FENOC
FirstEnergy Nuclear Operating Company

5501 North State Route 2
Oak Harbor, Ohio 43449

Barry S. Allen
Vice President - Nuclear

419-321-7676
Fax: 419-321-7582

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L-08-105

ATTN: Document Control Desk
United States Nuclear Regulatory Commission
Washington, D. C. 20555-0001

SUBJECT:
Davis-Besse Nuclear Power Station, Unit 1
Docket No. 50-346, License No. NPF-3
Davis-Besse Reactor Head Inspection Report

By letter dated February 20, 2004, the Nuclear Regulatory Commission (NRC) issued revised Order EA-03-009, "Issuance of First Revised NRC Order (EA-03-009) Establishing Interim Inspection Requirements For Reactor Pressure Vessel Heads At Pressurized Water Reactors." The FirstEnergy Nuclear Operating Company (FENOC) provided a response to revised Order EA-03-009, via letter Serial Number 3033, dated March 11, 2004. In that March 11 letter, FENOC committed to conduct Reactor Pressure Vessel (RPV) head inspections at the Davis-Besse Nuclear Power Station (DBNPS) every refuel outage, which is a frequency beyond that required by the February 20, 2004 revised Order EA-03-009.

Enclosed is the FENOC report providing the results of the DBNPS RPV head inspection conducted in January 2008 during the DBNPS fifteenth refuel outage. The RPV head inspection included a bare head visual inspection, under vessel inspection, and flange inspection.

There are no regulatory commitments contained in this letter. If there are any questions or if additional information is required, please contact Mr. Thomas A. Lentz, Manager – Fleet Licensing, at (330) 761-6071.

Sincerely,

Barry S. Allen

A101

NRR

Enclosure:
Summary Report for Davis Besse Unit 1 RFO15 Outage January 2008 Covering Bare Head Visual Inspection Under Vessel Inspection Flange Inspection

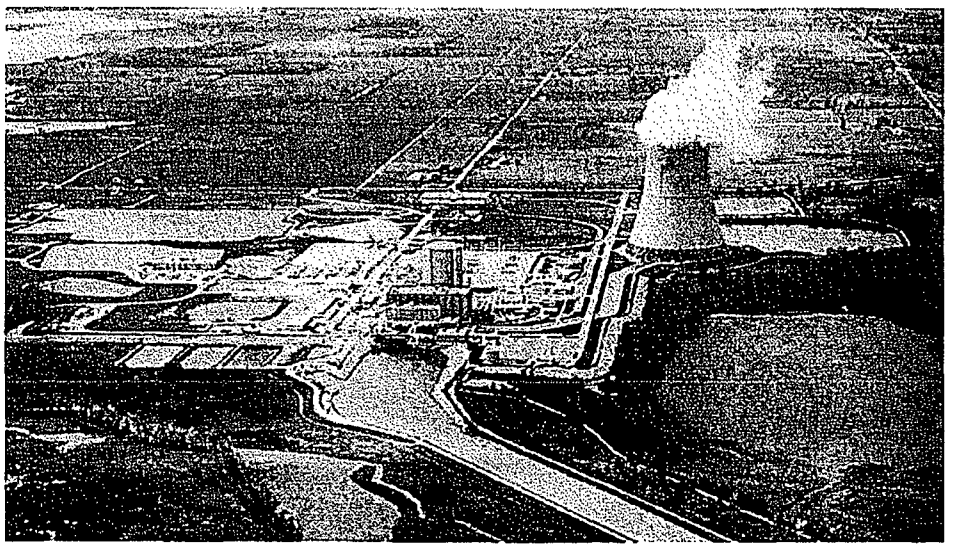
cc: NRC Region III Administrator
NRC Resident Inspector
NRR Project Manager
Utility Radiological Safety Board
Executive Director, Ohio Emergency Management Agency,
State of Ohio (NRC Liaison)

Summary Report for Davis Besse Unit 1
RFO15 Outage January 2008
Covering
Bare Head Visual Inspection
Under Vessel Inspection
Flange Inspection

Framatome ANP Task Lead _____
Dennis J. Austin

First Energy
Project Mgr. _____
Craig A. Hengge

This document is a summary of the inspections performed at the First Energy's Davis Besse Unit 1 plant during the January 2008 RFO15 outage.



Purpose and Scope

Bare Head Visual

The purpose of this visual examination was to identify evidence of boric acid leakage from the 69 reactor vessel head penetrations (RVHP) as well as evidence of wastage of the reactor vessel head surface. Leakage and wastage can be a result of boric acid corrosion from leaking RVHPs or from other sources that can degrade the top surface of the RV head. This visual examination was part of a comprehensive examination of the Davis Besse Unit 1 RV head that also included Under Vessel and Flange Interface inspections covered in this summary to meet the requirements of First Revised NRC Order EA-03-009 issued February 20, 2004.

The scope of the visual examination was 100% of the RV head surface from the top of the head including 360° around each of the 69 RVHPs, (68 four inch RVHPs and the one head vent penetration) down to the horizontal transition of the RV closure flange. The experiences and results of past Bare Head Visual Inspections performed by AREVA as well as the information documented by EPRI[1], provided guidance for performing effective VT-2 examinations

Under Vessel Inspection

The purpose of this inspection was to provide an effective visual examination of the 52 ICI nozzles, reducing bushings, 2 vibration monitoring boxes, the lower portion of the 2 core flood nozzles, and an overall view of under the reactor head. Each of the 52 penetrations required a 360 – degree inspection looking for boric acid deposits and a general view of the overall reactor head bottom head surface.

Flange Inspection

The purpose of this inspection was to provide a visual inspection of the 69 reactor head penetration flanges and split rings and the top surface of the insulation. Each penetration was viewed at the flange to split ring interface and underneath the split ring looking for evidence of boric acid deposits, accumulation and other evidence of primary water leakage.

Method

Bare Head Visual

The reactor head surface was gained by removing one or more of the 12" inspection ports on the shroud. An "as found" video was completed on the head surface using these access points and a robotic crawler carrying a miniaturized camera. This camera has been qualified through performance demonstrations in mockup situations as well as resolution and lighting checks throughout the inspection process in accordance with the AREVA procedure 54-ISI-367-07 governing this inspection. Throughout the activity, AREVA VT-2 Level II personnel ensured that complete inspections were performed and documented in real time. An examination 360° around each RPV head penetration nozzle was performed along with the bare metal head surface between

[1] "Visual Examination for Leakage of PWR Reactor Head Penetrations: Revision 2 of 1006296, Includes 2002 Results and MRP Inspection Guidance," EPRI, Palo Alto, CA: 2003, 1007842.

each penetration. Additionally, the inspections were witnessed by First Energy oversight personnel and recorded to DVD recorders Documentation also included a digital picture captured of each quadrant that was stored to a computer. Copies of field generated reports including all enclosures, DVDs and a CD-ROM containing the penetration quadrant digital pictures were turned over to the customer.

Note: The visual inspection of the transition area from the shroud ring out to the horizontal bolting flange was performed by site VT-2 personnel as a direct visual and a data sheet was included with Bare Metal procedure provided at close of inspections. This inspection included the shroud ring support lugs and the horizontal bolting surface, to identify any "as found" leakage that could have been introduced from the head above.

Under Vessel Inspection

Mirrored insulation panels were removed underneath the vessel to gain access for inspecting 52 (ICI) Incore Instrumentation nozzles, reducing bushings and 2 vibration monitoring boxes A general view of the periphery was also accomplished during this portion of inspections.

A small (PTZ) Pan Tilt Zoom camera was delivered by a robotic crawler that traveled across the remaining flat panels of mirrored insulation. The PTZ camera was pointed up towards the lower head for this inspection and the "driving" was handled by the robotic crawler. A map showing all ICI locations and alignment was used by inspection personnel and site oversight to ensure correct locations were achieved. A resolution and lighting check for the PTZ camera was also completed. This resolution and lighting check was completed at the beginning and at the end of this inspection due to high dose rates at inspection location. These inspections were recorded to DVD recorder and documentation also included a digital picture captured of each quadrant that was stored to a computer.

Flange Inspection

Access to the area of interest for this inspection was gained by through the eight APSR location holes on top of the reactor head. The seismic plates on these locations were removed prior to inspections. A long pole mounted PTZ (Pan, Tilt, and Zoom) camera was used to complete the inspection. The inspection was looking at the interface between the CRDM flange and split ring and also looking underneath the flange on the top surface of the insulation for evidence of boric acid leakage, accumulations, stains or other evidence of primary water leakage. This camera has been qualified through performance demonstrations in mockup situations as well as resolution and lighting checks throughout the inspection process in accordance with the AREVA procedure 54-ISI-367-07 governing this inspection. Throughout the activity, First Energy oversight personnel ensured that complete inspections were performed and documented in real time. Additionally, the inspections were witnessed by AREVA VT-2 Level II personnel and recorded to DVD recorders. Copies of DVDs were turned over to the customer.

AREVA Condition Reports written on / during Visual Inspections

- **CR-2008-198** - *Portion of Bare Metal Visual Inspection was not recoded to DVD*

- Resolution – Accepted inspection " as is", based on the bare metal surface area to be covered by the video not recorded was captured during other passes up the same row

- **CR-2008-221** - *NRC inspector raised question on light meter*
  - Resolution – Provided documentation that all cameras were capable of providing in excess of the 50 fc required by procedure in totally darkened environment. In the future test cameras in totally darkened area to meet procedure requirements.
- **CR-2008-225** - *Procedure listed in TDL - not required / used*
  - Resolution – Will be a total rewrite of the procedure for Flange inspection. New tooling (smaller PTZ - Pan, Tilt, Zoom camera) gained access through the 8 APSR locations and was able to give great overall views of the bottom of nut ring, flange interface and insulation surface. Procedure brought to outage was restrictive in that it required quadrant by quadrant signoffs and the customer was happy with the better overall views, time and dose savings provided by the new tooling.
- **CR-2008-257** - *Unapproved Document used at Davis Besse*
  - Resolution – Procedure 54-ISI-367-08 was submitted and approved by site after the inspections completed. There was some confusion about it's approval status at the end of inspections. This revision made the character height requirements more restrictive and was approved based on this merit. All documents will be sent to site only by Project Engineer will require either a signed letter from site or a completed Applicable Documents listing procedure as approved by site.

Inspection Results/Conclusions

Results:

The bare head visual portion of the inspections found no evidence of any active boric acid leakage or deposits during this outage. The overall condition of the reactor head surface and areas around the nozzles were very clean. There were several isolated deposits of white powdery substance (confirmed by smear samples to not be boric acid) noted on head surface identical to deposits identified and evaluated during the 14RFO inspection. There were several rust stains identified. These stains were investigated and all were associated with a Component Cooling Water leak from above the insulation surface. Nozzles showing darken stains noted during this and previous inspections were again compared to the previous outages and showed only rust stains on the nozzles and dark deposits in the crevice of the nozzles compared.

Under vessel inspections were completed with no leakage found. Previous outage pictures were utilized to compare quadrant views achieved

CRDM Flange inspections showed no indicated deposits of concern noted during this portion of inspections.

Conclusion:

The overall condition of the reactor head as covered in the preceding inspections was very good. The use of previous outage pictures helped in all inspections to ensure any changes in condition were noted. There were no new indications attributable to boric acid type leakage or deposits noted during these inspections.