January 19, 2001

Mr. William T. O'Connor, Jr.
Vice President - Nuclear Generation
Detroit Edison Company
6400 North Dixie Highway
Newport, MI 48166

SUBJECT: FERMI 2 - ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT OF THE SPENT FUEL POOL MODIFICATION (TAC NO. MA7233)

Dear Mr. O'Connor:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for a license amendment dated November 19, 1999, as supplemented on May 31, August 2, October 19, and November 21, 2000. The proposed amendment would revise the Fermi 2 Technical Specifications (TSs) by changing (1) the design features description of the fuel storage equipment and configuration to allow an increase in the spent fuel pool storage capacity from 2,414 to 4,608 fuel assemblies and (2) the description of the high-density spent fuel racks program to clarify that the surveillance program is applicable only to racks containing Boraflex as a neutron absorber.

The assessment is being forwarded to the Office of the Federal Register for publication.

Sincerely,

/RA by John Stang for/

John G. Lamb, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-341

Enclosure: Environmental Assessment

cc w/encl: See next page

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Fermi 2

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7590-01-P

UNITED STATES NUCLEAR REGULATORY COMMISSION

DETROIT EDISON COMPANY

DOCKET NO. 50-341

FERMI 2

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (NRC) is considering issuance of an amendment to Facility Operating License No. NPF-43 issued to Detroit Edison Company (the licensee), for operation of Fermi 2, located in Monroe County, Michigan.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would revise the Fermi 2 Technical Specifications (TSs) by changing (1) the design features description of the fuel storage equipment and configuration to allow an increase in the spent fuel pool (SFP) storage capacity and (2) the description of the high-density spent fuel racks program to clarify that the surveillance program is applicable only to racks containing Boraflex as a neutron absorber.

Currently, the SFP for Fermi 2 has 14 freestanding high-density (Boraflex) fuel racks, four General Electric (GE) low-density racks, and a rack for defective fuel, for a total storage capacity of 2414 fuel assemblies. As part of a proposed modification, the licensee plans to increase Fermi 2's spent fuel storage capacity by 2194 spaces in a three-phase operation. In phase one, four additional high-density racks will be added to open spaces in the SFP. In phase two, the GE racks, the rack for defective fuel, and one high-density rack would be replaced with five new high-density racks. In phase three, the remaining 13 existing racks

would be replaced with 14 new high-density racks. At the completion of phase three, the entire available floor space of the pool would be occupied with fuel storage racks providing for a total storage capacity of 4608 assemblies. Two platforms will be installed above the new high-density fuel storage racks to accommodate storage of miscellaneous activated components.

The proposed action is in accordance with the licensee's application for amendment dated November 19, 1999, as supplemented on May 31, August 2, October 19, and November 21, 2000.

The Need for the Proposed Action:

The proposed action is needed to maintain full core offload capability by expanding the spent fuel storage capacity. The licensee estimates that it will lose the ability to fully offload the reactor fuel by June 2001. The expanded storage capacity would extend full core offload capability to the year 2015. The current Fermi 2 operating license authorizes plant operations through March 20, 2025.

Environmental Impacts of the Proposed Action:

Radioactive Wastes

The existing contaminated fuel storage racks will be the main source of radioactive waste for the proposed modification. The racks will be washed prior to being removed from the pool to remove as much contamination as possible. The racks will then be shipped, using a special Department of Transportation approved container, to a volume reduction facility for processing and subsequent disposal at an authorized burial site.

In order to maintain the SFP water as clean as possible, underwater vacuuming of the SFP will be used to remove radioactive crud, sediment, and other debris generated in the rack replacement. Filters from use of this underwater vacuum system will also be a source of solid radwaste.

The impact of the expanded fuel storage capacity on the production and release of radioactive waste during normal operations is not expected to be significant. The level of radioactive contamination in the pool water impacts the amount of solid waste produced by pool purification system resins, as well as the liquid effluents originating from SFP water. Radioactive gases that evolve from the surface of the pool also contribute to the plant's gaseous effluents. However, the levels of gaseous and particulate radioactivity in the pool water are dominated by the most recent reactor core offload to the SFP, not the older cooled fuel stored in the pool. Therefore, the storage of additional aged spent fuel assemblies resulting from this proposed design change will have a minimal contribution to the levels of radioactivity in the pool water.

On the basis of its review of the Fermi 2 license amendment request, the NRC staff concludes that the proposed increase in spent fuel storage capacity (1) is not expected to result in an increase in the amount of gaseous tritium released from the SFP; (2) will result in a negligible increase in the amount of radioactive liquid released to the environment; and, (3) will not result in a significant increase in the volume of solid radioactive waste. Finally, small amounts of additional waste resin may be generated by the SFP's clean-up systems on a one-time basis. Shipping containers for these resins, the old racks, and debris generated by reracking will conform to 10 CFR Part 71, "Packaging and Transportation of Radioactive Material," and the requirements of States through which shipments may pass. Therefore, the NRC staff finds that, with regard to radioactive waste, the proposed increase in spent fuel storage capacity at Fermi 2 is acceptable.

Radiological Impact Assessment

The NRC staff has reviewed the licensee's plan for the replacement of the existing SFP storage racks at Fermi 2 with respect to occupational radiation exposure. As stated above, the licensee plans to replace the existing fuel storage racks in the SFP with 23 new high-density

racks. A number of facilities have performed similar operations in the past. On the basis of the lessons learned from these operations, the licensee estimates that the proposed fuel rack installation can be performed within a radiological dose estimate of approximately 12 person-rem. This estimate includes the rad-waste processing of the existing contaminated racks, as well as the projected dose to divers, in the event they are used, consistent with the licensee's contingency plan.

All of the operations involved in the fuel rack installations will utilize detailed procedures prepared with full consideration of as low as reasonably achievable (ALARA) principles. Workers performing the SFP re-racking operation will be given pre-job briefings to ensure that they are aware of their job responsibilities and precautions associated with the job. The licensee will monitor and control work, personnel traffic, and equipment movement in the SFP area to minimize contamination and to assure that exposures are maintained ALARA. Personnel will wear protective clothing and respiratory protective equipment, if necessary. Alarming dosimeters will be used as needed to confirm exposure and dose rates, while thermal luminescent dosimeters (TLDs) will be used to officially document the dose received. Additional personnel monitoring equipment (such as extremity TLDs or multiple TLDs) will be issued for appropriate tasks.

As indicated previously, the licensee intends to complete the three-phase fuel rack replacement without the use of divers in the pool. Removal of existing racks and installation of the new racks are expected to be completed remotely from the surface of the pool. However, if diving is necessary, the licensee has developed a contingency plan that includes diving procedures that are consistent with Regulatory Guide 8.38, Appendix A, in terms of diver restraint, radiological monitoring, physical monitoring, and standard SFP diving operations.

Prior to any diving operations, the radioactive sources in the pool will be configured to maximize the distance and shielding of the divers. Three dimensional radiation surveys will be performed with appropriate equipment. In addition, the divers will be equipped with monitors to survey the work area during each dive. The licensee will utilize underwater TV cameras to maintain visual contact with the divers during all diving operations. The divers will also be physically restrained by a dive tender with a tether contained in the dive umbilical. The SFP water will be continuously filtered through the SFP purification system in order to maintain water clarity. In addition, the licensee will vacuum the SFP floor prior to initiation of the diving operation and will vacuum the pool additional times during the diving operation, if it should become necessary, to maintain diver doses ALARA. Each diver will be equipped with whole body and extremity dosimetry (including alarming dosimetry) with remote, above surface, readouts that will be continuously monitored by radiation protection personnel.

All items removed from the pool, as well as divers, if used, will be monitored for radiation and contamination. This monitoring will be performed in isolated “bull pens” that separate the potentially contaminated areas from the rest of the refueling floor. The bull pens will minimize the possible spread of contamination, including “hot particles” (or discrete radioactive particles (DRPs)). Based on the Fermi 2 operating history and fuel integrity experience, the licensee does not anticipate any significant radiological challenges from DRPs.

The licensee assessed the radiological exposure impact of the proposed SFP design change on areas of the plant during normal operations. Revised shielding calculations indicate that the dose rates through the east and west walls of the pool would have only a modest increase (to 0.6 mrem/hr compared to the previous maximum of 0.5 mrem/hr). The maximum dose rates in the equipment storage room, adjacent to the north wall of the pool, increased to 400 mrem/hr. These calculations are based on the conservative assumption that all assemblies in the storage array have cooled for only 60 hours. The actual operational dose rates in this

area will depend upon the age of the fuel stored in the north end of the pool. In addition, this area is not a normally occupied room and can be controlled as a high radiation area consistent with the requirement in 10 CFR Part 20. The licensee has provided marked up radiation zoning maps from the Fermi 2 Updated Safety Analysis Report to reflect these design changes.

On the basis of the NRC staff review of the Fermi 2 license amendment, the NRC staff concludes that the proposed increase in spent fuel storage capacity at Fermi 2 can be performed in a manner that will ensure that doses to the workers will be maintained ALARA. The NRC staff finds that the projected dose for the project of 12 person-rem is in the range of doses for similar modifications at other plants and is, therefore, acceptable.

Accident Considerations

The proposed modification increases the spent fuel storage capacity, but it does not change the method for handling spent fuel assemblies.

The proposed expansion of the SFP will not affect any of the assumptions or inputs used in evaluating the dose consequences of a fuel handling accident and, therefore, will not result in an increase in the doses from a postulated fuel handling accident.

Environmental Impact Conclusions

The proposed action will not significantly increase the probability or consequences of accidents, no changes are being made in the types of any effluents that may be released off-site, and there is no significant increase in occupational or public exposure. Therefore, there are no significant radiological environmental impacts associated with the proposed action.

With regard to potential nonradiological impacts, the proposed action does not involve any historic sites. It does not affect nonradiological plant effluents and has no other environmental impacts. Therefore, there are no significant nonradiological environmental impacts associated with the proposed action.

Accordingly, the NRC concludes that there are no significant environmental impacts associated with the proposed action.

Alternatives to the Proposed Action:

Shipping Fuel to a Permanent Federal Fuel Storage/Disposal Facility

Shipment of spent fuel to a high-level radioactive storage facility is an alternative to increasing the onsite spent fuel storage capacity. However, the U.S. Department of Energy's (DOE's) high-level radioactive waste repository is not expected to begin receiving spent fuel until approximately 2010, at the earliest. To date, no interim Federal storage facility has yet to be approved in advance of a decision on a permanent repository. Therefore, shipping the spent fuel to the DOE repository is not considered an alternative to increasing the onsite fuel storage capacity at this time.

Shipping Fuel to a Reprocessing Facility

Reprocessing of spent fuel from Fermi 2 is not within the reasonable range of alternatives since there are no operating commercial reprocessing facilities in the United States. Therefore, spent fuel would have to be shipped to an overseas facility for reprocessing. However, this approach has never been used and it would require approval by the Department of State as well as other entities. Additionally, the cost of spent fuel reprocessing is not offset by the salvage value of the residual uranium; reprocessing represents an added cost.

Shipping the Fuel Offsite to Another Utility or Private Fuel Storage Facility

The shipment of fuel to another utility or transferring fuel to another of the licensee's facilities would provide short-term relief at Fermi 2. The Nuclear Waste Policy Act of 1982, Subtitle B, Section 131(a)(1), however, clearly places the responsibility for the interim storage of spent fuel with each owner or operator of a nuclear plant. The SFPs at the other reactor sites were designed with capacity to accommodate spent fuel from those particular sites. Therefore, transferring spent fuel from Fermi 2 to other sites would create storage capacity problems at

those locations. The shipment of spent fuel to another site is not an acceptable alternative because of increased fuel handling risks and additional occupational radiation exposure, as well as the fact that no additional storage capacity would be created.

The shipment of fuel to a private fuel storage facility is an alternative to increasing the onsite spent fuel storage capacity. However, a private fuel storage facility is not licensed at this time. Therefore, shipping the spent fuel to a private fuel storage facility is not considered an alternative to increased onsite fuel storage capacity at this time.

Alternatives Creating Additional Storage Capacity

Alternative technologies that would create additional storage capacity include rod consolidation, dry cask storage, modular vault dry storage, and constructing a new pool. Rod consolidation involves disassembling the spent fuel assemblies and storing the fuel rods from two or more assemblies into a stainless steel canister that can be stored in the spent fuel racks. Industry experience with rod consolidation is currently limited, primarily due to concerns for potential gap activity release due to rod breakage, the potential for increased fuel cladding corrosion due to some of the protective oxide layer being scraped off, and because the prolonged consolidation activity could interfere with ongoing plant operations. Dry cask storage is a method of transferring spent fuel, after storage in the pool for several years, to high capacity casks with passive heat dissipation features. After loading, the casks are stored outdoors on a seismically qualified concrete pad. Concerns for dry cask storage include the need for special security provisions and high cost. Vault storage consists of storing spent fuel in shielded stainless steel cylinders in a horizontal configuration in a reinforced concrete vault. The concrete vault provides missile and earthquake protection and radiation shielding. Concerns for vault dry storage include security, land consumption, eventual decommissioning of the new vault, the potential for fuel or clad rupture due to high temperatures, and high cost. The alternative of constructing and licensing new spent fuel pools is not practical for Fermi 2

because such an effort would require about 10 years to complete and would be an expensive alternative.

The alternative technologies that could create additional storage capacity involve additional fuel handling with an attendant opportunity for a fuel handling accident, involve higher cumulative dose to workers affecting the fuel transfers, require additional security measures that are significantly more expensive, and would not result in a significant improvement in environmental impacts compared to the proposed reracking modifications.

Reduction of Spent Fuel Generation

Generally, improved usage of the fuel and/or operation at a reduced power level would be an alternative that would decrease the amount of fuel being stored in the SFPs and, thus, increase the amount of time before the maximum storage capacities of the SFPs are reached. With extended burnup of fuel assemblies, the fuel cycle would be extended and fewer off-loads would be necessary. This is not an alternative for resolving the loss of full core off-load capability that will occur as a result of Fermi 2 receiving new fuel for Cycle 9 in June 2001. In addition, operating the plant at a reduced power level would not make effective use of available resources and would cause unnecessary economic hardship on the licensee and its customers. Therefore, reducing the amount of spent fuel generated by increasing burnup further or reducing power is not considered a practical alternative.

The No-Action Alternative

The NRC staff, also, considered denial of the proposed action (i.e., the “no-action” alternative). Denying the application would result in no significant change in current environmental impacts. The environmental impacts of the proposed action and the alternative actions are similar.

Alternative Use of Resources:

This action does not involve the use of any resources not previously considered in the Final Environmental Statement for Fermi 2.

Agencies and Persons Contacted:

In accordance with its stated policy, on December 11, 2000, the NRC staff consulted with the Michigan State official, M. Eldsman of the Michigan Public Service Commission, regarding the environmental impact of the proposed action. The state official had no comments.

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the environmental assessment, the NRC concludes that the proposed action will not have a significant effect on the quality of the human environment. Accordingly, the NRC has determined not to prepare an environmental impact statement for the proposed action.

For further details with respect to the proposed action, see the licensee's letter dated November 19, 1999, as supplemented by letters dated May 31, August 2, October 19, and November 21, 2000, which are available for public inspection at the NRC's Public Document Room, located at One White Flint North, 11555 Rockville Pike (first floor), Rockville, Maryland. Publicly available records will be accessible electronically from the ADAMS Public Library component on the NRC Web site, http:\\www.nrc.gov (the Electronic Reading Room).

Dated at Rockville, Maryland, this 19th day of January 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Claudia M. Craig, Section Chief, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation