February 1, 2005

Mr. James F. Klapproth, Manager
Engineering & Technology
Nuclear Energy
3901 Castle Hayne Road
Wilmington, NC, 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION – PART 21 NOTIFICATION REGARDING NARROW RANGE WATER LEVEL INSTRUMENT LEVEL 3 TRIP

Dear Mr. Klapproth:

By letter dated August 16, 2004, GE Nuclear Energy provided the Nuclear Regulatory Commission (NRC) with a Title 10 of the *Code of Federal Regulations* Part 21 notification regarding a potential issue with the Level 3 trip from the narrow range water level instruments that initiate reactor scram. The NRC staff has reviewed this information and has prepared the enclosed request for additional information. This request was discussed with members of your staff during a telephone call held on January 24, 2005, and it was agreed that a response would be provided within 30 days of receipt of this letter.

If you have any questions regarding this request, please contact me at (301) 415-3062.

Sincerely,

/RA/

Mel B. Fields, Senior Project Manager, Section 2
Project Directorate IV
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Project No. 710

Enclosure: Request for Additional Information

cc w/encl: See next page

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Wilmington, NC 28401

REQUEST FOR ADDITIONAL INFORMATION

GE Nuclear Energy 10 CFR Part 21 Notification

Narrow Range Water Level Instrument Level 3 Trip

GE Nuclear Energy (GENE) has indicated that, under certain circumstances, the reactor vessel water level may fall sufficiently low as to permit steam to flow out from under the dryer skirt and through the annular region to which the reactor vessel water level instrumentation is connected. They have indicated that the annular steam flow could result in a reduction of pressure at the upper level tap sufficient to cause the instrumentation to read up to about 8 inches high.

GENE has also indicated that this potential 8-inch error could be large enough to suppress the Level 3 reactor trip function. NRC staff observes that such a condition would result in a common-mode suppression of the Level 3 trip function in all channels, since all channels sense the same reactor vessel region and may therefore be expected to be equally affected by this phenomenon.

GENE addresses the possibility of the uncovering of the measurement tap in the suppression of the Level 3 trip function. NRC staff is concerned that other effects may also compromise this function, and requests that GENE address the following issues:

1. Whether the dryer skirt is fully uncovered or not, the presence of steam flow under it would result in a two-phase “froth” in the annular region sensed by the level instrumentation. The relationship between the resulting measured differential pressure and the interpreted degree of submersion of the reactor core would therefore be different from the presumed design conditions, for which the instrument is assumed to be sensing solid water. Show that the presence of such a “froth” in the area sensed by the level instrumentation is not credible, or show that the level instrument functions will not be adversely affected by it.

2. Steam flow past the lower tap of the reactor vessel water level instrumentation, in addition to compromising the calibration of the instrument by altering the density of the sensed fluid, could result in dynamic effects similar to those postulated for the reference legs. Such effects could result in an increase or decrease in pressure depending upon flow dynamics. In addition, such effects would not be expected to be constant but rather to fluctuate significantly as steam bubbles form and collapse and as flow streams move unpredictably through the sensed volume. The resulting level measurement would then be significantly noisy, and the noise would not necessarily be zero-meaned and would therefore not amenable to dynamic filtering. Show that such dynamic effects and process noise are not credible, or show that the behavior and calibration of the instrumentation will not be adversely affected by them.

3. NRC staff observes that the existing Level 3 setpoints are close to the bottom of the calibrated range of the associated instrument channels. NRC staff also observes that, in general, instruments tend to have increased uncertainty near the ends of calibrated range relative to the degree of uncertainty specified by manufacturers, which generally apply to the middle of the calibrated range. Show that the effects discussed above, combined with the inherent uncertainties in the channel and in the calibration process, and considering the potential for increased uncertainty near the bottom of the calibrated range, will not result in setpoints which are off-scale or otherwise inconsistent with the limits assumed in the accident analyses.