September 20, 2007

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

SUBJECT: DUANE ARNOLD ENERGY CENTER - ISSUANCE OF AMENDMENT REGARDING LICENSE AMENDMENT REQUEST TSCR-056 TO MODIFY LICENSE CONDITION 2.C.(2)(b) TO ELIMINATE THE REQUIREMENT TO PERFORM GENERATOR LOAD REJECTION LARGE TRANSIENT TESTING (TAC NO. MD2835)

Dear Mr. Van Middlesworth:

The U.S. Nuclear Regulatory Commission (NRC) has issued the enclosed Amendment No.266 to Facility Operating License No. DPR-49 for the Duane Arnold Energy Center (DAEC). The amendment consists of a change to the Operating License pertaining to the removal of requirements for the generator load rejection (GLR) large transient testing (LTT) in response to an application letter dated February 27, 2004, by Nuclear Management Company, LLC (NMC), the former licensee of DAEC, as supplemented by letters dated August 9, 2004, January 7, 2005, from NMC, and dated May 11, and August 3, 2007, from FPL Energy Duane Arnold, LLC (FPL Energy).

Amendment No. 260, issued on January 27, 2006, transferred the DAEC license from NMC to FPL Energy. Thus, any reference to the "licensee" refers to FPL Energy.

The application letter of February 27, 2004, requested removal of Facility Operating License Condition 2.C.(2)(b) in order to eliminate the requirement to perform the main steam isolation valve closure (MSIVC) LTT and the GLR LTT. The letter dated January 7, 2005, from NMC requested segmented review and separate licensing actions for the MSIVC LTT and for the GLR LTT. On March 18, 2005, the NRC issued Amendment No. 257 (TAC No. MC2320), which removed the requirement for the MSIVC LTT.

The issuance of the subject amendment completes the modification of licensing condition 2.C.(2)(b) that was requested in the application letter dated February 27, 2004.

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/

Karl D. Feintuch, Project Manager
Plant Licensing Branch III-1
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-331

Enclosure:
1. Amendment No. 266 to License No. DPR-49
2. Safety Evaluation

cc w/encls: See next page

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.

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July 3, 2007

FPL ENERGY DUANE ARNOLD, LLC

DOCKET NO. 50-331

DUANE ARNOLD ENERGY CENTER

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 266
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 February 27, 2004, as supplemented by letters dated August 9, 2004, January 7, 2005, May 11, and August 3, 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:

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[1]The application was submitted by Nuclear Management Company, LLC (NMC, the former licensee). Amendment No. 260, issued on January 27, 2006, transferred License No. 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) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 266, are hereby incorporated in the license. FPL Energy 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 30 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA Peter S. Tam for/

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

Attachment: Changes to the Facility Operating License

Date of Issuance: September 20, 2007

ATTACHMENT TO LICENSE AMENDMENT NO. 266

FACILITY OPERATING LICENSE NO. DPR-49

DOCKET NO. 50-331

Replace the following pages of the Appendix A Technical Specifications with the attached revised pages. The revised pages are identified by amendment number and contain marginal lines indicating the areas of change.

Remove	Insert
Page 3	Page 3
Page 4	Page 4

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 266 TO FACILITY OPERATING LICENSE NO. DPR-49

FPL ENERGY DUANE ARNOLD, LLC

DUANE ARNOLD ENERGY CENTER

DOCKET NO. 50-331

1.0 INTRODUCTION

On November 6, 2001, the Nuclear Regulatory Commission (NRC) issued Amendment No. 243 for the Duane Arnold Energy Center (DAEC) that approved an extended power uprate (EPU). The EPU amendment consisted of changes to the operating license and technical specifications (TS) to allow an increase in the maximum power level from 1658 Megawatts thermal (MWt) to 1912 MWt, representing a power increase of 15.3 percent. Amendment No. 243 also added license condition 2.C.(2)(b) requiring the licensee to perform generator load reject (GLR) and main steam isolation valve closure (MSIVC) large transient tests (LTTs) at certain reactor thermal power levels.

By application dated February 27, 2004, as supplemented by letters dated August 9, 2004, and January 7, 2005, the Nuclear Management Company, LLC (NMC), requested an amendment for DAEC that would remove license condition 2.C.(2)(b). The NMC requested approval of this change prior to March 1, 2005, as modifications would not allow the reactor power to reach the level requiring performance of the GLR test. Given the staggered nature of the plant modifications in the DAEC EPU project, NMC's letter dated January 7, 2005, requested that the NRC issue separate license amendments, one for each of the two LTTs.

On March 17, 2005, the NRC issued Amendment No. 257 for the DAEC that modified license condition 2.C.(2)(b) to remove the requirement to perform the MSIVC test. The transmittal letter stated that the licensee's request to eliminate the requirement to perform the GLR test would be addressed by separate correspondence.

Since the original amendment request, the plant license was transferred from NMC to FPL Energy Duane Arnold, LLC (FPL Energy). FPL Energy conveyed to the staff its plans to complete implementation of the changes necessary to achieve the EPU approved power level of 1912 MWt during refueling outage (RFO) 21 in February 2009. The license condition would require performance of the GLR test at 15 percent above the pre-EPU power level of 1658 MWt (i.e.,1906.7 MWt). The plant would not operate at this power level until after RFO 21.

Staff guidance for reviewing EPU test programs was developed subsequent to the review of the DAEC EPU amendment request. This guidance was published as NUREG-0800, Standard Review Plan (SRP) Section 14.2.1, "Generic Guidelines for EPU Testing Programs," and provides reasonable assurance that the proposed testing program verifies those plant

structures, systems, and components (SSCs) that are affected by the proposed power uprate, will perform satisfactorily in service at the proposed power uprate level. Therefore, the staff review focused on the licensee adequately addressing the applicable portions of the guidance described in SRP Section14.2.1 related to LTT. SRP Section 14.2.1 allows licensees to either perform transient testing, or provide adequate technical justification for not performing the tests. DAEC provided supplemental information concerning the elimination of license condition 2.C.(2)(b) for performance of the GLR test for EPU in letters dated May 11, and August 3, 2007, in response to a staff request for additional information (RAI). In addition, the staff reviewed the relevant portions of the documents listed in Section 3.1 and 3.4 of this safety evaluation (SE).

License condition 2.C.(2)(b) states, "The licensee will perform the generator load reject transient test required by the General Electric Licensing Topical Report for Extended Power Uprate (NEDC-32424P-A)-ELTR-1, including the allowances described in Section L.2.4(2) of ELTR-1 regarding credit for unplanned plant transient events, using the thermal power level (1658 MWt) to establish the ELTR-1 power level limit. The testing shall be performed at an initiating power level greater than the steady-state operation power level exceeding the respective ELTR-1 power level limit for each transient."

> Note: NEDC-32424P-A, "Generic Guidelines for General Electric Boiling-Water Reactor Extended Power Uprate," is commonly referred to as ELTR-1. ELTR-1 was subsequently revised to state that testing involving an automatic scram from a high power is not required based on transient experience at high powers at operating boiling-water reactor (BWR) plants. These experiences have demonstrated a close correlation of the plant transient data to the evaluated events. Based on the similarity of plants, past transient testing, past analyses, and the evaluation of test results, the effects of the uprated power level can be analytically determined on a plant specific basis. In addition, a scram from high power level results in an unnecessary and undesirable transient cycle on the primary system. Therefore, additional testing involving an isolation and scram from high power levels is not required or justifiable.
>
> Further, the important nuclear characteristics required for transient analysis are confirmed by the steady state physics testing. Transient mitigation capability is demonstrated by other tests required by the TS. In addition, the limiting transient analysis is included as part of the reload licensing analysis.

To ensure consistency throughout this SE when power levels are discussed, the following table is included:

Original Rated Thermal Power (ORTP)	1593 MWt	Done in 1974	Initial plant licensed thermal power
"Current" Rated Thermal Power (CRTP)	1658 MWt	Done in 1985	
EPU Phase I	1790 MWt	Done in Dec. 2001	
EPU Phase II	1840 MWt	Done in Spring 2005	
EPU Phase III	1880 MWt	Done in Fall 2006	
EPU Phase IV	1893 MWt	Planned for Spring 2009	

EPU Phase V	1912 MWt	Not Currently Scheduled	
Power Level in ELTR-1 for MSIVC Test	1823.8 MWt		Power level in ELTR-1 for test (10% of 1658 MWt).
Power Level in ELTR-1 for GLR Test	1906.7 MWt		Power level in ELTR-1 for test (15% of 1658 MWt).

2.0 REGULATORY EVALUATION

The purpose of the EPU test program is to verify that SSCs will perform satisfactorily in service at the proposed EPU power level.

The NRC staff's review covers:

(1) plans for the initial approach to the proposed maximum licensed thermal power level, including verification of adequate plant performance;

(2) integrated plant systems testing, including transient testing, if necessary, to demonstrate that plant equipment will perform satisfactorily at the proposed increased maximum licensed thermal power level; and

(3) the test program's conformance with applicable regulations.

The staff's acceptance criteria for the proposed EPU test program was based, in part, on:

(1) Appendix B to 10 CFR Part 50, Criterion XI, which requires establishment of a test program to demonstrate that SSCs will perform satisfactorily in service;

(2) General Design Criterion 1, "Quality Standards and Records," of Appendix A, "General Design Criteria for Nuclear Power Plants," to 10 CFR Part 50, insofar as it requires that SSCs important to safety be tested to quality standards commensurate with the importance of the safety functions to be performed;

(3) Section 50.16 of 10 CFR, "Contents of Applications: Technical Information," which specifies requirements for the content of the original operating license application, including Final Safety Analysis Report (FSAR) plans for pre-operational testing and initial operations; and

(4) Regulatory Guide 1.68, Appendix A, Section 5, "Power Ascension Tests," which describes tests that demonstrate that the facility operates in accordance with design both during normal steady-state conditions, and, to the extent practical, during and following anticipated operational occurrences (AOOs).

Specific review and acceptance criteria are contained in SRP Section 14.2.1.

3.0 TECHNICAL EVALUATION

3.1 SRP Section 14.2.1 Paragraph III.A. - Comparison of Proposed Test Program to the Initial Plant Test Program

3.1.1 Evaluation Criteria

SRP Section 14.2.1 Paragraph III.A., specifies the guidance and acceptance criteria that the licensee should use to compare the proposed EPU testing program to the original power ascension test program performed during initial plant licensing. The scope of this comparison should include: (1) all initial power ascension tests performed at a power level of equal to or greater than 80 percent of the original licensed thermal power level; and (2) initial test program tests performed at lower power levels if the EPU would invalidate the test results. The licensee shall either repeat initial power ascension tests within the scope of this comparison or adequately justify proposed deviations from the initial power ascension test program. The following specific criteria should be identified in the EPU test program:

- all power ascension tests initially performed at a power level of equal to or greater than 80 percent of the original licensed thermal power level,

- all initial test program tests performed at power levels lower than 80 percent of the original licensed thermal power level that would be invalidated by the EPU, and;

- differences between the proposed EPU power ascension test program and the portions of the initial test program identified by the previous criteria.

3.1.2 Staff Evaluation

The staff reviewed the licensee's Plant Uprate Safety Analysis Report for testing recommended in ELTR-1. The licensee compared the initial startup test program, and consistent with the NRC-approved generic EPU guidelines in ELTR-1, the EPU was determined to require only a limited subset of the original startup test program. As applicable to this plant's design, testing for the EPU is consistent with the description in ELTR-1. Specifically, the following testing has been or will be performed as necessary for the various Phases during the power ascension steps of the EPU.

- Testing will be performed in accordance with the TS surveillance requirements on the instrumentation that requires re-calibration for the EPU conditions.

- Steady-state data will be taken at points from 90 percent up to the previous reactor thermal power so that system performance parameters can be projected for the EPU before the previous power rating is exceeded.

- Power increases beyond the previous reactor thermal power level will be made in increments of equal to or less than 5 percent power. Steady-state operating data, including fuel thermal margin, will be taken and evaluated at each step. Routine measurements of reactor and system pressures, flows, and vibration will be evaluated from each measurement point prior to the next power increment.

- Control system tests will be performed for the feedwater/reactor water level controls and pressure controls. These operational tests will be made at the appropriate plant conditions for each test and at each power increment above the previous rated power

condition to show acceptable adjustments and operational capability. The same performance criteria will be used as in the original power ascension tests.

- A test specification will identify the EPU tests, the associated acceptance criteria, and the appropriate test conditions. All testing will be done in accordance with Appendix B to 10 CFR Part 50, Criterion XI.

The licensee's test plan follows the guidance of ELTR-1 and satisfies the applicable requirements in Appendix B to 10 CFR Part 50. In view of the above, the staff found the test plan acceptable. Specifically, the GLR test is not required by ELTR-1

The staff reviewed the power ascension testing performed as part of the original plan described in the DAEC Updated Final Safety Analysis Report (UFSAR) Table 14.2-3. The basis for testing was described in UFSAR Section 14.2.1.3. The startup testing requirements for the original DAEC test program were listed in Specification 22A2569, "General Electric Startup Test Specification." In response to staff RAIs, dated August 9, 2004, the licensee provided a comparison of the EPU test program with the original plant startup test program, as described in DAEC UFSAR Section 14.2. The licensee provided a matrix of these tests versus the thermal power levels at which testing was performed for Phase I and future phases of the EPU program. The staff found that essentially, the test plans were similar in scope. However, the EPU plans did not include an MSIVC or GLR test. No significant changes were noted with modifications or the EPU test program in the licensee's response to staff RAIs dated May 11, 2007.

The staff reviewed the following EPU test plan information provided by the licensee in order to verify that the initial EPU license amendment submittal, supplemental information provided in response to staff RAIs, and applicable sections of TS and the UFSAR addressed the specific criteria for an adequate EPU test program as described in SRP Section 14.2.1. Specifically, the following documents were reviewed during the staff's evaluation:

- FSAR Section 14, "Initial Test Program" - Provided a detailed description of the licensee's initial startup test program's (1) administrative controls (2) scope of testing (systems tested), and (3) the overall test objectives, methods, and acceptance criteria.

- DAEC letter NG-07-0412, "Response to Request for Additional Information Regarding License Amendment Request (TSCR-056A): "Elimination of License Condition 2.C.(2)(b) for Performance of Large Transient Tests for Extended Power Uprate," dated May 11, 2007 - Provided an update to the licensee's EPU plans for modifications and testing, as requested by the staff. (Reference 5)

- DAEC letter NG-05-0010, "Request for Segmented Review of License Amendment Request (TSCR-056)," dated January 7, 2005 - Provided a description of the revised request of the proposed change to the operating license, which would eliminate the MSIVC test as part of the EPU. (Reference 1)

- DAEC letter NG-04-011, "License Amendment Request (TSCR-056): Elimination of License Condition 2.C.(2)(b) for Performance of Large Transient Tests for Extended Power Uprate," dated February 27, 2004 - Provided a description of the proposed change, the supporting technical analysis, and evaluation of the No Significant Hazards Consideration for removing the license condition to perform large transient testing as part of the EPU. (Reference 2)
- DAEC letter NG-04-0478, "Response to Request for Additional Information Regarding License Amendment Request (TSCR-056): Elimination of License Condition 2.C.(2)(b)

for Performance of Large Transient Tests for Extended Power Uprate," dated August 9, 2004 - Provided responses to staff questions for (1) a comparison of the EPU test program to the initial plant test program, (2) modifications and the associated post-modification tests (PMTs) that were performed and are planned for the EPU, and (3) the licensee's response on how SRP Section 14.2.1 was addressed. (Reference 3)

- DAEC letter NG-01-0764, "Response to Request for Additional Information (RAI) to Technical Specification Change Request TSCR-042 - Extended Power Uprate," dated June 11, 2001 - Provided licensee responses to RAIs on (1) proposed implementation of the power uprate phases, (2) types of high power startup tests performed, (3) recent transient events that could be an indicator of plant response to the EPU, and (4) post-scram evaluation of applicable transient events. (Reference 4)

- DAEC letter NG-01-1198, "Final Typed Pages for Technical Specification Change Request TSCR-042 - Extended Power Uprate," dated October 17, 2001 - Provided inclusion of the commitment to perform certain transient testing during power ascension to the new licensed power level. (Reference 9)

- DAEC letter NG-02-0187, "Startup Test Report for Extended Power Uprate - Phase 1," dated March 4, 2002 - Provided a summary of the startup testing performed at DAEC following implementation of the first phase of the EPU, which increased thermal power 8 percent from 1658 MWt (CRTP) to 1790 MWt (Phase I). (Reference 10)

- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 243 to Facility Operating License No. DPR-49 Nuclear Management Company, LLC Duane Arnold Energy Center Docket No. 50-331," dated November 6, 2001 - Provided an NRC safety evaluation of the licensee's proposed amendment request to allow an increase of the authorized operating power level from 1658 MWt (CRTP) to 1912 MWt (original Phase III). The change represented an increase of 15.3 percent power above the current rated thermal power and therefore, was considered an EPU. (Reference 8)

The staff re-reviewed the EPU test program that was conducted as part of the staff review for License Amendment No. 243. Amendment No. 243 authorized operation up to 1912 MWt. Actual implementation of the EPU is being conducted in phases that support the licensee's modification schedule. Refer to the table in Section 1 of this SE for the power levels associated with the EPU Phases.

As part of the licensee's review of the original test program, the following additional tests were evaluated for applicability to the EPU and added.

- Steady-State Data Collection: Key nuclear steam supply system and balance of plant parameters were recorded to ensure proper plant equipment performance.

- Power Conversion System Piping Vibration Monitoring: Main steam and feedwater (FW) piping was instrumented and monitored for unacceptable flow-induced vibrations.

- Turbine Combined Intermediate Valve (CIV) and Turbine Control Valve (TCV) Surveillance Testing: Testing similar to original testing for the turbine stop valve was conducted on the CIVs and TCVs. The purpose of the testing was to establish the proper power level for conducting on-line surveillance testing of the CIVs and TCVs.

- General Service Water (GSW) Heat Exchanger Performance Monitoring: GSW piping size was increased for the EPU to provide additional cooling to key components. This monitoring program will confirm adequate design cooling.

3.1.3 Conclusions

The staff concludes, through review of the documents referenced above, that the proposed EPU test program adequately identified (1) all initial power ascension tests performed at a power level of equal to or greater than 80 percent of the ORTP, and (2) differences between the proposed EPU power ascension test program and the portions of the initial test program. The staff found that the proposed test program followed the guidance of ELTR-1, which does not require LTT and met the requirements of Appendix B to 10 CFR Part 50.

3.2 SRP Section 14.2.1 Paragraph III.B.- Post Modification Testing Requirements for SSCs Important to Safety Impacted by EPU-Related Plant Modifications

3.2.1 Evaluation Criteria

SRP Section 14.2.1 Paragraph III.B., specifies the guidance and acceptance criteria which the licensee should use to assess the aggregate impact of the EPU plant modifications, setpoint adjustments, and parameter changes that could adversely impact the dynamic response of the plant to AOOs. AOOs include those conditions of normal operation that are expected to occur one or more times during the life of the plant and include events such as loss of all offsite power, tripping of the main turbine generator set, and loss of power to all reactor coolant pumps. The EPU test program should adequately demonstrate the performance of SSCs important to safety that meet all of the following criteria (1) the performance of the SSC is impacted by EPU-related modifications, (2) the SSC is used to mitigate an AOO described in the plant-specific design basis, and (3) involves the integrated response of multiple SSCs. The following should be identified in the EPU test program as it pertains to the above paragraph:

- plant modifications and setpoint adjustments necessary to support operation at power uprate conditions, and

- changes in plant operating parameters (such as reactor coolant temperature, pressure, reactor pressure, flow, etc.) resulting from operation at EPU conditions.

3.2.2 Staff Evaluation

The staff reviewed the planned EPU modifications and their potential effect on SSCs as documented in DAEC letters NG-04-0478 and NG-07-0412. The PMTs discussed in the letters were the acceptance tests to demonstrate design function performance and integration with the existing plant. The staff also reviewed the basis for the licensee's conclusions that the modifications did not change the design function of the SSCs or the methods of performing or controlling their functions. The following modifications and PMT descriptions were reviewed by the staff.

The following modifications were completed for Phase I, with operation to 1790 MWt:

- Changes to the main turbine included: (1) the high pressure turbine was replaced, (2) turbine control valve operation was converted to partial arc admission, and (3) adjustments made to the electro-hydraulic control (EHC) system.

- Changes to the main generator included: (1) new hydrogen coolers with increased cooling capacity, and (2) new GSW piping of increased capacity to support the larger hydrogen coolers.

- Larger main transformer coolers were installed.

- New temperature sensors to monitor isophase buss temperature were installed.

- A capacitor bank was installed to increase plant volts-ampere reactive capability and enhance grid stability.

- Changes to the FW heaters included: (1) adjustment to FW heater level control settings to new heat balance, (2) trim on FW heater level control valves to allow higher flow, and (3) installation of a bypass around FW heaters 5A/B to maintain extraction steam flow at pre-EPU values to address heater tube vibration concerns.

- Tube stakes were installed on the high and low pressure condenser tubes for vibration dampening.

- Instrumentation upgrades included: (1) re-calibration of the local power range monitors and average power range monitors to the new 100 percent power, (2) trip reference cards installed for the maximum extended load-line limit analysis (MELLLA) operating domain on the power-to-flow map, (3) new main steamline high flow trip instruments installed and re-calibrated to new setpoint, (4) turbine first stage pressure (reactor protection system and end-of-cycle recirculation pump trip bypass) were re-calibrated to new setpoints, based upon operating characteristics of the new high pressure turbine, (4) revised alarm setpoint for the standby liquid control system tank volume alarm, (5) control room indications respanned to new ranges, and (6) the process computer re-programmed to new instrument ranges.

- Sensors and a data collection system were installed for the main steam and FW piping vibration monitoring system.

- The main steam reheater cross-around relief valve capacity was increased (phased upgrade - one valve planned for each outage over four refueling outages).

The following modifications were completed for Phase II, with operation to approximately 1840 MWt:

- The condensate pumps and motors were upgraded to allow higher flow rate and their electrical protective relay settings adjusted. The PMTs included: (1) factory acceptance testing (full flow performance test with motor), (2) pump and motor vibration baseline measurements, and (3) performance monitoring.

- FW heater upgrades were implemented with replacement of the 3A/B, 4A/B and 5A/B heaters. The PMTs included (1) factory acceptance testing (eddy-current testing and non-destructive examination of welds), (2) In-service leak testing, (3) thermal performance testing, and (4) FW heater level controller adjustments.

The Phase I modifications have been installed, tested (performance monitoring, calibrations and startup testing) and have been in service for 6 years. The Phase II modifications have been in service for 2 years. Phase III did not involve any modification and was based on operating margin available after the Phase II modifications were installed. The staff reviewed licensee event reports issued by DAEC since operating at EPU power levels. Several plant events have occurred, including manual scrams from intermediate power levels, as well as a dual main recirculation pump runback event. In none of these actual events has the plant's dynamic response been abnormal. The staff found the subsequent equipment performance acceptable for the modifications performed since the beginning of operation at EPU power levels.

The following modifications, tentatively scheduled for spring 2009, would be performed for Phase IV, planned to allow operation to approximately 1893 MWt:

- A supplemental FW pump will be installed to increase flow to the rated conditions at 1912 MWt. The PMT includes (1) performance testing (flow versus discharge pressure and pump vibration baseline), (2) Startup Test No. 23b - Single FW pump trip (as deemed appropriate, and (3) Startup Test No. 23c - Step Changes in Level.

- Proposed electrical system upgrades include (1) increase rating on isophase buss to 20,000 amp rating, (2) re-rate the auxiliary transformer, startup transformer, and main generator output breakers to higher electrical output, (3) install a new main transformer for higher electrical output, (4) conduct studies for potential changes in grid stability, and (5) replace/reset protective relays and breakers, as needed. The PMT includes performance monitoring. The staff finds the proposed PMTs acceptable for the modifications to be conducted in Phase IV.

- Phase V, which is not currently scheduled, would implement MELLA-Plus (MELLA+). Prior NRC approval will be required before the associated hardware/software changes can be made.

3.2.3 Conclusions

The staff concludes, based on review of each planned modification, the associated PMT, and the basis for determining the appropriate test, that the EPU test program will adequately demonstrate the performance of SSCs important to safety and included those SSCs (1) impacted by EPU-related modifications, (2) used to mitigate an AOO described in the plant design basis, and (3) supported a function that relied on integrated operation of multiple systems and components. The plant performance and PMTs for plant modifications to the EHC system and generator output breakers did not indicate a change in plant response to a GLR.

The staff concludes that the proposed test program adequately identified plant modifications and setpoint adjustments necessary to support operation at the uprated power level and changes in plant operating parameters (such as reactor coolant temperature, pressure, reactor pressure, flow, etc.) resulting from operation at EPU conditions. Additionally, the staff determines there are no unacceptable system interactions from modifications to the plant.

3.3 SRP Section 14.2.1 Paragraph III.C - Justification for Elimination of EPU Power Ascension Tests - Secondary Plant Systems (SPS) Aspects

3.3.1 Evaluation Criteria - SPS Aspects

SRP Section 14.2.1 Paragraph III.C., specifies the guidance and acceptance criteria the licensee should use to provide justification for a test program that does not include all of the power ascension testing that should be considered for inclusion in the EPU test program pursuant to the review criteria of Sections 1. and 2. above. The proposed EPU test program shall be sufficient to demonstrate that SSCs will perform satisfactorily in service. The following factors should be considered, as applicable, when justifying elimination of power ascension tests:

- previous operating experience,
- introduction of new thermal-hydraulic phenomena or identified system interactions,
- plant staff familiarization with facility operation and trial use of operating and emergency operating procedures,
- margin reduction in safety analysis results for AOOs, and
- risk implications.

3.3.2 Staff Evaluation - SPS Aspects

The staff focused the review on information regarding the following deviations or exceptions to original startup testing contained in the licensee RAI response letters NG-07-0412 and NG-01-0764.

- Test No. 31, Loss of Turbine Generator and Offsite Power: The purposes of this test are to determine the reactor transient performance during the loss of the main generator and all offsite power, and to demonstrate acceptable performance of the station electrical supply system. The loss of offsite power results in a GLR event. The performance of the electrical distribution system is confirmed by individual equipment tests; thus, an integrated test of the entire electrical distribution system is not required.

Previous Operating Experience

The staff reviewed the licensee's response in NG-07-0412 and NG-01-0764 regarding previous operating experience. The DAEC experienced unplanned events at approximately 1658 MWt (CRTP), which provided data for the MSIVC and the GLR tests. In the first event, the reactor was operating at approximately 1658 MWt, one main steam isolation valve unexpectedly closed due to a failed solenoid. Reactor pressure and reactor power increased and steam flow through the remaining three steam lines increased, until a full isolation of the main steam lines was initiated on high steam flow. No significant anomalies in the plant response were observed. In the second event, with the same reactor power, the main generator backup lockout differential current trip resulted in a TCV fast closure event. The primary source signal for the reactor scram was the pressure switches on the EHC system that signal the fast closure of the TCV. Plant response would be similar to a GLR. Again, no significant anomalies in the plant response were observed, with one exception.

The FW controls allowed reactor level to increase to greater than the FW pump trip setpoint. While the Level 2 criterion (licensee established criterion for FW level control) was not met, the Level 1 criterion that the steam lines not flood was met. There is no safety consequence to the Level 2 criterion not being met. Normal reactor water level control was subsequently established. The licensee subsequently resolved the FW control setpoint issue.

The licensee also cited Hatch Nuclear Plant Unit 2, as an example of a similar plant which had an event subsequent to their EPU. Hatch Unit 2, is a BWR 4 with a Mark I containment of essentially the same design as the DAEC, including the key balance of plant area of turbine generator control logic. Hatch Unit 2, had an unplanned event which resulted in a GLR from their full uprated power level. No anomalies were seen in the plant's response to this event. In addition, Hatch Unit 1, has experienced one turbine trip and one GLR event subsequent to its uprate. Again, the primary safety systems performed as expected. No new plant behaviors have been observed that would indicate that the analytical models being used are not capable of modeling plant behavior at the EPU conditions. A turbine trip and GLR event result in a pressurization transient similar to an MSIVC event.

Introduction of New Thermal-Hydraulic Phenomena or Identified System Interactions

In response to the possible introduction of new thermal-hydraulic phenomena or identified system interactions, the licensee responded that none of the modifications implemented should have an impact in this area. The major EPU modification to the DAEC was to modify the main steam flow path from the reactor to the turbine generator to accommodate the higher steam flow due to the EPU. A new, more efficient high pressure turbine was installed and the TCVs were converted to partial arc mode. However, neither of these modifications introduced new thermal-hydraulic phenomena in the plant, nor do they introduce new or different system interactions that would warrant performing the GLR test. The conversion to partial arc admission lessens the severity of the GLR event from operation in full arc admission. In addition, no instrument setpoints were modified that initiate equipment relied upon to mitigate this event.

The GLR is a pressurization transient caused by a fast shutoff of steam flow from the reactor vessel, from closure of the TCVs. The transient severity is primarily determined by the initial operating pressure and rate of pressure increase. Rated reactor power (i.e., rated steam flow), has a noticeable, but secondary effect on the rate of pressure increase. DAEC has implemented the EPU without a reactor pressure increase, commonly referred to as a constant pressure power uprate. While the TCVs were modified from full arc to partial arc admission as part of the EPU, the effect of this modification is a rate of steam flow cutoff that is now less severe than prior to the EPU. In addition, no modifications to the major SSCs used to mitigate this transient, such as the S/RVs or turbine bypass valves, have been made. Only rated steam flow has been affected by the EPU.

The staff reviewed the licensee's responses in NG-07-0412 and NG-04-0111 to the introduction of new thermal-hydraulic phenomena or identified system interactions. The major EPU modification to the plant was to modify the main steam flow path from the reactor to the turbine generator to accommodate the higher steam flow due to the EPU. A new, more efficient high pressure turbine was installed and the TCVs were converted to partial arc mode. However, neither of these modifications introduced new thermal-hydraulic phenomena in the plant, nor do they introduce new or different system interactions that would warrant performing the GLR test. As noted above, the conversion to partial arc admission lessens the severity of the GLR event from operation in full arc admission. In addition, no instrument setpoints were modified that

initiate equipment relied upon to mitigate this event, such as the TCV fast closure signal that initiates a reactor scram.

The staff reviewed the licensee's response in NG-07-0412 and NG-04-0111 to facility conformance to limitations associated with analytical analysis methods. The licensee used General Electric's analytical model for analyzing transients (ODYN) and associated methods (GEMINI), which have been proven (e.g., Hatch) to acceptably predict plant behavior during a pressurization transient, including the DAEC, at EPU conditions. These methods are routinely used in the analysis of core reloads that form the basis for the core operating limit requirements. No new limitations on these methods have been imposed as a result of EPU implementation.

Plant Staff Familiarization with Facility Operation and Trial Use of Operating and Emergency Operating Procedures

The staff reviewed plant staff familiarization with facility operation and trial use of operating and emergency operating procedures. The staff has previously reviewed and approved DAEC's process for updating the plant operating procedures (normal and off-normal), training (including plant simulator), and human factors aspects of the DAEC's EPU implementation. Additionally, DAEC plant staff have operated the plant for 6 years at uprated conditions, including experiencing operational transients and three Phases of EPU testing.

Margin Reduction in Safety Analysis Results for AOOs

The staff also noted that in describing and justifying test exceptions or deviations the licensee adequately considered previous operating experience, the possible introduction of new thermal-hydraulic phenomena or system interactions, and margin reduction in safety analysis results for AOOs. Other factors used to determine the EPU test elimination included use of baseline operational data, updated computer modeling analyses, and industry experience.

Risk Implications

Risk informed justifications for not performing a transient test were considered, as described in Section 10.4 of the SE for Amendment No. 243, but not the sole factor in determining elimination of any test. Previous operating experience, the initial startup test program report, computer model analyses and TS surveillance requirements were the major factors on those decisions.

3.3.3 Conclusions

The staff concludes that, in justifying test eliminations or deviations, the licensee adequately addressed factors that included (1) previous operating experience, (2) introduction of new thermal-hydraulic phenomena or system interactions, and (3) staff familiarization with facility operation and use of operating and emergency operating procedures. The staff determined that the licensee did not rely on analytical analysis as the sole basis for elimination of a power ascension test from the proposed EPU test program. Construction, installation and/or pre-operational testing for each modification will be performed in accordance with the plant design process procedures. The final acceptance tests will demonstrate that the modifications will perform their design function and integrate appropriately with the existing plant. The staff found that the licensee provided adequate historical reference and technical justification for not performing a GLR test.

3.4 SRP Section 14.2.1 Paragraph III.C - Justification for Elimination of EPU Power Ascension Tests - Reactor Systems Aspects

In order to perform this portion of the SE, the NRC staff reviewed the following EPU test plan information provided by the licensee to verify that the supplemental information provided in the submitted license amendment request; response to NRC staff RAIs, and plant operating experience addressed the specific criteria for justification for elimination of EPU power ascension tests as described in SRP 14.2.1 Paragraph III.C. In addition, documents from other BWRs, in various stages of EPU, similar to DAEC were reviewed relative to LTT.

Specifically, the following documents were reviewed during the NRC staff's evaluation:

- DAEC letter NG-05-0010 - Provided a description of the revised request of the proposed change to the operating license, which would eliminate the MSIV closure test as part of the EPU test plan (Reference 1).

- DAEC letter NG-04-011 - Provided a description of the proposed change, the supporting technical analysis, and evaluation of the No Significant Hazards Consideration for removing the license condition to perform large transient testing as part of the EPU (Reference 2).

- DAEC letter NG-04-0478 - Provided responses to NRC staff questions for (1) a comparison of the EPU test program to the initial plant test program, (2) modifications and the associated PMTs that were performed and are planned for the EPU, and (3) thelicensee's response on how SRP 14.2.1 was addressed (Reference 3).

- DAEC letter NG-01-0764 - Provided licensee responses to RAIs on (1) proposed implementation of the power uprate phases, (2) types of high power startup tests performed, and (3) recent post scram evaluation of applicable transient events (Reference 4).

- DAEC letter NG-07-0412 - Provided licensee responses to RAIs on (1) update information relative to SRP 14.2.1, (2) MGLR events at Hatch units at EPU conditions, and (3) comparison data between DAEC and Hatch (Reference 5).

- DAEC letter NG-07-0641 - Provided licensee response to RAI for additional reactor data from the event of June 23, 2000, for comparison with the predicted behavior of MGLR event (Reference 6).

- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 257 to Facility Operating License No. DPR-49 Nuclear Management Company, LLC Duane Arnold Energy Center Docket No. 50-331," - Provided an NRC safety evaluation of the licensee's proposed amendment request to modify license condition 2.C.(2)(b) to remove the requirement to perform a full main steam isolation valve closure test associated with extended power uprate (Reference 7).

- "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 243 to Facility Operating License No. DPR-49 Nuclear Management Company, LLC Duane Arnold Energy Center Docket No. 50-331," - Provided an NRC safety evaluation of the licensee's proposed amendment request to allow an increase of the authorized operating power level from 1658 MWt (CRTP) to 1912 MWt. The change represented an increase of 15.3 percent power above the current rated thermal power and therefore, was considered an EPU. The actual implementation of the EPU is being conducted in phases that support the licensee's modification schedule (Reference 8).

3.4.1 Evaluation Criteria Using SRP 14.2.1 Section III.C - Reactor Systems Aspects

SRP 14.2.1 Section III.C., specifies the guidance and acceptance criteria the licensee should use to provide justification for a test program that does not include all of the power ascension testing that should be considered for inclusion in the EPU test program. The proposed EPU test program should be sufficient to demonstrate that SSCs will perform satisfactorily in service. The following factors should be considered, as applicable, when justifying elimination of power ascension tests:

- previous power uprate operating experience,
- introduction of new thermal-hydraulic phenomena or identified system interactions,
- facility conformance to limitations associated with computer modeling and analytical analysis methods,
- plant operator familiarization with facility operation and trial use of operating and emergency operating procedures,
- minimal reductions in the margin of safety
- guidance contained in vendor topical reports, and
- risk implications.

3.4.2 Staff Evaluation Using SRP 14.2.1 Section III.C - Reactor Systems Aspects

The NRC staff focused the review on information regarding the following exception to original startup testing contained in the licensee RAI response letters NG-04-0478, NG-01-0764, and NG-07-0412.

Test No. 27b, MGLR Test is not required as part of EPU Phases I through IV testing, as the maximum power level authorized by the license is 1906.7 MWt (ELTR-1 power level for MGLR test), which will not be reached in Phases I - IV. As part of the license condition 2.C.(2)(b), this test is currently required to be performed as part of Phase V testing. However, the purpose of this license amendment request is to permit this test not to be performed as part of EPU testing.

Previous Power Uprate Operating Experience

The NRC staff reviewed the licensee's response in letters NG-01-0764, NG-07-0412, and NG-07-0641 regarding previous operating experience. The DAEC had experienced an unplanned event at the previous licensed power level of 1658 MWt, which provided data for the MGLR test. The licensee stated that no abnormalities or deviations from the predicted behavior were observed and that no modifications were performed as part of EPU implementation that would cause DAEC to behave fundamentally different from previous operating experience. From the event, the licensee provided reactor pressure vessel pressure, level, and steam flow data that demonstrated the parameters were within the acceptable margin of the predicted behavior. As part of the EPU, the turbine control valves were modified from full to partial arc admission, which changes the valve stroke characteristics, in such a way as to slow down the rate of pressure increase. Therefore, the rate of steam flow cutoff is less severe than prior to EPU.

The licensee stated that DAEC EPU Phase I modifications have been installed and in service for 6 years while the remainder of the modifications completed in Phase II have been in service for 2 years. Phase III did not involve any plant modifications but was based upon the operating margins available after the Phase II modifications were installed. Because these modifications had been tested and placed in service, they are now part of the routine plant equipment monitoring. Also, the licensee has stated that DAEC had experienced several plant events since EPU implementation including manual scrams from intermediate power levels, dual main recirculation pump runback, and a turbine trip from less than full power. The licensee reported that in none of these events had the plant dynamic response been abnormal.

The licensee also cited Hatch Nuclear Plant Units 1 and 2 as examples of similar BWR plants and the NRC staff had researched recent events at Hatch Unit 1 in which Hatch 1 had experienced events subsequent to Hatch Unit 1 EPU. In all of these events, it was reported that the primary safety systems performed as expected and no new plant behaviors have been observed that would indicate that the analytical models being used are not capable of modeling plant behavior at the EPU conditions.

Introduction of New Thermal-Hydraulic Phenomena or Identified System Interactions

In response to the possible introduction of new thermal-hydraulic phenomena or identified system interactions, the licensee responded that none of the modifications implemented have had an impact. The major EPU modification to the DAEC was to change the main steam flow path from the reactor to the turbine generator so as to accommodate the higher steam flow due to the EPU. A new, more efficient high pressure turbine was installed and the TCVs were converted to partial arc mode. However, neither of these modifications introduced new thermal hydraulic phenomena in the plant, nor do they introduce new or different system interactions that would warrant performing a pressurization transient test. The conversion to partial arc admission lessens the severity of a pressurization transient from operation in full arc admission. In addition, no instrument setpoints, that initiate equipment relied upon to mitigate this event, were modified. In the previous 6 years of operation in the EPU power range at DAEC, no new thermal-hydraulic phenomena have been identified. The flow-induced vibration failures of components in the main steam and feedwater systems seen in the industry, including DAEC, were caused by high cycle fatigue during normal operation. The short transients loads associated with the MGLR test would not identify undetected latent flaws in components subject to fatigue unless the component was already on the verge of failure. Therefore, the licensee

concludes that the MGLR test would not provide any additional significant information with respect to long-term flow-induced vibration and fatigue issues.

The NRC staff reviewed the licensee's response to the introduction of new thermal-hydraulic phenomena or identified system interactions. The staff concluded that none of the major EPU modifications would introduce new thermal-hydraulic phenomena in the plant, nor would the major EPU modifications introduce new or different system interactions.

Facility Conformance to Limitations Associated With Computer Modeling and Analytical Methods

The NRC staff reviewed the licensee's response in NG-04-0111 pertaining to facility conformance to limitations associated with analytical analysis methods. The licensee used General Electric's analytical model for analyzing transients (ODYN) and associated methods (GEMINI), which have been proven to acceptably predict plant behavior during a pressurization transient, including the DAEC, even at EPU conditions (e.g., Hatch). ODYN uses plant-specific inputs and models the essential physical phenomena for predicting integrated plant response to the analyzed transients. The ODYN predicted results were compared to the June 23, 2000, event data which demonstrated sufficient margin. These methods are also routinely used in the analysis of core reloads that form the basis for the core operating limit requirements. No new limitations on these methods have been imposed as a result of EPU implementation. Thus, the staff concludes that ODYN code has demonstrated it will accurately predict the integrated plant response to these transients at EPU power levels.

Plant Operator Familiarization With Facility Operation and Trial Use of Operating and Emergency Operating Procedures

The licensee states that DAEC staff has operated the plant for 6 years at uprated conditions, including experiencing operational transients and three Phases of EPU Startup Testing. The licensed operators have been through many cycles of re-qualification training on the plant-specific simulator, including training exercises with the Emergency Operating Procedures. The staff reviewed plant staff familiarization with facility operation and trial use of operating and emergency operating procedures. The NRC staff has previously reviewed and approved NMC's (the predecessor licensee) process for updating the plant operating procedures (normal and off-normal), training (including plant simulator), and human factors aspects of the DAEC's EPU implementation. The staff has determined that DAEC satisfies the requirement of plant operator familiarization with facility operation and use of operating and emergency operating procedures as demonstrated with over 6 years of DAEC operation at EPU conditions.

Minimal Reductions in the Margin of Safety

An advantage of a constant pressure EPU is that the severity of pressurization transients is not significantly impacted by the increase in power level and steam flow. For the bounding case, MGLR transient with failure of the turbine bypass valves, the licensee states that the calculated increase in peak pressure from pre-EPU conditions to EPU was less than 1 percent. Therefore, there is not a significant reduction in safety margin from these bounding transients due to EPU.

Guidance Contained in Vendor Topical Reports

The NRC previously reviewed and accepted General Electric (GE) Company Licensing Topical Report, "Generic Guidelines for General Electric Boiling Water Reactor Extended Power Uprate" (referred to as ELTR-1), NEDC- 32424P-A, Class III, February 1999, as a basis for reviewing EPU LARs. This topical report provided specific guidance on integrated system transient testing at EPU conditions. As described in Section 5.11.9.d and Appendix L.2.4 of ELTR-1, the generator load rejection and the main steam isolation valve (MSIV) closure tests verify that the plant performance is as predicted and projected from previous test data.

On March 31, 2003, the NRC approved the use of GE Licensing Topical Report NEDC-33004P, "Constant Pressure Power Uprate," for constant pressure power uprate (CPPU) EPU license amendment request LARs. However, as noted in the SE, the NRC staff did not accept the elimination of large transient testing (e.g., the MSIV closure and turbine generator load rejection described in NEDC-32424P-A) from the scope of the CPPU test program. The NRC staff determined that the need to conduct large-transient testing for a CPPU would be considered on a plant-specific basis. Guidance for determination of the need to conduct large-transient testing for a constant pressure EPU has since been included in SRP 14.2.1, which was used to evaluate this request.

Risk Implications

The licensee states that this application is not "risk informed," but they continue to believe, on a qualitative basis, that the perceived benefits from performing this test are negligible, when assessed against the risks of subjecting the plant to an otherwise unnecessary challenge.

The NRC staff determined that in describing and justifying an exception for the MGLR test, the licensee adequately considered previous operating experience, the possible introduction of new thermal-hydraulic phenomena or system interactions, and margin reduction in safety analysis results for AOOs, and guidance contained in vendor topical reports. Other factors used to determine the EPU test elimination included use of baseline operational data, updated computer modeling analyses, and industry experience.

3.4.3 NRC Staff Conclusions Related to SRP 14.2.1 Section III.C - Reactor Systems Aspects

The NRC staff concludes that, in justifying test eliminations or deviations, the licensee adequately addressed factors that included (1) previous operating experience, (2) introduction of new thermal-hydraulic phenomena or system interactions, (3) facility conformance to limitations associated with computer modeling and analytical methods, (4) staff familiarization with facility operation and use of operating and emergency operating procedures, (5) minimal reductions in the margin of safety, (6) guidance contained in vendor topical reports, and (7) risk implications. The NRC staff determined that the licensee did not rely on analytical analysis as the sole basis for elimination of a power ascension test from the proposed EPU test program. The NRC staff found the evaluation of the licensee's justification for not performing the MGLR LTT, as discussed above, to be acceptable.

3.5 SRP Section 14.2.1 Paragraph III.D - Adequacy of Proposed Testing Plans

3.5.1 Evaluation Criteria

SRP Section 14.2.1 Paragraph III.D., specifies the guidance and acceptance criteria the licensee should use to include plans for the initial approach to the increased EPU power level and testing that should be used to verify that the reactor plant operates within the values of EPU design parameters. The test plan should assure that the test objectives, test methods, and the acceptance criteria are acceptable and consistent with the design basis for the facility. The predicted testing responses and acceptance criteria should not be developed from values or plant conditions used for conservative evaluations of postulated accidents. During testing, safety-related SSCs relied upon during operation shall be verified to be operable in accordance with existing TS and Quality Assurance Program requirements. The following should be identified in the EPU test program:

- the method in which initial approach to the uprated EPU power level is performed in an incremental manner including steady-state power hold points to evaluate plant performance above the original full-power level,

- appropriate testing and acceptance criteria to ensure that the plant responds within design predictions including development of predicted responses using real or expected values of items such as beginning-of-life core reactivity coefficients, flow rates, pressures, temperatures, response times of equipment, and the actual status of the plant,

- contingency plans if the predicted plant response is not obtained, and

- a test schedule and sequence to minimize the time untested SSCs important to safety are relied upon during operation above the original licensed full-power level.

3.5.2 Staff Evaluation

The staff reviewed NG-04-0478, which outlined the licensee's proposed EPU test plan. The staff also reviewed the original NRR SE's conclusions on the adequacy of the startup test program. The staff had concluded that the licensee's test plan followed the guidelines of ELTR-1 and satisfied the applicable requirements in Appendix B to 10 CFR Part 50. Details of the Test Plans, which were evaluated, follow.

The licensee will conduct limited startup testing at the time of implementation of the proposed EPU. The tests will be conducted in accordance with the guidelines of ELTR-1 to demonstrate the capability of plant systems to perform their design functions under uprated conditions.

The tests will be similar to some of the original startup tests described in Table 14.2-3 and Section 14.2.1.3 of the DAEC UFSAR. Testing will be conducted with established controls and procedures which have been revised to reflect the uprated conditions.

The tests will consist essentially of steady-state, baseline tests between 90 and 100 percent of the currently licensed power level. Several sets of data will be obtained between 100 and 115.3 percent current power with no greater than 5 percent power increments between data sets. A

final set of data at the proposed EPU power level will also be obtained. The tests will be conducted in accordance with a site-specific test procedure, currently being developed by the licensee. The test procedure will be developed in accordance with written procedures as required by 10 CFR Part 50, Appendix B, Criterion XI, "Test Control."

The licensee indicated that the power increase test plan will have features as described in the Power Uprate Safety Analysis Report, Section 10.4, "Required Testing." Initial power ascension testing is outlined in Section 2.B.1 of this SE.

The guidelines in ELTR-1, Section 5.11.9, specify that pre-operational tests will be performed for systems or components which have revised performance requirements. These tests will occur during the ascension to EPU conditions. The performance tests and associated acceptance criteria are based on DAEC's original startup test specifications and previous General Electric BWR EPU test programs. The licensee's performance tests are discussed in Section 3.2 of this SE.

The staff noted that the results from the uprate test program will be used to revise the operator training program to more accurately reflect the effects of the proposed EPU.

In addition, the plant staff, through classroom and/or simulator training, will be familiarized with the operation of the plant under EPU conditions. The training will include (1) plant modification and parameter value changes, (2) implementation/execution of normal, abnormal, and emergency operating procedures, and (3) accident mitigation strategies.

3.5.3 Conclusions

The staff concludes that the proposed test plan to be performed will adequately assure that the test objectives, test methods, and test acceptance criteria are consistent with the design basis for the facility. Additionally, the staff concludes that the test schedule would be performed in an incremental manner, with appropriate hold points for evaluation, and that contingency plans exist if predicted plant response is not obtained. The staff found that the licensee's test program provided adequate justification for not performing large transient testing.

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 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 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 (69 FR 19572). 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 staff 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. DAEC letter NG-05-0010, “Request for Segmented Review of License Amendment Request (TSCR-056),” dated January 7, 2005, (ADAMS Accession No. ML0501902420).

2. DAEC letter NG-04-0111, “License Amendment Request (TSCR-056): Elimination of License Condition 2.C.(2)(b) for Performance of Large Transient Tests for Extended Power Uprate,” dated February 27, 2004, (ADAMS Accession No. ML0406907082).

3. DAEC letter NG-04-0478, “Response to Request for Additional Information Regarding License Amendment Request (TSCR-056): Elimination of License Condition 2.C.(2)(b) for Performance of Large Transient Tests for Extended Power Uprate,” dated August 9, 2004, (ADAMS Accession No. ML0422402410).

4. DAEC letter NG-01-0764, “Response to Request for Additional Information (RAI) to Technical Specification Change Request TSCR-042 - Extended Power Uprate,” dated June 11, 2001, (ADAMS Accession No. ML0116902580).

5. DAEC letter NG-07-0412, “Response to Request for Additional Information (RAI) to Technical Specification Change Request TSCR-056A - Elimination of license condition 2.C.(2)(b) for performance of large transient tests for extended power uprate,” dated May 11, 2007, (ADAMS Accession No. ML0715604740).

6. DAEC letter NG-07-0641, “Response to Request for Additional Information Regarding License Amendment Request (TSCR - 056A): Elimination of License Condition 2.C.(2)(b) for performance of Large Transient Tests for Extended Power Uprate (TAC NO. MD2835)”, dated August 3, 2007.

7. “Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 257 to Facility Operating License No. DPR-49 Nuclear Management Company, LLC Duane Arnold Energy Center Docket No. 50-331,” dated March 17, 2005, (ADAMS Accession No. ML0503304420).

8. "Safety Evaluation by the Office of Nuclear Reactor Regulation Related to Amendment No. 243 to Facility Operating License No. DPR-49 Nuclear Management Company, LLC Duane Arnold Energy Center Docket No. 50-331," dated November 6, 2001, (ADAMS Accession No. ML0130503420).

9. DAEC letter NG-01-1198, "Final Typed Pages for Technical Specification Change Request TSCR-042 - Extended Power Uprate," dated October 17, 2001, (ADAMS Accession No. ML013410015)

10. DAEC letter NG-02-0187, "Startup Test Report for Extended Power Uprate - Phase 1," dated March 4, 2002, (ADAMS Accession No. ML020730035)

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J. Budzynski

Date: September 20, 2007

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. 266, are hereby incorporated in the license. FPL Energy Duane Arnold, LLC shall operate the facility in accordance with the Technical Specifications.

(a) For Surveillance Requirements (SRs) whose acceptance criteria are modified, either directly or indirectly, by the increase in authorized maximum power level in 2.C.(1) above, in accordance with Amendment No. 243 to Facility Operating License DPR-49, those SRs are not required to be performed until their next scheduled performance, which is due at the end of the first surveillance interval that begins on the date the Surveillance was last performed prior to implementation of Amendment No. 243.

(b) Deleted.

(3) Fire Protection

FPL Energy Duane Arnold, LLC shall implement and maintain in effect all provisions of the approved fire protection program as described in the Final Safety Analysis Report for the Duane Arnold Energy Center and as approved in the SER dated June 1, 1978, and Supplement dated February 10, 1981, subject to the following provision:

FPL Energy Duane Arnold, LLC may make changes to the approved fire protection program without prior approval of the Commission only if those changes would not adversely affect the ability to achieve and maintain safe shutdown in the event of a fire.

(4) The licensee is authorized to operate the Duane Arnold Energy Center following installation of modified safe-ends on the eight primary recirculation system inlet lines which are described in the licensee letter dated July 31, 1978, and supplemented by letter dated December 8, 1978.

(5) Physical Protection

FPL Energy Duane Arnold, LLC shall fully implement and maintain in effect all provisions of the Commission-approved physical security, training and qualification, and safeguards contingency plans including amendments made pursuant to provisions of the Miscellaneous Amendments and Search Requirements revisions to 10 CFR 73.55 (51 FR 27817and 27822) and to the authority of 10 CFR 50.90 and 10 CFR 50.54(p). The combined set of plans, which contains Safeguards Information protected under 10 CFR 73.21, is entitled: “Duane Arnold Energy Center Physical Security Plan,” submitted by letter dated May 16, 2006.