



Commonwealth Edison
1400 Opus Place
Downers Grove, Illinois 60515

September 30, 1991

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Attn: Document Control Desk

Subject: Quad Cities Nuclear Station Unit 2
Reactor Head and Upper Shell Inspection Plan
NRC Docket No. 50-265

References: (a) R. Stols to T.E. Murley letter
dated May 4, 1990

(b) R. Stols to T.E. Murley letter
dated January 3, 1991

Dear Dr. Murley:

On April 19, 1990, members of the Nuclear Reactor Regulation's (NRR) and Commonwealth Edison Company's (CECo's) staff conducted a technical meeting to discuss the cracks identified in the Quad Cities Unit 2 Reactor Vessel Head. During that meeting, CECO committed to perform inspections of the reactor vessel heads at each of its Boiling Water Reactor (BWR) Plants.

In Reference (a), CECO committed to review the fabrication records for the upper vessel structure for each BWR unit and provide this information to your office. This information was provided in Reference (b). Attached for your staff's review is the Reactor Head and Upper Shell Inspection Plan for Quad Cities Unit 2 for the upcoming refuel outage (Q2R11) which is scheduled to begin on December 28, 1991.

The cracks found in the Quad Cities Unit 2 reactor vessel head were located mainly in the back-clad region of the head-to-flange weld. The apparent primary cause of these cracks appeared to be fabrication related. The fabrication history of the Quad Cities Unit 2 Upper Vessel revealed major fabrication mismatches with manual back clad welds at the head-to-flange area. The inspection therefore will concentrate upon this area. No inspection is recommended for the reactor vessel upper shell-to-flange weld since no major fabrication mismatch was identified for this weld.

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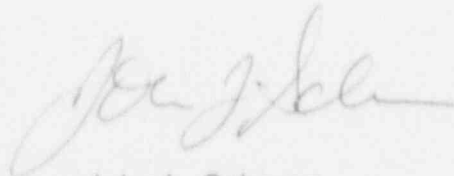
The inspection plan does not encompass the uppermost shell-to-shell weld due to technological limitations. Remote automated ultrasonic examination technology for BWR vessel welds is underway; however, the technology cannot be utilized reliably at this time. Examination of the uppermost shell-to-shell weld cannot be achieved by examination of the outer diameter due to inaccessibility, and manual liquid penetrant and/or manual ultrasonic examination from the inner diameter cannot be accomplished due to the radiation doses anticipated at that area. Commonwealth Edison, however, will perform the inspections when the technology is better developed.

The plan requires visual examinations (VT-3 and VT-1) of the head-to-flange weld to identify any evidence of potential cracks. These techniques will be followed by a liquid dye penetrant (PT) examination and an ultrasonic (UT) examination. Finally UT sizing will be used to map all crack indications as well as the highest PT indications

All flaw characteristics identified by the above examination techniques will be compared to the 1990 as-left flaw characteristics. Any apparent crack growth data will be resolved prior to unit start-up.

If there are any questions or comments on this plan, please direct them to this office.

Respectfully,



John L. Schrage
Nuclear Licensing Administrator

Attachment

cc: A. Bert Davis, Regional Administrator, RIII
L.N. Olshan, Project Manager, Quad Cities
T.E. Taylor, Senior Resident Inspector, Quad Cities
B.J. Elliot, NRR Technical Staff

PROPOSED REACTOR HEAD AND UPPER SHELL INSPECTION PLAN

QUAD CITIES UNIT 2

1. Visual Examination (VT-3) on 100% of the Reactor Pressure Vessel (RPV) Head ID outside of the 12 inch wide band which is centered on the RPV head-to-flange weld.

Lighting adequacy should be verified with a 1/32 inch black line on a 18% neutral gray card. Conditions to be examined for and recorded are:

- a. Cracks
 - b. Linear indications
 - c. Heavy/unusual rust streaks
2. Direct Visual Examination (VT-1) of all excavated cavities for pitting and cracking of the low alloy steel material. Lighting adequacy must be verified with a 1/32 inch black line on a 18% neutral gray card.
 3. Liquid dye penetrant test (PT) on the following:
 - a. All recordable indications found by activity 1 above.
 - b. The complete 12 inch band centered on the ID of the RPV head-to-flange weld and areas surrounding the PT indication (approximately 3 inch radius found in 1990 around the 25 inch evaluation). All PT indications shall be recorded.
 4. Ultrasonically test (UT), from the OD, 100% of the RPV head-to-flange weld using the enhanced UT technique (45 degree, 1 Mhz shear wave). Crack signal-to-clad roll response ratio of 2:1 or better shall be recorded. The examination coverage shall be the same coverage achieved in 1990.
 5. UT sizing, from the ID, the following:
 - a. All cracks found by activity 3.a.
 - b. All cracks located in and/or associated with all excavated cavities.
 - c. The three PT indications with the heaviest penetrant bleed out found by activity 3.b outside the cavity areas

The flaw characteristics found by activities 3.b., 4, and 5.b. shall be compared to the 1990 as-left flaw characteristics, if available, to determine crack growth. Any apparent crack growth data will be reviewed by Commonwealth Edison for resolution prior to unit start-up.