

FERMI 2
ANNUAL OPERATING REPORT
JANUARY 1 - DECEMBER 31, 1992

DETROIT EDISON COMPANY
NRC DOCKET NO. 50-341
FACILITY OPERATING LICENSE NO. NPF-43

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1.0 Introduction

The Fermi 2 Nuclear Power Plant site is located on the western shore of Lake Erie in Frenchtown Township, Monroe County, Michigan. The Nuclear Steam Supply System is a General Electric BWR 4, with a Mark I pressure-suppression containment. The plant is fully owned by the Detroit Edison Company.

2.0 Summary of Operating

2.1 Summary of Operating Experience

This summary covers the operation of Fermi 2 from January 1, 1992 to December 31, 1992. During this period, Fermi 2 generated 7,356,765 MWH (net) and was available 79.9 percent of the time. The forced outage rate was 2.7 percent.

The plant was on line from January 1 until March 16.

On March 16, during the performance of a Technical Specification surveillance test on Division 2 Reactor Water Levels 1, 2 and 8, an inadvertent actuation of the Low Pressure Coolant Injection (LPCI) system Loop Select Logic (LSL) occurred. The LSL signal caused the Reactor Recirculation Pump "B" discharge valve to close. The resulting core flow decrease led to entry into Region A of the power/flow map. No thermal hydraulic instability occurred. By procedure and the Technical Specification Action Statement, the reactor operator then manually tripped the reactor by placing the mode switch in the "Shutdown" position. The plant responded as expected to the resultant manual scram. The LSL actuation signal was caused by a short circuit condition in a Digital Multimeter (DMM). The DMM in question, and all DMM's of the same model number and series have been taken out of service at the plant. Following start up activities the main generator was synchronized to the grid on March 18. The plant remained on line until April 7.

On April 7, during performance of a routine surveillance on drywell and suppression chamber vacuum breaker operability, a vacuum breaker did not close after being opened. The vacuum breaker actuator (utilized during testing only) bound in the open position. The actuator cylinder for the vacuum breaker was replaced. The vacuum breaker was then successfully stroke tested. Following start up activities the main generator was synchronized to the grid on April 11. The plant remained on line until September 12.

On September 12 the main generator was removed from the electrical system for the third refuel Outage.

The major work included:

- o Refuel.
- o Modification and setpoint changes supporting the Power Uprate Project.
- o Installation of an Eighth Condensate Filter Demineralizer.
- o Installation of a Torus Hardened Vent.
- o Replacement of a Main Unit Transformer.
- o Repair of a crack discovered during the inspection of the steam dryer.
- o Replacement of 160 feet of large bore piping under Erosion/Corrosion program.

There were 1456 work requests performed during the outage. Modifications performed during the outage totaled one hundred and four.

The main generator was synchronized to the electrical system November 7. The plant remained on line until November 18.

On November 18, the plant was manually scrambled due to the loss of Heater Feed Pumps (HFP). The inadvertent opening of a condensate demineralizer inlet valve resulted in the loss of the HFP suction pressure and consequent trip of the HFP. The root cause of this event was determined to be personnel error by a non-licensed operator. The non-licensed operator inadvertently opened valve N20-F004H due to inattention to detail. The non-licensed operator did not use proper self-checking before opening the valve. An accountability meeting was held with the individual involved and plant management. This event was included in Operations Requalification Training. Following start up activities the main generator was synchronized to the grid on November 21. The plant remained on line until December 5.

On December 5 the plant shutdown to repair the extraction steam line which ruptured inside the main condenser. Following start up activities the main generator was synchronized to the grid on December 13. The main generator remained synchronized to the grid through the rest of the year.

2.2 Summary of Outages and Forced Reductions Greater than 20 Percent of Full Power

March, 1992

- March 16, 1992 - 45.6 Hours Shutdown

Manual reactor scram due to operation in region of instability (high power to flow) following inadvertent actuation of safety systems during surveillance test.

The safety system actuation occurred when a digital multimeter shorted internally. This event was reported by LER 92-002.

April, 1992

- April 7, 1992 - 92.8 Hours Shutdown

During performance of a routine surveillance on drywell and suppression chamber vacuum breaker operability, a vacuum breaker did not close after being opened. The vacuum breaker actuator (utilized during testing only) bound in the open position. This event was reported by LER 92-003.

August, 1992

- August 29, 1992 - Power Reduction

Reduced power to perform flux tilt testing to determine the location of a fuel defect. This was done to minimize the scope of fuel shimming required during the Third Refuel Outage. The fuel defect was the first fuel defect found at Fermi 2.

September, 1992

- September 12, 1992 - 1358.5 Hours Shutdown

Removed main turbine generator from the electrical system for the scheduled refueling outage. Following outage activities the plant was synchronized to the grid on November 7.

November, 1992

- November 18, 1992 - 57.2 Hours Shutdown

Scram due to loss of HFP. Inadvertent opening of condensate demineralizer inlet valve resulted in loss of HFP suction pressure and consequent trip of HFP. This event was reported by LER 92-012.

- November 28, 1992 - Power Reduction

Repair leaking flange of the high pressure throttle valve of the south reactor feed pump turbine.

December, 1992

- December 2, 1992 - Power Reduction

Recirculation Pump runback on loss of feedwater heater drains. Heater drains did not actually trip, but heater levels fluctuated.

- December 4, 1992 - Power Reduction

Power reduction to monitor number 4N heater pressure and extraction steamline. Extraction steamline problem is suspected.

- December 5, 1992 - 209.6 Hours Shutdown

Repair of extraction steam line rupture.

2.3 Fuel Performance

The plant completed its third fuel cycle on September 12, and began Cycle 4 on November 4. During the third refuel outage, the remaining 316 bundles of initial-load fuel were discharged. These were replaced with 92 bundles of initial-load fuel, which had been removed at the end of Cycle 1, and 224 bundles of new GE11-type fuel. The amount of thermal energy generated during the year was 247.5 FPD (Full Power Days) in Cycle 3 and 38.0 FPD in Cycle 4.

Indications of a leaking fuel pin were observed near the end of Cycle 3. A Flux Tilting process was used prior to the outage to locate the leak. This was successful in identifying the control cell (4 bundles) which contained the leaking bundle. Fuel sipping was performed during the outage and successfully identified the leaking bundle. The leaker was a GE6 non-barrier type bundle. It was one of the 316 bundles discharged during the outage. No further indications of leaking fuel have been observed since beginning Cycle 4 operation.

Fermi 2 was licensed for Power Uprate of 4.2 percent (thermal) for Cycle 4, 2.1% of which was actually attained before the end of the year. The following additional improvements are expected to improve unit capacity factor by reducing the number and extent of power reductions:

- Fuel loading designed to reduce reactivity variation during the cycle, resulting in fewer power reductions for control rod pattern adjustments.

Eliminating the use of non-barrier fuel on the interior of the core, which removes the need for fuel preconditioning.

- Continuing use of Control Cell Core and Maximum Extended Operating Domain (MEOD), which were introduced in Cycle 2 and Cycle 3, respectively.

2.4 Shore Barrier Survey

A survey of the Fermi 2 shore barrier was completed as per Procedure 43.000.01, "Shore Barrier Surveillance", and as required by Technical Specification 4.7.3. The results of the survey indicated no damage, significant movement, or deterioration of the barrier. All forty-seven survey point elevations were within the tolerance specified in Technical Specification Table 3.7.3-1. Civil Engineering Drawings 6C721-44 through 49 were revised to incorporate the survey data. No unusual incidents occurred in 1992 that would have required additional surveillance.

2.5 Safety Relief Valve Challenges

There were no safety relief valve challenges during 1992.

2.6 Personnel Monitoring and Exposure

Pursuant to 10CFR20.407(a)(2), a tabulation of the number of individuals monitored by range of measured exposure is shown in Table 2.6-1. Whole body exposures were determined using the thermoluminescent dosimeter (TLD) technique.

Table 2.6-2 provides a breakdown of radiation exposure by work and job function as required by Technical Specification 6.9.1.5(a).

Table 2.6-1

Statistical Summary Report
of the Number of Individuals for Whom
Personnel Monitoring was Provided
For the Period
January 1, 1992, to December 31, 1992

NUMBER OF INDIVIDUALS IN EACH RANGE	ESTIMATED WHOLE BODY EXPOSURE RANGE (REM)
1413	No Measurable Exposure
545	Exposure < 0.100
325	0.100 to 0.249
239	0.250 to 0.499
85	0.500 to 0.749
16	0.750 to 0.999
3	1.000 to 1.999
0	2.000 to 2.999
0	3.000 to 3.999
0	4.000 to 4.999
0	5.000 to 5.999
0	6.000 to 6.999
0	7.000 to 7.999
0	8.000 to 8.999
0	9.000 to 9.999
0	10.000 to 10.999
0	11.000 to 11.999
0	12.000 and Over

TABLE 2.6-2
ANNUAL EXPOSURE REPORT BY FUNCTION
01/01/92 to 12/31/92

Work & Job Function	Number of Personnel > 100 mrem			By DRD			Total Man-Rem			By TLD		
	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others	Station Employees	Utility Employees	Contractors and Others
Reactor Ops & Surveillance												
Maintenance Personnel	11	0	3	4,627	0.013	3,066	4,233	0.012	2,805			
Operating Personnel	63	0	10	16,522	0.000	2,568	15,115	0.000	2,349			
Health Physics Personnel	27	0	39	6,122	0.000	12,627	5,601	0.000	11,552			
Supervisory Personnel	1	0	1	1,815	0.000	0,625	1,660	0.000	0,572			
Engineering Personnel	7	0	0	2,700	0.062	0,084	2,470	0.057	0,077			
Routine Maintenance												
Maintenance Personnel	42	0	94	11,910	0.010	40,828	10,896	0.009	37,351			
Operating Personnel	29	0	1	6,512	0.000	0,952	5,957	0.000	0,871			
Health Physics Personnel	3	0	2	1,111	0.000	1,841	1,016	0.000	1,684			
Supervisory Personnel	2	0	0	1,514	0.015	0,185	1,385	0.014	0,169			
Engineering Personnel	6	0	1	2,940	0.000	0,343	2,690	0.000	0,314			
Inservice Inspection												
Maintenance Personnel	2	0	38	0,431	0.000	11,997	0,394	0.000	10,975			
Operating Personnel	6	0	0	1,992	0.000	0,005	1,822	0.000	0,005			
Health Physics Personnel	1	0	0	0,345	0.000	0,340	0,343	0.000	0,311			
Supervisory Personnel	6	0	0	2,532	0.000	0,110	2,316	0.000	0,101			
Engineering Personnel	13	0	17	3,451	0.000	6,642	3,157	0.000	6,076			
Special Maintenance												
Maintenance Personnel	47	0	94	15,950	0.000	38,528	14,592	0.000	35,247			
Operating Personnel	8	0	4	2,592	0.000	1,454	2,371	0.000	1,330			
Health Physics Personnel	18	0	28	5,625	0.000	12,570	5,192	0.000	11,499			
Supervisory Personnel	5	0	1	1,667	0.000	0,215	1,525	0.000	0,197			
Engineering Personnel	3	0	4	1,139	0.000	4,562	1,042	0.000	4,173			
Waste Processing												
Maintenance Personnel	0	0	4	0,010	0.000	0,841	0,009	0.000	0,709			
Operating Personnel	0	0	2	0,148	0.000	1,234	0,135	0.000	1,129			
Health Physics Personnel	0	0	7	0,236	0.000	2,122	0,216	0.000	1,941			
Supervisory Personnel	0	0	0	0,000	0.000	0,000	0,000	0.000	0,000			
Engineering Personnel	0	0	0	0,015	0.000	0,000	0,014	0.000	0,000			
Refueling												
Maintenance Personnel	9	0	8	2,583	0.000	2,990	2,363	0.000	2,735			
Operating Personnel	2	0	15	0,509	0.000	4,536	0,466	0.000	4,150			
Health Physics Personnel	2	0	9	0,491	0.000	2,846	0,449	0.000	2,604			
Supervisory Personnel	1	0	0	0,234	0.000	0,000	0,214	0.000	0,000			
Engineering Personnel	0	0	1	0,191	0.000	0,391	0,175	0.000	0,358			
Totals												
Maintenance Personnel	111	0	241	35,511	0.023	98,250	32,487	0.021	89,882			
Operating Personnel	108	0	32	28,275	0.000	10,749	25,867	0.000	9,834			
Health Physics Personnel	51	0	85	14,010	0.000	32,346	12,817	0.000	29,591			
Supervisory Personnel	15	0	2	7,762	0.015	1,135	7,101	0.014	1,038			
Engineering Personnel	29	0	23	10,436	0.062	12,022	9,547	0.057	10,998			
Grand Totals	314	0	393	95,994	0.100	154,502	87,818	0.092	141,343			

2.7 Service Life of Main Steam Bypass Line

In accordance with Detroit Edison letter VP-86-0154, dated November 7, 1986, the cumulative time the main steam bypass lines are operated with the bypass valves between 30 percent and 45 percent opened will be reported annually. A cumulative value of 100 days is not to be exceeded without prior NRC notification.

Evaluations performed by Stone and Webster and by Hopper and Associates concluded that the bypass lines are acceptable for safe operation when operated within the 100 day constraint. Based on these evaluations, the new main steam bypass piping that was installed in 1985 has a service life which will allow it to function for the life of the plant under anticipated operating conditions. The total value for 1992 is 20.3 hours and the cumulative value is 31.82 days, well within the constraint of 100 days. The annual average use of the bypass lines is expected to decrease in the future.

2.8 Specific Activity Analysis of the Primary Coolant Exceeding the Limits of Technical Specification 3.4.5

During 1992, the specific activity of the primary coolant did not exceed the limits of Technical Specification 3.4.5.

2.9 ECCS Outages

Pursuant to Fermi 2 technical specification 6.9.1.5.c, a summary of the ECCS system outages which occurred between January 1, 1992 and December 31, 1992 is provided. The tabulation of ECCS outage hours (Table 2.9-1) includes both forced and planned outages for the Low Pressure Coolant Injection (LPCI), Core Spray, High Pressure Coolant Injection (HPCI), and Automatic Depressurization Systems (ADS). An outage was considered to be whenever one of the ECCS systems was out-of-service at a time it was required to be operable per Technical Specifications.

ECCS Outages

Table 2.9-1

ECCS Outage Hours
January 1, 1992 to December 31, 1992

<u>ECCS System</u>	<u>Forced Hours</u>	<u>Planned Hours</u>
LPCI Division I	0.0	22.91
LPCI Division II	0.0	18.68
Core Spray Division I	0.0	16.88
Core Spray Division II	0.0	17.42
HPCI	34.90	141.70
ADS	3.52	0.0

DIVISION I LOW PRESSURE COOLANT INJECTION

- o ECCS System Outage: Division I Low Pressure Coolant Injection
Out of Service from 0500 03/31/92 to 0355 04/01/92
Duration: 22.91 hours Planned Outage

Outage Summary:

The division I LPCI system was removed from service to perform various corrective maintenance (CM) and preventive maintenance (PM) activities. Following completion of the activities and required surveillances, the division I LPCI system was returned to service.

DIVISION II LOW PRESSURE COOLANT INJECTION

- o ECCS System Outage: Division II Low Pressure Coolant Injection
Out of Service from 0355 04/07/92 to 2236 04/07/92
Duration: 18.68 hours Planned Outage

Outage Summary:

The division II LPCI system was removed from service to perform various CM and PM activities. Following completion of the activities and required surveillances, the Division II LPCI system was returned to service.

DIVISION I CORE SPRAY

- o ECCS System Outage: Division I Core Spray
Out of Service from 0609 03/24/92 to 2302 03/24/92
Duration: 16.88 hours Planned Outage

Outage Summary:

The division I core spray system was removed from service to perform various PM activities. Following completion of the activities and required surveillances, the division I core spray system was returned to service.

DIVISION II CORE SPRAY

- o ECCS System Outage: Division II Core Spray
Out of Service from 0530 01/14/92 to 2255 04/14/92
Duration: 17.42 hours Planned Outage

Outage Summary:

The division II core spray system was removed from service to perform various PM activities. Following completion of the activities and required surveillances, the division II core spray system was returned to service.

AUTOMATIC DEPRESSURIZATION SYSTEM

- o ECCS System Outage: Automatic Depressurization
Out of Service from 0029 06/28/92 to 0400 06/28/92
Duration: 3.52 hours Forced Outage

Outage Summary:

ADS Logic A was declared inoperable due to RPV water level instrument B21N595A failing its channel check. Following troubleshooting and performance of a partial surveillance, the level instrument was declared operable, along with ADS Logic A.

HIGH PRESSURE COOLANT INJECTION

- o ECCS System Outage: High Pressure Coolant Injection
Out of Service from 0930 02/15/92 to 0925 02/16/92
Duration: 23.9 hours Planned Outage

Outage Summary:

The HPCI system was removed from service to complete a 24 hour Auxiliary Oil Pump run. This was done to improve the quality of the oil. Following completion of the oil pump run, the HPCI system was returned to service.

- o ECCS System Outage: High Pressure Coolant Injection
Out of Service from 1516 05/04/92 to 1605 05/04/92
Duration: 0.8 hours Planned Outage

Outage Summary:

The HPCI system was removed from service to clean and sample oil. Following the completion of this activity, the HPCI system was returned to service.

- o ECCS System Outage: High Pressure Coolant Injection
Out of Service from 0400 05/05/92 to 2052 05/09/92
Duration: 112.9 hours Planned Outage

Outage Summary:

The HPCI system was removed from service to perform various CM and PM activities. The CMs included replacing the HPCI Turbine Carbon Rings (shaft seals) and replacing the Auxiliary Oil Pump. Following completion of the activities and required surveillances, the HPCI system was returned to service.

- o ECCS System Outage: High Pressure Coolant Injection
Out of Service from 1900 11/06/92 to 2305 11/06/92
Duration: 4.1 hours Planned Outage

Outage Summary:

The HPCI system was not in service during Low and High Pressure testing for start up from the third refuel outage.

- o ECCS System Outage: High Pressure Coolant Injection
Out of Service from 0245 11/22/92 to 1745 11/22/92
Duration: 15.0 hours Forced Outage

Outage Summary:

The HPCI system was removed from service to perform various CMs and PMs including a recalibration of the loop for HPCI suction pressure. Following completion of these activities and required surveillances, the HPCI system was returned to service.

- o ECCS System Outage: High Pressure Coolant Injection
Out of Service from 0533 11/29/92 to 0120 11/30/92
Duration: 19.9 hours Forced Outage

Outage Summary:

The HPCI system was removed from service to perform various CMs and PMs including replacement of the HPCI suction pressure switch. Following completion of these activities and required surveillances, the HPCI system was returned to service.