

April 25, 2002

MEMORANDUM FOR: Docket File

FROM: Jack Donohew, Senior Project Manager, Section 2
Project Directorate IV /RA/
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: CONFERENCE CALLS WITH PALO VERDE NUCLEAR
GENERATING STATION, UNIT 2, ON RV HEAD INSPECTION PLAN
TO MEET NRC BULLETINS 2001-01 AND 2002-01
(TAC NOS. MB4563, MB4564, AND MB4565)

Palo Verde Nuclear Generating Station, Unit 2, began a refueling outage on Friday, March 15, 2002. On March 20 and 28, 2002, the NRC staff and the licensee had conference calls to discuss the licensee's plans for assessing the condition of their reactor vessel (RV) head in response to NRC Bulletins 2001-01, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles," and 2002-01, "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity." Later there were calls held with the licensee on April 4 and 5, 2002, to discuss the results of the inspection. The plant is considered a moderate susceptibility plant in accordance with Bulletin 2001-01. Attached is the inspection plan sent by the licensee in support of the call held on March 20, 2002.

During the calls of March 20 and 28, 2002, the licensee explained their plan as follows: (1) the reactor head vent line would be visually examined on the top of the head, (2) ninety-seven control element drive mechanism (CEDM) nozzles will be examined from below the head with remote tooling using a combination of eddy current testing (ET) and volumetric ultrasonic testing (UT) techniques, (3) the ET and UT scans will be applied from inside diameter (ID) of the nozzle, (4) the ET and UT scans will be performed at the same time to examine the ID and outside diameter (OD) nozzle wall, (5) the scan area includes all wetted surfaces below the j-groove weld and up to 2 inches above the j-groove weld, (6) the UT technique includes two zero degree transducers with different gain settings to capture near surface and j-groove weld crack indications, (7) the Westinghouse nondestructive examination (NDE) techniques have been qualified using Entergy/EPRI [Electric Power Research Institute] nozzle mock-ups, (8) potential or through-wall crack indications in the nozzle at or above the j-groove weld area will require additional examination (i.e., full-length UT of the nozzle OD, low frequency ET interference fit NDE to assess potential bore corrosion, and top-of-head visual examination for leakage if the nozzle is accessible), (9) indications in the j-groove weld, or potential indications, will result in the j-groove weld being surface ET examined, and (10) licensee personnel will have the final approval of NDE data and repairs.

The licensee had identified several inspection difficulties during the phone calls (e.g., probe losing contact with the surface of the nozzle). The licensee stated that these difficulties were resolved and the inspection of the RV head should be completed by Friday, March 29, 2002. The licensee indicated that the actions taken to resolve the difficulties did not affect the qualification of the inspection technique.

With respect to inspecting the top surface of the RV head, the licensee indicated that they had inspected several (approximately 24) peripheral nozzles with no evidence of deposits or corrosion being observed. There was a boric acid leak identified by the licensee near one nozzle (CEDM Number 96). The leak was identified in the current Unit 2 outage through the licensee's inspection program for NRC Generic Letter 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants." The boric acid is to be removed and the affected areas of the reactor head and nozzle are to be cleaned and re-inspected. The licensee also summarized the unit's operating history with respect to boric acid leaks from above the head. The licensee stated that no significant boric acid leaks have occurred such that boric acid would have reached the head.

During the call of April 4, 2002, the licensee explained the results of their inspection of the RV head as follows: (1) the inspection of the RV head and analysis of the nozzle testing are complete, but not finally checked by quality assurance; (2) for the top surface of the head, the insulation collars around each of the 25 peripheral nozzles were removed and the head was inspected with no evidence of leakage of boric acid found other than the leakage from nozzle CEDM Number 96 discussed above (in the previous calls); and (3), for the nozzle welds under the head, ET and UT was performed and no detectable defects were found. With respect to the potential for boric acid to be located on other portions of the head, the licensee repeated that they had a leak near CEDM Number 96, a peripheral nozzle, which was identified one day after the unit was shutdown for the current outage. The leak was from a threaded connection on the reactor vessel level monitoring system, and the leakage was cleaned up by removing the insulation collar and wiping down the affected areas. After the clean up, the area was re-inspected and no degradation was found. Initially, the licensee had not intended to inspect the top of the head around the 25 peripheral nozzles (Item 1 above), but later decided to perform the inspection after finding the leakage at CEDM Number 96.

The licensee identified certain nozzles as "special interest" nozzles because the initial UT examinations showed, by the licensee's inspection criteria, indications which required further testing and/or analysis of the nozzle. Nozzles were conservatively placed in the "special interest" category to ensure that additional testing and/or analysis of the nozzles were performed. This was done by the licensee to assure themselves that there were no cracks that could cause leakage in the nozzle welds.

During the call, the licensee discussed the qualification of the technique used for detecting flaws in the j-groove weld. The licensee stated that it has the qualification report for the technique, but it has not received permission from the owners of the report to make it available to NRC. The licensee indicated the report should be provided to NRC when it submits the results of the inspection of the head in accordance with the schedule in Bulletins 2001-01 and 2002-01. The report is considered proprietary, and a request to withhold the report from the public will also be submitted with the report. This report was further discussed in a call with the licensee on April 5, 2002. At that time, the licensee repeated that the report that qualifies the technique will be submitted when the results of the inspection are submitted.

Based on the preliminary findings from Davis-Besse, the inspections performed on the Unit 2 head by the licensee, and the plant's susceptibility to nozzle cracking, the NRC staff did not identify any issues that needed additional follow-up prior to plant restart. The NRC staff will document its formal review after receiving the licensee's Bulletin 2002-01 response on the

Unit 2 inspection, which is 30 days after plant restart from the outage. The licensee submitted its initial response to the bulletin in the letter dated April 3, 2002.

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Attachment: RVH CEDM Nozzle Examinations (ADAMS ML021020223)

Unit 2 inspection, which is 30 days after plant restart from the outage. The licensee submitted its initial response to the bulletin in the letter dated April 3, 2002.

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Attachment: RVH CEDM Nozzle Examinations (ADAMS ML021020223)

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