



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

Report Nos.: 50-413/92-20 and 50-414/92-20

Licensee: Duke Power Company
 P.O. Box 1007
 Charlotte, N.C. 28201-1007

Docket Nos.: 50-413 and 50-414

License Nos.: NPF-35 and
 NPF-52

Facility Name: Catawba Nuclear Station Units 1 and 2

Inspection Conducted: July 27 - 31, 1992

Inspector:

[Signature]
 W. P. Kleinsorge P.E.
 Reactor Inspector

8-6-92
 Date Signed

Inspector:

[Signature]
 James L. Coley
 Reactor Inspector

8-6-92
 Date Signed

Approved by:

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 J. J. Blake, Chief
 Materials and Processes Section
 Engineering Branch
 Division of Reactor Safety

8/6/92
 Date Signed

SUMMARY

Scope:

This routine, announced inspection was conducted onsite in the areas of Inservice Inspection (ISI). In addition the following areas were examined: Review of Radiographic Film Packages For Replacement Piping Welds on the Feedwater and Auxiliary Feedwater Systems; Followup on NRC Generic Letter (GL) 89-08 "Erosion/Corrosion-Induced Pipe Wall Thinning"; NRC Information Notices (IN): 88-48 "Licensee Report of Defective Refurbished Valves" and 91-31 "Nonconforming Magnetic Particle (14AM) Prepared Bath."

Results:

The Review of the licensee's Inservice Inspection (ISI) program indicates adequate management and control of the program currently in place. In each of the areas examined the inspectors discovered that nondestructive test (NDE) examiners were conducting conservative examinations in accordance with the appropriate test procedure. NDE procedures were also noted to be very detailed, well organized and technically effective in implementing the applicable code requirements. The licensee's ISI Coordinator, Level III examiner, and NDE supervisors were actively involved in the resolution of technical issues and ensuring that all quality objectives were properly addressed by examiners.

However, several weaknesses were noted and discussed as concerns with senior management. These concerns are as follows: (1) sketches of geometric ultrasonic reflectors did not substantiate the call and no supplemental information was provided; (2) scan limitation sheets are presently not reviewed to determine the percent of weld effectively examined.

It appears that the licensee has established an effective conservative program to maintain high energy carbon steel piping systems within acceptable wall thickness limits.

The licensee has taken appropriate actions in response to IN 91-31. The actions taken in response to IN 88-48 are unclear as they were inadequately documented.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *B. Cheezam, Nondestructive Examination (NDE) Manager
- *J. Cherry, Quality Assurance (QA) Specialist-QATS
- *T. Crowford, System Engineering Manager
- *J. Forbes, Engineering Manager
- *R. Giles, Inservice Inspection (ISI) Coordinator
- *T. Harrall, Safety Assurance Manager
- J. Lowery, Compliance
- *J. McArdle, NDE Technical Support Level III
- *W. McCollum, Station Manager
- *R. Pettit, ISI Outage Support
- *K. Seasely, Compliance

Other licensee employees contacted included technicians, operators, mechanics, security force members, and office personnel.

NRC Resident Inspectors

- *W. Orders
- *P. Hopkins
- J. Zeiler

*Attended exit interview.

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Inservice Inspection (ISI)

The inspectors reviewed documents and records, and observed activities, as indicated below, to determine whether ISI was being conducted in accordance with applicable procedures, regulatory requirements, and licensee commitments. The applicable code for ISI, for both Unit 1 and Unit 2, is the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1980 edition with addenda through winter 1981 (80W81). Unit 1 is in the first outage of the third 40 month period, of the first ten year ISI interval (O1,P3,I1). Unit 1 received their operating license on January 17, 1985 and commenced commercial operations on June 29, 1985. Unit 2 received their operating license May 15, 1986 and commenced commercial operations on August 19, 1986. Unit 2 is operating in the second 40 month period, of the first ten year ISI interval (P2,I1). The licensee's nondestructive examination

personnel are performing the liquid penetrant (PT), magnetic particle (MT), ultrasonic (UT) examinations, and eddy current (EC) examination of Steam Generator (S/G) tubing.

a. ISI Program Review, Units 1 and 2 (73051)

The inspectors reviewed the following documents relating to the ISI program to determine whether the plan had been approved by the licensee and to assure that procedures and plans had been established for the applicable activities.

Unit 1 ISI Plan for Outage 1 Period 3, Interval 1

Unit 1 Steam Generator Inspection Plan for Outage 1 Period 3, Interval 1

b. Review of NDE Procedures, Units 1 and 2 (73052)

The inspectors reviewed the procedures listed below to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were also reviewed for technical content.

Procedures Reviewed

ID	Revision	Title
NDE-10	(R18)	Radiographic Examination Procedure
NDE-25	(R14)	Magnetic Particle Examination Procedure and Techniques
NDE-35	(R13)	Liquid Penetrant Examination
NDE-C	(R4)	Control of Nondestructive Equipment
NDE-600	(R1)	Ultrasonic Examination of Similar Metal Piping Welds in Wrought Ferritic and Austenitic Material
NDE-701	(R1)	Multifrequency Eddy Current Examination of Steam Generator Tubing at McGuire, Catawba, and Oconee Nuclear Stations

Procedures Reviewed (Cont.)

ID	Revision	Title
NDE-707	(R1)	Multifrequency Eddy Current Examination of Nonferrous Tubing Using a Motorized Rotating Pancake Coil
NDE-712	(R0)	Multifrequency Eddy Current Examination of Nonferrous Tubing Using a Motorized Rotating Pancake Coil With the SM-15
B&W-ISI-511	(R4)	RSG Sleeve Post Installation Eddy Current Examination

Relative to the review of procedures indicated above the inspectors noted the following:

- The licensee has two different controlled manuals ("1988 TECHNICAL MANUAL for Duke Power Company" and "Eddy Current Examination Manual For Duke Power Company Catawba, McGuire, Oconee All Units 1991") issued by the Babcock and Wilcox (B&W) document control program, which both contain Procedure No B&W-ISI-511, Revision Nos 2 and 4 respectively. Revision 4 is the appropriate Revision for eddy current examination of RSG sleeves planned for this outage. After some investigation the licensee determined that the B&W document control program had failed to notify holders of the "1988" manual that it had been superseded by the "1991" manual. The licensee notified B&W of the above circumstances. B&W has issued a memorandum dated July 30, 1992 to correct this oversight. The licensee informed the inspectors that no eddy current examinations had been accomplished with the "1988" manual after the issuance of Revision 3 to B&W-ISI-511. The licensee indicated that they would review their program for the control of vendor controlled manuals.
- All procedures reviewed appeared to contain the necessary elements for conducting the specific examination.

c. Observation of Work and Work Activities, Unit 1 (73753)

The inspectors observed work activities, reviewed certification records of NDE equipment and materials, and reviewed NDE personnel qualifications for personnel who had been utilized in the ISI examinations during this outage. The observations and reviews conducted by the inspectors are documented below.

Activities Observed

Liquid Penetrant Examination (PT)

The inspectors observed PT examinations of piping welds listed below. The inspectors performed an independent evaluation of the indications obtained to confirm the NDE examiner's evaluation.

Liquid Penetrant Examinations Observed

Item No	Weld No.	Size	System
B09.011.324A	1NI 152-02	6"x0.719"	Safety Injection
B09.011.325A	1NI 152-03	6"x0.719"	Safety Injection
B09.011.326A	1NI 152-04	6"x0.719"	Safety Injection
B09.011.327A	1NI 153-02	10"x1.00"	Safety Injection
B09.011.328A	1NI 153-03	10"x1.00"	Safety Injection
B09.011.329A	1NI 152-18	6"x0.719"	Safety Injection
B09.011.332A	1NI 162-22*	6"x0.719"	Safety Injection
B09.011.333A	1NI 162-23*	6"x0.719"	Safety Injection
B09.011.334A	1NI 162-24*	6"x0.719"	Safety Injection
B09.011.335A	1NI 162-25*	6"x0.719"	Safety Injection

The inspectors reviewed the certification documentation for penetrant Batch No. 78E084, developer Batch No. 91C17P and cleaner Batch No 91B04K.

The inspectors reviewed the certification, qualification, and visual acuity documentation for PT-II examiners DT and JKT.

The inspectors noted the following relative to the PT examinations observed:

- The examinations of welds marked with an asterisk (*) were prudently terminated by the examiner when the test was compromised by a liquid mist falling on the area of interest.
- The inspectors noted small diameter paint spatter in the area of interest, on several welds, after the examiner had completed the pretest cleaning. The spots were smaller than the minimum reportable indication size. The examiner recleaned the area of interest, and completed an acceptable test. The above is an indication of inattention to detail.
- With the exception of the inattention to detail noted above the examination was performed satisfactorily.

Magnetic Particle (MT) Examination

The inspectors observed a MT examination of weld 1SA52-02, a 6-inch x 0.432-inch butt weld in the Auxiliary Steam system. The inspectors performed an independent evaluation of the indications obtained to confirm the NDE examiner's evaluation.

The inspectors reviewed the certification documentation for gray MT powder Batch No. 91J047, yoke CNO-38, and test weight No. MTC-1.

The inspectors reviewed the certification, qualification, and visual acuity documentation for MT-II examiner DT.

The examination was performed satisfactorily.

Ultrasonic (UT) Examination

The inspectors observed examiners perform equipment calibrations and ultrasonic examinations for the welds listed below. The examinations were observed to

determine whether approved procedures were being followed, if examination personnel were knowledgeable of the examination method and operation of the test equipment, whether welds were properly scanned, and whether examination results and evaluations of the results were recorded, plotted, and dispositioned correctly. The applicable procedure for the examinations was NDE-600, Revision 1. Personnel and equipment certifications were verified by the inspectors. The following ISI examinations were observed by the inspectors:

Ultrasonic Examinations Observed

Weld Number	Item Number	Size
1NI-153-02	B09.011.327	10" DIA x 1.0"
1NI-153-03	B09.011.328	10" DIA x 1.0"
1NI-162-24	B09.011.334	6" DIA x .719"
1NI-162-25	B09.011.335	6" DIA x .719"

The inspectors noted the following relative to the UT examinations observed:

- None of the above welds were completed during the inspectors audit because indications recorded on the 10 inch weld joints and thought to be counterbore at the time had to be re-examined after review of the construction radiographs revealed that the welds did not have a counterbore on the pipe side. The examination of the 6 inch welds revealed that the transducers required by the procedure were too large for the inner-radius of the short elbows being examined.
- The inspectors however, observed enough of each weld examined to determine that the examiners were knowledgeable of the method and the procedure requirements and that, when problems occurred the examiners would make the correct decisions in order to effectively examine the welds.

Eddy Current (EC) Examination

The inspectors observed EC data acquisition activities associated with the S/Gs, and reviewed the qualification and certification, and visual acuity documentation for the following EC examiners.

EC Examiner Records Examined

CWC EC-II	TJC EC-I	RSW EC-II	TDT EC-II
RDS EC-II	BLS EC-I	TWD EC-IIA	ASG EC-II
RLG EC-I	DLP EC-II	RLM EC-I	RWM EC-I
TMH EC-IIIA	LH EC-I	TPC EC-II	TAB EC-II
WAB EC-II	DKB EC-II	BDB EC-II	SDB EC-II
TAB EC-II			

Data acquisition was performed satisfactorily.

d. Data Review and Evaluation Unit 1 (73755)

The inspectors also reviewed completed ultrasonic data of welds where recordable indications had been detected to determine if the indications were properly interpreted and dispositioned. The inspectors also reviewed baseline data of the welds to determine whether the indications were previously recorded and if so, were there any noticeable differences in the recorded information. Records for the following welds were reviewed:

Examination Records Examined

Weld ID Number	Item Number	Component
1SGB-SB-02	C02.021.005	Stud Barrel to Nozzle
1NC-28604	B09.011.071	Cap to Pipe
1CA72-01	C05.021.004	Elbow to Nozzle
1CA70-01	C05.021.003	Elbow to Nozzle
1CF22-01	C05.021.053	Elbow to Nozzle
1CF22-E	C05.021.054	Pipe to Elbow
SG1A	B02.040.001	Channel Head to Tube Sheet

All indications recorded in the above data were evaluated as geometrical reflectors. However, two concerns were identified. One dealt with a 20% indication on Weld No. 1SGB-SB-02 which had not been recorded in previous base line examination data. Plots of the indication indicated that it was located near

the center of the weld. This location if plotted correctly would not be indicative of geometry and no explanation was given in the appropriate resolution block. The examiners who performed the examination were interviewed concerning the disposition of this indication. The examiners stated that, the nozzle configuration caused the sound to redirect and when the indication was plotted using a true 45 degree angle it plotted in the middle of the weld in lieu of the outside or inside surface of the component.

The inspectors held discussions with the Level III examiner and senior management to express their concern that the records did not support the geometrical call and that, no comments were made in the resolution paragraph to give a reviewer of the records adequate information to concur with this call. However, the records had gone through the review cycle. The ISI Manager and the Level III examiner stated that this indication would be resolved, other records verified and examiners and reviewers instructed that evaluation of recorded indications will be appropriately supported either by the sketch or with a sketch and an explanation of any deviation in sound transmission.

The second concern identified by the inspectors dealt with the scan limitation reports. These reports for the welds audited identified significant examination limitations. The inspectors were concerned that at this point (1st outage of the 3rd period) no one is assigning a percentage to the limitations. Any weld limitation over 10 percent (Code Case N-460) of the weld joint would require approval of a relief request from NRC. At this point the licensee does not know how many welds would fall in the reportable category. However, if a large population of welds were reported with significant limitations additional actions may be required by NRC prior to granting the approval. At this point appropriate actions could be taken to ensure that an adequate population of the welds are examined to prevent a possible disapproval of a relief request. The licensee stated that this matter would be reviewed and not an appropriate action taken.

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

3. Review of Radiographic Film Packages For Replacement Piping Welds on the Feedwater and Auxiliary Feedwater Systems
Unit-2 (57090)

The inspectors examined the radiographic film and records for the welds listed below to determine whether they were prepared, evaluated, disposition, and maintained in accordance with the licensee's approved procedure NDE-10, Rev. 18.

Radiographs Examined

Weld ID No.	SIZE
2NC116-29	3"DIA X .438" THK.
2NC116-30	3"DIA X .438" THK.
2CA72-15	4"DIA X .337" THK.
2CA122-5	4"DIA X .337" THK.
2CA122-6	4"DIA X .337" THK.
2CA122-7	4"DIA X .337" THK.
2CA122-10	4"DIA X .337" THK.
2CA122-11	4"DIA X .337" THK.
2CA122-12	4"DIA X .337" THK.
2CA150-11	4"DIA X .337" THK.
2CA150-12	4"DIA X .337" THK.
2CA150-13	4"DIA X .337" THK.
2CA150-14	4"DIA X .337" THK.
2CA150-15	4"DIA X .337" THK.
2CA150-16	4"DIA X .337" THK.
2CA150-17	4"DIA X .337" THK.
2CA150-22	4"DIA X .337" THK.
2CF100-10	4"DIA X .337" THK.
2CF100-11	4"DIA X .337" THK.
2CF100-12	4"DIA X .337" THK.
2CF100-13	4"DIA X .337" THK.
2CF100-14	4"DIA X .337" THK.
2CF100-46	4"DIA X .337" THK.
2CF37-1	4"DIA X .337" THK.
2CF37-2	4"DIA X .337" THK.
2CF37-3	4"DIA X .337" THK.
2CF37-44	4"DIA X .337" THK.
2CF37-45	4"DIA X .337" THK.
2CF37-46	4"DIA X .337" THK.
2CF37-49	4"DIA X .337" THK.
2CF37-50	4"DIA X .337" THK.
2CF37-51	4"DIA X .337" THK.
2CF37-52	4"DIA X .337" THK.
2CF37-53	4"DIA X .337" THK.
2CF37-54	4"DIA X .337" THK.
2CF37-55	4"DIA X .337" THK.
2CF38-38	4"DIA X .337" THK.
2CF38-28	4"DIA X .337" THK.
2CF38-29	4"DIA X .337" THK.
2CF98-1	4"DIA X .337" THK.
2CF98-3	4"DIA X .337" THK.

Radiographs Examined (Cont.)

Weld ID No.	SIZE
2CF98-4	4"DIA X .337" THK.
2CF102-1	4"DIA X .337" THK.
2CF102-2	4"DIA X .337" THK.
2CF102-3	4"DIA X .337" THK.
2CF102-4	4"DIA X .337" THK.

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

4. Followup (92701)

- a. NRC Generic Letter (GL) 89-08: "Erosion/Corrosion-Induced Pipe Wall Thinning"

This GL requested licensees to provide assurances that a long term Erosion/Corrosion (E/C) monitoring program is in place, consisting of systematic measures to ensure that E/C does not lead to degradation of single and two phase high energy carbon steel piping systems.

As discussed in NRC Inspection Report 50-413,414/91-26 the licensee has established an E/C inspection program which uses Keller equation calculations, industry experience, the Electric Power Research Institute (EPRI) CHEC and CHECMATE computer programs and previous inspection data as predictive tools for the determining and prioritizing inspection locations. The licensee is still building the CHECMATE electronic model. This program is implemented by Nuclear Production Department "Piping Erosion Control Program Manual", the unit specific "Piping Erosion Control Manual", and Procedure PT/O/B/4600/18, dated 7/8/92, "Periodic Inspection of Pipe Wall Thickness". The unit specific "Piping Erosion Control Manual" contains test result summaries, and the evaluations of results for successive outage testing. The manual is updated after every inspection outage and is used to trend each inspection point in the program.

The inspectors reviewed the licensee's program, examined marked grids, observed data collection, interviewed licensee personnel and reviewed inspection data and calculations to evaluate the licensee's E/C program.

Observations/Findings

The inspection sample is selected on an outage by outage basis, based on the data from previous outages. The licensee's program has 709 and 733 test locations for Units 1 and 2 respectively. During the "End of Cycle 6" outage for Unit 1, 188 test locations will be examined. The licensee's program currently deviates from the EPRI CHECMATE recommendations as follows:

- ° EPRI recommends that the inspection cover an area from two inspection grids up stream of a component to two diameters down stream of the component. This provides an understanding of the counter bore area and a clearer understanding of the E/C pattern in the component. Currently the licensee does not examine two grids up or down stream of the component on piping 16-inch and larger. It should be noted that although not consistent with EPRI CHECMATE, the licensee's marking practices are consistent with ASME B&PV Code Section XI Draft 5 Subsection IWH dated 10/16/91.

Notwithstanding the above, it appears that the licensee has established an effective conservative program to maintain high energy carbon steel piping systems within acceptable wall thickness limits.

- b. NRC Information Notice (IN) 88-48: "Licensee Report of Defective Refurbished Valves"

In this IN and the two associated supplements, the staff discussed the problem (counterfeit valve) that Pacific Gas and Electric Company found with what they believed to be a valve manufactured by Henry Vogt Company in a non-safety related (NSR) system.

The licensee's documentation for this issue indicates that this matter is of no concern to Catawba. The supporting basis for this decision is only a reference to an individual. The inspectors discussed this matter with the licensee, indicating that the practice of using an individual as the basis for a decision (e.g. "per J. Doe") is ill-advised because of transitory nature of personnel. The actual basis for a decision could be lost when the individual leaves. The licensee indicated that they would revisit this issue and provide a more definitive closure.

- c. NRC Information Notice (IN) 91-31: "Nonconforming
Magnetic Particle
(14AM) Prepared
Bath"

This IN transmitted a Magnaflux Notice which recalled three batches of 14AM MT aerosol prepared bath, and included a warning for six others.

The licensee reviewed their records and determined that they have never received any of the material identified in the IN.

The licensee has taken appropriate action in response to this IN.

In the areas inspected, no violations or deviations were identified.

5. Exit Interview

The inspection scope and results were summarized on July 31, 1992, with those persons indicated in paragraph 1. The inspectors described the areas inspected. Although reviewed during this inspection, proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

6. Acronyms and Initialisms

ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
B&W	-	Babcock and Wilcox
EC	-	Eddy Current
E/C	-	Erosion/Corrosion
EPRI	-	Electric Power Research Institute
GL	-	NRC Generic Letter
ID	-	Identification
ISI	-	Inservice Inspection
IN	-	NRC Information Notice
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
No.	-	Number
NPF	-	Nuclear Power Facility
NRC	-	Nuclear Regulatory Commission
NSR	-	Non Safety-Related
P.E.	-	Professional Engineer
PT	-	Liquid Penetrant
QA	-	Quality Assurance
R	-	Revision
RSG	-	Recirculating Steam Generator
S/G	-	Steam Generator
UT	-	Ultrasonic