Nebraska Public Power District

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August 2, 1979

Director, Nuclear Reactor Regulation
Attn: Mr. Thomas A. Ippolito, Chief
Operating Reactors Branch No. 3
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: 1980 Refueling Outage
Clad Removal Procedures
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Dear Mr. Ippolito:

In response to your letter dated July 11, 1979, enclosed please find a summary description of the procedures for clad removal and inspection which will be performed at Cooper Nuclear Station during the 1980 Refueling Outage.

Should you require additional information on this subject, please do not hesitate to contact me.

Sincerely yours,

Jay M. Pilant
Director of Licensing
& Quality Assurance

JMP/jdw:kk2/14
Enclosure

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SUMMARY DESCRIPTION OF
CLAD REMOVAL PROCEDURE
TO BE USED AT CNS
DURING 1980 OUTAGE

The following is a brief description of the individual machining operations and inspections performed in completing a clad removal.

After removal of old spargers, the sparger wall brackets are cleaned and a visual inspection made of all brackets. The feedwater nozzles are then cleaned and a dye penetrant check of the nozzle faces and blend radii may be performed. This would be purely informational and costly from an exposure standpoint.

The machining processes are broken down into 6 different cuts per nozzle. These cuts are:

1. Rough Clad Removal Bore Cut
2. Finish Clad Removal Bore Cut
3. Deep Bore Cut
4. Safe End Cut
5. Face Cut
6. Blend Radius Cut

The Clad Removal Bore Cut

Because of the amount of material removed during this cut, it is broken down into rough and finish cuts. This process extends from the blend radius into the nozzle bore several inches, far enough to be assured of removing all the stainless steel cladding. It also provides a tapered transition from the clad removal bore to the deep bore.

The Deep Bore Cut

This cut extends from the clad removal bore up to and including the beginning of the nozzle safe end. A minimal amount of material is removed, approximately 0.100 inches in diameter during this cut. The main reason for this cut is to provide a true and centered surface for the safe end follower bearing to ride on. Ultrasonic transducers are set up on the outside of the nozzle near the safe end to respond to nozzle wall thickness. This assures that the deep bore was cut concentric.

The Safe End Cut

The safe end cut takes place entirely in the safe end. The cut provides two new sealing surfaces of different diameters capable of accepting the new double piston ring sparger thermal sleeves. The cuts remove a minimal amount of material. This cut is more of a cleanup cut of the surfaces and machining to proper diameters. Ultrasonic transducers are used and placed on the safe end, some in the location of where the new inboard sealing surface will be, and some in the location of the outboard sealing surface. These are to varify that minimum wall thickness of the safe end has not been violated and to provide an accurate indication of how concentric we had cut the safe end.

Face Cut

The face cut extends from the blend radius out onto the face of the nozzle. The cut, which is made on a 60° angle from the horizontal of the nozzle bore, extends out onto the nozzle face to a diameter of approximately 22.0 inches. The cut extends a couple inches into the nozzle bore tapering out to the nozzle face. All the cladding is removed from the blend radius extending out on the face with a gradual transition to the vessel wall cladding. This is a relatively long cut, time wise, and removes a substantial amount of material.

Where the face cut stops on the vessel wall there will be a sharp step left and this must be hand blended, removing the sharp transition leaving an acceptable radius. The entire face cut also needs some hand blending to remove any rough spots possibly left during the machining.

The Blend Radius Cut

The blend radius cut forms an acceptable radius from the face cut to the clad removal bore cut. It is a large radius but because of the configuration of the previous cuts, not much material is removed. Due to the size of the radius and tooling used to produce the radius, chatter marks may occur from the tooling. If the chatter marks appear, they will be removed by hand finishing.

After all cuts have been performed, hand finishing is usually required to obtain the desired surface finish specified by the reactor modification drawing and FDI. After the surface finishes are acceptable, all machined diameters are measured and the length of each cut rechecked and recorded.

The entire nozzle is then checked using dye penetrant. This check includes all surfaces which were machined. If any relevant indications are found, they are removed. To date, no indications have been found by General Electric. The sparger wall brackets are also checked using dye penetrant to verify that no cracking has occurred due to stress possibly impinged upon the brackets from the clad removal machine. Several times photographs of the nozzle penetrant checks have been taken and kept on file for future record.

The plants where this clad removal procedure has been implemented are Monticello, Hatch 1, Fitzpatrick and two of the Browns Ferry Plants. Quad Cities 1&2 and Dresden 2&3 will also be modified by late 1980.