

U.S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-390/90-15
50-391/90-15

Docket Nos. 50-390
50-391

License Nos. CPPR-91
CPPR-92

Licensee: Tennessee Valley Authority
Chattanooga, Tennessee 37401

Facility Name: Watts Bar Nuclear Plant Units 1 and 2

Inspection At: Watts Bar, Tennessee

Inspection Conducted: Phase 1 - July 16 through July 27, 1990
Phase 2 - August 27 through September 6, 1990

Inspectors: *Michael Chuders for* 10/19/90
H. W. Kerch, Project Manager NDE, Materials and
Processes Section, EB, DRS date

Richard H. Harris 10/19/90
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Approved by: *E H Gray* 10/19/90
E. H. Gray, Chief, Materials and Processes
Section, Engineering Branch, DRS, RI date

Inspection Summary: A routine announced inspection was conducted at Watts Bar Nuclear Power Station Units 1 and 2 on July 16 through July 27, 1990 and August 27 through September 6, 1990, using the NRC's Mobile Nondestructive Examination (NDE) Laboratory (Report Nos. 50-390; 391/90-15).

Areas Inspected: The inspection focused on activities related to preservice inspection, plant modifications, and plant construction programs such as the reinspection of vendor made fillet welds on heat exchangers and tanks, and butt welds of small bore piping. Selected ASME Class 3 piping that is prone to microbiologically influenced corrosion (MIC) was inspected.

Result: Two violations were identified: (1) corrosion problem on HVAC system 31 piping, (2) ASME class 3 welding problem. Three unresolved items were identified: (1) MIC identified in Essential Raw Cooling Water (ERCW), (2) penetration 1X46-W14 has a linear indication, (3) ISI centerline marking.

DETAILS

1.0 Persons Contacted (30703)

TVA

* J. Cruise	Nuclear Engineering
* P. Candage	Maintenance Engineer
* P. Wilson	Special Projects Manager
B. Kinnbrew	Welding Supervisor
* L. Herbert	Quality Assurance
* R. Briggs	Materials Engineer
F. Koontz	Operation Engineer
W. Elliot	Engineer Manager
S. Crowe	Site Quality Manager
G. Riner	Project Manager
T. Hale	NDE/PSI Supervisor
D. Etzler	Engineering Specialist
P. Pace	Compliance Supervisor
J. Gibbs	Project Engineer
M. Bellamy	Project Manager
T. Dean	Licensing
F. Laurent	Quality Assurance Manager
J. Goulart	Engineer Specialist
K. Phillips	Engineer
R. Lewis	Quality Assurance
J. Adair	Civil Engineer

U.S. Nuclear Regulatory Commission

S. Burris	Resident Inspector RII
R. C. Chou	Reactor Inspector RII
H. Livermore	Reactor Inspector RII
*B. Wilson	TVA Projects RII
*K. Barr	Section Chief RII
*J. Durr	Branch Chief RI
*G. Walton	Resident Inspector RII
*J. Blake	Section Chief RII
*R. Newsome	Reactor Inspector RII
D. Terao	Section Chief NRR

* Denotes those attending entrance and exit meeting. The inspector also contacted other administrative and technical personnel during the inspection.

2.0 Independent Measurements - NRC Nondestructive Examination and Quality Records Review of Safety Related Systems

During the periods of July 16 through July 27, 1990 and August 27 through September 6, 1990, an onsite independent measurement inspection was conducted at Watts Bar Nuclear Power Station using the NRC Mobile Nondestructive Examination (NDE) Laboratory. The inspection was conducted by NRC regional based inspectors. The objectives of this inspection were to assess the adequacy of the licensee's preservice inspection (PSI) program, heat exchanger fillet weld inspection, welding quality control program and the licensee's actions regarding the "As-Built" configuration of pipe hanger/supports. This was accomplished by duplicating those examinations required of the licensee by regulations and codes, then evaluating the results. ASME Code pipe weldments and pipe weldments selected from the Emergency Raw Cooling Water (ERCW) supply line for the diesel generators were examined using Radiography to determine if microbiologically influenced corrosion (MIC) was present.

2.1 Nondestructive Examination (NDE)

2.2 Visual Examination (57050)

Forty-three (43) safety related pipe weldments and adjacent base material (1/2 inch on either side of the weld) were visually examined in accordance with NRC Procedure NDE-10, Rev. 1, Appendix A, and associated site procedure for visual examination of pipe systems and attached components, QC documents, isometrics and as-built drawings. During this inspection ASME Class 1, 2 and 3 pipe weldments were selected from the Essential Raw Cooling Water (ERCW), Component Cooling (CC), Auxiliary Feedwater (AFW), Spent Fuel Pool Cooling (SFPC), Reactor Coolant (RC), Residual Heat Removal (RHR), and Upper Head Injection (UHI) Systems. The examination was performed specifically to identify any cracks or linear indications, gouges, leakage, arc strikes with craters, or corrosion, which may infringe upon the minimum pipe wall thickness. Mirrors, flash lights and weld gauges were used to aid in the inspection and evaluation of the weldments.

Results: The welding and general workmanship inspected was satisfactory. No violations were identified.

2.3 Visual Inspection Hanger/Support (57050)

During this inspection sixty-eight (68) safety related hanger/supports were visually inspected per NRC Procedure NDE-10, Rev. 1, Appendix A and B in conjunction with site procedures, QC documents and associated isometric/drawings. Included in this inspection were hanger/supports selected from the Chemical Volume Control (CVC), Essential Raw Cooling Water (ERCW), Safety Injection (SIS), Component Cooling (CC), and Heating and Air Conditioning (HVAC) Systems. In the area of welds, the accessible surface area and adjacent base metal for a distance of one-half inch on either side of the weld was examined. The component

integrity specific attributes looked at were proper installation, configuration or modification of supports, evidence of mechanical or structural damage, corrosion, bent, missing or broken members. Attachment No. 2 is a list of specific hanger/supports inspected.

Results: Welding and general workmanship was acceptable. No violations were identified.

2.4 Liquid Penetrant Examination (57060)

Nineteen (19) safety related pipe weldments and adjacent base material (1/2 inch on either side of the weld) were examined using the visible dye, solvent removable method per NRC Procedure NDE-9, Rev. 0, in conjunction with the licensee's procedure and associated QC records. Included in this inspection were ASME Class 1, 2 and 3 stainless steel weldments selected from the Spent Fuel Pool Cooling (SFPC), Essential Raw Cooling Water (ERCW) and Residual Heat Removal (RHR) systems. Attachment No. 1 is a list of specific weldments examined.

Results: Observed on some weldments were non-relevant indications because of grinding and punch marks made during construction. No violations were identified.

2.5 Concrete Anchor Bolt Examination (57090)

One hundred and sixty-five (165) concrete anchor bolts, randomly selected throughout the plant were ultrasonically examined for length and visually examined for location, type, size and length of bolt extended above the concrete surface.

Results: No manufacturers stamps were found on those concrete anchors examined. By using scales, the diameter and length of the anchor protruding from the surface of the concrete was measured. The length of the bolt was determined ultrasonically. The following areas were found to be of concern:

<u>Hanger/Support ID</u>	<u>Floor to Top of Plate</u>	<u>Plate to Top of Bolt</u>	<u>Length of Bolt (UT)</u>
1003B-03B-1AFW-R17			
No. 1	1.75 IN.	1 IN.	3 IN.
No. 2		1.125 IN.	3 IN.
No. 3		.6875 IN.	2.8 IN.
No. 4		.50 IN.	2.5 IN.
03-1AFW-R31			
No. 1	1.75 IN.	.50 IN.	2.5 IN.

The diameter of the above concrete anchor bolts are 0.5 inches. TVA destructively removed bolting in question, measured and determined bolting met requirements.

2.6 Radiographic Examination (57090)

Eighteen (18) pipe weldments were partially radiographed by the NRC in the process of locating microbiological influenced corrosion (MIC).

Results: First Phase: Ten (10) carbon steel weldments were radiographed in diesel generator room 2A-A. Welds radiographed were in the raw water cooling system and all welds and adjacent piping contained evidence of MIC. Ultrasonic thickness measurements attempted to establish the throughwall extent of the MIC condition was without conclusive results. This item is considered unresolved (50-390/90-15-01) pending TVA's resolution of the effect of MIC on these welds.

Eight (8) stainless steel weldments were also partially radiographed in the annulus ERCW system, where MIC was not detected. However, out of this sample size of 8 welds, four welds contained gross incomplete penetration. Paragraph ND 5212 of the ASME Code requires longitudinal weld joints in piping, pumps and valves greater than 4 inch nominal pipe size be examined by either magnetic particle, liquid penetrant or radiography. Code Interpretation III-82-19 (File NI-81-168) extends the requirement to circumferential welds. The applicable acceptance standards are those of paragraph ND-5300 for the method chosen. Paragraph ND-5321 (a) disallows any type of crack or zone of incomplete fusion or penetration when revealed by radiography while ND-5321 (b) limits any other elongated indication which has a length greater than 1/4" for thickness up to 3/4", inclusive. The licensee failed to properly control the welding at Watts Bar 1 and did not make adequate selection from the choice of NDE methods provided within the ASME Section III ND5000 Code. Proper process controls would have identified and eliminated the lack of penetration type indications detected in Watts Bar I Class 3 piping systems by the NRC.

An additional sample of twelve (12) Class 3 weldments was selected by the NRC for radiography in order to verify the extent of this Class 3 welding problem. Two of the selected welds within this sample contained water within the piping and satisfactory radiography could not be performed. The weld samples were from the following systems; Auxiliary Feedwater, Component Cooling, Essential Raw Cooling Water and Spent Fuel Pool Cooling.

Results: Second Phase: Sample of ten (10) welds, five (5) welds contained similar unacceptable Code indications.

This NRC independent measurements inspection disclosed that 50% of two (2) samples of Watts Bar Unit 1 ASME Class 3 piping weldments have unacceptable indications such as lack of fusion and lack of penetration that extends 50 to 80% of the weld length that do not meet the ASME Code. Regardless of the inspection method selected by TVA for the examination of ASME Class 3 weldments, adequate control of the welding process by the Watts Bar Unit 1 welding program did not produce ASME quality welds. Failure to control welding on Class 3 piping resulting in significant lack of fusion or penetration on circumferential welds is considered a violation (50-390/90-15-02).

Eight other welds were also radiographed by the NRC in order to verify the quality of modifications. For a detailed list of what welds were radiographed, accepted or rejected, see Attachment 1 for a list of specific weldments radiographed.

2.7 Ultrasonic Examination (57080)

Five (5) safety related pipe weldments were ultrasonically examined using a Sonic Mark 1 ultrasonic flaw detector in accordance with NRC Procedure NDE-1, Rev. 1, Tennessee Valley Authority (TVA) Procedure N-UT-18, Rev. 2, and associated ultrasonic test data. Instrument calibration (linear verification) was performed using NRC Procedure NDE-2, Rev. 0. A distance amplitude correction curve (DAC) was constructed using the licensee's calibration standards numbered: WB-2 and WB-8. To ensure repeatability of the ultrasonic examinations, instrument settings and search units (transducers) were matched as nearly as possible to those indicated by the licensee's ultrasonic data reports. The examinations performed were on ASME Class 1 weldments selected from the Residual Heat Removal (RHR) system. See Attachment 1 for specific weldments examined.

Results: No violations were identified, however, the counterbored condition on the I.D., particularly in the instances where the transducer was located within the introdose of an elbow yielded non-relevant indications due to mode conversion.

2.8 Erosion/Corrosion (57080)

Three pipe components were examined for erosion/corrosion using a Sonic Mark 1 Ultrasonic Flaw detector. The method and procedures used were in accordance with NRC Procedure NDE-11, Rev. 1, the licensee's procedures, and quality assurance records. The erosion/corrosion examined performed during phase 1 of this inspection on selected pipe components to determine if wall thinning was present and was based on information provided by the licensee. The thickness measurements were taken at predetermined locations on the systems selected and were on a 1 inch, 2 inch or 3 inch grid patterns, depending on the diameter of the component. Included in this inspection were various size components selected from Heating Ventilating and Air Conditioning (HVAC) systems. Seven pipe weldments were examined to determine the extent of wall loss due to microbiologically influenced corrosion. The weldments selected were based on the radiographic results obtained in Section 2.6 of this document.

Results: Indeterminate due to unavailability of acceptance criteria. See Attachment 3 for a list of specific weldments thickness measured.

2.9 Vessel Fillet Weld Examination (57050)

Five vendor supplied vessels were examined. All accessible nozzle to shell fillet welds were measured. Included in this examination were nozzle to plate/plate to shell fillet welds on nozzles with reinforcement plates and fillet welds with attaching smaller nozzles to larger nozzles located within the component pressure boundary. Specific components examined are as follows:

<u>Component</u>	<u>Drawing</u>	<u>Comments</u>
Vert. Containment Spray HX HX 1A HX 1B	5647-R2	Measurements taken every 45° starting at 0°. 8 weldments inspected 8 weldments inspected
Volume Control Tank	1103E20-R2	Nozzle A reinspected by site Quality Control, of fillet welds at 230° to 345°. Leg C indicated on drawing 7 weldments inspected
Horz. Spent Fuel Pit HX	5598-RI	14 weldments inspected
Shell Regenerative HX	5577-RI	12 weldments inspected

Results: After the weld verification (dimensional and visual) inspection performed by NRC personnel had been compared to those performed by site QC personnel, weldments on the vertical containment spray heat exchanger and volume control tank were reinspected by TVA QC personnel since several readings differed from those taken by NRC personnel. The results were resubmitted to the appropriate TVA Engineering department. Those fillet welds that were found to be below the dimensions specified by the drawings will be evaluated by the TVA Engineering staff and dispositioned. The discrepancies were due to the size of fillet weld legs being identified incorrectly on the inspection document.

3.0 Preservice Inspection (PSI) Program (73051)

The inspector reviewed the following documents to ascertain compliance with applicable ASME Code requirements, licensee commitments and regulatory requirements.

- Technical Instruction TI-50A R22
- ASME Code Section XI 1974 Summer 1975
- ASME Code Section XI 1977 Summer 1978
- Watts Bar Ultrasonic Calibration Blocks
- Site Procedure A1-9.15

Based on the foregoing, it was determined that the licensee's PSI program was originally intended to meet the requirements of the ASME Boiler and Pressure Vessel Code, Section XI 1974 Summer 1975 addenda. The licensee submitted a change to the existing PSI program to update the PSI program to the ASME 1977 edition, Summer 1978 addenda of the Code for PSI effective with all Nondestructive Examination (NDE) conducted after July 1, 1989.

Results: ASME Section XI, Article IWA-2600 and mandatory Appendix III, Supplement 2, requires that a marking system be established to provide a reference to the centerline of the welds requiring volumetric examination. The inspector determined that Watts Bar has not marked the centerline of welds within the PSI program nor does Watts Bar have a system in place to do so.

TVA has committed to revise the ultrasonic procedure to include the ASME Code marking requirements by September 28, 1990 and to stamp the ASME Code marking requirements on all welds within the PSI/ISI program as they are inspected/reinspected after this date.

This item is considered unresolved pending the procedure change and implementation by the licensee and reviewed by the NRC (50-390/90-15-04).

4.0 Previous Inspection Followup

(Closed) IFI 390/85-50-01

NRC inspection item 390/85-50-01 had concerns with TVA's corrective action on containment spray vendor fillet weldments. TVA inspected Unit 2 containment spray system and based on the results of Unit 2 vendor fillet weldments, signed off on Unit 1 also.

During NRC inspection report 50-390/90-15, TVA reinspected Unit 1 containment spray vendor fillet weldments. A NRC sample of TVA reinspection was performed. No deficiencies were identified.

5.0 Penetration 1X46-W14 (57090)

Background: NRC inspection 50-390,391/90-07 reviewed radiographic film on weld 14 for penetration 1X-46, it contained an unacceptable linear indication. TVA documented this on CAQRWBP900148.

During this inspection CAQRWBP900148 was reviewed and found to be inadequate for the following:

- ° TVA took the position radiography was not a commitment nor ASME Code required. Also TVA's position was that the anchor attachment was not Class MC.

The NRC review of the Tube Turn traveler for order 79432, item 26, revealed that the only NDE performed on this weld was radiography. The manufacturing data, N2, reported this item as MC. Watts Bar 1 is commented to ASME Section III and the engineering evaluation performed by TVA for this rejectable indication was not an acceptable means for dispositioning away an ASME Section III finding. This item is considered unresolved pending TVA reissuing CAQRWBP900148 to properly address the linear indication and NRC review (50-390/90-15-05).

6.0 HVAC AC System 31 Corrosion Problem (57080)

Background: In December 1988, TVA informally identified (outside Watts Bar) a major corrosion problem with the air conditioning system 31. TVA held many meetings during 1989 and half of 1990. They discussed this corrosion problem and performed some evaluations. During the NRC independent measurement inspection, pipe hangers were being inspected for weld and quality attributes. Hanger 1031-A920-31-120 could not be inspected by the NRC due to heavy corrosion buildup. Further investigation disclosed that the chilled water piping at the 737' elevation in the auxiliary building contained scab-like corrosion buildup, system wide (see Attachment 3). The NRC requested, at this time, from TVA the required documentation (CAQR) of this corrosion problem. The TVA stated none existed. By the second phase of the NRC inspection, this problem had been documented on a CAQR.

TVA's Design Guide DG-M5.2.1 requires an increase to the minimum pipe wall thickness above that required for other design considerations when corrosion is expected. Exterior pipe surfaces should be protected against corrosion when it is subject to high moisture environment. TVA's design calculations could not accommodate the required corrosion allowance of .08 for portions of the HVAC system 31 piping. Actual wall thickness for standard wall piping used were less than the minimum required wall. TVA's Watts Bar 1 design did not include any exterior surface piping corrosion allowance. Although this plant is not an operating system, the corrosion allowance has already been used up. This is considered a violation of 10 CFR 50 Appendix B, Criteria III and XVI (50-390/90-15-03).

7.0 Review of Site NDE Procedures and Manuals

The following procedures were reviewed in the regional office during this inspection period for compliance to the licensee's FSAR comments and applicable Codes, Standards and Specifications.

Tennessee Valley Authority (TVA) Nondestructive Examination Procedures TVA-Nuclear Power

<u>Procedure Title</u>	<u>Number/Revision</u>
Visual Inspection of AWS Welds	N-VT-2 Rev. 11

<u>Procedure Title</u>	<u>Number/Revision</u>
Preservice and Inservice Visual Examination Procedure	N-VT-1 Rev. 14
Visual Examination of Weld Ends, Fit-ups, and Dimensional Examination of Weld Joints	N-VT-3 Rev. 12
Watts Bar Nuclear Plant Fit-up and Final Visual Weld Examination	N-VT-11 Rev. 1
Liquid Penetrant Examination of ASME and ANSI Code Components and Welds	N-PT-9 Rev. 2
Ultrasonic Examination of Pipe Welds	N-UT-18 Rev. 2
Ultrasonic Examination for the Detection of ID Pitting, Erosion, and Corrosion	N-UT-26 Rev. 1
Ultrasonic Measurement of Wall Thickness (D-Meter)	N-UT-49 Rev. 2
Radiographic Examination of Structures, Systems, and Components (Non-mandatory)	N-RT-2 Rev. 2
Radiographic Examination of Nuclear Power Plant Components	N-RT-1 Rev. 9

Results: No violations were identified.

8.0 Attachments

Attachment No. 1 is a tabulation of specific pipe weldments and components examined and results. Attachment No. 2 is a tabulation of hanger/support components examined and results. Attachment No. 3 is a tabulation of specific areas examined for thickness, and Attachment No. 4 is a tabulation of specific radiographs reviewed.

9.0 Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items or violations.

10. Management Meetings (30703)

Licensee management was informed of the scope and purpose of the inspection at the entrance meetings on July 16 and August 27, 1990. The findings of the inspection were discussed with the licensee representatives during the course of the inspection and presented to licensee management at the exit interview (see paragraph 1.0 for attendees).

At no time during the inspection was written material provided to the licensee by the inspector. The licensee did not indicate that proprietary information was involved within the scope of this inspection.

ISO/DWG/WELD ID	SYS	CL.	RT	VT	PT	UT	ACC	REJ	COMMENTS
SK586-1-ZA2 20	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA2 18	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA2 21	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA2 3	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA2 2	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA1 21	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA1 17	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA1 16	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA1 3	ERCW	3	X	X					SEE REPORT MIC
SK586-1-ZA1 2	ERCW	3	X	X					SEE REPORT MIC
* 47W450-23 2	ERCW	3	X	X				X	INCOMPLETE PENETRATION
* 47W450-23 3	ERCW	3	X	X				X	INCOMPLETE PENETRATION
* 47W450-23 4	ERCW	3	X	X			X		
* 47W450-23 5	ERCW	3	X	X			X		
* 47W450-23 7	ERCW	3	X	X				X	INCOMPLETE PENETRATION
* 47W450-23 2	ERCW	3	X	X			X		
* 47W450-23 3	ERCW	3	X	X			X		
* 47W450-23 4	ERCW	3	X	X				X	INCOMPLETE PENETRATION
CHM-2638-C-8 RHRF-D055-13	RHR	1		X	X	X	X		
CHM-2638-C-8 RHRF-D055-13B	RHR	1		X	X	X	X		
CHM-2638-C-8 RHRF-D055-12	RHR	1		X	X	X	X		
CHM-2636-C-2 RHRS-27	RHR	2		X	X	X	X		
CHM-2636-C-2 RHRS-27	RHR	2		X	X	X	X		

* WELDS THAT WERE APART OF THE FIRST SAMPLE OF CLASS 3 WELDMENTS

ISO/DWG/WELD ID	SYS	CL.	RT	MT	PT	UT	VT	ACC	REJ	COMMENTS
SK435-21 R3 1-87B-W001-15J	UHI	1	X		X		X	X		
SK435-21 R3 1-87B-W001-7R	UHI	1	X		X		X	X		
SK435-21 R3 1-87B-W001-1G	UHI	1	X		X		X	X		
SK435-21 R3 1-87B-W001-9A	UHI	1	X		X		X	X		
47W304-1 R9 01	RC	1	X		X		X	X		RTD RETURN
47W304-1 R9 02	RC	1	X		X		X	X		RTD RETURN
47W304-1 R9 03	RC	1	X		X		X	X		RTD RETURN
47W304-1 R9 04	RC	1	X		X		X	X		RTD RETURN
* SK450-21 SH 28 1-070A-D168-01	CC	3	X				X		X	INCOMPLETE FUSION
* E2879IC196 D-078A-D196-5A	FPC	3	X		X		X	X		
* E2879IC196 D-078A-D196-5B	FPC	3	X		X		X		X	INCOMPLETE PENETRATION
* E2879IC196 1-003C-D009-C	AFW	3	X				X	X		
* E2879IC196 1-003C-D009-E	AFW	3	X				X	X		
* SK 450-37 SH 6 1-067J-T635-5	ERCW	3	X		X		X		X	INCOMPLETE FUSION
* SK 450-37 SH 6 1-067J-T635-6	ERCW	3	X		X		X		X	INCOMPLETE PENETRATION
* SK 450-37 SH 6 1-067C-T283-25	ERCW	3	X		X		X	X		
* SK 450-37 SH 6 1-067C-T283-26	ERCW	3	X		X		X	X		
* 47W464-4 1-070A-D168-G	CC	3	X				X		X	AREA 30-0 LENIER
SK-E-2879-1163-5	FPC	3	X				X	X		VENDOR
SK-E-2879-1163-5	FPC	3	X				X	X		VENDOR

* WELDS THAT WERE SELECTED BY RII FOR SECOND SAMPLE OF CL.3 WELDMENTS

ATTACHMENT 2

INDEPENDENT MEASUREMENTS INSPECTION SUMMARY
HANGER/SUPPORTS/RESTRAINTS

COMPONENT SYS. ISO/DWG#	IDENTIFIER	UNIT	ID	STATUS CONFIGURATION	CLASS	NO.	ACC.	REJ.	REMARKS
62-2LCV-R35	20262-62-2LCV-R35	CVCS	RR	RR	2	2	X		
74-1RHR-R99	1074-74-1RHR-R99	RHR	DS	DS	2	1	X		Support Removed
47A060-67-161	1067-A060-161	ERCW	RR	RR	2	1	X		
47A450-2-232	1067-A450-2-232	ERCW	RR	RR	2	1	X		
63-1515-433	1063-63-1515-R33	SIS	RR	RR	1	1	X		
47A406-1-2	1067-A406-1-2	CVCS	RR	RR	1	1	X		
47A060-70-94	1070-A060-70-94	CCS	ANC	ANC	2	1			Inaccessible
47A450-2-7	1067-A450-2-7	ERCW	RR	RR	2	1	X		
47A450-2-310	1067-A450-2-310	ERCW	RR	RR	2	2	X		
47A450-8-29	1067-A450-8-29	ERCW	RR	RR	2	2	X		
47A555-2-19	1062-A555-2-19	CVCS	RR	RR	2	2	X		
47A060-62-148	1062-A060-62-148	CVCS	ANC	ANC	3	2	X		
47A435-1-53	1063-A435-1-53	SIS	RR	RR	1	1	X		
47A920-31-120	1031-A920-31-120	ACS	RR	RR	M	1			Heavy Corrosion
47A450-4-503	1067-A450-4-503	ERCW	RR	RR	2	2	X		

INDEPENDENT MEASUREMENTS INSPECTION SUMMARY
HANGER/SUPPORTS/RESTRAINTS

ISO/DWG#	COMPONENT IDENTIFIER	SYS. ID	CONFIGURATION	CLASS	UNIT NO.	STATUS		REMARKS
						ACC.	REJ.	
63-2515-R208	63-2515-R208	SIS	RR		2	X		
63-2515-R24	63-2515-R24	SIS	RR		2		X	Licensee - NRC Written Previously
70-ICC-R262	1070-70-ICC-R262	CCS	RR	2	1	X		
62-ICVC-R112	1062-62-ICVC-R112	CVCS	RR	1	1	X		
47A406-17-5	1062-A406-17-5	CVCS	RR	1	1	X		
47A464-25-2	1070-A464-25-2	CCS	RR	G	1	X		
70-ICC-V195	1070-70-ICC-V195	CCS	S	2	1	X		
47A464-14-2	1070-A464-1-2	CCS	RR	2	2	X		
47A464-14-7	1070-A464-14-7	CCS	RR	2	1	X		
47A450-3-428	1067-A450-3-428	ERCW	RR	2	2	X		
47A450-3-501	1067-A450-3-501	ERCW	RR	2	1	X		
47A464-7-9	1070-A464-7-9	CCS	RR	2	1	X		
47A464-7-10	1070-A464-7-10	CCS	RR	2	1	X		
47A450-10-6	2067-A450-10-6	ERCW	RR	2	2	X		

INDEPENDENT MEASUREMENTS INSPECTION SUMMARY
HANGER/SUPPORTS/RESTRAINTS

ISO/DWG#	COMPONENT IDENTIFIER	SYS. ID	CONFIGURATION	CLASS	UNIT NO.	STATUS		REMARKS
						ACC.	REJ.	
47A450-10-7	2067-A450-10-7	ERCW	RR	2	2		X	Under review by Licensee CAQR to be Initiated
47A450-3-456	1067-A450-3-456	ERCW	RR	2	2		X	
47A450-3-70	1067-A450-3-70	ERCW	RR	2	2		X	Support Removed
67-1ERCW-R435	1067-1ERCW-R435	ERCW	RR	2	2		X	
47A060-67-176	1067-A060-67-176	ERCW	ANC	2	2		X	
47A045-3-126	1067-A450-3-126	ERCW	RR	2	2		X	
47A450-3-343	1067-A450-3-343	ERCW	RR	2	2		X	
47A555-10-79	1062-A555-10-79	CVCS	RR	2	1		X	
47A555-12-11	1062-A555-12-11	CVCS	RR	3	1		X	
47A450-4-501	1067-A450-4-501	ERCW	RR	2	1		X	
70-ICC-R602	1070-70-100-R602	CCS	RR	2	1		X	
70-ICC-R676	1070-70-ICC-R676	CCS	RR	2	1		X	
47A450-2-12	1067-A450-2-12	ERCW	RR	2	1		X	
67-2ERCW-R150	2067-67-2ERCW-R150	ERCW	RR	2	2		X	

INDEPENDENT MEASUREMENTS INSPECTION SUMMARY
HANGER/SUPPORTS/RESTRAINTS

ISO/DWG#	COMPONENT IDENTIFIER	SYS. ID	CONFIGURATION	CLASS	UNIT NO.	STATUS		REMARKS
						ACC.	REJ.	
47A406-1-33	1067-A406-1-33	RHR	RR	1	1	X		
67-1ERCW-R-194	6067-67-1ERCW-R194	ERWC	RR	2	1			Inaccessible
47A060-67-156	1067-A060-67-156	ERCW	ANCH	2	1	X		
47A450-3-3	1067-A450-3-3	ERCW	RR	2	2	X		
47A400-6-123	1001-A400-6-123	BDS	DS	1	1	X		
47A464-18-1	1070-A464-18-1	CCS	US	2	1	X		
47A464-19-4	1070-A464-19-4	CCS	RR	2	1	X		
17-A586-1-69	0067-A586-1-69	ERCW	RR	2	1	X		
47A435-8-83	1063-A435-8-83	SIS	RR	1	1	X		
47A060-70-82	1070-A060-70-82	CCS						Inaccessible
47A400-6-68	1001-A400-6-68	BDS	RR	1	1	X		
47A435-6-99	1063-A435-6-99	SIS	RR	1	1	X		
1-62-A-581	1062-1-62A-581	CVCS	RR	A	1	X		
47A450-21-396	1067-A450-21-396	ERCW	RR	2	1	X		
47A450-21-37	1067-A450-21-37	ERCW	RR	2	1	X		

INDEPENDENT MEASUREMENTS INSPECTION SUMMARY
HANGER/SUPPORTS/RESTRAINTS

ISO/DWG#	COMPONENT IDENTIFIER	SYS. ID	CONFIGURATION	CLASS	UNIT NO.	STATUS		REMARKS
						ACC.	REJ.	
47A450-6-95	1063-A435-6-95	SIS	RR	G	1	X		
1-70-171	1070-1-70-171	CCS	RR	1	1	X		
47A460-67-150	1067-A060-67-150	ERCW	ANC	2	1	X		
47A435-10-17	1063-A435-10-17	SIS	RR	1	1	X		
47A50-21-464	1067A450-21-464	ERCW	RR	2	1	X		
47A450-24-7	1067-A450-24-7	ERCW	RR	G	1	X		
47A450-21-227A	1067-A450-21-227A	ERCW	RR	2	1	X		
47A930-1-50	1031-A930-1-50	ACS	RR	M	1	X		
47A400-6-269	1001-A400-6-269	BDS	RR	1	1	X		Support Removed
47A930-7-15	1031-A930-7	ACS						Support Removed
47A930-7-50B	2031-A930-7-50B	ACS	RR	M	1	X		
47A060-67-152	2067-A060-67-152	ERCW	ANCH	C	2	X		
63-2515-R23	63-2515-R23	SIS	RR	2		X		Licensee Has Under Review
63-2515-R21	62-2515-R21	SIS	RR	2		X		License Has Under Review

INDEPENDENT MEASUREMENTS INSPECTION SUMMARY
HANGER/SUPPORTS/RESTRAINTS

ISO/DWG#	COMPONENT IDENTIFIER	SYS. ID	CONFIGURATION	CLASS	UNIT NO.	STATUS		REMARKS
						ACC.	REJ.	
47A464-2-266		CC	RR	2	2		X	
67-1ERCW-R351	1067-67-1ERCW-R351	ERCW	RR	2	1		X	
82-A586-5-18	2067-A586-5-18	ERCW	RR	1	1		X	

ATTACHMENT 3

Air Conditioning System Thickness Measurement Results

Location A: Floor Elev: 737'
Component Elev: 740'-6"
Near pumps between Column A4-A1
at Q column (wall)

Extradose Elbow

Area A: 4 x 5 1/2"; with measured wall thickness - .250"

Intradose Elbow

Area B: 2 3/4" x 8 1/2"; with measured wall thickness - .300"

Reducer

Area C: 3" x 3"; with measured wall thickness - .300"

Pipe

Area D: 4" x 6"; with measured wall thickness - .250"

Location B: Floor Elev: 737'
Component Elev: 753'
Near Column A1 and Q Column
(Scanned Entire Elbow & Adjacent Pipe)

Area A: .260 (Pipe Side) measured wall thickness

Area B: .270 (Elbow Side) measured wall thickness

Location C: Floor Elev: 737'
Component Elev: 757'
Near Column A2-A1 and Q Column
(Scanned 18" Area 360°)

Area A: .240"

Location: Diesel Generator Room 2A-A
South End

Weld #2 Configuration: Pipe-Flange

0° - .310" measured wall thickness remaining
7° - .300" measured wall thickness remaining
14° - .280" measured wall thickness remaining
21° - .300" measured wall thickness remaining

Weld #3 Configuration: Pipe-Elbow

0° - .320" measured wall thickness remaining
7" - .280" measured wall thickness remaining
14" - .280" measured wall thickness remaining
21" - .300" measured wall thickness remaining

Weld #18 Configuration: Flange-Pipe

0° - .320" measured wall thickness remaining
7" - .330" measured wall thickness remaining
14" - .320" measured wall thickness remaining
21" - .300" measured wall thickness remaining

Weld #20 Configuration: Elbow-Flange

0° - .330" measured wall thickness remaining
7" - .340" measured wall thickness remaining
14" - .360" measured wall thickness remaining
21" - .340" measured wall thickness remaining

Weld #21 Configuration: Flange-Elbow

0° - .330" measured wall thickness remaining
7" - .350" measured wall thickness remaining
14" - .370" measured wall thickness remaining
21" - .340" measured wall thickness remaining

North End

Weld #16 Configuration: Flange-Pipe

0° - .295 (.210" see Note)
7" - .305"
14" - .320"
21" - .350"

Note: At Location 3 1/2" cw from 0" and 3 1/2" up from weld toe, a area was found to exhibit .210" measured wall thickness remaining. This area is designated as Watt's Bar Corrosion Area #34. This Location lies Row 4 Column L to Row 4 Column H.

Weld #17 Configuration: Pipe

0° - .330" measured wall thickness remaining
7" - .310" measured wall thickness remaining
14" - .310" measured wall thickness remaining
21" - .310" measured wall thickness remaining

ATTACHMENT 4

Tabulation of Specific Radiographic Site Film Reviewed

<u>System/Line</u>	<u>Weld</u>	<u>Accepted</u>
2266-B	Girth 1	X
2266-1D Steel	T1	X
2666-1D Steel	T2	X
2266-1D	Girth 1	X
2266-1D	Girth 2	X
2266-1A	Girth 2	X
2266-1B	Nozzle	X
2266-1C	Nozzle	X
2266-1C	T1	X
2266-1C	T2	X
2266-1B	T1	X
2266-1B	T2	X
2266-1C	Girth 2	X
2266-1A	Girth 1	X
2266-1A	Nozzle A	X
2266-1C	Girth 1	X
2266-1A	Nozzle B	X
2266-1B	Girth 2	X
2266-1B	Head Plug	X
2266-1D	Nozzle A	X
2266-1D	Nozzle B	X
2266-1D	Bonet	X
2266-1D	Head Plug	X
2266-1A	T1	X
2266-1A	T2	X
2247-2A Pipe to Nozzle	A1	X
2247-2A Pipe to Nozzle	B	X
2247-2A Shell 3 to Nozzle	A1	X
2247-2A Shell 3 to Nozzle	B	X
2247-2A Shell to Nozzle	A2	X
2247-2A Shell to Nozzle	C	X
2247-2A Shell 2	A1	X
2247-2A Shell 2	A2	X
2247-2A Shell 2	B	X
2247-2A Shell 2	C	X
2247-2A Shell 3	Girth 2	X
2247-2A Shell 3	Girth 1	X
2247-2A Shell 1	Girth 3	X
2247-2A Shell 3	Girth 3	X
2247-2A Shell 3	Girth 4	X

Tabulation of Specific Radiographic Site Film Reviewed

2247-2A Shell 1	Girth 2	X
2247-2A Shell 1	Girth 1	X
2247-2A Shell 1	Girth 4	X
2247-2A Shell 2	Girth 1	X
2247-2A Shell 2	Girth 2	X
2247-2A Shell 2	Girth 3	X
2247-2A Shell 2	Girth 4	X
2247-2B Shell 3	Girth 3	X
2247-2B Shell 1	Girth 2	X
2247-2B Shell 1	Girth 4	X
2247-2B Shell 2	Girth 1	X
2247-2B Shell 2	Girth 2	X
2247-2B Shell 3	Girth 2	X
2247-2B Shell 3	Girth 4	X
2247-2B Shell 2	Girth 4	X
2247-2B Shell 3	Girth 1	X
2247-2B Shell 1	Girth 1	X
2247-2B Shell 1	Girth 3	X
2247-2B Nozzle	A1	X
2247-2B Nozzle	A2	X
2247-2B Nozzle	B	X
2247-2B Nozzle	C	X
2247-2B Shell 2	Girth 3	X
1-072B-D071	08	X