UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

Report Nos.: 50-269/94-17, 50-270/94-17 and 50-287/94-17

Licensee: Duke Power Company
422 South Church Street
Charlotte, NC 28242-0001

Docket Nos.: 50-269, 50-270, and 50-287

License Nos.: DPR-38, DPR-47, and DPR-55

Facility Name: Oconee Nuclear Station

Inspection Conducted: May 16 - 20 and 23 - 27, 1994

Inspectors: B. R. Crowley — Date Signed: 6/15/94

N. Economos — Date Signed: 6/15/94

Approved by: J. J. Blake, Chief — Date Signed: 6/23/94
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted on site in the areas of Inservice Inspection (ISI), including hydrostatic testing of piping systems and inspection and repair of steam generator tubes. In addition, modifications, the status of the Erosion/Corrosion (E/C) program, and corrective actions for previous inspection findings were inspected.

Results:

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

Relative to ISI, adequate performance was observed. Hydrostatic testing was being performed in a professional manner by qualified personnel in accordance with approved procedures. However, weaknesses were identified relative to: (1) the lack of administrative procedures for assignment of hydrostatic test numbers and identifying to craft personnel the scope of individual tests, and

(2) poor organization of Relief Requests documentation. Eddy Current (ET) examination of the two once through steam generators (OTSGs) was performed in accordance with Technical Specification (TS) requirements.

The licensee's E/C program has weaknesses in that the program is not well defined procedurally. However, based on discussions with licensee personnel and limited review of repair history, degraded/susceptible piping is being identified and corrective measurements taken to prevent piping failures.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

J. Batton, OTSG Engineer
B. Carney, Component Engineer
#*T. Coleman,Technical Specialist - ISI
*D. Dalton, Generation Services Department
T. Dearing, ET Acquisition Supervisor
V. Dixon, Hydro Engineer
*B. Dolan, Safety Assurance manager
E. Few, Senior Technical Specialist
*B. Foster, Maintenance Superintendent
C. Freeman, NDE Supervisor
M. Hipps, Mechanical Maintenance Manager
H. Jones, Maintenance Supervisor
J. McArdle, Level III Nondestructive Test Examiner
*B. Millsaps, Mechanical/Civil Equipment Manager
S. Nader, Mechanical Systems Engineering Supervisor
D. Nix, Compliance Engineer
E. Painter, Mechanical Maintenance
S. Perry, Assistant License Coordinator
M. Pyne, Welding Engineer
*T. Royal, Mechanical Engineering Supervisor

Other Organizations

Babcock & Wilcox Nuclear Technologies (BWNT)

M. Munsterman, Task Leader - Welding
R. Pruit, Process Engineer
B. Stallings, Site Manager
D. Tokarsky, QA Task Leader

Other licensee and contractor employees contacted during this inspection included engineers, QA/QC personnel, security force members, technicians, and administrative personnel.

NRC Employees

*P. Harmon, Senior Resident Inspector
G. Humphrey, Resident Inspector
K. Poertner, Resident Inspector

*Attended preliminary exit interview on May 26, 1994
#Attended final exit on May 27, 1994

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

2. Inservice Inspection

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 is the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1980 Edition with Addenda through Winter 1980, except selection of category B-D class 3 components is in accordance with the 1980 Edition including Addenda through the Winter of 1982. The Safety Evaluation Report (SER) for the second ten year ISI plan and original issue relief requests is dated May 14, 1991. Oconee 1 is in the 15th refueling outage and the 3rd period of the second ten year ISI interval. The current outage will be the last refueling outage prior to the end of the second 10 year interval.

The licensee's Generation Services Department is responsible for the ISI program and furnishes nondestructive examination (NDE) inspection personnel. The site Mechanical/Civil Engineering Group is responsible for implementing the ISI program including the hydrostatic test program.

a. ISI Program Review (73051) (Unit 1)

The inspectors reviewed the following documents related to the ISI program:

- Second Interval Inservice Inspection Plan, Revision 8
- QAL-5, Revision 12, Control of Preservice and Inservice Inspection Activities
- QA-513, Revision 9, Control of Inservice Inspection Plans and Reports
- QA-514, Revision 4, Procedure for Discrepancies Identified During Inservice Inspection Visual Examination of Supports (ONS and MNS Only)
- QA-516, Revision 2, Evaluation of ISI Indications

The documents were reviewed to verify:

- The plan had been approved by the licensee
- Relief requests had been approved by NRR
- The services of an Authorized Nuclear Inservice Inspector (ANII) had been procured and that the ANII was involved in ISI-activities.

- Procedures and plans had been established (written, reviewed, approved and issued) to control and accomplish the following applicable activities: program organization including identification of commitments and regulatory requirements, preparing plans and schedules, and qualification, training, responsibilities, and duties of personnel responsible for ISI; NDE personnel qualification requirements; and guidance for identifying and processing relief requests.

Since the current outage is the last outage of the second 10-year interval, the inspectors attempted to assess the status of ASME Section XI Relief Requests for the interval. The inspectors found that it was very difficult for the licensee to determine the status of Relief Requests issued early in the interval. After spending considerable time investigating their records and discussions with NRR, the licensee was able to provide the inspectors the status of the second interval Relief Requests. The following is a summary of this effort:

- At the beginning of the interval, the licensee's corporate office was responsible for Relief Requests. Therefore, site records were not complete and it was very difficult to determine the status of the early Requests. Later in the interval, the responsibility for Relief Requests was transferred to the site.

- After extensive review, the licensee was able to show that all Relief Requests, with exception of 88-08 and 89-01, through 92-11 have received NRC response and have either been granted, granted with comments, denied, or determined to not need approval. Comments on Requests ONS-001 and 002, relative to reactor vessel nozzle welds, has not been fully resolved and Request 93-08 has been issued to update the status of actions in response to the comments and delay the required surface examinations until the third interval. The Request has been granted. Request ONS04 was denied and has been resubmitted. The licensee could not find any response to Requests 88-08 and 89-01. During the inspection, their discussions with NRR revealed that NRR did not have any record of receiving these two Requests. At the conclusion of the inspection, the licensee was determining if these two Requests are still needed.

- According to licensee records, in addition to Relief Requests 88-08 and 89-01, Safety Evaluation Reports (SERs) have not been issued for the following Requests:

92-12	93-04	93-01
92-13	93-05	94-02
92-14	93-06	94-03
ONS04	93-07	
93-02	93-11	
93-03	93-12	

In addition, a generic Relief Request 93-GO-01 for all DPC sites relative to limited examinations has been issued and has not been responded to.

- Relief Request 93-01, relative to less than 100% coverage of the reactor vessel to flange weld, was denied by NRR. After further evaluation, the licensee determined that inspection techniques were available to achieve inspection of the required volume. The weld was re-inspected during the current outage. The inspector reviewed the records for the re-inspection (See paragraph 2.d. below).

- Relief Request 93-11 requested relief from hydrostatic test requirements for the class 3 portion of the Feedwater (FW) system. As an alternate examination, the licensee proposed visual (VT-2), inspection at normal operating pressure. Based on discussions with NRR, the Request was modified by letter dated May 17, 1994, to specify RT inspection of a sample of the welds involved in the Relief Request. See paragraphs 2.c.(2) and 4.b. below for details of the film review performed by the inspectors.

- As noted above, extensive reviews were required by the licensee to determine the exact status of the 2nd interval Relief Requests. The poor organization of Relief Requests documentation was considered to be a weakness. It was noted that for later Relief Requests, starting in 1992, a computerized list developed to track the submittal and approval documentation appeared to work well.

b. Review of Procedures (73052) (Unit 1)

The inspectors reviewed the following procedures to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were reviewed in the areas of procedure approval, requirements for qualification of personnel, compilation of required records, and division of responsibility between the licensee and contractor personnel. In addition, the procedures were reviewed for technical adequacy and conformance with ASME, Sections V and XI, and other licensee commitments/requirements.

- QAL-15, Revision 9, Inservice Inspection (ISI) Visual Examination, VT-2, Pressure test

- MP/O/A/1720/010, Change 23, System/Component Hydrostatic Test Controlling Procedure
- MP/O/A/1720/016, Change 12, System/Component Pressure Test Controlling Procedure
- MP/O/A/1720/015, Change 7, Piping - Pneumatic Test - After Installation, Repair, or Modification
- NDE-10, Revision 18, General Radiographic Procedure (Nuclear Stations)
- NDE-35, Revision 14, Liquid Penetrant Examination
- NDE-701, Revision 2, Multifrequency Eddy Current Examination of Steam Generator Tubing at McGuire, Catawba and Oconee
- NDE-703, Recision 4, Evaluation of Eddy Current Data for Steam Generator Tubing
- NDE-707, Revision 2, Multifrequency Eddy Current Examination of Non-Ferrous Tubing Sleeves and Plugs Using A Motorized Rotating Coil Probe
- NDE-708, Revision 2, Evaluation of Eddy Current Data for Non-Ferrous Tubing, Sleeves, & Plugs Using MRPC
- NDE-711, Revision 1, Evaluation of Eddy Current Data of Sleeved OTSG Tubing

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

The inspectors observed work activities, reviewed personnel qualification records, and reviewed certification/calibration records for equipment/materials, as detailed below. The inspectors verified: availability of and compliance with approved procedures, compliance with Code requirements, use of knowledgeable personnel, and use of personnel qualified to the proper level. In addition, general inspection quality, including in-process documentation, and inspection results were evaluated.

(1) Liquid Penetrant Inspection (PT)

The inspectors observed the in-process PT examination of the welds listed below. Observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

1-53B-4-46	1-51A-1PT-155
1-53B-4-40	1-51A-1PT-156
1-53B-4-42	1-51A-1PT-157
	1-51A-1PT-158
	1-51A-1PT-47

(2) Radiographic Inspection (RT)

The inspectors reviewed RT film for the welds listed below. Observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

*1-03-4.2-18B
*1-03-4.2-8B
*1-03A-3-69AB
*1-03-4-9B
*1-03-3-33B
*1-03-3032B
#1-LP-94-40
#1-51A-136-33
#1-51A-134A-31
**1-03-4-21BC
**1-03-3-25C
**1-03-4-19B
**1-03-3-34C

*Welds RT inspected as part of Relief Request 93-11

#Modification welds

**These were original Construction RT film review by the licensee because of rejectable defects identified in original construction welds 1-03-4.2-18B and 1-03-4.2-8B (See PIP 1-094-0682). During RT inspection of FW system welds as part of Relief Request 93-11, the licensee identified rejectable linear indications in welds 1-03-4.2-18B and 1-03-4.2-8B. As noted in paragraph 4.b. below, the indications were present in the original construction RT film. To evaluate this condition, the licensee issued Problem Investigation Process (PIP) report 1-094-0682. Part of the investigation included review of additional original construction RT film for other welds in the FW system. This review process was on-going at the close of the inspection. PIP 1-094-0682 corrective actions will be reviewed during the next ISI inspection.

(3) Hydrostatic Testing

The inspectors witnessed hydrostatic testing for Hydro 13HR187, including the review of the in-process record package. In addition, in-process and/or completed record packages for Hydros 12HR-161, 12HR-165, and 12HR-175 were reviewed.

Personnel (QA and Craft) qualification and knowledge, equipment calibration, tests boundaries, general quality of tests, and compliance with procedure and Code requirements were examined.

During the above observations/reviews, the inspectors noted a weakness relative to assigning Hydro numbers and color coding drawings to identify the scope of individual tests. Color coded drawings showing the ASME Section XI class boundaries are provided to the site Hydro Engineer by program personnel. Based on these class boundary drawings, the Hydro Engineer developed his own system, using color coded drawings, for assigning hydrostatic test numbers and delineating the components/piping to be covered by the test as well as the test boundary for individual tests. In addition, a set of color coded drawings is used to designate the status of testing for each system, i.e., which portion of the system has been tested during previous tests and which portions remain to be tested to complete the interval requirement. Although these systems for identifying the status of testing, assigning test numbers, and identifying test boundaries appears to work well, there are no administrative procedures detailing these activities. The inspectors identified the lack of administrative procedures for these activities as a weakness in the hydrostatic test program. The licensee agreed with this weakness and stated that administrative procedures will be developed and issued.

(4) Personnel Qualifications

The inspectors reviewed personnel qualification documentation as indicated below for personnel who performed the tests and examinations detailed in paragraphs (2) and (3) above and paragraph 3 below. These personnel qualifications were reviewed in the following areas: employer's name; person certified; activity qualified to perform; current period of certification; signature of employer's designated representative; basis used for certification; and, annual visual acuity, color vision examination, and periodic recertification.

EXAMINER RECORDS REVIEWED

Method	Level	NUMBER	EMPLOYER
ET	I	8	DPC
ET	II	12	DPC
ET	IIA	1	DPC
ET	II	2	BWNT
VT-2	II	3	DPC

(5) Equipment Certification Records

Equipment/material certification records, as listed below, for equipment/materials used in the inspections detailed in paragraph (1) above and paragraph 3 below were reviewed to ensure compliance with applicable requirements.

Equipment/Material Type	Identification
Penetrant Cleaner	Batch # 92K001
Penetrant	Batch # 87K043
Penetrant Developer	Batch # 92J05K
Penetrant Developer	Batch # 91C17P
Thermometers	Serials #s OCNDE30016 and 3766
MIZ-18A RADUs	Serial #s 016, 050, 081 and 180
RWT Power Supply	Serial # 5009602
Oscilloscope	Serial # VH 2176
Volt Meter	Serial # VH 2175
Pressure Gauge	Serial # 3954

d. Data Review and Evaluation (73755)

The current outage is the last outage for the second 10-year ISI interval. To evaluate the licensee's completion of all inspections required for the 2nd interval, the inspectors selected the Reactor Coolant (RC) system, Code Item Numbers B09.011 and B09.012, for review. The inspection results recorded in the ISI Outage Reports for outages 8, 9, 11, 12, and 13 were compared with the Second Interval Inservice Inspection Plan requirements. For the RC system, all inspections required in the 2nd interval plan were identified in the outage reports as having been completed.

The inspectors reviewed ultrasonic (UT) inspection reports and calibration records for the following welds/components inspected during the current outage:

Item Number	ID Number	Item Description
B09.011.118	1PSL-7	Surge Line Weld
*B06.040.001	1RPV-Ligaments	RPV Flange Ligaments
*B06.040.001A	1RPV-Ligaments	RPV Flange Ligaments
*B01.030.001A	1RPV-WR19	RPV Flange to Vessel Weld
*B01.030.001B	1RPV-WR19	RPV Flange to Vessel Weld
E01.001.001	RRCP-1A1	RC Pump Flywheel
E01.001.002	RRCP-1A2	RC Pump Flywheel
E01.001.003	RRCP-1B1	RC Pump Flywheel
E01.001.004	RRCP-1B1	RC Pump Flywheel

* Reinspection in response to denial of Relief Request 93-01

RESULTS

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

Weaknesses were identified relative to: (1) the lack of administrative procedures for assignment of hydrostatic test numbers and identifying to craft personnel the scope of individual tests, and (2) poor organization of Relief Requests documentation

3. Eddy Current Examination of OTSG Tubes (73753) (Unit 1)

See paragraph 2 above for applicable Code and documentation of review of procedures, personnel qualification records, and equipment qualification/calibration records.

As stated earlier, ISI activities during this outage included eddy current examination of tubes in "A" and "B" steam generators. data acquisition and analysis was being performed in accordance with procedures identified earlier in this report. Controlling documents/code by reference, included ASME Code Section XI (80W80), Regulatory Guide 1.83 (July 1975), and Code Cases N-401 and N-402. Data acquisition was being performed by licensee personnel. Data analysis was being performed at the McGuire Nuclear Station. Examinations were being performed with a multifrequency bobbin coil technique computerized MIZ-18A, remote data acquisition units (RDAUs).

a. Inspection Plan

The following summarizes the licensee's steam generator ET inspection program for the current outage.

- "Bobbin" Probe - The planned inspection included full length examination of approximately 60 percent (9325 for OTSG "A" and 9333 for OTSG "B") of the tubes in each generator. At the close of this inspection all tubes had been examined and analyzed.

- "Sleeve/Crosswound" - The planned inspection included 100 percent of the sleeves in both OTSGs (256 in "A" and 196 in "B"). Inspection was completed and all inspection results analyzed and resoled for the sleeve inspections.

- "MRPC LANE & WEDGE" - For "Lane and Wedge" area tubes, the planned inspection included 235 tubes in S/G "A" and 217 tubes in S/G "B." At the close of the inspection, all tubes scheduled for this type examination had been inspected and analyzed; no further problems were identified.

- "MRPC, Re-examined Tubes" - Ten tubes in S/G "A" and 18 in S/G "B" were in the inspection program. Examination in both S/Gs had been completed; one tube in S/G "B" was scheduled for reexamination.

- "Rolled Plugs" - Inspection plans called for MRPC examination of 100 percent of inconel-600 plugs. Examination of inconel-690 plugs included a baseline examination involving 33 percent of plugs installed during the previous outage and a random sample of about 20 percent of Inconel-690 plugs in the hot leg of "A" and "B" S/Gs. A summary, of plugs inspected during this outage is as follows:

Activity	"A" H/L	"A" C/L	"B" H/L	"B" C/L
100%, I-690 Plugs	41	46	103	117
Baseline and *Random sample of I-690, Plugs	53	46	193	160
Total	94	92	296	277

*The random sample involved plugs in the hot leg only.

At the close of this inspection all scheduled examinations as outlined in the plan had been completed. Analysis of results was complete, except that the list of tubes to be removed from service had not been finalized.

Following the close of this inspection, the licensee provided the inspector the total number of tubes plugged as a result of this and previous ET examinations, which were as follows:

	S/G "A"	S/G "B"
Tubes Removed from Services Prior to this Outage	291	1050
Tubes Plugged During this Outage	43	128
TOTAL Tubes Removed from Service	334	1178
Percentage of tubes plugged - 15,531 tubes per S/G	2.2%	7.6%

b. OTSG Tube Repairs

(1) Loose Roll Plug, S/G "B," Lower Tube Sheet

On May 11, 1994, BWNT issued nonconformance report (NCR) #94-00255 to document that a roll plug was observed missing from tube location 130-89 in S/G "B" lower tubesheet. The loose

plug, which records showed was installed in January 1989, was subsequently discovered broken in two pieces and found lodged in the fuel bundle inside the vessel. Both pieces were subsequently retrieved and forwarded to BWNT Lynchburg for failure analysis. During the winter 1993, Unit 3 refueling outage, a similar problem occurred in that, several roll plugs were found missing from S/G "B", (see Reports 94-01 and 94-04 for details). By document review and discussions with cognizant personnel the inspectors ascertained that the loose roll plugs on S/G "B" were installed with the same Roger Roll Tool and Roll Expander. Diagnostic and corrective actions taken to disposition the subject NCR included MRPC ET examination and pull testing of all inconel-600 rolled plugs in both S/Gs. This provided a check of all roll plugs installed with the Roger Tool in question. The pull test was performed per BWNT Drawing #1169333A, Rev. 23, "Field Procedure for Remote Rolled Plug Removal by Tig Relaxation."

Basically, the rolled plugs were subjected to a specified pull load of approximately 2,000 lbs. to look for movement. Any movement of less than 0.040 inches indicated the plugs were installed satisfactorily and as such were acceptable for continued service.

Results:

A total of 79 plugs were pull tested in S/G "A" and 136 in S/G "B." Of these, one roll plug in tube location 77-07 in S/G "A" upper tubesheet, appeared to have moved slightly. The plug was removed and replaced with a remote weld plug (RWP). In S/G "B," one roll plug in tube location 104-117 in the upper tubesheet broke off near the head of the plug when the pull load reached a force of approximately 1200 lbs. The inspectors examined the head section of this plug and observed no apparent anomalies in the fracture surface or the OD surface.

A second roll plug located in tube location 102-52 in the lower tubesheet exhibited movement that exceed the minimum acceptable limit. Both plugs were replaced with RWPs. A summary of roll plugs requiring repairs as a result of the pull test is as follows:

Plug Location	Reason For Repair
130-89	Broken plug retrieved from vessel S/G "B" lower tubesheet
104-117	Plug head broke off on pull force of ~ 1200 lbs. S/G "B" upper tubesheet

102-52	Movement detected on pull force of ~ 2200 lbs. S/G "B" lower tubesheet
77-07	Movement suspected during pull test S/G "A" upper tubesheet

The broken plug from location 130-89 in S/G "B" and the plug head from location 77-07 in S/G "A" were sent to BWNT, Lynchburg, VA for failure analysis.

The inspector reviewed the pull test procedure which appeared as an attachment to the above referenced NCR and observed pull testing of plugs in progress. The Testing was performed in an orderly and satisfactory manner. Equipment was properly calibrated and results were adequately documented and recorded on video tape for future reference.

(2) Roll Plug Installation

OTSG tubes exhibiting rejectable ET indications were removed from service by plugging them with mechanically rolled plugs. As documented earlier in this report, this included 43 tubes in S/G "A" and 126 out of 128 tubes in S/G "B." The two remaining tubes in S/G "B" involved one tube that was pulled for investigation even though it was free of rejectable ET indications, while the other was inadvertently spotfaced during the preparation of an adjacent tube for RWP. Both tubes were plugged with RWP(s). The controlling document for roll plugging was drawing #1154835A, Rev. 34, Field Procedure for Remote and Manually Rolled Plugging. The inspectors reviewed the subject procedure for content and adequacy, observed tool calibration and reviewed records of the following associated equipment:

Item	Serial No.
Pressure Gauge	VH 259
Torque Analyzer	VA 659
Roger Roll Tool	500-7368

These calibration records had been reviewed and found acceptable by BWNT's QA group.

Work Observation

The inspectors observed a test roll performed with roll plug S/N 122 on May 20, 1994, and observed roll plugs installation in the following tube locations:

OTSG "A" Lower Tubesheet

Tube No.	Plug S/N No.	Torque Time
77-125	CF-36-2-91	28.22 seconds
80-127	CF-26-2-14	26.7 seconds
84-126	CF-36-2-41	25.4 seconds

(3) Installation of Remote Welded Plugs

Through discussions with cognizant licensee personnel, the inspectors ascertained that the licensee planned, as a precautionary measure, to plug with remote weld plugs 23 tubes which had been previously plugged with explosive charge plugs. These plugs were located in the S/G "B" upper tubesheet. Use of the automatic weld process to perform this repair at Oconee has been authorized by the Commission by memorandum from D. B. Matthews to M. S. Tuckman dated September 13, 1991. Qualification of the weld procedure and welding operators was performed according to the requirements of the 1989 Edition of ASME Code, Section XI. Stress and fatigue analyses of the plugs and sizing of the fillet welds were based on the requirements of the 1989 Edition of ASME Code, Section III. The remote weld plugs (RWPs) to be used for this purpose were made of inconel-690 material.

Welding of the RWPs was performed with the remote control automatic gas tungsten arc welding (GTAW) process. The following documents were reviewed for content and compliance with the applicable code requirements.

SPP-2	General Procedure for Arc Welding Task Deployment Letter, Rev. 0, Remote Welded Plug Task No. 9
50-1212515-02	Remote Welded Plug Installation Process
51-1205304-05	WPS/OTSG/Plug-01
1211109A, Rev. 5	Calibration Procedure for Remote Weld Tool Power Supply
1211285A, Rev. 2	Remote Weld Tool System Set-up Instruction
WGT-30, Rev. 2	Welder Qualification Testing

In addition to the above, the inspectors reviewed welding procedure qualification records - 6470, Rev. 2; 6471, Rev. 2; 6472, Rev. 1; and 6473, Rev. 1. These records indicated the procedure was qualified in the flat and overhead positions.

The minimum throat thickness of fillet weld produced was 0.035 inches. The weld was made using a stringer bead, single pass technique with a travel speed of about 1 ½ RPM. The plugs were welded on the clad surface of the tubesheet. Weld operator performance qualification records for eleven individuals were reviewed and found to be in order. Certification records of materials used in this application were reviewed for compliance with applicable code requirements and are listed below:

Item	Ht. Number	Purchase No.
RWP	NX7120HK-11	1204793-001
RWP	NX6977HK-12	1208542-001
RWPs, Tapered	CF36-2-01 Through - 012	12085420991
Filler Metal	NX7681D	QA #23-1206024-01
	NX7906D	QA #23-1206024-02

During this inspection, the inspectors observed fabrication of a test weld produced using a tubesheet simulation block and a plug. The weld was fabricated using remote control production equipment. Following weld completion, the inspectors inspected the subject weld and found it to be satisfactory. No further welding was performed while the inspectors were on site.

c. Tube Pulls for Investigation

As part of an on-going program to investigate the root cause of tube failure mechanisms in OTSGs, the licensee identified nine tubes as pull candidates for this outage. One of the applicable procedures used to perform this task was 1151433A, Rev. 21, Tube Pull Field Procedure. The tubes designated for pulling were as follows: 20-48, 50-13, 134-58, 30-41, 129-54, 5-116 and 34-19. These tubes were cut and pulled per procedure 1208517A, Rev. 11, Field Procedure for Machining Steam Generator Plugs and Tubes. The inspectors observed several aspects of this task including boring, end-facing and cutting several of the tubes above. The task was performed by well trained personnel under the direct supervision of a cognizant engineer who directed the effort. The seven holes in the tubesheet left by the subject tube pulls were plugged using RWPs and the welding procedure discussed earlier in this report.

d. Review of Nonconformance Reports

A sample of NCRs were selected at random for review for content, adequacy of technical information, and disposition. NCRs selected for this review were as follows:

94-00029, Rev. 1	Video Verification of Air Flow Verification Assembly and Torque Out
94-00255, Rev. 0 through Rev. 5	Plug from Tube 130-89 Missing
94-00262, Rev. 0	Tubesheet Bore Cutter Identification and Cutting Edge Design
94-00263, Rev. 0	Tubesheet Bore Cutter Serial Numbers

The review determined the NCRs were clearly written, evaluated and adequately dispositioned.

Within the areas inspected violation or deviations were not identified.

4. Facility Modifications (37700/55050) (Unit 1)

a. Stainless Steel, Slip-On flanges with Inadequate Material Traceability Records

Background

In November 1992, Consolidated Power Supply (CPS), notified Duke Power of a 10 CFR 21 evaluation relative to DPC's Purchase Order A38143-17 dated October 17, 1992. DPC bought 16 slip on flanges, made of SA182 F304 material, that could not be traced to acceptable test data for the heat of material (465591) used for the flanges. The evaluation stems from a 10 CFR 21 report issued to the NRC by CPS on October 20, 1992, involving deficient material manufactured by Texas Metal Works (TMW) and subsequently upgraded by CPS. The basis for the initial report is that the same starting piece of material was not utilized for the test coupons used in the ASME Code upgrade process as that used for the finished material. Six of the flanges were used at Oconee. Four of the six were installed in Unit 1; two on the 1A LPI cooler channel head and two on the LPI pipes that attach to the 1A LPI cooler. These were installed during EOC-14 refueling outage. The remaining two flanges are on the 2ALPI Cooler Channel Head, which is in storage.

Reviews/Observations

By record review, the inspectors ascertained that, following an in depth material evaluation, the licensee concluded that the suspect flanges in service at Oconee met SA-182, F-304 material minimum mechanical properties and, therefore, should perform satisfactorily in the application. However, because some questions still remained with respect to the history of the material, which could be resolved by applied nondestructive testing methods, the licensee decided to replace the Unit 1 flanges during this outage. The inspectors reviewed replacement material quality records, including certified material test reports and the licensee's supplier QA certification

report. The replacement flanges were purchased form CPS under PO No. F14201-K5. The material was produced from Heat No. 30765, Lot No. 3012 per SA182, F304 and was classified as ASME Code Section III, 1989 Edition, 1989 Addenda Class 2 material. Flange replacement was performed under work order number 9307069301, "Replace Four Ten Inch Flanges on 1A LPI Cooler, Equipment LPIHX000A." Welding was performed per Field Weld Data Sheet L-231, Rev. 18, using the gas tungsten arc welding (GTAW) process. Weld procedure and welder performance qualification records for five (5) welders were reviewed for compliance with applicable code requirements and were found to be in order. The controlling code for welding and nondestructive examinations was Nuclear Power Piping B31.7, 1969 Edition. The work was being performed under ASME Code Section XI Repair and Replacement rules. The system and associated pipe welds were classified as ASME Section XI, Class 2 and Duke Class B Category.

The inspectors observed the following completed welds to verify that surface conditions and weld appearance were consistent with applicable code requirements and good workmanship practices.

Weld No.	Dwg. No.	Description	Condition
1-LP94-33	1-LP94 Rev. 11	Pipe to Flange	Accept
1-LP94-34	1-LP94 Rev. 11	Pipe to Flange	Accept
*1-LP94-35	1-LP94 Rev. 11	Pipe to Pipe	Mismatch
*1-LP94-36	1 LP94 Rev. 11	Pipe to Pipe	Mismatch
1-LP93-20	1-LP93 Rev. 9	Pipe to Flange	Accept
1-LP93-21	1-LP93 Rev. 9	Pipe to Flange	Accept
1-LP93-22	1-LP93 Rev. 9	3/4" Socket	Accept

*These two welds were radiographed and rejected repeatedly because of defects associated with joint mismatch. Following six unsuccessful attempts to repair defects associated with the mismatch condition, the licensee decided to replace the two pipe welds with flange connections. In reference to the repeated rejectable weld repairs, the inspectors expressed concern over the apparent inability of qualified welders to fabricate and/or make repairs on thin wall large diameter pipe where accessibility and environment were not a factor. The inspectors indicated that this problem suggests an apparent weakness in welder training/proficiency and pre-planning. It would appear that the mismatch condition should have been recognized as a potential problem to an acceptable weld and corrected before attempting to weld the joint. A review of material quality records and personnel qualifications showed them to be in order.

b. Repair of Fabrication Defects in Feedwater Welds

As noted in paragraph 2.a. above, Relief Request 93-11 requested relief from hydrostatic test requirements for the class 3 portion of the FW system. Based on discussions with NRR, the Request was

modified by letter dated May 17, 1994, to specify RT inspection of a sample of the welds involved in the Relief Request. Two of the welds radiographed exhibited Code rejectable linear, indications which required repair. The welds were identified as follows:

Weld Number	Size	Description
1-03-4.2-18B	24" dia. X 1.219"	Pipe to Reducer
1-03-4.2-8B	24" dia. X 1.219"	Pipe to Pipe

Through discussions with cognizant licensee personnel, the inspectors ascertained that the licensee reviewed the original construction radiographs and confirmed the subject indication were present in the original radiographs used for weld acceptance. The inspectors reviewed the original construction RT film and the film shot in lieu of hydrostatic testing during the current outage. This review confirmed the indications were present in the original film as reported by the license.

Weld repairs were performed under Work Requests 94039101-01 and 94039111-01. The applicable code was identified as USAS Power Piping Code B31.1, 1987 Edition. Both welds were identified as DPC Class F, which requires radiography for welds having a thickness > 3/4." The inspectors observed the repairs in process and reviewed the applicable weld travelers, weld Data Sheets, filler metal issue slips and welder Performance qualifications for completeness, accuracy and compliance with applicable code requirements. Repair RT film for weld 1-03-4.2-8B was reviewed and verified that the linear indication had been removed.

Within the areas inspected, violations or deviations were not identified.

5. Flow Accelerated Corrosion (FAC) Program (49001)

In this report, the terms FAC and E/C are used interchangeably.

See NRC Inspection Reports 50-269,270,287/92-91, and 50-269,270,287/93-15 for documentation of previous inspections in this area.

In response to Generic Letter (GL) 89-08, Erosion/Corrosion Pipe Wall Thinning, licensees have implemented long term E/C programs. The current inspection evaluated the status of various aspects of the Oconee program to determine if a defined program was in place. The following is a summary of the inspection activities and results:

a. Program Status

Based on discussions with licensee personnel and review of the documents listed in paragraph b. below, the following actions have been completed by the licensee:

- The E/C Program Manual (Pipe Erosion Control Program Generic Manual) is issued by the Corporate Engineering Support Division and the E/C Committee, which is made up of an engineer from the Engineering Support Division and representatives from each site. Site engineers are assigned to implement the E/C program.

- A program and implementing procedures have been issued.

- A susceptibility study of all plant systems has been completed. All susceptible systems or susceptible portions of systems are included in the program.

- Component selections for inspections are based on (1) Electric Power Research Institute (EPRI) CHECMATE Model, (2) plant experience, (3) industry experience, and (4) engineering judgement.

- Plans are to incorporate EPRI CHECMATE modeling to aid in predicting future degradation. CHECMATE modeling has been completed on "High Priority" systems (High Pressure Extraction Steam, Low Pressure Extraction Steam, Condensate, Feedwater, and Heater Drains) for two Units and is about 60% complete for the 3rd Unit. After completion of the "High Priority" systems, the other susceptible systems will be included.

b. Review of Procedures

The inspectors reviewed the following documents which defined the E/C program:

- Pipe Erosion Control Program Manual, Revision 1

- MP/0/B/3005/006, Change 11, Piping - Periodic Inspection of Wall Thickness - Preparation and Marking

c. Observations and Reviews

In addition to review of the above program, procedures, and plans, the inspectors observed activities and reviewed other aspects of the FAC program as detailed below:

- For the current outage, 65 components were inspected.

- The inspectors examined licensee's past practice and future plans for material replacements for E/C degraded piping, i.e., practices for replacing "like for like" or upgrading to better materials. The general practice is to replace degraded carbon steel with stainless steel material. The following are examples of piping that has been, or is being replaced:

High Pressure Extraction Steam - Systematically replacing problem areas with stainless steel

"C" Bleed - Essentially replaced all with stainless steel

"B" Bleed - In the process of replacing with stainless steel

Heater Drains - Significant replacements have been made with stainless steel

- The program currently does not include small bore (< 2-1/2" diameter) piping. However, based on discussions with the site E/C personnel, there are plans to study small bore piping, determine which piping would be detrimental to plant operations should a failure occur, and include this piping in the program.

- Based on a computer search of plant repair records using key words, the inspectors reviewed the history of piping system leaks and leak repairs since the beginning of 1991. Based on this review and discussions with plant E/C personnel, it appears that failures due to E/C have been minimal for a number of years.

Based on review of the procedures identified in paragraph b. above and discussions with E/C personnel, the inspectors noted that program and implementing procedures are limited in details covering actual practices and how the program works. Although general guidelines are covered in the Pipe Erosion Control Manual, details of how the program gets accomplished, i.e., program scope (systems, pipe sizes, etc.); selection criteria for inspection points; decision process for determining pipe replacement, next inspection time, etc.; and how EPRI CHECMATE and other tools are used to predict pipe degradation; are not covered in procedures. In addition, the Pipe Erosion Control Manual is out of date and references organizations that no longer exist due to company reorganizations. This lack or procedural detail is considered to be a weakness in the E/C program.

Based on review of the leak repair history and discussions with site E/C personnel, it appears that the E/C program has been effective in identifying piping subject to degradation and effecting pipe replacements with upgraded materials, in spite of lack of detailed procedures. However, site E/C personnel indicated that plans are to complete the EPRI CHECKMATE modeling of systems and upgrade the program. This area will be inspected further in future inspections.

RESULTS

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

A weakness was identified relative to the lack of detailed procedures covering actual practices and how the program works.

6. Licensee Actions on Previous Inspection Findings (92702)

a. (Closed) IFI 269,270,287/93-17-04, Containment Penetration Code requirements

This item concerned questions relative to the proper Code class for piping and piping components for containment penetrations. The inspectors noted that, although the piping and piping components were considered ISI class B, maintenance and replacements of the piping was accomplished in accordance with DPC Class C or F. The use of Class F for maintenance and replacement of these components was questioned based on the importance of the components and the impression that Class F could be maintained with "commercial grade" components and materials. Based on further review during the current inspection, the following details were identified:

- Current DPC drawings identify most containment penetration piping as ISI Class B and Duke Class F, which is consistent with ASME Section XI requirements. ASME Section XI, which establishes ISI classes and prescribes the applicable codes for repairs and replacements, allows repairs and replacements in accordance with the original construction code for the particular piping component.

- Based on review of the following documents, most containment penetration piping components, including valves, have been required to be DPC Class F since 1972:

  Specification OS-27-A.1, Nuclear and Conventional Power Plants Power Piping QA (PPQA) Manual and Specifications

  Selected sample of PPQA Sheets

  Specification OS-0243.00-00-0001, Piping Installation Specification

  Selected sample of Oconee Nuclear Station Piping Summary OPS Sheets

  Therefore, the piping components can be repaired/replaced in accordance with DPC Class F requirements.

- In accordance with Specification OS-0243.00-00-0001, the applicable construction Code for DPC Class F piping is USAS B31.1.0. The specification further requires, in general, that Class F piping systems be QA Condition, Seismic Design, with complete material traceability. Therefore, piping components in Class F piping systems are not "commercial grade."

- The licensee pointed out that some piping components originally constructed to DPC Class G had been upgraded to DPC Class F. DPC Class G, although constructed to USAS B31.1.0, is none

Safety-Related, none Seismic, none QA Condition and does not require full material traceability. These upgrades were performed in response to piping specification changes. Where systems or portions of systems were upgraded to Class F, DPC performed some type of engineering evaluation to verify that the piping components were satisfactory.

Based on the above review, this item is closed.

b. (Open) IFI 269,270,287/93-20-01, Instrument Impulse and Associated ISI Requirements

This item questioned the piping classification for Low Pressure Injection (LPI) Cooler impulse lines to pressure gauges. The lines are DPC Class G, which, as noted above in paragraph a. is none QA Condition and none safety Class piping. The impulse lines are not isolated from the system during operation of the coolers. Therefore, the inspectors questioned the none isolated lines being none QA Condition Class G piping.

At the time of the current inspection, the licensee had issued Problem Investigation Process (PIP) Report 0-094-0309 to determine the significance and scope of the problem and the necessary corrective actions. The results of this investigation will be reviewed further during future inspections.

c. (Closed) IFI 269,270,287/93-20-02, Review of Piping and Component Code Class Requirements

This item concerned essentially the same question as that in paragraph a. above, i.e. installing Class F "commercial grade" components in safety-related ISI Class C systems. The system involved was the Low Pressure Service Water (LPSW), which was designated DPC Class F in the original PPQA sheets. As noted above, Class F systems are B31.1.0, QA Condition, Seismic designed systems, require complete material traceability, and are not "commercial grade" systems.

This item is closed.

7. Exit Interview

The inspection scope and results were summarized on May 26, and May 29, 1994, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

(Closed) IFI 269,270,,287/93-17-04, Containment Penetration Code requirements

(Open) IFI 269,270,287/93-20-01, Instrument Impulse and Associated ISI Requirements

(Closed) IFI 269,270,287/93-20-02, Review of Piping and Component Code Class Requirements

8. Acronomyns and Initialisms

ANII	-	Authorized Nuclear Inservice Inspector
ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
BWNT	-	B&W Nuclear Technologies
C/L	-	Cold Leg
CPS	-	Consolidated Power Supply
DPC	-	Duke Power Company
E/C	-	Erosion/Corrosion
EPRI	-	Electric Power Research Institute
ET	-	Eddy Current Test
FAC	-	Flow Accelerated Corrosion
FW	-	Feed Water System
GL	-	NRC Generic Letter
GTAW	-	Gas Tungsten Arc Welding
H/L	-	Hot Leg
Hydro	-	Hydrostatic Test
ISI	-	Inservice Inspection
LPI	-	Low Pressure Injection System
LPSW	-	Low Pressure Service Water
MNS	-	McGuire Nuclear Station
MRPC	-	Mechanized Rotating Pancake Coil
NCR	-	Nonconformance Report
NDE	-	Nondestructive Examination
NRC	-	Nuclear Regulatory Commission
NRR	-	Nuclear Reactor Regulation
ONS	-	Oconee Nuclear Station
OTSG	-	Once Through Steam Generator
QA	-	Quality Assurance
QC	-	Quality Control
PIP	-	Problem Investigation Process
PPQA	-	Power Plants Power Piping QA
PT	-	Liquid Penetrant Test
RII	-	NRC Region II
RPM	-	Revolutions Per Minute
R&R	-	Repair and Replacement
RT	-	Radiographic Test
RWP	-	Remote Welded Plug
SER	-	Safety Evaluation Report
S/G	-	Steam Generator
TMW	-	Texas Metal Works
TS	-	Technical Specification
UT	-	Ultrasonic Test