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June 24, 1986

Docket No. 50-320

GPU Nuclear Corporation  
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Dear Sir:

Subject: Recovery Operations Plan Change No. 33

Reference: Letter from F.R. Standerfer to W.D. Travers 4410-86-L-0058 dated April 4, 1986 (ROP Change Request 37)

The referenced letter proposed an additional method of measuring reactor coolant system bulk water temperature. The requested change adds resistance temperature detectors (RTD's) to table 4.3-7 of the Recovery Operations Plan as an alternate means of measuring RCS water temperature. As defueling progresses the present method of measuring RCS water temperature using incore thermocouples will become less reliable and ultimately be impracticable.

Based on our enclosed safety evaluation we have concluded that the proposed changes will not present an undue risk to the health and safety of the public. We therefore approve the proposed change and are enclosing the amended pages for Recovery Operations Plant Change No. 33.

Sincerely,

**ORIGINAL SIGNED BY:**  
William D. Travers

William D. Travers  
Director  
TMI-2 Cleanup Project Directorate

Enclosures: As stated

cc: T.F. Demmitt  
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ATTACHMENT  
SAFETY EVALUATION

Introduction

Section 3.4.9.1 of the Appendix A Technical Specifications requires that the temperature of the reactor coolant system (RCS) be maintained between 50°F and 200°F. The purpose of this requirement is to avoid precipitation of the boron used to maintain subcriticality at low temperatures and minimize radioactive releases to the containment atmosphere due to boiling of the unpressurized RCS at high temperatures.

Bulk RCS water temperature is currently measured by approximately 30 operable incore thermocouples. As defueling progresses, disablement will become necessary to minimize the possibility of damage to reactor vessel integrity. In order to minimize stress to the instrument guide tube penetrations due to defueling the licensee proposes to sever each of the incore detector assemblies near the reactor vessel lower head. This will eliminate the RCS bulk water temperature measurements by the incore thermocouples. In order to retain the capability of measuring the RCS bulk water temperature the licensee has installed three resistance temperature detectors (RTDs) in the Internals Indexing Fixture (IIF).

Discussion

The three RTDs are located in the vicinity of the reactor vessel flange in the northeast quadrant. The licensee proposes that the readings from these three RTD's satisfy the surveillance requirement of Table 4.3.7 of the TMI-2 Recovery

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Operations Plan. The revised table would allow any combination of incore thermocouples or in-vessel RTDs resulting in a minimum of two operable temperature detectors to satisfy the surveillance requirement. The in-vessel RTDs would provide the licensee the flexibility and diversity to determine the RCS temperature when the incore thermocouples become inoperable. Additionally they presently provide the licensee with a second method of verifying reactor vessel coolant temperature.

Prior to installation of the in-vessel RTDs reactor coolant system bulk water temperature was measured only by the incore thermocouples. These incore thermocouples have experienced a number of failures in the past. Currently, the licensee uses the average of operational incores as opposed to individual incore readings. The licensee has determined that the locations of the incore junctions are undefinable. The accuracy of individual incores is uncertain, thus they are collectively used to indicate RCS temperature trends.

Hourly readings over a two week period from the three in-vessel RTDs were compared to the incore thermocouple average temperatures for the same period. Changes in the RCS temperature were simultaneously reflected by both the incore thermocouples and the RTDs. During the two week period the RCS bulk water temperature changed approximately 3°F. The incore thermocouple average temperature and the average temperature of the 3 RTDs differed by about 6°F during the entire 2 week period. As of June 2, 1986 the average incore thermocouple temperature was 84°F and the average RTD was 78°F.

#### Conclusion

The three in-vessel RTDs will provide a second method of verifying the reactor vessel bulk water temperature. The staff finds that the agreement between the readings from the incore thermocouples and the in-vessel RTDs is acceptable.

Since defueling will ultimately result in the elimination of all incore thermocouples an alternative method of measuring RCS bulk water temperature is necessary. The in-vessel RTDs will provide an acceptable method for measurement of bulk water temperature. The inclusion of the three RTDs in Table 4.3-7 of the Recovery Operations Plan will enhance safety by providing additional and alternative surveillance capability of the RCS bulk water. The change will not result in any environmental effects and falls within the scope of activities previously considered in the Programmatic Environmental Impact Statement.

**Enclosure**

**FACILITY OPERATING LICENSE NO. DPR-73**

**DOCKET NO. 50-320**

Replace the following pages of the TMI-2 Recovery Operations Plan with the enclosed pages as indicated:

4.3-10

4.3-10a

TABLE 4.3-7

ESSENTIAL PARAMETERS MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL <sup>(1)</sup> CALIBRATION	READOUT LOCATION(S)	MINIMUM OPERABLE CHANNELS
1. Reactor Building Pressure	S	R	Control Room	2
2. Reactor Vessel Water Level	S/W <sup>(2)</sup>	SA	Control Room <sup>(2)</sup>	2 <sup>(2)</sup>
3. Incore Thermocouples/RCS Temperature Detectors	S	R	Control Room or Cable Room	2 <sup>(3)</sup>
4. Reactor Building Water Level	NA	SA	Control Bldg. Area West	1
5. Borated Water Storage Tank Level	S	R	Control Room	1
6. Steam Generator Level	NA	NA	NA	1/Generator
7. Spent Fuel Storage Pool "A" Water Level	S/W <sup>(2)</sup>	SA	Control Room <sup>(2)</sup> or Fuel Handling Bldg	2 <sup>(2)</sup>
8. Fuel Transfer Canal (deep end) Water Level	S/W <sup>(2)</sup>	SA	Control Room <sup>(2)</sup> or Reactor Bldg	2 <sup>(2)</sup>

(See following page for notes)

TABLE 4.3-7 (Cont'd)

ESSENTIAL PARAMETERS MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

Notes:

- 1) Nuclear detectors and all channel components located inside containment may be excluded from CHANNEL CALIBRATION.
- 2) One channel consist of a visual indication such as a level stand pipe. Seven day surveillance applies to visual indication only. Visual indication readout may be in the Reactor Building, or Fuel Handling Building, or by remote television.
- 3) Any combination of incore thermocouples, or RC-TI-106 points A, B, or C that results in a minimum of two operable temperature detectors, satisfy this requirement.

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