ORDER EA-03-009

Palo Verde Nuclear Generating Station

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102-05950-DCM/RJR
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ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Dear Sirs:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Unit 1
Docket No. STN 50-528
APS's 60-Day after Plant Restart Letter in Response to First Revised NRC Order EA-03-009, Item IV.E – U1R14

By letter dated February 20, 2004, the NRC issued to Arizona Public Service Company (APS) the First Revised NRC Order EA-03-009. The Federal Register (73 FR, No. 176) dated September 10, 2008, states that once a licensee implements Code Case N-729-1, with conditions, the First Revised NRC Order EA–03–009 no longer applies to that licensee and is deemed to be withdrawn. The inspections performed during U1R14 were performed under the Order. However, APS has now implemented the requirements of the Code Case, as conditioned; therefore, the requirements of the Order no longer apply to Palo Verde Units 1, 2, and 3. APS is submitting this report as the final report of Order requirement IV.E.

The enclosure to this letter contains the following requested information for Unit 1's fourteenth refueling outage (U1R14):

- Inspection results for each inspection required by Paragraph C of the Order.
- Inspection results for each inspection required by Paragraph D of the Order.

APS completed the Palo Verde Unit 1 fourteenth refueling outage on November 19, 2008. No new commitments are being made to the NRC by this letter. Should you have questions regarding this submittal, please contact Russell A. Stroud, Licensing Section Leader, at (623) 393-5111.

Sincerely,

D. C. Mims

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NRR

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Enclosure

cc: E. E. Collins Jr. NRC Region IV Regional Administrator
R. Hall NRC NRR Project Manager (send electronic and paper)
R. I. Treadway NRC Senior Resident Inspector for PVNGS

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Enclosure

Palo Verde Unit 1 60-day Report Detailing the Inspection Results of the Reactor Pressure Vessel Head during the 14th Refueling Outage

First Revised NRC Order EA-03-009

At the start of the Palo Verde Unit 1 fourteenth refueling outage (U1R14) in the fall of 2008, the effective degradation years (EDY) were calculated as approximately 15.03 EDY, which places Palo Verde Unit 1 reactor pressure vessel (RPV) head in the high susceptibility category.

Results of the Inspection Required by Paragraph IV.C

First Revised NRC Order EA-03-009 IV.C.(1) states that:

For those plants in the high susceptibility category, RPV head and head penetration nozzle inspections shall be performed using the techniques of paragraph IV.C.(5)(a) and paragraph IV.C.(5)(b) every refueling outage.

IV.C.(5)(a) Bare metal visual examination of 100 percent of the RPV head surface (including 360° around each RPV head penetration nozzle). For RPV heads with the surface obscured by support structure interferences which are located at RPV head elevations downslope from the outermost RPV head penetration, a bare metal visual inspection of no less than 95 percent of the RPV head surface may be performed provided that the examination shall include those areas of the RPV head upslope and downslope from the support structure interference to identify any evidence of boron or corrosive product. Should any evidence of boron or corrosive product be identified, the licensee shall examine the RPV head surface under the support structure to ensure that the RPV head is not degraded.

(b) For each penetration, perform a nonvisual NDE in accordance with either (i), (ii) or (iii):

(i) Ultrasonic testing of the RPV head penetration nozzle volume (i.e., nozzle base material) from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches [see Figure IV-1]); OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0-inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater (see Figure IV-2). In addition, an assessment shall be made to determine if leakage has occurred into the annulus between the RPV head penetration nozzle and the RPV head low-alloy steel.

(ii) Eddy current testing or dye penetrant testing of the entire wetted surface of the J-groove weld and the wetted surface of the RPV head penetration nozzle base material from at least 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 2 inches below the lowest point at the toe of the J-groove weld on a horizontal plane perpendicular to the nozzle axis (or the bottom of the nozzle if less than 2 inches [see Figure IV-3]); OR from 2 inches above the highest point of the root of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) to 1.0-inch below the lowest point at the toe of the J-groove weld (on a horizontal plane perpendicular to the nozzle axis) and including all RPV head penetration nozzle surfaces below the J-groove weld that have an operating stress level (including all residual and normal operation stresses) of 20 ksi tension and greater (see Figure IV-4).

(iii) A combination of (i) and (ii) to cover equivalent volumes, surfaces and leak paths of the RPV head penetration nozzle base material and J-groove weld as described in (i) and (ii). Substitution of a portion of a volumetric exam on a nozzle with a surface examination may be performed with the following requirements:

1. On nozzle material below the J-groove weld, both the outside diameter and inside diameter surfaces of the nozzle must be examined.

2. On nozzle material above the J-groove weld, surface examination of the inside diameter surface of the nozzle is permitted provided a surface examination of the J-groove weld is also performed.

IV.C.(5)(a) Bare Metal Visual Examination Results

This examination was conducted in accordance with the requirements of the First Revised Order with no relaxations. A visual examination of the bare-metal surface of the reactor head found no evidence of boron or corrosion. No cleaning of the RPV head was necessary during U1R14.

IV.C.(5)(b) Nonvisual Nondestructive Examination (NDE) Results:

Nonvisual NDE was performed in accordance with the requirements of the First Revised NRC Order EA-03-009 Section IV.C.(5)(b) and approved relaxations.

Reactor Head Vent Nozzle:

The head vent nozzles at Palo Verde do not protrude below the surface of the RPV head and as a result, there is no material below the J-groove weld to be examined.

The inside diameter (ID) of the vent nozzle and the J-groove weld were examined by eddy current testing (ET). The results of the examinations were acceptable with no primary water stress corrosion cracking (PWSCC) indications detected.

Control Element Drive Mechanisms (CEDM):

All 97 CEDM nozzles were examined in accordance with Order requirement IV.C (5)(b) and the examination results were satisfactory. No special interest indications were identified that required additional examinations to be performed. No indications of PWSCC were detected.

Results of the Inspection Required by Paragraph IV.D

First Revised NRC Order EA-03-009 Section IV.D. states:

During each refueling outage, visual inspections shall be performed to identify potential boric acid leaks from pressure-retaining components above the RPV head. For any plant with boron deposits on the surface of the RPV head or related insulation, discovered either during the inspections required by this Order or otherwise and regardless of the source of the deposit, before returning the plant to operation the Licensee shall perform inspections of the affected RPV head surface and penetrations appropriate to the conditions found to verify the integrity of the affected area and penetrations.

First Revised NRC Order EA-03-009 Section IV.D. Results:

Potential boric acid leak sites from pressure retaining components above the RPV Head were examined using PVNGS procedure 70TI-9ZC01, Revision 7, Boric Acid Corrosion Prevention Program. Boric acid walk down inspections completed in Mode 3 (work order 3078732) at the beginning of the refueling outage revealed one new boric acid leakage site, Versa Vent 88. This location was reworked during the outage along with previously reported Versa Vents 28 and 75.

During plant restart at the end of U1R14, three new leak sites from pressure retaining components above the RPV Head were identified. CEDM Versa Vents 70, 81 and 83 were found to have a dried boric acid indication. However, there were no active leaks and the boric acid residue remained in the immediate area of the Versa Vent and did not migrate to the reactor head or related insulation. No carbon steel was affected by the boric acid residue. The dry residue was cleaned from all three Versa Vents and the piping joints for Versa Vents 70 and 81 were tightened via work order 3078707. Since no carbon steel was affected and Versa Vent 83 was not an active leak, Palo Verde Action Request 3251082 was initiated to rework the CEDM Versa Vent 83 in the next available Unit 1 outage.