



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT, UNIT 1

DOCKET NO. 50-325

RELATED TO THE BULLETIN 82-03 IGSCC INSPECTION FOR UNIT 1

1.0 Introduction and Background

On October 21, 1983 a meeting between all licensees of BWRs and senior NRC management was held in Bethesda. A morning session was held with all utilities and afternoon sessions were held with certain specific utilities, CP&L being one of those utilities. The meeting summary of the afternoon session with CP&L was issued on October 28, 1983. Enclosure 3 of that summary was "Attachment A - Summary of Inspection Results and Schedules for Next Inspection." Brunswick 1 was listed in that enclosure as being "marginal" in regard to "Inspection Quality." As indicated in the meeting summary, there was a discussion regarding the marginal rating given to the Brunswick Unit 1 inspection of January/February 1983. The NRC agreed with the scope of the inspection and the quality of the equipment and procedures, but had reservations with respect to the formal qualifications of the inspectors. A program for the resolution of the marginal inspection rating for Brunswick Unit 1 was to be implemented by CP&L in cooperation with the NRC staff.

In response to these concerns, CP&L submitted a letter dated January 31, 1984 (NLS-84-045). Our review of that letter indicated that it did not respond fully to the meeting conclusions above.

On February 27, 1984 another letter (NLS-84-087) was received from CP&L responding to the staff concerns regarding the October 1983 inspection at Brunswick 1. This letter contained the detailed inspection results. On March 4, 1984 another letter from CP&L (NLS-84-147) provided additional justification for continued operation of Brunswick 1 until November 1984.

2.0 Evaluation

We have reviewed the CP&L submittals regarding the Unit 1 Bulletin 82-03 inspections.

Our review indicates that the licensee met the requirements of IE Bulletin 82-03, however, the NRC considers the ultrasonic examinations performed on the recirculation system piping by Southwest Research Institute (SwRI) during the Unit 1, January 1983, outage to be marginal for the following reasons:

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1. Marginal performance of SwRI Level III Examiners during performance demonstration test conducted at Battelle Memorial in Columbus, Ohio, on October 15, 1982 and October 27, 1982.
2. SwRI Level II Examiners recorded a considerable number of ultrasonic reflectors on the recirculation system piping for Brunswick. However, all the reflectors except for weld IB32-28"-A15 were evaluated as non-relevant.
3. Noise levels due to a highly sensitive ultrasonic test. Joint configuration and marginal weld root conditions were observed ultrasonically. These conditions tend to make relevant indications, near the root, such as IGSCC. Level III Examiners, with the ability to discern cracks better than that demonstrated in item 1, would be needed to ensure a conservative examination was performed.
4. Two recirculation system weld joints were observed leaking. CP&L attributes the causes of these cracks to arc strikes. This is highly unlikely on 304 series stainless steel. During the weld repair preparation process for one of these welds, surface grinding revealed multiple axial cracking adjacent to areas of leakage indicating IGSCC.
5. SwRI rejected one 28" weld joint with ultrasonics.
6. Subsequent ultrasonic examinations in October 1983 were to be performed initially on three shop welds. Region II examiners requested that the licensee change their sample to three field welds because the shop welds may have been solution annealed. Two of the three welds selected by the licensee and NRC revealed large cracks requiring overlay weld repairs. Three additional welds were examined as required by IE Bulletin 83-02 and found satisfactory. However, two of the three were shop welds.

Based on our review, we conclude that Unit 1 inspections performed by SwRI, with personnel representative of the examiners that performed the IE Bulletin 82-03 demonstration test at Battelle Memorial, should be considered marginal and a 20 percent sample should be reexamined. This sample should include welds where many indications were recorded by SwRI and evaluated as non-relevant. In addition, the selection of welds should have a heavy population of field welds.

The NRC has reviewed the Unit 1 examinations performed during the October 1983 mini-outage by examiners individually qualified to IE Bulletin 83-02 and finds them to be satisfactory. These examinations were performed by Lambert, McGill and Thomas (LMT).

Examinations performed on Brunswick Unit 2 piping during the November 1983 outage were performed by General Electric (GE) using approved procedures, equipment, and personnel. GE examiners were qualified individually to IE Bulletin 83-02. The GE Level III Examiners performed well on the performance certification blocks at the EPRI NDE Center in Charlotte, North Carolina.

During the Unit 2 examinations, they demonstrated that they were not reluctant to make costly decisions when they are relatively certain of their technical evaluation. GE rejected 19 welds as having IGSCC during the Unit 2 outage.

Examinations to be performed on Unit 1 during the upcoming November 1984 outage will also be performed by GE. Based on their past performance level, we conclude that the ultrasonic examinations can be performed satisfactorily. Sample selection during the inspection and reinspection is of utmost importance if IGSCC is to be identified. We anticipate that cracks will be identified on welds previously inspected and welds not inspected to date on Unit 1 for the following reasons:

1. IE Bulletin 82-03 performance demonstration tests did not adequately determine an examiners ability to accurately discern cracks. This Bulletin did, however, verify the ability or inability of the inspection procedure and equipment.
2. As a result of IE Bulletin 83-02 and EPRI's certification training, examiners are now individually certified and must be able to discern cracks with minimum overcalls. This has increased the examiner's ability to discern cracks and increased the accuracy of the crack calls throughout the industry.
3. Technological advances in equipment and techniques have made ultrasonic examination much more reliable. Evaluation of ultrasonic indications can also be verified in a number of ways that were not available two years ago.

### 3.0 Conclusion

Based on the above evaluation, we conclude that scheduling the next inspection in November 1984 is acceptable.

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Dated: August 24, 1984