

**Core Shroud
Reinspection Plan**

**Unit 2
B212R1 Outage**

February 1996

Recommended by: W Blane Wilton Date: 10/30/95

Approved by: J. J. [Signature] Date: 11/2/95

**Core Shroud Reinspection Plan
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EXECUTIVE SUMMARY

The scope of reinspection for the Unit 2 core shroud is based on the results of previous inspections performed on both Unit 1 and Unit 2, follow-up actions and commitments established from the last inspection documented in Engineering Evaluation Report 94-0077, guidance on shroud inspections contained in NRC Generic Letter 94-03 and draft 4 of the BWRVIP "Guidelines for Reinspection of BWR Core Shrouds" dated September 15, 1995.

The reinspection scope focuses on three objectives: re-examination of selected areas to determine crack growth, examination of a sample of the installed clamps to verify no inservice degradation, and utilization of specifically developed tooling to examine accessible portions of certain welds that were previously inaccessible. Inspection of the core shroud in Unit 2 during May 1994 was performed prior to the issuance of Generic Letter 94-03. The inspection was also performed utilizing prototype UT tooling under development. Reliability problems arose, and use of the tooling had to be abandoned. The UT equipment commonly used for core shroud inspections will not work on the Brunswick Plant shrouds because of interference from the installed clamps on welds H2 and H3. BNP is developing specialized UT tooling to inspect certain welds. Specifically, UT examinations will be performed on 100% of the accessible areas of weld H1. UT will also be performed on areas not previously inspected on welds H6A, and H6B and H7. Additionally, UT will be repeated at selected areas on weld H4 to assess crack growth during the cycle.

Additional inspections will be performed if measurements indicate that crack growth is greater than anticipated. Predictions from crack growth models (GE PLEDGE) and plant specific data from the Crack Arrest Verification System (CAVS), indicate that little, if any, crack growth is expected. This is consistent with predictions and actual results from Unit 1.

UT inspections will be conducted utilizing pulse echo technology. Equipment and procedures for UT, and for any supplemental VT, will be qualified in accordance with the inspection guidelines of the BWRVIP. The NDE uncertainty will be determined in qualification testing by the inspection vendor. These qualifications will follow the BWRVIP inspection guidelines.

Two of the twelve clamps installed on welds H2 and H3 during the Spring 1994 outage will be VT inspected to insure that no adverse degradation has occurred during the operating cycle. An engineering evaluation of the inspection results will be performed using the flaw evaluation

guidance issued by the BWRVIP in Core Shroud Inspection and Evaluation Guidelines, or other accepted industry criteria.

CP&L is working closely with the BWRVIP to evaluate field information and incorporate "lessons learned" into the inspection program. Inspection of core shroud support legs, and other vessel attachments and internals, will be performed consistent with the guidance provided by the BWRVIP in the future.

UNIT 2 CORE SHROUD INSPECTION PLAN

The scope of this inspection plan along with previous inspections meets the intent of requested licensee action item 3 of Generic Letter 94-03. This action item requires an inspection plan for all shroud welds or justification for not inspecting certain welds, and requires use of technology and industry experience to perform inspections that will consistently detect IGSCC.

The inspection plan scope has been developed from Generic Letter 94-03, the proposed BWRVIP "Guidelines for Reinspection of Core Shroud Welds" and from knowledge gained from the previous inspections of BNP Units 1 and 2. The inspection plan for the core shroud focuses on application of improved inspection techniques for welds where internal surfaces were not accessible, and on reinspection of certain areas to determine crack growth rates. UT inspection tooling commonly used in the industry will not perform adequately on the BNP core shrouds due to interference from the clamps installed on the H2 and H3 welds. BNP is developing specialized tooling to inspect the welds that cannot be inspected with conventional tooling.

Weld H1 was VT inspected at selected outside surface locations in 1994. UT will be performed during the B212R1 outage on 100% of the accessible areas of weld H1 and its associated fillet weld. Weld H1 is a ring weld with "end grain" exposure and significant cold work. Welds H2 and H3 will not be inspected since their structural function was replaced by clamps in 1994.

Weld H4 will be reinspected in two places to determine crack growth rates. Weld H5 is not scheduled for reinspection, since relatively little cracking was found during the previous inspection, and since conditions at weld H4 (weld geometry, ECP, fluence, etc.) closely approximate those at H5.

The accessible outside areas of welds H6A, H6B and H7 were VT inspected in 1994. Inspection of welds H6A and H6B and their associated fillet welds will be supplemented by UT inspection at six locations between jet pump pairs. Access is limited to these six areas due to the proximity of the jet pump sensing lines. All accessible areas of weld H7 will be UT inspected.

Weld H8 and the shroud support legs below the core plate will not be inspected this outage because equipment and techniques are still being developed for these inspections. These areas will be inspected consistent with guidance provided by the BWRVIP in the future.

Although weld H9 is not currently required to be inspected by the BWRVIP guidelines, data may be available for the H9 weld due to its proximity to a weld that is included in the vessel beltline inspection program.

Two of the twelve repair clamps will be VT inspected to assure no degradation has occurred during the last cycle of operation.

Details of the scope of inspection for each weld and for the clamps are provided in Table 1.

INSPECTION SCOPE EXPANSION

Based on the results of the Brunswick Plant Unit 2 Core Shroud Reinspection Plan, additional inspections of the core shroud (including repair clamps) will be performed, if required to demonstrate core shroud integrity. CP&L will address any scope expansion in our submittal of the inspection results to the NRC Staff. No such expansion is anticipated, based on the operational history during the last cycle, and the results from Unit 1.

EVALUATION

An engineering evaluation of the results of the inspection will be performed, using the flaw evaluation guidance issued by the BWRVIP in the Core Shroud Inspection and Evaluation Guidelines, or other accepted industry criteria. CP&L will submit the inspection results in accordance with the guidance of NRC Generic Letter 94-03.

TABLE 1

Unit 2 Outage - Core Shroud Reinspection

WELD	REINSPECTION METHOD*	COMMENTS
H1	UT	100% of accessible areas.
H2	N/A	None. (Weld is structurally replaced by installed clamps).
H3	N/A	None. (Weld is structurally replaced by installed clamps).
H4	UT	Two locations to assess crack growth (100% of accessible areas were inspected during the B211R1 Outage).
H5	None planned	Conditions at weld H4 (weld geometry, ECP, fluence, etc.) closely approximate weld H5.
H6A	UT	Six (6) areas between jet pump pairs.
H6B	UT	Six (6) areas between jet pump pairs.
H7	UT	100% of accessible areas between jet pump pairs.
H8	None planned	BWRVIP developing inspection tools/techniques.
H9	UT	Data may be available as a by-product of the vessel beltline inspection program. (from OD as part of vessel beltline inspection)
Shroud support legs	None planned	BWRVIP developing inspection tools/techniques.
Two Clamps	VT	VT-3 clamps & hardware for general appearance and missing parts. VT-1 integrity of tack welds.

* NDE methods to be qualified in accordance with "BWRVIP Reactor Pressure Vessel and Internals Examination Guidelines" issued by the BWRVIP.

ENCLOSURE 2

BRUNSWICK STEAM ELECTRIC PLANT, UNIT NO. 2
NRC DOCKET NO. 50-324
OPERATING LICENSE NO. DPR-62
SUBMITTAL OF UNIT 2 CORE SHROUD REINSPECTION PLANS

LIST OF REGULATORY COMMITMENTS

The following table identifies those actions committed to by Carolina Power & Light Company in this document. Any other actions discussed in the submittal represent intended or planned actions by Carolina Power & Light Company. They are described to the NRC for the NRC's information and are not regulatory commitments. Please notify the Manager-Regulatory Affairs at the Brunswick Nuclear Plant of any questions regarding this document or any associated regulatory commitments.

Commitment	Committed date or outage
1. Submit the B212R1 core shroud reinspection results.	30 days after completion of inspections