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Date 7/13/79

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1. J. Collins		
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3. Std Tech Specs		
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REMARKS

We should plan to include safety and environmental evaluation for amending Appendix B Technical specifications for TMI-2 on radiological and effluent limitations (RETS). At the same time, exclude TMI-2 from the present ETS, and modify TMI-1 site related surveillance programs to agree with TMI-2.

Schedule can be worked out next week with reviewers.

8211180187 790713
PDR ADOCK 05000320
P PDR

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FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
J. Boegli	Phone No.

5041-102

☆U.S. GPO: 1979—261-647/3310

OPTIONAL FORM 41 (Rev. 7-76)
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TO: J. Boegli
Pls take a look at this
JT

ROUTING AND TRANSMITTAL SLIP Date 7/5/79

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. R.H. Vollmer		7/6/79
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Copy for John Collins return this

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REMARKS

Attached TMI-2 Safety Evaluation is for your review and information. It has been prepared to support the revised Tech Specs for TMI-2.

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FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg. 335
D. Brinkman	Phone No. 27306

5041-102
U.S. G.P.O. 1977-241-530/3090

OPTIONAL FORM 41 (Rev. 7-76)
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

SUPPORTING AMENDMENT NO. 10 TO FACILITY OPERATING LICENSE NO. DPR-73

METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER AND LIGHT COMPANY

PENNSYLVANIA ELECTRIC COMPANY

DOCKET NO. 50-320

THREE MILE ISLAND NUCLEAR STATION, UNIT NO. 2

INTRODUCTION

On March 28, 1979 an accident at the Three Mile Island Nuclear Station Unit 2 resulted in substantial damage to the reactor core and to certain reactor systems and components. The facility is not operational and is in a cold shutdown condition with fuel in the core. Although many systems were damaged incapacitated or have subsequently failed, the facility has been maintained in a safe and stable cooling condition utilizing a substantial number of systems and components. Some of the systems and components currently being used to maintain the facility in its present mode of operation were not originally included in the facility's technical specifications because these systems were not required for safe operation of the facility under pre-accident conditions.

Since these additional systems and components are now being used to remove decay heat from the core, revised technical specifications to encompass the additional systems and components should be included in the facility license and other technical specifications for equipment not required during the present mode of operation should be deleted.

The available systems and components to provide plant safety, including long term cooling of the core, under the present conditions with the facility in cold shutdown and while cleanup and recovery of the facility proceed, have been reviewed. The reactor is presently being maintained in a stable, long term cooling mode with decay heat being removed by natural convection circulation of primary coolant through the core with heat rejection through the "A" steam generator. The "A" steam generator is producing steam which is condensed in the condenser and recirculated to the "A" steam generator. An alternate means of removing decay heat from the primary coolant is through the "B" steam generator. The steam side of the "B" steam generator has been modified to provide a water solid, closed loop cooling system which is in turn cooled by the secondary services closed cooling water system. Either steam generator cooling mode is adequate to remove decay heat from the primary coolant. If natural circulation cooling of the core should be lost, contingency plans and procedures have been prepared and approved for alternate means of providing long term core cooling. These alternate core cooling means include forced circulation of the primary coolant using the reactor coolant pumps or decay heat removal pumps. Operation of various systems to control the release of radioactive materials will also be required during the cleanup of radioactive materials released within the facility and the recovery of the facility from the effects of the accident. This amendment does not include any changes in Appendix B (which remains in effect and includes effluent release limits) to the facility operating license. This evaluation also does not address the use of the EPICOR-II radioactive waste treatment system to process radioactively

We are planning to revise these

The change will provide additional capacity; but will not alter the release limits. Suggest deletion

This assessment has nothing to do w/ Tech Specs if we think it should be included then we should include it

contaminated liquid effluents. EPICOR-II is subject to a separate assessment by the Staff as directed by the Commission in it's Statement of May 25, 1979. Appropriate Appendix A Technical Specifications governing this period (long term cooling of the core and during cleanup and recovery of the facility) have been established through conferences between the staff and the licensee and have been agreed to by the licensee. This safety evaluation describes the protection required to provide adequate safety during present conditions. It does not address or authorize removal of fuel from the reactor pressure vessel. Any such authorization will be addressed in a subsequent safety evaluation.

During the process of preparing these revised technical specifications, a new operational mode was defined. This new operational mode (designated the "Recovery Mode" and defined in Technical Specification 1.4) is intended to be applicable during the long term cooling of the core and facility cleanup and recovery operations. This change in mode applicability is reflected in the revised technical specifications. This amendment deletes other operating modes and thereby precludes operation in other than the cold shutdown conditions defined for the Recovery Mode.

The March 28, 1979 incident resulted in excessively high radiation areas in certain portions of the facility; therefore, provisions have been included in the surveillance requirements for the revised technical specifications which relieve the licensee of the requirement to perform certain surveillance requirements when access to the equipment would result in excessive occupational exposures. It is expected that the areas in which this relief is applicable will be reduced as cleanup of the facility progresses.

Minor changes have been made in Technical Specifications 3.3.3.1, 3.3.3.3, 3.3.3.4, 3.3.3.5, 3.3.3.6, 3.3.3.7, 3.3.3.8, 3.4.3, 3.6.1.3, 3.6.1.4, 3.6.1.5, 3.6.4.1, 3.6.4.2, 3.7.3.1, 3.7.3.2, 3.7.4.1, 3.7.6.1, 3.7.7.1, 3.7.10.1, 3.7.10.2, 3.7.10.3, 3.7.10.4, 3.7.11 and 3.8.2.3. These minor changes consist of changes in applicability requirements, changes to existing action statements which require reactor shutdown or prohibit plant startup with inoperable equipment, and deletion of operability requirements for equipment which has failed and cannot be repaired or equipment which is not required in the plant's present condition. These changes do not significantly increase the probability or consequences of an accident or significantly decrease a safety margin. Therefore, these minor changes do not involve a significant hazards consideration and in fact are of no safety significance.

The following Technical Specifications are being deleted since they are applicable only during operation in Modes 1, 2, 3, 4 and 6: 2.1.1, 2.1.2, 2.2.1, 3.0.4, 4.0.4, 4.0.5, 3.1.1.3, 3.1.1.4, 3.1.2.1 - 3.1.2.9, 3.1.3.2 - 3.1.3.9, 3.2.1 - 3.2.5, 3.3.3.2, 3.4.2, 3.4.4 - 3.4.8, 3.4.9.2, 3.4.10.1, 3.5.1 - 3.5.4, 3.6.1.2, 3.6.1.6, 3.6.1.7, 3.6.2.1 - 3.6.2.3, 3.6.3.1, 3.6.4.3, 3.6.4.4, 3.6.5, 3.7.1.2 - 3.7.1.6, 3.7.5.1, 3.7.8.1, 3.7.9.1, 3.8.1.2, 3.8.2.2, 3.8.2.4, 3.9.1 - 3.9.11, and 3.10.1 - 3.10.4. Operation in Modes 1, 2, 3, 4 and 6 is no longer authorized; deletion of these Technical Specifications therefore does not significantly increase the probability or consequences of an accident or significantly decrease a safety margin. Therefore, these deletions do not involve a significant hazards consideration and in fact are of no safety significance.

EVALUATION

1. Nuclear Safety

The full length control rods (safety and regulating) were fully inserted into the core during the reactor trip which occurred at the beginning of the March 28, 1979 incident. To provide assurance that control rod motion will not cause a change in core reactivity, Technical Specification 3.1.3.1 requires that the control rod drive breakers be maintained open. Since the integrity of the control rods and the fuel rods is unknown, the staff has performed analyses which show that with a reactor coolant boron concentration of about 3000 ppm, the core will be maintained subcritical in all possible configurations (Reference 1). Consequently, Technical Specifications 3.1.1.1 and 3.1.1.2 have been prepared requiring two operable systems for injecting borated cooling water into the reactor coolant system and requiring the reactor coolant boron concentration to be maintained between 3000 and 4500 ppm. The maximum boron concentration has been specified to assure that boron precipitation will not occur. A concentration of 4500 ppm boron in water has a precipitation temperature of approximately 45°F. Therefore, a requirement has been added to maintain the reactor coolant minimum temperature above 50°F thereby assuring that boron precipitation will not occur.

2. Core Cooling, Water Inventory and Reactor Coolant System Pressure Control

The core is presently being maintained in a stable cold shutdown condition and is being cooled by the reactor coolant system operating in natural circulation. Heat removal from the reactor coolant system is through the "A" steam generator which is producing steam. The steam is being routed to the condenser where it is being condensed and then recirculated to the "A" steam generator. An alternate means of removing decay heat from the primary coolant is available through the "B" steam generator. The steam side of the "B" steam generator has been modified to provide a water solid, closed loop cooling system which is in turned cooled by the secondary services closed cooling water system (Reference 2). Operability of the steam generators and associated cooling water system is required by Technical Specifications 3.7.1 and 3.7.2.1. Either steam generator cooling mode is adequate to remove the decay heat from the primary coolant (Reference 1). Tecnnical Specification 3.4.1 requires that the reactor coolant pumps be maintained operable for possible forced circulation of reactor coolant in the event forced circulation cooling is required.

A standby reactor coolant system pressure control system has been added to the facility to maintain the reactor coolant system level and pressure for normal operation in the "Recovery Mode" and over a wide range of anticipated transient events which would cause shrinkage of the reactor coolant (Reference 2). These anticipated transients include loss of natural circulation cooling due to a loss of all secondary side cooling with restart of one secondary cooling loop following a hot leg temperature rise of 50°F. More severe transients which this system is not designed to accommodate would be handled by the high pressure injection pumps, the operability of which is required by Technical Specification 3.1.1.1. Appropriate surveillance requirements which demonstrate the operability of these systems have been incorporated. The operability of borated water sources which are sufficient to accommodate all possible transients is assured by appropriate surveillance requirements.

Technical Specification 3.4.9.1 has been modified to restrict the reactor coolant system temperature and pressure to 300°F and 1000 psig. This provides assurance that the reactor pressure vessel will not be subjected to conditions which could result in its brittle fracture.

3. Instrumentation

Since the reactor will not be operated during this time period, the only portions of the reactor protection instrumentation required to be maintained in an operable condition are the source range and intermediate range neutron monitoring channels. Although the reactor will be maintained subcritical via boron in the reactor coolant (Reference 1), these instruments are required to be maintained in an operable condition per Technical Specification 3.3.1.1 to provide the capability for monitoring the neutron level in the core.

The only Engineered Safety Feature Actuation System instrumentation required to be maintained operable during this period is that provided to start the Class 1E diesel generators upon detection of a loss of offsite electrical power. This instrumentation is required operable per Technical Specification 3.3.2.1. Other ESFAS instrumentation is not required due to the low decay heat loads and the ample time available for manual initiation of systems available to accommodate possible transients. This is acceptable based upon the present plant conditions (Reference 2).

Since the reactor coolant system pressure instrumentation, reactor building water level instrumentation and the incore thermocouples are being used to assure core cooling and to provide assurance that vital equipment in the containment is not flooded, their operability is required and operability requirements for this instrumentation have been added to Technical Specification 3.3.3.6.

4. Containment Systems

Since significant quantities of radioactive materials have been released into the containment, containment integrity is required to be maintained by Technical Specification 3.6.1.1 to ensure that these materials are not inadvertently released to the environs. Approved procedures will be used for controlling any future actions which involve the controlled removal of radioactive materials from the containment and for personnel entries into the containment which will be via the air locks.

5. Fire Detection and Fire Suppression

As part of the facility modifications made for long term cooling of the core, additional fire detection instrumentation and deluge/sprinkler systems were installed. These additions included fire detection instrumentation and deluge/sprinkler systems for the self-contained skid mounted "Gray" and "White" balance of plant diesel generators. A deluge/sprinkler system was also installed for the auxiliary building exhaust filter. Operability requirements for this added equipment have been incorporated into Technical Specifications 3.3.3.8 and 3.7.10.2. These operability requirements provide assurance that fires in the auxiliary building filters or in the area of the BOP diesel generators will be promptly detected and suppressed.

6. Electrical Power

The electrical energy to operate the systems being used to remove decay heat from the core is provided by redundant circuits from the offsite transmission network and by onsite power supplies. The present cooling mode requires the use of electrical power,to operate equipment which previously did not require protection against loss-of-offsite power. Therefore, an additional 13.2 kv circuit from the Middletown Junction Substation and two redundant balance of plant diesel generators have been installed to increase the reliability of the offsite and onsite electrical power supplies (Reference 2). The new 13.2 kv circuit provides a backup offsite electrical power supply for two circulating water pumps (one of these pumps provides adequate cooling for removing decay heat). In the event of a total loss of offsite power the core can be cooled using only the onsite diesel generators as a power supply (Reference 2). The redundant self-contained skid-mounted "Gray" and "White" diesel generators have been installed to provide backup protection to all electrical loads which are required for core cooling and which were not previously protected against loss-of-offsite power. Therefore, Technical Specification 3.8.1.1 has been modified to require the operability of the backup 13.2 kv circuit and the two additional, redundant, balance of plant ("Gray" and "White") diesel generators.

7. Control of Radioactive Materials in Gaseous Effluents

The auxiliary building air cleanup system has been installed to ~~filter~~ treat radioactive materials in gaseous effluents from the auxiliary building. Operation of this system in conjunction with the fuel handling building air cleanup system, ensures that any radioactive materials in effluents from these buildings will be processed through HEPA filters and charcoal adsorbers prior to release to the environs. The operability requirements for the auxiliary building air cleanup system have been added to Technical Specification 3.9.12 which previously contained the operability requirements for only the fuel handling building air cleanup system.

8. Review and Audit Functions

The incident of March 28, 1979 has resulted in the generation of large quantities of radioactive wastes. Therefore, the licensee has established two new, additional review and audit committees (Radwaste Operations Review Committee, RORC, and Radwaste Review Committee, RRC) to perform independent reviews and audits of matters related to radioactive waste management. These two new committees will function in parallel to the existing Plant Operations Review Committee, PORC, and Generation Review Committee, GRC. The requirements for these new committees have been added as Technical Specifications 6.5.3 and 6.5.4 in the Administrative

Controls section of the Technical Specifications. The minimum qualifications for membership on these committees will be comparable with those previously established for membership on the PORC and GRC with an experience emphasis on radioactive waste management. We consider the addition of these new committees, with expertise in radioactive waste management, to be an appropriate addition to the facility staff since the licensee will be handling and processing significant quantities of radioactive wastes. These committees will assure that such activities are properly reviewed and controlled by licensee personnel with appropriate and adequate expertise.

9. Summary

The technical specification changes associated with this amendment reflect the changes that are necessary to account for the present condition of the facility and to assure the continued maintenance of the safe, stable condition of the facility in the "Recovery Mode". Certain additional controls and equipment requirements, not required in the pre-accident technical specifications, have been added to provide additional assurance that the facility will be maintained in a safe and stable cold shutdown condition during the present and planned activities for facility recovery from the accident. The technical specifications associated with this amendment include these added controls and equipment requirements. The available functioning equipment and operable backup equipment is adequate to provide core cooling.

Except as necessitated by the physical realities that exist due to damage caused by or as a result of the accident, no safety limit, limiting condition for operation or surveillance requirement in the pre-accident technical specifications that is pertinent to the present cold shutdown condition of the facility has been modified, relaxed, or deleted by this amendment. The resulting technical specifications continue to provide adequate protection to the health and safety of the public and, by accounting for the actual existing condition of the facility systems and components, they minimize potentially unsafe conditions or actions. With the facility in its present cold shutdown condition and considering the very low amount of decay heat generation from the core and the various backup systems available for removing decay heat from the reactor coolant system, the probability of any further accidental releases of radioactivity from the site is very low and the potential consequences of any further accident are correspondingly low in the present post-accident status of the facility. The present plant conditions were not contemplated nor provided for in the present facility operating license; consequently, the present facility operating license does not include any provisions or technical specifications for assuring the continued maintenance of the plant in a safe, stable condition or for providing for foreseeable off-normal conditions. These revised technical specifications impose such license requirements and thereby provide an increased assurance of plant safety. In addition, by deletion of operating modes other than the Recovery Mode and by the changes to existing Technical Specifications discussed herein, planned operation of the facility in other than the stable shutdown condition of the Recovery Mode is precluded. Therefore, rather than increasing the probability or consequences of an accident or decreasing a safety margin, these revised technical specifications do the opposite. In view of the foregoing, we conclude that the issuance of this amendment does not involve a significant hazards consideration.

ENVIRONMENTAL CONSIDERATIONS

We have determined that since the limits on effluent releases and discharges contained in Appendix B to the facility operating license are not being changed and remain in effect, the amendment does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that the amendment involves an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement and/or negative declaration and environmental impact appraisal need not be prepared in connection with the issuance of this amendment.

This will change.

CONCLUSION

The changes in technical specifications authorized in connection with this evaluation result in enhancement of safety under present conditions, as discussed above. Based on these considerations, we have concluded that: (1) because the change does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the change does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Date:

References:

1. NUREG-0557, "Evaluation of Long-Term Post-Accident Core Cooling of Three Mile Island Unit 2," NRC Staff Report, May 1979.

2. Memorandum for R. Vollmer from A. Ignatonis, "TMI-2 Plant Modifications for Cold Shutdown, Revision 2," June 8, 1979.