Georgia Power

ENCLOSURE 1

NRC DOCKET 50-321

EDWIN I. HATCH NUCLEAR PLANT UNIT 1

HATCH UNIT 1 IGSCC-SUSCEPTIBLE PRIMARY PRESSURE BOUNDARY STAINLESS STEEL PIPING AND COMPONENTS INSPECTION/MITIGATION PROGRAM-1987 MAINTENANCE/REFUELING OUTAGE

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1.0 Introduction

This enclosure provides a description of the proposed program for the mitigation of Intergranular Stress Corrosion Cracking (IGSCC) in, and the inspection of, the main recirculation and other reactor pressure boundary stainless steel piping systems during the Hatch Unit 1 1987 maintenance/refueling outage.

Included in the program description are GPC's criteria for weld selection, ultrasonic examination, flaw evaluation, and application of induction heating stress improvement (IHSI) and weld joint overlays. In addition, our proposed inspection procedure and personnel qualification criteria are described, as well as leak detection and leakage limits for the next fuel cycle. A discussion of the Enclosure 1 items relative to the proposed inspection program follows.

2.0 Proposed Inspection Scope

Georgia Power Company (GPC) has elected to examine 95 of the 153 IGSCC-sensitive piping and component welds within the pressure boundary in a manner consistent with draft Revision 2 of NUREG-0313 as commented upon by the EPRI/BWR Owner's Group for IGSCC Research (BWROG-II) and GPC. Listed below is a tabulation of these welds. The available population has increased from that delineated in prior submittals because the draft NUREG contains reference to certain low carbon stainless steel piping and components and other materials not considered previously.

Condition	NUREG-0313 Rev. 2 Draft-IGSCC Category	Avail. Pop.	Percent Sample Required*	Percent Sample Actual	No. of Resultant Exams
1982 Overlays of Repair Piping Welds with IGSCC (4th Cycle)	E	6	50%	83%	5

Condition	NUREG-0313 Rev. 2 Draft-IGSCC Category	Avail. Pop.	Percent Sample Required*	Percent Sample Actual	No. of Resultant Exams
1984 Overlays of Repaired Piping Welds with IGSCC (3rd Cycle)	E	17	50%	65%	11
1985/1986 Overlays of Repaired Piping Welds with IGSCC (2nd Cycle)	E	13	50%	69%	9
Uncracked Welds	G	10	100%	100%	10
Uncracked IHSI Welds	C	98	50%	52%	51
"AS IS" Post-IHSI	F	9	100%	100%	9
TOTAL WELDS		153			95

*The PERCENT SAMPLE REQUIRED is the number of welds required by draft, Revision 2 of NUREG-0313, Section 5.3.2 to be examined during the upcoming outage. However, indications were detected during the 1985/1986 refueling outage, primarily in the overlays, that were not considered crack-like in nature. Therefore, a determination was made to examine these indications during the next three refueling outages. The PERCENT SAMPLE ACTUAL reflects these extra examinations.

3.0 Inspection Procedure and Personnel Qualification

The stainless steel piping and component ultrasonic examinations to be performed during the Hatch Unit 1 1987 maintenance/refueling outage will be conducted using a Southern Company Services (SCS) procedure similar to a procedure which was qualified in 1982 at Battelle-Columbus Laboratories (BCL) pursuant to the requirements of

NRC I&E Bulletin 82-03, Revision 1. Since the inspection of the Hatch Unit 1 stainless steel piping welds in 1982, the procedure has been revised slightly and used successfully in the detection of IGSCC at Hatch Units 1 and 2 during the 1983, 1984, and 1985/1986 outages, respectively. The latest approved revision of the procedure meets or exceeds the original BCL- qualified procedure, e.g., calibration and recording requirements. GPC's ultrasonic examination procedure was written to be in compliance with ASME Boiler and Pressure Vessel Code, Section XI, 1980 Edition with Addenda through Winter 1981, to which the inservice inspections are being performed.

With regard to personnel qualification, examination personnel will be certified to basic Levels I, II, and III in accordance with American Society for Nondestructive Testing document SNT-TC-1A, as applicable. Additionally, examination personnel will be required to achieve a level of competence commensurate with their functions. Levels II and III examination personnel shall demonstrate successfully their detection of IGSCC performance capabilities in accordance with the upgraded September 1985 NDE Coordination Plan. Execution of this plan is conducted at the EPRI NDE Center. Examiners involved in equipment setup or scanning operations will be trained and must demonstrate the required levels of proficiency to assure both their technical ability and their ability to perform activities consistent with the principles of maintaining radiation exposure as low as reasonably achievable (ALARA).

The examination team responsible for conducting the personnel qualification procedures will consist of examination personnel who have received certification at the EPRI NDE Center in the detection and interpretation of IGSCC. Examination personnel who have received certification at the EPRI NDE Center in planar flaw sizing may also perform personnel qualification examinations and evaluations, as appropriate.

4.0 Inspection of Weld Overlays

The 25 weld overlays specified in the proposed inspection program for the 1987 Hatch Unit 1 maintenance/refueling outage will be ultrasonically examined using the high-angled refracted longitudinal-wave technique which is similar to the procedure developed at the EPRI NDE Center. This technique is designed to verify the integrity of both the weld overlay and the outer 1/4T of

the piping base material. The high-angled refracted longitudinal-wave technique has been proven to be an effective tool in recent EPRI NDE Center tests on weld overlays. The results of the tests have indicated that crack-like indications can be reliably detected and sized in the outer 1/4T of the weld overlaid pipe wall and in the weld overlay itself. In addition, a liquid penetrant examination will be conducted on the weld overlay and on 1 inch of the base material found on either side of the weld overlay. Levels II and III ultrasonic examiners responsible for the examination of weld overlays shall be trained and qualified at the EPRI NDE Center.

5.0 Criteria for Flaw Evaluation and Weld Overlay Repair

Flaw evaluation for weld overlay repair, if required during the 1987 Hatch Unit 1 maintenance/refueling outage, will be performed using criteria which are consistent with those specified in Section 4 of draft, Revision 2, NUREG-0313.

Should any new unacceptable, crack-like indications or any significant growth of old IGSCC cracks be observed during the inspection, information concerning any of the following areas will be submitted to the NRC for review and approval:

- Flaw evaluations.
- Re-evaluations.
- Weld overlay design and analyses techniques, if required.

In our letter dated May 2, 1986, we described the results of the Hatch Unit 1 1985/1986 maintenance and refueling outage activities which were performed to re-evaluate and upgrade existing weld overlays and to improve the surface finish on all weld overlays. All overlays except those required only for a leakage boundary were upgraded to a "full structural" status. In the future, the improved surface finish will enhance the demonstrable reliability of the overlay.

6.0 Criteria for Application of IHSI

During the 1985/1986 Hatch Unit 1 maintenance and refueling outage, GPC evaluated the welds which did not require weld overlay repair

per the above-mentioned criteria for application of IHSI. If the flaw evaluation indicated that IHSI was a viable mitigation technique for a particular weld, (that is, the weld was free of crack-like indications or such indications were sufficiently shallow that the crack tip was within the zone of compressive residual stresses following treatment), IHSI was performed. A total of 107 welds in the Recirc, RHR, and RWCU systems was treated successfully with IHSI, including all 10 of the 12-in. riser safe end-to-inlet nozzle welds and both of the 28-in. safe end-to-outlet nozzle welds. Applicable Class 1 welds have had the potential for IGSCC mitigated by either IHSI or weld overlay. GPC will continue to evaluate other IGSCC-susceptible welds not specifically delineated in draft, Revision 2, NUREG-0313 in order to determine if the IHSI process is feasible and if it will provide acceptable mitigation to IGSCC.

7.0 Leak Detection and Leakage Limits for Next Fuel Cycle

By letters dated February 10 and 11, 1983, GPC proposed Technical Specifications changes to augment the reactor coolant leakage detection requirements. The NRC reviewed and approved the Technical Specifications changes as discussed in the Hatch Unit 1 Safety Evaluation Report, dated February 11, 1983. The changes meet the intent of the leak detection and leakage limits discussed in Section 6 of draft, Revision 2 of NUREG-0313.

In addition, a visual examination for leakage from the reactor coolant piping will be performed during the 1987 Hatch Unit 1 maintenance/refueling outage. The examination will be performed in accordance with the requirements of IWA-5241 and IWB-5242 of the 1980 Edition of the ASME Code, Section XI. The system boundary which is subject to this examination will be in accordance with the requirements of IWA-5221.

8.0 Inspection/Mitigation Plans Summary

The following information is provided as a summary of GPC's proposed IGSCC corrective program planned for the Hatch Unit 1 maintenance/refueling outage.

ENCLOSURE 1 (Continued)

1. Georgia Power Company has elected to examine in excess of 50 percent of the IGSCC-sensitive piping and components within the primary pressure boundary which are required by ASME Code, Section XI to be volumetrically examined.

2. Qualification of ultrasonic examination personnel will be in accordance with NRC requirements as defined in draft Revision 2 of NUREG-0313 (as commented on by the BWROG-II and GPC).

3. The 25 existing weld overlays designated for the proposed inspection program will be ultrasonically examined using a high-angle refracted longitudinal-wave technique. This technique is designed to verify the integrity of both the weld overlay and the outer 1/4T of the piping base material.

4. Use of a high-angle refracted longitudinal-wave ultrasonic examination technique has proven to be effective in EPRI NDE Center tests conducted on weld overlays. The results of these tests have indicated that crack-like indications can be reliably detected and sized in the outer 1/4T of the overlaid pipe wall and in the weld overlay itself.

5. In a manner consistent with ASME Code, Section V, or the EPRI NDE Center technique, any new weld overlays applied during the upcoming Hatch Unit 1 maintenance/refueling outage will be ultrasonically examined to verify the integrity of the weld overlay and its bond to the piping base material.

6. In addition to ultrasonic examination, for the 25 existing weld overlays and any new weld overlays applied, a liquid penetrant examination will be conducted on the weld overlay and on 1 inch of base material found on either side of the weld overlay.

7. Flaw evaluation and weld overlay repair, if required, will be performed to criteria consistent with the intent of draft, Revision 2, NUREG-0313 as commented upon by the EPRI/BWR Owners Group for IGSCC Research (BWROG-II) and GPC.

8. Existing Plant Technical Specifications for reactor coolant leakage detection meet the intent of the leak detection and leakage limits specified in draft, Revision 2, NUREG-0313.

9. In addition to the existing reactor coolant leakage detection Technical Specifications, a visual examination for leakage from the reactor coolant piping will be performed during each plant outage in which the primary containment is deinerted.

9.0 References

Letter SL-569, L. T. Gucwa (GPC) to D. Muller (NRC), "Report Clarification and Submittal of Revised Design Report for Class 1 Stainless Steel Piping and Components - 1985 Maintenance/Refueling Outage," May 2, 1986.