DETRO T EDISON COMPANY

FERMI 2 NUCLEAR POWER PLANT

OPERATING LICENSE NO. NPF - 43

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT

for the period of

July 1, 1992 through December 31, 1992

PREFACE

The Fermi 2 Nuclear Power Plant maintains a comprehensive program of monitoring and controlling the release of radioactive material from the site. The releases covered in this report are of three types: liquid releases, gaseous releases, and radioactive waste shipments.

In a liquid release, a tank containing radioactive water is sampled prior to discharge. Based on the analysis of this sample, both the amount of radioactivity in the tank and the potential radiation dose to a member of the public are determined, and these figures are compared to federal limits. In calculating the radiation dose, very conservative assumptions are used. For example, it is assumed that an individual eats 46 pounds of fish per year from Lake Erie directly offshore of the Fermi 2 plant. The tank may be released only after it is determined that no federal limits are exceeded. As the tank is released, the contents of the tank are diluted by clean water in a ratio of approximately 400 gallons of clean water to one gallon of tank water. The release is continuously monitored by radiation detectors. Fermi 2 is continuing to work toward minimizing or eliminating liquid releases.

In the second half of 1992, there were six liquid releases. These releases contained 0.352 curies of tritium and 0.000195 curies of other radioactive material. Except for tritium, whose concentration remains fairly constant in liquid releases, the concentration of radioactive material in these liquid releases was, on the average, much smaller than that in the last series of releases, which occurred during the first 7 months of 1991.

Radioactive gaseous releases occur as part of the normal operation of Fermi 2. There are six ventilation system release points, or "stacks", each of which is monitored by a sophisticated radiation monitor which continuously extracts a sample from the stack effluent. Since any gaseous radioactive material is diluted by the building ventilation air flow, the stack concentrations are small. In fact, radioactive material is not detected in most stack samples. All sample results are compared with federal limits to ensure they are not exceeded. If the amount of radioactivity in the effluent of any stack approaches a federal limit, an alarm will be activated in the Fermi 2 control room to alert operations personnel. After evaluating the situation, the operators may choose to order increased sampling, shut down building ventilation, or divert the effluent stream to a special gaseous treatment system so that federal limits are not exceeded.

During the refueling outage which occurred during September and October, a torus hardened vent was installed to help mitigate serious accidents. This system is capable of rapidly depressurizing the primary containment by releasing primary containment gases to the outside atmosphere via a new vent stack. This torus hardened vent system is not expected to be used except in a severe accident situation.

In the second half of 1992, the amount of radioiodines and particulate radionuclides with half lives greater than 8 days in gaseous releases was 0.0169 curies. This amount is comparable to levels seen in previous periods. The amount of noble gases released in the second half of 1992 was 182 curies. This amount is higher than levels seen in previous periods due to significantly increased noble gas releases in August and September due to the presence of a leaking fuel assembly. This assembly was removed during the refueling outage, after which noble gas releases returned to levels seen prior to the fuel leakage.

Estimated annual radiation doses due to effluents from Fermi 2 are included in this report. Noble gas doses to air at the site boundary in 1992 were 0.0383 mrad gamma and 0.0375 mrad beta. These doses are 0.38% and 0.19%, respectively, of federal limits. Doses to maximally exposed individuals due to I-131, I-133, tritium, and particulates with half lives greater than 8 days were 0.0960 mrem (maximum organ gaseous), 0.0000175 mrem (total body liquid), and 0.0000433 mrem (maximum organ liquid). These doses are 0.64%, 0.00058%, and 0.00043%, respectively, of federal limits.

Radioactive shipments of solid waste from the Fermi 2 site consist of waste generated during water treatment, radioactive trash, and irradiated components. Federal regulations governing these shipments are extensive, and Fermi 2 also complies with internal procedures. Shipment destinations are either licensed burial sites or intermediate processing facilities. In the second half of 1992, Fermi 2 did not ship any radioactive waste due to the exclusion of Michigan licensees from the burial sites.

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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 material to the environment in accordance with Nuclear Regulatory Commission (NRC) and Detroit Edison Company requirements. This Semiannual Radioactive Effluent Release Report, for the July through December 1992 period, 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 14)

4. Changes to the Offsite Dose Calculation Manual (ODCM) (Section 16)

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

6. A list of any new locations for dose calculation or environmental monitoring identified by the land use census (Section 15)

7. A list of effluent monitors which were inoperable for a period longer than that specified in ODCM Controls 3.3.7.11 and 3.3.7.12, and an explanation of why the time limit was exceeded (Section 12)

8. A description of events leading up to any liquid holdup tanks exceeding the limit of Technical Specification 3.11.1.4 (Section 18)

9. A description of any major changes to radioactive waste treatment systems (Section 17)

10. An assessment of the radiological impact on the public in terms of dose due to liquid and gaseous effluents, both to the maximally exposed individual and to the population within a 50 mile radius of the plant (Section 11)

11. A summary of 1992 meteorological data (wind speed and wind direction for different stability classes) which was used in calculating gaseous dispersion factors (Section 13)

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 radicnuclides 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 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 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 (10 CFR) 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 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 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.

ODCM Control 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

ODCM Control 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 ODCM. As required by ODCM Control 3.11.1.1, the MPC's 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.

Quarterly the filters from each ventilation release point are composited and then 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. Also reported in Section 8 are the pre-dilution waste volume (the total volume of waste sample tanks released), the post-dilution waste volume (the total tank volume released plus the volume of circulating water released while the tanks were being released), and the total dilution volume discharged (the total volume of circulating water released during the reporting period).

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 must be provided in this report. The following batch liquid releases from radwaste holding tanks to the circulating water decant line occurred between July 1, 1992 and December 31, 1992 (all these releases occurred during December 1992):

Number of releases:	6
Total time for all releases:	2685 minutes
Maximum time for a release:	470 minutes
Average time for a release:	448 minutes
Minimum time for a release:	422 minutes

The only batch gaseous releases from Fermi 2 are the venting or purging of the primary containment (drywell or torus) 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 SUMMATION OF ALL RELEASES BY QUARTER
TYPE OF ACTIVITY : ALL LIQUID EFFLUENTS
REPORTING PERIOD : QUARTER 3 AND QUARTER 4

TYPE OF EFFLUENT	UNIT	QUARTER 3	QUARTER 4
A. FISSION AND ACTIVATION PRODUCTS			
1. TOTAL RELEASE (NOT INCLUDING TRITIUM, GASES, ALPHA)	CURIES	0.00E+00	1.52E-04
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ml	0.00E+00	1.56E-11
3. MAXIMUM PERCENT OF ODCM CONTROL LIMIT FOR A SINGLE RELEASE	%	0.00E+00	4.56E-03
B. TRITIUM			
1. TOTAL RELEASE	CURIES	0.00E+00	3.52E-01
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ml	0.00E+00	3.62E-08
3. PERCENT OF ODCM CONTROL LIMIT	%	0.00E+00	6.94E-02
C. DISSOLVED AND ENTRAINED GASES			
1. TOTAL RELEASE	CURIES	0.00E+00	4.29E-05
2. AVERAGE DILUTED CONCENTRATION DURING PERIOD	uCi/ml	0.00E+00	4.41E-12
3. PERCENT OF ODCM CONTROL LIMIT	%	0.00E+00	1.27E-04
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	0.00E+00	4.01E+05
F. WASTE VOL RELEASED (POST-DILUTION)	LITERS	0.00E+00	1.59E+08
G. TOTAL VOLUME DILUTION DISCHARGED	LITERS	9.86E+09	9.72E+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 3 AND QUARTER 4

		BATCH RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4
ALL NUCLIDES			
H-3	CURIES	0.00E+00	3.52E-01
Cr-51	CURIES	0.00E+00	7.27E-05
Mn-54	CURIES	0.00E+00	1.32E-05
Co-60	CURIES	0.00E+00	6.65E-05
Xe-133	CURIES	0.00E+00	2.04E-05
Xe-135	CURIES	0.00E+00	2.25E-05
Cs-134	CURIES	0.00E+00	:*<4.1E-08
Cs-137	CURIES	0.00E+00	:*<3.5E-08
Ce-141	CURIES	0.00E+00	:*<3.8E-08
Ce-144	CURIES	0.00E+00	:*<1.1E-07
Total for Period	CURIES	0.00E+00	3.52E-01

* 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 SUMMATION OF ALL RELEASES BY QUARTER
TYPE OF ACTIVITY : ALL AIRBORNE EFFLUENTS
REPORTING PERIOD : QUARTER 3 AND QUARTER 4

TYPE OF EFFLUENT	UNIT	QUARTER 3	QUARTER 4
A. FISSION AND ACTIVATION GASES			
1. TOTAL RELEASE	CURIES	1.69E+02	1.29E+01
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	2.13E+01	1.62E+00
B. RADIOIODINES			
1. TOTAL IODINE - 131	CURIES	1.33E-03	7.05E-04
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	1.67E-04	8.87E-05
C. PARTICULATES			
1. PARTICULATES (HALF-LIVES>8 DAYS)	CURIES	8.51E-04	4.65E-04
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	1.07E-04	5.85E-05
3. GROSS ALPHA RADIOACTIVITY	CURIES	1.21E-06	1.28E-06
D. TRITIUM			
1. TOTAL RELEASE	CURIES	2.65E+01	2.25E+00
2. AVERAGE RELEASE RATE FOR PERIOD	uCi/sec	3.33E+00	2.83E-01

9. GASEOUS EFFLUENT SUMMARY (continued)

REPORT CATEGORY : SEMIANNUAL AIRBORNE CONTINUOUS RELEASES
TYPE OF ACTIVITY : FISSION GASES, IODINES, AND PARTICULATES
REPORTING PERIOD : QUARTER 3 AND QUARTER 4

		MIXED MODE RELEASES	
NUCLIDE	UNIT	QUARTER 3	QUARTER 4
PARTICULATES			
Cr-51	CURIES	5.97E-04	1.99E-04
Mn-54	CURIES	8.72E-06	4.19E-05
Co-58	CURIES	1.06E-05	5.04E-06
Co-60	CURIES	2.76E-05	6.59E-05
Na-24	CURIES	2.63E-04	*<6.7E-13
Zn-65	CURIES	*<1.3E-13	1.15E-05
Tc-99m	CURIES	1.43E-03	1.15E-04
Ba-139	CURIES	2.06E-01	7.99E-02
Ba-140	CURIES	1.45E-04	4.23E-05
La-140	CURIES	9.60E-05	7.32E-05
Y-91m	CURIES	1.29E-03	1.05E-02
Sr-91	CURIES	2.51E-03	5.99E-04
Rb-89	CURIES	2.80E-01	1.23E-01
Cs-138	CURIES	1.17E+00	6.67E-02
Cs-139	CURIES	2.53E-01	*<8.8E-09
Br-82	CURIES	5.30E-05	*<1.5E-13
Se-75	CURIES	4.92E-06	*<3.4E-14
Hf-181	CURIES	*<5.9E-14	1.50E-06
Sr-89	CURIES	5.36E-05	9.80E-05
Sr-90	CURIES	3.31E-06	*<3.0E-16
Cs-134	CURIES	*<5.2E-14	*<5.2E-14
Cs-137	CURIES	*<5.3E-14	*<5.3E-14
Ce-141	CURIES	*<4.7E-14	*<4.7E-14
Ce-144	CURIES	*<2.0E-13	*<2.0E-13
Total for Period	CURIES	1.92E+00	2.81E-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 3 AND QUARTER 4

	: MIXED MODE RELEASES		
NUCLIDE	: UNIT	: QUARTER 3	: QUARTER 4
FISSION AND ACTIVATION GASES			
Ar-41	: CURIES	: 2.70E-01	: 4.59E-01
Xe-135m	: CURIES	: 2.48E+01	: 8.53E-01
Xe-138	: CURIES	: 5.54E+01	: 2.78E+00
Xe-135	: CURIES	: 1.47E+01	:*<3.6E-08
Kr-85m	: CURIES	: 1.84E+00	:*<2.8E-08
Xe-137	: CURIES	: 1.73E+01	: 8.78E+00
Kr-87	: CURIES	: 2.18E+00	:*<6.6E-08
Kr-88	: CURIES	: 8.23E+00	:*<1.1E-07
Kr-89	: CURIES	: 2.48E+00	:*<1.3E-06
Xe-133	: CURIES	: 4.14E+01	:*<7.0E-08
Total for Period	: CURIES	: 1.69E+02	: 1.29E+01
IODINES			
I-131	: CURIES	: 1.33E-03	: 7.05E-04
I-132	: CURIES	: 1.77E-02	: 2.29E-02
I-133	: CURIES	: 8.13E-03	: 5.38E-03
I-134	: CURIES	: 1.14E-03	: 4.56E-02
I-135	: CURIES	: 7.05E-03	: 1.55E-02
Total for Period	: CURIES	: 3.54E-02	: 9.01E-02

* 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): No shipments in this reporting period.

B. Irradiated Fuel Shipments: No shipments in this reporting period.

11. RADIOLOGICAL IMPACT ON THE PUBLIC

A. Dose Due to Liquid Effluents

As discussed in Section 6.5.1 of the Fermi 2 ODCM, compliance with ODCM Control 3.11.1.2, which limits dose to a member of the public to any organ and to the total body due to liquid effluents, is evaluated by calculating the dose to a hypothetical individual who both eats fish from Lake Erie and drinks water extracted from Lake Erie at the water intake for the city of Monroe. Conservative assumptions from Regulatory Guide 1.109 are made about the quantity of fish and water consumed. The individual organ and total body doses for 1992 to this hypothetical individual were calculated according to Section 6.5.1 of the ODCM and are listed below.

Organ	1992 Liquid Effluent Dose
Bone	1.48 E-5 mrem
Liver	1.88 E-5 mrem
Thyroid	1.48 E-5 mrem
Kidney	1.57 E-5 mrem
Lung	1.48 E-5 mrem
GI-LLI	4.33 E-5 mrem
Total body	1.75 E-5 mrem

The highest organ dose, 4.33 E-5 mrem to the GI-LLI tracts, is 0.00043% of the ODCM Control 3.11.1.2 annual organ dose limit; the total body dose, 1.75 E-5 mrem, is 0.00058% of the ODCM Control 3.11.1.2 annual total body dose limit.

B. Dose Due to Gaseous Effluents

As discussed in Section 7.8.1 of the Fermi 2 ODCM, compliance with ODCM Control 3.11.2.3, which limits dose due to I-131, I-133, H-3, and particulates with half lives greater than 8 days in gaseous effluents to any organ of a member of the public, is evaluated by calculating the dose to an individual in an age group which would receive the highest single organ dose of any member of the public. This individual is a child who is assumed to live at an offsite location which is known, based on the Land Use Census, to have a garden. This child is assumed to eat food from this garden, and to also be exposed by the inhalation and ground plane pathways. The individual organ and total body doses to this individual due to I-131, I-133, H-3, and particulates with half lives greater than 8 days were calculated according to Section 7.8.1 of the ODCM and are listed below.

Organ	1992 Gaseous Effluent Dose to Receptor with Highest Single Organ Dose
Bone	7.22 E-3 mrem
Liver	5.69 E-3 mrem
Thyroid	9.60 E-2 mrem
Kidney	5.87 E-3 mrem
Lung	5.46 E-3 mrem
GI-LLI	5.66 E-3 mrem
Total body	6.12 E-3 mrem

The highest single organ dose to the maximally exposed receptor, 9.60 E-2 mrem to the thyroid, is 0.64% of the ODCM Control 3.11.2.3 annual dose limit.

C. Dose Due to Direct Radiation and Compliance with 40CFR190

Title 40, Part 190 of the Code of Federal Regulations requires that dose to an individual from the uranium fuel cycle be limited to 25 mrem/yr to the total body and 75 mrem/yr to the thyroid. The sources of fuel cycle dose not analyzed above are due to other fuel cycle facilities and dose due to direct radiation. As discussed in Section 8.2 of the Fermi 2 ODCM, no other fuel cycle facilities contribute significantly to dose in the vicinity of Fermi 2. With respect to direct radiation, none of the offsite TLD locations listed in Table 10.0-1 of the ODCM showed 1992 TLD readings which were consistently greater than the TLD readings at the control locations. Since other facilities and direct radiation did not contribute significantly to offsite dose, and since the preceding sections of this report show compliance with the more restrictive requirements of 10CFR50 Appendix I, Fermi 2 was in compliance with 40CFR190 in 1992.

D. Dose to Visitors on Site

As discussed in Section 8.0 of the Fermi 2 ODCM, "visitors" to the Fermi 2 site may receive dose due to their activities within the site boundary. For purposes of this analysis, visitors are members of the public who spend time within the site boundary and who do not do work associated with the operation of Fermi 2. The ODCM considers two categories of visitors: persons ice fishing on Lake Erie and persons spending time in the Fermi 2 Visitors Center.

Table 8.0-1 of the ODCM lists the maximum amount of time an individual is likely to spend in these activities and the exposure pathways which apply: An individual is assumed to spend 240 hours per year ice fishing near the site and 4 hours per year at the Visitors Center. Exposure by direct radiation from noble gases and by inhalation of radioactive particulates, iodines, and tritium are considered. The doses given below do not include dose due to the pathways already considered in part A of this section, namely dose due to water and fish ingestion.

Based on these assumptions, the maximum dose in 1992 to a visitor at the Visitors Center is 2.07 E-5 mrem to total body and 3.04 E-5 mrem to the maximally exposed organ (thyroid). The maximum dose in 1992 to an ice fisherman is 2.77 E-3 mrem to the total body and 4.26 E-3 mrem to the maximally exposed organ (thyroid).

E. Population Dose

Dose to the population within a fifty mile radius of Fermi 2 due to 1992 gaseous and liquid effluents was calculated.

For liquid effluents, the fish ingestion and drinking water pathways were considered. Since there is no significant commercial fishery in the Michigan waters of Lake Erie, the dose due to fish ingestion was assumed to be due to ingestion by the local population of the entire sport fish catch in these waters. In calculating dose due to fish ingestion, parameters from Regulatory Guide 1.109 were used, as was the UFSAR dilution factor of 100. The dose due to water ingestion was determined by assuming that all residents served by the Monroe water intake drink at the average rate given by Regulatory Guide 1.109, and by using the UFSAR dilution factor to the intake of 77. The population total body dose due to drinking water was estimated to be 0.24 mrem, and the total body dose due to fish ingestion was estimated to be 0.006 mrem, for a total estimated population total body dose due to liquid effluents of 0.25 mrem.

For gaseous effluents, the code MICROAIRDOS was used to estimate the population dose. Inputs to the code were 1992 gaseous release data, wind direction and wind speed frequencies for each stability class, population in each of 10 segments of each of 16 sectors, stack release specifications, etc. The estimated 1992 collective effective dose due to gaseous effluents is 227 mrem.

F. Site Boundary Air Dose

Gamma and beta dose to air at the site boundary due to noble gases must be calculated to evaluate compliance with ODCM Control 3.11.2.2. In 1992, gamma air dose was 3.83 E-2 mrad and beta air dose was 3.75 E-2 mrad. These doses represent 0.38% and 0.19% of the ODCM Control 3.11.2.2 gamma and beta annual air dose limits, respectively.

12. RADIATION INSTRUMENTATION

Fermi 2 ODCM Controls 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 status be reported in the next Semiannual Effluent Release Report. During this reporting period, July through December of 1992, the time specified in the action statements for these monitors was not exceeded.

13. METEOROLOGICAL DATA SUMMARY

The meteorological monitoring system is described in the Fermi 2 UFSAR. In accordance with Regulatory Guide 1.21, data recorded by that system is provided here to permit the NRC to assess the radiological impact of Fermi 2 releases independently. The data format required by Regulatory Guide 1.21 is used. Appendix A contains the meteorological data tables. Specifically, these are joint frequency tables of wind speed versus wind direction for each atmospheric stability class for the 10 meter monitoring level. These data were used to derive annual average dispersion and deposition factors.

14. 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 that 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 radioactive waste is solidified.

In August 1992, Revision 15 of the PCP Manual was approved prior to its effective date and the determination was made that the change did not reduce the overall conformance of the solidified waste product to existing criteria. The Onsite Review Organization reviewed the change and found the change acceptable. This revision supported relocation of the Radiological Effluent Technical Specifications to the Offsite Dose Calculation Manual, changed "Shipping Supervisor" to "Radwaste Supervisor, Shipping", and made editorial corrections. Appendix B contains this revision together with supporting documents.

15. CHANGES TO DOSE CALCULATION AND ENVIRONMENTAL MONITORING LOCATIONS

During this reporting period, July through December 1992, several changes were made. Based on the 1992 Land Use Census, a new "critical receptor" for gaseous effluent dose calculation was identified. This receptor is a child residing 0.66 miles WNW of the plant who, for purposes of evaluating compliance with ODCM Control 3.11.2.3, is assumed to be exposed by the vegetation, inhalation, and ground plane pathways. Due to this critical receptor change, grass samples (collected in lieu of milk) are no longer collected at location M-7, the previous critical receptor, and grass sample controls are no longer collected at M-8, the milk control location. The new critical receptor location is expected to become a food product (garden) sample location (FP-7), with the first samples expected in July 1993.

There were also other changes not related to the change in critical receptor locations. Milk samples are no longer collected at location M-3 because the milk animals there were sold. Surface water location SW-1, the Fermi 1 Service Building, was reclassified as drinking water location DW-3 due to the fact that some of this water is processed into potable water. Surface water location SW-3, the Fermi 2 General Service Water Intake Structure, was added as a program enhancement. Food product location FP-5 was dropped because there was another closer location in the same sector.

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

In August 1992, Revision 4 of the ODCM was approved, implementing NRC Generic Letter 89-01. Appendix C contains this revision, together with supporting documents.

17. MAJOR CHANGES TO RADIOACTIVE WASTE SYSTEMS

During this reporting period, July through December of 1992, there were no major changes to the liquid, gaseous, or solid radioactive waste treatment systems.

18. 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, July through December of 1992, this activity limit for such tanks was not exceeded.

APPENDIX A: METEROLOGICAL DATA TABLES

PROGRAM: JFD VERSION: PC-1.1

PRINTOUT OF INPUT CONTROL DATA

TITLE: DECO FERMI2 JFD AT 10-METERS FOR 1992
BEGIN DATE: 92 1 1 1
END DATE: 92 12 31 24
OPTION TO PRINT MONTHLY JFDS: NO
OPTION TO PRINT SEASONAL JFDS: NO
OPTION TO PRINT STABILITY BY HOUR OF DAY: NO
OPTION TO PLACE JFD IN FILE FORMATTED FOR PAVAN/XOQDOQ: YES
OPTION TO USE 12 WIND SPEED CLASSES
INPUTTED WIND SPEED CLASSES IN MPH : .75 2.50 4.50 6.50 8.50 11.50 14.50 18.50 23.50 30.50 39.50 .00

PRIMARY MEASUREMENTS BASED ON:
WIND SPEED MEASURED AT 10.0 METERS IN MPH
BAD WIND SPEED DATA CODED: 999.90
WIND SPEED THRESHOLD: .75 MPH
WIND DIRECTION MEASURED AT 10.0 METERS
BAD WIND DIRECTION DATA CODED: 999.0
STABILITY BASED ON 1=A,2=B,...,7=G
BAD STABILITY CODED: 9.0

BACK-UP MEASUREMENTS BASED ON:
NO BACKUP WIND SPEED MEASUREMENTS
NO BACKUP WIND DIRECTION MEASUREMENTS
NO BACKUP STABILITY MEASUREMENTS

WIND SPEED HEIGHT TO BE USED FOR JFD: 10.00 METERS

CONVERSION FACTOR TO CONVERT SIGMA RANGE TO SIGMA THETA: 6.0

FORMAT TO READ INPUT DATA: (4I2,F5.1,F3.0,10X,F1.0,27X,A6,T11,A3,A3,T27,A1)

FIRST DATA RECORD READ: FERMI2 91 12 31 24 4.6 170.0 3.0

PROGRAM: JFD VERSION: PC-1.1

DECO FERMI2 JFD AT 10-METERS FOR 1992
SITE IDENTIFIER: FERMI2
DATA PERIOD EXAMINED: 1/ 1/92 - 12/31/92

*** ANNUAL ***

STABILITY CLASS A

STABILITY BASED ON 1=A,2=B,...,7=G
WIND MEASURED AT: 10.0 METERS
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 10.00 METERS

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 2.50	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
2.51- 4.50	0	0	0	2	0	0	1	0	0	0	0	0	0	0	0	0	3
4.51- 6.50	1	1	2	3	3	6	8	3	2	1	0	0	2	4	4	1	41
6.51- 8.50	0	5	14	6	12	20	17	6	1	0	1	5	7	21	9	5	129
8.51-11.50	3	2	1	11	23	9	3	0	0	1	0	7	7	24	26	12	129
11.51-14.50	2	2	0	2	17	9	0	0	2	8	0	0	2	11	6	5	66
14.51-18.50	1	0	0	0	0	3	0	0	0	0	0	0	0	5	2	2	13
18.51-23.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3
23.51-30.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.51-39.30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	7	10	17	24	55	47	29	9	5	10	1	12	18	66	47	28	385

STABILITY CLASS B

STABILITY BASED ON 1=A,2=B,...,7=G
WIND MEASURED AT: 10.0 METERS
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 10.00 METERS

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 2.50	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	2
2.51- 4.50	0	1	3	2	1	1	2	0	1	0	0	0	1	3	1	0	16
4.51- 6.50	2	0	5	8	5	10	5	1	7	2	0	0	5	5	6	7	68
6.51- 8.50	1	0	9	9	4	10	15	8	9	8	1	3	4	17	7	11	116
8.51-11.50	3	7	4	8	13	8	5	0	2	6	6	4	8	13	7	12	106
11.51-14.50	3	0	0	1	5	3	2	1	1	6	1	0	0	6	1	4	34
14.51-18.50	3	0	0	0	2	1	0	0	0	1	0	0	1	0	0	1	9
18.51-23.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
23.51-30.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.51-39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	12	8	21	28	30	34	29	10	20	24	8	7	19	44	22	35	351

PROGRAM: JFD VERSION: PC-1.1

DECO FERMI2 JFD AT 10-METERS FOR 1992
SITE IDENTIFIER: FERMI2
DATA PERIOD EXAMINED: 1/ 1/92 - 12/31/92

*** ANNUAL ***

STABILITY CLASS C

STABILITY BASED ON 1=A,2=B,...,7=G
WIND MEASURED AT: 10.0 METERS
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 10.00 METERS

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	0
.76- 2.50	1	1	2	1	1	0	0	0	0	0	0	0	1	1	2	0	10
2.51- 4.50	3	2	3	2	4	4	1	0	2	2	3	4	3	7	9	2	51
4.51- 6.50	5	3	7	7	8	20	18	6	15	9	5	10	21	21	19	9	183
6.51- 8.50	9	4	13	4	11	29	23	17	17	17	9	22	20	11	15	8	229
8.51-11.50	10	7	5	6	10	12	17	7	18	16	31	8	8	11	5	11	182
11.51-14.50	6	2	4	1	10	7	3	0	1	10	14	0	3	4	2	7	74
14.51-18.50	2	1	0	0	2	4	0	0	0	0	4	0	1	4	0	2	20
18.51-23.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3	4
23.51-30.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30.51-39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	36	20	34	21	47	76	62	30	53	54	66	44	57	59	52	42	753

STABILITY CLASS D

STABILITY BASED ON 1=A,2=B,...,7=G
WIND MEASURED AT: 10.0 METERS
WIND THRESHOLD AT: .75 MPH
JOINT FREQUENCY DISTRIBUTION OF WIND SPEED AND DIRECTION IN HOURS AT 10.00 METERS

SPEED (MPH)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL
CALM																	1
.76- 2.50	8	6	4	1	2	7	3	3	5	8	3	14	7	6	5	4	86
2.51- 4.50	42	33	20	7	14	22	19	15	20	24	29	66	62	46	49	48	516
4.51- 6.50	42	45	47	17	27	54	62	41	48	33	70	88	96	59	92	100	921
6.51- 8.50	61	33	100	70	59	80	59	59	63	55	100	90	75	51	51	98	1104
8.51-11.50	46	20	97	72	100	54	41	71	73	100	145	58	43	63	36	65	1084
11.51-14.50	20	6	30	21	36	39	18	19	25	72	88	15	26	22	9	17	463
14.51-18.50	6	9	8	4	10	5	4	4	10	22	24	4	9	6	2	3	130
18.51-23.50	6	0	0	4	6	0	0	0	1	8	3	0	0	3	0	2	33
23.51-30.50	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1
30.51-39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
>39.50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	231	152	306	196	255	261	206	212	245	322	462	335	318	256	244	337	4339