



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

Report Nos.: 50-369/94-26 and 50-370/94-26

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

Docket Nos.: 50-369 and 50-370

License Nos.: NPF-9 and NPF-17

Facility Name: William B. McGuire Nuclear Station Units 1 and 2

Inspection Conducted: December 5-9, 1994

Inspector:

*Nick Economos*  
N. Economos

*1/5/95*  
Date Signed

Approved by:

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

*1/6/95*  
Date Signed

#### SUMMARY

##### Scope:

This routine, unannounced inspection was conducted in the areas of Unit 2: Eddy Current (ET) examination of steam generator (S/G) tubes and inservice inspection (ISI) of safety related components and pipe welds.

##### Results:

In the areas inspected, two violations were identified.

The licensee was cited for failure to perform the VT-3, visual examination on the interior surfaces of the reactor vessel of Unit 1 during refueling outage 1EOC9. This violation is similar to one documented in Region II Report 94-18, September 29, 1994, in that, both point to apparent administrative weaknesses in the implementation and control of the inservice inspection and testing programs, see paragraph 3.

Enclosure

In addition, the licensee was cited for a failure to provide adequate procedures and administrative controls to perform activities important to safety in that B&W Nuclear Technologies (BWNT) failed to install a replacement plug in S/G 1D tube R5-C90. This problem occurred on September 15, 1994, and was documented in PIP 1-M94-1260, see paragraph 2.b(2).

A previously identified outside diameter (OD), surface connected indication in the reactor vessel transition ring to bottom head weld was reexamined manually from the OD surface and confirmed to be below the OD surface without through-wall dimension, see paragraph 2.b.(1).

Eddy Current examination of S/G tubing detected evidence of circumferential cracking on a number of tubes at the top of the tubesheet on the hot leg side of the S/G. The number of tubes found with this condition (11), is significantly greater than those found on any previous single outage on this Unit. All sleeved tubes were plugged during this outage. Following completion of this inspection, the inspector ascertained that the following S/G tubes would be plugged because of indications found during this outage:

S/G "A"	S/G "B"	S/G "C"	S/G "D"
65	79	65	70

Ultrasonic examinations performed for ISI purposes were observed and the inspector ascertained that the examinations and results obtained were consistent with applicable code requirements.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*J. Bauman, Supervisor, Eddy Current (ET)
- \*D. Brenton, Program Manager, S/G Maintenance (SGM)
- \*R. Cross, Regulatory Compliance, Technical Specialist
- \*R. Deese, Manager SRG
- M. Geddie, Station Manager
- D. Green, Lead Analyst ET
- P. Herran, Engineering Manager, DPC
- D. Jolley, NDE Specialist, Ultrasonic Examinations
- J. McArdle, Level III, Non-Destructive Examiner
- \*T. McMeekin, Vice-President, NMS
- \*N. Sample, Manager, SGM
- \*J. Shuping, Primary Technical Support, SGM
- \*D. Silvers, ISI Coordinator, Execution Support
- \*J. Snyder, Manager, Regulatory Compliance
- \*M. Thompson, Work Execution, SGMG

Other licensee employees contacted during this inspection included technical support, Quality Assurance, and administrative personnel.

#### NRC Resident Inspectors

- \*G. Harris, Resident Inspector

#### \*Attended Exit Interview

### 2. Inservice Inspection (ISI) Unit 2

This was the 9th refueling outage for this Unit which is the first such outage of the second, 10-year interval. The inspector observed in-process examinations, and reviewed procedures and records indicated below, to determine whether ISI examinations were being conducted in accordance with the applicable codes, procedures, regulatory requirements and licensee commitments. The applicable code for examination activities was the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1986 Edition. The licensee's technical support group was in charge of ISI examinations. Eddy-current (ET), examinations of Steam Generator tubes was managed by the licensee's Steam Generator Maintenance Group assisted by the Technical Support Group.

#### a. Review of NDE Procedures (73052)

The inspector reviewed the procedures listed below to determine whether they were consistent with applicable code requirements and regulatory commitments. The procedures were also reviewed in the areas of procedure approval, requirements for qualification of NDE personnel, visual acuity and compilation of required records.

- Eddy Current Analysis Guidelines McGuire Unit 2, EOC-9
  - Computer Data Screening Guidelines, Bobbin
  - Lead/Resolution Analyst Guidelines
  - MRPC Special Interest/Tubesheet Analysis Guidelines
  - MRPC Plug Analysis Guidelines
  - SM-15 Crackmap Analysis Guidelines
- NDE-600 Rev. 5 Ultrasonic Examination of Similar Metal Welds in Wrought Ferritic and Austenitic Piping
- NDE-620 Rev. 2 Ultrasonic Examination of Welds in Ferritic Pressure Vessels greater than 2.0" thickness
- NDE-670 Rev. 0 Ultrasonic Sizing of Planar Flaws in Ferritic and Austenitic Steels with Nominal Thickness from 0.2" through 2.0"
- NDE-701 Rev. 2                      Multifrequency Eddy Current Examination of S/G Tubing at McGuire
- NDE-702 Rev. 0                      Eddy Current Data Screening Program
- NDE-707 Rev. 4                      Evaluation of Eddy Current Data for S/G Tubing
- NDE-707 Rev. 2                      Multifrequency Eddy Current Examination of Nonferrous Tubing using a motorized Rotary Coil
- NDE-708-Rev. 2                      Evaluation of Eddy Current Data for Nonferrous Tubing Using Motorized Rotating Pancake Coil (MRPC)
- NDE-713 Rev. 1                      Data Management Procedure and Responsibility in support of Eddy Current Inspections
- NDE-714 Rev. 0                      Administrative Guide for Resolving Differences During Review of Eddy Current Data
- NDE-721 Rev. 0                      System Administrative Procedure for Handling of Raw Eddy Current Data and Analysis Results
- NDE-900 Rev. 0                      Ultrasonic Examination of Reactor Coolant Pump Flywheels, with Field Change 93-06

Through this review and discussions with the licensee's corporate Level III UT Examiner, the inspector ascertained that the above mentioned UT procedure NDE-600, Ultrasonic Examination of Similar Metal welds in Wrought Ferritic and Austenitic Piping, was qualified at the EPRI NDE Center, under ASME Code Section XI, Appendix-VIII, Subarticle VIII-2100 Procedure Requirements, 1992 Edition with Addenda through 1993 and Subarticle IWA-2240 Alternative Examinations, 1986 and 1989 Editions with no Addenda through 1991. Test specimens used in the qualification were fabricated in accordance with Appendix VIII of the above mentioned Code. In regards to inspection techniques, the licensee has used provisions of Appendix III, Subarticle III-1100 (D) 1986 and 1989 Editions to take exceptions to several requirements including the following: sensitivity is based on setting a 5 percent to 10 percent noise level from the inside surface of the pipe to be examined; basic calibration blocks are not used for system calibration. By procedure qualification it has been demonstrated that coverage of the examination volume from two directions is not necessary to find flaws in the volume of interest, because basic calibration blocks are not used for system calibration III-3230 (b) (c) (d) and (e) are not applicable; Calibration confirmation establishing the Distance-Amplitude-Correction (DAC) curve is not applicable. Since examination sensitivity is set on each pipe, the system check consists of verifying only the sweep range. Although calibration blocks are not required, an Appendix III basic calibration block is an option for beam angle measurement and screen distance calibration.

The following calibration data is not applicable:

1. Basic calibration block identification.
2. Amplitudes and sweep readings from calibration reflectors.

In addition to the above exceptions, the following examination provisions apply: A 60° angle is used for axially oriented flaws; When the ID/OD ratio does not permit the use of a 45° angle, a refracted angle is selected that will produce an incident angle at the inside surface of 60°. A 70° angle is used for flaw confirmation and extended coverage; Since no DAC is used, recording of indications is based on signal amplitude as a percent of full screen height (FSH); Recorded indications are plotted on a cross-sectional sketch; Reflector end points, are determined by setting the peak amplitude to 80% FSH and moving the search unit parallel to the reflector until the amplitude equals 20% FSH.

## b. Observation of Work Activities Unit 2 (73753)

(1) Ultrasonic Examination

The inspector observed work activities, reviewed certification records of NDE equipment and materials and, reviewed NDE personnel qualifications for personnel, utilized for ISI examination observed. The observations and reviews conducted by the inspector are documented below.

<u>Item</u>	<u>Weld #</u>	<u>Component</u>	<u>Exam</u>	<u>Comments</u>
G01.001.002	---	RC Pump Flywheel 2RCP-2B	Ultrasonic	No Recordable Indications (NRI)
C05.011.110	2NI-2F-461	Reducer to Pipe	UT-45°, 60° 60°L	Two root Geometry Recordable Indications
C05.011.112	2NI-2F-464	Reducer to Pipe	UT-45°, 60°L	NRI
C05.011.113	2NI-2F-465	Pipe to Elbows	UT-45°, 60°L 70°, 70°L	Six Recordable Indications additional Examinations scheduled; Root Condition
C05.011.114	2NI-2F-467	Pipe to Elbows	UT-45°, 60°L 70°, 70°L	Four Recordable Indications, Root Condition & Beam Redirec on
C05.011.117	2NI-2F-470	Pipe to Valve	UT-45°, 60° 70°, 70°L	NRI

The licensee's Level III NDE reviewed radiographs of welds 2NI-2F-265 and 467 to help evaluate the indications observed by UT and confirmed that they were as described above. The inspector reviewed the radiographs of the subject welds as part of the inspection effort and concurred with the evaluation. Following the close of this inspection, the inspector ascertained by telephone that the supplementary UT examination of weld 2NI-2F-465 confirmed that the previously observed

indications involved counterbore, root-geometry, and beam redirection due to material characteristics. Equipment and personnel utilized for the examinations witnessed were as follows:

Instruments

Krautkramer: USK-7D	S/N32810-921	11-18-93
Krautkramer: USK-7D	S/N32810-873	11-18-93
Krautkramer: USK-7D	S/N32810-3019	11-18-93
Staveley, 136 Plus	S/N975K	07-14-94

Transducers

Sonic	0°	1.0"dia.	2.25Mhz	S/N09471T
KB-Aerotech	13°	1.0"dia.	2.25Mhz	S/NE30939
Gamma	45°	0.375"dia.	2.25Mhz	S/N33255
Gamma	60°	0.375"dia.	2.25Mhz	S/N32462
Gamma	70°L	0.375"dia.	2.25Mhz	S/N33252
Sigma	60°L	2(21x8)mm	2.25Mhz	S/N2292-94003
KBA	45°	0.375"dia.	2.25Mhz	S/N32357
KBA	60°	0.375"dia.	2.25Mhz	S/N33260
Sigma	60°L	2(21x8)mm	2.25Mhz	S/N2292-94001

Consumables

UT Couplant	Ultragel II	Batch #093001
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Pyrometer

Serial Number: MCNDE27024

Certification records of four level II, UT examiners, assigned to these examinations, were reviewed to ascertain whether training, testing, updating and eye examination had met applicable code requirements and or industry standards.

The examinations were performed with adequate expertise and conservatism to verify weld integrity.

Within these areas, violations or deviations were not identified.

## Reactor Vessel Outer Diameter Indication Reexamination

### Background:

The ten year ISI examination of the Unit 2 Reactor Vessel (RV) was performed during the previous refueling outage (EOC-8) in July 1993, see Region II Report 93-12 for details. That examination identified an indication that was dispositioned as a code rejectable planar flow connected to the OD surface. The indication was located in weld 2RPV-W01 which joins the bottom head to the transition ring. The indication was plotted at approximately 130°, clockwise from the "W" axis of the vessel. It was positioned transverse to the weld axis near the root and, appeared to penetrate the OD surface. Its dimensions were calculated to be approximately  $\frac{1}{2}$ " deep or about 8.8% through wall and had a length of about 2.4 inches. On the instrument screen, it had an amplitude between 15% and 20% DAC. The presence of incore instrumentation stubs, limited the examination to a singular circumferential scan direction. A review of baseline data and construction radiographs revealed no evidence to corroborate the presence of this indication. During the ten year outage (EOC-8) in 1993, the ultrasonic (UT) examination was conducted using the B&W Nuclear Service Company's (BWNS) Automated Data Acquisition and Imaging System ACCUSONEX, together with the Automated Reactor Inspection System ARIS.

The ARIS examination of weld 2RPV-W01 was performed using the contact (vice immersion), full-node examination technique. A total of seven transducers were simultaneously utilized for examination of the weld, namely two 45° shear waves, two 60° shear waves, two 70° longitudinal waves, and one 0° degree longitudinal wave.

During the present outage (EOC-9), the licensee performed visual surface and volumetric examinations from the OD surface of the reactor vessel. Also, at and around the location where plots from the previous examination had identified the indication. Specifically the examination encompassed an area of six (6) inches by 18 inches or approximately an arc of 15 degrees, at the weld diameter.

### Results:

Through discussions and by review of records the inspector ascertained that visual and magnetic particle examination showed no evidence of a surface connected indication. Also the results of a manual ultrasonic examination showed no evidence of a surface connected indication. One indication was detected in the area of interest. The indication was located approximately 0.5" below the weld surface and measured approximately 0.5" in length. The indication had no measurable through wall thickness. The licensee's preliminary evaluation and disposition of the subject

indication was that, the indication was a subsurface volumetric type flaw with a measured length of 0.5 inches and no measurable through wall dimension. A 0.5 aspect ratio (a/l) was assumed which translated to a through wall dimension of approximately 0.250 inches. Based on these values, the calculated aspect ratio (a/l) was 0.50. A review of the acceptance standard of ASME Code Section XI, Table IWB-3510-1, 1989 Edition showed that the maximum allowable subsurface flaw (a/t%) for ferritic material with a thickness between four (4) and 12 inches was 7.6%. By calculation, the licensee determined the subject flaw's a/t% was 4.27% and therefore was characterized as an acceptable subsurface planar flaw. Results of this examination would be forwarded to BWNT for their review and evaluation. Following a final review and approval of these results, the licensee would forward a revision to the ten year ISI report to NRR for their review.

2.b. (2) Eddy Current Examination of Steam Generator Tubing, Unit 2

As reported in previous Inspection Report 93-12 Unit 2 has experienced primary water stress corrosion cracking (PWSCC) in the rolled tubesheet region. This phenomenon is responsible for removing many tubes from service. Other causes responsible for taking tubes out of service include: tube wear observed at the periphery in the preheater area of the generator; antivibration bar wear in the U-Bend area; stress corrosion cracking in the freespan region in the cold leg side of the steam generators; outside diameter stress corrosion cracking (ODSCC) which originates at the tube support plates (TSP) generally in the hot leg side of the steam generator.

As in previous outages, this inspection would include, 100% bobbin full length, with at least the cold leg, straight sections being examined with a 0.630" probe if possible. The hot leg and U-bend areas would be examined with either a 0.610" or 0.630" probe. 100% of the hot leg tubesheet would be examined with MRPC probe for the span of 1.0" above and 3.0" below the top of the tubesheet.

The U-bends in rows 1, 2, 3, would be examined full length, up to and including the upper most support with a 25 tube random sample in Row 4 by MRPC.

100% of the currently installed I-600 plugs in the hotleg.

100% of the currently installed I-600 plugs in the coldleg.

All sleeved tubes would be removed from service during this outage by plugging. However, a few sleeves would be examined using a newly developed, I-coil probe in order to gain experience and develop viable techniques and standards for future examinations of sleeves at Ocone.

As a supplementary examination, top of tube sheet, (TTS) indications would be examined with the SM-15 fixture, manufactured by Zetec. This is a system designed to inspect the TTS area using a MRPC probe, associated software or "Crackmap Analysis", would be used by analysts to determine crack lengths and orientation.

The function of the SM-15 data during this outage will be to positively identify (PID) tubes containing defects that were identified by the "standard" MRPC examination of the TTS. The SM-15 data will be re-evaluated following the outage to determine crack lengths.

Data acquisition and analysis was being performed in accordance with procedures identified earlier in this report. Controlling documents/code by reference, included ASME Code Case N-401, Digitized Data Collection for Eddy Current Examination. Data acquisition was being performed by licensee personnel. Examinations were being performed with a multifrequency bobbin coil technique, utilizing the computerized MIZ-18 system.

Secondary analysis was performed on site with the aid of Zetec's computer data screening (CDS) system. CDS was performed and monitored by certified Level IIA or III ET analysts.

All indications reported or categorized by the CDS screening program were further analyzed by IIA/III ET personnel to determine if reporting was required per applicable procedure or guidelines.

The bulk of primary analysis of bobbin probe data was being performed off-site by contractors i.e., Conam and BWNT at their respective facilities. The licensee assisted by BWNT and Westinghouse performed secondary analysis of bobbin probe data and primary of TTS, MRPC data, special interest MRPC and rolled plug MRPC. BWNT, performed the bulk of primary bobbin probe analysis and Conam performed analysis of TTS MRPC probe data.

Resolution of differences between primary and secondary analysis including the final determination to remove tubes from service was performed on site by the licensee. Within these areas the following were noted:

Equipment used for data acquisition and analysis included Hewlett Packard (HP) computers, Zetec's Eddynet acquisition modules and software, HP hard disk and optical disk drive. Probes used for the examination included differential bobbin probes 0.610" and 0.630" diameter and motorized rotating pancake multi-coil probes.

Tubes in each of the four steam generators were examined in the following manner.

	S/G "A"	S/C "B"	S/G "C"	S/G "D"
Bobbin	4190	4173	423.8	4212
MRPC, U-Bend	*303	*297	*275	*300
MRPC, H/L Tube	4190	4173	4238	4212
MRPC, Plugs HL/CL	198/238	202/Ø	179/Ø	162/Ø
MRPC, Special Interest HL/CL	158/140	206/165	209/156	187/198

\*Include U-bend special interest tubes.

● Examination Results:

- Circumferential Cracking at TTS Region:

As stated earlier in this report, ET examination of the TTS, hot leg region identified several tubes exhibiting circumferential cracking. From discussions with cognizant licensee personnel the inspector ascertained that although circumferential cracking had been identified at this S/G location on previous outages, it was observed on a much smaller scale, i.e., one or two tubes in all four S/Gs. The eleven (11) tubes found during this outage was significantly greater and therefore presented a condition requiring additional investigation. Accordingly, the licensee contracted Westinghouse to review and analyze the ET data obtained and to provide more precise information on crack morphology extent of cracking and recommend the appropriate repairs to be performed. This cracking condition was observed in all four S/Gs, in the tubes listed below:

	S/G"A"	S/G"B"	S/G"C"	S/G "D"
Tubes with Circ. Cracking	9	2	1	2

The inspector will followup on the results of this analysis and the recommended repairs on a future inspection.

- Sleeved Tube Repairs:

Problems with kinetically welded sleeves at McGuire has caused the licensee to remove from service all sleeved tubes in this Unit. The number of tubes that would be plugged for this purpose during this outage were as follows:

S/G "A"	S/G "B"	S/G "C"	S/G "D"
134	130	119	140

Two sleeved tubes were observed with minor leaks during this outage. These were R7-C23 in S/G "A" HL and R 12-C 62 in S/G "C" HL. These sleeves were installed during the September 1990 outage.

Tubes Removed from Service Because of ET Findings:

As stated earlier in this report, on December 15, 1994, the inspector received by telephone the final list of tubes removed from service by plugging. These were as follows:

S/G "A"	S/G "B"	S/G "C"	S/G "D"
65	79	65	70

Records Review - Present & Previous Outage: Units 1 and 2

Through record review and discussions with cognizant personnel the inspector was informed of three instances involving ET examination or data analysis discrepancies that required a Problem Investigation Process (PIP) report to be issued for root cause analysis purposes. The subject instances were as follows:

PIP: 2-M94-1754 Incorrect Evaluation of Indication 2D S/G, Tube 4-84.

On December 3, 1994, the licensee determined that during the previous outage (U2: EOC-8), 2D S/G tube 4-84 exhibited an indication which was incorrectly evaluated. The indication was located at the 3rd tube support plate (TSP) at  $-0.12$ ". It was flagged by analysts and forwarded to resolution for further evaluation. The 1993 bobbin probe data showed the indication was approximately 0.60 volts and 69% through wall. Resolution evaluated the indication as NDD or no degradation detected without requesting additional testing. Accordingly the tube was returned to service even though it exhibited a potentially rejectable indication. During the present outage (EOC-9), this same indication was again flagged by analysis. This time resolution requested further inspection i.e., MRPC, as part of the special interest tube list. The 1994 bobbin probe data showed the indication was 3.22 volts, with 86% through wall degradation. The licensee's root cause analysis as documented in the subject PIP was that the resolution analyst used poor judgement in deciding to characterize the indication as NDD without requesting additional testing and/or evaluations. Both steam Generator Maintenance and Engineering Support groups have met and determined that the present resolution analysis process and training improvements implemented since the last outage have significantly heightened

the analyst's awareness and sensitivity to the need for full evaluation of all ET indications. By record review, the inspector ascertained that the Lead Analyst and Level III discussed this indication with all of the resolution analysts, during Unit 2, EOC9 as a lesson learned. The tube in question was MRPCed, rejected and subsequently placed on the list of tubes scheduled for plugging.

The inspector expressed concern over this item and recalled a similar incident in Unit 1 where tube (R47-C46) with a rejectable indication was incorrectly evaluated as a manufacturing burnishing mark which ultimately resulted in an unscheduled outage when the tube failed shortly after the plant returned to power. The inspector stated that he will continue to monitor closely the licensee's performance in this area and look for developing trends.

PIP-O-M94-1767: Error in Retrieval Function of Zetec ET Analysis Software.

Unit 2 S/G "A" tube R9-C75 exhibited an indication that was 32% throughwall at the 18th tube support plate, +3.85 inches elevation. When the analyst recalled the flaw on the computer screen the software presented a flaw located at the 10th TSP + 3.82 inches elevation instead. The licensee's evaluation was that this was a software problem which required followup action by Zetec. The implication as documented in the subject PIP was that if the indication had been a secondary CDS call and resolution had no graphic of the indication, it would have been resolved as NDD and could have resulted in a missed call.

Corrective actions included: Zetec was notified and asked for assistance in dealing with similar software problems, all primary and secondary calls resolved as NDD were re-evaluated to assure that similar discrepancies had not occurred during this outage; the problem as described was communicated to all analysts performing analysis during this outage.

PIP-M94-1260: BWNT Failed to Replace Leaky Plug Removed During Unit 1, (EOC-9) Refueling Outage.

On September 20, 1994, during Unit 1, EOC-9 refueling outage, BWNT discovered that a Inconel-600 plug which had been pulled previously from 1D S/G tube R5-C90, on/or about September 15, 1994, had not been replaced with an Inconel-690 plug as planned. By review of the subject PIP dated September 20, 1994, and the accompanying corrective actions, the inspector ascertained the following: Removal of the plug from tube R5-C90 cold leg, was the result of a leak observed in this tube location. The time during which the leak was discovered and the plug removed, precluded its addition to the original tube repair list issued by the licensee. Consequently, the licensee issued a second/separate plug

removal/replacement letter to BWNT authorizing the repair on the subject tube. According to the subject PIP, this letter was not controlled properly, allowing for the plug to be removed but not replaced. BWNT's QA personnel did not discover this error during final plug installation verification, nor did the licensee's QA/QC Steam Generator maintenance team. The error was discovered during the final plug accountability paper work review, performed by BWNT. A new Inconel-690 plug was installed during the second drain to mid loop. The licensee's root cause analysis investigation into this incident identified the following contributing factors:

- Weakness in field procedures.

Procedures did not prescribe how control of this repair would be maintained. Also, verification of the repair by QC was optional and left to interpretation of the applicable BWNT procedure.

- Multiple Repair lists.

Three letters were issued addressing plugging activities in S/G "D" which complicated the control process. In addition, these letters/repair lists were not addressed to a specific BWNT site person and were not control documents.

- Insufficient Communication During Turnovers.

Although BWNT supervisors met twice/day to discuss work-scope and progress. Turnover meetings concentrated on work progress and equipment problems. Additions to the work-scope in S/G "D" were not discussed as it was assumed that everyone was aware of them.

- The Missing Plug was not Identified by the Licensees's SGM Group.

The SGM group performed visual verification of installed plugs in accordance with a plugging list issued prior to the addition of the one for Tube C5-R90. This resulted in a failure to verify that a replacement plug had been installed as required.

- Corrective actions taken in response to the identified problems and actions taken to prevent their recurrence were as follows:

- The SGM group would write a guideline which would be used to create, track and communicate S/G tube repair lists. this guideline would be incorporated in the S/G Maintenance Manual and used for McGuire-2, EOC-9 outage.

- BWNT would revise the "Outage Manager on Site Operating Guidelines". This guideline would be compatible with DPC's Master Repair List, developed for CAC #1. Oconee and Catawba plants are currently using such a list.
- BWNT would issue a Document Change Notice (DCN #94-01185) to the BWNT field procedure for removal and manual plugging that will require the plugging task leaders to fill out the plugging task checklist as the repair scope is being completed during the McGuire-2, EOC9 outage.
- BWNT would revise the QC Process Matrix Procedure to include a requirement that BWNT QC meet with Task Leaders, Outage Manager and site Representative prior to S/G close out and final task completion sign off, to verify that all repair lists have been accounted for and, repairs have been properly completed.
- BWNT would revise and clarify the QC Process Matrix Procedure to ensure that multiple task enclosure lists are reviewed against the current site repair list and each other, to verify that all work has been properly completed. This requirement would result in each S/G having a QC Matrix which would be one continuous document regardless of how many different repair tasks are performed.
- BWNT would revise the Outage Managers Guideline to include a requirement that each control station shall have a status board who is responsible for keeping it up to date. The guideline would also provide better direction for Outage Managers on maintaining proper communication during outages.

SGMG would initiate a procedure change to MNS maintenance procedure MP/O/A/7650/113 to clarify how SGMG will perform independent plug verification following a vendor tube repair. This procedure would include a provision requiring a responsible Steam generator Maintenance Representative to verify that all repair work was completed as required by Duke Power Master Repair List."

SGM/BWNT would co-sponsor a quality improvement team made up of personnel from both companies whose goal will be to review the S/G maintenance process and specifically look at the overall work process, communications, experience, QA/QC controls, etc. for improvements.

The licensee discussed in detail the failure to recognize that the replacement plug had not been installed during the appropriate time frame and the ensuing PIP that was issued to document the problem and proposed corrective actions with the NRC site resident inspectors. A write-up of this discussion was documented in RII Report 50-369, 370/94-22. The item was identified as an unresolved item to allow a followup of this issue at a later time. The unresolved item was

identified as 50-369,370/94-22-03: Vendor did not Install Plug in Steam Generator Tube. Following the close of this inspection this inspector reviewed the problem as described in the subject PIP: 1-M94-1260 and the corrective action taken to prevent its recurrence. Following this review the inspector determined that this failure to install the replacement plug was an example of a significant weakness in the implementing and administrative procedures used to control and perform activities important to safety. In addition, the inspector noted a weakness in the licensee's oversight of vendor activities in that the licensee failed to adequately oversee BWNT's maintenance work to assure that activities important to plant safety were being performed in a prescribed manner, well documented and with adequate QA/QC controls. As such, the inspector closed the above mentioned unresolved item 50-369,370/94-22-03 and opened a violation to address the licensee's failure to perform activities affecting quality in accordance with documented instructions appropriate to circumstances. This is in violation of 10 CFR 50, Appendix B Criterion V, and is identified as VIO 369, 370/94-26-01, Failure to Provide Adequate procedures and Administrative Controls for S/G Tube Repair.

The licensee was notified of this violation after the close of this inspection. Except for the violation discussed above violations or deviations were not identified.

3. ISI Records Review and Evaluation, Unit 1 (73755)

Missed Visual Examination (VT-3) on Reactor Vessel Interior Surface

By review of PIP:1-M94-1467 dated October 26, 1994, the inspector ascertained that a code required VT-3 visual examination of reactor vessel internal surfaces, which was required to be performed during Unit 1, EOC-9 refueling outage was missed. Specifically, ASME Code Section XI, 1986 Edition Table IWB-2500-1, Category B-N-1 Interior of Reactor Vessel, requires that the spaces above and below the reactor core that are made accessible for examination by removal of components (internals), during normal refueling outages are to undergo a VT-3 visual examination, each inspection period following the first interval. Deferral of this inspection is not permissible according to the code. McGuire's Unit, 1 IEOC-9 refueling outage was the last outage of the 1st inspection period of the 2nd ten year interval.

Through discussions with the licensee's site ISI coordinator and review of the subject PIP, the inspector ascertained the following:

- (1) The need to perform the examination was communicated to the QA/QC leader by the ISI coordinator.
- (2) The QA/QC Leader, relying on memory, remembered that this examination had been performed during IEOC7 refueling outage and concluded that the inspection plan was in error. Outage IEOC7, was the last outage of the 1st ten year interval.

- (3) The failure to perform the subject examination was not discovered until after the plant had returned to power, during a review of ISI data. As a result of discussions with aforementioned personnel and review of the subject PIP, the inspector has determined that one of the major contributing factors and/or the root cause of this problem was an apparent administrative weakness in the implementation and control of the inservice inspection program. This is evidenced by: (1) a lack of adequate communication between the ISI coordinator and the QA/QC Task Lead, (2) reliance on memory for performing the examination which suggests a lack of appropriate oversight and administrative controls to assure accountability of programmatic requirements. (3) failure to identify the problem in a timely manner and take appropriate corrective action, suggests that reviews by qualified personnel to assure that the ISI program requirements were being implemented, were inadequate. Therefore, this failure to perform a visual, VT-3 examination on the reactor vessel interval surfaces, during the first inspection period of the second ten year interval as required, is in violation of ASME Code Section XI requirements. This violation was identified as, 369,370/94-26-02, Failure to Perform VT-3 Visual Examination on Reactor Vessel Internal Surfaces. The licensee's identification of the failure to perform this code required examination was documented in McGuire Unit 1 PIP: 1-M94-1467.

The subject violation is similar to one documented in Report 396,370/94-18 in that it also pointed to weaknesses in the performance and control of the Inservice Inspection Testing Program as required by ASME Code Section XI.

● Missed Inservice Inspections on Penetrations and Nuclear Service Water System, Unit 1

By review of PIP: 1-M94-1744 dated November 30, 1994, and through discussions with cognizant licensee personnel, the inspector ascertained that as in the case of the missed reactor vessel internal surface examination above, the licensee's ISI execution specialist discovered, during a final review of inspections performed during the recently completed, McGuire Unit 1, EOC9 outage that two required ISI inspections had been missed. The missed inspections involved a portion of the Nuclear Service Water System and mechanical penetrations M-321 and M-330. The problem was discovered on November 30, 1994, which according to information obtained through discussions with cognizant personnel and documentation, coincided with the last day of the inspection period. Therefore, in order to avoid the problem of missing an inspection during the specified timeframe, the licensee scheduled and performed these

inspections on November 30, 1994. Inspection of both penetrations required entries into Unit 1 Lower Containment Pipe Chase and Annulus while Unit 1 was at 100 percent power. This missed inspection provides additional support to the reasons given for the violation identified earlier in this report.

This PIP was still open at the end of this inspection. Except for the violation discussed above, other violations or deviations were not identified.

#### 4. Exit Interview

The inspection scope and results were summarized on December 9, 1994, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. The licensee did not identify as proprietary any of the material provided to or reviewed by the inspector during this inspection.

Following the end of this inspection the licensee was informed by the resident inspectors that Unresolved Item 50-369,370/94-22-03 was closed and violation: 369,370/94-26-01, Failure to Provide Adequate Procedures and Administrative Controls for S/G Tube Repair, was opened.

(Open) Violation: 369,370/94-26-02 Failure to Perform VT-3 Visual Examination on Reactor Vessel Internal Surfaces.