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

ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CLARIFICATION OF PREVIOUS REACTOR VESSEL SURVEILLANCE PROGRAM ACTIONS AND WITHDRAWAL SCHEDULE CHANGE FOR REACTOR MATERIAL SURVEILLANCE CAPSULE

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2

DOCKET NOS. 50-317 AND 50-318

1.0 INTRODUCTION

Appendix H of 10 CFR Part 50 specifies the requirements for reactor vessel material surveillance programs. The purpose of these programs is to monitor changes in the fracture toughness properties of ferritic materials in the reactor vessel beltline region of light water nuclear power reactors. The programs are used to determine the effects of neutron irradiation and thermal stresses on the vessel materials. Each of the Calvert Cliffs reactor vessels contain six surveillance capsule assemblies which contain reactor vessel material test specimens. The six surveillance capsules have approved withdrawal schedules which span the 40-year license period of each reactor.

By letter dated August 28, 1992, Baltimore Gas and Electric Company (BG&E) provided clarification on previous reactor vessel surveillance program actions and requested Commission approval for a change to the withdrawal schedule for the Unit 2 reactor vessel material surveillance capsules.

This safety evaluation (SE) will assess the significance of the clarification provided by BG&E relating to previous actions taken and their impact on the reactor vessel material surveillance program at the Calvert Cliffs facility and the request for a change to the withdrawal schedule for the Unit 2 reactor vessel material surveillance capsules. The requested change in the withdrawal schedule was submitted pursuant to Appendix H of 10 CFR Part 50.

Section II.B.3 of Appendix H to 10 CFR Part 50 requires that proposed withdrawal schedules for the material specimens must be provided to the Nuclear Regulatory Commission (NRC), with technical justification, for review and approval prior to implementation.

2.0 EVALUATION

The clarification provided by BG&E in its August 28, 1992, letter indicated that the BG&E letter dated January 20, 1982, was submitted on the Units 1 and 2 dockets and provided justification for withdrawing the first surveillance capsule of each reactor vessel from the 263 degree location instead of the 97 degree location initially approved in the reactor vessel material surveillance program for each vessel. However, the NRC staff approval letter of February 2, 1982, was for Unit 1 only.

Since the initial request and justification was for both units, BG&E revised the Final Safety Analysis Report to reflect the change in the withdrawal schedules for both units and the surveillance capsules at the 263 degree locations were removed at the first removal interval for each of the reactor vessels. This error was not identified until the recent update, Revision 13, to the Updated Final Safety Analysis Report (UFSAR) dated July 17, 1992.

The NRC staff has confirmed that the January 20, 1982, letter, which provided the justification for the change in the schedule for withdrawal of the surveillance capsules, was for both Unit 1 and Unit 2 reactor vessels. Part 50 of Title 10 of the Code of Federal Regulations, Appendix H, requires that material surveillance programs be in place to monitor fracture toughness properties of ferritic materials in reactor vessel beltline regions. Since the surveillance programs are the same for each vessel, including the surveillance capsules and locations, the NRC staff has determined that the withdrawal of the 263 degree surveillance capsule at the first removal interval for Unit 2 has no adverse impact on the ability of the surveillance program to determine the effects of neutron irradiation and thermal stresses on the reactor vessel materials and is, therefore, acceptable.

BG&E further noted that it had incorrectly stated that the surveillance capsules located at the 263 degree and 97 degree locations were identical when the requested change in the withdrawal schedules were made. This error was also identified during the recent UFSAR update.

Each of the surveillance capsules contains 57 test specimens of which 45 are identical. In addition to the identical specimens, the capsules located at the 263 degree location of each reactor vessel contained 12 standard reference material (SRM) test specimens and the capsules located at the 97 degree location of each reactor vessel contained 12 base metal (transverse) specimens.

BG&E has indicated that there is only one more surveillance capsule in each vessel, the 104 degree location, which has SRM. BG&E also notes it is important that the surveillance capsules located at the 104 degree location be withdrawn at later dates to assure that the SRM test specimens have a greater difference in fluence exposure. The greater difference in fluence exposure will result in more meaningful test data when the second set of each reactor vessel's SRM specimens are withdrawn and tested.

The NRC staff has determined that the differences in the materials of the 263 degree location and the 97 degree location has no adverse impact on the sequence of withdrawal and effectiveness of the reactor vessel material surveillance programs to determine the effects of neutron irradiation and thermal stresses on the reactor vessel materials and is, therefore, acceptable. This is based on the fact that the SRM and base metal are not limiting in respect to embrittlement for the Calvert Cliffs reactor vessels. The axial welds are limiting in relation to embrittlement concerns for the reactor vessels. This was noted in the NRC staff's SE relating to pressurized thermal shock sent to BG&E by letter dated July 15, 1992. The fluence

exposure for the SRM test specimens has already been addressed for Unit 1 in the NRC letter dated March 11, 1992, which approved the current withdrawal schedule for Unit 1 and is addressed for Unit 2 in the following portion of this SE.

Section II.B.3 of Appendix H to 10 CFR Part 50 requires that proposed withdrawal schedules for specimens must be provided to the NRC, with technical justification, for review and approval prior to implementation. BG&E requested NRC review and approval of changes to the previously-approved withdrawal schedule for the material specimen capsules in the Unit 2 reactor. Specifically, the request is to switch the capsule at the 104 degree location currently scheduled to be withdrawn at the second withdrawal interval, which will be during the upcoming refueling outage (RFO-9) in the spring of 1993, with the capsule at the 97 degree location which is currently scheduled to be withdrawn at the fourth withdrawal interval. This change has already been reviewed and approved for Unit 1. The supporting SE for the Unit 1 schedule change was provided to BG&E by letter dated March 11, 1992.

The material specimen capsule at the 104 degree location contains SRM Charpy impact specimens. The material specimen capsule at the 97 degree location contains base metal (transverse) Charpy impact specimens. The material specimen capsule at the 263 degree location that was removed during first interval withdrawal, as previously noted, contained SRM Charpy impact specimens which are the same as those contained in the 104 degree location capsule. Deferring the withdrawal of the capsule at the 104 degree location will result in an increase in its exposure to fluence. This in turn creates a greater difference in exposure of the SRM Charpy impact specimens withdrawn during the first interval. BG&E indicates, and the staff agrees, that the greater the difference in the fluence exposures of the two SRM specimens will result in more meaningful data when the second SRM Charpy impact specimen is withdrawn and tested.

3.0 CONCLUSION

The NRC staff has concluded that the clarifications provided by BG&E are acceptable based on the above evaluation. The NRC staff further concludes that BG&E has provided the necessary technical justification required by Section II.B.3 of Appendix H to 10 CFR Part 50 to support the proposed changes to the withdrawal schedules for the vessel material specimens for Calvert Cliff, Unit 2, capsules. The capsule at the 97 degree location in the Unit 2 reactor will be the specimen withdrawn for the second withdrawal interval and the capsule at the 104 degree location will become scheduled for withdrawal at the end of the fourth withdrawal interval. These changes are consistent with those approved for Unit 1 and will be reflected in the next UFSAR update.

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Date: December 23, 1992

location and the 104 degree location capsule will be scheduled for withdrawal at the end of the fourth interval. Details supporting these conclusions are included in the enclosed safety evaluation. These approved changes will be reflected in the next update of the Updated Final Safety Analysis Report.

Sincerely,

Original signed by:

Daniel G. McDonald, Senior Project Manager
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Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosure:
Safety Evaluation

cc w/enclosure:
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