

April 11, 2001

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

SUBJECT: DUANE ARNOLD ENERGY CENTER - ENVIRONMENTAL ASSESSMENT AND
FINDING OF NO SIGNIFICANT IMPACT FOR LICENSE AMENDMENT
REGARDING SECONDARY CONTAINMENT OPERABILITY (TAC NO. MB1569)

Dear Mr. Van Middlesworth:

Enclosed is a copy of the Environmental Assessment and Finding of No Significant Impact related to a portion of your application for amendment dated October 19, 2000, as supplemented November 16, 2000, and April 9, 2001, and as limited in scope by letter dated March 23, 2001. The proposed amendment would change the Technical Specifications for Duane Arnold Energy Center by relaxing operability requirements for secondary containment (including associated isolation instrumentation, valves, dampers, and the standby gas treatment system) during core alterations and movement of irradiated fuel assemblies. The amendment also provides for a change in design and licensing bases for a selective application of the alternate radiological source term in accordance with 10 CFR 50.67, "Accident Source Term," and revised meteorology dispersion values, both being limited to a design-basis fuel handling accident.

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

Sincerely,

/RA/

Darl S. Hood, Senior 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 (NMC, the licensed operator) and IES Utilities Inc., Central Iowa Power Cooperative, Corn Belt Power Cooperative (the licensed owners), for operation of the Duane Arnold Energy Center, located in Linn County, Iowa.

ENVIRONMENTAL ASSESSMENT

Identification of the Proposed Action:

The proposed action would revise Facility Operating License No. DPR-49 to change the Technical Specifications (TS) for Duane Arnold Energy Center (DAEC and the facility) by relaxing operability requirements for secondary containment (aka, the reactor building), including associated isolation instrumentation, valves, dampers, and the standby gas treatment system, during core alterations and movement of irradiated fuel assemblies. The proposed action would also provide for a change in design and licensing bases for a selective application of the alternate radiological source term (AST) in accordance with 10 CFR 50.67, "Accident Source Term," and revised meteorology dispersion values, both being limited to evaluations of the consequences of a design-basis fuel handling accident (FHA).

The proposed action is in accordance with a portion of NMC's application for amendment by letter dated October 19, 2000, as supplemented November 16, 2000, and April 9, 2001, and as limited in scope by NMC's letter dated March 23, 2001.

The Need for the Proposed Action:

Changing DAEC's TS to relax requirements for the operability of the secondary containment (including associated isolation instrumentation, isolation valves and dampers, and the standby gas treatment system) when core alterations are occurring or spent fuel is being moved provides increased flexibility to NMC in the scheduling and conduct of refueling activities. Changing the design and licensing bases regarding an AST for a FHA recognizes advances in understanding of the behavior of radiological releases resulting from the accident, and is in accordance with 10 CFR 50.67. Changing the design and licensing bases regarding atmospheric dispersion values for use in evaluating the potential consequences of a radiological release due to a FHA is needed as a result of more recent data obtained from DAEC's meteorological program over the period of January 1, 1997, to December 31, 1999. NMC states that DAEC's historical atmospheric dispersion data did not meet its current expectations for level of documentation and design bases, and was not sufficient for analysis of new transport pathways in the AST methodology.

Environmental Impacts of the Proposed Action:

In December 1999, the NRC issued 10 CFR 50.67, which provides a mechanism for licensees of power reactors to replace the traditional radiological source term used in the design-basis accident (DBA) analyses with an AST. The NRC also issued Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design-Basis Accidents at Nuclear Power Reactors," to provide guidance for implementing these ASTs. Section 50.67 provides that a licensee who seeks to revise its current accident source term in design basis radiological consequence analyses shall submit an application for a license

amendment containing an evaluation of the consequences of applicable DBAs previously analyzed in the safety analysis report. By letter dated October 19, 2000, Nuclear Management Company, LLC (NMC and the licensee) requested a license amendment to apply the AST to a spectrum of DBAs. NMC's evaluation of the radiological consequences for the spectrum of DBAs applied the AST consistent with NMC's application for amendment, by letter dated November 16, 2000, to increase the maximum power level from 1658 thermal megawatts (MWt) to 1912 MWt. In a subsequent letter dated March 23, 2001, NMC requested that the portion of the October 19, 2000, application addressing a design-basis FHA be reviewed separately and in an expedited manner to facilitate an upcoming refueling outage. By letter dated April 9, 2001, NMC forwarded typed TS replacement pages reflecting certain TS changes proposed in the March 23, 2001, letter.

Accordingly, as requested in NMC's letter dated March 23, 2001, this environmental assessment addresses only the following portions of the original October 19, 2000, application for license amendment: (1) Implementing the AST in the radiological consequence analysis of a design-basis FHA performed to show compliance with 10 CFR 50.67(b)(2); (2) using revised atmospheric dispersion factors for radiological releases related to release points and human receptors associated with an FHA; and (3) eliminating TS requirements for operability of secondary containment (TS 3.6.4.1), its isolation instrumentation (TS 3.3.6.2), isolation valves and dampers (TS 3.6.4.2), and the standby gas treatment system (TS 3.6.4.3) during core alterations and movement of irradiated fuel assemblies.

The application for amendment describes NMC's radiological analysis of the design-basis FHA implementing the AST for a reactor core designed to operate at up to 1912 MWt. The accident analysis postulates that a spent fuel assembly is dropped from 30 feet above the top of the reactor core during refueling operations, resulting in the breaching of the cladding for 151 fuel rods. The drop over the reactor core is more limiting (damages more fuel rods) than

any drops that could occur over the fuel pool. The assumption of 151 damaged fuel rods is more conservative than the existing design and licensing basis value of 125 fuel rods.

Consistent with DAEC refueling procedures, a post-shutdown period of 60 hours is credited for radioactive decay in determining the release activity inventory, which is greater than the existing design and licensing basis of 24 hours. All the activity in the gap between the fuel pellets and the cladding of the damaged fuel rods is assumed to be released instantaneously into the pool. A pool water iodine decontamination factor of 200 is used, which is higher than the value of 100 used in the existing licensing basis analysis. NMC assumed no decontamination for noble gases released in the pool and full retention of all aerosol and particulate fission products by the pool water. Any activity leaving the pool enters the reactor building. All of the FHA activity is assumed to be released within 2 hours from the reactor building as a ground release, with no credit for holdup or dilution by the reactor building, and no credit for operation of the standby gas treatment system. Not crediting any dilution, holdup, or cleanup by the standby gas treatment system of the activity released from the pool represents a more conservative basis than that used in the existing licensing basis FHA analysis. NMC used atmospheric dispersion values derived from additional meteorology data from DAEC's meteorological program over the period of January 1, 1997, to December 31, 1999. The new atmospheric dispersion values are more conservative (e.g., provide higher offsite doses) than the previous values. The NRC staff finds that these assumptions and input parameters for the design-bases FHA are consistent with NMC's application to (1) change the TS to relax requirements for the operability of the secondary containment (including associated isolation instrumentation, isolation valves and dampers, and the standby gas treatment system) when core alterations are occurring or spent fuel is being moved, (2) change the design and licensing bases to apply an AST for a FHA, and (3) change the design and licensing bases to apply the updated atmospheric dispersion values for the FHA consequence analysis.

The results of NMC's analyses indicate that the dose at the exclusion area boundary would be no more than 0.94 rem total effective dose equivalent (TEDE)¹ and the dose at the low-population zone would be no more than 0.23 rem TEDE. These results are less than the TEDE criterion of 6.3 rem set forth in RG 1.183 (Table 6) and, therefore, are acceptable. Therefore, the proposed action to change the TS and the licensing and design bases regarding the design-basis FHA does not represent a significant offsite radiological impact to the human environment.

Using the above AST and the updated atmospheric dispersion values, NMC evaluated the dose to operators in the control room assuming that operators manually actuate control room isolation within 10 minutes. NMC evaluated the dose to personnel in the technical support center (TSC), which was assumed to be isolated manually after a 30-minute delay. These delay times are consistent with NMC's proposed TS change to relax the operability requirements for isolation of the control room and TSC. The analyses also assumed 1000 cubic feet per minute of unfiltered inleakage into the control room and TSC, even though both areas are designed to be pressurized to preclude such inleakage after an accident. The control room and TSC doses were analyzed over a 30-day period. The results indicate that the control room operators would receive no more than 3.16 rem TEDE and TSC personnel would receive no more than 2.83 rem TEDE. These doses are less than the TEDE limit of 5 rem contained in 10 CFR 50.67 and are, therefore, acceptable. Therefore, the proposed action would not result in a significant onsite radiological impact to the human environment.

¹ As part of the implementation of the AST, the TEDE acceptance criterion of 10 CFR 50.67 (b)(2) replaces the previous whole body and thyroid dose guidelines of 10 CFR 100.11, "Reactor Site Criteria--Determination of Exclusion Area, Low Population Zone, and Population Center Distance," and General Design Criterion (GDC)-19 of 10 CFR Part 50, Appendix A, which (based upon NMC's selective application) is limited to the FHA only.

The proposed action to change the TS and to change the licensing and design bases with respect to the FHA will not increase the probability or consequences of accidents, no significant changes are being made in the types or amounts of any effluents that may be released offsite, and there is no significant increase in occupational or public radiation exposure. Therefore, the NRC concludes that 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. The proposed action does not involve any physical features of the plant or procedure changes involving a potential nonradiological release. Thus, the proposed action 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:

As an alternative to the proposed action, the NRC staff considered denial of the proposed action (i.e., the “no action” alternative). Denial of the application would not result in a significant improvement 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 Relating to the Operation of Duane Arnold Energy Center,” dated March 1973.

Agencies and Persons Consulted:

In accordance with its stated policy, the NRC staff consulted with the Iowa State official, Mr. D. Fleeter 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 application dated October 19, 2000, as supplemented by letters dated November 16, 2000, and April 9, 2001, and as limited in scope by letter dated March 23, 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 ADAMS Public Library component on the NRC Web site, <http://www.nrc.gov> (the Electronic Reading Room).

Dated at Rockville, Maryland, this 11th day of April 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Darl S. Hood, Senior Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation