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

ENCLOSURE 1

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING PRESSURIZED WATER REACTORS

ACCUMULATOR PRESSURE AND LEVEL INSTRUMENTATION

RELAXATION OF REGULATORY GUIDE 1.97 ENVIRONMENTAL QUALIFICATION REQUIREMENTS

1.0 INTRODUCTION

Section 6.2 of the Generic Letter 82-33 requested licensees to provide a report on their implementation of Regulatory Guide (RG) 1.97 (Revision 2), and methods for complying with the Commission's regulations including a supporting technical justification of any proposed alternatives or deviations. A review of the licensees' submittals was performed by the staff and a Safety Evaluation (SE) was issued for each plant. These SEs concluded that the licensees either conformed to, or adequately justified deviations from, the guidance of the RG for each post-accident monitoring (PAM) variable except for the variables identified in the SE.

Exceptions were identified for the accumulator level and pressure monitoring. A large number of the exception requests were for relaxing the equipment qualification (EQ) requirement from Category 2 to Category 3 qualification that allows commercial grade instruments to be used in certain applications. However, none of the submittals requesting the exceptions provided sufficient justification for granting the exception. These requests were denied to the licensees and applicants whose RG 1.97 compliance SEs were issued by the staff before 1987. Since 1987, exceptions for the accumulator instrumentation were considered by the staff as an open item till a generic resolution could be found. Thirty-two plants requested relaxation of EQ requirements from Category 2 to Category 3 for the accumulator level and pressure instrumentation.

2.0 EVALUATION

Title 10 of Code of Federal Regulations, Section 10 CFR 50.49, requires licensees to establish a program for qualifying certain post-accident monitoring equipment for which specific guidance concerning the types of variables to be monitored is provided in Revision 2 of RG 1.97. This guide identifies the accumulator instrumentation as a type D variable that provides information to indicate the operation of individual safety systems and other systems important to safety, to help the operator in selecting appropriate mitigating actions. The guide lists Category 2 qualification for this instrumentation, The Category 2 qualificaton criteria require the

instrumentation to be qualified in accordance with RG 1.89 and the methodology described in NUREG-0588. Additionally, the instrumentation with Category 2 qualification should be energized from a high-reliability power source, not necessarily standby power. In contrast to this, the Category 3 qualification criteria require only an off-site power source and the instrumentation to be only of high-quality commercial grade to withstand the specified service environment (mild environment as defined in 10 CFR 50.49, paragraph c).

Qualification criteria for instrumentation are established based on the safety function of the system whose variables are being monitored. The selection criteria for RG 1.97 variables qualification category is based upon whether monitoring of system parameters is needed during and following an accident and whether subsequent operator actions in the operating procedures are dependent on the information provided by this instrumentation.

The accumulators are pressure vessels filled with borated water and pressurized with nitrogen gas. Being a passive system, it provides a fast acting, high flow rate, cold leg injection during the injection phase of an emergency core cooling system operation. Both volume and pressure are monitored to assure the accumulator's function in accordance with the FSAR safety analysis. During normal operation, the accumulator is isolated from the reactor coolant system (RCS) by two check valves in series. To prevent inadvertent closing, each accumulator's motor operated isolation valve (MOV) is normally open with its power removed, and the status of the MOV is assured by the Technical Specification surveillance requirements. Should the RCS pressure decrease below accumulator pressure (i.e., during a loss-of-coolant accident), the check valves open and the nitrogen gas pressure will force the borated water into the RCS. Thus, a mechanical operation of the swing-check valves is the only action required to open the injection path from the accumulator to the reactor core. No external power source or initiating signal is needed for the accumulator to perform its safety function. The operator can only control the operation of the motor operated valve which is used to isolate the accumulator from the RCS. Isolation from the RCS is not a safety function of the accumulator. Additionally, the accumulator is not designed to perform any post-accident safety function.

The above discussion establishes that the accumulator instrumentation does not perform a safety function during or in a post-accident environment and operator actions to mitigate the effects of an accident do not depend on the information provided by the accumulator instrumentation. Additionally, successful performance of core cooling systems can be inferred from other environmentally qualified instrumentation.

3.0 CONCLUSION

Based on our review, we conclude that the post-accident monitoring of the accumulator volume and pressure does not perform a safety function and no operator action is based on the information that will require Category 2 qualification of the instrumentation. In lieu of Category 2 qualification, Category 3 qualification of this instrumentation is acceptable.

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