January 7, 2000

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

SUBJECT: ENVIRONMENTAL ASSESSMENT AND FINDING OF NO SIGNIFICANT IMPACT TO ALLOW USE OF EXPANDED SPENT FUEL STORAGE CAPABILITY - DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 (TAC NO. MA5477)

Dear Mr. Campbell:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated May 21, 1999 (Serial Number 2550), as supplemented by submittal dated December 1, 1999 (Serial Number 2628).

The proposed amendment would modify the Technical Specifications for Davis-Besse Nuclear Power Station, Unit 1, in order to expand the present spent fuel storage capability by up to 289 storage locations by allowing the use of spent fuel racks in the cask pit area adjacent to the spent fuel pool. This action is necessary in order to conduct a full core off-load in support of reactor vessel Inservice Inspection activities planned for the Twelfth Refueling Outage, which is scheduled to commence in April 2000.

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

Sincerely,

/RA/

Douglas V. Pickett, Senior 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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cc w/encl: See next page
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UNITED STATES NUCLEAR REGULATORY COMMISSION

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

ENVIRONMENTAL ASSESSMENT AND FINDING OF

NO SIGNIFICANT IMPACT

The U.S. Nuclear Regulatory Commission (the Commission) is considering issuance of an amendment to Facility Operating License NPF-3, issued to FirstEnergy Nuclear Operating Company (the licensee), for operation of the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS), located in Ottawa County, Ohio.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action will expand the present spent fuel storage capability by 289 storage locations by allowing the use of spent fuel racks in the cask pit area adjacent to the spent fuel pool (SFP). The cask pit is accessible from the SFP through a gated opening in the wall dividing the two pool areas. The modification will be achieved by two separate activities. In support of the twelfth refueling outage (12RFO), currently scheduled for April 2000, the licensee has installed two rack modules in the cask pit, containing a total of 153 storage locations. Later, during Cycle 13, the licensee plans to install two additional rack modules in the cask pit containing 136 additional storage locations. The licensee's long-term plans include submitting a request for a complete re-racking of the SFP. The four rack modules in the cask pit, which will be used to support shuffling of spent fuel during the re-racking, will be relocated into the SFP.

The design of the new high density spent fuel storage racks incorporates Boral as a neutron absorber in the cell walls to allow for more dense storage of spent fuel.

The proposed action is in accordance with the licensee's application for amendment dated May 21, 1999, as supplemented by submittal dated December 1, 1999.

The Need for the Proposed Action:

An increase in spent fuel storage capacity is needed to reestablish full core off-load capability. The licensee currently has insufficient storage capacity in the SFP to fully off-load the reactor core (177 fuel assemblies). The current spent fuel storage capacity in the SFP is 735 fuel assemblies and there are only 114 empty storage locations available. The licensee needs to conduct a full core off-load in order to perform reactor vessel Inservice Inspection activities during the twelfth refueling outage (12RFO) which is currently scheduled to begin in April 2000. The licensee's long-term plans include submitting a license amendment request to permit a complete re-racking of the SFP with higher density fuel storage racks.

Environmental Impacts of the Proposed Action:

Radioactive Waste Treatment

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. The proposed SFP expansion will not involve any change in the waste treatment systems described in the FES.

Gaseous Radioactive Wastes

The storage of additional spent fuel assemblies in the SFP is not expected to affect the release of radioactive gases from the pool. 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 is released to the reactor coolant from the small number of fuel assemblies that are expected to develop leaks during reactor operation. During refueling operations, some of these fission products enter the pool and are subsequently released into the air. 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 no increase in the amounts of these types of fission products released to the atmosphere as a result of the increased SFP storage capacity.

The increased heat load on the pool from the storage of additional spent fuel assemblies will potentially result in an increase in the pool's evaporation rate. However, this increased evaporation rate is not expected to result in an increase in the amount of gaseous tritium released from the pool. The overall release of radioactive gases from DBNPS will remain a small fraction of the limits of 10 CFR 20.1301.

Solid Radioactive Wastes

Spent resins are generated by the processing of SFP water through the pool's purification system. The spent fuel pool cooling and cleanup system at DBNPS currently generates approximately 50 cubic feet of solid radioactive waste annually. The necessity for pool filtration resin replacement is determined primarily by the need for water clarity, and the resin is normally changed about once every 18 months. The additional number of fuel assemblies in storage is not expected to significantly affect the resin replacement frequency. Therefore, the staff does not expect that the additional fuel storage provided by the new rack modules will result in a significant change in the generation of solid radwaste at DBNPS.

Liquid Radioactive Waste

The release of radioactive liquids will not be affected directly as a result of the modifications. The SFP ion exchanger resins remove soluble radioactive materials from the

SFP water. When the resins are changed out, the small amount of resin sluice water which is released is processed by the radwaste system. As stated above, the staff does not expect that the additional fuel storage provided by the new rack modules will result in a significant change in the generation of solid radwaste at DBNPS. The volume of SFP water processed for discharge is also not expected to be significantly changed. Therefore, the staff expects that the amount of radioactive liquid released to the environment as a result of the proposed SFP expansion will be negligible.

Occupational Dose Consideration

Radiation Protection personnel at DBNPS will constantly monitor the doses to the workers during the SFP expansion operation. 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 slightly due to crud deposits spalling from fuel assemblies and due to activities carried into the pool from the primary system. Should dose rates above and around the cask pit perimeter increase, this change would be identified by routine surveillances. Where there is a potential for significant airborne activity, continuous air monitors will be in operation. Personnel will wear protective clothing as required and, if necessary, respiratory protective equipment. If it becomes necessary to utilize divers for the operation, the licensee will equip each diver with appropriate personal dosimetry. The total occupational dose to plant workers as a result of this SFP expansion is estimated to be between 1.85 and 4.0 person-rems. This dose estimate is comparable to doses for SFP re-racking modifications at other nuclear plants. The planned activities will follow detailed procedures prepared with full consideration of ALARA (as low as is reasonably achievable) principles.

On the basis of its review of the licensee's proposal, the staff concludes that the SFP expansion operation can be performed in a manner that will ensure that doses to workers will be maintained ALARA. The estimated dose of 1.85 to 4.0 person-rem to perform the modification is a small fraction of the annual collective dose accrued at DBNPS.

Accident Considerations

In its application, the licensee evaluated the possible consequences of a fuel handling accident to determine the thyroid and whole-body doses at the site's Exclusion Area Boundary, Low Population Zone, and in the DBNPS Control Room. The proposed cask pit storage racks 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.

The licensee proposes to place restrictions on the spent fuel that will be stored in the cask pit racks. The restrictions stipulate that the spent fuel must have been removed from the reactor vessel for at least three years. The length of the decay period was determined by the licensee to address onsite ALARA and thermal-hydraulics considerations. The licensee will establish administrative controls to ensure the three year age limitation will not be violated.

The staff reviewed the licensee's analysis of a fuel handling accident and performed confirmatory calculations to check the acceptability of the licensee's doses. The staff's calculations confirmed that the offsite doses from a fuel handling accident meet the acceptance criteria and that the licensee's calculations are acceptable. The results of the staff's calculations are presented in the Safety Evaluation to be issued with the license amendment.

An accidental cask drop into the pool continues to be unlikely as none of the features preventing such a drop (e.g., design and maintenance of the main hoist, the controlled cask movement path, and the hydraulic guide cylinder cask drop protection system) are affected by

the proposed action. The licensee also found that the consequences of a loss of SFP cooling were acceptable in that ample time would be available for the operators to reestablish cooling before the onset of pool boiling. Evaluation of a design basis seismic event indicated the new racks would remain safe and impact-free, the structural capability of the pool would not be exceeded, and the reactor building and crane structure would continue to retain necessary safety margins. Thus, these potential accidents have no environmental consequences.

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 nonradiological impacts, the proposed action does not involve any historic sites. It does not affect nonradiological plant effluents and has no other environmental impact. 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. In October 1996, the Administration did commit DOE to begin storing waste at a centralized location by January 31, 1998. However, 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 spent fuel to the DOE repository is not considered an alternative to increased onsite spent 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.

Shipping Fuel to Another Utility or Site or to another FirstEnergy Facility

The shipment of fuel to another utility or transferring DBNPS fuel to another FirstEnergy facility (i.e., Perry Nuclear Power Plant, Unit 1, or Beaver Valley Power Station, Units 1 & 2) for storage would provide short-term relief from the storage problem at DBNPS. The Nuclear Waste Policy Act of 1982 and 10 CFR Part 53, however, clearly place the responsibility for the interim storage of spent fuel with each owner or operator of a nuclear plant. The other FirstEnergy spent fuel pools have been designed with capacity to accommodate their own needs and, therefore, transferring spent fuel from DBNPS to another FirstEnergy pool would create fuel storage capacity problems for these other facilities. The shipment of fuel to another site or transferring it to another FirstEnergy facility 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, 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. In the early 1990s, the licensee made the decision to reclaim some of the DBNPS SFP storage using a dry fuel storage system. In January 1996, 72 spent fuel assemblies were loaded into three Dry Shielded Canisters and were placed in dry fuel storage utilizing the certified Nutech Horizontal Modular Storage (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. In addition, the contracted supplier of the NUHOMS system voluntarily stopped fabrication activities and was unable to provide additional storage systems within an acceptable schedule. Further use of this technology was re-evaluated and determined not to be the best choice for future storage expansion at DBNPS. Based upon economics, schedule, and risk management, the licensee concluded that dry cask storage was not a viable alternative at DBNPS.

The alternative of constructing and licensing a new fuel pool is not practical because such an effort would require about 10 years to complete and would be the most 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 effecting the fuel transfers, require additional security measures, are significantly more expensive, and would not result in a significant improvement in environmental impacts compared to the proposed re-racking modifications.

Reduction of Spent Fuel Generation

Generally, improved usage of the fuel or operation at a reduced power level would be an alternative that would decrease the amount of fuel being stored in the pool and thus, increase the amount of time before full core off-load capacity is lost. 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 the DBNPS refueling outage scheduled to begin in April 2000, because the spent fuel to be transferred to the pool for storage has now almost completed its operating history in the core. DBNPS has been operating on the basis of 24-month refueling cycles, with core designs and fuel management schemes optimized accordingly. 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

As an alternative to the proposed action, the staff considered denial of the proposed action (i.e., the “no-action” alternative). Denial of the application would result in no change in current environmental impacts. The environmental impacts of the proposed action and the alternative action 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 DBNPS.

Agencies and Persons Consulted:

In accordance with its stated policy, on December 14, 1999, the staff consulted with the Ohio State official, Carol O'Claire, of the 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 May 21, 1999, as supplemented by letter dated December 1, 1999, which are available for public inspection at the Commission's Public Document Room, The Gelman Building, 2120 L Street, NW., Washington, DC. 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 7th day of January 2000.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Anthony J. Mendiola, Chief, Section 2
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Division of Licensing Project Management
Office of Nuclear Reactor Regulation