November 27, 2006

Mr. Gary Van Middlesworth
Vice President
Duane Arnold Energy Center
3277 DAEC Road
Palo, Iowa 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT REGARDING REVISION TO THE REACTOR PRESSURE VESSEL MATERIAL SURVEILLANCE PROGRAM (TAC NO. MC9313)

Dear Mr. Van Middlesworth:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No.262 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). This amendment revises the DAEC licensing basis, as described in the Updated Final Safety Analysis Report (UFSAR), to replace the current plant-specific reactor pressure vessel material surveillance program with the Boiling Water Reactor Vessel and Internals Project Integrated Surveillance Program as the basis for demonstrating compliance with the requirements of Appendix H to Part 50 of Title 10 of the *Code of Federal Regulations*, "Reactor Vessel Material Surveillance Program Requirements."

The changes to the DAEC UFSAR shall be as stated in the Nuclear Management Company, LLC (NMC, the former licensee) application dated December 22, 2005. Amendment No. 260, issued on January 27, 2006, transferred the DAEC license from NMC to FPL Energy Duane Arnold, LLC (FPL Energy). By letter dated February 6, 2006, FPL Energy adopted all previous docketed requests before the NRC for review and approval.

A copy of the Safety Evaluation is also enclosed. A Notice of Issuance will be included in the Commission's next biweekly *Federal Register* notice.

Sincerely,

/RA/

Richard B. Ennis, Senior Project Manager
Plant Licensing Branch III-1
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures:
1. Amendment No. 262 to License No. DPR-49
2. Safety Evaluation

cc w/encls: See next page

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FPL ENERGY DUANE ARNOLD, LLC

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 262
License No. DPR-49

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by Nuclear Management Company, LLC[1] dated December 22, 2005, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

---

[1] The application was submitted by Nuclear Management Company, LLC (NMC, the former licensee). Amendment No. 260, issued on January 27, 2006, transferred license DPR-49 from NMC to FPL Energy Duane Arnold, LLC (FPL Energy, the current licensee). By letter dated February 6, 2006, FPL Energy adopted all previous docketed requests before the NRC for review and approval.

2. Accordingly, the license is amended to authorize changes to the Updated Final Safety Analysis Report (UFSAR) to allow implementation of the Boiling Water Reactor Vessel and Internals Project Integrated Surveillance Program as the basis for demonstrating complance with Appendix H to 10 CFR Part 50, "Reactor Vessel Material Surveillance Program Requirements." The changes to the UFSAR shall be as set forth in Exhibit B to the licensee's application dated December 22, 2005.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of the date of issuance. Implementation of the amendment is the incorporation into the UFSAR of the program description set forth in the licensee's application dated December 22, 2005, and evaluated in the Safety Evaluation enclosed with this amendment. The licensee shall submit the changes authorized by this amendment with the next update of the UFSAR in accordance with 10 CFR 50.71(e).

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

L. Raghavan, Chief
Plant Licensing Branch III-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Date of Issuance: November 27, 2006

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 262 TO FACILITY OPERATING LICENSE NO. DPR-49

FPL ENERGY DUANE ARNOLD, LLC

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

By letter dated December 22, 2005 (Reference 1), Nuclear Management Company, LLC (NMC, the former licensee) requested a license amendment to revise the Updated Final Safety Analysis Report (UFSAR) for the Duane Arnold Energy Center (DAEC). Amendment No. 260, issued on January 27, 2006, transferred the DAEC license from NMC to FPL Energy Duane Arnold, LLC (FPL Energy, the current licensee). By letter dated February 6, 2006, FPL Energy adopted all previous docketed requests before the NRC for review and approval.

The proposed amendment would revise the DAEC licensing basis to replace the current plant-specific reactor pressure vessel (RPV) material surveillance program with the Boiling Water Reactor Vessel and Internals Project (BWRVIP) Integrated Surveillance Program (ISP) as the basis for demonstrating compliance with the requirements of Appendix H to Part 50 of Title 10 of the *Code of Federal Regulations*, (10 CFR Part 50, Appendix H), "Reactor Vessel Material Surveillance Program Requirements."

The BWRVIP ISP was submitted for Nuclear Regulatory Commission (NRC) staff review and approval in Topical Reports BWRVIP-78, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan," and BWRVIP-86, "BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," (References 2 and 3). Additional information necessary to establish the technical basis for, and proposed implementation of, the BWRVIP ISP was provided in letters from the BWRVIP to the NRC dated December 15, 2000, and May 30, 2001, (References 4 and 5). The NRC staff approved the proposed BWRVIP ISP in a safety evaluation (SE), which was provided to the BWRVIP by letter dated February 1, 2002 (Reference 6). However, the NRC staff's SE specified that certain plant-specific information must be provided by BWR licensees who wish to implement the BWRVIP ISP for their facilities. The licensee's December 22, 2005, submittal, addressed the plant-specific information specified in the NRC staff's February 1, 2002, BWRVIP ISP SE.

2.0 REGULATORY REQUIREMENTS

The NRC staff determined that the December 22, 2005, submittal, identified the applicable regulatory requirements. The regulatory requirements for which the NRC staff based its review are described below.

Appendix H of 10 CFR Part 50, requires nuclear power plant licensees to implement RPV surveillance programs to "monitor changes in the fracture toughness properties of ferritic

materials in the reactor vessel beltline region...which result from exposure of these materials to neutron irradiation and the thermal environment." Two specific alternatives are provided with regard to the design of a facility's RPV surveillance program which may be used to address the requirements of 10 CFR Part 50, Appendix H.

The first alternative is the implementation of a plant-specific RPV surveillance program consistent with the requirements of American Society for Testing and Materials (ASTM) Standard Practice E-185, "Standard Practice for Conducting Surveillance Tests for Light-Water Cooled Nuclear Power Reactor Vessels." In the design of a plant-specific RPV surveillance program, a licensee may use the edition of ASTM Standard Practice E-185 which was current on the issue date of the American Society of Mechanical Engineers Code to which the reactor vessel was purchased, or later editions through the 1982 Edition.

The second alternative provided in 10 CFR Part 50, Appendix H, is the implementation of an ISP. An ISP is defined in 10 CFR Part 50, Appendix H as occurring when, "the representative materials chosen for surveillance for a reactor are irradiated in one or more other reactors that have similar design and operating features." Five specific criteria are stated in Appendix H to 10 CFR Part 50 which must be met to support approval of an ISP:

a. The reactor in which the materials will be irradiated and the reactor for which the materials are being irradiated must have sufficiently similar design and operating features to permit accurate comparisons of the predicted amount of radiation damage.

b. Each reactor must have an adequate dosimetry program.

c. There must be adequate arrangement for data sharing between plants.

d. There must be a contingency plan to assure that the surveillance program for each reactor will not be jeopardized by operation at reduced power level or by an extended outage of another reactor from which data are expected.

e. There must be substantial advantages to be gained, such as reduced power outages or reduced personnel exposure to radiation, as a direct result of not requiring surveillance capsules in all reactors in the set.

As noted above in Section 1.0, the NRC staff approved the proposed BWRVIP ISP in an SE issued to the BWRVIP by letter dated February 1, 2002. In Reference 6, all of the criteria cited above for approval of an ISP were addressed either completely or partially. For those criteria which could not be fully addressed in Reference 6, plant-specific information was needed.

The NRC staff identified in Reference 6 the specific information which would be needed from licensees who wished to implement the BWRVIP for their facilities. As stated in Reference 6:

> [L]icensees who wish to participate in the BWR ISP must provide, for NRC staff review and approval, information which defines how they will determine RPV and/or surveillance capsule fluences based on the dosimetry data which will be available for their facilities. This information must be submitted concurrently with each licensee's submittal to replace their existing plant-specific surveillance program with the BWR ISP as part of their facility's licensing basis. The information submitted must be sufficient for the staff to determine that:
>
> (1) RPV and surveillance capsule fluences will be established as based on the use of an NRC-approved fluence methodology that will provide acceptable results based on the available dosimetry data; and
>
> (2) If one methodology is used to determine the neutron fluence values for a licensee's RPV and one or more different methodologies are used to establish the neutron fluence values for the ISP surveillance capsules which "represent" that RPV in the ISP, the results of these differing methodologies are compatible (i.e., are within each other's levels of uncertainty).

This plant-specific information is required by the NRC staff in order to ensure that Criterion III.C.1.b of 10 CFR Part 50, Appendix H, for an ISP could be met by each facility and to confirm that data which would be shared as part of the BWRVIP ISP could be effectively utilized by each licensee for the monitoring of RPV embrittlement for their facility.

Regulatory Guide (RG) 1.190, "Calculational and Dosimetry Methods For Determining Pressure Vessel Neutron Fluence," describes methods and assumptions acceptable to the NRC staff for determining the pressure vessel neutron fluence. The guide is intended to ensure the accuracy and reliability of the fluence determination required by General Design Criteria 14, 30, and 31 of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50.

3.0 TECHNICAL EVALUATION

The December 22, 2005, submittal for DAEC contained information which addressed the plant-specific information requested in the NRC staff's SE approving the BWRVIP ISP. The licensee proposed to change Section 5.3 of the DAEC UFSAR to include the following information:

> A neutron fluence calculation methodology which has been approved by the NRC staff and conforms with U.S. Nuclear Regulatory Commission Regulatory Guide 1.190, "Calculational and Dosimetry Methods for Determining Pressure Vessel Neutron Fluence," will be used for the determination of neutron fluence values for the DAEC.

RG 1.190 was developed to provide state-of-the-art calculations and measurement procedures, which are acceptable to the NRC staff for determining pressure vessel fluence. Although the NRC staff would note that the guidance in RG 1.190 is not a regulatory requirement of the NRC, the staff has concluded that the inclusion of this statement in the DAEC UFSAR is

sufficient to address both items (1) and (2) from Reference 6. Regarding item (1), the licensee's use of a methodology for determining the DAEC RPV neutron fluence values which is consistent with the attributes of RG 1.190 and has been approved by the NRC staff will provide acceptable results based upon the available dosimetry data. Regarding item (2), RPV surveillance capsules tested under the BWRVIP ISP will have their fluences determined by the use of a methodology which is consistent with the attributes of RG 1.190 and has been approved by the NRC staff. The NRC staff has concluded that any two (or more) different fluence methodologies will provide "compatible" (as defined in Reference 6) results provided that the best estimate fluence values are within each other's uncertainty bounds.

In addition, proposed Section 5.3 of the DAEC UFSAR contained the revised surveillance capsule withdrawal schedule for DAEC. The withdrawal schedule was revised to state that future withdrawal of surveillance capsules will be conducted in accordance with the NRC staff-approved BWRVIP ISP. The proposed UFSAR revision would include the following supplemental paragraph addressing their implementation of the BWRVIP ISP:

> The program for implementation of the scheduling, withdrawal, and testing of the material surveillance specimens is governed and controlled by...BWRVIP-78,...BWRVIP-86,... NRC letter dated December 15, 2000, "Project No, 704 - BWRVIP Response to NRC Request for Additional Information Regarding BWRVIP-78," NRC letter dated May 30, 2001, "Project No. 704 - BWRVIP Response to Second NRC Request for Additional Information on the BWR Integrated Surveillance Program," and the NRC Safety Evaluation which approved BWRVIP-78 and BWRVIP-86. The BWRVIP...ISP complies with the requirements of 10 CFR [Part] 50, Appendix H. The [surveillance] specimens will be pulled in accordance with the test matrix included in BWRVIP-86, as modified by the NRC's safety evaluation.

The licensee also proposed changes to Section 5.3 of the DAEC UFSAR with references for the documents discussed above.

Based on the above considerations, the NRC staff has determined that the proposed revisions to the DAEC UFSAR adequately document the licensee's intent to appropriately implement the NRC staff-approved BWRVIP ISP as the method for demonstrating compliance with the requirements of 10 CFR Part 50, Appendix H. Therefore, the licensee is authorized to revise the UFSAR for DAEC, to allow implementation of the BWRVIP ISP as the basis for demonstrating compliance with the requirements of 10 CFR Part 50, Appendix H. As part of the implementation of this amendment and documentation of the licensee's intent to utilize the BWRVIP ISP for this purpose, the licensee shall modify the DAEC UFSAR as stated in the December 22, 2005, submittal. The DAEC UFSAR is controlled in accordance with the requirements of 10 CFR 50.59, "Changes, tests, and experiments."

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Iowa State official was notified of the proposed issuance of the amendment. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATIONS

The amendment changes a requirement with respect to installation or use of a facility component located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that the amendment involves no significant increase in amounts, and no significant change in the types of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendment involves no significant hazards consideration, and there has been no public comment on such finding (71 FR 43533). Accordingly, the amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendment.

6.0 CONCLUSION

The Commission has concluded, based on the considerations discussed above, that: (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

7.0 REFERENCES

1. G. Van Middlesworth, Nuclear Management Company, LLC, to U.S. NRC Document Control Desk, "License Amendment Request Pursuant to 10 CFR 50.90: Revision to the Duane Arnold Energy Center Reactor Pressure Vessel Material Surveillance Program," December 22, 2005

2. C. Terry, BWRVIP, to U.S. NRC Document Control Desk, "Project No. 704 - BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)," December 22, 1999.

3. C. Terry, BWRVIP, to U.S. NRC Document Control Desk, "Project No. 704 - BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan," [Electric Power Research Institute] EPRI Technical Report 1000888, December 22, 2000.

4. C. Terry, BWRVIP, to U.S. NRC Document Control Desk, "Project No. 704 - BWRVIP Response to NRC Request for Additional Information Regarding BWRVIP-78," December 15, 2000.

5. C. Terry, BWRVIP, to U.S. NRC Document Control Desk, "Project No. 704 - BWRVIP Response to Second NRC Request for Additional Information on the BWR Integrated Surveillance Program," May 30, 2001.

6. W. H. Bateman, NRC, to C. Terry, BWRVIP, “Safety Evaluation Regarding EPRI Proprietary Reports BWR Vessel and Internals Project, BWR Integrated Surveillance Program Plan (BWRVIP-78)” and “BWRVIP-86: BWR Vessel and Internals Project, BWR Integrated Surveillance Program Implementation Plan,” February 1, 2002.

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Date: November 27, 2006