



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

February 25, 1985

Docket No. 50-219

MEMORANDUM FOR: John A. Zwolinski, Chief
Operating Reactors Branch No. 5
Division of Licensing

FROM: Jack N. Donohew, Project Manager
Operating Reactors Branch No. 5
Division of Licensing

SUBJECT: WORKING MEETING WITH GPU NUCLEAR ON FEBRUARY 14, 1985
ON REACTOR WATER LEVEL INDICATION

Re: Oyster Creek Nuclear Generating Station

On Thursday, February 14, 1985, a meeting was held at NRC, Bethesda, Maryland, with GPU Nuclear to discuss the licensee's December 18, 1984, response to Generic Letter (GL) 84-23, "Reactor Vessel Water Level Instrumentation in BWRs," dated October 26, 1984. In the generic letter, the staff requested the licensee to submit a description of his plans to implement improvements in the following areas:

1. Improvements to the reference leg to reduce water level instrumentation errors caused by high drywell temperature,
2. Improvements to replace mechanical water level indication equipment, and
3. Improvements to the reactor protection logic that may be needed for those plants in which operator action may be required to mitigate consequences of a break in a reference leg and a single failure in a protection system channel associated with an intact reference leg.

Attachment 1 is the list of those individuals attending the meeting.

The licensee stated in his response to GL 84-23 that improvements were not needed to the water level instrumentation reference leg and that he plans to replace the existing mechanical level indication equipment during the next refueling outage. The licensee did not address the question of improvements for the reactor protection system. Attachment 2 is the licensee's response to GL 84-23.

Generic Letter 84-23 is related to TMI Action Plan Item II.F.2, "Instrumentation for Detection of Inadequate Core Cooling." The reactor water level instrumentation for BWRs is being used to meet the staff's requirements on Item II.F.2, and a satisfactory licensee response for Oyster Creek to GL 84-23 will close out Item II.F.2 for the plant.

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The staff stated at the beginning of the meeting that the licensee needs to show the staff that the reactor level instrumentation at Oyster Creek can detect the onset of Inadequate Core Cooling (ICC), the existence of ICC and the return from ICC for all possible plant conditions. This should take into account possible instrumentation error as discussed in GL 84-23.

The licensee gave a presentation on the plant Emergency Operating Procedures (EOPs) and the Fuel Zone Monitoring System to show how the plant operators can deal with the onset of ICC. EOPs have been written for the primary containment temperature exceeding the maximum temperature for the Yarway, Barton and GEMAC water level instrumentation. The Yarway, Barton and GEMAC level instrumentation are discussed in the attached response to GL 84-23. They are used for input to the reactor protection system and the feedwater control. These do not indicate water level below the top of the fuel.

The licensee stated that the EOPs direct the operator to:

1. Monitor the reactor water level using alternate level instrumentation or flood the core with core spray, if the primary containment temperature exceeds the maximum allowed for the Yarway, Barton and GEMAC instrumentation and this instrumentation reads below the minimum allowed values,
2. Flood the core with core spray if the primary containment temperature reaches the reactor water saturation temperature,
3. Actuate primary containment spray to lower containment temperature before the temperature reaches 281°F.

The licensee stated that the EOPs prevent the onset of ICC and provide assurance that the operator can rely on the instrumentation to indicate actual reactor water level or the operator should be flooding the core to prevent the onset of ICC. The staff stated that the temperature at the instrumentation reference leg is near the condensate pot and may be different from the rest of the reference leg. Thus, instrument error may occur (from localized flashing in the reference leg for example) and confuse the operator.

The licensee discussed the fuel zone monitoring system which is the alternate level instrumentation to the Yarway, Barton and GEMAC. This instrumentation was added to Oyster Creek following the May 2, 1979 event which came close to uncovering the core. This instrumentation has taps near the bottom of the reactor vessel, at core spray and near the top of the vessel and, therefore, can indicate water level to the bottom of the fuel. This instrumentation has narrow range and wide range indication.

The fuel zone instrumentation has two programmable controllers and two channels for each controller. The instrumentation readings are compensated for water density by calculators using the steam tables.

The licensee stated that the fuel zone instrumentation will not mislead the operator. It will give indication of the onset of ICC, that ICC has occurred and the return from ICC. The fuel zone instrumentation can detect flashing in the reference leg by comparing the density of water in the condensate pot to that in the core. The fuel zone instrumentation will automatically turn off when flashing is detected and will automatically turn on when core cooling is established. The EOPs direct the operator to flood the core if this instrumentation detects flashing.

The staff questioned if there were horizontal or sloping runs of the reference legs inside containment where the reference leg goes through localized hot spots in containment. Measurements at the condensate pot may not be indicative of the entire reference leg and localized hot spots may cause localized flashing in the reference leg.

The licensee assures that there is unambiguous indication of ICC to the operator due to the following: the fuel zone instrumentation is a R.G. 1.97 instrument, containment temperature and reactor water level will be R.G. 1.97 parameters, and the operator is directed by EOPs to continue flooding the core until the instrumentation is reading reactor water level correctly and there is adequate water level in the core.

The staff asked if the licensee had looked at possible plant conditions which could result in high containment temperature and localized flashing in the reference leg away from the condensate pot. The licensee stated that the containment will not go above 212°F when the reactor is in shutdown cooling. The staff and the licensee discussed ways to reach high containment temperatures which would cause localized flashing in the reference leg but the operators would not be directed by EOPs to flood the core. The licensee did not believe this could happen but agreed with the staff that the scenario would include:

1. high containment temperature,
2. no containment spray,
3. water level below GEMAC, Yarway and Barton level instrumentation,
4. fuel zone instrumentation oscillates on and off, and
5. may involve local hot spots on the reference leg.

The staff questioned the licensee on the use of EOPs and operator action to "fix" problems of instrument error in detecting the onset of ICC instead of installing a hardware fix to reduce the burden on the operator. The licensee stated that the possible hardware "fixes" for instrument error could fail and they actually do not reduce any burden on the operator because operators must still be trained for possible instrumentation failure. Also, the licensee stated that the Oyster Creek operators are trained for confusing instrumentation readings and that the safety benefit of possible hardware "fixes" for flashing in the reference leg do not justify the cost of these "fixes."

At the end of the meeting, the Oyster Creek PM summarized the results of the discussion between the staff and the licensee. The licensee has presented additional information, which was not in his response to GL 84-23, on the EOPs and the fuel zone level instrumentation to show that operators can detect the onset of ICC and respond to it. The staff requested additional information on (1) the possibility of localized hot spots and high containment temperature causing localized flashing in the reference leg and errors in water level instrumentation which will confuse the operators and (2) how Oyster Creek operators are trained to respond to confusing instrument readings. The staff stated that with the documentation of the information presented at this meeting and adequate responses to the staff's questions, that this would be an acceptable response to GL 84-23 and would close-out TMI Action Item II.F.2. The licensee committed to submit this information by April 30, 1985, thus the staff would receive it by May 7, 1985. This was acceptable to the staff.

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John A. Zwolinski, Chief

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February 25, 1985

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WORKING MEETING WITH GPU NUCLEAR ON

REACTOR WATER LEVEL INDICATION

Thursday, February 14, 1985

P-118 NRC

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