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December 22, 1986
 NRC/TMI 86-119

Docket No. 50-320

Mr. F. R. Standerfer
 Vice President/Director, TH1-2
 GPU Nuclear Corporation
 P. O. Box 480
 Middletown, PA 17057

Dear Mr. Standerfer:

Subject: Addition of Coagulants to the Reactor Coolant System

- References: (a) Letter 4410-86-L-0213, F. Standerfer to W. Travers, Safety Evaluation Report for the Addition of Coagulants to the Reactor Coolant System, dated November 15, 1986
- (b) Letter NRC/TMI 86-066, W. Travers to F. Standerfer, Safety Evaluation for the Operation of the Filter Aid Feed System and Use of Diatomaceous Earth as Feed Material, dated July 9, 1986
- (c) Letter NRC/TMI 85-055, W. Travers to F. Standerfer, Defueling Water Cleanup System, dated August 6, 1985
- (d) Betz Handbook of Industrial Water Conditioning, Seventh Edition, 1976

Reference (a) submitted, for NRC staff review and approval, your proposal for the addition of coagulant chemicals and filter aid materials to enhance the performance of the Defueling Water Cleanup System (DWCS) filters. Experience to date with DWCS operation has shown the filters to be ineffective in efficiently controlling RCS water clarity due to unexpectedly short filter life. This is apparently caused by the presence of colloidal suspensions of hydrated metal oxides in the water. Laboratory tests have shown that the addition of a coagulant material along with diatomaceous earth as a filter aid significantly improves filter performance. This was further verified by a full scale test of a filter using water in the reactor coolant bleed tanks.

Your proposal involves the injection of a coagulant and filter aid upstream of the DWCS filters. Additional lengths of hose will be added in appropriate locations to allow for sufficient contact time between the fluid and coagulant to permit formation of a filterable flocculant before the process flow reaches the filters. The system also includes a coagulant mixing tank and feed system.

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We have evaluated your proposal for potential adverse consequences due to chemical effects of the coagulant, spills of RCS liquid, and inadvertent criticality. The use of the filter aid feed system and diatomaceous earth was previously reviewed and approved in reference (b).

The potential for and consequences of hose ruptures and line breaks in the DMCS were previously evaluated. The system modifications necessary to support the coagulant addition program are very minor and do not alter the conclusions stated in reference (c).

The coagulant chosen for your proposed process is a high molecular weight polymer classified as a cationic polyelectrolyte. The use of the polyelectrolytes in the coagulation of colloidal suspensions is discussed in chapter 5 of reference (d). Laboratory testing has shown that the coagulant does not cause precipitation or removal of boron from solution, thus it does not present a potential deboration mechanism. It does however release chlorides to the RCS. The level of chlorides caused by the additives is small, and if properly controlled will not result in RCS chemistry parameters exceeding the technical specification limits. The chemicals have been tested for reaction with the recombiner catalyst in the defueling canisters and have been shown to have no unacceptable adverse effects.

The concentration of coagulants that will result in the RCS and defueling canisters is very low if controlled in accordance with your proposal. This will not result in a criticality concern if the RCS boron concentration is maintained within the current technical specification limits. The effects of the coagulant or criticality of a dewatered filter canister has not been fully evaluated. Thus, any filters containing coagulants will be stored in the boric acid water of the reactor vessel, the fuel transfer canal, or the spent fuel pool. These filters will not be acceptable for dewatering and shipping until further evaluations are complete.

We concur with your analysis that the proposed activities do not pose a risk to the health and safety of the public or the occupational work force, nor do they exceed the scope of activities and associated environmental impacts considered in the staff's Programmatic Environmental Impact Statement. The proposal does not present the possibility of any accident not previously analyzed nor does it change the consequences of, or likelihood of any previously analyzed accident. Margins of safety as previously analyzed are not reduced.

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We therefore approve your proposal for addition of coagulants to the reactor coolant system as described in reference (a). This approval is contingent upon our review of the associated procedures subject to Technical Specification 6.3.2.

Sincerely,

ORIGINAL SIGNED BY:
William D. Travers

William D. Travers
Director
TMI-2 Cleanup Project Directorate

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