October 4, 2001

Mr. Guy G. Campbell, Vice President - Nuclear
FirstEnergy Nuclear Operating Company
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER PLANT - ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT OF THE SPENT FUEL POOL MODIFICATION (TAC NO. MB0688)

Dear Mr. Campbell:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated December 2, 2000. The proposed amendment would revise the technical specifications for Davis-Besse Nuclear Power Plant to increase the capacity of the spent fuel pools from 735 to 1,624 fuel assemblies.

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

Sincerely,

/RA/

Stephen P. Sands, Project Manager, Section 2
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Environmental Assessment

cc w/encl: See next page

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UNITED STATES NUCLEAR REGULATORY COMMISSION

FIRSTENERGY NUCLEAR OPERATING COMPANY, FENOC

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER PLANT

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-3 issued to FirstEnergy Nuclear Operating Company, (FENOC, or the licensee), for operation of Davis-Besse Nuclear Power Plant (DBNPS), located in Oak Harbor, Ohio. As required by 10 CFR 51.21, the NRC is issuing this environmental assessment and finding of no significant impact.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would increase the number of fuel assemblies that can be stored in the DBNPS spent fuel pool (SFP) from 735 fuel assemblies to 1,624 fuel assemblies, an increase of 889 fuel assemblies. In addition, the new spent fuel storage racks will use Boral as the neutron absorber material.

The proposed action is in accordance with the licensee's application for amendment dated December 2, 2000.

The Need for the Proposed Action:

DBNPS is a pressurized water reactor which commenced commercial operation in 1974 and its current operating license will expire in April 22, 2017. DBNPS was originally designed to accommodate 735 spent fuel assemblies.

DBNPS began operating Cycle 12 (May 1998) with insufficient storage capacity in the SFP to fully offload the entire reactor core (177 fuel assemblies). Since a full core offload into the SFP was required for the performance of the 10-year inservice inspection activities during the spring 2000 Twelfth Refueling Outage, DBNPS submitted License Amendment Request 98-007 on May 21, 1999, to allow the use of spent fuel racks in the cask pit area adjacent to the SFP to perform the 10-year inservice inspection activities the NRC staff approved this activity on February 29, 2000.

The purpose of this current license amendment request is to provide the necessary revisions to the DBNPS technical specifications (TSs) to reflect an increase in SFP storage capability from the current capacity of 735 fuel assemblies to a new capacity of 1,624 fuel assemblies. To provide additional temporary storage of fuel assemblies to support a complete re-racking of the SFP, the licensee also requested approval for up to 90 transfer pit storage locations. The transfer pit storage rack will be relocated into the SFP as part of the completion of the re-racking project. The resulting SFP fuel storage capacity will be sufficient to meet the storage needs through the current expiration date of the DBNPS operating license (April 22, 2017).

Environmental Impacts of the Proposed Action:

Radioactive Wastes

DBNPS uses waste treatment systems designed to collect and process gaseous, liquid, and solid waste that might contain radioactive material. These radioactive waste treatment systems were evaluated in the Final Environmental Statement (FES) dated October 1975 (NUREG 75/097). The proposed SFP expansion will not involve any change in the waste treatment systems described in the FES.

Radioactive Material Released into the Atmosphere

The expanded fuel storage capacity obtained by installing new fuel racks is not expected to affect the release of radioactive gases from the SFP. Gaseous fission products such as Krypton-85 and Iodine-131 are produced by the fuel in the core during reactor operation. A small percentage of these fission gases are released to the reactor coolant from the small number of fuel assemblies which are expected to develop leaks during reactor operation. During refueling operations, some of these fission products enter the SFP and are subsequently released into the air of the spent fuel building. Gaseous releases from the fuel storage area are combined with other plant exhausts. If radio-iodine levels become too high, the air can be diverted to charcoal filters for the removal of radio-iodine before release to the environment. Normally, the radioactive gas contribution from the fuel storage area is negligible compared to the gaseous releases from other areas of the plant. Since the frequency of refueling (and therefore the number of freshly off loaded spent fuel assemblies stored in the SFP at any one time) will not increase, there will be a negligible increase in the amounts of these types of fission products released to the atmosphere as a result of the increased SFP fuel storage capacity.

Tritium gases contained in the SFP are produced from two sources. The first source is the tritium from the reactor coolant system (RCS), which is a result of neutron capture in the reactor core by ^{10}B. This tritium can only enter the spent fuel pool during refueling outages when the SFP and the RCS are interconnected. Since the proposed amendment does not increase the frequency of refueling outages, this source of tritium does not change. The second source of tritium is a result of neutron capture by ^{10}B in the SFP water. The decay neutron flux from the old fuel in the SFP is considerably smaller than the neutron flux in the

core of an operating reactor. Due to the small neutron flux associated with the fuel to be stored in the new racks, the affect on tritium production will be insignificant. Therefore, the release of tritium from the storage of additional spent fuel assemblies in the transfer canal will be insignificant.

In addition, the plant radiological effluent TSs, which are not being changed by this action, restrict the total releases of gaseous activity from the plant (including the SFP).

Solid Radioactive Wastes

Independent of the proposed modification, the concentration of radionuclides in the SFP is controlled by the filters and demineralizer of the SFP purification system as well as by the decay of short-lived isotopes. Spent resins are generated by the processing of SFP water through the SFP purification system. Both spent resins and filters are disposed of as solid radioactive waste. The spent fuel pool cooling and cleanup system currently generates approximately 50 cubic feet of solid radioactive waste annually. Re-racking activities may result in a one-time shortening of the resin change-out interval or an increase in filter usage, however, the long-term normal resin and filter replacement frequency is not expected to be significantly affected by the additional number of fuel assemblies in storage.

There will be a one-time increase in solid waste generation due to the need to dispose of 12 fuel storage rack modules, a module for 15 failed fuel storage locations, and miscellaneous piping runs currently located in the SFP that will be replaced with the new rack modules. However, this represents an insignificant incremental increase in the total quantity of solid waste generated as a result of plant operation.

In conclusion, the staff does not expect that the additional fuel storage capacity will result in a significant change in the generation of solid radwaste at DBNPS.

Liquid Radioactive Wastes

The number of stored spent fuel assemblies does not affect the release of radioactive liquids from the plant. The contribution from the stored fuel assemblies of radioactive materials in the SFP water is insignificant relative to other sources of activity, such as the reactor coolant system. The volume of SFP water processed for discharge is independent of the quantity of stored spent fuel assemblies. Therefore, the installation of the new fuel racks is not expected to increase the amount of liquid radioactive wastes generated at the DBNPS.

In addition, the plant radiological effluent TSs, which are not being changed by this action, restrict the total releases of activity in liquids from the plant.

Radiological Impact Assessment

During normal operations, personnel working in the fuel storage area are exposed to radiation from the SFP. Operating experience has shown that area radiation dose rates originate primarily from radionuclides in the pool water. During refueling and other fuel movement operations, pool water concentrations might be expected to increase somewhat. Fuel movement operations as a result of rack installation activities may marginally increase dose rates above and around the SFP and cask pit perimeter. However, the dose fields should still approximate conditions seen during normal operating conditions. Therefore, the staff does not expect a significant increase in airborne radioactivity as a result of the expanded spent fuel storage capacity.

On the basis of our review of the licensee's proposal, the staff concludes that the DBNPS SFP expansion can be performed in a manner that will ensure that doses to workers will be maintained as low as is reasonably achievable and within the limits of 10 CFR Part 20. The upcoming SFP rack installation will follow detailed procedures prepared with full consideration of as low as reasonably achievable principles. Personnel doses, including diving operations, is estimated to be no greater than 12 person-rem.

Accident Considerations

The licensee evaluated criticality safety calculations for normal conditions, criticality safety calculations for accident conditions, long-term reactivity changes, calculation of the transient decay heat load in the SFP, calculation of the resulting maximum SFP bulk temperature, calculation of the time-to-boil after a loss of forced cooling or makeup water capability, rack seismic/structural evaluations, rack fatigue analysis, SFP structural evaluation, bearing pad analysis and liner integrity analysis, shallow drop event, deep drop event, and object drop event.

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.

In summary, the Commission has completed its evaluation of the proposed action and concludes that there are no significant adverse environmental impacts associated with the proposed action.

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 offsite, and there is no significant increase in occupational or public radiation exposure.

Therefore, there are no significant radiological environmental impacts associated with the proposed action.

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

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

Environmental Impacts of the 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 location has been identified and an interim federal storage facility has yet to be identified in advance of a decision on a permanent repository. Therefore, shipping the spent fuel to the DOE repository is not considered an alternative to increased onsite fuel storage capacity at this time.

Shipping Fuel to a Reprocessing Facility

Reprocessing of spent fuel from DBNPS is not a viable alternative 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. Therefore, the shipping of spent fuel overseas and the increased cost of reprocessing, do not provide a viable alternative.

Shipping the Fuel Offsite to another Utility or another FENOC Site

The shipment of fuel to another utility or transferring fuel to another of the licensee's facilities would provide short-term relief from the problems at DBNPS. 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 DBNPS 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.

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. The licensee has previously

implemented dry cask storage onsite using the NUHOMS system, in accordance with 10 CFR 72.214, Certificate Number 1004. However, changes within the dry spent fuel storage industry have caused cost increases. The contracted supplier of the NUHOMS system voluntarily stopped fabrication activities and was unable to provide additional storage systems within a schedule acceptable to the licensee. Further use of this technology was re-evaluated by the licensee and determined not to be the best choice for future storage expansion at DBNPS.

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 DBNPS because such an effort would require 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. Therefore, the alternative technologies, the increased risk to workers and security, and the increased costs of these measures, do not provide a viable alternative.

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. However, 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:

Also, the NRC staff considered denial of the proposed action (i.e., the “no-action” alternative). Denial of 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 Statements for DBNPS.

Agencies and Persons Contacted:

In accordance with its stated policy, on August 30, 2001, the NRC staff consulted with Ohio State official, Carol O’Claire, Chief, Radiological Branch, Ohio Emergency Management Agency, 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 December 2, 2000. Documents may be examined, and/or copied for a fee, at the NRC's Public Document Room (PDR), 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 Public Electronic Reading Room). If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC PDR Reference staff at 1-800-397-4209, or 301-415-4737, or by e-mail at pdr@nrc.gov.

Dated at Rockville, Maryland, this 4th day of October 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Anthony Mendiola, Section Chief, Section 2
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