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DTE Energy

August 28, 2008
NRC-08-0057

U. S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D.C. 20555

Reference: Enrico Fermi Atomic Power Plant, Unit 1
NRC Docket No. 50-16
NRC License No. DPR-9

Subject: Enrico Fermi Atomic Power Plant, Unit 1
Annual Report Period Ending June 30, 2008

Pursuant to Section I.8 (Reporting Requirements) of the Technical Specifications for Provisional Operating License No. DPR-9, the annual report for the period ending June 30, 2008 for the SAFSTOR Fermi 1 facility is enclosed.

Should you have any questions, please contact Lynne S. Goodman, Manager, Fermi 1 at 734-586-1205.

Sincerely,

Joseph H. Plona

Joseph H. Plona
Site Vice President, Nuclear Generation

JHP/BD/ljd

Enclosure

cc: NRC Regional Administrator, Region III
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Fermi 1 Staff

Information Management (140 NOC) - Fermi 1 Records
NRR Chron File (Licensing)
NRC Notebook (Fermi 1)

DETROIT EDISON COMPANY

ENRICO FERMI ATOMIC POWER PLANT, UNIT 1

Docket No. 50-16
License No. DPR-9

Annual Report for Period

July 1, 2007 through June 30, 2008

Approved by: _____ Date: 8/27/08
Lynne S. Goodman
Custodian

ENRICO FERMI ATOMIC POWER PLANT, UNIT 1
ANNUAL REPORT

JULY 1, 2007 THROUGH JUNE 30, 2008

1.0 PREFACE

This report provides a summary of the activities performed and the results of the facility surveillance program of the Enrico Fermi Atomic Power Plant, Unit 1 Decommissioning Project, during the past twelve (12) months ending June 30, 2008.

In summary, the Fermi 1 staff conducted the required activities in accordance with the Operating License and Technical Specifications. Detroit Edison submitted one Licensee Event Report due to an uncontrolled release of radioactive material slightly above detection limits due to a pipe breach in the Primary Loop #3 when processing sodium. Fermi 1 continues decommissioning activities with the removal of contaminated components as well as residual sodium to achieve license termination.

2.0 SAFSTOR STATUS

2.1 Health Physics

2.1.1 Personnel Exposure

From July 1, 2007 through June 30, 2008, all monitored Fermi 1 personnel wore thermoluminescent dosimeters as dosimetry of record. Fermi 1 personnel wore electronic dosimeters from July 1, 2007 through June 30, 2008 as secondary dosimetry at Fermi 1. All visitors were appropriately escorted and wore electronic dosimeters as a minimum when entering all Radiologically Restricted Areas.

The accumulative whole body dose from activities associated with Fermi 1, as measured by thermoluminescent dosimeters was 980 millirem for this reporting period.

2.2 Surveillance Program

2.2.1 Environmental Surveys

No liquid radiological releases occurred during this period; therefore, environmental monitoring samples were not required or obtained.

2.2.2 Weekly Tests and Inspections

- **General area** --- Fermi 1 Staff performed walkthroughs and visual inspections as required by Technical Specifications.

2.2.3 Monthly Inspections

- **Controlled Area Inspections** --- Fermi 1 Staff performed visual inspections of the fences, gates, and doors within the specified intervals and surveyed the water level in the sump from the top access of all active sumps.
- Fermi 1 Staff performed monthly inspections which identified a number of minor issues during the period. Each was appropriately resolved. The following sump pump issues were identified and resolved:
  - Sump pump #1 failed. The sump pump was replaced.
  - Sump pump #4 external float level control switch would hang up against the side of the sump casing. The pump and piping was restrained to keep float from hanging up until Design Change 07-008-DC was implemented in July 2008.
  - Sump pump #10 failed due to a failed external float level control switch, the switch was replaced with a new diaphragm switch.
  - Sump pump #3 and #5 had degraded wiring due to age. The wiring was replaced.

2.2.4 Quarterly Surveillances

- **Radiological Surveys** --- Fermi 1 Radiation Protection personnel checked the Reactor Building and the Fuel and Repair Building for presence of gamma radiation and beta, gamma, and alpha contamination. The results of the quarterly contamination surveys indicated general area walkways remained <500-dpm/100 cm^2 beta/gamma and <20-dpm/100-cm^2 alpha until May 20, 2008 when a Loop #3 pipe breach event occurred. The Reactor Building, Fuel and Repair Building, and trestleway were contaminated to 500-dpm/100 cm^2 beta/gamma.

  Fermi 1 personnel decontaminated the Reactor Building, Fuel and Repair Building, and trestleway general areas to <500-dpm/100 cm^2 beta/gamma and <20-dpm/100-cm^2 alpha.

3.0 DECOMMISIONING PROJECT

The Fermi 1 Decommissioning Project continued during this period. Fermi 1 personnel continued with the sodium cleanup.

Reactor Rotating Shield Plug activities included:

Completed the removal of the Offset Handling Mechanism plug from the reactor.

Completed the removal of rings from the top of the reactor.

Lifted and cut the Offset Handling Mechanism shaft.

Completed the removal of the sweep mechanism equipment above the rotating shield plug cover plate.

Completed the removal of the stainless steel encased graphite cans and steel from the Offset Handling Mechanism plug shell.

Completed the removal of the contents of the rotating plug, which made up the top ~10 feet of the reactor vessel. This effort took months to complete, since it involved removal of thousands of graphite blocks, metal sleeves, chinkers and metal plates.

Completed the installation of the reactor cover plate.

Fermi 1 personnel completed the removal of the neutron source from the reactor and:

Processed the neutron source to remove any potential sodium residues.

Stored the neutron source temporarily within shielded stand on the Reactor Building operating floor until its shipment.

Shipped neutron source to Barnwell Waste Management Facility in Barnwell, South Carolina on February 6, 2007.

Fermi 1 personnel modified the Sodium Building temporary effluent system in preparation for more extensive future decommissioning activities.

Fermi 1 personnel modified the Fuel and Repair Building temporary effluent system in preparation for higher activity future decommissioning activities.

Fermi 1 Staff conducted periodic groundwater sampling during this period to obtain information for license termination planning. Fermi 1 Staff detected no plant related isotopes.

3.1 Sodium Cleanup

During the reporting period, continued sodium cleanup activities which included:

Fermi 1 sodium processing crew processed residual sodium in batches of pipe and equipment inside the sodium reaction chamber.

Fermi 1 sodium processing crew processed the rod extensions and gripper assemblies from the reactor within the individual shielded pipes (rod pods).

Fermi 1 personnel continued to work on cutting and grinding graphite blocks that were removed from the reactor rotating plug which may contain sodium based on sample population results.

Reactor Vessel sodium processing activities included:

Fermi 1 personnel completed the physical setup for processing the reactor.

The Fermi 1 sodium processing crew used a detailed procedure and a detailed work request with instructions to:

Perform system valve lineups.

Leak test the reactor system.

Ensure the reactor atmosphere was inert.

Energize the original reactor vessel heaters.

Heat the reactor vessel to a temperature to ensure the sodium was molten.

Monitor reactor vessel temperature using the originally installed thermocouples.

After meeting the setup criteria Fermi 1 sodium processing crew performed the final checks per the procedure, and started the actual sodium reaction with steam.

After the sodium reactions were completed, steaming was finished on April 13, 2007.

The heating and steaming phases took close to a month to complete, which was dependent on the sodium reactions.

Fermi 1 personnel modified the system and then carefully flooded the reactor with water.

Fermi 1 sodium processing crew recirculated the caustic liquid after flooding, and then neutralized the liquid with acid.

Fermi 1 sodium processing crew performed two evolutions of draining the reactor, by repeating the flooding, recirculating, neutralizing and draining steps to obtain greater assurance that all sodium was reacted. These evolutions took several weeks to complete.

Fermi 1 sodium processing crew completed draining the reactor of water that could be drained using the installed pump.

Primary Sodium Loop #3

The Fermi 1 sodium processing crew started the processing procedure for Loop #3 after performing the final system checks.

A pipe breach occurred while processing Loop #3, allowing molten sodium, caustic and nitrogen to leak from the system. Fermi 1 sodium processing crew immediately shut down the Loop #3 sodium processing. Additional details are located in section 5.3, "Licensee Event Report 08-001" of this report.

Fermi 1 personnel performed repairs, modifications and caustic cleanup due to the Loop #3 pipe breach.

Fermi 1 personnel performed radiological decontamination cleanup activities due to the Loop #3 pipe breach.

At the end of the reporting period, Fermi 1 personnel had addressed identified issues and were performing final checks prior to restarting system heating and processing.

3.2 Radiological Surveys

Fermi 1 Radiation Protection personnel encountered no unexpected radiological conditions during this reporting period until May 20, 2008 when the Loop #3 pipe breach occurred. Radiation Protection personnel performed extensive radiological surveys covering the exposed areas within the plant, then decontaminated the Reactor Building, Fuel and Repair Building, and trestleway general areas to <500-dpm/100 cm^2 beta/gamma and <20-dpm/100-cm^2 alpha.

3.3 Radiological Shipments

Fermi 1 personnel shipped the following materials offsite from Fermi 1 during the reporting period. Tools and equipment shipped to Fermi 2 are not included in this table.

Shipment Number	Material Description	Destination	Shipment Category	Activity (mCi)	Volume Gross (ft3)	Weight Gross (lbs)
EF1-07-009	Contaminated Laundry	UniTech Inc. Morris, IL	Limited Quantity	1.06	117.6	1838
EF1-07-010	Samples	General Engineering Lab, LLC Charleston, SC	Limited Quantity	2.44E-04	0.1	5
EF1-07-011	Contaminated Laundry	UniTech Inc. Morris, IL	Limited Quantity	0.99	117.6	1341

EF1-07-013	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.0297	117.6	1647
EF1-07-014	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.01	117.6	1847
EF1-07-015	Smear Samples	General Engineering Lab, LLC Charleston, SC	Limited Quantity	5.74E-04	2	10
EF1-07-017	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.06	235.2	2612
EF1-07-018	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.064	117.6	1813
EF1-07-019	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.014	117.6	1883
EF1-07-020	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.045	117.6	1720
EF1-07-021	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	0.996	118	1694
EF1-07-022	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	1.02	118	1772
EF1-07-023	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	6.02	59	874
EF1-07-024	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	13.84	118	1806
EF1-07-025	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	5.09	59	888
EF1-07-026	Contaminated Laundry	UniTech Inc. Morris, IL	Limited Quantity	10.05	118	1591
EF1-07-027	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	6.08	59	891
EF1-07-028	DAW/ Metal Waste	Energy Solutions BWF, Clive Utah	LSA	142	680	40,000
EF1-07-029	DAW/ Metal Waste	Energy Solutions BWF, Clive Utah	LSA	190	680	43,000
EF1-07-030	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	50.4	1080	38,236
EF1-07-031	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	11.15	118	1743
EF1-08-001	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	60	680	12,500
EF1-08-002	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	12.1	118	1736

EF1-08-003	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	195	1752	25,245
EF1-08-004	Depleted Neutron Source as Waste	Barnwell Waste Management Facility, Barnwell SC	LSA	674	15.9	4,327
EF1-08-006	Contaminated Salt Water	Energy Solutions Bear Creek Facility, Oak Ridge TN	LSA	16.1	641.7	41,565.7
EF1-08-007	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	10.84	118	1632
EF1-08-008	Contaminated Salt Water	Energy Solutions Bear Creek Facility, Oak Ridge TN	LSA	18.2	647.16	42,344
EF1-08-009	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	11.76	118	1814
EF1-08-010	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	23.26	236	3530
EF1-08-011	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	16.9	177	2428
EF1-07-026	Contaminated Laundry	UniTech Inc. Morris, IL	Limited Quantity	10.05	118	1591
EF1-07-027	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	6.08	59	891
EF1-07-028	DAW/ Metal Waste	Energy Solutions BWF, Clive Utah	LSA	142	680	40,000
EF1-08-012	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	145	276	33,935
EF1-08-013	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	77.4	1656	19,528
EF1-08-014	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	10.62	59	786
EF1-08-015	Air & Smear Samples	Framatome AREVA, Westborough MA	Limited Quantity	1.12E-03	.1	5
EF1-08-016	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	11.88	118	1587
EF1-08-017	Contaminated Laundry	UniTech Inc. Morris IL	Limited Quantity	12.34	118	1789
EF1-08-012	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	145	276	33,935
EF1-08-013	DAW/Metal Waste	Energy Solutions BWF, Clive Utah	LSA	77.4	1656	19,528

4.0 RADIOLOGICAL EFFLUENTS

Fermi 1 Radiation Protection personnel recorded no unmonitored radiological gaseous or particulate effluent releases during the reporting period except on May 20, 2008 when a Loop #3 pipe breach occurred (LER 08-001). Fermi 1 Radiation Protection personnel determined no particulate releases occurred during the reporting period with the exception of the May 20, 2008 Loop #3 pipe breach. Fermi 1 Radiation Protection personnel determined the majority of measurable releases were associated with the sodium removal project. The maximum dose to an offsite member of the public from these releases was 9.01 E-7 mrem total effective dose equivalent from tritium. The total activity of tritium released was 1.84 mCi. Including the conservatively calculated dose due to the May 20, 2008 event of 3.98 E-6 mrem, results in a maximum dose to an offsite member of the public of 4.88E-6 mrem. The gaseous effluent releases were below the Technical Specification air dose limit of 10 mrad of gamma radiation and 20 mrad of beta radiation per year. The individual dose calculated due to gaseous effluent releases was below the Technical Specification air dose limit of 5 mrem Total Effective Dose Equivalent.

50.59 EVALUATIONS AND DESIGN CHANGES

5.1 10 CFR 50.59

One 10 CFR 50.59 screening conducted during this period determined that a 50.59 evaluation was required:

08-001-SE - 50.59 Evaluation for processing sodium residues in the reactor vessel.

Summary:

The change evaluated is the as-left condition after processing reactor vessel sodium residues. The current condition is that the reactor vessel contains sodium and contamination deposited on its internal surfaces and the sodium storage tanks contain contaminated liquid. The as-left condition following the change is that the sodium will have been converted to sodium hydroxide and hydrogen gas. The hydrogen gas will have been vented; the reactor will have been flooded and subsequently drained. The liquid will have been drained to the sodium storage tanks. The majority of contamination will remain in the reactor vessel, some activity will have been contained in the liquid drained to the storage tanks, some activity will have been deposited in filter(s) in the liquid transfer path, some activity will have been deposited in the effluent system filters, and some activity will have been deposited on components in the processing system. Some activity, primarily tritium, will have been released to the environment through the effluent system. The activity potentially available for release is greater than analyzed in the F1SAR for a catastrophic event.

The increase in consequences of an accident was determined to be no more than minimal, and no other 50.59 criteria are affected, so NRC approval is not required.

5.2 Design Changes

Fermi 1 Staff did not implement any formal design changes during this report period. Fermi 1 personnel continued the removal of abandoned systems using work request documents per the Fermi 1 Quality Assurance Program.

5.3 Licensee Event Reports

Fermi 1 Licensee Event Report 08-001 (Summary)

Detroit Edison submitted a Licensee Event Report as required by Fermi 1 Technical Specifications Section F.7 as a condition reportable in accordance with Section A.4.

At approximately 1400 hours on May 20, 2008, while processing sodium in Primary Loop #3 using inerted superheated steam, a sodium fire occurred at a small pipe breach. When Fermi 1 personnel observed the fire, they terminated sodium processing and the fire was out in 10 minutes.

Portable air sampling for radioactivity was performed within the Fermi 1 Steam Generator Building, Fuel and Repair Building, and outdoors adjacent to the facility immediately following the event. Radiation Protection personnel recorded sampling data results that indicated an unplanned release of radioactive material from the facility slightly above detection limits had occurred during the event.

Four selected samples were sent to an offsite lab to determine if any hard to detect nuclides were released. Lab results showed only Cs-137 was detected. The Licensee Event Report had conservatively assumed Strontium-90 to also be released pending offsite laboratory analysis results.

Radiation Protection personnel used data from the sample results, effluent system discharge samples, and monitoring in the Fuel and Repair Building to estimate a total release from the pathways in the Fuel and Repair Building, Steam Generator Building, and trestleway. There was no detectable release through the Reactor Building effluent filtration system. The total release was calculated to be 16.2 μCi Cs-137 for a total dose to any individual at the site boundary of 3.98 E-6 mrem committed effective dose equivalent.

Fermi 1 Staff estimated the release duration to be approximately two hours based on the air monitor indication in the Fuel and Repair Building. For comparison purposes, if the release had continued for a full year, the dose to any individual at or beyond the

site boundary would still have been less than that allowed by Fermi 1 Technical Specification Section C.2 limit for dose due to gaseous effluents.

An evaluation team determined the cause of the pipe breach to be from high temperatures. The failed pipe was a 2" line installed to allow draining the 14" and 16" pipe sections of Primary Loop #3, which contained a large quantity of sodium, into a larger 30" pipe to be processed. The high temperature in the drain line occurred during subsequent steam processing (reacting) of the remaining sodium in the 16" pipe. Sodium overflowed into the 2" drain line while processing the 16" pipe which had not been anticipated, therefore, the temperature control, monitoring, and procedural controls were not adequate.

Fermi 1 Staff used the Corrective Action Program to implement corrective actions including procedure revisions, drain pipe modifications and sealing some building openings to minimize potential out leakage from the Reactor Building during sodium processing evolutions.

6.0 AUDIT SUBCOMMITTEE

The Audit Subcommittee inspected the physical facility and reviewed the Technical Specification surveillance records during the reporting period. The Audit Subcommittee did not identify any significant problems.

All audit reports are maintained on file.