

**Lew W. Myers**  
Senior Vice President

724-682-5234  
Fax: 724-643-8069

March 28, 2002  
L-02-021

U. S. Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, DC 20555-0001

**Subject: Beaver Valley Power Station, Unit No. 2  
Docket No. 50-412, License No. NPF-73  
Bulletin 2001-01 Circumferential Cracking of Reactor  
Pressure Vessel Head Penetration Nozzles**

On August 31, 2001, the FirstEnergy Nuclear Operating Company (FENOC) provided a response to NRC Bulletin 2001-01 for Beaver Valley Power Station (BVPS) Units 1 and 2. The Bulletin pertains to the structural integrity of the reactor pressure vessel head penetration (VHP) nozzles. The BVPS response to Question 5.a. of the Bulletin stated, in part, that following the 2R09 Refueling Outage, Beaver Valley Unit 2 would provide a description of the visual inspection performed and provide the results.

Attached is a report of the 2R09 visual examinations performed on the Unit 2 Control Rod Drive Mechanism (CRDM) penetrations. This report includes the evaluation of the visual examinations performed for Bulletin 2001-01 and the result of these examinations. This report concluded that no relevant visual indications of boric acid leakage from the CRDM penetrations were found.

If there are any questions concerning this matter, please contact Mr. Larry R. Freeland, Manager, Regulatory Affairs/Corrective Action at 724-682-5284.

Sincerely,



Lew W. Myers

Attachment

c: Mr. D. S. Collins, Project Manager  
Mr. D. M. Kern, Sr. Resident Inspector  
Mr. H. J. Miller, NRC Region I Administrator  
Mr. D. A. Allard, Director BRP/DEP  
Mr. L. E. Ryan (BRP/DEP)  
Ms. C. O'Clair, Ohio Emergency Management Agency

**Evaluation Report for 2R09 Visual Inspection of  
Beaver Valley Unit 2 CRDM Penetrations**

Evaluation Performed by Dennis Weakland  
February 2002  
March, 2002 Revision 1

## **Introduction**

The inspection of the CRDM penetrations at Beaver Valley Unit 2 during the 2R09 Refueling outage was performed as part of the commitment made by Beaver Valley in response to Bulletin 2001-01 issued by the NRC. NRC Bulletin 2001-01 was issued as a result of leakage and subsequent identification of circumferential through-wall cracking in the CRDM penetrations at the Oconee Units 1, 2, and 3 and Arkansas Nuclear One power plants. The Industry has investigated the issue and is continuing to perform work to address the concerns under the direction of the EPRI Materials Reliability Project (MRP).

The Beaver Valley commitment in response to NRC Bulletin 2001-01 is to perform a bare metal visual examination of the area on the Reactor Vessel head where the CRDM penetrations meet the outside surface of the Reactor Vessel Head. This examination is performed under the Reactor Vessel head insulation on the exterior surface of the Reactor Vessel Head. The inspection is for the identification of boric acid accumulations that may indicate that a CRDM penetration is cracked through-wall and is leaking.

## **Purpose and Scope**

The purpose of the inspection was to identify any evidence of leakage from the CRDM penetration area and Reactor Head Vent piping penetration. The scope of the Beaver Valley Unit 2 inspection of the CRDM penetrations during 2R09 was 100% of the CRDM penetrations and the Reactor Vessel Vent Line penetration.

The identification of visual evidence of leakage in the form of an accumulation of boric acid crystal residue extruding from the penetration area where the CRDM tubing and Reactor Vessel Head Vent piping penetrated the outside surface of the Reactor Vessel Head is the area of focus for the visual inspection. This inspection was performed by Framatome ANP personnel using high resolution remote visual examination equipment and video probes. The inspection was recorded on Super-VHS tape for review and evaluation by the Beaver Valley Site Level III Visual Examiner and the Site Materials Engineer responsible for the inspection.

As noted in the attached visual examination Summary Report (Attachment 1) from Framatome ANP, all examinations were performed by qualified visual examination personnel. The personnel and equipment were qualified using the performance demonstration method. All personnel documentation and certifications are included in the Inspection package maintained by the NDE Department for such examinations.

## **Inspection Results**

The bare metal inspection of all the Reactor Head penetrations which consists of the sixty-five (65) CRDM penetrations and one (1) Reactor Head Vent Line from under the insulation found no indication of Boric Acid leakage from any penetration in the Reactor Vessel Head. None of the penetrations on the Beaver Valley Unit 2 displayed boric acid accumulations of a nature that are indicative of through-wall leakage. As noted in the attached FRAMATOME report, loose accumulations and staining was observed that was directly attributable to leakage from above the insulation.

The inspection found loose boric acid pebbles scattered across the surface of the Reactor Vessel Head with some accumulation of these loose pebbles on the up hill side of several penetrations. Additionally the inspection identified light boric acid stain patterns on several CRDMs indicating leakage from a source above the CRDM Tube to Reactor Vessel Head penetration. In all cases the debris was loose and did not mask the area of examination.

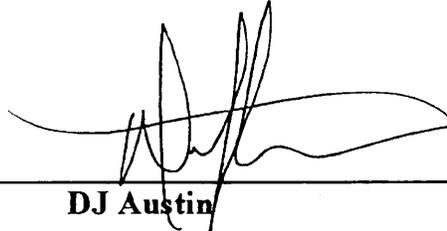
## **Summary of Results**

The boric acid accumulations and debris identified were loose in nature and are not associated with leakage from a CRDM penetration. All boric acid accumulations and residue observed was directly attributable to external sources of leakage outside the area of the CRDM penetration.

# Summary Report for Beaver Valley Unit 2 RVH CRDM Penetration Visual Inspection

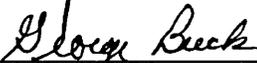
February 2002

Framatome ANP Task Lead



DJ Austin

Beaver Valley Site Project Coordinator



GL Beck

This document is a summary of the visual inspection of the RVH penetrations at the Beaver Valley Unit 2 plant. Inspections were performed during the 2RFO-9 outage.

## **Purpose and Scope**

The purpose of this visual examination was to look for evidence of discharge or leakage around the 65 RPV penetrations and the one (1) Reactor Head Vent piping penetration in the form of the basic build-up of boric acid crystal residue. The experiences and results of the Bare Head Visual Inspections, as performed by Framatome-ANP and reviewed by EPRI MRP, provided guidance for performing effective VT-2 examinations.

## **Method**

Due to the dose considerations involved with removing the head's insulation package each of the 65 RPV nozzle penetrations and the head vent line was remotely inspected for a full 360° view utilizing high resolution cameras and video probes delivered through guide tubes and crawlers. These cameras have been qualified through performance demonstrations in mockup situation as well as passing resolution and lighting checks throughout the inspection process in accordance with the FRA-ANP procedure governing this In Service Inspection. VT Level II personnel ensured that complete inspections were performed and documented in real time. All inspections were recorded to Super-VHS tape and reviewed by site Level III's and Material Engineering responsible for this inspection.

## **Inspection Results**

Light scattered debris, which was easily moved, was noted around several nozzles during this inspection. All debris seemed to be associated with stains originating from above the insulation. The overall condition of the Reactor Head itself was very clean, with again only a few showing the scattered debris. No sign of leakage was noted during these inspections.

## **Conclusions**

This inspection is intended as a tool to evaluate overall conditions of the reactor head and particularly a view of the interface between the nozzle and the head. While the experience of the inspectors is useful as a determining factor of any leakage or event, the focus is intended to be a reporting vehicle with the utility making it's own determination of data. With the cleanliness of this head it is easier to help assist in those determinations.