION

a) During release by the pathway, channels shall be OPERABLE and in service during such release on a continuous, uninterrupted basis, except that outages are permitted, within the time frame and limitations of the specified action, for the purpose of maintenance and performance of required tests, checks and calibration.

b) The Condensate Polisher Facility (CPF) instrumentation requirements apply only when a primary to secondary leak is present (R-61 and TDS level instruments). This leak is defined in ODCM Part II, Section 1, Table 1-1, footnote 4. |12|1

c) Required only if alarm/trip set point is based on recorder-controller.

d) Tanks included in this Control are those outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents and do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system.

e) Applicable for Continuous Steam Generator Blowdown to the environment only. Not applicable for Steam Generator Draindowns in Mode 5 or 6. |12|

TABLE 2.1-1 *(Continued)*

TABLE NOTATION

ACTION 1 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Radiological Effluent Control Surveillance Requirement 3.3.1.A,

and

b. At least two technically qualified members of the Facility Staff independently verify the release rate calculations and discharge line valving:

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 2 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are analyzed either for principal gamma emitters or for gross radioactivity (beta or gamma) at a lower limit of detection of at least 5E-7 microcurie/ml (as Cs-137):

a. At least once per 12 hours when the specific activity of the secondary coolant is greater than 0.01 microcurie/gram Dose Equivalent I-131.

b. At least once per 24 hours when the specific activity of the secondary coolant is less than or equal to 0.01 microcurie/gram Dose Equivalent I-131.

ACTION 3 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided that, at least once per 12 hours, grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a lower limit of detection of at least 5E-7 microcurie/ml (as Cs-137).

ACTION 4 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours during actual releases. Pump performance curves may be used to estimate flow.

ACTION 5 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, liquid additions to this tank may continue provided the tank liquid level is estimated during all liquid additions to the tank.

TABLE 3.1-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS				
INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. GROSS RADIOACTIVITY MONITORS PROVIDING ALARM AND AUTOMATIC TERMINATION OF RELEASE				
a. Liquid Radwaste Effluent Line (R-18)	Daily [a]	Daily [a]	24M [i]	Quarterly [a,g]
b. CPF Effluent Line (R-61) [e]	Daily [a]	Monthly [a]	24M [i]	Quarterly [a,g]
c. Steam Generator Blowdown (R-19) [f]				
2. GROSS BETA OR GAMMA RADIOACTIVITY MONITORS PROVIDING ALARM BUT NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE				
a. Service Water System Effluent Line (R-16A and R-16B)	Daily [a]	Monthly [a]	24M [i]	Quarterly [a,h]
b. Service Water System Effluent Line (R-23)	Daily [a]	Monthly [a]	18M [i]	Quarterly [a,h]
3. FLOW RATE MEASUREMENT DEVICES				
a. Liquid Radwaste Effluent Line	Daily [j]	N.A.	18M	Quarterly
b. Steam Generator Blowdown Effluent Line	Daily [j]	N.A.	24M	N.A.
4. RADIOACTIVITY RECORDERS				
a. Liquid Radwaste Effluent Line	Daily [a]	N.A.	24M	Quarterly [d]
b. Steam Generator Blowdown Effluent Line	Daily [a]	N.A.	24M	Quarterly [d]
5. TANK LEVEL INDICATING DEVICES [c]				
a. Refueling Water Storage Tank	Daily [b]	N.A.	18M	18M
b. Primary Water Storage Tank	Daily [b]	N.A	24M	24M
c. Monitor Tank #31	Daily [b]	N.A.	18M	18M
d. Monitor Tank #32	Daily [b]	N.A.	18M	18M
e. CPF High Total Dissolved Solids Tank [e]	Daily [b]	N.A.	24M	24M
f. CPF Low Total Dissolved Solids Tank [e]	Daily [b]	N.A.	24M	24M

TABLE 3.1-1*(Continued)*

TABLE NOTATION

a) When this pathway is utilized for releases, with frequency no more than indicated.

b) During liquid additions to the tank.

c) Tanks included in this Control are those outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents and do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system.

d) Required only if alarm/trip setpoint is based on recorder-controller.

e) For effluent concerns, surveillances on the CPF instrumentation pathway are not required unless a primary to secondary leak is present, per ODCM Part II, Section 1, Table 1-1, footnote 4. (The tank level indicator calibrations are required by the SPDES permit at an unspecified frequency). 12

f) Applicable for Steam Generator Blowdown to the river only. Not applicable for Steam Generator Draindowns in Mode 5 or 6.

g) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if the following condition exists:

1. Instrument indicates measured levels above the alarm/trip setpoint.

h) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the alarm setpoint.

2. Instrument controls not set in operate mode.

i) Radioactive calibration standards used for CHANNEL CALIBRATIONS shall be traceable to the National Institute of Standards and Technology (NIST) or an aliquot of calibration solution shall be analyzed with instrumentation which is calibrated with NIST traceable standards. (Standards from suppliers who participate in measurement assurance activities with NIST are acceptable).

j) CHANNEL CHECK shall consist of verifying indication of flow during periods of release. CHANNEL CHECK shall be made at least once per 24 hours on days on which continuous, periodic, or batch releases are made.

Periodicity Abbreviations

D	Daily	M	Monthly
Q	Quarterly	N.A.	Not Applicable
18M	At least once per 18 months	24M	At least once per 24 months

2.2 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

CONTROL:

In accordance with Technical Specification 5.5.4, the radioactive gaseous effluent monitoring instrumentation channels shown in Table 2.2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Control 2.4.1 are not exceeded. The alarm/trip setpoints of these channels shall be determined and adjusted in accordance with the methodology and parameters in the ODCM.

APPLICABILITY: As shown in Table 2.2-1.

ACTION:

A. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above Control, immediately suspend the release of radioactive gaseous effluents monitored by the affected channel or declare the channel inoperable, or change the setpoint so it is acceptably conservative.

B. With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table 2.2-1. Exert best efforts to return the instruments to OPERABLE status within 30 days and, if unsuccessful, explain in the next Annual Radioactive Effluent Release Report, pursuant to RECS 5.2, why the inoperability was not corrected within this time frame.

C. Report all deviations in the Annual Radioactive Effluent Release Report.

3.2 SURVEILLANCE REQUIREMENTS:

Radioactive gaseous effluent monitoring instrumentation channels shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table 3.2-1.

TABLE 2.2-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION			
INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1. WASTE GAS HOLDUP SYSTEM			
a. Noble Gas Activity Monitor Providing Alarm (R-20)	(1)	(b)	6
2. CONDENSER AIR EJECTOR			
a. Noble Gas Activity Monitor (R-15)	(1)	(a)	8
3. ENVIRONMENTAL RELEASE POINTS: (PLANT VENT [c], ADMIN BUILDING CONTROLLED AREA, RAD MACHINE SHOP)			
a. Noble Gas Activity Monitor (R-14 or R-27, R-46 and R-59)	(1)	(a)	8,11,12
b. Iodine Sampler	(1)	(a)	10
c. Particulate Sampler	(1)	(a)	10
d. Flow Rate Monitor	(1) [d]	(a)	7
e. Sampler Flow Rate Monitor	(1)	(a)	7
4. CONTAINMENT PURGE SYSTEM			
a. Containment Noble Gas Activity - Monitor (R-12) Providing Alarm and Automatic Termination of Release	(1)	(a)	9

[12]

TABLE NOTATION

(a) Channels shall be OPERABLE and in service on a continuous basis during release via this pathway, except that outages are permitted, within the time frame of the specified action for the purpose of maintenance and performance of required tests, checks and calibrations.

(b) During waste gas holdup system operation (treatment for primary system offgases).

(c) The Plant Vent will also monitor releases from the Vent Header, Auxiliary Building Vents, Fuel Storage Building Vents, and the Rad Waste Area Vent.

(d) The Admin Bldg Controlled Area Ventilation system uses default fan flow rate in lieu of a Process Flow Rate Monitor, per ODCM Part II, Section 3.1.13. |

TABLE 2.2-1 *(Continued)*

ACTION 6 - With the number of channels OPERABLE less than that required by the Minimum Channels OPERABLE requirement, the radioactive content of the receiving gas decay tank shall be determined daily to ensure compliance with RECS 2.11.

ACTION 7 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the flow rate is estimated at least once per 4 hours.

ACTION 8 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided grab samples are taken at least once per 12 hours and these samples are analyzed for gross activity within 24 hours.

ACTION 9 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, immediately suspend PURGING of radioactive effluents via this pathway. During containment building ventilation in Modes 5 or 6, continuous monitoring and automatic termination of release is not required. One continuous monitor at the final release point (plant vent) is sufficient.

ACTION 10 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via the effected pathway may continue provided samples are continuously collected with auxiliary sampling equipment as required in Table 3.4-1.

ACTION 11 - With the number of channels OPERABLE less than that required by the Minimum Channels OPERABLE requirement for the plant vent, the contents of the radwaste gas decay tanks may be released to the environment provided that prior to initiating the release:

a. At least two independent samples of the tank contents are analyzed, AND,

b. At least two technically qualified members of the facilities staff independently verify the release rate calculations and discharge valve lineup.

ACTION 12 - If the plant vent sampling capability or the wide-range vent monitor (R-27) is/are determined to be inoperable in Modes 1-4, then restore the sampling/monitoring capability within 72 hours or:

a. Initiate a pre-planned alternate sampling/monitoring capability as soon as practical, but no later than 72 hours after identification of the failures. If the capability is not restored to operable status within 7 days, then,

b. Submit a Special Report to the NRC pursuant to Technical Specification 5.6.7, and Technical Reference Manual 3.3.C within 14 days following the event, outlining the action taken, the cause of the inoperability, and the plans and schedule for restoring the system.

TABLE 3.2-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS				
INSTRUMENT [a]	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	FUNCTIONAL TEST
1. WASTE GAS HOLDUP SYSTEM				
a. Noble Gas Activity Monitor Providing Alarm (R-20)	Daily	Monthly	24M [e]	Quarterly [b,d]
2. CONDENSER AIR EJECTOR				
a. Noble Gas Activity Monitor (R-15)	Daily	Monthly	24M [e]	Quarterly [b,d]
3. ENVIRONMENTAL RELEASE POINTS: (PLANT VENT, ADMIN BUILDING CONTROLLED AREA, RAD MACHINE SHOP VENT)				
a. Noble Gas Activity Monitors (R-14, R-27, R-46, and R-59)	Daily	Monthly	24M [e]	Quarterly [b,d]
b. Iodine Sampler	Weekly	N.A.	N.A.	N.A.
c. Particulate Sampler	Weekly	N.A.	N.A.	N.A.
d. Flow Rate Monitor [c]	Daily	N.A.	18M	Quarterly
e. Sampler Flow Rate Monitor	Daily	N.A.	18M	N.A.
4. CONTAINMENT PURGE SYSTEM				
a. Containment Noble Gas Activity Monitor (R12) providing Alarm and Automatic Termination of Release	Daily	Monthly	24M [e]	Quarterly [b,d]

12.1.1

TABLE 3.2-1 *(Continued)*

TABLE NOTATION

a) Surveillances are required at all times except when monitor has been removed from service in accordance with Table 2.2-1.

b) Will not include operation of automatic control functions.

c) The Administration Building Controlled Area Vent system uses default fan flow rate in lieu of a Process Flow Rate Monitor, per ODCM Part II, Section 3.1.13.

d) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

- Instrument indicates measured levels above the alarm setpoint.
- Instrument controls not set in operate mode.

e) Radioactive Calibration Standards used for CHANNEL CALIBRATIONS shall be traceable to the National Institute of Standards and Technology (NIST) or an aliquot of calibration gas shall be analyzed with instrumentation which is calibrated with NIST traceable standards (standards from suppliers which participate in measurement assurance activities with NIST are acceptable).

D	Daily
M	Monthly
N.A.	Not Applicable
Q	Quarterly
18M	At least once per 18 months.
24M	At least once per 24 months.

2.3 RADIOACTIVE LIQUID EFFLUENTS

2.3.1 LIQUID EFFLUENT CONCENTRATION

CONTROL:

In accordance with Technical Specifications 5.5.4, the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to 10 times the EFFLUENT CONCENTRATION values specified in Appendix B, Table 2, Column 2 of 10CFR20 in accordance with 10CFR20.1302(2)(i) for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-4 uCi/ml. [12]

APPLICABILITY: At all times.

ACTION:

With the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeding the above limits, immediately restore the concentration to within these limits.

3.3.1 SURVEILLANCE REQUIREMENTS:

A. Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Table 3.3.1-1.

B. The results of the radioactivity analyses shall be used in accordance with the methodology and parameters in the ODCM to assure that the concentrations at the point of release are maintained within the limits of Control 2.3.1.

TABLE 3.3.1-1

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM				
Liquid Release Type	**Sampling Frequency**	**Minimum Analysis Frequency**	**Type of Activity Analysis**	**Lower Limit of Detecttion (LLD)[a] (uCi/ml)**
A. Batch Releases[b] (Waste Tanks, Steam Generator Draindowns to the River, etc)	Each Batch (Prior to Release)	Each Batch (Prior to Release)	Principal Gamma Emitters[c]	5E-7
			Mo-99, Ce-144	5E-6
			I-131	1E-6
	One Batch per Month	Monthly	Dissolved & Entrained Gases (Gamma Emitters)	1E-5
	Each Batch	Monthly Composite[d]	H-3	1E-5
			Gross Alpha	1E-7
	Each Batch	Quarterly Composite[d]	Sr-89, Sr-90	5E-8
			Fe-55	1E-6
B. Continuous Steam Generator Blowdown to River[e]	3 per Week Composite[d]	Weekly Composite[d]	Principal Gamma Emitters	5E-7
			Mo-99, Ce-144	5E-6
			I-131	1E-6
	Monthly Grab Sample	Monthly	Dissolved & Entrained Gases (Gamma Emitters)	1E-5
	Weekly Composite[d]	Monthly Composite[d]	H-3	1E-5
			Gross Alpha	1E-7
			Sr-89, Sr-90	5E-8
			Fe-55	1E-6
C. Service Water (in the Radiologically Controlled Area)	Monthly	Monthly	Gamma and Beta emitters[g]	per Section A, Liquid Batch Releases
D. Turbine Hall Drains, SG Feedwater[f]	3 per Week Composite	Weekly	Gamma and Beta emitters[g]	per Section A, Liquid Batch Releases

TABLE 3.3.1-1 *(Continued)*

TABLE NOTATION

a) The LLD is defined, for purposes of these Controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal. Equations used in the calculation of the LLD for a particular measurement system are presented in the ODCM.

> It should be recognized that the LLD is defined as an *a priori* (before the fact) limit representing the capability of a measurement system and not as an *a posteriori* (after the fact) limit for a particular measurement.

b) A batch release is the discharge of liquid wastes of a discrete volume. Prior to samplings for analyses, each batch shall be isolated, and then thoroughly mixed to assure representative sampling.

c) The principal gamma emitters for which the LLD Control applies exclusively are the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Cs-134, Cs-137; and Ce-141. This list does not mean that only these nuclides are to be monitored. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radioactive Effluent Release Report pursuant to Reporting Requirement 5.2.

d) A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged for each pathway. The method of sampling employed results in a specimen that is representative of the liquids released.

e) A continuous release is the discharge of liquid wastes of a nondiscrete volume, e.g., from a volume of a system that has an input flow during the continuous release.

f) Steam Generator Feedwater and Turbine Hall Drains need only be monitored when a Primary to Secondary leak exists. This leak is defined in ODCM Part II, Section 1, Table 1-1, footnote 4. |12/1

g) Beta emitters need only be analyzed if gamma emitters have been positively identified. |12/1

2.3.2 DOSE FROM LIQUID EFFLUENTS

CONTROLS:

In accordance with Technical Specifications 5.5.4, the dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each reactor unit, to UNRESTRICTED AREAS shall be limited:

1. During any calendar quarter to less than or equal to 1.5 mrems to the total body and to less than or equal to 5 mrems to any organ,

   and

2. During any calendar year to less than or equal to 3 mrems to the total body and to less than or equal to 10 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective action(s) that have been taken to reduce the release(s) and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

If drinking water supply is taken from the receiving water body within 3 miles of the plant discharge (3 miles downstream for river sited plants), this Special Report shall also include: 12/1

1) the results of radiological analyses of the drinking water source; and

2) the radiological impact on finished drinking water supplies with regard to the requirements of 40 CFR Part 141.

3.3.2 SURVEILLANCE REQUIREMENTS:

Cumulative dose contributions from liquid effluents for the current calendar quarter and the current calendar year shall be determined in accordance with the methodology and parameters in the ODCM at least once per month.

2.3.3 LIQUID RADWASTE TREATMENT SYSTEM

CONTROL:

In accordance with Technical Specification 5.5.4, the liquid radwaste treatment system shall be used when the projected doses due to the liquid effluent, from each reactor unit, to UNRESTRICTED AREAS would exceed 0.06 mrem to the total body or 0.2 mrem to any organ in a 31 day period.

APPLICABILITY: At all times.

ACTION:

With radioactive liquid waste being discharged without treatment and in excess of the above limits, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that includes the following information:

A. Explanation of why liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability,

B. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

C. Summary description of action(s) taken to prevent a recurrence.

3.3.3 SURVEILLANCE REQUIREMENTS:

Doses due to liquid releases from each reactor unit to UNRESTRICTED AREAS shall be projected at least once per month in accordance with the methodology and parameters in the ODCM when the liquid radwaste treatment systems are not being fully utilized.

2.4 RADIOACTIVE GASEOUS EFFLUENTS

2.4.1 GASEOUS EFFLUENT DOSE RATES

CONTROL:

In accordance with Technical Specification 5.5.4, the dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the SITE BOUNDARY shall be limited to the following:

A. For noble gases: Less than or equal to a dose rate of 500 mrems/yr to the total body and less than or equal to a dose rate of 3000 mrems/yr to the skin,

and

B. For iodine-131, for tritium, and for all radionuclides in particulate form with half lives greater than 8 days: Less than or equal to a dose rate of 1500 mrem/yr to any organ.

APPLICABILITY: At all times.

ACTION:

With the dose rate(s) exceeding the above limits, immediately restore the release rate to within the above limit(s).

3.4.1 SURVEILLANCE REQUIREMENTS:

A. The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters in the ODCM.

B. The dose rate due to iodine-131, tritium, and all radionuclides in particulate form with half lives greater than 8 days in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters in the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table 3.4.1-1.

TABLE 3.4.1-1

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM					
Gaseous Release Type		**Sampling Frequency**	**Minimum Analysis Frequency**	**Type of Activity Analysis**	**Lower Limit of Detection (LLD)[a], uCi/cc**
A. Waste Gas Storage		Batch Grab Sample Prior to Each Release	Batch Grab Sample Prior to Each Release	Principal Noble Gas (NG)Gamma Emitters [b]	1E-4
B. Vapor Containment	Purge	Batch Grab Sample Prior to Each Purge	Batch Grab Sample Prior to Each Purge	Principal NG Gamma Emitters [b]	1E-4
	Press Relief	Monthly [i]	Monthly [i]		
C. Condenser Air Ejector		Grab Sample	Monthly	Principal NG Gamma Emitters [b,h]	1E-4
D. Environmental Release Points (Plant Vent, Admin Bldg Controlled Area Vent, Radioactive Machine Shop Vent)		Monthly Grab Sample [c]	Monthly [c]	Principal NG Gamma Emitters [b]	1E-4
		Monthly Grab Sample [d,e]	Monthly [d,e]	H-3	1E-6
		Continuous [f]	Weekly [g] Charcoal Sample	I-131	1E-12
		Continuous [f]	Weekly [g] Particulate Sample	Principal [b] Gamma Emitters	1E-11
		Continuous [f]	Monthly Composite Particulate Sample	Gross Alpha	1E-11
		Continuous [f]	Quarterly Composite Particulate Sample	Sr-89, Sr-90	1E-11
		Continuous [f]	Noble Gas Monitor	Noble Gases Gross Beta or Gamma	1E-6

[21]

TABLE 3.4.1-1 *(Continued)*

TABLE NOTATION

a) The LLD is defined, for purposes of these Controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal. Equations used in the calculation of the LLD for a particular measurement system are presented in the ODCM.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

b) The principal gamma emitters for which the LLD Control applies exclusively are the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be monitored. Other identifiable gamma peaks (I-131 in particulate form, for example), together with those of the above nuclides, shall also be analyzed and reported in the Annual Radioactive Effluent Release Report pursuant to RECS 5.2.

c) The main plant vent shall be sampled and analyzed following shutdown, startup, or a THERMAL POWER change (within one hour) exceeding 15 percent of RATED THERMAL POWER unless either (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3: or (2) the noble gas activity monitor shows that effluent activity has not increased by more than a factor of 3. Under no circumstances would iodine samples be required more than once per day.

d) Plant vent Tritium grab samples shall be taken at least once per 24 hours when the refueling canal is flooded unless continuous sampling equipment is in use.

e) Plant vent tritium grab samples shall be taken at least once per 7 days from the ventilation exhaust from the spent fuel pool area, whenever spent fuel is in the spent fuel pool unless continuous sampling equipment is in use.

f) The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Controls 2.4.1, 2.4.2 and 2.4.3.

TABLE 3.4.1-1 *(Continued)*

TABLE NOTATION

g) Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup or THERMAL POWER change exceeding 15 percent of RATED THERMAL POWER in one hour and analyses shall be completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if either (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; or (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.

h) The air ejector shall be sampled for Iodine and Tritium when a Primary to Secondary Leak exists. This leak is defined in ODCM Part II, Section 1, Table 1-1, footnote 4.

i) Vapor Containment noble gas shall be sampled at least monthly to ensure Pressure Reliefs are quantified with an accurate isotopic mixture. Containment noble gas radiation monitor readings can be used for quantification of Pressure Reliefs, provided the monitor readings are consistent with those observed during recent (at least monthly) grab samples. Sample data is adjusted by the noble gas radiation monitor reading for purposes of quantification of each release. Should the monitor be inoperable, a containment noble gas grab sample is required within 24 hours prior to the Pressure Relief. 12/1

2.4.2 DOSE FROM NOBLE GASES

CONTROLS:

In accordance with Technical Specification 5.5.4, the air dose due to noble gases released in gaseous effluents, from each reactor unit, to areas at and beyond the SITE BOUNDARY shall be limited to the following:

1. During any calendar quarter: Less than or equal to 5 mrads for gamma radiation and less than or equal to 10 mrads for beta radiation.

   and,

2. During any calendar year: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation.

APPLICABILITY: At all times.

ACTION:

With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

3.4.2 SURVEILLANCE REQUIREMENTS:

Cumulative dose contributions for the current calendar quarter and current calendar year for noble gases shall be determined in accordance with the ODCM at least once per month.

2.4.3 DOSE FROM IODINE-131, TRITIUM, AND RADIONUCLIDES IN PARTICULATE FORM

CONTROLS:

In accordance with Technical Specification 5.5.4, the dose to a MEMBER OF THE PUBLIC from Iodine-131, Tritium and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from each reactor unit, to areas at and beyond the SITE BOUNDARY shall be limited to the following:

1. During any calendar quarter: Less than or equal to 7.5 mrems to any organ

   and,

2. During any calendar year: Less than or equal to 15 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

With the calculated dose from the release of iodine-131, tritium, and radionuclides in particulate form with half lives greater than 8 days, in gaseous effluents exceeding any of the above limits, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that identifies the cause(s) for exceeding the limit and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

3.4.3 SURVEILLANCE REQUIREMENTS:

Cumulative dose contributions for the current calendar quarter and current calendar year for iodine-131, tritium, and radionuclides in particulate form with half lives greater than 8 days shall be determined in accordance with the methodology and parameters in the ODCM at least once per month.

2.4.4 GASEOUS RADWASTE TREATMENT SYSTEM

CONTROL:

In accordance with Technical Specification 5.5.4, the appropriate GASEOUS RADWASTE TREATMENT SYSTEM and the appropriate VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected gaseous effluent air doses due to gaseous effluent releases, from each reactor unit, to areas at and beyond the SITE BOUNDARY would exceed 0.2 mrad for gamma radiation and 0.4 mrad for beta radiation in a 31 day period. The VENTILATION EXHAUST TREATMENT SYSTEM shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses due to gaseous effluent releases, from each reactor unit, to areas at and beyond the SITE BOUNDARY would exceed 0.3 mrem to any organ of a MEMBER OF THE PUBLIC in a 31 day period.

APPLICABILITY: At all times.

ACTION:

With gaseous waste being discharged without treatment and in excess of the above limits, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that includes the following information:

A. Explanation of why gaseous radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability,

B. Action(s) taken to restore the inoperable equipment to OPERABLE status,

and

C. Summary description of action(s) taken to prevent a recurrence.

3.4.4 SURVEILLANCE REQUIREMENTS:

Doses due to gaseous releases from each reactor unit to areas at and beyond the SITE BOUNDARY shall be projected at least once per month in accordance with the methodology and parameters in the ODCM when the GASEOUS RADWASTE TREATMENT SYSTEMS are not being fully utilized.

2.5/3.5 SOLID RADIOACTIVE WASTE CONTROLS AND SURVEILLANCE REQUIREMENTS:

These sections are contained in the PCP.

2.6 TOTAL DOSE

CONTROL:

In accordance with Technical Specification 5.5.4, limit the annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to direct radiation from uranium fuel cycle sources to less than or equal to 25 mrems to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems.

APPLICABILITY: At all times.

ACTION:

A. With calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Control 2.3.2.1, 2.4.2.1 or 2.4.3.1, calculations should be made, including direct radiation contributions from the reactor units and from outside storage tanks, etc., to determine whether the above limits have been exceeded. 12/1

B. If such is the case, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits and includes the schedule for achieving conformance with the above limits. This Special Report, as defined in 10 CFR Part 20.2203(a)(4), shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentrations of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the above limits and if the release condition resulting in violation of 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report within 30 days is considered a timely request, and a variance is granted until staff action on the request is complete.

3.6 SURVEILLANCE REQUIREMENTS:

A. Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Surveillance Requirements 3.3.2, 3.4.2, 3.4.3 and in accordance with the methodology and parameters in the ODCM.

B. Cumulative dose contributions from direct radiation from the reactor units and from radwaste storage tanks, etc., shall be determined in accordance with the methodology and parameters in the ODCM. This requirement is applicable only under conditions set forth in Control 2.6. 12/1

2.7 RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

CONTROL:

Pursuant to Technical Specifications 5.5.1.b, a program shall be provided to monitor the radiation and radionuclides in the environs of the plant. The program shall provide (1) representative measurements of radioactivity in the highest potential exposure pathways, and (2) verification of the accuracy of the effluent monitoring program and modeling of the environmental exposure pathways. The program shall (1) be contained in the ODCM, (2) conform to the guidance of 10CFR50, Appendix I, and (3) include the following:

A. Monitoring, sampling, analysis, and reporting of radiation and radionuclides in the environment in accordance with the methodology and parameters in the ODCM.

B. A Land Use Census to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census.

C. Participation in an Interlaboratory Comparison Program to ensure that independent checks on the precision and accuracy of the measurements of radioactive materials in the environmental sample matrices are performed as part of the quality assurance program for environmental monitoring.

The Radiological Environmental Monitoring Program (REMP) shall be conducted as specified in Table 2.7-1.

APPLICABILITY: At all times.

ACTION:

A. With the Radiological Environmental Monitoring Program not being conducted as specified in Table 2.7-1, in lieu of a Licensee Event Report, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report required by RECS 5.3, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.

B. With the level of radioactivity as the result of plant effluents in an environmental sampling medium at a specified location exceeding the reporting levels of Table 2.7-2 when averaged over any calendar quarter, in lieu of a Licensee Event Report, prepare and submit to the Commission within 30 days, pursuant to RECS 5.7, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to A MEMBER OF THE PUBLIC is less than the calendar year limits of Controls 2.3.2, 2.4.2, and 2.4.3.

When more than one of the radionuclides in Table 2.7-2 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{reporting level (1)}} + \frac{\text{concentration (2)}}{\text{reporting level (2)}} + \ldots \geq 1.0$$

When radionuclides other than those in Table 2.7-2 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to A MEMBER OF THE PUBLIC is equal to or greater than the calendar year limits of Controls 2.3.2, 2.4.2, and 2.4.3. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

C. With milk or fresh leafy vegetable samples unavailable from one or more of the sample locations required by Table 2.7-1, identify locations for obtaining replacement samples and add them to the Radiological Environmental Monitoring Program within 30 days. The specific locations from which samples were unavailable may then be deleted from the monitoring program. In lieu of a Licensee Event Report and pursuant to RECS 5.2, identify the cause of the unavailability of samples and identify the new location(s) for obtaining replacement samples in the next Annual Radioactive Effluent Release Report and also include in the report a revised figure(s) and table for the ODCM reflecting the new location(s).

3.7 SURVEILLANCE REQUIREMENTS:

The radiological environmental monitoring samples shall be collected pursuant to Table 2.7-1 from the specific locations given in the table and figure(s) in the ODCM and the detection capabilities required by Table 3.7-1.

TABLE 2.7-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM			
Exposure Pathway and/or Sample	**Number of Representative Samples and Sample Locations[a]**	**Sampling and Collection Frequency**	**Type and Frequency of Analysis**
1. Direct Radiation[b]	40 routine monitoring stations (DR1-DR40) with two or more dosimeters for measuring and recording integrated dose continuously placed as follows: an inner ring of stations, one in each meteorological sector in the general area of the site boundary (DR1-DR16) an outer ring of stations, one in each meteorological sector in the 6 to 8 km range from the site (DR17- DR32) the balance of the stations (DR33-DR40) to be placed in special interest areas and in one area to serve as a control station.	Quarterly	Gamma dose quarterly

TABLE 2.7-1 *(Continued)*

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM			
Exposure Pathway and/or Sample	**Number of Representative Samples and Sample Locations[a]**	**Sampling and Collection Frequency**	**Type and Frequency of Analysis**
2. Airborne Radioiodine and Particulates	Samples from 5 locations (A1-A5): 3 samples (A1-A3) from close to the 3 site boundary locations in different sectors, of the highest calculated annual average ground level D/Q. 1 sample (A4) from the vicinity of a community having the highest calculated annual average ground level D/Q. 1 sample (A5) from a control location as for example 15-30 km distant and in the least prevalent wind direction. [c]	Continuous sampler operation with collection weekly, or more frequently if required by dust loading	Radioiodine Canister: I-131 analysis weekly. Particulate Sampler: Gross beta radioactivity analysis following filter change;[d] Gamma isotopic analysis[e] of composite (by location) quarterly
3. Waterborne a. Surface [f]	1 sample upstream (Wa1) 1 sample downstream (Wa2)	Composite sample over 1 month period[g]	Gamma isotopic analysis[e] monthly. Composite for tritium analysis quarterly.

TABLE 2.7-1 *(Continued)*

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM			
Exposure Pathway and/or Sample	**Number of Representative Samples and Sample Locations[a]**	**Sampling and Collection Frequency**	**Type and Frequency of Analysis**
3. Waterborne b. Drinking	1 sample (Wb1) of the nearest surface drinking supply	Grab monthly	Gross beta and gamma isotopic analysis monthly. Composite for tritium analysis quarterly. [e]
c. Sediment from Shoreline	2 samples (Wc1-Wc2) 1 sample (Wc1) from downstream area with existing or potential recreational value. 1 control sample (Wc2) from an upstream area.	2 annually at least 90 days apart	Gamma isotopic analysis[e]
4. Ingestion a. Milk [i]	Samples from milking animals in 3 locations (Ia1-Ia3) within 5 km distance having the highest dose potential. If there are none, then 1 sample from milking animals in each of 3 areas (Ia1-Ia3) between 5 to 8 km distant if available where doses are calculated to be greater than 1 mrem per yr[h]. 1 sample from milking animals at a control location (Ia4), 15-30 km distant and in the least prevalent wind direction.	Semimonthly when animals are on pasture; monthly at other times. Concurrently with indicator locations.	Gamma isotopic[e] and I-131 analysis semimonthly when animals are on pasture; monthly at other times.

TABLE 2.7-1 *(Continued)*

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM			
Exposure Pathway and/or Sample	**Number of Representative Samples and Sample Locations[a]**	**Sampling and Collection Frequency**	**Type and Frequency of Analysis**
4. Ingestion			
b. Fish and Invertebrates	2 samples (Ib1, Ib2) 1 sample (Ib1) of each of 2 species commercially and/or recreationally important species of fish or invertebrate in the vicinity of the discharge when available. 1 sample (Ib2) of each of 2 commercially and/ or recreationally important species (the same species as in Ib1 if available) from an area not influenced by plant discharge.	Sample in season, or semi-annually if they are not seasonal	Gamma isotopic analysis[e]
c. Food Products	Samples of 3 different kinds of broad leaf vegetation (edible or inedible) grown nearest each of two different offsite locations of highest predicted annual average ground level D/Q if milk sampling is not performed (Ic1-Ic2). [j] 1 sample of each of the similar broad leaf vegetation grown 15-30 km distant in the least prevalent wind direction if milk sampling is not performed (Ic3).	Monthly when available Monthly when available	Gamma isotopic[e] and I-131 analysis Gamma isotopic[e] and I-131 analysis

TABLE 2.7-1 *(Continued)*

TABLE NOTATION

[a]The code letters in parenthesis (e.g., DR1, A1, etc.) refer to sample locations as specified in the ODCM. Specific parameters of distance and direction sector from the centerline of one reactor, and additional description where pertinent, shall be provided for each and every sample location in Table 2.7-1 in a table and figure(s) in the ODCM. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plant," October 1978, and to Radiological Assessment Branch Technical Position, Revision 1, November 1979. Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report pursuant to RECS 5.3. It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the Radiological Environmental Monitoring Program. In lieu of a Licensee Event Report and pursuant to RECS 5.2, identify the cause of the unavailability of samples for that pathway and identify the new location(s) for obtaining replacement samples in the next Annual Radioactive Effluent Release Report and also include in the report a revised figure(s) and table for the ODCM reflecting the new location(s).

[b]One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purposes of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation.

[c]The purpose of this sample is to obtain background information. If it is not practical to establish control locations in accordance with the distance and wind direction criteria, other sites that provide valid background data may be substituted.

[d]Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air particulate samples is greater than ten times the yearly mean, of the previous calendar year, of control samples, gamma isotopic analysis shall be performed on the individual samples.

TABLE 2.7-1 *(Continued)*

TABLE NOTATION

[e]Gamma isotopic analysis means the identification and quantification of gamma emitting radionuclides that may be attributable to the effluents from the facility.

[f]The "upstream" sample shall be taken near the intake structures as described in the ODCM. The "downstream" sample shall be taken from the mixing zone at the diffuser to the discharge canal.

[g]A composite sample is one in which the quantity (aliquot) of liquid sampled shall be collected at time intervals that are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure obtaining a representative sample.

[h]The dose shall be calculated for the maximum organ and age group using the methodology and parameters in the ODCM.

[i]The requirement to obtain and analyze samples from milch animals within 8 km of the site is intended to ensure monitoring of the "cow-milk" and vegetaion pathways. Thus, only milch animals whose milk is used for human consumption are considered in the pathway and sample evaluation.

[j]Broad lead vegetation sampling of at least three different kinds of vegetation may be performed at the SITE BOUNDARY in each of two different sectors with the highest predicted D/Q in lieu of the garden census.

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TABLE 2.7-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES					
Analysis	Water (pCi/l)	Airborne Particulate or Gases (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/l)	Food Products (pCi/kg,wet)
H-3	20,000*				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-Nb-95	400				
I-131	2**	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140	200			300	

TABLE NOTATION

* For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/l may be used.

** If no drinking water pathway exists, a value of 20 pCi/l may be used.

TABLE 3.7-1

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS[a]						
	LOWER LIMIT OF DETECTION (LLD)[b,c]					
Analysis	Water (pCi/l)	Airborne Particu-late or Gases (pCi/m^3)	Fish (pCi/kg, wet)	Milk (pCi/l)	Food Products (pCi/kg, wet)	Sediment (pCi/kg,dry)
gross beta	4	0.01				
H-3	2,000*					
Mn-54	15		130			
Fe-59	30		260			
Co-58, 60	15		130			
Zn-65	30		260			
Zr-Nb-95	15					
I-131	1**	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-La-140	15			15		

TABLE NOTATION

* If no drinking water pathway exists, a value of 3,000 pCi/l may be used.

** If no drinking water pathway exists, a value of 15 pCi/l may be used.

TABLE 3.7-1 (Continued)

[a]This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating Report pursuant to RECS 5.3.

[b]Required detection capabilities for thermoluminescent dosimeters used for environmental measurements are given in Regulatory Guide 4.13.

[c]The LLD is defined, for purposes of these Controls as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal. Equations used in the calculation of the LLD for a particular measurement system are presented in the ODCM, Part II, Appendix B. 12-1

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally background fluctuations, unavoidable small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Operating Report pursuant to RECS 5.3.

2.8 LAND USE CENSUS

CONTROL:

In accordance with Technical Specification 5.5.1.b and RECS 2.7, conduct a land use census which identifies within a distance of 8 km (5 miles) the location in each of the 16 meteorological sectors of the nearest milk animal, the nearest residence and the nearest garden of greater than $50m^2$ ($500 ft^2$) producing broad leaf vegetation. Broad leaf vegetation sampling of at least three different kinds of vegetation may be performed at the SITE BOUNDARY in each of two different direction sectors with the highest predicted D/Qs in lieu of the garden census. The Controls for broad leaf vegetation sampling in Table 2.7-1.4c shall be followed, including analysis of control samples.

APPLICABILITY: At all times.

ACTION:

A. With a land use census identifying a location(s) that yields a calculated dose or dose commitment greater than the values currently being calculated in Control 3.4.3, in lieu of a Licensee Event Report, identify the new location(s) in the next Annual Radioactive Effluent Release Report, pursuant to RECS 5.2.

B. With a land use census identifying a location(s) that yields a calculated dose or dose commitment (via the same exposure pathway) two times greater than at a location from which samples are currently being obtained in accordance with Control 2.7, add the new location(s) to the Radiological Environmental Monitoring Program within 30 days. The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment(s), via the same exposure pathway, may be deleted from this monitoring program after (October 31) of the year in which this land use census was conducted. In lieu of a Licensee Event Report and pursuant to RECS 5.2, identify the new location(s) in the next Annual Radioactive Effluent Release Report and also include in the report a revised figure(s) and table for the ODCM reflecting the new location(s).

3.8 SURVEILLANCE REQUIREMENTS:

The land use census shall be conducted during the growing season at least once per calendar year using that information that will provide the best results, such as by a door-to-door survey, aerial survey or by consulting local agriculture authorities. The results of the land use census shall be included in the Annual Radiological Environmental Operating Report pursuant to RECS 5.3.

2.9 INTERLABORATORY COMPARISON PROGRAM

CONTROL:

In accordance with Technical Specification 5.5.1.b and RECS 2.7, perform analyses on radioactive materials supplied as part of an Interlaboratory Comparison Program. 12/1

APPLICABILITY: At all times.

ACTION:

With analyses not being performed as required above, report the corrective actions taken to prevent a recurrence to the Commission in the Annual Radiological Environmental Operating Report pursuant to RECS 5.3.

3.9 SURVEILLANCE REQUIREMENTS:

A summary of the results obtained as part of the required Interlaboratory Comparison Program shall be included in the Annual Radiological Environmental Operation Report pursuant to RECS 5.3.

2.10 RADIOACTIVE LIQUID EFFLUENT HOLDUP TANKS

CONTROL:

The quantity of radioactive material contained in each of the following unprotected outdoor tanks[a] shall be limited to less than or equal to 10 curies, excluding tritium and dissolved or entrained noble gases.

1. Refueling Water Storage Tank [b]
2. Primary Water Storage Tank
3. 31 Monitor Tank
4. 32 Monitor Tank
5. CPF High Total Dissolved Solids Tank [c]
6. CPF Low Total Dissolved Solids Tank [c]
7. Outside Temporary Tank [d]

APPLICABILITY: At all times [c]

ACTION:

With the quantity of radioactive material in any of the above listed tanks exceeding the above limit, immediately suspend all additions of radioactive material to the tank. Within 48 hours, reduce the tank contents to within the limit, and describe the events leading to this condition in the next Annual Radioactive Effluent Release Report, per RECS 5.2.

3.10 SURVEILLANCE REQUIREMENTS:

The quantity of radioactive material contained in each of the listed tanks shall be determined to be less than or equal to 10 curies excluding tritium and noble gases, by analyzing a representative sample of the tanks' contents at least once per month when radioactive materials are being added to the tank[c].

NOTES:

a) Tanks included in the specification are those outdoor tanks that are not surrounded by liners, dikes, or walls capable of holding the tank contents and that do not have tank overflows and surrounding area drains connected to the liquid radwaste treatment system.

b) After refueling operations, liquid from the reactor cavity will be sampled for radioactive material content prior to pumping into the tank.

c) The Condensate Polisher Facility (CPF) Total Dissolved Solids Tanks require controls and surveillances **only** when a primary to secondary leak exists.

d) Liquid will be sampled for radioactive content prior to being pumped into the tank.

2.11 GAS STORAGE TANKS

CONTROL:

The quantity of radioactivity contained in each gas storage tank shall be limited to less than or equal to 50,000 curies of noble gas (considered as Xe-133 equivalent).

APPLICABILITY: At all times.

ACTION:

With the quantity of radioactive material in any gas storage tank exceeding the above limit, immediately suspend all additions of radioactive material to the tank. Within 48 hours, reduce the tank contents to within the limit and describe the events leading to this condition in the next Annual Radioactive Effluent Release Report, per RECS 5.2.

3.11 SURVEILLANCE REQUIREMENTS:

The quantity of radioactive material contained in each gas storage tank shall be determined to be within the limits at least once per 24 hours when radioactive materials are being added to the tank in accordance with the methodology and parameters in the ODCM.