DETROIT EDISON COMPANY

FERMI 2 NUCLEAR POWER PLANT

OPERATING LICENSE NO. NPF - 43

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

for the period of

January 1, 1991 through June 30, 1991

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Fermi 2 Semiannual Radioactive Effluent Release Report
January 1, 1991 through June 30, 1991

PREFACE

The purpose of the Fermi 2 Nuclear Power Plant is to provide safe, economic and reliable electrical energy to the people of Southeastern Michigan. In 1990, Fermi 2 generated over 7 million Megawatt-hours (net) of electricity, which is 15% of the total electricity generated by the Detroit Edison Company in 1990.

Fermi 2 is designed, constructed and operated in accordance with the standards and requirements established by the U.S. Nuclear Regulatory Commission (USNRC) to ensure that any potential radiation doses to members of the public will be "as low as reasonably achievable" (ALARA).

The USNRC defines the term "as low as reasonably achievable" to mean "as low as reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest".

The Semiannual Effluent Release Report contains data and information regarding radioactivity which was released in gaseous and liquid effluents and as solid radioactive waste from the Fermi 2 Nuclear Power Plant from January 1, 1991 through June 30, 1991.

This preface includes a perspective on radioactive effluent releases and annual radiation doses to members of the public which are calculated from the radioactive effluent release data, covering the entire period of Fermi 2 operation (1985-1991).

The radiation dose data which are contained in this report are calculated by using conservative methods and models, which are required and approved by the USNRC. This ensures that any assessment of compliance with USNRC standards and requirements will be based upon calculated values which represent the maximum potential radiation doses to members of the public. Actual radiation doses to a member of the public from Fermi 2 radioactive effluents may be much less than the calculated values in this report.

Figure 1 shows that over the six years that Fermi 2 has operated, no member of the public has received annual radiation doses exceeding 2/10ths of one millirem (0.2 millirem) to the total body due to radioactive effluents from the plant.

Table 1 shows that the highest calculated annual total body exposures from noble gas and liquid radioactive effluents (in 1989) are each less than 2% of the limits approved by the USNRC in the Fermi 2 Technical Specifications. For all other years of Fermi 2 operation, each of the calculated annual total body exposures from radioactive gaseous and liquid effluents are less than 1% of the limits.

The calculated radiation exposure from radioactive noble gases shown in Table 1 for 1989 is approximately three times the value for 1990. The difference in the calculated radiation exposure values is due to a revision made in 1990 to the calculation method to more accurately reflect the actual release characteristics. The calculated radiation exposure value for 1990 (0.046 millirad) is conservative, but it is more realistic than the value calculated in 1989 (0.136 millirad) using the original calculation method.

Figure 2a shows the quantities of radioactivity which were released annually in radioactive gaseous effluents from Fermi 2. Most (99%) of the radioactive gaseous effluents consist of short-lived noble gases which decay away in minutes or hours. The noble gases are inert, which means that they do not concentrate in the environment or in the human body. The increase in gaseous radioactive effluents after 1988, when compared to the data for 1985-1988, is due to the fact that the plant first achieved full power commercial operation in 1988.

Figure 2b shows the annual wastewater volumes and radioactivity which were released in 1985-1991. The decrease in wastewater volumes released annually since 1985-1987 is due to improved plant operation and water management practices. The higher wastewater volumes and radioactivity released in 1989 and 1991 compared to the lesser amounts released in 1990 are due to the increased usage and processing of water within plant systems during the first and second refueling outages in 1989 and 1991. There was no refueling outage in 1990.

The National Council on Radiation Protection (NCRP) estimates that the average person in the U.S. receives approximately 300 millirems per year from sources of natural background radiation. Also, the NCRP estimates that an additional 60 millirems per year is received from sources of medical radiation exposure and from consumer products. By these NCRP estimates, the average person in the U.S. receives approximately 360 millirems per year from natural and man made sources of radiation exposure, other than commercial nuclear power.[1]

The NCRP estimate of 360 millirems per year is more than 1,400 times the maximum calculated annual radiation dose of less than 2/10ths of one millirem to the total body from Fermi 2 radioactive effluents, which occurred in 1989. The annual calculated radiation exposure from Fermi 2 radioactive effluents contributes less than 6/100ths of one per cent (< 0.06%) of the average total body radiation exposure received per year by a member of the public from natural and other man-made sources of exposure.

[1] National Council on Radiation Protection and Measurements Report No. 93, "Ionizing Radiation Exposure of the Population of the United States", published in 1987.

Maximum Calculated Total Body Dose to a Member of the Public from Fermi 2 Radioactive Airborne and Liquid Effluents 1985 – 1991

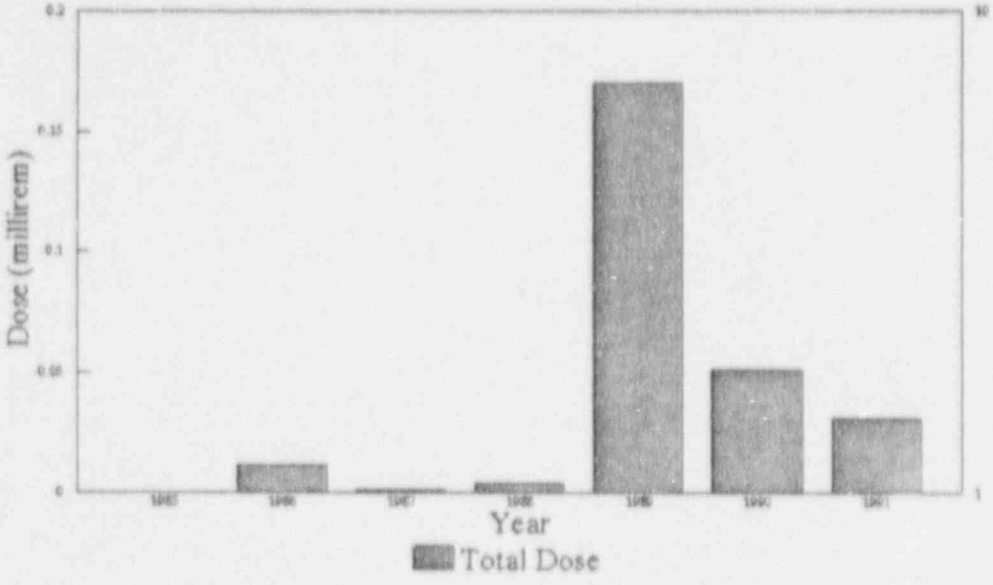

Figure 1

Data Summary Table

Radiation Dose (millirems)

Year	Airborne Effluents	Liquid Effluents	Total
1985	N.D.	<0.001	<0.001
1986	N.D.	0.011	0.011
1987	<0.001	0.001	0.001
1988	<0.001	0.004	0.004
1989	0.137	0.033	0.170
1990	0.046	0.005	0.051
*1991	0.015	0.016	0.031

N.D.= No radioactivity was detected.

* Data for 1991 is for January – June 1991 only

Table 1

Comparison of Fermi 2 Calculated Radioactive Effluent Exposure Data (Total Body) to Fermi 2 Technical Specification Annual Limits

Year	Calculated Total Body Exposure Due to Noble Gas (mrad) (Limit = 10 mrad/yr)	Calculated Total Body Exposure Due to Liquid Effluents (mrem) (Limit = 3 mrem/yr)
1985	N.D.	<0.001 (<0.01%)
1986	N.D.	0.011 (0.37%)
1987	N.D.	0.001 (0.03%)
1988	<0.001 (<0.01%)	0.004 (0.13%)
1989	0.136 (1.36%)	0.033 (1.10%)
1990	0.046 (0.46%)	0.005 (0.17%)
*1991	0.015 (0.15%)	0.016 (0.53%)

N.D. = No radioactive noble gases were detected.

* Data for 1991 is for January – June 1991 only

Fermi 2 Radioactive Airborne Effluent
Summary Data 1985 – 1991

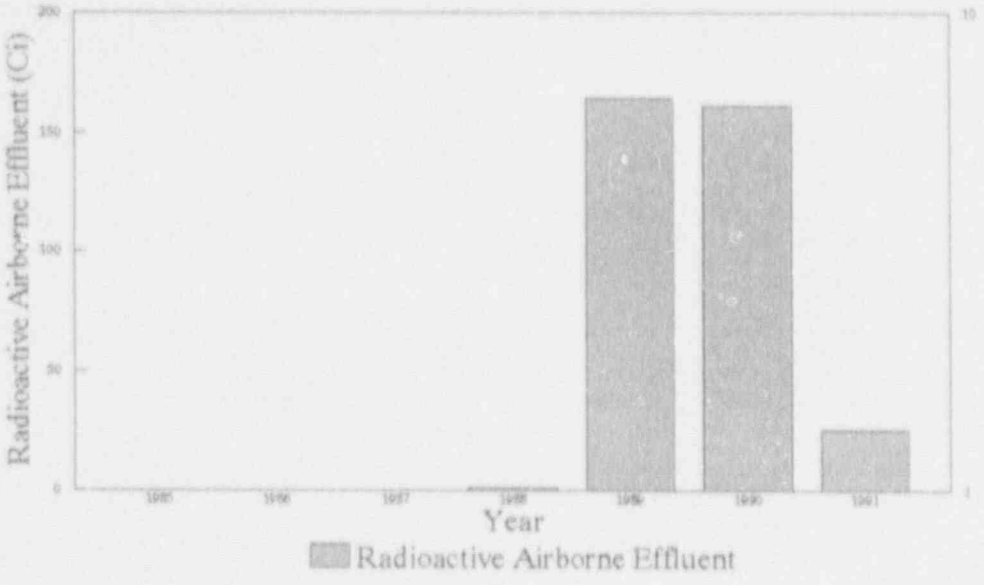

Figure 2a

Data Summary Table

Year	Radioactivity Released (Curies) Gases	Radioiodines	Particulates
1985	N.D.	N.D.	N.D.
1986	N.D.	N.D.	N.D.
1987	N.D.	N.D.	0.009
1988	1.11	<0.001	0.002
1989	164	0.002	0.015
1990	161	0.003	0.012
*1991	25.4	0.001	0.001

N.D. = No radioactivity was detected

* Data for 1991 is for January – June 1991 only

Fermi 2 Radioactive Liquid Effluent
Summary Data 1985 – 1991

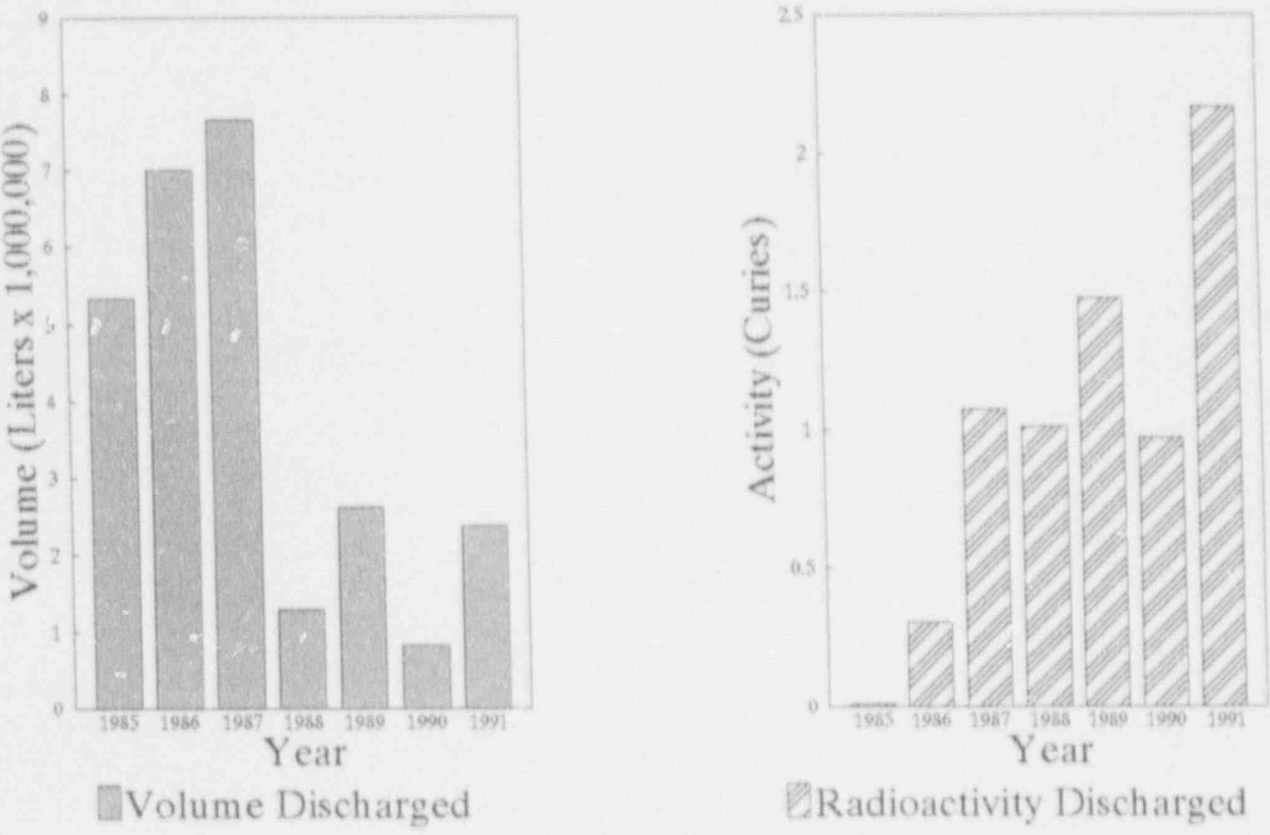

Figure 2b

Data Summary Table

Year	Volume Discharged (Liter X 1000000)	Radioactivity (Curies)
1985	5.33	0.010
1986	7.01	0.304
1987	7.67	1.067
1988	1.29	1.007
1989	2.61	1.472
1990	0.83	0.966
	2.36	2.164

*Data for 1991 is for January – June 1991 only

1. INTRODUCTION

The Detroit Edison Fermi 2 Nuclear Power Plant is designed and operated in a manner which strictly controls and monitors the release of radioactive effluents to the environment in accordance with Nuclear Regulatory Commission (NRC) and Detroit Edison Company requirements. This Semiannual Radioactive Effluent Release Report is submitted in accordance with Fermi 2 Technical Specification 6.9.1.8 and NRC Regulatory Guide 1.21. This report provides the following information required by those references:

1. Summation of the quantities of radioactive material (in the form of gases and liquids) released from the plant (Sections 8 and 9)

2. Summation of quantities of radioactive material contained in solid waste packaged and shipped for off-site disposal (Section 10)

3. Changes to the Process Control Program (PCP) (Section 12)

4. Changes to the Offsite Dose Calculation Manual (ODCM) (Section 14)

5. A list and description of any unplanned releases of radioactive materials to unrestricted areas (Section 6)

6. A listing of any new locations for dose calculation or environmental monitoring identified by the land use census (Section 13)

7. A listing of effluent monitors which were inoperable for a period longer than that specified in Technical Specifications 3.3.7.11 and 3.3.7.12, and an explanation of why the time limit was exceeded (Section 11)

8. A description of events leading up to any liquid holdup tanks exceeding the limit of Technical Specification 3.11.1.4 (Section 16)

9. A description of any major changes to radioactive waste treatment systems (Section 15)

This report covers the period of January 1 through June 30, 1991.

During the first half of 1991, the total gaseous and liquid radioactive effluent releases and resulting dose to the public were maintained As Low As Reasonably Achievable (ALARA). In accordance with Fermi 2 Technical Specification 6.9.1.8, the next Semiannual Radioactive Effluent Release Report--the one to be submitted within 60 days after January 1, 1992--will contain dose assessments for all of 1991.

2. REGULATORY LIMITS

The Nuclear Regulatory Commission limits on liquid and gaseous effluents are incorporated in the Fermi 2 Technical Specifications. These limits prescribe the maximum quantities and rates of release for radioactive effluents resulting from normal operation of Fermi 2. The limits are defined in several ways to limit the overall impact on persons living near the plant. The limits are described in the following sections.

A. Gaseous Effluents

1. Dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following:

   a. Noble gases

      Less than or equal to 500 mrem/year to the total body
      Less than or equal to 3000 mrem/year to the skin

   b. Iodine 131, 133, tritium, and for all radionuclides in particulate form with half lives greater than 8 days

      Less than or equal to 1500 mrem/year to any organ.

2. Air dose due to noble gases released in gaseous effluents from the reactor to areas at and beyond the site boundary shall be limited to the following:

   a. Less than or equal to 5 mrads for gamma radiation
      Less than or equal to 10 mrads for beta radiation
      -During any calendar quarter

   b. Less than or equal to 10 mrads for gamma radiation
      Less than or equal to 20 mrads for beta radiation
      -During any calendar year

3. Dose to a member of the public from Iodine-131, 133, tritium, and all radionuclides in particulate form with half lives greater than 8 days in gaseous effluents released from the reactor to areas at and beyond the site boundary shall be limited to the following:

   a. Less than or equal to 7.5 mrems to any organ
      -During any calendar quarter

   b. Less than or equal to 15 mrems to any organ
      -During any calendar year

B. Liquid Effluents

1. The concentration of radioactive material released in liquid effluents to unrestricted areas shall be limited to the concentrations specified in Title 10 of the Code of Federal Regulations Part 20 (Standards for Protection Against Radiation), 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-4 (.0002) microcuries/ml total activity.

2. The dose or dose commitment to a member of the public from radioactive materials in liquid effluents released from the reactor to unrestricted areas shall be limited to the values in the following sections.

a. Less than or equal to 1.5 mrem to the total body
Less than or equal to 5 mrem to any organ
-During any calender quarter

b. Less than or equal to 3 mrem to the total body
Less than or equal to 10 mrem to any organ
-During any calender year

3. MAXIMUM PERMISSIBLE CONCENTRATION (MPC)

Fermi 2 Technical Specifications implement the MPC requirements of 10 CFR 20 and NRC Regulatory Guide 1.21 by means of the following dose rate limits:

A. Gases

The dose rate due to gaseous effluents is calculated in accordance with the Fermi 2 Offsite Dose Calculation Manual (ODCM). The maximum permissible dose rates for gaseous releases are defined in Fermi 2 Technical Specifications:

Technical Specification 3.11.2.1.a (Dose rate at the site boundary from noble gases):

-Less than or equal to 500 mrem/year to the total body
-Less than or equal to 3000 mrem/year to the skin

Technical Specification 3.11.2.1.b (Dose rate at the site boundary from I-131, I-133, and particulates with half lives greater than 8 days):

-Less than or equal to 1500 mrem/year to any organ

B. Liquids

Allowable liquid release rates are calculated in accordance with the Fermi 2 Offsite Dose Calculation Manual (ODCM). The maximum permissible concentration (MPC) for liquids used for these calculations are taken from 10 CFR 20, Appendix B, Table II, Column 2. The most restrictive MPC is used in all cases. For dissolved and entrained gases the MPC of 2E-4 microcuries/ml is applied. This MPC is based on the Xe-135 MPC in air (submersion dose) converted to an equivalent concentration in water as discussed in the International Commission on Radiological Protection (ICRP) Publication 2.

4. AVERAGE ENERGY

The calculated site boundary dose rates for Fermi 2 are based on identification of individual isotopes and on use of dose factors specific to each identified isotope or a highly conservative dose factor. Average energy values are not used in these calculations, and therefore need not be reported.

5. MEASUREMENTS AND APPROXIMATIONS OF TOTAL ACTIVITY

As required by NRC Regulatory Guide 1.21, this section describes the methods used to measure the total radioactivity in effluent releases and to estimate the overall errors associated with these measurements. The effluent monitoring systems are described in Chapter 11.4 of the Fermi 2 Updated Final Safety Analysis Report (UFSAR).

A. Gaseous Effluents

1. Fission and Activation Gases

Samples are obtained from each of the seven plant radiation monitors which continuously monitor the six ventilation exhaust points and from the Offgas Vent Pipe which carries the gland seal condenser exhaust, mechanical vacuum pump exhaust, and treated offgas streams. The Offgas Vent Pipe effluent is released through one of the six ventilation exhaust points (the reactor building exhaust plenum). The fission and activation gases are quantified by gamma spectroscopy analysis of periodic samples.

The values reported in Section 9 are the sums of all fission and activation gases quantified at all monitored release points.

Considering the inherent variability in radiation measurement, the variability in effluent stream composition, and the uncertainties in effluent flow rate and instrument calibration, Detroit Edison estimates that the uncertainty of the fission and activation gas total release figures is less than plus or minus 8 percent.

2. Radioiodines

Samples are obtained from each of the seven plant radiation monitors, which continuously monitor the six ventilation exhaust points. The radioiodines are entrained on charcoal and then quantified by gamma spectroscopy analysis. For each sample the duration of sampling and continuous flow rate through the charcoal are used in determining the concentration of radioiodines. From the flow rate of the ventilation system a rate of release can be determined.

The values reported in Section 9 are the sums of all radioiodines quantified at all continuously monitored release points.

Considering the inherent variability in radiation measurements, the variability in effluent stream composition, and the uncertainty in sample and effluent flow rates, Detroit Edison estimates that the uncertainty of the total radioiodine release figures is less than plus or minus 5 percent.

3. Particulates

Samples are obtained from each of the seven plant effluent radiation monitors, which continuously monitor the six ventilation exhaust points. The particulates are collected on a filter and then quantified by gamma spectroscopy analysis. For each sample the duration of sampling and continuous flow rate through the filter are used in determining the concentration of particulates. From the flow rate of the ventilation system a rate of release can be determined.

A composite of the filters from each ventilation release point is analyzed monthly for gross alpha radioactivity using gas proportional counting methods. Quarterly the filters are radiochemically separated and analyzed for Strontium (Sr)-89/90 using various analytical methods. If found these radionuclides are reported as total particulate activity.

The values reported in Section 9 are the sums of all particulates quantified at all monitored release points.

Considering the inherent variability in radiation measurements, the variability in effluent stream composition, and the uncertainties in instrument calibration and in sample and effluent flow rates, Detroit Edison estimates that the the uncertainty of the total particulate release figures is less than plus or minus 3 percent.

4. Tritium

Samples are obtained for each of the seven plant effluent radiation monitors which continuously monitor the six ventilation exhaust points. The sample is passed through a bottle containing water and the tritium is "washed" out to the collecting water. Portions of the collecting water are analyzed for tritium using liquid scintillation counting techniques. For each sample, the duration of sample and sample flow rate is used to determine the concentration. From the flow rate of the ventilation system a release rate can be determined.

The values reported in Section 9 are the sums of all tritium quantified at all monitored release points.

Considering the inherent variability in radiation measurement, the variability in effluent stream composition, and the uncertainties in instrument calibration, sample and effluent flow rates, and collection efficiency, Detroit Edison estimates that the uncertainty of total gaseous tritium release figures is less than plus or minus 34 percent.

5. Gross Alpha

The gaseous particulate filters from the seven plant effluent radiation monitors are stored for one week to allow for decay of naturally occurring alpha emitters. These filters are then analyzed for gross alpha radioactivity by gas proportional counting, and any such radioactivity found is assumed to be plant related. The quantity of alpha emitters released can then be determined from sample flow rate, sample duration, and stack flow rate.

The values reported in Section 9 are the sums of all alpha emitters quantified at all monitored release points.

Considering the inherent variability in radiation measurements, the variability in effluent stream composition, and the uncertainties in instrument calibration and in sample and effluent flow rates, Detroit Edison estimates that the uncertainty of the total gaseous gross alpha release figures is less than plus or minus 10 percent.

B. Liquid Effluents

The liquid radwaste processing system and the liquid effluent monitoring system are described in the Fermi-2 UFSAR.

1. Fission and activation products

Before the contents of each holding tank is discharged to the environment, a representative sample of the tank's contents is taken and retained. The sample allows for the determination of radioactive material concentrations and establishes the rate at which the radioactive material can be discharged to the environment.

At the end of the calendar quarter a composite sample is made of all discharge samples taken during the quarter. This composite sample consists of portions of each discharge sample which are proportional to the volumes discharged. The composite sample is analyzed for Iron (Fe)-55 and Strontium (Sr)-89/90. Radiochemical separations and various analytical methods are used to quantify the amounts of Sr-89/90 and Fe-55.

The values reported in Section 8 are the sums of all fission and activation products found in all batch releases.

Considering the inherent variability in radiation measurement and the uncertainties in volume measurements and instrument calibration, Detroit Edison estimates that the uncertainty in total liquid fission and activation product release figures is less than plus or minus 5 percent.

2. Tritium

Before the contents of each holding tank is discharged to the environment, a representative sample of the tank contents is taken and retained. At the end of the calendar month a composite sample is made of all discharge samples taken during the month. This composite sample consists of portions of each discharge sample which are proportional to the volumes discharged. The composite sample is analyzed for tritium by liquid scintillation counting.

The values reported in Section 8 sums all tritium quantified from all batch releases.

Considering the inherent variability in radiation measurement and the uncertainties in volume measurement and instrument calibration, Detroit Edison estimates the uncertainty in total tritium release figures is less than plus or minus 15 percent.

3. Dissolved and Entrained Gases

Prior to releasing liquid radioactive waste to the environment a sample is taken from the radwaste holding tank. This sample is representative of the tank's contents. The sample is examined using gamma spectroscopy to determine the dissolved and entrained noble gases.

The values reported in Section 8 are the sums of all radioactive gases found for all batch releases.

Considering the inherent variability in radiation measurement and the uncertainties in instrument calibration and volume measurements, Detroit Edison estimates that the uncertainty in total dissolved and entrained gas release figures is less than plus or minus 15 percent.

4. Gross Alpha

Before the contents of each holding tank is discharged to the environment, a representative sample of the tank's contents is taken and retained. At the end of the calendar month a composite sample is made of all discharge samples taken during the month. This composite sample consists of portions of each discharge sample which are proportional to the volumes discharged. The composite sample is analyzed for gross alpha radioactivity by gas proportional counting.

The values reported in Section 8 are the sums of the gross alpha radioactivity from all batch releases.

Considering the inherent variability in radiation measurement and the uncertainty in volume measurements and instrument calibration, Detroit Edison estimates that the uncertainty in total liquid gross alpha release figures is less than plus or minus 43 percent.

6. ABNORMAL RELEASES

For the purpose of this report, an abnormal release is any release of radioactive material not performed in accordance with the Fermi 2 license and implementing procedures. No abnormal releases occurred during the reporting period.

7. BATCH RELEASES

As required by Regulatory Guide 1.21, a summary of data for batch releases is provided below. The following batch liquid releases from radwaste holding tanks to the Circulating Water Decant Line occurred between January 1, 1991 and June 30, 1991:

Number of releases:	30
Total time for all releases:	13,126 minutes
Maximum time for a release:	490 minutes
Average time for a release:	438 minutes
Minimum time for a release:	380 minutes

The only batch gaseous releases from Fermi 2 are the venting or purging of the primary containment (drywell) atmosphere. These venting or purging releases pass through the reactor building ventilation or standby gas treatment system and are monitored by the final effluent monitors for these pathways. Separate data on these venting or purging releases are not reported because the associated data are already included in the gaseous effluent release data (Section 5.A and Section 9).

8. LIQUID EFFLUENT SUMMARY

REPORT CATEGORY : SEMIANNUAL SUMMMATION OF ALL RELEASES BY QUARTER
TYPE OF ACTIVITY : ALL LIQUID EFFLUENTS
REPORTING PERIOD : QUARTER 1 AND QUARTER 2

TYPE OF EFFLUENT	UNIT	QUARTER 1	QUARTER 2
A. FISSION AND ACTIVATION PRODUCTS			
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	6.01E-02	1.46E-01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ml	6.87E-09	1.81E-08
3. MAXIMUM PERCENT OF TECHNICAL SPECIFICATION LIMIT FOR A SINGLE RELEASE	%	8.79E-01	7.03E-01
B. TRITIUM			
1. TOTAL RELEASE	CURIES	6.98E-01	1.26E+00
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ml	7.98E-08	1.56E-07
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	9.54E-02	6.58E-02
C. DISSOLVED AND ENTRAINED GASES			
1. TOTAL RELEASE	CURIES	6.82E-05	1.83E-06
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ml	7.79E-12	2.27E-13
3. PERCENT OF TECHNICAL SPECIFICATION LIMIT	%	1.40E-04	1.43E-06
D. GROSS ALPHA RADIOACTIVITY (Note: N.D. = No activity detected)			
1. TOTAL RELEASE	CURIES	N.D.	N.D.
E. WASTE VOL RELEASED (PRE-DILUTION)	LITERS	6.46E+05	1.71E+06
F. TOTAL VOLUME DILUTION DISCHARGED	LITERS	8.75E+09	8.07E+09

8. LIQUID EFFLUENT SUMMARY (continued)

REPORT CATEGORY : SEMIANNUAL LIQUID BATCH RELEASES
TYPE OF ACTIVITY : TOTALS FOR EACH NUCLIDE RELEASED
: ALL RADIONUCLIDES
REPORTING PERIOD : QUARTER 1 AND QUARTER 2

		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 1	QUARTER 2
ALL NUCLIDES			
H-3	CURIES	6.98E-01	1.26E+00
Na-24	CURIES	6.55E-03	1.52E-03
Cr-51	CURIES	3.14E-02	9.16E-02
Mn-54	CURIES	2.44E-03	8.88E-03
Co-58	CURIES	3.20E-03	7.01E-03
Co-60	CURIES	3.85E-03	1.05E-02
Zn-65	CURIES	2.50E-03	5.69E-03
Fe-59	CURIES	*<5.2E-08	4.48E-04
Tc-99m	CURIES	1.86E-03	6.79E-04
I-131	CURIES	1.03E-04	*<2.7E-08
I-133	CURIES	2.08E-04	*<1.8E-08
Xe-133	CURIES	1.34E-05	*<7.3E-08
Xe-135	CURIES	5.48E-05	1.83E-06
Sr-89	CURIES	1.29E-04	9.92E-05
Sr-90	CURIES	*<7.0E-09	*<5.0E-09
Fe-55	CURIES	7.11E-03	1.88E-02
Ba-131	CURIES	*<6.8E-08	1.04E-04
Ba-133m	CURIES	*<9.9E-08	2.50E-05
Ru-103	CURIES	*<2.3E-08	1.58E-05
Ag-110m	CURIES	*<1.5E-07	7.10E-06
As-76	CURIES	5.45E-04	1.02E-03
Re-188	CURIES	1.37E-04	*<1.3E-07
Ni-65	CURIES	6.27E-05	*<2.1E-07
Cs-134	CURIES	*<2.5E-08	*<2.5E-08
Cs-137	CURIES	*<3.1E-08	*<3.1E-08
Ce-141	CURIES	*<2.8E-08	*<2.8E-08
Ce-144	CURIES	*<1.5E-07	*<1.5E-07
Total for Period	CURIES	7.58E-01	1.41E+00

* Less than Lower Limit of Detection (LLD), i.e. the maximum sensitivity of measurement, in units of microcuries per milliliter (uCi/ml).

9. GASEOUS EFFLUENT SUMMARY

REPORT CATEGORY : SEMIANNUAL SUMMMATION OF ALL RELEASES BY QUARTER
TYPE OF ACTIVITY : ALL AIRBORNE EFFLUENTS
REPORTING PERIOD : QUARTER 1 AND QUARTER 2

TYPE OF EFFLUENT	UNIT	QUARTER 1	QUARTER 2
A. FISSION AND ACTIVATION GASES			
1. TOTAL RELEASE	CURIES	2.20E+01	3.42E+00
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	2.83E+00	4.35E-01
B. RADIOIODINES			
1. TOTAL IODINE - 131	CURIES	7.00E-04	2.32E-04
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	9.00E-05	2.95E-05
C. PARTICULATES			
1. PARTICULATES (HALF-LIVES>8 DAYS)	CURIES	7.59E-04	3.52E-04
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	9.76E-05	4.48E-05
3. GROSS ALPHA RADIOACTIVITY	CURIES	4.50E-07	1.47E-06
D. TRITIUM (Note: N.D. = No activity detected)			
1. TOTAL RELEASE	CURIES	N.D.	N.D.
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	N.A.	N.A.

3. GASEOUS EFFLUENT SUMMARY (continued)

REPORT CATEGORY : SEMIANNUAL AIRBORNE CONTINUOUS RELEASES
TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
REPORTING PERIOD : QUARTER 1 AND QUARTER 2

		MIXED MODE RELEASES	
NUCLIDE	UNIT	QUARTER 1	QUARTER 2
PARTICULATES			
Cr-51	CURIES	3.07E-04	5.78E-05
Mn-54	CURIES	1.08E-05	6.97E-05
Fe-59	CURIES	*<1.8E-13	3.49E-05
Co-58	CURIES	5.42E-06	1.65E-05
Co-60	CURIES	2.14E-05	9.98E-05
Na-24	CURIES	7.07E-04	9.66E-05
Zn-65	CURIES	4.87E-06	3.18E-05
Tc-99m	CURIES	2.36E-03	3.87E-05
Ba-139	CURIES	3.23E-01	4.37E-02
Ba-140	CURIES	3.19E-04	1.91E-05
La-140	CURIES	2.15E-04	6.83E-05
Y-91m	CURIES	1.92E-03	1.47E-04
Sr-91	CURIES	3.06E-03	2.78E-04
Rb-89	CURIES	3.65E-01	4.86E-02
Cs-138	CURIES	1.72E-01	2.03E-02
Re-188	CURIES	7.32E-05	*<9.8E-14
Br-82	CURIES	1.47E-05	*<5.1E-14
Se-75	CURIES	*<2.5E-14	8.00E-06
Rb-88	CURIES	2.33E-04	*<2.3E-11
Sr-89	CURIES	8.97E-05	1.36E-05
Sr-90	CURIES	4.89E-07	3.26E-07
Cs-134	CURIES	*<3.6E-14	*<3.6E-14
Cs-137	CURIES	*<4.7E-14	*<4.7E-14
Ce-141	CURIES	*<3.1E-14	*<3.1E-14
Ce-144	CURIES	*<[illegible]E-13	*<1.2E-13
Total for Period	CURIES	8.69E-01	1.14E-01

* Less than the Lower Limit of Detection (LLD), i.e. the maximum sensitivity of measurement in units of microcuries per milliliter (uCi/ml)

9. GASEOUS EFFLUENT SUMMARY (continued)

REPORT CATEGORY : SEMIANNUAL AIRBORNE CONTINUOUS RELEASES
TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
REPORTING PERIOD : QUARTER 1 AND QUARTER 2

	MIXED MODE RELEASES		
NUCLIDE	UNIT	QUARTER 1	QUARTER 2
FISSION GASES			
Ar-41	CURIES	2.20E+00	1.37E+00
Xe-135m	CURIES	1.25E+00	1.06E-01
Xe-138	CURIES	2.71E+00	3.46E-01
Xe-135	CURIES	2.04E-01	*<2.7E-08
Kr-85m	CURIES	1.77E+00	2.97E-01
Xe-137	CURIES	8.17E+00	1.09E+00
Kr-88	CURIES	1.72E+00	2.10E-01
Kr-89	CURIES	3.54E+00	*<2.0E-06
Xe-133	CURIES	3.93E-01	*<4.1E-08
Total for Period	CURIES	2.20E+01	3.42E+00
IODINES			
I-131	CURIES	7.00E-04	2.32E-04
I-132	CURIES	6.28E-04	1.42E-04
I-133	CURIES	3.64E-03	7.38E-04
I-134	CURIES	2.91E-04	*<1.6E-13
I-135	CURIES	1.17E-03	7.46E-04
Total for Period	CURIES	6.43E-03	1.86E-03

* Less than the Lower Limit of Detection (LLD), i.e. the maximum sensitivity of measurement in units of microcuries per milliliter (uCi/ml)

10. SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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	0.00E+00	NA
	Curies	0.00E+00	NA
b. Dry compressible waste, contaminated equipment, etc.	m^3	2.16E+01	±25
	Curies	2.02E+00	±25
c. Irradiated components, control rods, etc.		0	NA
d. Other		0	NA

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

Dry active waste:

Nuclide	Percent of Total Activity	Curies
Mn-54	5.6	1.13E-01
Fe-55	81.0	1.64E+00
Co-60	8.5	1.73E-01
Zn-65	4.6	9.28E-02
C-14	0.2	4.27E-03
Tc-99	<0.1	2.35E-04
I-129	<0.1	1.56E-04
H-3	N.A.	Not detected

Note: Activities of all principal radionuclides were determined by measurement.

3. Solid Waste Disposition (All waste was Class A and was shipped in LSA containers.)

Type of shipment/ solidification process	Number of shipments	Mode of Transport	Destination
Dry active waste	1	truck	Chem-Nuclear Systems, Inc. Channahon, IL

4. Irradiated Fuel Shipments:

None

10. SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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	0.00E+00	NA
	Curies	0.00E+00	NA
b. Dry compressible waste, contaminated equipment, etc.	m^3	2.16E+01	±25
	Curies	2.02E+00	±25
c. Irradiated components, control rods, etc.		0	NA
d. Other		0	NA

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

Dry active waste:

Nuclide	Percent of Total Activity	Curies
Mn-54	5.6	1.13E-01
Fe-55	81.0	1.64E+00
Co-60	8.5	1.73E-01
Zn-65	4.6	9.28E-02
C-14	0.2	4.27E-03
Tc-99	<0.1	2.35E-04
I-129	<0.1	1.56E-04
H-3	N.A.	Not detected

Note: Activities of all principal radionuclides were determined by measurement.

3. Solid Waste Disposition (All waste was Class A and was shipped in LSA containers.)

Type of shipment/ solidification process	Number of shipments	Mode of Transport	Destination
Dry active waste	1	truck	Chem-Nuclear Systems, Inc. Channahon, IL

4. Irradiated Fuel Shipments:

None

11. RADIATION INSTRUMENTATION

Fermi 2 Technical Specifications 3.3.7.11, Radioactive Liquid Effluent Monitoring Instrumentation, and 3.3.7.12, Radioactive Gaseous Effluent Monitoring Instrumentation, require that those monitors which exceed the time specified for out of service be reported in the next Semiannual Effluent Release Report. During this reporting period, January through June of 1991, the time specified in the action statements for these monitors was not exceeded.

12. CHANGES TO THE PROCESS CONTROL PROGRAM (PCP)

As required by the Fermi 2 license the operator (Detroit Edison) is required to establish a program that will reasonably assure the complete processing of radioactive wastes. This program assures processed wastes are completely solidified and are free of standing water. Changes to the PCP Manual are provided to document changes to established conditions and to ensure that controls are in place to assure that the radioactive waste is solidified.

During this reporting period, January through June of 1991, there were no changes to the PCP.

13. CHANGES TO DOSE CALCULATION AND ENVIRONMENTAL MONITORING LOCATIONS

In June, 1991, a new milk sampling location (the Roelant farm, M-4) was added. However, after 3 scheduled samples were obtained, the milk animal was sold. This location has been dropped as a milk sample location but is retained as a vegetation sample location.

14. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL (ODCM)

During this reporting period, January through June of 1991, there were no changes to the ODCM.

15. MAJOR CHANGES TO RADIOACTIVE WASTE SYSTEMS

During this reporting period, January through June of 1991, there were no major changes to the liquid, gaseous or solid radioactive waste treatment systems.

16. LIQUID HOLDUP TANKS EXCEEDING LIMITS

Fermi 2 Technical Specification 3.11.1.4 requires that the quantity of radioactive material contained in any outside temporary tank shall be limited to 10 curies, excluding tritium and dissolved or entrained noble gases. During this reporting period, January through June of 1991, this activity limit for such tanks was not exceeded.