



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

December 3, 2008

Mr. Richard L. Anderson  
Vice President  
Duane Arnold Energy Center  
3277 DAEC Road  
Palo, IA 52324-9785

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT TO  
CHANGE SURVEILLANCE REQUIREMENTS OF THE CEDAR RIVER DEPTH  
TO ASSURE ULTIMATE HEAT SINK OPERABILTIY (TAC NO. MD7542)

Dear Mr. Anderson:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 272 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated December 20, 2007.

The amendment adds surveillance requirements to the TS, Section 3.7.2, "River Water Supply (RWS) System and Ultimate Heat Sink (UHS)," to require surveillance of the Cedar River depth to assure UHS operability.

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,

A handwritten signature in black ink, appearing to read "Peter S. Tam".

Peter S. Tam, Senior Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures:

1. Amendment No. 272 to  
License No. DPR-49
2. Safety Evaluation

cc w/encls: Distribution via ListServ



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

FPL ENERGY DUANE ARNOLD, LLC

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 272  
License No. DPR-49

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:
  - A. The application for amendment by FPL Energy Duane Arnold, LLC dated December 20, 2007, 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.
2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C.(2) of Facility Operating License No. DPR-49 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 272, are hereby incorporated in the license. FPL Energy Duane Arnold, LLC, shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 120 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/

Lois M. James, Chief  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Attachment: Changes to the Facility Operating License  
and Technical Specifications

Date of Issuance: December 3, 2008

ATTACHMENT TO LICENSE AMENDMENT NO. 272

FACILITY OPERATING LICENSE NO. DPR-49

DOCKET NO. 50-331

Replace the following page of Renewed Facility Operating License DPR-49 with the attached revised page. The revised page is identified by amendment number and contains a marginal line indicating the area of change.

REMOVE

INSERT

Page 3

Page 3

Replace the following page of Appendix A, Technical Specifications, with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

REMOVE

INSERT

3.7-4

3.7-4

- 2.B.(2) FPL Energy Duane Arnold, LLC, pursuant to the Act and 10 CFR Part 70, to receive, possess and use at any time special nuclear material as reactor fuel, in accordance with the limitations for storage and amounts required for reactor operation, as described in the Updated Final Safety Analysis Report, as supplemented and amended as of June 1992 and as supplemented by letters dated March 26, 1993, and November 17, 2000.
  - 2.B.(3) FPL Energy Duane Arnold, LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use at any time any byproduct, source and special nuclear material as sealed neutron sources for reactor startup, sealed sources for reactor instrumentation and radiation monitoring equipment calibration, and as fission detectors in amounts as required;
  - 2.B.(4) FPL Energy Duane Arnold, LLC, pursuant to the Act and 10 CFR Parts 30, 40 and 70, to receive, possess and use in amounts as required any byproduct, source or special nuclear material without restriction to chemical or physical form, for sample analysis or instrument calibration or associated radioactive apparatus components;
  - 2.B.(5) FPL Energy Duane Arnold, LLC, pursuant to the Act and 10 CFR Parts 30 and 70, to possess, but not to separate, such byproduct and special nuclear materials as may be produced by the operation of the facility.
- C. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I; Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

Maximum Power Level

- 2.C.(1) FPL Energy Duane Arnold, LLC is authorized to operate the Duane Arnold Energy Center at steady state reactor core power levels not in excess of 1912 megawatts (thermal).

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 272, are hereby incorporated in the license. FPL Energy Duane Arnold, LLC shall operate the facility in accordance with the Technical Specifications.

**SURVEILLANCE REQUIREMENTS**

SURVEILLANCE		FREQUENCY
SR 3.7.2.1	Verify the river water level is $\geq 725.2$ ft mean sea level.	24 hours
SR 3.7.2.2	Verify the average river water temperature is $\leq 95^{\circ}\text{F}$ .	24 hours
SR 3.7.2.3	<p>-----NOTE-----                      Not required to be performed until river depth &lt; 2 feet at the intake structure.                      -----</p> <p>Verify the river water depth is <math>\geq 12</math> inches.</p>	7 days
SR 3.7.2.4	Verify each RWS subsystem power operated and automatic valve in the flow paths servicing safety related systems or components, that is not locked, sealed, or otherwise secured in position, is in the correct position.	31 days
SR 3.7.2.5	Verify the river water depth $\geq 12$ inches.	92 days
SR 3.7.2.6	Verify each RWS subsystem actuates on an actual or simulated initiation signal.	24 months



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION  
RELATED TO AMENDMENT NO. 272 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 20, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML080020649), FPL Energy Duane Arnold, LLC (the licensee) submitted a license amendment request regarding the Duane Arnold Energy Center (DAEC) Operating License. The proposed amendment would add Surveillance Requirements (SRs) to Technical Specifications (TS) Section 3.7.2, "River Water Supply (RWS) System and Ultimate Heat Sink (UHS)," to require surveillance of the Cedar River depth to assure UHS operability. The addition to the current Section 3.7.2 river elevation is necessary to assure adequate river flow into the intake structure to meet emergency cooling requirements because river flow may be independent of river elevation under certain conditions.

2.0 REGULATORY EVALUATION

DAEC SR 3.7.2.1 specifies that the licensee verify river elevation is greater than or equal to 725.2 feet mean sea level on a frequency of once every 24 hours. A river elevation greater than or equal to 725.2 feet mean sea level ensures proper operation of the RWS pumps based on net positive suction head and vortex considerations.

Section 9.2.2 of the DAEC Updated Final Safety Analysis Report (UFSAR) specifies that a minimum flow of 13 cubic feet per second (cfs) [approximately 5830 gallons per minute (gpm)] from a minimum 1000-year river flow of 60 cfs must be diverted from the river into the intake structure to assure UHS operability. Section 9.2.2 of the DAEC UFSAR describes that minimum total accident cooling flow requirement is 4963 gpm and that actual accident flows may be as high as 6000 gpm based on actual system performance. To ensure that the available flow at the intake provides the required accident cooling flow, a water depth of at least 12 inches must be maintained at the intake.

3.0 TECHNICAL EVALUATION

3.1 System Description

The DAEC RWS system is designed to provide cooling water for the emergency service water (ESW) and residual heat removal service water (RHRSW) systems, which in turn provide

Enclosure

cooling for various systems required for a safe reactor shutdown following an accident or transient. The RWS system also provides water to the circulating water system to make up for cooling tower evaporative losses.

The RWS system consists of the UHS and two independent and redundant subsystems. Each of the two RWS subsystems is made up of a header, two 6000 gpm pumps, a suction source, valves, piping and associated instrumentation. Either of the two subsystems is capable of providing the required cooling capacity to support the required systems with one pump operating. The two subsystems are separated from each other so failure of one subsystem will not affect the operability of the other system.

The water from the river enters the intake structure through two rectangular openings in the reinforced concrete structure that act as 13.5 feet-wide rectangular weirs. The bottoms of the openings in the intake structure are at an elevation of 724.0 feet mean sea level. Upstream of the intake structure, the river has been modified with various features to manage the river flow and sediment deposition in front of the intake structure. These features include an overflow barrier to maintain desired flow conditions at the intake during low river flow, lowa vanes to develop secondary currents to scour away sediment near the intake, and spur dikes to divert river flow toward the intake structure. Within the intake structure, the water passes through a trash rack, over a sand gate and through travelling screens before reaching the RWS pump suction. The RWS pumps supply cooling water from the intake structure to the RHRSW/ESW stilling basin in the pump house through the two main headers. From the stilling basin, the water is either used by the RHRSW and/or ESW systems, or supplied to the circulating water system to replace evaporative losses from the cooling towers during normal plant operation.

As stated above, TS SR 3.7.2.1 specifies that the licensee verify river elevation is greater than 725.2 feet mean sea level on a frequency of once every 24 hours. A river elevation greater than 725.2 feet mean sea level ensures proper operation of the RWS pumps based on net positive suction head and vortex considerations. However, changes in the configuration of the Cedar River bottom due to sediment deposition could reduce the available area for flow to the intake structure below the area necessary to support the required accident flow rate.

The licensee proposed adding two new SRs to ensure adequate flow area size to the intake structure is available. Proposed SR 3.7.2.5 specifies that the licensee verify the river water depth is greater than or equal to 12 inches at least once every 92 days, and proposed conditional SR 3.7.2.3 specifies that the licensee verify the river water depth is greater than or equal to 12 inches at least once every 7 days when the river depth is less than 2 feet.

The licensee calculated a required minimum river depth necessary for pump run-out conditions for the RWS pumps, which equates to a flow of 17.6 cfs (7900 gpm). The licensee determined a river depth of 6.5 inches or greater at the intake structure would provide the pump run-out flow. The proposed SRs ensure a significant margin to this minimum depth by specifying a depth of 12 inches or greater at the intake structure. The NRC staff performed independent calculations and confirmed that the 12 inch minimum depth provides substantial margin above the minimum depth necessary to provide the specified flow.

The licensee stated that the 92-day period for measurement of river depth was reasonable based on Cedar River studies and operating experience indicating that river bed changes occur gradually. In addition, the licensee stated that the 7-day period for measurement of river depth when the depth is less than 2 feet will ensure that river bed conditions are monitored until any corrective actions, such as dredging, are implemented.

The NRC staff found that the addition of the proposed SRs would be conservative, that the 92-day surveillance period that applies when river depth is greater than 2 feet would be appropriate considering the available river depth margin, and that the 7-day period would be appropriate considering the smaller margin that could be overcome by small changes in river depth. The addition of the new SRs would provide reasonable assurance that adequate river water flows into the intake structure to meet emergency cooling requirements. The proposed SRs are, thus, acceptable additions to the DAEC TS.

#### 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

This amendment changes surveillance requirements. The NRC staff has determined that the amendment involves no significant increase in the amounts, and no significant change in the types, of any effluent 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 (73 FR 34342). 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.

Principal Contributor: Steve Jones

Date: December 3, 2008

Mr. Richard L. Anderson  
Vice President  
Duane Arnold Energy Center  
3277 DAEC Road  
Palo, IA 52324-9785

December 3, 2008

**SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT TO CHANGE SURVEILLANCE REQUIREMENTS OF THE CEDAR RIVER DEPTH TO ASSURE ULTIMATE HEAT SINK OPERABILITY (TAC NO. MD7542)**

Dear Mr. Anderson:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No. 272 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center. This amendment consists of changes to the Technical Specifications (TS) in response to your application dated December 20, 2007.

The amendment adds surveillance requirements to the TS, Section 3.7.2, "River Water Supply (RWS) System and Ultimate Heat Sink (UHS)," to require surveillance of the Cedar River depth to assure UHS operability.

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/**

Peter S. Tam, Senior Project Manager  
Plant Licensing Branch III-1  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosures:

1. Amendment No. 272 to License No. DPR-49
2. Safety Evaluation

cc w/encls: Distribution via ListServ

**DISTRIBUTION:**

PUBLIC	LPL3-1 r/f	RidsNrrDorLpl3-1 Resource
RidsNrrPMDuaneArnold Resource		S. Jones, NRR
RidsNrrLABTully Resource		G. Hill, OIS
RidsAcrcAcnw_MailCTR Resource		RidsOgcRp Resource
RidsRgn3MailCenter Resource		RidsNrrDirsltsb Resource
		RidsNrrDorIDpr Resource

ADAMS Accession No.: **ML083190108**

OFFICE	NRR/LPL3-1/PM	NRR/LPL3-1/LA	NRR/SBPB/BC*	OGC NLO	NRR/LPL3-1/BC
NAME	PTam	BTully	MRahimi*	AJones	LJames
DATE	11/21/08	11/19/08	10/23/08*	12/02/08	12/03/08

\*SE provide by memo of 10/23/08.

**OFFICIAL RECORD COPY**