SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

R. E. GINNA NUCLEAR PLANT

ROCHESTER GAS AND ELECTRIC

DOCKET NO. 50-244

JANUARY - JUNE, 1991

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1.0 INTRODUCTION

This Semiannual Radioactive Effluent Release Report is for Rochester Gas and Electric Corporation R.E. Ginna plant and is submitted in accordance with the requirements of Technical Specification Section 6.9.1.4. The report covers the period from January 1, 1991 through June 30, 1991.

This report includes a summary of the quantities of radioactive gaseous and liquid effluents and solid waste released from the plant presented in the format outlined in appendix B of Regulatory Guide 1.21, Revision 1, June 1974.

Corrected forms for liquid effluents released during the July - December 1990 period are included as Tables 5A and 5B to show data which was not available when the report was prepared. Table 3 listing isotopic data for radwaste shipments was incomplete during the July-December 1990 report and a corrected table is included as Table 6 with this report. The table as printed only accounted for 2/3 of the total activity shipped.

All gaseous and liquid effluents discharged during this reporting period were in compliance with the limits of the R.E. Ginna Technical Specifications.

During this report period, 5 of the liquid effluent monitors were replaced with new monitors. The Tech. Spec. allows releases to be made when specific sampling programs are followed when monitors are inoperable. Several monitors were inoperable for more than 30 days, and either the sampling requirements were met or the releases were not made for all situations.

2.0 SUPPLEMENTAL INFORMATION

2.1 Regulatory Limits

The Technical Specification limits applicable to release of radioactive material in liquid and gaseous effluents are:

2.1.1 Fission and Activation Gases

The instantaneous dose rate, as calculated in the ODCM, due to noble gases released in gaseous effluents from the site shall be limited to a release rate which would yield $\leq$ 500 mrem/yr to the total body and $\leq$ 3000 mrem/yr to the skin if allowed to continue for a full year.

The air dose, as calculated in the ODCM, due to noble gases released in gaseous effluents from the site shall be limited to the following:

(i) During any calendar quarter to ≤ 10 mrad for gamma radiation and to ≤ 20 mrad for beta radiation.

2.1.2 Radioiodine, Tritium and Particulates

The instantaneous dose rate, as calculated in the ODCM, due to radioactive materials released in gaseous effluents from the site as radioiodines, radioactive materials in particulate form, and radionuclides other than noble gases with half-lives greater than 8 days shall be limited to a release rate which would yield ≤ 1500 mrem/yr to any organ if allowed to continue for a full year.

The dose to an individual, as calculated in the ODCM, from radioiodine, radioactive materials in particulate form and radionuclides other than noble gases with half-lives greater than eight days released with gaseous effluents from the site shall be limited to the following:

(i) During any calendar quarter to ≤ 7.5 mrem to any organ.

(ii) During any calendar year to ≤ 15 mrem to any organ.

2.1.3 Liquid Effluents

The release of radioactive liquid effluents shall be such that the concentration in the circulating water discharge does not exceed the limits specified in accordance with Appendix B, Table II, Column 2 and notes thereto of 10CFR20. For dissolved or entrained noble gases the total activity due to dissolved or entrained noble gases shall not exceed 2 E-4 uCi/ml.

The dose or dose commitment to an individual as calculated in the ODCM from radioactive materials in liquid effluents released to unrestricted areas shall be limited:

(i) During any calendar quarter to ≤ 1.5 mrem to the total body and to ≤ 5 mrem to any organ, and

(ii) During any calendar year to ≤ 3 mrem to the total body and to ≤ 10 mrem to any organ.

2.2 Maximum Permissible Concentrations (MPC)

2.2.1 For gaseous effluents, maximum permissible concentrations are not directly used in release rate calculations since the applicable limits are stated in terms of dose rate at the unrestricted area boundary.

2.2.2 For liquid effluents, the maximum permissible concentration values specified in 10CFR20, Appendix B, Table II, column 2 are used to calculate release rates and permissible concentrations at the unrestricted area boundary. A value of 2E-04 uCi/ml is used as the MPC for dissolved and entrained noble gases in liquid effluents.

2.3 Release Rate Limits

The release rate limits for fission and activation gases from the R.E. Ginna plant are not based on the average energy of the radionuclide mixture in gaseous effluents; therefore, this value is not applicable. However, the average energy of the radionuclide mixture was 0.217 Mev.

2.4 Measurements and Approximations of Total Radioactivity

Gamma spectroscopy was the primary analysis method used to determine the radionuclide composition and concentration of gaseous and liquid effluents. Composite samples were analyzed for Sr-89, Sr-90 and Fe-55 by a contract laboratory. Tritium and alpha analysis were done using liquid scintillation and gas flow proportional counting respectively.

The total radioactivity in effluent releases was determined from the measured concentration of each radionuclide present and the total volume of effluents released.

2.5 Batch Releases

2.5.1 Liquid

1.	Number of batch releases:	2.71 E+02
2.	Total time period for batch releases:	4.57 E+04 min.
3.	Maximum time period for a batch release:	5.41 E+03 min.
4.	Average time period for batch releases:	1.68 E+02 min.
5.	Minimum time period for a batch release:	1.3 E+01 min.
6.	Average stream flow (LPM) during periods of release effluent into a flowing stream:	9.59 E+05 lpm

2.5.2 Gaseous

1.	Number of batch releases:	1.0E+01
2.	Total time period for batch releases:	6.94E+03 min.
3.	Maximum time period for a batch release:	5.38E+03 min.
4.	Average time period for batch releases:	6.94E+02 min.
5.	Minimum time period for a batch release:	1.52E+02 min.

2.6 Abnormal Releases

There were no abnormal releases of liquid or gaseous effluents during the reporting period.

3.0 SUMMARY OF GASEOUS RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in gaseous effluents are summarized in tables 1A and 1B. All releases were considered to be elevated releases.

4.0 SUMMARY OF LIQUID RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in liquid effluents are summarized in tables 2A and 2B.

5.0 SOLID WASTES

The quantities of radioactive material released in shipments of solid waste transported from the site during the reporting period are summarized in table 3. Principal nuclides were determined by gamma spectroscopy and non-gamma emitters were calculated from scaling factors determined by an independent laboratory from representative samples of that waste type. The majority of Dry Active Waste is processed utilizing an off-site processor who reduces the volume and then sends the waste for burial.

6.0 LOWER LIMIT OF DETECTION NOT MET

One or more gamma emitting radionuclides did not meet the required lower limit of detection for 14 liquid releases. These are listed by release number in Table 4.

7.0 RADIOLOGICAL IMPACT

An assessment of doses to the maximally exposed individual from gaseous and liquid effluents will be performed and reported in the July - December, 1991 Semi-Annual Report for the year of 1991.

8.0 METEOROLOGICAL DATA

This data will be in the report issued for July-December, 1991.

9.0 LAND USE CHANGES

This data will be in the report issued for July-December, 1991.

10.0 ANNUAL TABULATION OF PERSONNEL EXPOSURE

This data will be in the report issued for July-December, 1991.

11.0 LEAK TEST OF SEALED SOURCES

No sealed sources were found to be leaking when smeared by both wet and dry smears.

12.0 CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL (ODCM)

There were no changes to the ODCM during the report period.

13.0 CHANGES TO THE PROCESS CONTROL PROGRAM (PCP)

There were no changes to the PCP during the reporting period.

14.0 MAJOR CHANGES TO RADWASTE TREATMENT SYSTEMS

There were no major changes to the Radwaste Treatment Systems during the reporting period.

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Table 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
JANUARY - JUNE 1991

A. Fission & activation gases	Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
1. Total release	Ci	1.03E+02	2.53E+01	6.60E+00
2. Average release rate for period	uCi/sec	1.33E+01	3.21E+00	
3. Percent of technical specification limit	%	2.11E-03	5.10E-04	
B. Iodines				
1. Total iodine-131	Ci	7.04E-04	5.45E-04	3.20E+01
2. Average release rate for period	uCi/sec	9.05E-05	6.93E-05	
3. Percent of technical specification limit	%	1.99E-01	1.52E-01	
C. Particulates				
1. Particulates with half-lives > 8days	Ci	4.45E-06	6.60E-06	3.50E+01
2. Average release rate for period	uCi/sec	5.72E-07	8.39E-07	
3. Percent of technical specification limit	%	4.30E-05	6.31E-05	
4. Gross alpha radioactivity	Ci		6.10E-08	
D. Tritium				
1. Total release	Ci	2.01E+01	2.30E+01	3.20E+00
2. Average release rate for period	uCi/sec	2.58E+00	2.92E+00	
3. Percent of technical specification limit	%	3.04E-04	3.44E-04	
E. Carbon-14				
1. Total release	Ci	9.14E-01	8.56E-01	3.00E+01
2. Average release rate for period	uCi/sec	1.18E-01	1.09E-01	
3. Percent of technical specification limit	%	6.25E-06	5.79E-06	

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 1B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
GASEOUS EFFLUENTS - ELEVATED RELEASE

		Continuous Mode		Batch Mode	
Nuclides released	Unit	Quarter 1st	Quarter 2nd	Quarter 1st	Quarter 2nd
1. Fission gases					
argon-41	Ci	6.76E-01	1.93E-01	3.13E-01	3.41E-02
krypton-85	Ci			1.65E+00	5.18E-01
krypton-85m	Ci	1.23E+00	7.37E-02	7.06E-03	1.78E-03
krypton-87	Ci	2.61E-02	6.80E-02		
krypton-88	Ci	4.36E-02	1.20E-01	8.38E-03	1.34E-03
xenon-131m	Ci	6.03E-02	1.16E-01	2.82E-01	6.33E-02
xenon-133	Ci	6.92E+01	1.62E+01	1.37E+01	3.73E+00
xenon-133m	Ci	2.02E-01	2.53E-02	7.23E-02	3.17E-02
xenon-135	Ci	1.22E+01	3.50E+00	9.17E-02	3.48E-02
xenon-135m	Ci	3.61E+00	4.62E-01		
xenon-138	Ci	6.74E-02	1.55E-01		
others (specify)	Ci				
	Ci				
	Ci				
	Ci				
Total for period	Ci	8.73E+01	2.09E+01	1.61E+01	4.41E+00
2. Iodines					
iodine-131	Ci	6.89E-04	5.44E-04	1.51E-05	1.41E-06
iodine-133	Ci	3.29E-04	3.54E-05	1.16E-07	
iodine-135	Ci				
Total for period	Ci	1.02E-03	5.79E-04	1.52E-05	1.41E-06
3. Particulates					
strontium-89	Ci		*		
strontium-90	Ci		*		
cesium-134	Ci				
cesium-137	Ci	4.45E-06	6.30E-06		
other (specify)	Ci				
cobalt-58	Ci		9.40E-08		
cobalt-60	Ci		2.01E-07		
Total for period	Ci	4.45E-06	6.60E-06		
unidentified	Ci	3.39E-06	1.21E-05		

Note: Isotope for which no value is given were not identified in applicable releases.

* Sample sent out for analysis but result not yet received. Data for identified isotopes will be included with next semi-annual report for July - December, 1991.

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Table 2A
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
JANUARY - JUNE 1991

A. Fission and activation products	Unit	Quarter 1st	Quarter 2nd	Est.Total Error, %
1. Total release (not including tritium, gases, alpha)	Ci	4.26E-02	2.28E-02	5.60E+00
2. Average diluted concentration during period	uCi/ml	3.22E-10	1.93E-10	
3. Percent of applicable limit	%	2.41E-02	3.79E-03	
B. Tritium				
1. Total release	Ci	1.75E+02	7.47E+01	3.20E+00
2. Average diluted concentration during period	uCi/ml	1.33E-06	6.33E-07	
3. Percent of applicable limit	%	4.42E-02	2.11E-02	
C. Dissolved and entrained gases				
1. Total release	Ci	8.53E-02	2.14E-02	6.00E+00
2. Average diluted concentration during period	uCi/ml	6.46E-10	1.81E-10	
3. Percent of applicable limit	%	3.23E-04	9.07E-05	
D. Gross alpha radioactivity				
1. Total release	Ci			
E. Vol. of waste released (prior to dilution)	Liters	3.10E+07	1.34E+07	
F. Vol. of dilution water used during period	Liters	1.32E+11	1.18E+11	

Note: Isotope for which no value is given were not identified in applicable releases.

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Table 2B
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
chromium-51	Ci				2.84E-04
manganese-54	Ci			6.79E-05	7.77E-05
iron-55	Ci		*		*
iron-59	Ci			2.31E-06	
cobalt-58	Ci			3.89E-03	5.07E-03
cobalt-60	Ci	1.13E-07	7.06E-05	1.05E-03	1.45E-03
zinc-65	Ci				
strontium-89	Ci		*	6.31E-07	*
strontium-90	Ci		*	4.08E-05	*
zirconium/niobium-95	Ci			5.65E-05	6.40E-05
molybdenum-99	Ci			1.73E-05	
silver-110m	Ci			2.11E-04	
antinony-122	Ci			1.49E-03	2.03E-04
antinony-124	Ci		7.82E-05	1.22E-03	2.78E-03
antinony-125	Ci			8.27E-05	2.39E-04
iodine-131	Ci	2.72E-04	7.40E-05	7.62E-03	9.15E-04
iodine-133	Ci	1.69E-04	3.57E-05	3.09E-03	
iodine-135	Ci	2.16E-05	2.27E-05	5.79E-04	
cesium-134	Ci	1.30E-04	1.61E-04	9.88E-03	5.15E-03
cesium-136	Ci			2.58E-04	
cesium-137	Ci	1.80E-04	2.41E-04	1.22E-02	5.83E-03
barium/lanthanum-140	Ci				
cerium-141	Ci				
other (specify)	Ci				
	Ci				
Total for period (above)	Ci	7.73E-04	6.83E-04	4.18E-02	2.21E-02
unidentified	Ci				
xenon-133	Ci	2.74E-05		8.17E-02	2.14E-02
xenon-135	Ci			3.61E-03	

Note: Isotope for which no value is given were not identified in applicable releases.

* Sample sent out for analysis but results not yet received. Data for identified isotopes will be included with next Semi-annual report for July-December 1991.

Table 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

January - June 1991

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. Type of waste	Unit	6-month Period	Est. Total Error %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	1.22E+01	2.0+00
	Ci	2.30E+00	2.0+01
b. Dry compressible waste, contaminated equip, etc.	m^3 *	9.27E+00	2.0+00
	Ci *	8.84E-01	2.0+01
c. Irradiated components, control rods, etc.	m^3		
	Ci		
d. Other (describe)	m^3		
	Ci		

2. Estimate of major nuclide composition (by type of waste)

a.	Hydrogen-3	%	9.3E+01
	Antimony-125	%	2.6E+00
	Antimony-124	%	2.3E+00
	Iodine-131	%	1.2E+00
	Cobalt-58	%	9.9E-02
	Cesium-137	%	6.2E-02
	Iron-55	%	5.7E-02
	Nickel-63	%	3.9E-02
	Cesium-134	%	1.8E-02
	Silver-110m	%	1.7E-02
b.	Iron-55	%	3.2E+01
	Cesium-137	%	2.0E+01
	Cobalt-58	%	1.5E+01
	Cobalt-60	%	1.5E+01
	Antimony-125	%	3.6E+00
	Nickel-63	%	6.8E+00
	Cesium-134	%	3.9E+00
	Iodine-129	%	1.2E+00
	Strontium-90	%	8.1E+00
	Technetium-99	%	5.7E-01
	Carbon-14	%	2.4E-01
		%	

* Volume and activity buried by waste processor during this period

Table 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

January - June 1991

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
**5	Sole Use Truck	Oak Ridge TN

** Shipped to waste processor for volume reduction

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

Table 4

RELEASE PERMITS NOT MEETING LLD REQUIREMENTS

No.	Date	Isotopes	Cause
910035	1/24/91	Fe-59,Zn-65,Ce-141	a.
910056	2/6/91	Zn-65	a.
910075	2/16/91	Fe-59,Zn-65	a.
910129	3/23/91	Zn-65, Ce-141	a.
910131	3/24/91	Fe-59, Zn-65	a.
910132	3/24/91	Fe-59, Zn-65, Cs-134, Ce-141	a.
91015	4/8/91	Fe-59, Zn-65, Cs-134, Ce-141	a.
910159	4/9/91	Fe-59, Zn-65, Cs-137	a.
910161	4/10/91	Fe-59, Zn-65, Cs-134, Cs-137, Ce-141	a.
910169	4/16/91	Fe-59, Zn-65	a.
910184	4/30/91	Fe-59, Zn-65	a.
910186	5/2/91	Fe-59, Zn-65	a.
910235	5/28/91	Zn-65	a.
910278	6/26/91	Fe-59, Co-60, Zn-65, Cs-134, Ce-141	a.

a. Activity from other isotopes caused an increased background resulting in the LLD calculation exceeding 5E-07 uCi/ml for the listed isotopes.