GPU Nuclear

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July 8, 1986
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Mr. John A. Zwolinski, Director
BWR Project Directorate No. 1
Division of BWR Licensing
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Zwolinski:

Subject: Oyster Creek Nuclear Generating Station
Docket No. 50-219
SEP Topic V-5, Reactor Coolant Pressure
Boundary Leakage Detection

During the integrated assessment of the subject SEP Topic, the NRC staff stated that, in order to preclude pipe breaks inside containment by detecting cracks as they develop, at least one reliable method of reactor coolant system (RCS) leakage detection should be provided whose leakage sensitivity is commensurate with the leakage rate from the limiting crack size. Further, that leakage detection method should be qualified to an SSE seismic event or provide procedures that specify actions to be taken for a failure of the leakage detection equipment due to a seismic event (e.g., plant shutdown).

In light of the above, GPU committed to (1) evaluate the reliability and sensitivity of the existing leakage detection systems, (2) propose actions to be taken for a failure of the leakage detection equipment due to a seismic event, (3) evaluate and identify the system modifications necessary to have the original containment airborne particulate and gaseous radiation monitors operational and (4) propose a schedule for any necessary system modifications (Section 4.16.1 of NUREG-0822, "Integrated Plant Safety Assessment/SEP/Oyster Creek").

Oyster Creek Technical Specifications currently limit the unidentified leakage to 5 gallons per minute (gpm) and the total leakage (identified and unidentified) to 25 gpm. Additionally, if there is more than 2 gpm increase in the unidentified leakage rate in a four hour period while operating at steady state power, the plant will be shutdown.

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At Oyster Creek, the unidentified leakage from the RCS to the primary containment is collected in the containment sump and pumped out to the radwaste system. There are several leak detection methods available for unidentified leakage into the containment sump which operate on diverse principles. These methods, as described below, provide quantitative indications of unidentified RCS leakage inside the containment.

The normal method of monitoring unidentified leak rate is to obtain flow integrator readings from the containment sump pump discharge every four hour period and calculate average flow rate. Approximately 1 gpm can be measured in a four hour interval. This methodology is identified in Oyster Creek Technical Specifications as the primary method of leakage measurement.

When the flow integrator is not available, the average leakage rate can be calculated using the known volume between the high and low level alarms for the sump and the time required to fill the sump between these levels.

A recorder available in the control room also provides continuous indication of an estimated unidentified leak rate to the containment sump by utilizing a differential pressure signal as a result of the sump level change. The sensitivity of the recorder is approximately 0.2 gpm.

Additionally, a timer available in the 480 volt switch gear room provides the run time of the containment sump pumps. This run time along with the estimated flow rate of the sump pumps can provide approximate leak rates. This methodology is utilized every four hours during power operation.

Also, an annunciator will alarm in the control room if the time to fill the containment sump is too short an interval. The timer associated with this alarm is set to bring in the alarm if unidentified leak rate equals or exceeds 4 gpm.

Our previous analysis indicates that the sensitivity of the existing containment sump leak detection systems is adequate to allow safe shutdown before a crack would grow to an unstable length. In the analysis both stainless steel (Reactor Water Clean-Up (RWCU) return) and carbon steel (Main Steam) piping inside the containment were selected to determine if the piping will leak before breaking (that is, the lines exhibit stability) under predefined crack orientations and length and loading conditions. The results indicate that the piping will be structurally stable with slow crack growth rate during plant operation for postulated initial through-wall crack sizes ranging up to 90° in the circumferential direction. For example, the time for a crack on RWCU return line to propagate from a circumferential crack length yielding a 1 gpm leak rate to a length yielding 5 gpm is approximately 30 days. Also, the minimum time for the crack to propagate from a length yielding a 5 gpm leak rate to 90° is 5 days. Due to the slow crack growth and structural stability of the piping, a leak from a crack would be detected soon enough to allow safe shutdown before the crack grows to an unstable length.

It is not practical to make operable the existing containment radiation monitoring system due to a number of preclusive deficiencies (i.e., inadequate microprocessor, detector shielding, particulate filter, air flow control, moisture control and lack of baseline calibration data). A new system would have to be designed, installed and tested. However, a new particulate and noble gas radiation monitoring system is judged to be of little use in quantifying leakage rates to meet the Oyster Creek Technical Specification limit of 5 gpm. It can only be used as a trending indication to be confirmed and quantified by other means. The value of the radiation monitoring system is therefore limited only to a general qualitative assessment. There are other data available (e.g., drywell pressure humidity and temperature) which provide qualitative information regarding the RCS leakage.

The RCS leak detection systems at Oyster Creek are not seismically qualified. However, Oyster Creek procedures and Technical Specifications require that the leak detection systems, if failed, must be restored to operable status within 7 days and and during the 7 days the leakage calculation must be performed using alternate means. If the requirement cannot be met, the reactor must be placed in shutdown condition within the next 12 hours. These time intervals are well within the piping stability parameters.

In conclusion, we believe that the Oyster Creek unidentified leakage detection systems satisfy the positions taken by the NRC staff and that installation of a new radiation monitoring system is not justified due to questionable usefulness.

We, therefore, by this letter request a cancellation of our commitment per GPUN letter dated November 16, 1982 to restore the containment airborne particulate and gaseous radiation monitors.

Very truly yours,

R F Wilson

R. F. Wilson
Vice President
Technical Functions

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