PDR

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

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Docket Nos. 50-522
and 50-523

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Gentlemen:

SUBJECT: SKAGIT NUCLEAR POWER PROJECT, UNITS 1 & 2

Your letter of April 17, 1978, expressed your concerns regarding the need to commit to the installation of a Loose-Parts Monitoring System (LPMS) at the Construction Permit (CP) stage of the Skagit Nuclear Power Project Licensing review.

The staff considers the existence of loose parts in a reactor system to be a significant safety concern. On this basis, we have required the installation of a LPMS on nuclear plants. This requirement is documented in section 4.4 of the Standard Review Plan (NUREG-75/087) and has been in effect since the issuance of the SRP in late 1975. It is not an area in which voluntary participation is requested. Further guidance on the design of a LPMS which meet our requirements is contained in the proposed Regulatory Guide 1.133. For a construction permit application, your PSAR must include a commitment to the system.

As a result of a study we conducted on the installation of, and experience with, loose parts monitoring systems in operating plants, we have identified the following aspects for a loose parts monitoring system which we will use to assess the acceptability of the specific system to be provided for the Skagit Nuclear Power Project when we review the detailed information to be submitted in the Final Safety Analysis Report:

1. The description of the loose parts monitoring system shall include the location of all sensors and the method for monitoring them. A minimum of two sensors will be required at each natural collection region.

2. The description of the monitoring equipment shall include the levels and the basis for the alarm settings. In addition, the manufacturer's sensitivity specifications for the equipment shall be provided. Anticipated major sources of internal and external noise shall be identified along with the plans for minimizing the effects of these sources on the ability of the monitoring equipment to perform its intended function.

3. The loose parts monitoring system shall be required to function after any seismic event for which plant shutdown is not required. The procedures of Regulatory Guide 1.100, "Seismic Qualification of Electric Equipment for Nuclear Power Plants," are acceptable for demonstrating the seismic qualification of the system. An exception to this seismic qualification is that recorders are not required to function within their specified accuracy during or after seismic events without maintenance. However, monitoring (alarm and/or indication) capability must remain available for that channel at all times during and after the seismic event. A description of the precautions to be taken to assure the operability of the system after an operating basis earthquake shall be provided.

The staff agrees that LPMS are still in the development stage regarding optimized sensor location and diagnostic interpretation of sensor signals. However, the primary objective of a LPMS meeting our minimal requirements is not to diagnose the safety significance of a loose part, but to detect its existence such that the safety significance can be assessed and appropriate corrective action taken if necessary. The staff believes that the installation, operation, and maintenance technology for a LPMS, along with its capability to detect the existence of loose parts, is sufficiently developed and demonstrated to warrant its inclusion in the plant design at this time. To this effect, we point out that the conclusions of the ORNL study (ORNL/NUREG/TM-133) are consistent with the present staff position for these objectives. Apparent differences, which you point out, between the conclusions of this study and the staff requirements are because ORNL assessed the capability of the LPMS to perform as a plant protection system. The staff considers the LPMS to be a safety related system, which is not required to perform automatic protective actions other than alarm functions.

Regarding your concern of the capability of a LPMS to detect the existence of loose parts, considerable experience, both in the United States and abroad has been obtained. You are referred to Table 1 of the value-impact statement for proposed Regulatory Guide 1.133,(1) which cites relevant LWR experience with loose parts including many instances in which the loose part was detected by the LPMS. In addition, the LPMS detection of a broken burnable poison rod and holddown spider, parts of which caused extensive

(1) Reference Draft Revision 2 and state availability in the PDR memorandum Arlotto to Fraley, "Draft 2, Revision 1, Regulatory Guide 1.133 'Loose-Part Detection Program for the Primary System of Light-Water-Cooled Reactors'" dated May 4, 1978; AVAILABLE: USNRC Public Document Room.

damage to the steam generator tube sheet in the Crystal River Plant, is a recent and perhaps more significant example of the value of a LPMS to detect loose parts prior to their causing extensive primary system damage.

Concern was also expressed that LPMS "pose a serious threat to NSSS availability . . ." One of the benefits of LPMS is the early detection of a loose part such that corrective action can be quickly taken. Undetected loose parts, besides presenting a real safety concern, have the potential to cause significant damage requiring extended outages to make the necessary repairs. The impact on plant availability was assessed in the value-impact statement for proposed Regulatory Guide 1.133 (which we believe addresses your concern for the need of a value-impact statement) and indicated that a LPMS would most likely benefit plant availability. An example of this is the Crystal River case. Continued operation of other plants of the Crystal River type has been partly justified on the basis that LPMS are installed in all of these plants and will detect failures of the holddown mechanisms for poison rods and orifice plugs before a safety problem results.

In your letter, you stated that instrument signal noise and installed flow instrumentation historically detect vibrations and loose parts. We agree that this instrumentation provides a desirable augmentation to the LPMS detection capability. However, it is not adequate in the absence of a dedicated system for the detection of loose parts, with associated sensitivities, alarm settings, and required actions designed specifically for the detection of loose parts.

You also state in your letter the difficulty of inspecting the lower plenum of a BWR in the event a LPMS indicates a loose part in that region. While we acknowledge the difficulty of such an inspection, we do not consider this to be a valid argument to ignore the existence of a loose part in the lower plenum which could potentially affect the safety of the plant.

Finally, your claim that SAR accident analyses will encompass the most severe consequences a loose part could cause implies a primary reliance on systems that mitigate the consequences caused by loose parts. We point out that the Commission safety philosophy relies firstly on the prevention of accidents, which is the primary basis for our requirements to include LPMS in nuclear plants.

In conclusion, we have carefully considered each of the items identified in your letter and cannot conclude they sufficiently justify deferral of a commitment to install a LPMS. We conclude that there is sufficient basis to support our recommendation to the Atomic Safety and Licensing Board to condition the construction permit for the Skagit Nuclear Power Project requiring the installation of a LPMS in the event this matter remains at issue.

Sincerely,

Domenic B. Vassallo, Assistant Director
for Light Water Reactors
Division of Project Management

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See next page

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