Niagara Mohawk

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March 1, 2001
NMP2L 2010

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

RE: Nine Mile Point Unit 2
Docket No. 50-410
NPF-69

Subject: ***July - December 2000 Radioactive Effluent Release Report***

Gentlemen:

Improved Technical Specifications (ITS) were implemented at Nine Mile Point Unit 2 (NMP2) December 2, 2000. ITS requires the Radioactive Effluent Release Report be submitted in accordance with 10 CFR 50.36a; an annual submittal that summarizes liquid and gaseous effluents during the previous 12 month period. A Semi-Annual report for the period January - June 2000 was submitted in August 2000 for NMP2. Enclosed is the Radioactive Effluent Release Report for the reporting period July - December 2000. Following this 6 month submittal, the Radioactive Effluent Release Report will be submitted annually covering a 12 month period thereafter.

The attached Radioactive Effluent Release Report includes a summary of gaseous, liquid, and solid effluents released from the station during the reporting period (Attachments 1 - 6), a summary of revisions to the Offsite Dose Calculation Manual and the Process Control Program during the reporting period (Attachments 7 and 8), and an explanation as to the cause and corrective actions regarding the inoperability of any station liquid and/or gaseous effluent monitoring instrumentation (Attachment 9). Attachments 10 and 11 provide a summary and assessment of radiation doses to members of the public within and outside the site boundary, respectively, from liquid and gaseous effluents as well as direct radiation in accordance with 40 CFR 190.

The format used for the effluent data is outlined in Appendix B of Regulatory Guide 1.21, Revision 1. Dose assessments were made in accordance with the NMP2 Offsite Dose Calculation Manual. Distribution is in accordance with 10 CFR 50.4(b)(1) and the Technical Specifications.

Attachment 12 to this report is an update of actual data for the second quarter 2000 used in the January - June 2000 Semi-Annual Radioactive Effluent Release Report.

IE48

Attachment 13 is a copy of Revisions 18, 19, 20, and 21 of the Offsite Dose Calculation Manual.

Attachment 14 is a copy of Revision 4 of the Process Control Program.

During the reporting period from July - December 2000, NMP2 did not exceed any 10 CFR 20, 10 CFR 50, Technical Specification, or Offsite Dose Calculation Manual limits for gaseous or liquid effluents.

If you have any questions concerning the attached report, please contact Mr. Anthony M. Salvagno, (315) 349-1456, Engineering Services, Nine Mile Point.

Very truly yours,

Richard B. Abbott
Vice President Nuclear Engineering

RBA/CLW/cld
Attachments

xc: Mr. H. J. Miller, Regional Administrator, Region I
Ms. M. K. Gamberoni, Section Chief PD-I, Section 1, NRR (without Attachment 13)
Mr. G. K. Hunegs, NRC Senior Resident Inspector, Region I (with Attachment 13 located in Licensing Files)
Mr. P. S. Tam, Senior Project Manager, NRR (without Attachment 13)
Records Management

NINE MILE POINT NUCLEAR STATION - UNIT 2

RADIOACTIVE EFFLUENT RELEASE REPORT

July – December 2000

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION - UNIT 2

RADIOACTIVE EFFLUENT RELEASE REPORT

JULY – DECEMBER 2000

SUPPLEMENTAL INFORMATION

Facility: **Nine Mile Point Unit #2** **Licensee:** **Niagara Mohawk Power Corporation**

1. TECHNICAL SPECIFICATION LIMITS (ODCM Limits following implementation of Improved Technical Specifications (ITS) on 12/2/00)

A) FISSION AND ACTIVATION GASES

1. The dose rate limit of noble gases released in gaseous effluents from the site to areas at or beyond the site boundary shall be less than or equal to 500 mrem/year to the whole body and less than or equal to 3000 mrem/year to the skin.

2. The air dose from noble gases released in gaseous effluents from Nine Mile Point Unit 2 to areas at or beyond the site boundary shall be limited during any calendar quarter to less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation, and during any calendar year to less than or equal to 10 mrad for gamma radiation and less than or equal to 20 mrad for beta radiation.

B&C) TRITIUM, IODINES AND PARTICULATES, HALF LIVES > 8 DAYS

1. The dose rate limit of Iodine-131, Iodine-133, Tritium and all radionuclides in particulate form with half-lives greater than eight days, released in gaseous effluents from the site to areas at or beyond the site boundary shall be less than or equal to 1500 mrem/year to any organ.

2. The dose to a member of the public from Iodine-131, Iodine-133, Tritium and all radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released from Nine Mile Point Unit 2 to areas at or beyond the site boundary shall be limited during any calendar quarter to less than or equal to 7.5 mrem to any organ and, during any calendar year to less than or equal to 15 mrem to any organ.

D) LIQUID EFFLUENTS

1. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-04 microcurie/ml total activity.

NOTE: Improved Technical Specifications (ITS) were implemented on December 2, 2000. The change limits the concentration of radioactive material released in the liquid effluents to unrestricted areas to ten times the concentrations specified in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2E-04 microcuries/ml total activity.

2. The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released from Nine Mile Point Unit 2 to unrestricted areas shall be limited during any calendar quarter to less than or equal to 1.5 mrem to the whole body and to less than or equal to 5 mrem to any organ, and during any calendar year to less than or equal to 3 mrem to the whole body and to less than or equal to 10 mrem to any organ.

2. MEASUREMENTS AND APPROXIMATIONS OF TOTAL RADIOACTIVITY

Described below are the methods used to measure or approximate the total radioactivity and radionuclide composition in effluents.

A) FISSION AND ACTIVATION GASES

Noble gas effluent activity is determined by on-line gamma spectroscopic monitoring (intrinsic germanium crystal) of an isokinetic sample stream.

B) IODINES

Iodine effluent activity is determined by gamma spectroscopic analysis (at least weekly) of charcoal cartridges sampled from an isokinetic sample stream.

C) PARTICULATES

Activity released from the main stack and the combined Radwaste/Reactor Building vent is determined by gamma spectroscopic analysis (at least weekly) of particulate filters sampled from an isokinetic sample stream and composite analysis of the filters for non-gamma emitters.

D) TRITIUM

Tritium effluent activity is measured by liquid scintillation or gas proportional counting of monthly samples taken with an air sparging/water trap apparatus.

E) LIQUID EFFLUENTS

Isotopic contents of liquid effluents are determined by isotopic analysis of a representative sample of each batch and composite analysis of non-gamma emitters.

F) SOLID EFFLUENTS

Isotopic contents of waste shipments are determined by gamma spectroscopy analyses of a representative sample of each batch. Scaling factors established from primary composite sample analyses conducted off-site are applied, where appropriate, to find estimated concentration of non-gamma emitters. For low activity trash shipments, curie content is estimated by dose rate measurement and application of appropriate scaling factors.

ATTACHMENT 1

Summary Data

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

Liquid Effluents:

10CFR20, Appendix B, Table II, Column 2[1]

Average MPC - μCi/ml (Qtr. 3) = **2.78E-03**
Average MPC - μCi/ml (Qtr. 4) = **2.19E-03**

Average Energy (Fission and Activation gases – Mev):

Qtr. 3rd : $\bar{E}\gamma$ = **5.79E-01** $\bar{E}\beta$ = **8.87E-01**
Qtr. 4th : $\bar{E}\gamma$ = **9.35E-01** $\bar{E}\beta$ = **9.30E-01**

Liquid:

Number of batch releases	:	85	
Total time period for batch releases (hrs)	:	2.71E+02	
Maximum time period for a batch release (hrs)	:	3.40E+00	
Average time period for a batch release (hrs)	:	3.19E+00	
Minimum time period for a batch release (hrs)	:	3.89E-03	
Total volume of water used to dilute the liquid effluent during the release period (L)		3rd Qtr	4th Qtr
	:	1.09E+09	7.46E+08
Total volume of water used to dilute the liquid effluent during reporting Period (L)		3rd Qtr	4th Qtr
	:	1.36E+10	1.32E+10

Gaseous (Emergency Condenser Vent): "Not Applicable for Unit 2"

Number of batch releases	:	N/A
Total time period for batch releases (hrs)	:	N/A
Maximum time period for a batch release (hrs)	:	N/A
Average time period for a batch release (hrs)	:	N/A
Minimum time period for a batch release (hrs)	:	N/A

Gaseous (Primary Containment Purge):

Number of batch releases	:	14
Total time period for batch releases (hrs)	:	1.55E+02
Maximum time period for a batch release (hrs)	:	2.45E+01
Average time period for a batch release (hrs)	:	1.11E+01
Minimum time period for a batch release (hrs)		1.57E+00

[1] Improved Technical Specifications implemented on December 2, 2000 limit the concentration of radioactive material released in the liquid effluents to unrestricted areas to ten times the concentrations specified in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2. Maximum Effluent Concentrations (MEC) numerically equal to ten times the 10CFR20.1001-20.2402 concentrations were adopted to evaluate liquid effluents. No releases were performed during the report period subject to the use of MEC values. All calculations reflected in this report are based upon MPC values from 10CFR20, Appendix B, Table II, Column 2.

ATTACHMENT 1

Summary Data

Unit 1 ___ Unit 2 X	Reporting Period July – December 2000
Abnormal Releases: There were no abnormal releases during this report period.	
A. Liquids:	
Number of releases	0
Total activity released	N/A Ci
B. Gaseous:	
Number of releases	0
Total activity released	N/A Ci

ATTACHMENT 2

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

GASEOUS EFFLUENTS – SUMMATION OF ALL RELEASES, ELEVATED AND GROUND LEVEL

			3rd QUARTER	4th QUARTER	EST. TOTAL ERROR, %
A.	Fission & Activation gases				
	1. Total release	Ci	**2.33E+01**	**1.75E+00**	5.00E+01
	2. Average release rate	μCi/sec	**2.92E+00**	**2.21E-01**	
B.	Iodines				
	1. Total Iodine-131	Ci	**2.63E-05**	**1.58E-05**	3.00E+01
	2. Average release rate for period	μCi/sec	**3.11E-06**	**2.01E-06**	
C.	Particulates[1]				
	1. Particulates with half-lives >8 days	Ci	**9.92E-04**	**7.21E-04**	3.00E+01
	2. Average release rate for period	μCi/sec	**1.17E-04**	**9.18E-05**	
	3. Gross alpha radioactivity	Ci	**3.85E-05**	**1.23E-05**	2.50E+01
D.	Tritium[1]				
	1. Total release	Ci	**3.93E+00**	**3.28E+00**	5.00E+01
	2. Average release rate for period	μCi/sec	**4.64E-01**	**4.17E-01**	
E.	Percent of Tech. Spec. Limits				
	Fission and Activation Gases				
	Percent of Quarterly Gamma Air Dose Limit (5 mrad)	%	**3.07E-02**	**3.82E-03**	
	Percent of Quarterly Beta Air Dose Limit (10 mrad)	%	**2.28E-03**	**1.80E-04**	
	Percent of Annual Gamma Air Dose Limit to Date (10 mrad)	%	**3.83E-02**	**4.02E-02**	
	Percent of Annual Beta Air Dose Limit to Date (20 mrad)	%	**2.51E-03**	**2.60E-03**	
	Percent of Whole Body Dose Rate Limit (500 mrem/yr)	%	**1.16E-03**	**1.46E-04**	
	Percent of Skin Dose Rate Limit (3000 mrem/yr)	%	**2.53E-04**	**3.03E-05**	
	Tritium, Iodines, and Particulates[1] (with half-lives greater than 8 days)				
	Percent of Quarterly Dose Limit (7.5 mrem)	%	**2.21E-02**	**1.34E-02**	
	Percent of Annual Dose Limit (15 mrem)	%	**3.79E-02**	**4.47E-02**	
	Percent of Organ Dose Rate Limit (1500 mrem/yr)	%	**4.12E-04**	**2.70E-04**	

[1] Tritium, Iron-55 and Strontium 89 and 90 results for the third and fourth quarter were not received from the off-site vendor at the time of this report. These values include estimates. Actual values will be provided in the next Radioactive Effluent Release Report.

ATTACHMENT 3

Unit 1 __ Unit 2 **X** Reporting Period **July – December 2000**

GASEOUS EFFLUENTS – ELEVATED RELEASE

Nuclides Released		CONTINUOUS MODE[3] 3rd QUARTER	CONTINUOUS MODE[3] 4th QUARTER
1. Fission Gases[1]			
Argon-41	Ci	**1.18E-02**	**
Krypton-85	Ci	**	**
Krypton-85m	Ci	**8.20E-03**	**
Krypton-87	Ci	**4.32E-01**	**4.94E-02**
Krypton-88	Ci	**2.34E-01**	**3.90E-01**
Xenon-127	Ci	**	**
Xenon-131m	Ci	**	**
Xenon-133	Ci	**	**
Xenon-133m	Ci	**	**
Xenon-135	Ci	**7.71E-02**	**1.10E-02**
Xenon-135m	Ci	**6.41E+00**	**8.72E-02**
Xenon-137	Ci	**9.24E+00**	**6.43E-01**
Xenon-138		**6.84E+00**	**5.68E-01**
2. Iodines[1]			
Iodine-131	Ci	**2.63E-05**	**1.58E-05**
Iodine-133	Ci	**2.57E-04**	**7.09E-05**
Iodine-135	Ci	**	**
3. Particulates[1,2]			
Strontium-89	Ci	**2.34E-05**	**6.53E-05**
Strontium-90	Ci	**3.53E-07**	**3.35E-07**
Cesium-134	Ci	**	**
Cesium-136	Ci	**	**
Cesium-137	Ci	**	**
Cobalt-58	Ci	**	**
Cobalt-60	Ci	**1.03E-05**	**1.70E-05**
Manganese-54	Ci	**	**3.04E-06**
Cerium-141	Ci	**	**
Cerium-144	Ci	**	**
Iron-55	Ci	**2.55E-05**	**1.14E-05**
Iron-59	Ci	**	**
Chromium-51	Ci	**	**
Zinc-65	Ci	**	**
Antimony-125	Ci	**	**
Niobium-95	Ci	**	**
Barium-Lanthanum-140	Ci	**	**
Molybdenum-99	Ci	**	**
4.Tritium[2]	Ci	**3.32E+00**	**2.66E+00**

1 Concentrations less than the lower limit of detection of the counting system used are indicated with a double asterisk. A lower limit of detection of 1.00E-04 μCi/ml for required noble gases, 1.00E-11 μCi/ml for required particulates, 1.00E-12 μCi/ml for required Iodines, and 1.00E-06 μCi/ml for Tritium, as required by Technical Specifications (Off-Site Dose Calculation Manual (ODCM) following implementation of Improved Technical Specifications (ITS) on December 2, 2000), has been verified.

2 Tritium, Iron-55 and Strontium 89 and 90 results for the third and fourth quarter were not received from the off-site vendor at the time of this report. These values include estimates. Actual values will be included in the next Radioactive Effluent Release Report.

3 Contributions from purges are included.

ATTACHMENT 4

Unit 1 __ Unit 2 **X** Reporting Period **July – December 2000**

GASEOUS EFFLUENTS – GROUND LEVEL RELEASES

Nuclides Released		CONTINUOUS MODE 3rd QUARTER	CONTINUOUS MODE 4th QUARTER	BATCH MODE 3rd QUARTER	BATCH MODE 4th QUARTER
				There were no batch releases during the reporting period.	
1. Fission Gases[1]					
Argon-41	Ci	**	**		
Krypton-85	Ci	**	**		
Krypton-85m	Ci	**	**		
Krypton-87	Ci	**	**		
Krypton-88	Ci	**	**		
Xenon-127	Ci	**	**		
Xenon-131m	Ci	**	**		
Xenon-133	Ci	**	**		
Xenon-133m	Ci	**	**		
Xenon-135	Ci	**	**		
Xenon-135m	Ci	**	**		
Xenon-137	Ci	**	**		
Xenon-138		**	**		
2. Iodines[1]					
Iodine-131	Ci	**	**		
Iodine-133	Ci	**	**		
Iodine-135	Ci	**	**		
3. Particulates[1,2]					
Strontium-89	Ci	**3.67E-06**	**4.81E-06**		
Strontium-90	Ci	**5.56E-07**	**5.46E-07**		
Cesium-134	Ci	**	**		
Cesium-136	Ci	**	**		
Cesium-137	Ci	**	**3.53E-05**		
Cobalt-58	Ci	**	**		
Cobalt-60	Ci	**5.45E-04**	**3.11E-04**		
Manganese-54	Ci	**1.29E-04**	**8.23E-05**		
Cerium-141	Ci	**	**		
Cerium-144	Ci	**	**		
Iron-55	Ci	**7.04E-05**	**7.06E-05**		
Iron-59	Ci	**	**		
Chromium-51	Ci	**	**		
Zinc-65	Ci	**1.85E-04**	**1.20E-04**		
Antimony-125	Ci	**	**		
Niobium-95	Ci	**	**		
Barium-Lanthanum-140	Ci	**	**		
Molybdenum-99	Ci	**	**		
4. Tritium[2]	Ci	**6.08E-01**	**6.22E-01**		

[1] Concentrations less than the lower limit of detection of the counting system used are indicated with a double asterisk. A lower limit of detection of 1.00E-04 μCi/ml for required noble gases, 1.00E-11 μCi/ml for required particulates, 1.00E-12 μCi/ml for required Iodines, and 1.00E-06 μCi/ml for Tritium, as required by Technical Specifications (Off-Site Dose Calculation Manual (ODCM) following implementation of Improved Technical Specifications (ITS) on December 2, 2000), has been verified.

[2] Tritium, Iron-55 and Strontium 89 and 90 results for the third and fourth quarter were not received from the off-site vendor at the time of this report. These values include estimates, and actual values will be included in the next Radioactive Effluent Release Report.

Unit 1 __ Unit 2 **X** Reporting Period **July – December 2000**

LIQUID EFFLUENTS – SUMMATION OF ALL RELEASES

			3rd QUARTER	4th QUARTER	EST. TOTAL ERROR, %
A.	Fission & Activation Products[1]				
	1. Total release (not including Tritium, gases, alpha)	Ci	2.14E-02	5.33E-02	5.00E+01
	2. Average diluted concentration during reporting period	µCi/ml	1.58E-09	4.03E-09	
B.	Tritium[1]				
	1. Total release	Ci	8.85E+00	5.69E+00	5.00E+01
	2. Average diluted concentration during reporting period	µCi/ml	6.51E-07	4.30E-07	
C.	Dissolved and Entrained Gases[3]				
	1. Total release	Ci	**	3.72E-05	5.00E+01
	2. Average diluted concentration during reporting period	µCi/ml	**	2.81E-12	
D.	Gross Alpha Radioactivity[3]				
	1. Total release	Ci	**	1.18E-04	5.00E+01
E.	Volumes				
	1. Prior to dilution	Liters	4.41E+06	3.00E+06	5.00E+01
	2. Volume of dilution water used during release period	Liters	1.09E+09	7.46E+08	5.00E+01
	3. Volume of dilution water available during reporting period	Liters	1.36E+10	1.32E+10	5.00E+01
F.	Percent of Technical Specification Limits				
	Percent of Quarterly Whole Body Dose Limit (1.5 mrem)	%	1.26E-01	1.98E-01	
	Percent of Quarterly Organ Dose Limit (5 mrem)	%	1.16E-01	3.09E-01	
	Percent of Annual Whole Body Dose Limit to Date (3 mrem)	%	3.83E-01	4.75E-01	
	Percent of Annual Organ Dose Limit to Date (10 mrem)	%	2.31E-01	3.84E-01	
	Percent of 10CFR20 Concentration Limit[2,4]	%	2.35E-02	1.98E-02	
	Percent of Dissolved or Entrained Noble Gas Limit[3,4] (2.00E-04 µCi/ml)	%	**	1.41E-06	

[1] Iron-55, Strontium 89 and 90 and Tritium results for the fourth quarter were not received from the off-site vendor at the time of this report. These values include estimates, and actual values will be included in the next Radioactive Effluent Release Report.

[2] The percent of 10CFR20 concentration limit is based on the average concentration during the quarter.

[3] Concentrations less than the lower limit of detection of the counting system used are indicated with a double asterisk. A lower limit of detection of 5.00E-07 µCi/ml for required gamma emitting nuclides, 1.00E-05 µCi/ml for required dissolved and entrained noble gases and Tritium, 5.00E-08 µCi/ml for Sr-89/90, 1.00E-06 µCi/ml for Fe-55 and 1.00E-07 µCi/ml for gross alpha radioactivity, as required by Technical Specifications (Off-Site Dose Calculation Manual (ODCM) following implementation of Improved Technical Specifications (ITS) on December 2, 2000), has been verified.

[4] Improved Technical Specifications implemented on December 2, 2000 limit the concentration of radioactive material released in the liquid effluents to unrestricted areas to ten times the concentrations specified in 10CFR20.1001-20.2402, Appendix B, Table 2, Column 2. Maximum Effluent Concentrations (MEC) numerically equal to ten times the 10CFR20.1001-20.2402 concentrations were adopted to evaluate liquid effluents. No releases were performed during the report period subject to the use of MEC values. All calculations reflected in this report are based upon MPC values from 10CFR20, Appendix B, Table II, Column 2.

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

LIQUID EFFLUENTS RELEASED

Nuclides Released[1,2]		BATCH MODE[3] 3rd QUARTER	4th QUARTER
Silver-110m	Ci	**2.82E-04**	**1.32E-03**
Gold-199	Ci	**	**3.22E-05**
Barium-140	Ci	**	**
Cerium-141	Ci	**	**
Cerium-144	Ci	**	**
Cobalt-58	Ci	**9.56E-05**	**3.42E-04**
Cobalt-60	Ci	**3.32E-03**	**4.20E-03**
Chromium-51	Ci	**1.44E-03**	**6.57E-04**
Cesium-134	Ci	**	**
Cesium-136	Ci	**	**
Cesium-137	Ci	**	**
Copper-64	Ci	**	**1.23E-04**
Iron-55	Ci	**6.48E-03**	**2.34E-03**
Iron-59	Ci	**9.70E-04**	**2.59E-03**
Iodine-131	Ci	**	**
Iodine-132	Ci	**	**
Iodine-133	Ci	**	**
Lanthanum-140	Ci	**	**
Manganese-54	Ci	**7.22E-03**	**3.95E-02**
Manganese-56	Ci	**	**
Molybdenum-99	Ci	**	**
Sodium-24	Ci	**	**
Niobium-95	Ci	**1.66E-05**	**
Nickel-65	Ci	**	**
Neptunium-239	Ci	**	**
Antimony-124	Ci	**1.82E-05**	**3.95E-05**
Strontium-89	Ci	**	**5.07E-05**
Strontium-90	Ci	**	**1.40E-05**
Strontium-92	Ci	**	**
Technecium-99m	Ci	**	**
Tellurium-132	Ci	**	**
Tungsten-187	Ci	**	**
Zinc-65	Ci	**1.60E-03**	**2.12E-03**
Zinc-69m	Ci	**	**
Zirconium-95	Ci	**	**
Zirconium-97		**	**
Dissolved or Entrained Gases[1]	Ci	**	**3.72E-05**
Tritium[2]	Ci	**8.85E+00**	**5.69E+00**

[1] Concentrations less than the lower limit of detection of the counting system used are indicated with a double asterisk. A lower limit of detection of 5.00E-07 μCi/ml for required gamma emitting nuclides, 1.00E-05 μCi/ml for required dissolved and entrained noble gases and Tritium, 5.00E-08 μCi/ml for Sr-89/90, 1.00E-06 μCi/ml for Fe-55 and 1.00E-07 μCi/ml for gross alpha radioactivity, as required by Technical Specifications (Off-Site Dose Calculation Manual (ODCM) following implementation of Improved Technical Specifications (ITS) on December 2, 2000), has been verified.

[2] Iron-55, Strontium 89 and 90 and Tritium results for the fourth quarter were not received from the off-site vendor at the time of this report. These values include estimates, and actual values will be included in the next Radioactive Effluent Release Report.

[3] No continuous mode releases occurred during the reporting period.

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. TYPE	Volume (m^3) Class			Activity[1] (Ci) Class		
	A	B	C	A	B	
1. Spent Resins (Dewatered)	**0**	**0**	**0**	**0**	**0**	**0**
2. Dry Compressible Waste	**0**	**0**	**0**	**0**	**0**	**0**
3. Irradiated Components, Control Rods, etc.	**0**	**0**	**0**	**0**	**0**	**0**
4. Other: (to Vendor for Processing or Consolidation)						
a. Dry Active Waste (Compactible and Non-Compactible)	**6.80E+01**	**0**	**0**	**7.06E-02**	**0**	**0**

[1] The estimated total error is 5.00E+01%.

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A.1 TYPE	Container	Package	Solidification Agent
1. Spent Resins (Dewatered)	**N/A**	**N/A**	**N/A**
2. Dry Compressible Waste (Compactible and Non-Compactible)	**N/A**	**N/A**	**N/A**
3. Irradiated Components, Control Rods, etc.	**N/A**	**N/A**	**N/A**
4. Other: (To Vendor for Processing or Consolidation)			
a. Dry Active Waste (Compactible and Non-Compactible)	**Metal Box**	**STP**	**N/A**

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SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A.2 ESTIMATE OF MAJOR NUCLIDE COMPOSITION (BY TYPE OF WASTE)

a. Spent Resins (Dewatered): There were no shipments.

Nuclide	Percent

b. Dry Compressible Waste: There were no shipments.

Nuclide	Percent

c. Irradiated Components, Control Rods, etc.: There were no shipments.

Nuclide	Percent

d. Other: (to Vendor for Processing or Consolidation)

1. Dry Active Waste (Compressible and Non-Compressible)

Nuclide	Percent
(1) Co-60	4.76E+01
(2) Mn-54	2.08E+01
(4) Zn-65	1.94E+01
(5) Cr-51	7.75E+00
(6) Fe-55	1.95E+00
(7) Co-58	1.53E+00
(8) Other	1.00E+00

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SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A.3. SOLID WASTE DISPOSITION

Number of Shipments	Mode of Transportation	Destination
1	**Truck**	**GTS Duratek Oak Ridge, TN**

B. IRRADIATED FUEL SHIPMENTS (DISPOSITION): There were no shipments.

Number of Shipments	Mode of Transportation	Destination
0	**N/A**	**N/A**

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SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

C. SOLID WASTE SHIPPED OFF-SITE TO VENDORS FOR PROCESSING AND SUBSEQUENT BURIAL

Below is a summary of NMP-2 radwaste buried by vendor facilities during **July – December 2000**. These totals were reported separately from "10CFR61 Solid Waste Shipped for Burial" since (a) waste classification and burial was performed by the vendors, and (b) Technical Specification 6.9.1 (Improved Technical Specification (ITS) Section 5.6.3, implemented 12/2/00) requires reporting of "information for each class of solid waste (as defined by 10CFR61) shipped off-site during the reporting period." The following data represents the actual shipments made from the off-site vendors of our radwaste (e.g., non-compacted trash, dry non-compressible waste, scrap metal, and resins) that was processed and commingled prior to burial.

C.1. TYPE OF WASTE – Non-compacted trash, dry non-compressible waste, scrap metals, and resins processed by vendor facilities prior to burial.

Burial Volume (m^3)	Activity (Ci)	Est. Total Error, %
9.87E+00	**2.05E-01**	**5.00E+01**

C.2. ESTIMATE OF MAJOR NUCLIDE COMPOSITION

Nuclide	Percent
(1) Co-60	**4.76E+01**
(2) Mn-54	**2.08E+01**
(3) Zn-65	**1.94E+01**
(4) Cr-51	**7.75E+00**
(5) Fe-55	**1.95E+00**
(6) Co-58	**1.53E+00**
(7) Other	**1.00E+00**

C.3. SOLID WASTE DISPOSITION

Number of Shipments	Mode of Transportation	Destination
27	**Truck**	**Envirocare, UT**
2	**Truck**	**Barnwell, SC**

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SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

D. SEWAGE WASTES SHIPPED TO A TREATMENT FACILITY FOR PROCESSING AND BURIAL

Below is a summary of the sewage sludge, which was removed from the site sanitary treatment facility and transferred to a municipal sewage treatment facility, for subsequent drying and disposal to a landfill. This is a site release and therefore includes the results from both Unit 1 and Unit 2 activities.

D. 1 TYPE OF WASTE –	Burial Volume (m^3)	Activity (Ci)	Est. Total Error, %
Sewage Sludge	**1.81E+02**	**7.00E-04**	**5.00E+01**

D. 2 ESTIMATE OF MAJOR NUCLIDE COMPOSITION

Nuclide	Percent
(1) Ni-63	**9.35E+01**
(2) Co-60	**5.19E+00**
(3) Other	**1.31E+00**

D. 3 SOLID WASTE DISPOSITION

Number of Shipments	Mode of Transportation	Destination
5	**Truck**	**Landfill**

Unit 1 ___ Unit 2 X Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE OFF-SITE DOSE CALCULATION MANUAL (ODCM)

The Unit 2 Off-Site Dose Calculation Manual (ODCM) was revised during the reporting period to update the liquid dose factors. The ODCM changes will not reduce the accuracy or reliability of the dose calculations or setpoint determinations in accordance with the Technical Specifications. A copy of the ODCM, Revision 18 is attached and a summary of the changes presented to and approved by the Station Operations Review Committee on October 24, 2000 is provided below. The summary also includes the justification for the change.

Revision 18

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
II-29 – II-32	II 29 – II 32	Tables 2-2 through 2-5	Revised liquid dose factors for Sb-124	Update dose factors
II 29 – II 32	II 29 – II 32	Table 2-2 through 2-5	Added Liquid Dose factors for Zn-69m and Au-199	Zn-69m and Au-199 identified in effluent releases

The Unit 2 Off-Site Dose Calculation Manual (ODCM) was fully revised during the reporting period to support Improved Technical Specifications (ITS) implementation. The ODCM changes will not reduce the accuracy or reliability of the dose calculations or setpoint determinations in accordance with the Technical Specifications. A copy of the ODCM, Revision 19 is attached and a summary of the changes presented to and approved by the Station Operations Review Committee on June 20, 2000 is provided below. The summary also includes the justification for the change.

Revision 19

N/A	Full Revision	N/A	The Radiological Effluent Technical Specifications (RETS) are transferred from the Technical Specifications to the ODCM.	ITS Implementation
3/4 11.1 IB 3/4 11-1	I 3.1-1 IB 3.1-1	D 3.1 B 3.1	The liquid effluent concentration limits have been revised to be consistent with the revised 10CFR20 requirements. They have been changed from the old 10CFR20 Appendix B, Table II Column 2 limits to ten times the limits of the revised 10CFR20 Appendix B, Table 2 Column 2.	ITS Implementation
N/A	Full Revision	N/A	The term "MPC" has been replaced by "EC" (effluent concentration), consistent with the new 10CFR20.	ITS Implementation
N/A	I 3.3-7	D 3.3.2	Required action 135 for Technical Specification 3.3.7.10, Radioactive Gaseous Effluent Monitoring Instrumentation, has been clarified in ODCM specification D 3.3.2 to allow flexibility to either place the inoperable channel in the tripped condition or to take grab samples. Placing a channel in the tripped condition increases the risk of a plant scram.	ITS Implementation
N/A	N/A	D 3.5.1	The usage of the term "Frequency" in the revised ODCM is as defined in ITS Section 1.4, with the exception of Section D 3.5.1, the Radiological Effluent Monitoring Program. The sampling frequencies specified in Table D 3.5.1-1 have been retained from Current Technical Specifications (CTS) Table 3.12.1-1. This is done because of the seasonal nature of the sampling program and because it is done in conjunction with Unit 1 and James A. Fitzpatrick. The frequencies for environmental sampling are specified in the Radiological Environmental Monitoring Program (REMP) and its associated procedures.	ITS Implementation

Unit 1 ___ Unit 2 X Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE OFF-SITE DOSE CALCULATION MANUAL (ODCM)

Revision 19 (Cont)

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
N/A	Full Revision	N/A	In the transition from the Current Technical Specifications (CTS) to the ODCM, the specifications have been reformatted and renumbered to conform with the format of the ITS. There has been some non-technical rewording and elimination of redundancy (e.g., terms that are defined in the Definitions section of the Technical Specifications are not repeated in the Definitions section of the ODCM.	ITS Implementation

The Unit 2 Off-Site Dose Calculation Manual (ODCM) was revised during the reporting period to support Improved Technical Specifications (ITS) implementation. The ODCM changes will not reduce the calculations or setpoint determinations in accordance with the Technical Specifications. A copy of the ODCM, Revision 20 is attached and a summary of the changes presented to and approved by the Station Operations Review Committee on June 20, 2000 is provided below. The summary also includes the justification for the change.

Revision 20

I 3.3-13	I 3.3-13	Table D 3.3.2-1	Item 2 deleted. The Technical Specification Requirements and Actions for hydrogen monitoring for explosive mixtures relocated from the Radiological Effluent Technical Specifications (RETS) to the Technical Requirements Manual (TRM 3.3.11).	ITS Implementation
I 3.3-13	I 3.3-13	Table D 3.3.2-1	Item 3 renumbered to Item 2.	Editorial
I 3.3-14	I 3.3-14	Table D 3.3.2-1	Item 4 renumbered to Item 3.	Editorial

The Unit 2 Off-Site Dose Calculation Manual (ODCM) was revised during the reporting period to update liquid dose factors and provide editorial corrections and clarifications. The ODCM changes will not reduce the calculations or setpoint determinations in accordance with the Technical Specifications. A copy of the ODCM, Revision 21 is attached and a summary of the changes presented to and approved by the Station Operations Review Committee on November 16, 2000 is provided below. The summary also includes the justification for the change.

Revision 21

II 33 – II 36	II 33 – II 36	Tables D 2-2, D 2-3, D 2-4, and D 2-5	Add Liquid Dose Factors for Zn-69m, Au-199 and As-76 (all but As-76 have been previously accepted by SORC for Revision 18).	Zn-69m, Au-199, and As-76 identified in effluent releases
II 33 – II 36	II 33 – II 36	Tables D 2-2, D 2-3, D 2-4, and D2-5	Revise the Liquid Dose Factors for Sb-124.	Correct Sb-124 dose factors
II 34	II 34	Table D 2-3	Add the lung dose factor for Sr-89.	Update Table for Sr-89
I 3.3-6	I 3.3-6	Table 3.3.1-1	Footnote (c), last word on the 1st line: Typo – change the word "truck" to "tank".	Editorial Correction
I 4.0-1	I 4.0-1	Section 4.0	Correction of an omission. Insert – "Section 5.5.4, Radioactive Effluent Controls Program," after "The ODCM Specifications are subject to Technical Specifications".	Editorial Correction
II 2	II 2	Section 1.1.2.1	The equation at the bottom of the page: Typo - $\Sigma i\ (CG_i CF_i) \cdot \Sigma i\ (CG_i CF_i)$ should be $\Sigma i\ (CG_i CF_i) \quad \Sigma i\ (CG_i) CF$	Editorial Correction

Unit 1 ___ Unit 2 X Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE OFF-SITE DOSE CALCULATION MANUAL (ODCM)

Revision 21 (Cont)

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
II 3	II 3	Section 1.1.2.1	1st paragraph, 1st line: EC (Effluent Concentration) is being changed to MEC (Maximum Effluent Concentration) throughout the ODCM in order to distinguish between the limiting Effluent Concentrations (EC) given in 10CFR20 Appendix B, Table 2, Column 2 and the maximum allowable effluent concentrations for NMP2, (MEC). Change EC to MEC, RDF = Σ EC fraction $\Sigma i\ (C_i/EC_i)$ should be RDF = Σ MEC fraction $\Sigma i\ (C_i/MEC_i$	Editorial Clarification
II 3	II 3	Section 1.1.2.1	1st paragraph, 4th & 5th lines: Replace the sentence "These values may be replaced by ratios calculated from analysis of composite samples." With "The contribution will be estimated using results from the latest analysis of composite samples, when available."	Editorial Clarification
II 3	II 3	Section 1.1.2.1	Bottom of page, definition of variable TDF: Add parenthesis around (ranges from 30,000 to 58,000 gpm), and (typically 10,200 gpm). Also, add a "+" between ...58,000 gpm) and Blowdown..., delete "is" after Blowdown flow, and add "- Tempering" at the end, i.e., Service Water Flow (ranges from 30,000 to 58,000 gpm) + Blowdown Flow (typically 10,200 gpm) – Tempering	Editorial Clarification
II 4	II 4	Section 1.1.2.1	Definition of variable EC_i : Change variable name from EC_i to MEC_i. Change the definition to: Maximum Effluent Concentration, ten times the limiting Effluent Concentration for isotope i from ...	Editorial Clarification
II 4	II 4	Section 1.1.2.1	Definition of RDF: Change $\Sigma_i\ (C_i/EC_i)$ to $\Sigma_i\ (C_i/MEC_i)$	Editorial Clarification
II 4	II 4	Section 1.1.2.1	Definition of Fraction Tempering: Delete the word "Fraction". Add at the end of the definition: ...control, gpm. Move the entire definition to directly follow the definition for TDF/PEF.	Editorial Clarification
II 4	II 4	Section 1.1.2.1	In the sentence beginning "Permissible effluent flow...": Delete the words "ten times" and add the word "maximum" before "effluent concentration".	Editorial Clarification
II 4	II 4	Section 1.1.2.1	In the equation for PEF: Replace "(Dilution Flow) (1 – Fraction Tempering)" with "(TDF)".	Simplify Equation for PEF

Unit 1 ___ Unit 2 X Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE OFF-SITE DOSE CALCULATION MANUAL (ODCM)

Revision 21 (Cont)

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
II 4	II 4	Section 1.1.2.1	In the last line: Delete the words "ten times" and add the word "maximum" before "effluent concentration".	Editorial Clarification
II 5	II 5	Section 1.1.2.2	1st paragraph, last sentence: Delete the words "ten times" and add the word "maximum" before "effluent concentration".	Editorial Clarification
II 5	II 5	Section 1.1.2.2	Equation for FEC: FEC is changed to FMEC to be consistent with the change of EC to MEC described above. Replace "FEC" with "FMEC" and replace "EC_i" with "MEC_i".	Editorial Clarification
II 5	II 5	Section 1.1.2.2	In the denominator of the equation for PEF: Replace "FEC" with "FMEC".	Editorial Clarification
II 5	II 5	Section 1.1.2.2	In the denominator of the equation for Alarm Setpoint: Replace "FEC" with "FMEC".	Editorial Clarification
II 5	II 5	Section 1.1.2.2	Definition for EC_i: Replace "EC_i" with "MEC_i", and add the words "Maximum Effluent Concentration," to the beginning of the definition.	Editorial Clarification
II 6	II 6	Section 1.1.2.3	1st paragraph, 3rd line: Replace "EC" with "MEC".	Editorial Clarification
II 7	II 7	Section 1.1.2.3	Alarm Setpoint Equation: Replace "EC_i" with "MEC_i".	Editorial Clarification
II 7	II 7	Section 1.1.2.3	Definition of EC_i: Replace "EC_i" with "MEC_i", add the words "Maximum Effluent Concentration," to the beginning of the definition and add "s" to the word "time".	Editorial Corrections and Clarification
II 7	II 7	Section 1.2	At the beginning of the 1st paragraph: to provide the basis for the statement. Add "As required by Technical Specification 5.5.4, "Radioactive Effluent Controls Program,"" the concentration...	Editorial Clarification
II 7	II 7	Section 1.2	Equation for FEC: Replace "FEC" with "FMEC", and replace "EC_i" with "MEC_i".	Editorial Clarification
II 7	II 7	Section 1.2	Definition for FEC in the 1st line: Replace "FEC" with "FMEC", capitalize the 1st letter in the words fraction, effluent, and concentration, and add the word "Maximum" before the word "Effluent".	Editorial Clarificaition

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE OFF-SITE DOSE CALCULATION MANUAL (ODCM)

Revision 21 (Cont)

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
II 8	II 8	Section 1.2	Definition for EC_i: Replace "EC_i" with "MEC_i", add the words "Maximum Effluent Concentration," to the beginning of the definition, add the word "Effluent" between the words "limiting" and "concentration", and capitalize the "c" in "Concentration".	Editorial Clarification
II 8	II 8	Section 1.2	Definition for $\Sigma_i (C_{is}/EC_i)$. Replace "$\Sigma_i (C_{is}/EC_i)$" with "$\Sigma_i (C_{is}/MEC_i)$", and correct the spelling of "consentration" to "concentration".	Editorial Correction and Clarification
II 8	II 8	Section 1.2	Last line before Section 1.3: Replace "EC" with "MEC".	Editorial Clarification
II 9	II 9	Section 1.3	Definition and use of F_L. Add "These factors can be related to batch release parameters as follows: F_L = PEF / (TDF x 5.9) (Terms defined in Section 1.1.2.1 and above) $\Delta T_L F_L$ = [PEF(gpm) x ΔT_L (min) x 1.67E-2(hr/min)] / [TDF(gpm) x 5.9] = [TV x 2.83E-3(hours)] / TDF For each batch, PEF(gpm) x ΔT_L (min) = Tank Volume. For each batch, a dose calculation common constant ($\Delta T_L F_L$) is calculated to be used with the concentration of each nuclide and dose factor A_i, to calculate the dose to a receptor. Normally, the highest dose factor for any age group (adult, teen, child, infant) will be used for calculation, but specific age-group calculations to demonstrate compliance may be performed if required."	Editorial Clarification
II 10	II 10	Section 1.5	Last line: Replace "DSR 3.1.2.1" with "Section 1.3".	Editorial Correction
II 26	II 26	Section 3.4	1st line, 1st paragraph: Delete the word "Semiannual"	Editorial Correction
II 66	II 66	Appendix A	Definition of variable Ko: Ko should be K_o.	Editorial Correction
II 66	II 66	Appendix A	Definition of variable Ko, end of line: ml/L should be ml/liter	Editorial Clarification
II 66	II 66	Appendix A	Definition of variable U_w: l/yr should be liters/yr	Editorial Clarification
II 66	II 66	Appendix A	Definition of variable Uf: Kg/yr should be kg/yr	Editorial Correction
II 66	II 66	Appendix A	Definition of variable Bf_i: pCi/l should be pCi/liter	Editorial Clarification

Unit 1 ___ Unit 2 X Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE OFF-SITE DOSE CALCULATION MANUAL (ODCM)

Revision 21 (Cont)

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
II 67	II 67	Appendix A	Definition of 69.3, 1st line: (L/kg-hr) should be (liters/kg-hr)	Editorial Clarification
II 67	II 67	Appendix A	Definition of 69.3, 2nd line: L/m^2-d) should be liters/m^2-d	Editorial Clarification
II 67	II 67	Appendix A	Definition of 69.3, 3rd line: L/kg per hr) should be liters/kg per hr	Editorial Clarification
II 67	II 67	Appendix A	Example Calculation, units of B_{fi}: pCi/Kg per pCi/L should be pCi/kg per pCi/liter	Editorial Correction and Clarification
II 67	II 67	Appendix A	Example Calculation , units of U_f: Kg/yr should be kg/yr	Editorial Correction
II 67	II 67	Appendix A	Example Calculation, units of U_w: L/yr should be liters/yr	Editorial Clarification
II 67	II 67	Appendix A	Example Calculation: Ko should be K_o	Editorial Correction
II 75	II 75	Appendix C Section C.3	Definition of Q_f: Kg/day should be kg/day	Editorial Correction
II 80	II 80	Appendix C Table C-2	Parameter F_f: (pCi/Kg should be (pCi/kg...	Editorial Correction
II 80	II 80	Appendix C Table C-2	Parameter U_{ap}: (Kg/yr) should be (kg/yr)	Editorial Correction

ATTACHMENT 8

Unit 1 ___ Unit 2 **X** Reporting Period **July – December 2000**

SUMMARY OF CHANGES TO THE PROCESS CONTROL PROGRAM (PCP)

The Unit 2 Process Control Program (PCP) Revision 4 was implemented in September 2000. Administrative changes were made to reflect the procedures used for waste classification and to implement Improved Technical Specifications (ITS). The PCP changes do not reduce the overall conformance of the solidified waste product to existing criteria for solid waste in accordance with Technical Specifications. A copy of the PCP, Revision 4 is attached and below is a summary of the changes accepted by the Station Operations Review Committee on August 22, 2000.

Old Page #	New Page #	New/Amended Section #	Description of Change	Reason for Change
1	1	2.1.2	Reference to Quality Assurance Program/remove TS reference	Implementation of ITS
10	10	3.5.d	S-WHP-03 and S-WHP-04 references	Change made to reflect procedures used for waste classification
10	10	3.6.1.b	Reference to Quality Assurance Program/remove TS reference	Implementation of ITS
12	12	3.6.4.a	USAR Section reference changed from TS reference	Implementation of ITS
N/A	13	3.6.6 (New)	Added TRM Specification references	Implementation of ITS
N/A	14	5.1.2 (New)	Added Unit 2 Technical Specification Section reference for Radioactive Effluent Release Report	Implementation of ITS

ATTACHMENT 9

Unit 1 ___ Unit 2 X	Reporting Period **July – December 2000**
SUMMARY OF INOPERABLE MONITORS	
There were no inoperable monitors for a period greater than 30 days during the reporting period.	

ATTACHMENT 10

Doses to Members of the Public Due To Their Activities Inside the Site Boundary

ATTACHMENT 10

RADIOACTIVE EFFLUENT RELEASE REPORT (2000)
NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES INSIDE THE SITE BOUNDARY

JANUARY – DECEMBER 2000

Doses to members of the public (as defined by the Technical Specifications and Unit 2 Off-Site Dose Calculation Manual (ODCM) after implementation of Improved Technical Specifications (ITS) on December 2, 2000) from the operation of the Nine Mile Point Unit 2 (NMP2) facility as a result of activity inside the site boundary are based on activities at the Energy Center located approximately one quarter mile west of Nine Mile Point Unit 1 (NMP1). This facility is open to the public and offers educational information, summer picnicking activities and fishing. Any possible doses received by a member of the public by utilizing the private road that transverses the east and west site boundaries are not considered here since it takes a matter of minutes to travel the distance.

The activity at the Energy Center that is used for the dose analysis is fishing near the shoreline adjacent to the NMP site. Dose pathways considered for this activity include direct radiation, inhalation and external ground (shoreline sediment or soil) doses. Other pathways, such as ingestion pathways, are not considered because they are either not applicable, insignificant, or are considered as part of the evaluation of the total dose to a member of the public located off-site. In addition, only releases from the NMP2 stack and vent were evaluated for the inhalation pathway.

The direct radiation pathway is evaluated in accordance with the methodology found in the Off-Site Dose Calculation Manual (ODCM). This pathway considers four components: direct radiation from the generating facilities, direct radiation from any possible overhead plume, direct radiation from ground deposition and direct radiation plume submersion. The direct radiation pathway is evaluated by the use of high sensitivity environmental Thermoluminescent Dosimeters (TLDs). Since any significant fishing activity near the Energy Center occurs between April through December, environmental TLD data for the approximate period of April 1 – December 31, 2000 were considered. Data from environmental TLDs from the approximate area where the fishing occurs were compared to control environmental TLD locations for the same time period. The average fishing area TLD dose rate was 8.1E-03 mRem per hour for the period. The average control TLD dose rate was 6.6E-03 mRem per hour for the period (approximate second, third and fourth calendar quarters of the year). The average increase in dose as a result of fishing in this area at a conservative frequency of eight hours per week for thirty-nine weeks is 4.8E-01 mRem from direct radiation for the period in question. The majority of the dose from this pathway is from the NMP1 facility because of its proximity to the fishing area. A small portion may be due to the NMP2 facility.

ATTACHMENT 10

RADIOACTIVE EFFLUENT RELEASE REPORT (2000) NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES INSIDE THE SITE BOUNDARY

JANUARY – DECEMBER 2000

The inhalation dose pathway is evaluated by utilizing the inhalation equation in the ODCM, as adapted from Regulatory Guide 1.109. The equation basically gives a total inhalation dose in mRem for the time period in question (April – December). The total dose equals the sum, for all applicable radionuclides, of the NMP2 stack and vent release concentrations, times the average NMP2 stack and vent flow rate, times the applicable five-year average calculated X/Q, times the inhalation dose factors from Regulatory Guide 1.109, Table E-7, times the Regulatory Guide 1.109 annual air intake, times the fractional portion of the year in question. In order to be slightly conservative, no radiological decay is assumed.

The 2000 calculation utilized the following information:

NMP2 Stack:

- Unit 2 average stack flowrate = 5.06E+01 m^3/sec
- X/Q value = 9.60E-07 (annual NWN sector, historical average)
- Inhalation dose factor = Table E-7 of Regulatory Guide 1.109
- Annual air intake = 8000 m^3 per year (adult)
- Fractional portion of the year = 0.0356 (312 hours)
- H-3 = 6.59E+03 pCi/m^3
- Mn-54 = 2.49E-03 pCi/m^3
- Fe-55 = 4.03E-02 pCi/m^3
- Co-60 = 2.65E-02 pCi/m^3
- Sr-89 = 1.27E-01 pCi/m^3
- Sr-90 = 5.73E-04 pCi/m^3
- I-131 = 3.52E-02 pCi/m^3
- I-133 = 3.07E-01 pCi/m^3

ATTACHMENT 10

RADIOACTIVE EFFLUENT RELEASE REPORT (2000)
NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES INSIDE SITE BOUNDARY

JANUARY – DECEMBER 2000

NMP2 Vent:

- Unit 2 average vent flowrate = 1.00E+02 m^3 /sec
- X/Q value = 2.8E-06 (conservative ground level value)
- Inhalation dose factor = Table E-7 of Regulatory Guide 1.109
- Annual Air intake = 8000 m^3 per year (adult)
- Fractional portion of the year = 0.0356 (312 hours)
- H-3 = 7.71E+02 pCi/m^3
- Mn-54 = 1.27E-01 pCi/m^3
- Fe-55 = 8.90E-02 pCi/m^3
- Co-60 = 3.91E-01 pCi/m^3
- Zn-65 = 3.01E-01 pCi/m^3
- Sr-89 = 3.35E-03 pCi/m^3
- Sr-90 = 4.38E-04 pCi/m^3
- Cs-137 = 1.36E-02 pCi/m^3

The inhalation dose to a member of the public from NMP2 as a result of activities inside the site boundary is 5.3E-05 mRem to the lung (maximum organ dose) and 2.4E-05 mRem to the whole body.

The dose from standing on the shoreline while fishing is based on the methodology in the ODCM, as adapted from Regulatory Guide 1.109. During 2000, it was noted that fishing was performed from the shoreline on many occasions although waders were also utilized. In order to be conservative, it is assumed that the maximum exposed individual fished from the shoreline at all times.

The ODCM equation gives the total dose to the whole body and skin from the sum of all plant-related radionuclides detected in shoreline sediment samples. The plant-related radionuclide concentration is adjusted for background sample results, as applicable. The equation, therefore, yields the whole body and skin dose by multiplying the radionuclide concentration adjusted for any background data (as applicable), times a usage factor, times the sediment or soil density in grams per square meter (to a depth of one centimeter), times the applicable shore width factor, times the regulatory guide dose factor, times the fractional portion of the year over which the dose is applicable. In order to be conservative and to simplify the equation, no radiological decay is assumed since the applicable radionuclides are usually long lived.

ATTACHMENT 10

RADIOACTIVE EFFLUENT RELEASE REPORT (2000)
NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES INSIDE THE SITE BOUNDARY

JANUARY – DECEMBER 2000

The calculation utilized the following information:

- Usage factor = 312 hours
- Density in grams per square meter = 40,000
- Shore width factor = 0.3
- Whole body and skin dose factor for each radionuclide = Regulatory Guide 1.109, Table E-6
- Fractional portion of the year = 1 (used average radionuclide concentration over total time period)
- Average Cs-137 concentration = 0.25 pCi/g

The total whole body and skin dose from standing on the shoreline to fish is 4.0E-03 mRem whole body and 4.7E-03 mRem skin dose for the period.

Doses to members of the public relative to activities inside the site boundary from aquatic pathways other than ground dose from shoreline sediment/soil are not applicable.

In summary, the total dose to a member of the public as a result of activities inside the site boundary from the direct radiation, inhalation and shoreline dose pathways is 4.8E-01 mRem to the whole body and 5.3E-05 mRem to the maximum exposed internal organ (lung). The dose to the skin of an adult is 4.7E-03 mRem. These doses are generally a result of the operation of NMP2. However, a portion of these doses for the direct radiation pathway may be attributable to the NMP1 facility.

ATTACHMENT 11

Doses to Members of the Public Due To Their Activities Outside The Site Boundary

ATTACHMENT 11

RADIOACTIVE EFFLUENT RELEASE REPORT (2000)
NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES OUTSIDE THE SITE BOUNDARY

JANUARY – DECEMBER 2000

Radiation doses to the likely most exposed member of the public outside of the site boundary are evaluated relative to 40 CFR 190 requirements. The dose limits of 40 CFR 190 are 25 mRem (whole body or organ) per calendar year and 75 mRem (thyroid) per calendar year. The intent of 40 CFR 190 also requires that the effluents of Nine Mile Point Unit 2 (NMP2) , as well as other nearby uranium fuel cycle facilities, be considered. In this case, the effluents of Nine Mile Point Unit 1 (NMP1), NMP2 and the James A. FitzPatrick (JAF) facilities must be considered.

Doses to the likely most exposed member of the public as a result of effluents from the site can be evaluated by using calculated dose modeling based on the accepted methodologies of the facilities' Off-Site Dose Calculation Manuals (ODCMs) or may, in some cases, be calculated from the analysis results of actual environmental samples. Acceptable methods of calculating doses from environmental samples are also found in the facilities' ODCMs. These methods are based on Regulatory Guide 1.109 methodology.

Dose calculations from actual environmental samples are, at times, difficult to perform for some pathways. Some pathway doses should be estimated using calculational dose modeling. These pathways include noble gas air dose, inhalation dose, etc. Other pathway doses may be calculated directly from environmental sample concentrations using Regulatory Guide 1.109 methodology

Since the effluents from the generating facilities are low, the resultant gaseous and liquid effluent doses are anticipated to be low. In view of this, doses can be based on calculated data. Doses are not based on actual environmental data for 2000 with the exception of doses from direct radiation, fish consumption and shoreline sediment. In addition, in order to be conservative and for the sake of simplicity, it is assumed in the dose calculations that the likely most exposed member of the public is positioned in the maximum receptor location for each pathway at the same time. This approach is utilized because the doses are very low and the computations are greatly simplified.

The following pathways are considered:

1. The inhalation dose is calculated at the critical residence because of the high occupancy factor. In order to be conservative, the maximum whole body and organ dose assumes no correction for residing inside a residence.

ATTACHMENT 11

RADIOACTIVE EFFLUENT RELEASE REPORT (2000)
NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES OUTSIDE THE SITE BOUNDARY

JANUARY – DECEMBER 2000

2. The milk ingestion dose is calculated utilizing the maximum milk cow location. As noted previously, in order to be conservative and for the sake of simplicity, the likely most exposed member of the public is assumed to be at all critical receptors at one time. In this case, the member of the public at the critical residence is assumed to consume milk from the critical milk location.

3. The maximum dose from the milk ingestion pathway as a result of consuming goat's milk is based on the same criteria established for item "2" above (ingestion of cow's milk).

4. The maximum dose associated from consuming meat is based on the critical meat animal. The likely most exposed member at the critical residence is assumed to consume meat from the critical meat animal location.

5. The maximum site dose associated with the consumption of vegetables is calculated from the critical vegetable garden location. As noted previously, the likely most exposed member of the public is assumed to be located at the critical residence and is assumed to consume vegetables from the critical garden location.

6. The dose, as a result of direct gamma radiation from the site, encompasses doses from direct "shine" from the generating facilities, direct radiation from any overhead gaseous plumes, plume submersion and from ground deposition. This total dose is measured by environmental TLDs. The critical location is based on the closest year-round residence from the generating facilities as well as the closest residence in the critical downwind sector in order to evaluate both direct radiation from the generating facilities and gaseous plumes as determined by the local meteorology. During 2000, the closest residence and the critical downwind residence are at the same location.

   The measured average dose for 2000 at the critical residence was 14.1 mRem/qtr. The average control dose was 14.4 mRem/qtr. The dose at the critical residence can be considered representative of the background dose since the control location dose was higher. Therefore, no dose was calculated and was assumed to be zero for this pathway.

ATTACHMENT 11

RADIOACTIVE EFFLUENT RELEASE REPORT (2000)
NINE MILE POINT NUCLEAR STATION UNIT 2
DOSES TO MEMBERS OF THE PUBLIC DUE TO THEIR ACTIVITIES OUTSIDE THE SITE BOUNDARY

JANUARY – DECEMBER 2000

7. The dose, as a result of fish consumption, is considered as part of the aquatic pathway. The dose for 2000 is calculated from actual results of the analysis of environmental fish samples. For the sake of being conservative, the average plant-related radionuclide concentrations were utilized from fish samples taken near the site discharge points. The only plant-related radionuclide detected in fish samples was Cs-137. This nuclide was detected in one sample from the control location only and not detected in any fish sampled from the site discharge location. Therefore, no dose was calculated and was assumed to be zero for this pathway.

8. The shoreline sediment pathway is considered relative to recreational activities. The dose due to recreational activities from shoreline sediment is based on the methodology in the ODCM, as adapted from Regulatory Guide 1.109. The ODCM gives the total dose to the whole body and skin from the sum of plant-related radionuclides detected in actual shoreline sediment samples. The plant-related radionuclide concentration is adjusted for background sample results, as applicable. The total whole body and skin dose from shoreline recreational activities are 2.3E-4 mRem whole body and 2.7E-4 mRem skin dose for the period.

In summary, the maximum dose to the likely most exposed member of the public is 6.1E-1 mRem to the Thyroid (maximum organ dose) and 5.9E-1 mRem to the whole body. It should be noted that the maximum organ dose and maximum whole body doses are based on the sum of the maximum doses observed for all three facilities regardless of age group. This results in some conservatism. The maximum organ and whole body doses were a result of gaseous effluents. Doses as a result of liquid effluents are secondary. The total whole body and skin dose from shoreline recreational activities are 2.3E-4 mRem whole body and 2.7E-4 mRem skin dose for the period. The direct radiation dose to the critical residence from the generating facilities was insignificant or zero. The dose to an individual as a result of fish consumption was also zero. These maximum total doses are a result of operations at the NMP1, NMP2 and the JAF facilities. The maximum organ dose and whole body dose are below the 40 CFR 190 criteria of 25 mRem per calendar year to the maximum exposed organ or the whole body, and below 75 mRem per calendar year to the thyroid.

ATTACHMENT 12

Update of Actual Data for the Second Quarter 2000

Unit 1 ___ Unit 2 X Reporting Period **January – June 2000**

UPDATE OF RELEASE AND DOSE DATA FOR GASEOUS (ELEVATED AND GROUND LEVEL) AND LIQUID EFFLUENTS

Update of data using actual results from the off-site vendors for Strontium, Tritium, and Iron-55 for the second quarter 2000.

Nuclide[1]	GASEOUS 2nd QUARTER 2000 Activity (Ci)	LIQUID 2nd QUARTER 2000 Activity (Ci)
Sr-89	6.46E-05	**
Sr-90	**	**
H-3	2.53E+00	4.41E+00
Fe-55	8.11E-05	**

			GASEOUS	LIQUID
Particulates	1. Particulates with half-lives >8 days	Ci	7.20E-04	2.04E-02
	2. Average release rate (gaseous) or diluted concentration (liquid) for reporting period	µCi/sec (gaseous) µCi/ml (liquid)	9.61E-05	1.48E-09
Tritium	1. Total release	Ci	2.53E+00	4.41E+00
	2. Average release rate for period (gaseous) or diluted concentration (liquids) for the reporting period	µCi/sec (gaseous) µCi/ml (liquid)	3.37E-01	3.20E-07

Tritium, Iodines, and Particulates (with half-lives greater than 8 days)		GASEOUS	LIQUID
1.	Percent of Quarterly[2] Dose Limit (Gaseous – 7.5 mrem, Liquid – 1.5 mrem) %	5.08E-03 (Quarterly)	3.42E-01 (Quarterly)
2.	Percent of Annual[2] Dose Limit to Date (Gaseous – 15 mrem, Liquid – 3 mrem) %	5.11E-03 (Annual)	3.30E-01 (Annual)
3.	Percent of Organ -Dose Rate Limit (Gaseous – 1500 mrem/yr), Dose Limit (Liquid – 5 mrem Quarter, 10 mrem Annual) %	1.07E-04 (Quarterly)	2.15E-01 (Quarterly) 2.09E-01 (Annual)
4.	Percent of 10CFR20[3] Concentration Limit (Liquid) %		1.29E-02
5.	Percent of Dissolved or Entrained Noble Gas (Liquid – 2.00E-04 µCi/ml) %		2.30E-07

[1] Concentrations less than the lower limit of detection, as required by Technical Specifications (Off-Site Dose Calculation Manual (ODCM) following implementation of Improved Technical Specifications (ITS) on December 2, 2000) are indicated with a double asterisk.

[2] The dose is to the whole body for liquid effluents and to the maximally exposed organ for gaseous effluents.

[3] The percent of the 10CFR20 concentration limit is based on the average concentration during the quarter.

ATTACHMENT 13

Off-Site Dose Calculation Manual (ODCM) Rev 18, 19, 20, and 21

ORIGINAL

CONTROLLED

NINE MILE POINT NUCLEAR STATION

NINE MILE POINT UNIT 2

OFF-SITE DOSE CALCULATION MANUAL (ODCM)

APPROVALS	SIGNATURES	DATE REVISION 18
Prepared by:	G. R. Stinson Health Physicist	10/20/00
Reviewed by:	T. G. Kulczycky Supervisor, Analysis Services	10/23/00
Reviewed by:	W. R. Yaeger Manager, Engineering Services	10/24/00
M. F. Peckham	**Plant Manager Unit 2**	10/25/00
R. B. Abbott	**V. P. Nuclear Engineering**	10/25/00

NIAGARA MOHAWK POWER CORPORATION

SUMMARY OF REVISIONS

Revision 18 (Effective October 2000)

PAGE	*DATE*
iii,12-14,18,28-31,34, 37,53,55-58,60-82,87-89, 92	May 1986
15	May 1987
54	May 1987 (TCN-1)
19	June 1987 (TCN-2)
90-91,93-103	February 1988
20-27,83-86	April 1988
i-ii	November 1988
1-11,16,32-33,35-36,59	February 1990
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Part I - xii Part II - II 36, II 54, II 60, II 105	December 1995

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Part II - II 19, II 90, II 99	December 1996
Part II - II 84, II 99	June 1997
Part I - xii	June 1998
Part II - II 11, II 13, II 14, II 33	June 1998
Part I – i, iii, ix, xii, I 3/4 3-74, I 3/4 3-75, I 3/4 3-76, I B 3/4 3-5	June 1999
Part II – II 9	December 1999
Part II – II 29, II 30, II 31, II 32	March 2000
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INTRODUCTION

The OFFSITE DOSE CALCULATION MANUAL (ODCM) is a supporting document of the Technical Specifications. The previous Limiting Conditions for Operation that were contained in the Radiological Effluent Technical Specifications are now transferred to the ODCM as Radiological Effluent Controls. The ODCM contains two parts: Radiological Effluent Controls, Part I; and Calculational Methodologies, Part II. Radiological Effluent Controls, Part 1, includes the following: (1) The Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Technical Specification 6.8.4 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Semiannual Radioactive Effluent Release Reports required by Technical Specifications 6.9.1.3 and 6.9.1.4. Calculational Methodologies, Part II, describes the methodology and parameters to be used in the calculation of liquid and gaseous effluent monitoring instrumentation alarm/trip setpoints and the calculation of offsite doses due to radioactive liquid and gaseous effluents. The ODCM also contains a list and graphical description of the specific sample locations for the radiological environmental monitoring program, and liquid and gaseous radwaste treatment system configurations.

The ODCM follows the methodology and models suggested by NUREG-0133 and Regulatory Guide 1.109, Revision 1. Simplifying assumptions have been applied in this manual where applicable to provide a more workable document for implementing the Radiological Effluent Control requirements; this simplified approach will result in a more conservative dose evaluation for determining compliance with regulatory requirements.

The ODCM will be maintained for use as a reference and training document of accepted methodologies and calculations. Changes to the calculation methods or parameters will be incorporated into the ODCM to assure that the ODCM represents the present methodology in all applicable areas. Any changes to the ODCM will be implemented in accordance with Section 6.14 of the Technical Specifications.

Until the Unit 2 Technical Specifications are revised to delete the Radiological Effluent Technical Specifications, the ODCM Part I will be used as a reference only, and the Technical Specifications with LCO's and Surveillance requirements will remain the primary controlling document.

PART I - RADIOLOGICAL EFFLUENT CONTROLS

PART I - RADIOLOGICAL EFFLUENT CONTROLS

SECTION 1.0

DEFINITIONS

1.0 DEFINITIONS

The following terms are defined so that the CONTROLS may be uniformly interpreted. The defined terms appear in capitalized type throughout the controls.

ACTION

1.1 ACTION shall be that part of a CONTROL which prescribes remedial measures required under designated conditions.

CHANNEL CALIBRATION

1.4 A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output so that it responds with the necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel including the sensor and alarm and/or trip functions, and shall include the CHANNEL FUNCTIONAL TEST. The CHANNEL CALIBRATION may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated.

CHANNEL CHECK

1.5 A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

CHANNEL FUNCTIONAL TEST

1.6 A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels - the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions and channel failure trips.

b. Bistable channels - the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

The CHANNEL FUNCTIONAL TEST may be performed by any series of sequential overlapping or total channel steps so that the entire channel is tested.

CONTROL

The present Limiting Conditions for Operation or LCO's that are contained in the Radiological Effluent Technical Specifications are being transferred to the Offsite Dose Calculation Manual and being renamed to CONTROLS. This is to distinguish between those LCO's which are being retained in the Technical Specifications and those LCO's or CONTROLS that are being transferred to the Offsite Dose Calculation Manual.

DOSE EQUIVALENT I-131

1.10 DOSE EQUIVALENT I-131 shall be that concentration of I-131, expressed in microcuries per gram, which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites."

FREQUENCY NOTATION

1.16 The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.1.

GASEOUS RADWASTE TREATMENT SYSTEM

1.17 A GASEOUS RADWASTE TREATMENT SYSTEM shall be any system designed and installed to reduce radioactive gaseous effluents by collecting offgases from the main condenser evacuation system and providing for delay or holdup for the purpose of reducing the total radioactivity prior to release to the environment.

MEMBER(S) OF THE PUBLIC

1.23 MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the Nine Mile Point Nuclear Station and James A. FitzPatrick Nuclear Power Plant. This category does not include employees of Niagara Mohawk Power Corporation, the Nine Mile Point Unit 2 co-tenants, the New York State Power Authority, their contractors or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with Nine Mile Point Nuclear Station and James A. FitzPatrick Nuclear Power Plant.

MILK SAMPLING LOCATION

1.24 A MILK SAMPLING LOCATION is a location where 10 or more head of milk animals are available for collection of milk samples.

OFFSITE DOSE CALCULATION MANUAL

1.26 The OFFSITE DOSE CALCULATION MANUAL (ODCM) shall contain the current methodology and parameters used in the calculation of offsite doses that result from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the environmental radiological monitoring program. The ODCM shall also contain: (1) the radioactive effluent controls and Radiological Environmental Monitoring Program required by Section 6.8.4 and, (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Semiannual Radioactive Effluent Release Reports required by CONTROLS 6.9.1.7 and 6.9.1.8.

OPERABLE - OPERABILITY

1.27 A system, subsystem, train, component, or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s) and when all necessary attendant instrumentation, controls, electrical power, 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).

OPERATIONAL CONDITION - CONDITION

1.28 An OPERATIONAL CONDITION, i.e., CONDITION, shall be any one inclusive combination of mode switch position and average reactor coolant temperature as specified in Table 1.2.

PURGE - PURGING

1.33 PURGE and PURGING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, concentration, or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.

RATED THERMAL POWER

1.34 RATED THERMAL POWER shall be a total reactor core heat transfer rate to the reactor coolant of 3323 MWt.

REPORTABLE EVENT

1.36 A REPORTABLE EVENT shall be any of those conditions specified in 10 CFR 50.73.

SITE BOUNDARY

1.40 THE SITE BOUNDARY shall be that line around the Nine Mile Point Nuclear Station beyond which the land is not owned, leased or otherwise controlled by the Niagara Mohawk Power Corporation or the New York State Power Authority.

REPRESENTATIVE COMPOSITE SAMPLE (Not Transferred from Technical Specifications)

A REPRESENTATIVE COMPOSITE SAMPLE is that part of more than one liquid or gaseous streams or volumes that contains the same radioactive nuclides or materials in the same ratios as the whole streams or volumes, that is obtained over short-time intervals.

SOURCE CHECK

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

THERMAL POWER

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

UNRESTRICTED AREA

1.47 An UNRESTRICTED AREA shall be any area at or beyond the SITE BOUNDARY, access to which is not controlled by the Niagara Mohawk Power Corporation or the New York State Power Authority for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

VENTILATION EXHAUST TREATMENT SYSTEM

1.48 A VENTILATION EXHAUST TREATMENT SYSTEM shall be 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 adsorbers 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 features (ESF) atmospheric cleanup systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.

VENTING

1.49 VENTING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, concentration, or other operating condition, in such a manner that replacement air or gas is not provided or required during VENTING. Vent, used in system names, does not imply a VENTING process.

TABLE 1.1

SURVEILLANCE FREQUENCY NOTATIONS

NOTATION	FREQUENCY
S	At least once per 12 hours
D	At least once per 24 hours
W	At least once per 7 days
M	At least once per 31 days
Q	At least once per 92 days
SA	At least once per 184 days
A	At least once per 366 days
R	At least once per 18 months (550 days)
S/U	Prior to each reactor startup
P	Prior to each radioactive release
NA	Not applicable

TABLE 1.2

OPERATIONAL CONDITIONS

CONDITION	MODE SWITCH POSITION	AVERAGE REACTOR COOLANT TEMPERATURE
1. Power Operation	Run	Any temperature
2. Startup	Startup/Hot Standby	Any temperature
3. Hot Shutdown	Shutdown*,**	> 200°F
4. Cold Shutdown	Shutdown*,**†	≤ 200°F
5. Refueling††	Shutdown or Refuel*#	≤ 140°F

TABLE NOTATIONS

* The reactor mode switch may be placed in the Run or Startup/Hot Standby position to test the switch interlock functions provided that the control rods are verified to remain fully inserted by a second licensed operator or other technically qualified member of the unit technical staff.

** The reactor mode switch may be placed in the Refuel position while a single control rod is being recoupled provided that the one-rod-out interlock is OPERABLE.

† The reactor mode switch may be placed in the Refuel position while a single control rod drive is being removed from the reactor pressure vessel per Technical Specification 3.9.10.1.

†† Fuel in the reactor vessel with the vessel head closure bolts less than fully tensioned or with the head removed.

\# See Technical Specification Special Test Exceptions 3.10.1 and 3.10.3.

PART I - RADIOLOGICAL EFFLUENT CONTROLS

SECTIONS 3.0 AND 4.0

CONTROLS

AND

SURVEILLANCE REQUIREMENTS

3/4 CONTROLS AND SURVEILLANCE REQUIREMENTS

3/4.0 APPLICABILITY

CONTROLS

3.0.1 Compliance with the CONTROLS is required during the OPERATIONAL CONDITIONS or other conditions specified therein; except that upon failure to meet the CONTROL, the associated ACTION requirements shall be met.

3.0.2 Noncompliance with a CONTROL shall exist when the requirements of the CONTROL and associated ACTION requirements are not met within the specified time intervals. If the CONTROL is restored prior to expiration of the specified time intervals, completion of the ACTION requirements is not required.

3.0.3 When a CONTROL is not met, except as provided in the associated ACTION requirements, within 1 hour action shall be initiated to place the unit in an OPERATIONAL CONDITION in which the CONTROL does not apply by placing it, as applicable, in:

1. At least STARTUP within the next 6 hours,

2. At least HOT SHUTDOWN within the following 6 hours, and

3. At least COLD SHUTDOWN within the subsequent 24 hours.

Where corrective measures are completed that permit operation under the ACTION requirements, the ACTION may be taken in accordance with the specified time limits as measured from the time of failure to meet the CONTROL. Exceptions to these requirements are stated in the individual CONTROLS.

This CONTROL is not applicable in OPERATIONAL CONDITIONS 4 or 5.

3.0.4 Entry into an OPERATIONAL CONDITION or other specified condition shall not be made unless the conditions for the CONTROL are met without reliance on provisions contained in the ACTION requirements. This provision shall not prevent passage through or to OPERATIONAL CONDITIONS as required to comply with ACTION requirements. Exceptions to these requirements are stated in the individual CONTROLS.

APPLICABILITY

SURVEILLANCE REQUIREMENTS

4.0.1 SURVEILLANCE REQUIREMENTS shall be met during the OPERATIONAL CONDITIONS or other conditions specified for individual Controls unless otherwise stated in an individual Surveillance Requirement.

4.0.2 Each SURVEILLANCE REQUIREMENT shall be performed within the specified time interval with a maximum allowable extension not to exceed 25% of the surveillance interval.

4.0.3 Failure to perform a SURVEILLANCE REQUIREMENT within the allowed surveillance interval, defined by Specification 4.0.2, shall constitute noncompliance with the OPERABILITY requirements for a CONTROL. The time limits of the ACTION requirements are applicable at the time it is identified that a SURVEILLANCE REQUIREMENT has not been performed. The ACTION requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the ACTION requirements are less than 24 hours. SURVEILLANCE REQUIREMENTS do not have to be performed on inoperable equipment.

4.0.4 Entry into an OPERATIONAL CONDITION or other specified applicable condition shall not be made unless the Surveillance Requirement(s) associated with the CONTROL have been performed within the applicable surveillance interval or as otherwise specified. This provision shall not prevent passage through or to OPERATIONAL CONDITIONS as required to comply with ACTION requirements.

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INSTRUMENTATION

MONITORING INSTRUMENTATION

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.3.7.9 The radioactive liquid effluent monitoring instrumentation channels shown in Table 3.3.7.9-1 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of CONTROL 3.11.1.1 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: During releases via this pathway.

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 the number of channels OPERABLE less than the Minimum Channels OPERABLE requirement, take the ACTION shown in Table 3.3.7.9-1. Restore the instruments to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.

c. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.9 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 at the frequencies shown in Table 4.3.7.9-1.

TABLE 3.3.7.9-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
1. Radioactivity Monitors Providing Alarm and Automatic Termination of Release		
Liquid Radwaste Effluent Line	1	128
2. Radioactivity Monitors Providing Alarm but not Providing Automatic Termination of Release		
a. Service Water Effluent Line A	1	130
b. Service Water Effluent Line B	1	130
c. Cooling Tower Blowdown Line	1	130
3. Flow Rate Measurement Devices		
a. Liquid Radwaste Effluent Line	1	131
b. Service Water Effluent Line A	1	131
c. Service Water Effluent Line B	1	131
d. Cooling Tower Blowdown Line	1	131
4. Tank Level Indicating Devices*	1	132

* *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, such as temporary tanks.*

TABLE 3.3.7.9-1 (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

TABLE NOTATIONS

ACTION 128 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue provided that before initiating a release:

a. At least two independent samples are analyzed in accordance with Surveillance 4.11.1.1.1, 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 129 - Not used.

ACTION 130 - 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 radioactivity at a limit of detection of at least 5×10^{-7} microcuries/ml.

ACTION 131 - 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 generated in place may be used to estimate flow.

ACTION 132 - 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 4.3.7.9-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. Radioactivity Monitors Providing Alarm and Automatic Termination of Release Liquid Radwaste Effluent Line	D	P	R(c)	M(a)(b)
2. Radioactivity Monitors Providing Alarm but not Providing Automatic Termination of Release				
a. Service Water Effluent Line A	D	M	R(c)	SA(b)
b. Service Water Effluent Line B	D	M	R(c)	SA(b)
c. Cooling Tower Blowdown Line	D	M	R(c)	SA(b)
3. Flow Rate Measurement Devices				
a. Liquid Radwaste Effluent Line	D(d)	NA	R	Q
b. Service Water Effluent Line A	D(d)	NA	R	Q
c. Service Water Effluent Line B	D(d)	NA	R	Q
d. Cooling Tower Blowdown Line	D(d)	NA	R	Q
4. Tank Level Indicating Devices*	D**	NA	R	Q

* *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, such as temporary tanks.*

** *During liquid additions to the tank.*

TABLE 4.3.7.9-1 (Continued)

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

(a) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occurs if the instrument indicates measured levels above the Alarm/Trip Setpoint.

(b) 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, or
(2)Circuit failure, or
(3)Instrument indicates a downscale failure, or
(4)Instrument controls not set in operate mode.

(c) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards* (NBS), standards that are traceable to the NBS standards, or using actual samples of liquid effluents that have been analyzed on a system that has been calibrated with National Institute of Standards and Testing traceable sources. These standards shall permit calibrating the system over its intended range of energy and measurement. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration may be used.

(d) 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.

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* *When the technical specification change is complete to delete the procedural details that are being transferred to the ODCM, then the NBS will be changed to the correct NIST.*

INSTRUMENTATION

MONITORING INSTRUMENTATION

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.3.7.10 The radioactive gaseous effluent monitoring instrumentation channels shown in Table 3.3.7.10-1 shall be OPERABLE with their Alarm/Trip Setpoints set to ensure that the limits of CONTROL 3.11.2.1 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 3.3.7.10-1.

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 the number of channels OPERABLE less than the Minimum Channels OPERABLE requirement, take the ACTION shown in Table 3.3.7.10-1. Restore the instruments to OPERABLE status within 30 days and, if unsuccessful, explain in the next Semiannual Radioactive Effluent Release Report why the inoperability was not corrected in a timely manner.

c. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.3.7.10 Each radioactive gaseous 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 4.3.7.10-1.

TABLE 3.3.7.10-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1. Offgas System			
a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release	2	*	135
b. System Flow-Rate Measuring Device	1	*	136
c. Sampler Flow-Rate Measuring Device	2	*	136
2. Offgas System Explosive Gas Monitoring System - Retained in the RETS			
3. Radwaste/Reactor Building Vent Effluent System			
a. Noble Gas Activity Monitor†	1	††	139
b. Iodine Sampler	1	††	138
c. Particulate Sampler	1	††	138
d. Flow-Rate Monitor	1	††	136
e. Sample Flow-Rate Monitor	1	††	136
4. Main Stack Effluent			
a. Noble Gas Activity Monitor†	1	††	139
b. Iodine Sampler	1	††	138
c. Particulate Sampler	1	††	138
d. Flow-Rate Monitor	1	††	136
e. Sample Flow-Rate Monitor	1	††	136

TABLE 3.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

TABLE NOTATIONS

* During offgas system operation.
† Includes high range noble gas monitoring capability.
†† At all times.

ACTIONS

ACTION 135 - a. With the number of OPERABLE channels one less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided the inoperable channel is placed in the tripped condition within 12 hours.

b. With the number of OPERABLE channels two 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 136 - 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 for the inoperable channel(s) is estimated at least once per 4 hours.

ACTION 137 - Retained in the RETS.

ACTION 138 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue provided samples are continuously collected starting within 8 hours of discovery, using auxiliary sampling equipment as required in Table 4.11.2-1.

ACTION 139 - a. 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 for a radioactivity limit of detection of at least 1×10^{-4} microcurie/ml.

b. Restore the inoperable channel(s) to OPERABLE status within 72 hours or in lieu of another report required by Technical Specification 6.9.1, prepare and submit a Special Report to the Commission pursuant to Technical Specification 6.9.2 within 14 days following the event outlining the action taken, the cause of the inoperability and the schedule for restoring the system to OPERABLE status.

TABLE 4.3.7.10-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
1. Offgas System					
a. Noble Gas Activity Monitor - Providing Alarm and Automatic Termination of Release	D	NA	R(a,e)	M(b,c)	**
b. System Flow-Rate Measuring Device	D	NA	R	Q	**
c. Sample Flow-Rate Measuring Device	D	NA	R	Q	**
2. Offgas System Explosive Gas Monitoring System - Retained in RETS					
3. Radwaste/Reactor Building Vent Effluent System					
a. Noble Gas Activity Monitor†	D	M	R(a)	Q(c)	*
b. Iodine Sampler	W	NA	NA	NA	*
c. Particulate Sampler	W	NA	NA	NA	*
d. Flow-Rate Monitor	D	NA	R	Q	*
e. Sample Flow-Rate Monitor	D	NA	R	Q	*

TABLE 4.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE REQUIRED
4. Main Stack Effluent					
a. Noble Gas Activity Monitor†	D	M	R(a)	Q(c)	*
b. Iodine Sampler	W	NA	NA	NA	*
c. Particulate Sampler	W	NA	NA	NA	*
d. Flow-Rate Monitor	D	NA	R	Q	*
e. Sample Flow-Rate Monitor	D	NA	R	Q	*

TABLE 4.3.7.10-1 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

TABLE NOTATIONS

* At all times.
** During offgas system operation.
† Includes high range noble gas monitoring capability.

(a) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Bureau of Standards (NBS) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NBS, or using actual samples of gaseous effluents that have been analyzed on a system that has been calibrated with NBS traceable sources. These standards shall permit calibrating the system over its intended range of energy and measurement. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration may be used.

(b) The CHANNEL FUNCTIONAL TEST shall also demonstrate the automatic isolation capability of this pathway and that control room alarm annunciation occurs if the instrument indicates measured levels above the Alarm/Trip Setpoint (each channel will be tested independently so as to not initiate isolation during operation).

(c) 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)Circuit failure.
(3)Instrument indicates a downscale failure.
(4)Instrument controls not set in operate mode.

(d) Retained in RETS.

(e) The CHANNEL CALIBRATION shall also demonstrate that automatic isolation of this pathway occurs when the instrument channels indicate measured levels above the Trip Setpoint.

3/4.11 RADIOACTIVE EFFLUENTS

3/4.11.1 LIQUID EFFLUENTS

CONCENTRATION

CONTROLS

3.11.1.1 The concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (see Figure 5.1.3-1) shall be limited to the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2, for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microcurie/ml total activity.

APPLICABILITY: At all times.

ACTION:

With the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeding the above limits, without delay restore the concentration to within the above limits.

SURVEILLANCE REQUIREMENTS

4.11.1.1.1 Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Table 4.11.1-1.

4.11.1.1.2 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 3.11.1.1.

TABLE 4.11.1-1
RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

LIQUID RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD) (a) (uCi/ml)
1. Batch Waste Release Tanks(b)	P Each Batch	P Each Batch	Principal Gamma Emitters(c)	$5x10^{-7}$
a. 2LWS-TK4A b. 2LWS-TK4B c. 2LWS-TK5A d. 2LWS-TK5B			I-131	$1x10^{-6}$
	P One Batch/M	One Batch/M	Dissolved and Entrained Gases (Gamma Emitters)	$1x10^{-5}$
	P Each Batch	M Composite(d)	H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
	P Each Batch	Q Composite(d)	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$
2. Continuous Releases	Grab Sample M(e)	Grab Sample M(e)	Principal Gamma Emitters(c)	$5x10^{-7}$
			I-131	$1x10^{-6}$
a. Service Water Effluent A			Dissolved and Entrained Gases (Gamma Emitters)	$1x10^{-5}$
b. Service Water Effluent B			H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
c. Cooling Tower Blowdown	Grab Sample Q(e)	Grab Sample Q(e)	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$
d. Auxiliary Boiler Pump Seal and Sample Cooling Discharge (Service Water)	Grab Sample M(f)	Grab Sample M(f)	Principal Gamma Emitters(c)	$5x10^{-7}$
	Grab Sample Q(f)	Grab Sample Q(f)	H-3	$1x10^{-5}$

TABLE 4.11.1-1 (Continued)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATIONS

(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.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ S_b}{E\ V\ 2.22x10^6\ Y\ \exp(-\lambda\Delta t)}$$

Where:

LLD = the before-the-fact lower limit of detection (microcurie per unit mass or volume),

S_b = the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute),

E = the counting efficiency (counts per disintegration),

V = the sample size (units of mass or volume),

$2.22x10^6$ = the number of disintegrations per minute per microcurie,

Y = the fractional radiochemical yield, when applicable,

λ = the radioactive decay constant for the particular radionuclide (sec^{-1}), and

Δt = the elapsed time between the midpoint of sample collection and the time of counting (seconds).

Typical values of E, V, Y, and Δt should be used in the calculation.

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

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

TABLE 4.11.1-1 (Continued)

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATIONS

(c) The principal gamma emitters for which the LLD CONTROL applies include the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137 and Ce-141. Ce-144 shall also be measured, but with an LLD of 5×10^{-6}. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to CONTROL 6.9.1.8 in the format outlined in RG 1.21, Appendix B, Revision 1, June 1974.

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

(e) If the alarm setpoint of the effluent monitor, as determined by the method presented in the ODCM, is exceeded, the frequency of sampling shall be increased to daily until the condition no longer exists. Frequency of analysis shall be increased to daily for principal gamma emitters and an incident composite for H-3, gross alpha, Sr-89, Sr-90, and Fe-55.

(f) If the alarm setpoint of Service Water Effluent Monitor A and/or B, as determined by the method presented in the ODCM, is exceeded, the frequency of sampling shall be increased to daily until the condition no longer exists. Frequency of analysis shall be increased to daily for principal gamma emitters and an incident composite for H-3, gross alpha, Sr-89, Sr-90, and Fe-55.

RADIOACTIVE EFFLUENTS

LIQUID EFFLUENTS

DOSE

CONTROLS

3.11.1.2 The dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released, from each unit, to UNRESTRICTED AREAS (see Figure 5.1.3-1) shall be limited:

a. During any calendar quarter to less than or equal to 1.5 mrem to the whole body and to less than or equal to 5 mrem to any organ, and

b. During any calendar year to less than or equal to 3 mrem to the whole body and to less than or equal to 10 mrem to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, 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.

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.2 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 31 days.

RADIOACTIVE EFFLUENTS

LIQUID EFFLUENTS

LIQUID RADWASTE TREATMENT SYSTEM

CONTROLS

3.11.1.3 The liquid radwaste treatment system shall be OPERABLE, and appropriate portions of the system shall be used to reduce releases of radioactivity when the projected doses due to the liquid effluent, from the unit, to UNRESTRICTED AREAS (see Figure 5.1.3-1) would exceed 0.06 mrem to the whole body or 0.2 mrem to any organ in a 31-day period.

APPLICABILITY: At all times.

ACTION:

a. With radioactive liquid waste being discharged without treatment and in excess of the above limits and any portion of the liquid radwaste treatment system not in operation, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report that includes the following information:

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

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

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

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.1.3.1 Doses due to liquid releases from each unit to UNRESTRICTED AREAS shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM when liquid radwaste treatment systems are not being fully utilized.

4.11.1.3.2 The installed liquid radwaste treatment system shall be considered OPERABLE by meeting CONTROLS 3.11.1.1 and 3.11.1.2.

RADIOACTIVE EFFLUENTS

3/4.11.2 GASEOUS EFFLUENTS

DOSE RATE

CONTROLS

3.11.2.1 The dose rate from radioactive materials released in gaseous effluents from the site to areas at or beyond the SITE BOUNDARY (see Figure 5.1.3-1) shall be limited to the following:

a. For noble gases: Less than or equal to 500 mrem/yr to the whole body and less than or equal to 3000 mrem/yr to the skin, and

b. For iodine-131, for iodine-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days: Less than or equal to 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).

SURVEILLANCE REQUIREMENTS

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

4.11.2.1.2 The dose rate from iodine-131, iodine-133, 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 4.11.2-1.

TABLE 4.11.2-1

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/ml)
1. Containment(b)	Each PURGE	P	Principal Gamma Emitters(c)	$1x10^{-4}$
		Each PURGE	H-3 (oxide), Principal Gamma Emitters(c)	$1x10^{-6}$, $1x10^{-4}$
2. Main Stack Radwaste/Reactor Building Vent	M(d)	M(d)	Principal Gamma Emitters(c)	$1x10^{-4}$
	Grab Sample M(e)	M(e)	H-3 (oxide)	$1x10^{-6}$
	Continuous(f)	W(g) Charcoal Sample	I-131	$1x10^{-12}$
	Continuous(f)	W(g) Particulate Sample	Principal Gamma Emitters(c)	$1x10^{-11}$
			Gross Alpha	$1x10^{-11}$
	Continuous(f)	Q Composite Particulate Sample	Sr-89, Sr-90	$1x10^{-11}$

TABLE 4.11.2-1 (Continued)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATIONS

(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.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ S_b}{E\ V\ 2.22 \times 10^6\ Y\ \exp(-\lambda \Delta t)}$$

Where:

LLD	=	The before-the-fact lower limit of detection (microcuries per unit mass or volume)
S_b	=	the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute)
E	=	the counting efficiency (counts per disintegration)
V	=	the sample size (units of mass or volume)
2.22×10^6	=	the number of disintegrations per minute per micro curie
Y	=	the fractional radiochemical yield, when applicable
λ	=	the radioactive decay constant for the particular radionuclide (sec^{-1})
Δt	=	the elapsed time between the midpoint of sample collection and the time of counting (seconds)

Typical values of E, V, Y, and Dt should be used in the calculation.

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

TABLE 4.11.2-1 (Continued)

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

TABLE NOTATIONS

(b) Sample and analysis before PURGE is used to determine permissible PURGE rates. Sample and analysis during actual PURGE is used for offsite dose calculations.

(c) The principal gamma emitters for which the LLD CONTROL applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, and Xe-138 in noble gas releases and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141, and Ce-144 in iodine and particulate releases. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to CONTROL 6.9.1.8 in the format outlined in RG 1.21, Appendix B, Revision 1, June 1974.

(d) If the main stack or reactor/radwaste building isotopic monitor is not OPERABLE, sampling and analysis shall also be performed following shutdown, startup, or when there is an alarm on the offgas pretreatment monitor.

(e) Tritium grab samples shall be taken weekly from the reactor/radwaste ventilation system when fuel is offloaded until stable tritium release levels can be demonstrated.

(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 3.11.2.1.b and 3.11.2.3.

(g) When the release rate of the main stack or reactor/radwaste building vent exceeds its alarm setpoint, the iodine and particulate device shall be removed and analyzed to determine the changes in iodine and particulate release rates. The analysis shall be done daily until the release no longer exceeds the alarm setpoint. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10.

RADIOACTIVE EFFLUENTS

GASEOUS EFFLUENTS

DOSE - NOBLE GASES

CONTROLS

3.11.2.2 The air dose from noble gases released in gaseous effluents, from each unit, to areas at or beyond the SITE BOUNDARY (see Figure 5.1.3-1) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 5 mrad for gamma radiation and less than or equal to 10 mrad for beta radiation, and

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

APPLICABILITY: At all times.

ACTION:

a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, 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.

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.2 Cumulative dose contributions for the current calendar quarter and current calendar year for noble gases shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

RADIOACTIVE EFFLUENTS

GASEOUS EFFLUENTS

DOSE - IODINE-131, IODINE-133, TRITIUM, AND RADIOACTIVE MATERIAL IN PARTICULATE FORM

CONTROLS

3.11.2.3 The dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium, and all radioactive material in particulate form with half-lives greater than 8 days in gaseous effluents released, from each unit, to areas at or beyond the SITE BOUNDARY (see Figure 5.1.3-1) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 7.5 mrem to any organ and,

b. During any calendar year: Less than or equal to 15 mrem to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of iodine-131, iodine-133, tritium, and radioactive material in particulate form with half-lives greater than 8 days, in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, 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.

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.3 Cumulative dose contributions for the current calendar quarter and current calendar year for iodine-131, iodine-133, tritium and radioactive material 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 31 days.

RADIOACTIVE EFFLUENTS

GASEOUS EFFLUENTS

GASEOUS RADWASTE TREATMENT SYSTEM

CONTROLS

3.11.2.4 The GASEOUS RADWASTE TREATMENT SYSTEM shall be in operation.

APPLICABILITY: Whenever the main condenser air ejector system is in operation.

ACTION:

a. With gaseous radwaste from the main condenser air ejector system being discharged without treatment for more than 7 days, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report that includes the following information.

   1. Identification of the inoperable equipment or subsystems and the reason for the inoperability,

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

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

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.4 The readings of the relevant instruments shall be checked every 12 hours when the main condenser air ejector is in use to ensure that the gaseous radwaste treatment system is functioning.

RADIOACTIVE EFFLUENTS

GASEOUS EFFLUENTS

VENTILATION EXHAUST TREATMENT SYSTEM

CONTROLS

3.11.2.5 The VENTILATION EXHAUST TREATMENT SYSTEM shall be OPERABLE and appropriate portions of this system shall be used to reduce releases of radioactivity when the projected doses in 31 days from iodine and particulate releases, from each unit, to areas at or beyond the SITE BOUNDARY (see Figure 5.1.3-1) would exceed 0.3 mrem to any organ of a MEMBER OF THE PUBLIC.

APPLICABILITY: At all times.

ACTION:

a. With radioactive gaseous waste being discharged without treatment and in excess of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report that includes the following information:

   1. Identification of any inoperable equipment or subsystems, and the reason for the inoperability,

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

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

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.5.1 Doses from iodine and particulate releases from each unit to areas at or beyond the SITE BOUNDARY shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM when the VENTILATION EXHAUST TREATMENT SYSTEM is not being fully utilized.

4.11.2.5.2 The installed VENTILATION EXHAUST TREATMENT SYSTEM shall be considered OPERABLE by meeting CONTROLS 3.11.2.1 or 3.11.2.3.

RADIOACTIVE EFFLUENTS

GASEOUS EFFLUENTS

VENTING OR PURGING

CONTROLS

3.11.2.8 VENTING or PURGING of the drywell and/or suppression chamber shall be through the standby gas treatment system.*

APPLICABILITY: OPERATIONAL CONDITIONS 1, 2, and 3.

ACTION:

a. With the requirements of the above CONTROL not satisfied, suspend all VENTING and PURGING of the drywell and/or suppression chamber.

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.2.8.1 The drywell and/or suppression chamber shall be determined to be aligned for VENTING or PURGING through the standby gas treatment system within 4 hours before start of and at least once per 12 hours during VENTING or PURGING.

* *See Technical Specification 3.6.5.3.*

3/4.11.4 TOTAL DOSE

CONTROLS

3.11.4 The annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC due to releases of radioactivity and to radiation from uranium fuel cycle sources shall be limited to less than or equal to 25 mrem to the whole body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrem.

APPLICABILITY: At all times.

ACTION:

a. With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of CONTROLS 3.11.1.2.a, 3.11.1.2.b, 3.11.2.2.a, 3.11.2.2.b, 3.11.2.3.a, or 3.11.2.3.b, calculations shall be made including direct radiation contributions from the units (including outside storage tanks, etc.) to determine whether the above limits of CONTROL 3.11.4 have been exceeded. If such is the case, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, 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 20.405(c), 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 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR 190. Submittal of the report is considered a timely request, and a variance is granted until staff action on the request is complete.

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.11.4.1 Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with CONTROLS 4.11.1.2, 4.11.2.2, and 4.11.2.3, and in accordance with the methodology and parameters in the ODCM.

4.11.4.2 Cumulative dose contributions from direct radiation from the units (including outside 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 ACTION a of CONTROL 3.11.4.

3/4.12 RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.1 MONITORING PROGRAM

CONTROLS

3.12.1 The Radiological Environmental Monitoring Program shall be conducted as specified in Table 3.12.1-1.

APPLICABILITY: At all times.

ACTION:

a. With the Radiological Environmental Monitoring Program not being conducted as specified in Table 3.12.1-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report required by CONTROL 6.9.1.7, 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 3.12.1-2 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, 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 3.11.1.2, 3.11.2.2, or 3.11.2.3. When more than one of the radionuclides in Table 3.12.1-2 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 3.12.1-2 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 from all radionuclides is equal to or greater than the calendar year limits of CONTROL 3.11.1.2, 3.11.2.2, or 3.11.2.3. 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 required by CONTROL 6.9.1.7.

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* *The methodology and parameters used to estimate the potential annual dose to a MEMBER OF THE PUBLIC shall be indicated in this report.*

CONTROLS

3.12.1 (Continued)

ACTION:

c. With milk or fresh leafy vegetation samples unavailable from one or more of the sample locations required by Table 3.12.1-1, identify specific locations for obtaining replacement samples and add them within 30 days to the Radiological Environmental Monitoring Program. The specific locations from which samples were unavailable may then be deleted from the monitoring program. Pursuant to CONTROL 6.9.1.8, submit in the next Semiannual Radioactive Effluent Release Report documentation for a change in the ODCM including a revised figure(s) and table for the ODCM reflecting the new location(s) with supporting information identifying the cause of the unavailability of samples and justifying the selection of the new location(s) for obtaining samples.

d. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.1 The radiological environmental monitoring samples shall be collected pursuant to Table 3.12.1-1 from the specific locations given in the table and figure(s) in the ODCM, and shall be analyzed pursuant to the requirements of Table 3.12.1-1 and the detection capabilities required by Table 4.12.1-1.

TABLE 3.12.1-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES AND SAMPLE LOCATIONS(a)	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
1. Direct Radiation(b)	32 routine monitoring stations either with 2 or more dosimeters or with 1 instrument for measuring and recording dose rate continuously, placed as follows: An inner ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY An outer ring of stations, one in each land base meteorological sector in the 4 to 5-mile* range from the site The balance of the stations should be placed in special interest areas such as population centers, nearby residences, schools, and in one or two areas to serve as control stations(c).	Once per 3 months	Gamma dose once per 3 months

** At this distance, 8 windrose sectors, (W, WNW, NW, NNW, N, NNE, NE, and ENE) are over Lake Ontario.*

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES AND SAMPLE LOCATIONS(a)	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
2. Airborne Radioiodine and Particulates	Samples from five locations: 3 samples from offsite locations close to the site boundary (within one mile) in different sectors of the highest calculated annual site average ground-level D/Q (based on all site licensed reactors) 1 sample from the vicinity of an established year-round community having the highest calculated annual site average ground-level D/Q (based on all site licensed reactors) 1 sample from a control location, at least 10 miles distant and in a least prevalent wind direction(c)	Continuous sampler operation with sample 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) and gamma isotopic analysis(e) of composite (by location) at least quarterly
3. Waterborne			
a. Surface(f)	One sample upstream(c); one sample from the site's downstream cooling water intake	Composite sample over 1-month period(g)	Gamma isotopic analysis(e) once/month; composite for tritium analysis once/ 3 months

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES AND SAMPLE LOCATIONS(a)	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
3. Waterborne (Continued)			
b. Ground	Samples from one or two sources, only if likely to be affected(h)	Quarterly grab sample	Gama isotopic(e) and tritium analysis quarterly
c. Drinking	1 sample of each of one to three of the nearest water supplies that could be affected by its discharge(i)	Composite sample over a 2-week period(g) when I-131 analysis is performed; monthly composite otherwise	I-131 analysis on each composite when the dose calculated for the consumption of the water is greater than 1 mrem per year.(j) Composite for gross beta and gamma isotopic analyses(e) monthly. Composite for tritium analysis quarterly
d. Sediment from Shoreline	1 sample from a downstream area with existing or potential recreational value	Twice per yearGamma isotopic analysis(e)	

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES AND SAMPLE LOCATIONS(a)	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
4. Ingestion			
a. Milk	Samples from MILK SAMPLING LOCATIONS in three locations within 3.5 miles distance having the highest calculated site average D/Q (based on all licensed site reactors). If there are none, then 1 sample from MILK SAMPLING LOCATIONS in each of three areas 3.5-5.0 miles distant having the highest calculated site average D/Q (based on all licensed site reactors). One sample from a MILK SAMPLING LOCATION at a control location 9-20 miles distant and in a least prevalent wind direction(c)	Twice per month, April-December (samples will be collected January-March if I-131 is detected in November and December of the preceding year)	Gamma isotopic(e) and I-131 analysis twice/month when animals are on pasture (April-December); once per month at other times (January-March if required)
b. Fish	One sample each of two commercially or recreationally important species in the vicinity of a plant discharge area(k) One sample of the same species in areas not influenced by station discharge(c)	Twice per year	Gamma isotopic analysis(e) on edible portions twice per year

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF SAMPLES AND SAMPLE LOCATIONS(a)	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
4. Ingestion (Continued)			
c. Food Products	One sample of each principal class of food products from any area that is irrigated by water in which liquid plant wastes have been discharged(l)	At time of harvest(m)	Gamma isotopic(e) analysis of edible portions (isotopic to include I-131)
	Samples of three different kinds of broad leaf vegetation (such as vegetables) grown nearest to each of two different offsite locations of highest calculated site average D/Q (based on all licensed site reactors)	Once per year during the harvest season	Gamma isotopic(e) analysis of edible portions (isotopic to include I-131)
	One sample of each of the similar broad leaf vegetation grown at least 9.3 miles distant in a least prevalent wind direction	Once per year during the harvest season	Gamma isotopic(e) analysis of edible portions (isotopic to include I-131)

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

TABLE NOTATIONS

(a) 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 3.12.1-1 in a table and figure(s) in the ODCM. Refer to NUREG-0133, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants, "October 1978, and to Radiological Assessment Branch Technical Position on Environmental Monitoring, Revision 1, November 1979. Deviations are permitted from the required sampling schedule if specimens are unobtainable because of such circumstances as hazardous conditions, seasonal unavailability,* or malfunction of automatic sampling equipment. If specimens are unobtainable because sampling equipment malfunctions, effort shall be made to complete corrective action before 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 CONTROL 6.9.1.7. It is recognized that, at times, it may not be possible or practical 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 may be made within 30 days in the Radiological Environmental Monitoring Program given in the ODCM. Pursuant to CONTROL 6.9.1.8, submit in the next Semiannual Radioactive Effluent Release Report a revised figure(s) and table for the ODCM reflecting the new location(s) with supporting information identifying the cause of the unavailability of samples for that pathway and justifying the selection of new location(s) for obtaining samples.

(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 purpose 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 these samples 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, which 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 10 times the previous yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

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

**Seasonal unavailability is meant to include theft and uncooperative residents.*

TABLE 3.12.1-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

TABLE NOTATIONS

(f) The "upstream" sample shall be taken at a distance beyond significant influence of the discharge. The "downstream" sample shall be taken in an area beyond but near the mixing zone.

(g) In this program, representative composite sample aliquots 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 (refer to the ODCM for definition of representative composite sample).

(h) Groundwater samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination (see ODCM for discussion).

(I) Drinking water samples shall be taken only when drinking water is a dose pathway (see ODCM for discussion).

(j) Analysis for I-131 may be accomplished by Ge-Li analysis provided that the lower limit of detection (LLD) for I-131 in water samples found on Table 4.12.1-1 can be met. Doses shall be calculated for the maximum organ and age group; using the methodology in the ODCM.

(k) In the event two commercially or recreationally important species are not available, after three attempts of collection, then two samples of one species or other species not necessarily commercially or recreationally important may be utilized.

(l) This CONTROL applies only to major irrigation projects within 9 miles of the site in the general "downcurrent" direction (see ODCM for discussion).

(m) If harvest occurs more than once a year, sampling shall be performed during each discrete harvest. If harvest occurs continuously, sampling shall be taken monthly. Attention shall be paid to including samples of tuberous and root food products.

TABLE 3.12.1-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

RADIONUCLIDE 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-95, 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	

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

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

Table 4.12.1-1

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS(a)(b)

LOWER LIMIT OF DETECTION(c)

RADIONUCLUDE ANALYSIS	WATER (pCi/l)	AIRBORNE PARTICULATE 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-95, 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		

* *If no drinking water pathway exists, a value of 3000 pCi/liter may be used.*

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

TABLE 4.12.1-1 (Continued)

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE

ANALYSIS - LOWER LIMIT OF DETECTION
TABLE NOTATIONS

(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 CONTROL 6.9.1.7.

(b) Required detection capabilities for thermoluminescent dosimeters used for environmental measurements are given in ANSI N-545, Section 4.3 1975. Allowable exceptions to ANSI N-545, Section 4.3 are contained in the Nine Mile Point Unit 2 ODCM.

(c) The lower limit of detection (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.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66\ s_b}{E\ V\ 2.22\ Y\ \exp(-\lambda \Delta t)}$$

Where:

LLD	=	the before-the-fact lower limit of detection (picocuries per unit mass or volume)
S_b	=	the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (counts per minute)
E	=	the counting efficiency (counts per disintegration)
V	=	the sample size (units of mass or volume)
2.22	=	the number of disintegrations per minute per picocurie
Y	=	the fractional radiochemical yield, when applicable
λ	=	the radioactive decay constant for the particular radionuclide (sec^{-1})
Δt	=	the elapsed time between environmental collection, or end of the sample collection period, and time of counting (seconds)

Typical values of E, V, Y, and Dt should be used in the calculation.

TABLE 4.12.1-1 (Continued)

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE

ANALYSIS - LOWER LIMIT OF DETECTION

TABLE NOTATIONS

It should be recognized that the LLD is defined as a before-the-fact limit representing the capability of a measurement system and not as an 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 CONTROL 6.9.1.7.

3/4.12.2 LAND USE CENSUS

CONTROL

3.12.2 A land use census shall be conducted and shall identify within a distance of 5 miles the location in each of the 16 meteorological sectors of the nearest milk animal and the nearest residence, and the nearest garden* of greater than 500 square feet producing broad leaf vegetation. For elevated releases as defined in RG 1.111, Revision 1, July 1977, the land use census shall also identify within a distance of 3 miles the locations in each of the 16 meteorological sectors of all milk animals and all gardens* greater than 500 square feet producing broad leaf vegetation.

APPLICABILITY: At all times.

ACTION:

a. With a land use census identifying a location(s) that yields a calculated dose, dose commitment, or D/Q value greater than the values currently being calculated in CONTROL 4.11.2.3, pursuant to CONTROL 6.9.1.8, identify the new location(s) in the next Semiannual Radioactive Effluent Release Report.

b. With a land use census identifying a location(s) that yields a calculated dose, dose commitment, or D/Q value (via the same exposure pathway) significantly greater (50%) than at a location from which samples are currently being obtained in accordance with CONTROL 3.12.1-1, add the new location(s) within 30 days to the Radiological Environmental Monitoring Program given in the ODCM. The sampling location(s), excluding the control station location, having the lowest calculated dose, dose commitment(s) or D/Q value, 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. Pursuant to CONTROL 6.9.1.8 submit in the next Semiannual Radioactive Effluent Release Report documentation for a change in the ODCM including a revised figure(s) and table(s) for the ODCM reflecting the new location(s) with information supporting the change in sampling locations.

c. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

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* *Broad leaf vegetation sampling of at least three different kinds of vegetation, such as garden vegetables, may be performed at offsite locations in each of two different locations with the highest predicted D/Qs in lieu of the garden census. CONTROLS for broad leaf vegetation sampling in Table 3.12.1-1, Part 4.c, shall be followed, including analysis of control samples.*

SURVEILLANCE REQUIREMENTS

4.12.2 The land use census shall be conducted during the growing season at least once every 12 months 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 CONTROL 6.9.1.7.

RADIOLOGICAL ENVIRONMENTAL MONITORING

3/4.12.3 INTERLABORATORY COMPARISON PROGRAM

CONTROLS

3.12.3 Analyses shall be performed on all radioactive materials, supplied as part of an Interlaboratory Comparison Program that has been approved by the Commission, that correspond to samples required by Table 3.12.1-1. Participation in this program shall include media for which environmental samples are routinely collected and for which intercomparison samples are available.

APPLICABILITY: At all times.

ACTION:

a. 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 CONTROL 6.9.1.7.

b. The provisions of CONTROLS 3.0.3 and 3.0.4 are not applicable.

SURVEILLANCE REQUIREMENTS

4.12.3 The Interlaboratory Comparison Program shall be described in the ODCM. A summary of the results obtained as part of the above required Interlaboratory Comparison Program shall be included in the Annual Radiological Environmental Operating Report pursuant to CONTROL 6.9.1.7.

PART I - RADIOLOGICAL EFFLUENT CONTROLS BASES