



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323

Report Nos.: 50-280/87-15 and 50-281/87-15

Licensee: Virginia Electric and Power Company
Richmond, VA 23261

Docket Nos.: 50-280 and 50-281

License Nos.: DPR-32 and DPR-37

Facility Name: Surry 1 and 2

Inspection Conducted: May 18-22, 1987

Inspector: R. W. Newsome
R. W. Newsome

6-23-87
Date Signed

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

6/23/87
Date Signed

SUMMARY

Scope: This routine, announced inspection was in the areas of Nondestructive Examination (NDE) of Units 1 & 2 main feedwater piping replacement welds; Unit 1, loop A, isolation valve stem fracture; augmented NDE of selected Unit 2 recirculation spray system pipe wall and welds for growth of identified degradation; and licensee action on previously opened enforcement items.

Results: No violations or deviations were identified.

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *E. S. Grecheck, Assistant Manager
- *H. L. Miller, Assistant Manager
- *D. L. Benson, Assistant Manager, Virginia Power
- *R. H. Blount, Superintendent, Technical Services
- *W. D. Grady, Supervisor Quality, Nondestructive Examination

Other licensee employees contacted included construction craftsmen, engineers, technicians, mechanics, security force members, and office personnel.

NRC Resident Inspectors

- *W. E. Holland, Senior Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 22, 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.

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, Units 1 and 2

- a. (Closed) Violation 50-280, 281/86-34-01, Failure to Provide Appropriate ISI Drawings. This item identified incorrectly revised pressurizer inservice inspection (ISI) drawings which shows the circumferential lower head to shell weld as being located three inches above the support skirt instead of at the correct location, 27 inches above the support skirt. As a result of the incorrect location of the circumferential weld, ultrasonic inspection of the correct weld was not accomplished as required. The licensee has now examined the weld as required and has issued a new revision to the pressurizer drawings which correctly locate the weld position. The licensee has initiated an ongoing program to review and upgrade isometric drawings for use in the ISI program. This matter is considered closed.

- b. (Closed) Violation 50-280, 281/84-05-02, Inadequate Corrective Action Measures. This item identified a situation where the licensee did not obtain and utilize the services of an ASME Authorized Inspection Agency in a timely manner relative to inservice inspection (ISI) ultrasonic examination procedure deficiencies that were identified and questioned by the Authorized Inspection Agency Inspection Specialist. The licensee has implemented a Corporate ISI Manual which provides more detailed administrative controls over all aspects of the ISI program and includes a new procedure 10-ISI-001 titled: Identification, Correction and Documentation of Corrective Actions. The inspector has reviewed this procedure and considers this matter closed.
- c. (Closed) Unresolved Item 50-281/84-05-04, Boric Acid Return Piping Stress Corrosion Cracking. All potentially affected piping has been replaced. This item is considered closed.

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Independent Inspection Effort

On May 16, 1987, Unit 1 reactor was tripped from approximately 100% power. The trip was determined to be caused by restricted coolant flow through the loop A hot leg, reactor coolant loop isolation valve, MOV-1590. The cause of the flow restriction through the isolation valve was not immediately known. The valve is a 34" X 30" X 34" No. S350W DD series 1500 venturi gate valve with an SB-4 Limitorque motor operator. The valve was fabricated by Darling Valve & Manufacturing Co.

Following shutdown of the reactor, the licensee made the decision to remove the valve bonnet in order to expose the internal portions of the valve so that positive identification of the flow restriction could be determined. Following removal of the bonnet and exposure of the internals of the valve, it was evident that the valve stem had fractured at a point where the valve stem backseat sealing surface begins to flare out from the main stem surface. The separation allowed the valve disc to drop and lodge on the valve seat area in a partially closed position, thereby causing flow restriction through the valve. The valve stem is 17-4PH stainless steel material and is approximately four inches in diameter at the fracture location.

Discussions with knowledgeable licensee personnel following the visual observation of the fracture, indicated that this fracture was very similar to the fracture of the Unit 1 loop B isolation valve stem that occurred in November 1973 (See Westinghouse Electric Corp. Surry Unit No. 1 Reactor Coolant Loop Isolation Valve Stem Failure Report, ME-HE-12985, of March 7, 1974, for additional information). The licensee intends to have portions of the failed stem subjected to structural and metallurgical analysis to

determine the cause of the failure. In addition, the licensee intends to have the remaining isolation valve stems ultrasonically examined to determine if any of the remaining valve stems appear to have similar problems. Upon conclusion of this inspection, neither the analysis or the ultrasonic examinations had taken place. The NRC intends to review the findings of the analysis and the ultrasonic examinations in the future.

No violations or deviations were identified within the area inspected.

6. Main Feedwater Pipe Replacement, Units 1 and 2

- a. The inspector reviewed radiographs of circumferential welds in the Unit 2 Main Feedwater Suction and Unit 1 Main Feedwater Discharge piping systems. These welds were produced as a result of the pipe replacement of portions of these systems. The welds were radiographed by a contractor for the licensee and the radiographs were originally interpreted by the contractor. Certain portions of the welds reviewed were originally rejectable as interpreted by the contractor. The licensee's qualified radiographic film interpreter subsequently re-evaluated the indications shown on the radiographs and accepted them using the applicable acceptance criteria. Sometime later, three of the areas accepted by the licensee's interpreter were questioned as to why the rejected areas were later accepted. This inspector reviewed the questioned radiographs and felt they were acceptable under the applicable acceptance criteria. However, in one instance on view 0-1, drawing E101 WFPD-1-901, weld W-18; the inspector felt that one indication could not be adequately evaluated on the radiograph submitted. The licensee had the area re-radiographed with the radiation source positioned directly over the area in question. The resulting radiograph revealed a broken slag line that would be acceptable under the acceptance criteria applied to this weld.
- b. The below listed radiographic film were reviewed to determine if radiographic quality was in accordance with applicable Code requirements and to specifically verify the following: penetrometer type, size, and placement; penetrometer sensitivity; film density and density variation; film identification; film quality; and weld coverage. Also, the inspector reviewed the examination records for the listed welds to determine compliance with procedure requirements for examination records and to determine if disposition of the welds radiographed was in compliance with applicable Code and specification requirements. The applicable code is ANSI B31.1.

<u>Unit</u>	<u>Drawing No./Weld No.</u>	<u>Description</u>	<u>Film Reviewed</u>
2	E202 WCPD-128-301 W-6	CS .5" thick, 18" dia.	0-1
2	E202 WCPD-128-301 W-6	CS .5" thick, 18" dia.	2-3
1	E101 WFPD-1.901 W-18	CS 1.156" thick, 18" dia.	0-1

<u>Unit</u> (Continued)	<u>Drawing No./Weld No.</u>	<u>Description</u>	<u>Film Reviewed</u>
1	E101 WFPD-1.901 W-18	CS 1.156" thick, 18" dia.	2-3
2	E200 WCPD-128.301 W-2	CS .5" thick, 18" dia.	4-0
2	E200 WCPD-128.301 W-2	CS .5" thick, 18" dia.	3-4

- c. The inspector reviewed the qualification documentation for both the contractor and licensee personnel radiographic film interpreters in the following areas: employer's name; person certified; activity qualified to perform; effective period of certification; signature of employer's designated representatives; basis used for certification; and annual visual acuity, color vision examination and periodic recertification.
- d. The inspector reviewed the calibration documentation for the below listed radiographic film interpretation equipment.
- Densitometer - Serial No. 2473A
 - NBS Film Strip - Serial No. CSY-129666
 - Radiographic Film Viewer - Serial No. RT-1
- e. The inspector reviewed the magnetic practical examination data for all welds reviewed. The results indicated that no indications had been detected with this examination. The inspector also performed a visual examination on the outside surface of weld W-18, drawing E101 WFPD-1-901, prior to the re-radiography of area 0-1. The visual examination did not reveal any deficiencies.

No violations or deviations were identified within the areas inspected.

7. Recirculation Spray System Unit 2

- a. During the latter part of 1986, leakage was identified on 10"-RS-109-153, ASME Class 2 piping, near a welded expansion joint inside containment at the penetration area. The expansion joint is located between welds 17 and 18 as shown on drawing VIR-1-4656 Rev. 1. The expansion joint was removed to evaluate the leakage and upon removal evidence of pitting was found within the local expansion joint region as well as the associated piping connected to the welds. This was confirmed by a random liquid penetrant examination of the area. Exploratory grinding determined that the pits expanded in the base metal, characteristic of a microbic enhanced corrosion phenomena. These pits were mechanically sized indicating depths ranging from .003" to .170". The pipe is stainless steel Sch. 40 with a nominal wall thickness of .365". Residual water remaining within the system is considered to be the source of the infestation and it was apparent that the residual water existed beyond this local region. A volumetric, radiographic examination (RT), program was initiated to determine the extent of the corrosion. The RT examinations identified crack-like indications in three of the nineteen welds radiographed. The crack-like indications were located in welds 15 and 18 as shown on drawing

VIR-1-4656 and weld 8 shown on drawing VIR-1-4658. These three welds also had extensive pitting and two other welds, #16 drawing VIR-1-4656 and #21 drawing VIR-1-4658, indicated pitting. RT examinations at low points next to the heat exchangers had no reportable indications. Additionally, the expansion joint between welds 16 and 17 on drawing VIR-1-4657 was removed to allow visual examination of the area. The visual examination found similar but less severe conditions than those found at the expansion joint shown on drawing VIR-1-4656.

The licensee intends to replace the affected piping during the next refueling outage. In the interim, the licensee has established a monitoring program and has modified procedures to insure water drainage from the affected area. The extent of this program is as follows:

- (1) Modified Procedure PT 17.3 to insure water drainage on the pump discharge piping following testing.
- (2) Perform a quarterly RT examination of weld 8 (VIR 1-4658).
- (3) During the next outage (refueling) perform RT examinations (random) on welds downstream of the check valves (2-RS-17, 2-RS-11) to confirm original integrity still exists.
- (4) Continue pipe walk-downs during PT 17.3 for evidence of leakage.

b. The current status of the welds exhibiting crack like indications is as follows:

- Weld #18 (VIR-1-4656) replaced with new weld.
- Weld #15 (VIR-1-4656) remains in system.
- Weld #8 (VIR-1-4658) remain in system - monitored quarterly for possible growth.

NOTE: Weld #8 has been radiographed three times including the original radiograph. The crack like indications being monitored do not appear to have grown during the last two quarters.

c. The inspector reviewed the below listed radiographs relative to the recirculation spray system to determine the adequacy and extent of the radiographic examinations.

<u>Line No.</u>	<u>Weld No.</u>	<u>View</u>	<u>Findings</u>
RS-109	17B	0-1	Sat. new weld
		1-2	Sat. new weld
		2-3	Sat. new weld
		3-0	Sat. new weld

<u>Line No.</u> (Continued)	<u>Weld No.</u>	<u>View</u>	<u>Findings</u>
RS-109	5	0-1	Sat.
		1-2	Sat.
		2-3	Sat.
		3-0	Sat.
RS-109	15	0-1	base metal pitting
		1-2	axial & circ. cracks - base metal pitting
		2-3	axial cracks
		3-0	base metal pitting
RS-109	16	0-1	Sat.
		1-2	weld pitting
		2-3	pitting in weld and base metal
		3-0	Sat.
RS-110	14	0-1	Sat.
		1-2	Sat.
		2-3	Sat.
		3-0	Sat.
RS-110	21	0-1	Sat.
		1-2	base metal pitting
		2-3	base metal pitting
		3-0	possible shallow base metal pitting
RS-109	8	0-1*	shallow pitting
		1-2*	axial & circ. crack - base metal pitting
		2-3*	base metal pitting
		3-0*	Sat.
RS-109	8	1-2	axial & circ. crack - base metal pitting (RT'd 2-24-87 - no crack growth)
RS-109	8	1-2	axial & circ. crack - base metal pitting (RT'd 5-21-87 - no apparent crack growth)

*Original radiograph

No violations or deviations were identified within the areas inspected.

8. Inspector Followup Items (IFI) Units 1 and 2

- a. (Closed) IFI 50-280, 281/83-22-01, Clarification of ISI Administrative Procedures. This item identified weaknesses in the licensee's administrative procedures for control of ISI activities. The licensee has issued several additional and revised station administrative procedures to more clearly define the organization, responsibilities, and conduct of operations for the ISI program at Surry. The inspector reviewed the below listed procedures and has no further questions regarding this matter.

<u>Procedure No.</u>	<u>Revision</u>	<u>Title</u>
SUADM-M-23	7-5-86	Disposition of ASME Section XI Inspection and Testing Discrepancies
SUADM-M-26	3-21-86	ASME Section XI Inspection and Examination Control

<u>Procedure No.</u> (Continued)	<u>Revision</u>	<u>Title</u>
SUADM-M-25	6-20-85	ASME Documentation Control and Reporting Requirements
SUADM-M-33	10-28-86	Secondary Piping Inspections
SUADM-M-36	6-17-86	Support Program
SUADM-M-20	10-8-85	ASME Section XI Visual Examination Program (VT-2, 3 and 4)
SUADM-M-19	6-20-85	Weld Selection Program
SUADM-ADM-29	7-03-86	Inservice Inspection Program-Organization and Responsibilities

- b. (Closed) IFI 50-280, 281/85-06-02, Missing Record of Functional Test After Valve Repair. This matter will be addressed during the implementation review of the licensee's new procedure for pump and valve testing. This matter is considered closed.
- c. (Closed) IFI 50-280, 281/82-03-01, Processing of Changes to NDE Procedures. This item identified a weakness in the method used by the licensee for control of changes to NDE procedures. The inspector reviewed revised procedure, NDE-3.1 (R3) - Preparation, Issue and Control of Nondestructive Examination Procedures, which standardizes the method for processing changes to NDE procedures. This matter is considered closed.
- d. (Closed) IFI 50-280, 281/85-15-01, Future Inservice Inspection and Repairs for Steam Generator (SG) Girth Weld Cracking. This item identified the possible need for additional licensee examinations to locate cracking in the transition cone of the Steam Generators in Units 1 and 2. Also, the need to review actions relative to the adequacy of repairs to the SG cracking, the adequacy of examinations performed to verify removal of cracking, and the frequency of subsequent inspection on the areas that have experienced cracking were addressed. The licensee has examined and removed all cracking located in the Units 1 and 2 SG's transition cone weld and has an ongoing commitment to conduct surface and volumetric examinations of selected areas of these welds. This item is considered closed.