



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 REGION II  
 101 MARIETTA STREET, N.W.  
 ATLANTA, GEORGIA 30323

Report No.: 50-261/87-07

Licensee: Carolina Power and Light Company  
 P. O. Box 1551  
 Raleigh, NC 27602

Docket No.: 50-261

License No.: DPR-23

Facility Name: H. B. Robinson

Inspection Conducted: April 6-9 and 20-24, 1987

Inspector: J. L. Coley

6/8/87  
 Date Signed

Approved by: J. J. Blake  
 J. J. Blake, Section Chief  
 Engineering Branch  
 Division of Reactor Safety

6/8/87  
 Date Signed

SUMMARY

Scope: This routine, unannounced inspection was in the areas of licensee actions on previous open matters (92701B), inservice inspection (ISI) - review of program (73051), review of procedures (73052), observation of work activities (73753) and review of recorded data and evaluations (73755).

Results: One violation was identified - ISO Drawing Discrepancy - paragraph 6.c.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. M. Corley, Acting General Manager
- \*\*\*A. R. Wallace, Manager, Technical Support
- \*\*\*E. M. Harris, Director, Onsite Nuclear Safety
- \*\*\*H. J. Young, Director, Quality Assurance/Quality Control (QA/QC)
- \*D. A. Sayre, Acting Director, Regulatory Compliance
- \*\*\*S. W. Farmer, Performance Engineer
- \*\*S. A. Griggs, Regulatory Compliance

Other licensee employees contacted included construction craftsmen, engineers, technicians, and office personnel.

#### Other Organizations

- J. Hancock, Authorized Nuclear Inspector, Kemper Group
- J. Campbell, ISI Coordinator, Westinghouse
- B. Hughes, ISI Supervisor, Westinghouse
- R. Muth, Project Engineer, Westinghouse

#### NRC Resident Inspectors

- \*\*\*H. Krug, Senior Resident Inspector
- \*\*\*R. Latta, Resident Inspector

- \*Attended exit interview on April 9, 1987
- \*\*Attended exit interview on April 24, 1987
- \*\*\*Attended exit interview on April 9, 1987 and April 24, 1987

### 2. Exit Interview

The inspection scope and findings were summarized on April 9 and 24, 1987, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

(Open) Violation 50-261/87-07-01, ISO Drawing Discrepancy - paragraph 6.c.

On May 6, 1987, CP&L's Manager of Technical Support notified Region II by telecon that a notation had been found in the Authorized Nuclear Inspector log (Kemper Group Insurance Company) dated August 6, 1984, which indicated that the licensee was aware of the drawing error reported in the violation above, in 1984. The licensee also had requested and received approval from the Authorized Nuclear Inspector to apply the calibration

block thickness tolerance of 1/4 inch which was approved in Code Case N-98 for a basic calibration block shown in figure T-533(2) of Article 5, of Section V, to the 1974 Edition of the ASME Code. The block depicted in figure T-533(2) to the 1974 Edition of the ASME Code has side drill hole reflectors in lieu of the less sensitive OD/ID notch reflectors currently required by the ASME Code and CP&L's special procedure for the examination of piping. The purpose of the telecon notification by the licensee was to determine if this additional information would reduce the inspector's above violation to an unresolved item. The inspector informed the licensee that the item would remain a violation for the following reasons:

- The licensee had discovered the drawing was in error in 1984 but had not revised the drawing to reflect actual plant conditions.
- Special Procedure SP-681 and the ASME Code require that notched calibration blocks be the same nominal thickness and diameter of the pipe being examined. Code case N-98 does not apply for calibration blocks with notches.
- The Authorized Nuclear Inspector (ANI) does not have the authority to allow calibration block tolerances to a less sensitive calibration block. If the licensee had requested to use the side drill hole block in lieu of the notch block the examination would have been an enhanced examination and the ANI could have approved the use of the side drill hole block in accordance with Section V and Section XI of the ASME Code. Relief to ASME Code requirements can only be approved by the NRC in accordance with 10 CFR 50.552(a)(3).
- The licensee's UT procedure does not require thickness readings or profiles be taken of the examination area. When calibration blocks have been manufactured to drawing requirements that are incorrect the UT examiner could mis-interpret the reflectors and classify valid indications as non-valid indications. In addition, if the calibration standard is thinner than the pipe examined as in the situation reported by the inspectors, the examination area scanned may be inadequate.

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

### 3. Licensee Action on Previous Enforcement Matters

This subject was not addressed in the inspection.

### 4. Unresolved Items

Unresolved items were not identified during this inspection.

## 5. Independent Inspection Effort

The inspector conducted a general inspection of the reactor containment building and the auxiliary building to observe construction progress and construction activities such as welding, material handling and control, housekeeping and storage.

Within the areas examined, no violations or deviations were identified.

## 6. Inservice Inspection (ISI)

The inspector reviewed CP&L's program for ISI, reviewed vendor examination procedures, observed ISI work activities, conducted a "hands on" audit of examiner techniques using Region II equipment and reviewed record data and evaluations from CP&L's spring 1986 outage to determine if the present outage plan was incorporating followup examinations of reported indications. Unit 2 commenced commercial operation on March 4, 1971, and is presently in the second 40 month period of the second ten year ISI interval March 7, 1981 to February 19, 1992, as permitted by ASME Section XI subsection IWA-2400(c) due to the 349 day duration of the steam generator replacement outage. The applicable code for this 10 year interval is the ASME, Boiler and Pressure Vessel Code, Section XI (77S78). The ISI activities are being performed this outage by Westinghouse and the authorized nuclear inspector services are provided by Kemper Group.

### a. Review of Program (73051)

CP&L's ISI Program was reviewed in part, in Region II, Inspection Report No. 261/87-03. The extent of the inspector's review this inspection was focused on CP&L's ISI program, interfacing procedures and the 10 year plan.

The inspector reviewed the ISI program and referenced documents to ascertain whether adequate QA plans and procedures have been established (written, reviewed, approved and issued) to assure the ISI program is complete and in conformance with regulatory requirements and licensee commitments.

The following documents were reviewed:

CP&L - "Second Ten Year Inservice Inspection Plan"

CP&L - PLP-025, Rev. 0, "Inservice Inspection Program"

CP&L - PLP-030 Rev. 0, "Independent Verification"

CP&L - PLP-032 Rev. 0, "Nuclear Safety Reviewer Qualification Program"

CP&L - PLP-1024 Rev. 2, "Surveillance Test Procedure"

CP&L - AP-004 Rev. 18, "Development, Review and Approval of Procedures, Revisions and Temporary Changes"

CP&L - AP-001 Rev. 3, "Plant Organization and Responsibilities"

CP&L - AP-006 Rev. 0, "Procedure Adherence"

CP&L - AP-014 Rev. 0, "Safe Handling and Storage of Chemicals"

CP&L - AP-030, Rev. 3, "NRC Reporting Requirements"

CP&L - PLP-024 Rev. 11, "Technical Specification Surveillance Program"

CP&L - TMM-004 Rev. 12, "Inservice Inspection Testing"

CP&L - TMM-015 Rev. 4, "Inservice Inspection Repair and Replacement Program"

CP&L - OQA-101 Rev. 0, "Preparation, Review and Approval of OQA Procedures"

CP&L - OQA-103 Rev. 0, "Personnel Indoctrination Training, Qualification and Certification"

CP&L - OQA-201 Rev. 0, "Surveillance Program"

CP&L - OQA-202 Rev. 0, "Document Review"

CP&L - OQA-306 Rev. 0, "Stop Work Authority"

CP&L - OQA-310 Rev. 0, "Calibration of QA/QC Inspection and Examination Equipment"

CP&L - OQA-501 Rev. 0, "Quality Assurance Engineering Document Review"

With regard to the inspection above, the inspector noted the following:

- (1) The ISI program provides no guidance other than the assignment of responsibility for the preparation of plans and schedules and filing the same with appropriate regulatory authorities. (This comment was also noted in Region II Inspection Report 261/87-03).
- (2) The "Second Ten Year Inservice Inspection Plan" is a ledger of components and ISO drawings for the components. It provides no specific guidance as to applicable calibration blocks augmented inspections, relief requests or interfacing procedures, etc. CP&L, however, is in the process of updating the 10 year plan into

a computer base document. During the week of April 20-24 the inspector observed that the outage plan had been retrieved from the computer. This plan listed the components by category and item number, gave the calibration block number, drawing number applicable to each item and had picked up items that were being monitored for re-examination because of previously reported indications. The computer read-out for this outage was a significant program improvement and an indicator that CP&L is making progress in updating their second ten year inservice inspection plan.

During the April 9, 1987, exit meeting the ISI performance engineer committed to review the ISI program and ten year plan and to upgrade these documents to address the inspector's programmatic concerns.

b. Review Of Examination Procedures (73052)

The inspector reviewed the licensee's ultrasonic examination and recording procedures listed below to determine whether the procedures adequately covered all required aspects of the approved ISI program and contained sufficient technical content to adequately examine the welds required to be examined by the Code of Federal Regulations 10 CFR 50, Chapter 50.55a(g)(4). The following procedures were examined:

<u>Procedure</u>	<u>Title</u>
CP&L Special Procedure SP-681 Rev. 0	Manual Ultrasonic Examination of Welds (Westinghouse No. ISI- 206 Rev. 1)
CP&L Special Procedure SP-684 Rev. 0	Manual Ultrasonic Examination of Welds in Vessels (Westinghouse No. ISI-47 Rev. 4)
CP&L Special Procedure SP-679 Rev. 0	Preservice and Inservice Inspection Documentation (Westinghouse No. OPS-NSD-101 Rev. 5)

With regard to the above review of CP&L Special Procedure SP-681 which is applicable to piping systems (.25 inch to 6 inch thick) and vessel materials (.25 inch to 2 inch thick) in ferritic or austenitic steels of either wrought or cast product forms, the inspector had the following editorial and technical comments:

- (1) Paragraph 2.8.1 states that, calibration blocks shall be fabricated from the same material specification as one of the materials in the weld assembly to be examined. Alternatively, for welds in austenitic materials, material of equivalent P-number or P-number grouping may be used.

Inspector's Concern: There is no material ultrasonically equivalent to P-8 (austenitic) materials. This P-number material is always handled as a unique material in the ASME Code.

- (2) Included in "Interpretation and Investigation," is paragraph 6.1.1 that states,

"valid indications are reflectors caused by flaws, such as cracks, lack of penetration or fusion, inclusions and porosity. All other indications are considered non-valid, including those due to: scanning noise, grain structure, beam redirection, internal liquid levels, clad interface, straight beam back surface and geometric reflectors."

paragraph 6.3 states,

"Other transducers, search units, frequencies, techniques, etc., may be used to aid interpretation and investigation."

Inspector's Concern: The licensee's procedure requirements are weak for determining whether an indication is non-valid in piping. The procedure indicates that the examiner makes the determination without verifying his analysis of the reflector by reviewing the fabrication drawing or radiographs of the weld. This weakness in evaluation to classify reflectors is further complicated by the inherent technical weakness noted in this procedure. For instance, ID profiles or thickness readings are not taken with this procedure to accurately identify where counterbores are located or whether the material varies in nominal thickness as to effect the plotting of indications. The procedure does not require checking the angle of the transducer in a material similar to that being examined. This also will increase the error in interpretation. The ASME Code requirements for classifying a reflector as geometrical in piping are as follows:

"(a) Ultrasonic indications that can be identified as reflectors due to piping surface configuration (such as weld root geometry) or variations in metallurgical structure of materials at interfaces (such as weld-to-base metal interface) may be classified as geometric reflectors. Such reflectors need not be characterized as indications or compared with the allowable indication standards of IWB-3514.2 and IWB-3514.3. The presence of a geometric reflector shall be noted for the record.

(b) To qualify an ultrasonic indication as a geometric reflector, the following requirements shall be met.

(1) The area containing the geometric reflector shall be examined and interpreted in accordance with Appendix III.

(2) The presence of geometric reflectors shall be confirmed either by review of the fabrication drawings of the pipe weld edge preparation, the nondestructive examination records, or supplemental examination results.

(3) Supplemental examination methods shall be used, if necessary, to confirm the presence of geometric reflectors."

The code notation of "shall be" in nearly every sentence above indicates the importance the code attaches to this evaluation process.

- (3) Included in "Recording of Indications" is paragraph 7.4 that states, "Non-valid indications, and the absence of valid indications shall be considered as, no indications and noted as NI."

Inspector's Concern: As noted in (2a) above, the code requires that geometric reflectors in piping shall be noted for the record. CP&L's procedure invokes this requirement by referring the examiner to Special Procedure SP-679 for recording examination results. The two procedures appeared to have contradictory requirements. CP&L's Spring 1986 outage summary reports were reviewed by the inspector to determine how the ultrasonic examiners implemented the requirements. The inspector found that four welds were noted to have geometry. All four of the welds were examined using either a 41°, 13° or 27° transducer. Welds that require transducers with these angles are unique and geometrical indication are common place. However, during the 1986 outage numerous dissimilar metal welds and pipe to fittings were examined and no interface signal, counterbore or root configuration reflectors were documented.

CP&L's performance engineer for ISI agreed that the procedure should be enhanced in the areas discussed above, so that examiners would not be confused as to the intent of the requirements. The engineer committed to have the procedure revised by the next refueling outage. The inspector will review the revised procedure at that time.

## c. Observation of Work and Work Activities (73753)

The inspector observed Westinghouse examiners during examination of two pressure vessel welds. The welds and the procedures used are delineated below:

<u>Weld ID</u>	<u>Component</u>	<u>Procedure</u>
CSW-4	Steam Generator B	CP&L Special Procedure SP-648
VCSW-A-1	Pulsation Damp Vessel	CP&L Special Procedure SP-681

During the calibration of weld CSW-4 CP&L's surveillance examiner inquired of an Westinghouse examiner if he was going to check the beam angle of the transducer since he had not observed the normal calibration function. The Westinghouse examiner stated that the angle was checked when the transducer was manufactured. The CP&L examiner reminded the Westinghouse examiner that transducers that are used on large pressure vessels wear and the angle changes increasing his chance of error in plotting indications or determining if an indication is valid or non-valid. During the calibration for the pulsation damp vessel, which is an austenitic steel the Westinghouse examiners had a IIW block on the job to check the transducer beam angle. The inspector noted, however, that the IIW block they were using was not an austenitic steel (stainless steel) block. Transducer beam angle can vary significantly between these two materials. The inspector later found out that CP&L did not have a stainless steel IIW block or a stainless steel rompas block on site. As a result, the inspector loaned the examiners one of the Region II stainless steel rompas blocks to verify their transducer angle. The check revealed the beam angle to be satisfactory.

The inspector observed the examination of the above welds to determine whether approved procedures were available and being followed. Examination personnel were knowledgeable of the examination method and the test equipment; examination personnel with the proper level of qualifications and certifications were performing the various examination activities; and examination results were being recorded as specified in the ISI program and nondestructive examination procedures.

In addition to observing the work activities of the Westinghouse ultrasonic examiners, the inspector also examined their work by "hands on" re-examination. The ultrasonic examinations were performed by the inspector using Region II equipment. The objective was to determine if good techniques had been used in order to identify and record reflectors within the inspection zone on stainless steel piping. The welds examined and the problems encountered are delineated below.

<u>Weld ID</u>	<u>Diameter of Pipe</u>	<u>Configuration</u>
CPW-219-188	8 Inch	Pipe To Reducer
CPW-219-187	10 Inch	Reducer To Fitting

The inspector's re-examination of the 8" piping weld, CPW-219-188, revealed that the Westinghouse examination of this weld was not acceptable for the following reasons:

- (1) Drawing notes on CPL-219 ISO indicated that the stainless steel pipe was 8" diameter schedule 120. Thickness readings taken by the inspector prior to performing his examination indicated that the pipe was schedule 160. This is a difference in thickness of nearly 1/4". CP&L's examination procedure SP-681 and the ASME Code require that piping calibration blocks that contain notch reflectors shall be of the same nominal diameter and nominal wall thickness as the item to be examined.
- (2) CP&L does not require thickness readings or ID profiles be taken on weld joints. This has never been a requirement and CP&L does not have an ultrasonic base line of "as-built" conditions for the Robinson Unit 2 plant. In addition to this inspector's findings, NRC Followup Item 261/84-48-03 "Stress ISOs weld location", identifies a similar drawing discrepancy.
- (3) The calibration block used by the Westinghouse examiners was not in accordance with CP&L's Special Procedure SP-681 and CP&L does not have a calibration block to use on welds for this size piping.
- (4) When welds are examined using an incorrect size calibration block and thickness readings are not taken, as in this particular situation, ID/OD positions on the examiner's ultrasonic instrument are incorrect; consequently, the inspection coverage may be inadequate and evaluations may be incorrect as to whether an indication is classified as a valid or invalid indication.

In summary, the findings identified above indicate drawings are incorrect, inspection techniques are poor, weld coverage may be inadequate and evaluations may be incorrect. The ASME Code recognizes the inherent difficulty of examining austenitic stainless steel and recommends that enhanced procedures and techniques be used for this material. This position is further amplified in ASME Code Case N-335 where nearly every examination parameter has been tightened to insure that plotting and classification of indications will be accurate. The inspector reported the above finding to the licensee as a violation of 10 CFR 50, Appendix B, Criterion V, and identified the item as violation 261/87-07-01, ISO Drawing Discrepancy."

The inspector also held discussions with CP&L's Performance Engineer for ISI activities. Procedure weakness, drawing discrepancy and technique weakness were discussed in detail. The engineer committed to the following corrective actions:

- (a) Thickness reading will be taken
- (b) Drawings will be reviewed for accuracy of requirements
- (c) An 8" schedule 160 calibration block will be procured
- (d) Procedure requirements for classifying geometrical reflectors will be enhanced
- (e) Transducer beam angles will be checked in stainless steel
- (f) Weld CPW-219-188 will be re-examined next outage

d. Data Review and Evaluation (73755)

The inspector reviewed examination records in the licensee's summary report for the spring outage of 1986 to ascertain whether the licensee's disposition of adverse findings and subsequent re-examination was consistent with regulatory requirements. The following weld examination records were:

<u>Weld Identification</u>	<u>Inspection Method</u>	<u>Method of Acceptance</u>
CPL-107-A Weld 4	Surface Examination	IWB-3514.3(a)
CPL-118-A Weld 5	Surface Examination	IWB-3514.3(b) accepted with UT, weld scheduled to be monitored this outage
460-A&B		
LCV-460-A&B	Visual Examination	Indication was removed
CPL-118-A Weld 6	Surface Examination	IWB-3514.3(b) accepted with UT, weld sched- uled to be monitored this outage
CPL-118-A Weld	Surface Examination	IWB-3514.3(2)

The inspectors reviewed the licensee's disposition for each of the reportable indications observed in the above welds. The present outage plan was also reviewed to insure that examination followup was scheduled where required.

Within the areas examined, no violation or deviation was identified except as noted in paragraph 6.c above.

7. Inspector Followup Items (92701)

(Closed) 50-261/87-03-01, RHR, HX, Surface Examination Relief Request. In CP&L Letter NSL-84-167, the licensee requested relief from the volumetric and surface examination requirements of IWC-2500 for the nozzle to vessel welds on the residual heat removal (RHR) heat exchangers. The basis of the request for relief is as follow: The nozzle-to-vessel welds of the RHR heat exchangers are covered by a reinforcement ring and are not accessible for examination as required by IWC-2500. The geometric configuration such that alternative NDE methods cannot be substituted. The reinforcement ring covering the RHR heat exchanger nozzle-to-vessel weld contain "Tell-Tale" holes such that visual examination can be performed for evidence of leakage for evidence of leakage. The NRC Office of Nuclear Reactor Regulation (NRR), Division of Licensing, Operating Reactors Branch #1 in their letter dated January 11, 1985, concluded: "Relief should be granted from performing volumetric examination of two nozzle-to-vessel welds among the RHR heat exchangers for each unit, provided that:

- a. Surface examination is performed on the reinforcement ring welds that make the nozzle-to-vessel welds inaccessible.
- b. Visual examination of the welds for leakage is performed during periodic hydrostatic testing in accordance with IWC-5000.

The NRC letter of January 11, 1985, was silent on the subject of relief from the surface examination requirements of IWC-2500 for the nozzle-to-vessel welds. On April 7, 1987, CP&L's Nuclear Licensing personnel contacted the NRC Project Manager concerning this relief request. The Project Manager affirmed that CP&L's relief request was granted as requested. This item is considered closed.

Within the areas examined, no violation or deviation was observed.