

July 18, 2001

Gary Van Middlesworth
Site Vice President
Duane Arnold Energy Center
Nuclear Management Company, LLC
3277 DAEC Road
Palo, IA 52324-0351

SUBJECT: DUANE ARNOLD ENERGY CENTER - ENVIRONMENTAL ASSESSMENT AND
FINDING OF NO SIGNIFICANT IMPACT RELATED TO AMENDMENT REQUEST
FOR REVISED THERMAL-HYDRAULIC ANALYSIS FOR SPENT FUEL POOL
(TAC NO. MB0596)

Dear Mr. Van Middlesworth:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to your application for amendment dated November 17, 2000, as supplemented on February 16 and April 9, 2001. The proposed amendment would change the license to allow refueling activities in accordance with a revised thermal-hydraulic analysis based upon use of advanced core designs employing advanced fuel, increased fuel burnup, increased cycle length, and increased reload batch size. The revised analysis also corrects several input parameter discrepancies in the existing analysis.

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

Sincerely,

/RA/

Brenda L. Mozafari, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure: Environmental Assessment

cc w/encl: See next page

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Duane Arnold Energy Center

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UNITED STATES NUCLEAR REGULATORY COMMISSION
NUCLEAR MANAGEMENT COMPANY, LLC
DOCKET NO. 50-331
DUANE ARNOLD ENERGY CENTER
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. DPR-49, issued to Nuclear Management Company, LLC (the licensee), for operation of the Duane Arnold Energy Center (DAEC) located in Palo, Iowa. Therefore, 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 change the license to allow refueling activities in accordance with a revised thermal-hydraulic analysis based upon use of advanced core designs employing advanced fuel, increased fuel burnup, increased cycle length, and increased reload batch size. The revised analysis also corrects several input parameter discrepancies in the existing analysis.

The proposed action is in accordance with the licensee's application for amendment dated November 17, 2000, as supplemented by letters dated February 16 and April 9, 2001.

The Need for the Proposed Action:

The proposed action is needed to support DAEC plans to pursue advanced core designs beginning with Cycle 18, including the use of General Electric (GE)-14 fuel, increased fuel burnup, increased cycle length, and increased reload batch size. The proposed action revises the thermal-hydraulic analysis for the spent fuel pool (SFP) submitted to the NRC by letter dated October 3, 1997. The proposed action also corrects discrepancies made in the existing thermal-hydraulic analysis.

Environmental Impacts of the Proposed Action:

NUREG-0800, "Standard Review Plan," provides criteria related to the design and performance of the spent fuel pool. Regulatory Guide 1.13, "Spent Fuel Storage Facility Design Basis," provides methods acceptable for the licensee to implement General Design Criteria 61 of Appendix A to 10 CFR Part 50 which requires that fuel storage and handling systems be designed to assure adequate safety under normal and postulated accident conditions. NRC memorandum, "Office Technical Position for Review and Acceptance of Spent Fuel Storage and Handling Applications," dated April 14, 1978, and modified by Addendum dated January 18, 1979, provides key design criteria and regulatory guidance for new spent fuel storage racks.

The licensee submitted a revised thermal-hydraulic analysis, which included maximum SFP temperatures, minimum time-to-boil after loss of forced cooling, and local water and fuel cladding temperatures. The licensee calculated the maximum bulk SFP temperatures for the following three cases: (a) planned full core offload scenario with full core discharge beginning at 60 hours after reactor shutdown, with one train of the fuel pool cooling and cleanup (FPCCU) system in operation; (b) planned full core offload scenario, the same scenario as case (A) except that two trains of FPCCU are in operation; and (c) unplanned full core offload scenario consisting of a normal refueling outage of 36 days, followed by 45 days of full power operation and a subsequent unplanned discharge of the full core to the SFP beginning 60 hours after

reactor shutdown, with two trains of FPCCU in operation. Based on its review, the NRC staff concluded that the methodology and assumptions used by the licensee to calculate the decay heat loads and to calculate the SFP bulk temperatures met the intent of the applicable NRC guidelines. The maximum SFP bulk temperatures of the revised hydraulic analysis are below the onset of boiling and are below the SFP temperatures approved by the NRC staff for the current thermal-hydraulic analysis.

The licensee also evaluated the effect of a complete loss of forced cooling to the SFP, which was assumed to occur when the SFP was at the maximum SFP bulk temperature. The calculated minimum time from the loss of pool cooling at peak pool water temperature until the pool boils for the worst case was 3.8 hours for the revised analysis, which was a slight decrease from the 4.5 hours of the current analysis, but still substantially longer than the 2 hours required to align the emergency service water system to provide makeup water to the SFP. In addition, various other sources of emergency makeup water would be available in less than 2 hours. Based on its review, the NRC staff concluded that in the unlikely event that there is a complete loss of cooling, the licensee is capable of aligning the makeup water from various sources to the pool before boiling begins and that makeup water will be supplied at a rate which exceeds the boil-off rate, and that cooling the SFP by adding makeup water in the unlikely event that there is a complete loss of cooling to the SFP conforms to NRC guidance.

The NRC staff has completed its evaluation of the proposed action and concludes that the proposed revision to the thermal-hydraulic analysis complies with the applicable regulatory documents and will allow for the continued safe storage of spent fuel.

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 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 have a potential to affect any historic sites. The proposed action does not involve any physical features of the plant or procedure changes involving a potential nonradiological release. 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.

Environmental Impacts of the Alternatives to the Proposed Action:

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 different resources than those previously considered in the Final Environmental Statement for the DAEC dated March 1973.

Agencies and Persons Consulted:

On July 11, 2001, the staff consulted with the Iowa State official, Mr. D. McGhee of the Department of Public Health, 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 17, 2000, as supplemented by letters dated February 16 and April 9, 2001. Documents may be examined, and/or copied for a fee, 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 Agencywide Documents Access and Management Systems (ADAMS) Public Electronic Reading Room on the Internet at the NRC web site, <http://www.nrc.gov/NRC/ADAMS/index.html>. Persons who do not have access to ADAMS or who encounter problems in accessing the documents located in ADAMS should contact the NRC Public Document Room (PDR) Reference staff by telephone at 1-800-397-4209 or 301-415-4737, or by e-mail at pdr@nrc.gov.

Dated at Rockville, Maryland, this 18th day of July 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Carl F. Lyon, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation