

A Centenor Energy Company

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Serial Number 1664

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United States Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Subject: High Pressure Injection/Makeup Nozzle and Thermal Sleeve

Gentlemen:

On July 2, 1988, during a combined ASME Section XI and pre-fueling visual inspection several 'loose parts' were discovered in the Davis-Besse Nuclear Power Station (DBNPS) Unit 1 reactor vessel. Among these loose parts were two metallic pieces resembling half cylinders, which were later determined to be a portion of the makeup/high pressure injection (HPI) nozzle thermal sleeve. Approximately three inches of the thermal sleeve had broken off from the end of the sleeve, which protrudes into the reactor coolant system (RCS) cold leg. This condition permitted cold water impingement directly on the RCS cold leg cladding. Inspection of the makeup/HPI nozzle revealed linear indications throughout the area where the thermal sleeve had failed. A conservative analysis was performed, which indicated that with the thermal sleeve intact the potential crack growth is acceptable for the 40-year lifetime of the unit.

Toledo Edison submitted by letter (Serial Number 1580 dated September 15, 1988) the cause and analysis of the failure of the HPI/makeup thermal sleeve and related effects on the nozzle to the Nuclear Regulatory Commission (NRC). In that submittal, Toledo Edison committed to provide the NRC with an update regarding the progress of evaluation of the failure and the progress of the preparation for action on this item during the sixth refueling outage. This submittal provides the NRC with the preparations and evaluations being performed for the sixth refueling outage.

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Toledo Edison is currently proceeding with a comprehensive program which calls for visual inspection of the thermal sleeve, ultrasonic (UT) examination of the nozzle from the outside diameter (O.D.) to verify no adverse changes have occurred in the as-left condition of the nozzle and thermal sleeve, and piping modifications to utilize an alternate HPI nozzle for normal makeup flow.

The visual inspection of the thermal sleeve will involve inspecting the inside diameter using fiberoptics similar to the fiberoptic inspection which was performed when the failure was initially discovered and described in Serial Number 1580. The results of this inspection will be utilized to verify continued acceptability of the thermal sleeve. If no indications are observed, the sleeve will be considered acceptable for further operation. If any indications are observed, a dye-penetrant (PT) examination will be performed. The thermal sleeve will be replaced if indications are discovered.

An enhanced UT examination will be performed on the nozzle from the nozzle outside diameter. This technique, which is currently under development, is considered to be a significant improvement over that previously utilized. If the inspection reveals additional defects, propagation of the as-left condition, or indications outside the existing analysis, contingency actions have been established and implementing details are being developed depending on the characteristics of the observed indications. External weld reinforcement of the nozzle and/or further fracture mechanics analysis will be performed as necessary. Weld reinforcement would provide additional component thickness that would justify continued operation. Based on field experience at a facility similar to Davis-Besse, there would be no significant welding or personnel radiation exposure concerns.

If the inspection and examinations reveal no additional defect, no propagation of the as-left condition, or indications within the existing analysis, the results of the previous analysis will be considered to remain valid. This will ensure acceptability of continued operation for an additional cycle. A similar inspection will be performed at the seventh refueling outage to assess the existence of any potential degradation.

A plant modification package is under development which will install new piping to re-route makeup flow through an alternate HPI nozzle. This modification will eliminate the possibility of thermal cycling on the present makeup/HPI nozzle caused by the cold makeup flow. The enhanced UT examination will also be performed on the alternate nozzle to obtain baseline information for use in any necessary future evaluations. The modification and examination will be completed during the sixth refueling outage.

Considering the lifetime of the original thermal sleeve, Toledo Edison expects that no cracks have initiated in the replacement unit. With an effective thermal sleeve in place, it is believed that no growth has occurred in the crack-like indications in the nozzle. Toledo Edison will inspect the makeup/HPI nozzle and thermal sleeve as outlined in this letter to confirm or negate these predictions. A summary of the results of these examinations, corrective actions taken during the outage, and action planned for the seventh refueling outage will be submitted to the NRC before the end of the sixth refueling outage. Toledo Edison considers that the above modification and

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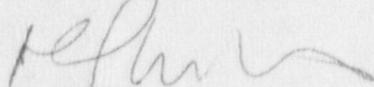
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inspection plan satisfactorily addresses the failure concerns related to the HPI thermal sleeve and nozzle. Toledo Edison is currently scheduling activities for the sixth refueling outage. Any changes to the process described above could significantly impact the scheduling of the outage. Therefore, Toledo Edison requests that any questions or concerns be identified prior to July 7, 1989.

If you have any questions concerning this matter, please contact Mr. R. W. Schrauder, Nuclear Licensing Manager, at (419) 249-2366.

Very truly yours,



GBK/dlm

cc: P. M. Byron, DB-1 NRC Senior Resident Inspector
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