METROPOLITAN EDISON COMPANY

JERSEY CENTRAL POWER & LIGHT COMPANY

AND

PENNSYLVANIA ELECTRIC COMPANY

THREE MILE ISLAND NUCLEAR STATION, UNIT 1

Operating License No. DPR-50
Docket No. 50-289
Technical Specification Change Request No. 212

This Technical Specification Change Request is submitted in support of Licensee's request to change Appendix A to Operating License No. DPR-50 for Three Mile Island Nuclear Station, Unit 1. As a part of this request, proposed replacement pages for Appendix A are also included.

GPU NUCLEAR CORPORATION

BY: J.B. Broughton
Vice President and Director, TMI-1

Signed and sworn before me this
25th day of August, 1992.

Melody Kim Kulp
Notary Public

Notarial Seal
Melody Kim Kulp, Notary Public
Londonderry Twp., Dauphin County
My Commission Expires Aug. 21, 1993

Member, Pennsylvania Association of Notaries

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

IN THE MATTER OF
GPU NUCLEAR CORPORATION

DOCKET NO. 50-289
LICENSE NO. DPR-50

CERTIFICATE OF SERVICE

This is to certify that a copy of Technical Specification Change Request No. 212 to Appendix A of the Operating License for Three Mile Island Nuclear Station Unit 1, has, on the date given below, been filed with executives of Londonderry Township, Dauphin County, Pennsylvania; Dauphin County, Pennsylvania; and the Pennsylvania Department of Environmental Resources, Bureau of Radiation Protection, by deposit in the United States mail, addressed as follows:

Mr. Jay H. Kopp, Chairman
Board of Supervisors of
Londonderry Township
R. D. #1, Geyers Church Road
Middletown, PA 17057

Mr. Russell L. Sheaffer, Chairman
Board of County Commissioners
of Dauphin County
Dauphin County Courthouse
Harrisburg, PA 17120

Mr. William P. Dornsife, Acting Director
PA. Dept. of Environmental Resources
Bureau of Radiation Protection
P.O. Box 2063
Harrisburg, PA 17120

GPU NUCLEAR CORPORATION

BY: J F Broughton
Vice President and Director, TMI-1

DATE: August 25, 1992

I. Technical Specification Change Request No. 212

GPUN requests that the following revised replacement pages be inserted into the existing Technical Specifications: 5-4, 5-6, 5-7 and 5-7a. The replacement pages and new page 5-7b are attached.

Technical Specification Section 5.3.1.6 is being revised to indicate the increased limit for fuel enrichment to a nominal 5.0 weight percent U^{235} for new reload fuel assemblies and rods.

Technical Specification Section 5.4.1.a, new fuel storage, is being revised to:

1) indicate that nominal 5.0 weight percent U^{235} fuel can be stored in the New Fuel Storage Vault or Spent Fuel Pool "A" (SFP-A), Region I storage locations without exceeding a K_{eff} = 0.95;

2) differentiate between:

a) the New Fuel Storage Vault and SFP-A, Region I storage locations which have been evaluated as capable of storing new fuel assemblies with a higher fuel enrichment (5.0 versus 4.3 weight percent U^{235});

b) the SFP-A, Region II storage locations which are limited to storage of new fuel at 1.75 weight percent U^{235};

c) and the Spent Fuel Pool "B" (SFP-B) storage locations which have been upgraded to store new fuel at 4.37 weight percent U^{235};

3) reorganize 5.4.1.a for clarity; and

4) revise Figure 5-4 based on the result of calculations incorporating a more conservative SFP-A temperature of 4°C.

Technical Specification Section 5.4.2, spent fuel storage, is being revised to:

1) identify the acceptability of storing high enrichment burned fuel in SFP-A, Region II and SFP-B locations as restricted by Figures 5-4 and 5-5 respectively;

2) delete notes from sections 5.4.e and 5.4.f which duplicate text;

3) decrease by 12 the number of storage locations in the Dry New Fuel Storage Area to reflect the number of locations required to be vacant of fissile or moderating material to assure sufficient neutron leakage;

4) revise section 5.4.2.f to specify a new value for the maximum allowable grams of U^{235} per axial centimeter of fuel assembly. This change is necessary to support the increase to 5.0 weight percent U^{235} new fuel;

5) add section 5.4.2.h to identify the requirement that the combination of initial enrichment and cumulative burnup for spent fuel assemblies must be within the acceptable areas of Figure 5-5 for storage in Spent Fuel Pool "B" storage locations; and

6) a revised page 5-7a, Figure 5-4, depicts the changes to the curve resulting from a reduction in the design temperature to 4°C, the use of as built B-10 loading in the Boral poison panels and the use of the KENO-5a code versus KENO IV.

7) include a new page 5-7b, Figure 5-5, which depicts the acceptable burnup domain to be consulted for determining the acceptability for storage of high enriched spent fuel in SFP-B. The results are also based on a 4°C pool temperature.

II. Reason for Change

The maximum allowable fuel enrichment for new fuel storage at TMI-1 proposed herein is in support of Cycle 10 and subsequent operation cycles for which it is planned that fuel loadings of higher enrichment (a nominal 5.0 weight percent U^{235}) than presently approved would be used. Use of the proposed more highly enriched fuels would require the use of fewer fuel assemblies over the remaining life of the plant.

III. Safety Evaluation Justifying the Change

The proposed Technical Specifications (TS) incorporate appropriate surveillance and design requirements to allow for the storage of new fuel with an enrichment not to exceed nominal 5.0 weight percent U^{235} in the TMI-1 New Fuel Storage Vault, and SFP-A, Region I storage locations. The proposed change also stipulates the minimum burnup requirements for the storage of fuel in SFP A, Region II and SFP B storage locations. The criticality safety analysis (Attachment I) provided by Holtec verifies that the more highly enriched fuel can be stored in these locations without exceeding the NRC guidelines on K_{eff} (0.95) under normal and accident conditions. To ensure that the NRC guidelines on K_{eff} are met at all times, two previously established existing restrictions will continue to apply. Note that restriction 2 was revised to include SFP-B which allows the storage of new 4.37 weight percent U^{235} in SFP-B storage locations.

1. Block twelve (12) storage locations in the New Fuel Storage Vault (aligned in two rows of six locations each; transverse rows numbers four and eight) to ensure they are vacant of fissile or moderating material. The restriction will ensure that the NRC Standard Review

Plan (NUREG 0800) Section 9.1.1 requirements for reactivity under hypothetical conditions of low density "optimum" moderation are met by allowing for the necessary additional neutron leakage.

2. Maintain at least 600 ppm soluble boron in the Spent Fuel Pools "A" and "B" during fuel movements in or over a pool while fuel is being stored in that pool. This will ensure that the maximum reactivity is less than the NRC maximum allowed reactivity value for the postulated accident.

An evaluation of the thermal-hydraulic effects on SFP temperature for both a normal refueling discharge and a full core off-load was performed based on the 5.0 weight percent U^{235} new enriched fuel and 60 MDW/KgU burnup. A full core off-load of 177 spent fuel assemblies at the beginning of cycle (with 36 days of reactor power operation) was found to be the limiting condition. This is due to the heat load contribution of the 80 assemblies discharged during the just completed refueling outage. With two spent fuel coolers operating in parallel, the analysis indicated that the maximum pool bulk temperature would result in an increase to 159.1°F. Although this exceeds the previously submitted value of 156.1°F by approximately 3°F, it remains considerably lower than the pool bulk boiling temperature (212°F) and is an insignificant decrease in the time-to-boil from 10.5 hours to 10 hours. There will also be no impact on the TMI-1 SFP structural concrete since it has been prevoiusly evaluated as being capable to withstand temperatures to 199°F. Based on the evaluations, no new thermal-hydraulic concerns were identified with respect to the use of 5.0 weight percent U^{235} new enriched fuel.

The proposed amendment involves no significant change in either the type or the amount of any effluents that may be released off site. The storage of more highly enriched fuel elements designed to achieve longer cycle lengths and higher burnups will be permitted by the amendment.

Under normal conditions, there are no significant changes to the effluents from the plant as the fission product inventory associated with the higher burnup is retained within the fuel cladding. Accidents and fuel failure scenarios would have no significant change in effluents and releases will be well within TS limits. The most important isotopes are comparably short-lived, are in equilibrium, and not significantly changed with burnup. As burnup increases, the radiological effluents associated with the production of fuel are reduced due to the reduction in ore and yellow cake requirements.

The potential release of relatively short-lived fission products would be reduced since fewer fuel assemblies will be discharged and short-lived fission products do not increase with burnup. The potential release of long-lived radionuclides is essentially unchanged as the increase due to higher burnup is offset by the need for fewer fuel assemblies.

No significant increase in individual or cumulative occupational radiation exposure will result from the implementation of the proposed amendment. Under normal conditions, insignificant increases in individual occupational exposure would result from shielding spent fuel assemblies with higher bundle specific activity with fuel pool water. The cumulative occupational exposure would be reduced since fewer assemblies would be handled during a refueling and refuelings would be less frequent. Under accident scenarios, there would be no significant increase in radiation exposure since the major contributors are relatively short-lived gaseous or volatile radioisotopes which are in equilibrium and whose amounts are not significantly increased by burnup. The major exception is Kr^{85}, which is a minor contributor to the dose resulting from an accident. As demonstrated in Attachment 2, the expected increase in Kr^{85} would not result in a significant change to accident doses.

It can be concluded that while fuel assembly radionuclide inventories may increase with burnup, the need for a fewer number of fuel assemblies in a high burnup fuel cycle would offset that effect and the doses attributable to Three Mile Island Unit I are essentially unchanged. The environmental impacts and risks associated with transportation of high enrichment fuel and wastes have been previously evaluated by the Commission. The conditions associated with the use of high burnup fuel at TMI-1 are bounded by the NRC studies.

The study conducted by the Atomic Industrial Forum National Environmental Studies Project, AIF/NESP-032 dated June 1985 entitled "The Environmental Consequences of Higher Fuel Burnup," concluded that extending fuel burnup to 60 GWD/MT results in environmental consequences which are either less than or virtually the same as those assumed in the current regulations. This conclusion was based on a comparison of the use of natural resources and the expected effluents (chemical and radiological) that would result from the nuclear fuel cycle. NUREG/CR-5009, "Assessment of the Use of Extended Burnup Fuel in Light Water Power Reactors," dated February 1988, which examined both the environmental and economic impacts, similarly concluded that the burnup increase would have no significant environmental impact over that of normal burnup while providing favorable economic effects.

A controlling factor in the studies was the reduced number of shipments required to support the use of extended burnup fuel. The reduction in the shipments is due to fewer outages for fuel reloads and results in fewer new fuel shipments to the reactor and fewer spent fuel shipments from the reactor. With an adjusted increase in shipments of low level solid wastes, the total shipments for higher burnup fuel are still somewhat reduced from those at 33 GWD/MT. There would also be a corresponding reduction in the estimated number of persons exposed.

Increasing the allowable fuel enrichment and consequently extending fuel burnup at TMI-1 results in environmental consequences which are either less than or virtually the same as those previously evaluated by the NRC. The NRC evaluation is considered applicable to the TMI-1 nuclear fuel cycle and supports the proposal to increase the allowable fuel enrichment to 5.0 weight percent U^{235} and extend fuel burnup to 60 GWD/MT.

IV. No Significant Hazards Considerations

GPUN has determined that the Technical Specification Change Request poses no significant hazards as defined in 10 CFR 50.92

1. Operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability of occurrence or the consequences of an accident previously evaluated. Fuel handling accidents remain bounded by the original FSAR analysis. The only accident scenarios for which the probability of occurrence are affected by fuel enrichment involve criticality events during fuel handling and storage. The enclosed criticality safety analysis demonstrates that the calculated K_{eff} during fuel handling and storage is adequate to ensure sub-criticality for all defined accident conditions. Since sub-criticality is maintained, no releases result from the above fuel handling criticality accident scenarios. It has been demonstrated that the NRC criticality requirements for the storage of new fuel are met under both normal and abnormal conditions and therefore, the consequences of these accidents are not increased.

2. Operation of the facility in accordance with the proposed amendment would not create the possibility of a new or different kind of accident from any accident previously evaluated. The only potential impact of increased enrichment upon fuel handling and storage involves the potential for criticality which has been addressed above.

3. Operation of the facility in accordance with the proposed amendment does not involve a significant reduction in a margin of safety. The enclosed criticality analysis demonstrates that there is adequate margin to assure the subcriticality of the fuel during handling and storage operations.

V. Implementation

It is requested that the amendment authorizing these changes become effective on issuance and shall be implemented within sixty days of receipt.