2003

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

R. E. GINNA NUCLEAR PLANT

ROCHESTER GAS AND ELECTRIC

DOCKET NO. 50-244

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1.0 INTRODUCTION

This Annual Radioactive Effluent Release Report is for the Rochester Gas and Electric Corporation R. E. Ginna Nuclear Power Plant and is submitted in accordance with the requirements of Technical Specification Section 5.6.3. The report covers the period from January 1, 2003 through December 31, 2003.

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.

All gaseous and liquid effluents discharged during this reporting period were in compliance with the limits of the R. E. Ginna Technical Specifications as defined in the Offsite Dose Calculation Manual (ODCM).

2.0 SUPPLEMENTAL INFORMATION

2.1 Regulatory Limits

The ODCM limits applicable to the 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 ≤ 500 mrem/yr to the total body and ≤ 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 ≤ 5 mrad for gamma radiation and to ≤ 10 mrad for beta radiation.

(ii) During any calendar year 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 μCi/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, ten times the effluent 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 as permitted by Technical Specification 5.5.4.b. A value of 2E-04 μCi/ml is used as the MPC for dissolved and entrained noble gases in liquid effluents.

2.3 Release Rate Limits Based on Average Nuclide Energy. The release rate limits for fission and activation gases from the R. E. Ginna Nuclear Station are not based on the average energy of the radionuclide mixture in gaseous effluents; therefore, this value is not applicable. However, the 2003 average beta/gamma energy of the radionuclide mixture in fission and activation gases released from Ginna Station is available for review upon request.

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 performed 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:	1.01 E+02
2. Total time period for batch releases:	4.09 E+04 min
3. Maximum time period for a batch release:	1.02 E+04 min
4. Average time period for batch releases:	4.05 E+02 min
5. Minimum time period for a batch release:	1.20 E+01 min
6. Average blowdown (LPM) during periods of effluent release into the discharge canal.	206*

*Continuous overboard blowdown from steam generators began 8/26/02.

2.5.2 Gaseous

1. Number of batch releases:	3.4 E+01
2. Total time period for batch releases:	5.05 E+05 min
3. Maximum time period for a batch release:	4.46 E+04 min
4. Average time period for batch releases:	1.37 E+04min
5. Minimum time period for a batch release:	1.15 E+02 min

2.6 Abnormal Releases

On 3/31/03, pressure dropped in "C" gas decay tank during gas stripper flange maintenance. Release was documented in permit #2003-0016. Total release was 0.018 Curies.

During realignment of CVCS system on 9/28/03, "B" gas decay tank was inadvertently released. Samples were collected and a release permit was generated. Total release was 0.029 Curies of noble gas.

The Containment equipment hatch was open between 10/01/03 and 10/07/03 for refueling outage activities. A non-routine batch release permit was generated in accordance with the requirements of section 2.5 of the ODCM, and the calculated conservative doses to the public were included in the applicable monthly release reports.

On 1/6/03 a leak was detected in the plant vent duct. A small defect was detected in a section of the containment vent ductwork in September 2003. On 11/25/03, a leak was detected at an access door on plant vent ductwork. Upon discovery, air samples were taken continuously during the period that the defects were open, and no radioactivity was detected. A conservative assessment of the potential air flow out of these defects represented an insignificant fraction of vent flow, and would have had an insignificant effect on the calculated doses to the public from plant vent releases, so no adjustment to plant vent release calculations were made. However, a review of the frequency of incidence of ventilation leaks, or of air flow in undesired directions, led to a generic evaluation of the material condition of the plant ventilation, documented in the Station corrective action program.

3.0 SUMMARY OF GASEOUS RADIOACTIVE EFFLUENTS

The quantities of radioactive material released in gaseous effluents are summarized in tables 1A and 1B. Plant vent and Containment Vent releases are modeled as mixed mode and Air Ejector is modeled as ground level release.

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 WASTE

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

Required Lower Limit of Detection, (LLD), as defined in the ODCM, was not met on the following two occasions of liquid batch releases in 2003. Actions have been taken to reduce depletion of the liquid waste processing resin.

"A" Monitor Tank release #2003005, 1/13/03.
Depletion of the liquid waste treatment demineralizer resin led to higher activity in the counted sample. Fe-59,and Zn-65 did not meet LLD's.
"A" monitor Tank release #20030074, 9/11/03.
Depletion of the liquid waste treatment demineralizer resin led to higher activity in the counted sample. Fe-59 and Zn-65 did not meet LLD's.

7.0 RADIOLOGICAL IMPACT

An assessment of doses to the maximally exposed individual from gaseous and liquid effluents was performed for locations representing the maximum calculated dose in occupied sectors. Meteorological sectors from WNW through ENE are entirely over Lake Ontario. In all cases, doses were well below Technical Specification limits as defined in the ODCM. Doses were assessed based upon historical average meteorological conditions considering the noble gas exposure, inhalation, ground plane and ingestion pathways. The ingestion pathways considered were the fruit, vegetable, fish, drinking water, goat's milk, cow's milk and meat pathways. The results of this assessment are presented in Tables 4A and 4B.
Since the attacks of September 11, 2001, Ginna Station Security has been augmented by full-time presence of the New York State Police and the New York National Guard. These personnel have posts within the site boundary. For these personnel, the noble gas exposure and uptake pathways for 2003 are evaluated using maximum meteorological dispersion and deposition parameters on-site in order to assess dose to members of the public on-site.

7.1 Total Dose

40CFR190 limits the total dose to members of the public due to radiation and radioactivity from uranium fuel cycle sources to:

<25 mrem total body or any organ and;
<75 mrem thyroid for a calendar year.

Using the maximum gaseous effluent and liquid effluent exposure and uptake pathways at the site boundary, and the maximum direct radiation measurements at 850 meters WSW, the following are the dose summaries to the hypothetical maximally exposed individual member of the public.

9.2 mrem total body (9.2 mrem direct radiation plus 4.4E-3 mrem all other pathways)
1.22E-3 mrem thyroid (maximum organ dose).

These doses effectively bound the maximum doses to any real member of the public.

Using the maximum gaseous effluent and liquid effluent exposure and uptake pathways on-site in the vicinity of the National Guard outpost, and the maximum direct radiation measurements nearest the outpost, the following are the dose summaries to the hypothetical maximally exposed member of the public on-site.

5.4 mrem total body (5.4 mrem direct radiation plus 5.0E-3 mrem all other pathways)
1.7E-3 mrem thyroid (maximum organ dose)

8.0 METEOROLOGICAL DATA

The annual summary of hourly meteorological data collected during 2003 is not included with this report, but can be made available at the R. E. Ginna Nuclear Station.

9.0 LAND USE CENSUS CHANGES

There were no changes in critical receptor location for dose calculations during the reporting period. The milk farm formerly at 5230 m SSE is no longer in business. Additional new homes were built at a rate similar to past years.

10.0 CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

The ODCM was revised July 30, 2003. No major changes were made to requirements or to methodology used in calculation of offsite dose. A total of ten changes were made in accordance with the following list.

1. Clarification of referenced procedures.
2. Equation typographical error.
3. Increase in assumed plant vent flow rate to bound as tested values.
4. Addition of a flow determination requirement for the air ejector vent and discharge canal.
5. Clarification that SPING monitors R-12A and R-14A have both skid requirements and individual channel requirements.
6. Retirement of farm and update of distance to remaining farms based on GPS.
7. Clarification that D/Q and X/Q tables are not rolling averages.
8. Revision of Table 6-1 (Report) to match Table 5-1 (Program).
9. Addition of administrative requirements for operability.
10. Clarification of TLD terminology.

See attached ODCM, Revision 18.

11.0 CHANGES TO THE PROCESS CONTROL PROGRAM

There were no changes to the Process Control Program during the reporting period.

12.0 MAJOR CHANGES TO RADWASTE TREATMENT SYSTEMS

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

13.0 INOPERABLE MONITORS

- RM-15A was declared out of service on 8/6/03 at 0500 due to electronic spiking. Return to service on 8/14/03 at 1019.
- RM-12A was declared out of service on 9/17/03 at 0210 and returned to service on 9/23/03 at 2037.
- RM-12A was declared out of service on 9/25/03 at 0205 due to low failure of R12A2, and was returned to service on 10/30/03 at 0523
- RM-14A was declared out of service on 9/27/03 at 0624 due to low failure and returned to service on 10/22/03 at 0918.
- RM-15A was declared out of service on 10/18/03 at 0300 due to high air ejector flow rate and returned to service on 10/30/03 at 0523.

14.0 CHANGES TO PREVIOUS ANNUAL EFFLUENT OPERATING REPORTS

None.

ROCHESTER GAS ELECTRIC CORPORATION

Table 1A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
January - June : 2003

	Unit	Quarter 1st	Quarter 2nd	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	8.40E+00	8.77E+00	1.50E+01
2. Average release rate for period	uCi/sec	1.07E+00	1.12E+00	
3. Percent of technical specification limit	%	1.70E-04	1.78E-04	
B. Iodines				
1. Total iodine-131	Ci	2.72E-05	2.75E-05	1.50E+01
2. Average release rate for period	uCi/sec	3.46E-06	3.50E-06	
3. Percent of technical specification limit	%	7.60E-03	7.69E-03	
C. Particulates				
1. Particulates with half-lives > 8days	Ci			2.00E+01
2. Average release rate for period	uCi/sec			
3. Percent of technical specification limit	%			
4. Gross alpha radioactivity	Ci	1.85E-07		
D. Tritium				
1. Total release	Ci	1.55E+01	7.02E+00	9.20E+00
2. Average release rate for period	uCi/sec	1.97E+00	8.93E-01	
3. Percent of technical specification limit	%	2.32E-04	1.05E-04	

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

ROCHESTER GAS ELECTRIC CORPORATION

Table 1A

EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES
July - December 2003

	Unit	Quarter 3rd	Quarter 4th	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	1.02E+01	7.08E+00	1.50E+01
2. Average release rate for period	uCi/sec	1.28E+00	8.91E-01	
3. Percent of technical specification limit	%	2.04E-04	1.41E-04	
B. Iodines				
1. Total iodine-131	Ci	2.64E-05	2.54E-05	1.50E+01
2. Average release rate for period	uCi/sec	3.32E-06	3.20E-06	
3. Percent of technical specification limit	%	7.30E-03	7.02E-03	
C. Particulates				
1. Particulates with half-lives > 8days	Ci		6.75E-06	2.00E+01
2. Average release rate for period	uCi/sec		8.49E-07	
3. Percent of technical specification limit	%		4.51E-09	
4. Gross alpha radioactivity	Ci			
D. Tritium				
1. Total release	Ci	1.37E+01	1.30E+01	9.20E+00
2. Average release rate for period	uCi/sec	1.72E+00	1.64E+00	
3. Percent of technical specification limit	%	2.03E-04	1.92E-04	

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

ROCHESTER GAS ELECTRIC CORPORATION

Table 1B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
GASEOUS EFFLUENTS - CONTINUOUS AND BATCH RELEASES

		Continuous Mode		Batch Mode	
Nuclides released	Unit	Quarter 1st	Quarter 2nd	Quarter 1st	Quarter 2nd
1. Fission gases					
argon-41	Ci			5.17E-02	6.24E-02
krypton-85	Ci				
krypton-85m	Ci			4.36E-04	1.36E-04
krypton-87	Ci				
krypton-88	Ci				
xenon-131m	Ci			3.81E-03	3.43E-03
xenon-133	Ci	4.63E+00	4.68E+00	1.36E+00	1.63E+00
xenon-133m	Ci			1.38E-02	1.65E-02
xenon-135	Ci	2.31E+00	2.34E+00	3.03E-02	3.21E-02
xenon-135m	Ci				
xenon-138	Ci				
others (specify)	Ci				
	Ci				
	Ci				
	Ci				
Total for period	Ci	6.94E+00	7.02E+00	1.46E+00	1.74E+00
2. Iodines					
iodine-131	Ci	1.27E-05	1.29E-05	9.57E-09	
iodine-132	Ci				
iodine-133	Ci	1.45E-05	1.46E-05		
Total for period	Ci	2.72E-05	2.75E-05	9.57E-09	
3. Particulates					
strontium-89	Ci				
strontium-90	Ci				
cesium-134	Ci				
cesium-137	Ci				
niobium-95	Ci				
cobalt-58	Ci				
cobalt-60	Ci				
Total for period	Ci				
unidentified	Ci				

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

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Table 1B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
GASEOUS EFFLUENTS - CONTINUOUS AND BATCH RELEASES

		Continuous Mode		Batch Mode	
Nuclides released	Unit	Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
1. Fission gases					
argon-41	Ci			3.41E-01	3.85E-02
krypton-85	Ci				1.11E-02
krypton-85m	Ci				7.44E-05
krypton-87	Ci				
krypton-88	Ci			2.21E-04	
xenon-131m	Ci			7.08E-03	1.65E-03
xenon-133	Ci	5.33E+00	4.73E+00	2.38E+00	2.50E-01
xenon-133m	Ci			1.30E-02	1.71E-03
xenon-135	Ci	2.05E+00	2.04E+00	6.19E-02	6.54E-03
xenon-135m	Ci				
xenon-138	Ci				
others (specify)	Ci				
	Ci				
	Ci				
	Ci				
Total for period	Ci	7.38E+00	6.77E+00	2.80E+00	3.10E-01
2. Iodines					
iodine-131	Ci	1.27E-05	1.27E-05	3.77E-07	3.19E-08
iodine-133	Ci	1.33E-05	1.27E-05	5.08E-08	
iodine-135	Ci				
Total for period	Ci	2.60E-05	2.54E-05	4.28E-07	3.19E-08
3. Particulates					
chromium-51	Ci		*		1.38E-06
manganese-54	Ci				3.96E-08
zirconium-95	Ci				4.35E-07
silver-110m	Ci				7.72E-08
niobium-95	Ci				7.12E-07
cobalt-58	Ci				3.65E-06
cobalt-60	Ci				4.50E-07
Total for period	Ci				6.75E-06
unidentified	Ci				

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

ROCHESTER GAS ELECTRIC CORPORATION

Table 2A
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
January - June 2003

A. Fission and activation products	Unit	Quarter 1st	Quarter 2nd	Est.Total Error, %
1. Total release (not including tritium, gases, alpha)	Ci	3.72E-04	5.12E-05	9.90E+00
2. Average diluted concentration during period	uCi/ml	1.12E-12	1.10E-13	
3. Percent of applicable limit	%	8.70E-05	1.46E-04	
B. Tritium				
1. Total release	Ci	4.04E+01	4.25E+01	9.20E+00
2. Average diluted concentration during period	uCi/ml	1.22E-07	9.13E-08	
3. Percent of applicable limit	%	1.22E-03	9.13E-04	
C. Dissolved and entrained gases				
1. Total release	Ci	4.15E-06		9.90E+00
2. Average diluted concentration during period	uCi/ml	1.25E-14		
3. Percent of applicable limit	%	6.25E-10		
D. Gross alpha radioactivity				
1. Total release	Ci			
E. Vol. of waste released (prior to dilution)	Liters	2.39E+07	2.50E+07	
F. Vol. of dilution water used during period	Liters	8.77E+10	1.23E+11	

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

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Table 2A
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT

LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES
July - December 2003

A. Fission and activation products	Unit	Quarter 3rd	Quarter 4th	Est.Total Error, %
1. Total release (not including tritium, gases, alpha)	Ci	7.31E-04	2.04E-04	9.90E+00
2. Average diluted concentration during period	uCi/ml	1.92E-12	4.79E-13	
3. Percent of applicable limit	%	2.53E-06	3.71E-07	
B. Tritium				
1. Total release	Ci	2.18E+02	3.85E+01	9.20E+00
2. Average diluted concentration during period	uCi/ml	5.75E-07	9.06E-08	
3. Percent of applicable limit	%	5.75E-03	9.06E-04	
C. Dissolved and entrained gases				
1. Total release	Ci	6.16E-04	1.51E-04	
2. Average diluted concentration during period	uCi/ml	1.62E-12	3.55E-13	
3. Percent of applicable limit	%	8.10E-07	1.77E-08	
D. Gross alpha radioactivity				
1. Total release	Ci			2.00E+01
E. Vol. of waste released (prior to dilution)	Liters	2.15E+07	1.96E+07	
F. Vol. of dilution water used during period	Liters	1.00E+11	1.12E+11	

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

ROCHESTER GAS ELECTRIC CORPORATION

Table 2B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
		1st	2nd	1st	2nd
chromium-51	Ci				
manganese-54	Ci				
iron-55	Ci			9.18E-05	2.75E-05
iron-59	Ci				
cobalt-58	Ci			1.72E-04	1.65E-05
cobalt-60	Ci			9.91E-05	7.20E-06
zinc-65	Ci				
strontium-89	Ci				
strontium-90	Ci				
zirconium/niobium-95	Ci				
molybdenum-99	Ci				
silver-110m	Ci				
antimony-122	Ci				
antimony-124	Ci				
antimony-125	Ci				
iodine-131	Ci				
iodine-133	Ci				
iodine-135	Ci				
cesium-134	Ci				
cesium-136	Ci				
cesium-137	Ci				
barium/lanthanum-140	Ci				
cerium-141	Ci				
Te-123m	Ci				
Sn-113	Ci				
Co-57	Ci			9.18E-06	
Total for period (above)	Ci			3.72E-04	5.12E-05
unidentified	Ci				

xenon-133	Ci			4.15E-06	
xenon-135	Ci				

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

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Table 2B
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Quarter	Quarter	Quarter	Quarter
		3rd	4th	3rd	4th
chromium-51	Ci			9.01E-05	
manganese-54	Ci				
iron-55	Ci				
iron-59	Ci				
cobalt-58	Ci			3.29E-04	8.77E-05
cobalt-60	Ci			2.30E-04	1.62E-05
zinc-65	Ci				
strontium-89	Ci				
strontium-90	Ci				
niobium-95	Ci			5.87E-06	
molybdenum-99	Ci				
silver-110m	Ci				
antimony-122	Ci				
antimony-124	Ci				
antimony-125	Ci			7.57E-05	
iodine-131	Ci				
iodine-132	Ci				5.02E-05
iodine-135	Ci				
cesium-134	Ci				
cesium-136	Ci				
cesium-137	Ci				
barium/lanthanum-140	Ci				
cerium-141	Ci				
Te-132	Ci				4.96E-05
Zr-95	Ci				
Co-57					
Total for period (above)	Ci			7.31E-04	2.04E-04
unidentified	Ci				

xenon-133	Ci			6.14E-04	1.51E-04
xenon-135	Ci			1.70E-06	

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

Table 3
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS
January 1, 2003 - December 31, 2003

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

1.	Type of waste	Unit	12 month period	Est. total Error %
a.	Spent resins, filter sludges, evaporator bottoms, etc.	m^3 Ci	4.729 4.55	1
b.	Dry compressible waste, contaminated equip, etc.	m^3 Ci	110.7 0.1043	1
c.	Irradiated components, control rods, etc.	m^3 Ci	0 0	
d.	Other:	m^3 Ci	0 0	

2.Estimate of major nuclide composition (by type of waste)								
a.			b.			d.		
Ni-63	51.7		Co-58	27.3			%	
Fe-55	25.5		Cr-51	18.7			%	
Co-58	6.6		Fe-55	14.3			%	
Co-60	9.7		Nb-95	11.3			%	
Cs-137	1.5		Zr-95	8.6			%	
Sb-125	1.4		Ni-63	8.2			%	
H-3	1		Co-60	6.14			%	
Co-57	0.5		Ag-110m	1.6			%	
Mn-54	0.4		Ce-144	0.7			%	
							%	
Total 98.3			Total 96.8			Total		

3. Solid Waste Disposition		
Number of Shipments	Mode of Transportation	Destination
5	Highway	Duratek/Tennessee
1	Highway	Studsvik/Tennessee

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None		

Table 4A

Radiation Dose to Maximum Individual Receptor

First Quarter 2003

(Units In rem)

	All	All	Adult	Teen	Child	Infant
	T. Body	Skin	THYRD	THYRD	THYRD	THYRD
N	2.57E-08	4.43E-08				
NNE	2.85E-08	4.92E-08				
NE	9.32E-09	1.61E-08				
ENE	8.26E-09	1.42E-08				
E	4.24E-08	7.31E-08	3.24E-07	3.28E-07	2.92E-07	1.78E-07
ESE	5.39E-08	9.30E-08	3.50E-07	3.54E-07	3.15E-07	1.93E-07
SE	3.34E-08	5.77E-08	2.98E-07	3.02E-07	2.68E-07	1.64E-07
SSE	1.31E-08	2.27E-08	2.40E-07	2.42E-07	2.16E-07	1.32E-07
S	2.35E-08	4.06E-08	2.96E-07	3.00E-07	2.66E-07	1.63E-07
SSW	2.28E-08	3.93E-08	2.68E-07	2.71E-07	2.41E-07	1.47E-07
SW	2.18E-08	3.76E-08	2.65E-07	2.69E-07	2.39E-07	1.46E-07
WSW	2.51E-08	4.33E-08	2.87E-07	2.92E-07	2.58E-07	1.58E-07
W	1.60E-08	2.75E-08	2.59E-07	2.63E-07	2.33E-07	1.42E-07
WNW	1.35E-09	2.32E-09				
NW	3.35E-09	5.77E-09				
NNW	5.64E-09	9.74E-09				
MAX.	5.39E-08	9.30E-08	3.50E-07	3.54E-07	3.15E-07	1.93E-07

Table 4A

Radiation Dose to Maximum Individual Receptor

Second Quarter 2003

(Units In rem)

	All	All	Adult	Teen	Child	Infant
	T. Body	Skin	THYRD	THYRD	THYRD	THYRD
N	2.75E-08	4.71E-08				
NNE	3.06E-08	5.23E-08				
NE	1.00E-08	1.71E-08				
ENE	8.85E-09	1.51E-08				
E	4.54E-08	7.77E-08	2.00E-07	2.02E-07	1.80E-07	1.10E-07
ESE	5.78E-08	9.89E-08	2.15E-07	2.18E-07	1.94E-07	1.18E-07
SE	3.58E-08	6.14E-08	1.91E-07	1.93E-07	1.72E-07	1.05E-07
SSE	1.41E-08	2.41E-08	1.64E-07	1.66E-07	1.48E-07	9.02E-08
S	2.52E-08	4.31E-08	1.90E-07	1.93E-07	1.71E-07	1.04E-07
SSW	2.44E-08	4.17E-08	1.77E-07	1.80E-07	1.59E-07	9.73E-08
SW	2.33E-08	3.99E-08	1.76E-07	1.79E-07	1.58E-07	9.71E-08
WSW	2.69E-08	4.60E-08	1.86E-07	1.89E-07	1.67E-07	1.02E-07
W	1.71E-08	2.93E-08	1.73E-07	1.75E-07	1.56E-07	9.51E-08
WNW	1.44E-09	2.47E-09				
NW	3.59E-09	6.14E-09				
NNW	6.05E-09	1.04E-08				
MAX.	5.78E-08	9.89E-08	2.15E-07	2.18E-07	1.94E-07	1.18E-07

Table 4A

Radiation Dose to Maximum Individual Receptor

Third Quarter 2003

(Units In rem)

	All	All	Adult	Teen	Child	Infant
	T. Body	Skin	THYRD	THYRD	THYRD	THYRD
N	3.69E-08	5.35E-08				
NNE	4.10E-08	5.94E-08				
NE	1.34E-08	1.94E-08				
ENE	1.19E-08	1.72E-08				
E	6.09E-08	8.83E-08	3.07E-07	3.11E-07	2.76E-07	1.69E-07
ESE	7.75E-08	1.12E-07	3.30E-07	3.35E-07	2.97E-07	1.82E-07
SE	4.81E-08	6.97E-08	2.84E-07	2.87E-07	2.55E--07	1.56E-07
SSE	1.89E-08	2.74E-08	2.31E-07	2.34E-07	2.08E-07	1.27E-07
S	3.38E-08	4.90E-08	2.81E-07	2.84E-07	2.53E-07	1.54E-07
SSW	3.27E-08	4.74E-08	2.56E-07	2.58E-07	2.30E-07	1.41E-07
SW	3.13E-08	4.53E-08	2.53E-07	2.55E-07	2.27E-07	1.39E-07
WSW	3.60E-08	5.22E-08	2.73E-07	2.77E-07	2.44E-07	1.50E-07
W	2.29E-08	3.32E-08	2.48E-07	2.51E-07	2.23E-07	1.36E-07
WNW	1.93E-09	2.80E-08				
NW	4.81E-09	6.97E-09				
NNW	8.11E-09	1.18E-08				
MAX.	7.75E-08	1.12E-07	3.30E-07	3.35E-07	2.97E-07	1.82E-07

Table 4A

Radiation Dose to Maximum Individual Receptor

Fourth Quarter 2003

(Units In rem)

	All	All	Adult	Teen	Child	Infant
	T. Body	Skin	THYRD	THYRD	THYRD	THYRD
N	2.24E-08	3.86E-08				
NNE	2.49E-08	4.28E-08				
NE	8.12E-09	1.40E-08				
ENE	7.20E-09	1.24E-08				
E	3.69E-08	6.36E-08	2.93E-07	2.96E-07	2.93E-07	1.61E-07
ESE	4.70E-08	8.10E-08	3.15E-07	3.19E-07	2.83E-07	1.73E-07
SE	2.92E-08	5.02E-08	2.71E-07	2.74E-07	2.44E-07	1.49E-07
SSE	1.15E-08	1.97E-08	2.20E-07	2.22E-07	1.98E-07	1.21E-07
S	2.05E-08	3.53E-08	2.69E-07	2.72E-07	2.42E-07	1.48E-07
SSW	1.98E-08	3.42E-08	2.44E-07	2.47E-07	2.20E-07	1.34E-07
SW	1.90E-08	3.27E-08	2.42E-07	2.45E-07	2.18E-07	1.32E-07
WSW	2.19E-08	3.76E-08	2.61E-07	2.64E-07	2.35E-07	1.43E-07
W	1.39E-08	2.40E-08	2.36E-07	2.39E-07	2.12E-07	1.30E-07
WNW	1.17E-09	2.02E-09				
NW	2.92E-09	5.02E-09				
NNW	4.92E-09	8.47E-09				
MAX.	4.70E-08	8.10E-08	3.15E-07	3.19E-07	2.83E-07	1.73E-07

Table 4B

Radiation Dose To Maximum Individual Receptor

From Liquid Release

2003

(Units in rem)

	Adult	Teen	Child	Infant
		First Quarter		
T. Body	3.55E-07	2.51E-07	4.73E-07	4.59E-07
Bone	1.18E-09	1.24E-09	1.62E-09	<1.0E-10
Thyroid	3.55E-07	2.51E-07	4.73E-07	4.59E-07
		Second Quarter		
T. Body	2.62E-07	1.86E-07	3.50E-07	3.40E-07
Bone	2.50E-10	2.61E-10	3.43E-10	<1.0E-10
Thyroid	2.62E-07	1.86E-07	3.50E-07	3.40E-07
		Third Quarter		
T. Body	1.36E-06	9.60E-07	1.81E-06	1.76E-06
Bone	3.57E-11	3.60E-11	4.25E-11	<1.0e-10
Thyroid	1.36E-06	9.60E-07	1.81E-06	1.76E-06
		Fourth Quarter		
T. Body	2.45E-07	1.80E-07	3.39E-07	3.30E-07
Bone	1.43E-09	1.51E-09	1.88E-09	<1.0E-10
Thyroid	2.45E-07	1.80E-07	5.50E-07	3.30E-07