

May 10, 2001

Mr. Mark E. Warner
Vice President - TMI Unit 1
AmerGen Energy Company, LLC
P.O. Box 480
Middletown, PA 17057

SUBJECT: TMI-1 - AMENDMENT RE: EXPANDED USE OF M5 CLADDING ALLOY (TAC NO. MB0788)

Dear Mr. Warner:

The Commission has issued the enclosed Amendment No. 233 to Facility Operating License No. DPR-50 for the Three Mile Island Nuclear Station, Unit 1 (TMI-1), in response to your application dated December 20, 2000, as supplemented March 14, 2001. A camera-ready copy of the related TS pages was provided in your letter dated March 23, 2001.

The amendment allows the expanded use of the Framatome Cogema Fuels M5 alloy for fuel rod cladding and fuel assembly spacer grids. A related Bases change is included with the licensee's application. Limited use of the M5 alloy in demonstration assemblies had been previously approved for TMI-1 in Amendment No. 194, dated July 24, 1995.

A copy of the related safety evaluation is also enclosed. Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

/RA/

Timothy G. Colburn, Senior Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-289

Enclosures: 1. Amendment No. 233 to DPR-50
2. Safety Evaluation

cc w/encls: See next page

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*SE provided. No substantive changes made. **see previous sheet for concurrence

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AMERGEN ENERGY COMPANY, LLC

DOCKET NO. 50-289

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 233
License No. DPR-50

1. The Nuclear Regulatory Commission (the Commission or NRC) has found that:
 - A. The application for amendment by AmerGen Energy Company, LLC (the licensee), dated December 20, 2000, as supplemented March 14, 2001, 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-50 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 233, are hereby incorporated in the license. The AmerGen Energy Company, 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 no later than startup of Cycle 14 operation, approximately October 1, 2001.

FOR THE NUCLEAR REGULATORY COMMISSION

/RA/ M. Banerjee for

Marsha Gamberoni, Chief, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications

Date of Issuance: May 10, 2001

ATTACHMENT TO LICENSE AMENDMENT NO. 233

FACILITY OPERATING LICENSE NO. DPR-50

DOCKET NO. 50-289

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

2-1

5-4

6-19

Insert

2-1

5-4

6-19

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION
RELATED TO AMENDMENT NO. 233 TO FACILITY OPERATING LICENSE NO. DPR-50

AMERGEN ENERGY COMPANY, LLC

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

DOCKET NO. 50-289

1.0 INTRODUCTION

By letter dated December 20, 2000, as supplemented March 14, 2001, AmerGen Energy Company, LLC (the licensee), submitted a request for approval of changes to the Three Mile Island Nuclear Station, Unit 1 (TMI-1), Technical Specifications (TSs). The March 14, 2001, letter provided additional clarifying information which did not change the initial proposed no significant hazards consideration determination or expand the amendment beyond the scope of the original notice. A March 23, 2001, letter provided a camera-ready copy of the revised TS pages.

The requested changes would permit the expanded use of the Framatome Cogema Fuels (FCF) M5 alloy for fuel rod cladding and fuel assembly spacer grids. A related Bases change is included with the licensee's application. Limited use of the M5 alloy in demonstration assemblies had been previously approved for TMI-1 in Amendment No. 194, dated July 24, 1995.

2.0 BACKGROUND

The licensee requested to operate TMI-1 with a batch reload of M5 alloy fuel beginning with the TMI-1 14th operating cycle and additional reloads of M5 alloy fuel in subsequent operating cycles until the TMI-1 core is fully loaded with M5 alloy fuel. The licensee's letter also indicates that the M5 alloy will also be used for fuel end plugs, and fuel assembly guide tubes and instrument tubes. A related exemption from the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) Sections 50.46, 50.44, and 10 CFR Part 50, Appendix K, to allow the expanded use of the M5 alloy has been issued on May 8, 2001.

3.0 EVALUATION

In its December 20, 2000, submittal, the licensee referenced Topical Report BAW-10227P-A, "Evaluation of Advanced Cladding and Structural Material (M5) in PWR [pressurized water reactor] Reactor Fuel," which had been approved by the Nuclear Regulatory Commission (NRC) staff on February 4, 2000, to justify its technical basis for using M5 fuel. BAW-10227P-A is an FCF generic topical report which describes the M5 alloy, its properties, and compares them with those of Zircaloy (Zr₄), the Zirconium alloy specified in 10 CFR 50.46(b) which it will

replace. Zircaloy is currently the most commonly used alloy in light water reactor core applications.

The NRC staff review of BAW-10227P-A found that M5 was sufficiently like Zr_4 , and that it could replace Zr_4 in core designs. The staff also concluded that, when the two alloys were co-resident in the same core and had like geometry, a mixed core penalty would not have to be assessed to compensate for the material differences. The M5 fuel to be used at TMI-1 has very slight geometric differences from the resident Zr_4 alloy fuel. In evaluating the mixed-core penalty due to M5 fuel co-resident with Zr_4 fuel, the licensee determined that the penalty is negligible because the slight geometric differences have virtually no thermal-hydraulic effect. The staff, therefore, has determined that current licensing analyses will not be affected by the use of the M5 fuel at TMI-1.

In its March 14, 2001, letter, the licensee showed that BAW-10227P-A and the FCF loss-of-coolant accident (LOCA) analysis methodologies apply specifically to TMI-1 by stating that AmerGen and FCF have ongoing processes which assure that LOCA analysis input values for peak cladding temperature-sensitive parameters bound the as-operated plant values for those parameters. The licensee also described ongoing AmerGen and FCF processes which determine mixed-core penalties as needed. Since BAW-10227P-A also discusses other FCF methodologies and correlations such as those for fuel performance (swelling, hydriding, growth, etc.) and departure from nucleate boiling, these would also specifically apply to TMI-1 when operated with mixed and full-core loadings of M5-clad fuel and other M5 core structures.

The staff concludes that safe TMI-1 operation with M5 fuel can be assured when operated within the bounds of analyses performed with the methodologies found to apply specifically to TMI-1 as stated in this safety evaluation and as specified in the licensee's licensing basis documentation. The staff also concludes that, other than performing comparative analyses to determine which type of fuel is more limiting, which the licensee would document in the Core Operating Limits Report (COLR), licensing analyses will not be affected by the use of the M5 fuel at TMI-1.

The December 20, 2000, letter, Enclosure 2, contained proposed changes to the Bases of TMI-1 TS 2.1, "SAFETY LIMITS, REACTOR CORE" to specify which FCF critical heat flux correlations apply to Mark-B fuel with intermediate spacer grids made of either inconel, Zr_4 , or M5. A change was also proposed to TS 5.3.1.1, "REACTOR CORE," to add M5 to the list of allowed reactor core materials. The TS additions are acceptable because they are consistent with the proposed use of M-5 fuel discussed above and meet the terms given in Topical Report BAW-10227P-A.

In the March 14, 2001, letter, the licensee proposed to change TMI-1 TS 6.9.5.2 by adding Topical Report BAW-10227P-A to the list of TMI-1 COLR references in response to the NRC staff's request. The NRC staff had requested this change to document and clarify the applicability of Topical Report BAW-10227P-A to TMI-1.

These changes correctly provide conditions of operation for the plant, are technically supported as discussed above, and are acceptable.

The staff has determined that it is acceptable to operate TMI-1 with the M-5 fuel, spacer grids, guide tubes, and instrument tubes as proposed because it is technically justified, and because

appropriate TS control is provided. This safety evaluation, in combination with an exemption issued on May 8, 2001, to 10 CFR 50.46, 10 CFR 50.44, and 10 CFR 50 Appendix K, provides adequate basis for operation of TMI-1 with its core partially or fully loaded with M-5 fuel assemblies. The staff also concludes that spacer grids, guide tubes, and instrument tubes made of M-5 are acceptable for TMI-1 operation.

4.0 STATE CONSULTATION

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

5.0 ENVIRONMENTAL CONSIDERATION

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 the 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 (66 FR 9379). 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: F. Orr

Date: May 10, 2001

Three Mile Island Nuclear Station, Unit No. 1

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