U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No:	50-369
License No:	NPF-9
Report No:	50-369/97-03
Licensee:	Duke Power Company
Facility:	McGuire Generating Station, Unit 1
Location:	12700 Hagers Ferry Rd. Huntersville, NC 28078
Dates:	January 25, 1997 - March 8, 1997
Inspectors:	M. Sykes, Resident Inspector N. Economos, Regional Inspector, (paragraph M1.1) W. Stansberry, Security Inspector, (paragraph S1) R. Chou, Regional Inspector, (paragraph E1.2) R. Moore, Regional Inspector, (paragraphs E1.1 and E2.1) J. York, Regional Inspector, (paragraphs E1.1 and E2.1)
Approved by:	C. Casto, Chief, Projects Branch 1 Division of Reactor Projects

Enclosure

EXECUTIVE SUMMARY

McGuire Generating Station, Unit 1
NRC Inspection Report 50-369/97-03

This integrated inspection was conducted of Steam Generator Replacement Project preoutage activities in the areas of maintenance, engineering, and plant support. The report covers a six week period of announced inspections performed by resident and regional inspectors.

Maintenance

- Radiography has improved significantly and achieved a quality which can be rated a strength. Similarly, postweld heat treatment of pre-fabricated main feedwater welds was considered a strength in that it was performed by well-trained personnel using improved equipment and appropriate procedures. Results met code requirements and were well documented. The findings of the Welding Readiness Assessment Team showed that although some improvements have been made in certain areas some of the NRC and Quality Improvement Team identified issues have not been addressed at the station and/or corporate levels (paragraph M1.1).

- The licensee's training program for vendor QA/QC inspectors was adequate and adequate procedural controls have been established to provide assurance in the control and accountability of filler metal (paragraph M1.1).

- Modifications to the automated welding equipment, coupled with the experience gained through their use, improved the production rate and the quality of shop fabricated feedwater welds. Continued welding of actual pipe size weld coupons with automatic welding equipment should continue to improve weld quality and the welders expertise in this process. The licensee's support of this initiative demonstrates a commitment in training of welders to state of the art equipment which should improve weld production and quality (paragraph M1.1).

- The inspectors concluded that the licensee's control of work activities relating to the removal of the original steam generators was good. Fire protection controls were adequate (paragraph M2.1).

Engineering

- Design controls implemented for the Unit 1 Steam Generator Replacements were consistent with applicable regulatory requirements and the licensee's Quality Assurance Program. Additionally, safety evaluations for SGRP modifications adequately implemented the 10 CFR 50.59 regulatory requirements (paragraphs E1.1 and E2.1).

Enclosure

- The inspectors concluded that the required lifting plan, path, calculation, and analyses generated for the safe lifting and transfer operations of the old and replacement steam generators were adequate. The inspectors concluded that the erected lifting system, the on-site fabrication facility, the storage facility, and the plan of the rail system were adequate and can achieve the intended function for the SGRP (paragraph E1.2).

- The inspectors concluded that the engineering staff was knowledgeable in SGRP activities and that the licensee had conducted adequate preparations to include supporting calculations, drawings, procedures, and other documents to ensure the SGRP was an acceptable program (paragraph E1.3).

Plant Support

- A security inspection was documented in inspection report 50-369, 370/97-02. Security practices for the SGRP activites were determined to be adequate. However, the procedures were not clear as to the method of monitoring and observing the protected area during darkness. Subsequently, an Inspector Follow-up item (50-369, 370/97-02-01) was issued (paragraph S1).

Report Details

II. Maintenance

M1 Conduct of Maintenance (50001)

The Unit 1 steam generator inspection replacement outage began February 14, 1997. The replacement is being performed due to significant degradation which has diminished the original steam generator service life. The original Westinghouse supplied steam generators will be replaced by Babcock and Wilcox International supplied steam generators with minor changes in design characteristics. Duke Power is acting as the prime contractor for the project. The replacement is to be performed in accordance with 10 CFR 50.59.

M1.1 Steam Generator Replacement (SGR)

a. Inspection Scope

This inspection was a followup to the one performed between January 6-10, 1996, and documented in Region II Report 50-369,370/96-11. The objective of the present inspection was to continue monitoring automatic machine welding, training of QA/QC contractor inspectors, and review of SGRP administrative procedures.

b. Observations and Findings

Applicable Codes and Standards

See Inspection Report 50-369,370/96-11 for applicable codes and standards.

Main Feedwater Pipe Welding

As discussed in the above-mentioned report, main feedwater piping was being assembled in spools at the fab-shop to facilitate field installation. Welds were being fabricated using Dimetric's Gold Track IV, welding machines and the gas tungsten arc (TIG) welding process. Problems associated with these machines, the shielding gas, technique and welder proficiency led to a work stoppage to allow for corrective action. During this time, weld production continued using the manual TIG process. Approximately 14 welds were fabricated in this manner.

Discussions with the licensee's cognizant welding personnel revealed that although the majority of equipment problems had been addressed, Dimetric continued their work to correct specific problems on the weld heads. See NRC Inspection Report 96-11 for more details in this area.

Work Observation:

The inspector continued to monitor welding of main feedwater welds at the fab-shop. These activities included new weld fabrication, weld repair and post weld heat treatment. New welds being fabricated at this time were as follows:

Welding in Progress

Weld	Size	Description	Condition
CF1FW26-09	18"x.938"	Elbow to Pipe	Root in welding out joint.
CF1FW26-10	18"x.938"	Elbow to Pipe	Weld complete, prepping for RT.
CF1FW26-19	16"x.844"	Elbow to Pipe	Welding out joint.
CF1FW26-27	16"x.844"	Elbow to Pipe	Root in, welding out joint.
CF1FW26-24	16"x.844"	Elbow to Pipe	Root in, welding out joint.

The above welds were fabricated using field weld data sheets (FWDSs) L-374-4 for tacking and L-223-A Rev. 0 for welding out the joint. The latter FWDS was qualified for machine TIG using only argon as the shielding gas verses the argon-helium mixture used at the start of spool fabrication. As such, the inspector reviewed the applicable procedure qualification records to verify compliance with applicable code requirements, checked weld parameters on the power supply machines and checked metal deposition rate and weld appearance for compliance with procedural requirements. Weld process control sheets were reviewed for completeness, accuracy and code inspector's hold points. Other QC hold points included fitup, cleanliness, preheat, interpass temperature and final visual inspections as applicable. In addition, the inspectors selected for review, qualification records of welders who participated in the fabrication of these welds. A total of four welders were selected for a check of performance qualifications and updates. These qualification records were found to be in order.

Nondestructive Examinations (NDE) Radiography

Main feedwater pipe welds, fabricated onsite, were radiographed to verify weld integrity and satisfaction of applicable code requirements. The licensee's code implementing procedure for this examination was NDE-10, Rev. 19, General Radiographic Procedure, which referenced ASME Code, Sections V and XI, 1989 Edition. The inspectors reviewed radiographs of completed main feedwater welds to verify proper penetrameter type, size and placement; sensitivity, film density, identification, quality and weld coverage. Welds selected for this work effort were as follows:

Steam Generator 1B

Weld No.	Size	Description	Status
CF1FW25-19	16"x.844"	Pipe to Elbow	Rejected - Lack of Fusion (LOF), accepted 1-29-97
CF1FW25-24	16"x.844"	Pipe to Elbow	Rejected - Slag accepted 1-29-97
CF1FW25-18	16"x.844"	Pipe to Elbow	Accepted 1-29-97
CF1FW25-27	16"x.844"	Pipe to Elbow	Rejected - LOF accepted 1-29-97

Steam Generator 1C

CF1FW26-09	18"x.983"	Pipe to Elbow	Rejected - LOF accepted 1-31-97
CF1FW26-10	16"x.844"	Pipe to Elbow	Rejected - LOF accepted 1-31-97
CF1FW26-14	18"x.938"	Pipe to Elbow	Accepted 1-30-97
CF1FW26-24	16"x.844"	Pipe to Elbow	Accepted 1-30-97

CF1FW26-27	16"x.844"	Pipe to Elbow	Rejected, Porosity
CF1FW26-19	16"x.844"	Pipe to Elbow	Accepted 1-31-97
CF1FW26-05	18"x.938"	Pipe to Elbow	Accepted 1-31-97
	Steam Generator 1D		
CF1FW27-23	16"x.844"	Pipe to Elbow	Accepted 1-29-97

Conclusion:

Through this review the inspector ascertained that the radiographs showed that the welds were properly evaluated. That radiographic density, and penetrameter sensitivity were sufficient to display the penetrameter image and the specified hole which are essential indications of the radiograph's image quality. In addition, the inspector noted that the films were free of artifacts, chemical streaks and equipment related problems observed on previous SGRP inspections at Catawba.

Postweld Heat Treatment of Completed Welds

The requirement for postweld heat treatment (PWHT) of field welds was controlled by the code of record, ASME Code Section III 1971 Edition. This requirement was implemented by DPC's Process Specification L-900 and associated Postweld Data Sheets which provided the necessary details for carrying out this operation. At the time of this inspection all completed feedwater welds had been PWHTed using PWHT Data Sheet L-908, Rev. 0. As such, the inspector reviewed the PWHT strip charts to verify that minimum PWHT temperature levels had been attained and maintained for the prescribed times, that heating and cooling rates were consistent with code requirements and that an adequate number of thermostats were used to verify that the minimum PWHT temperature had been reached over the required material width. The inspectors noted that these PWHT strip charts had been reviewed and initialed by the authorized code inspector.

Conclusion:

Within these areas, the inspectors noted that according to the data reviewed, heating and cooling rates were uniform, holding temperatures and times were consistent and well within minimum requirements. Strip charts travelled at the proper rates and that information on these charts were easily discernable. Welds selected for this review were as follows: CF1FW24-18, 19, 23, 24 and 27, CF1FW25-9, 10, 18, 19, 24 and 25, and CF1FW27-14, 15, 17, 19, 20 and 23.

Issue and Control of Welding Materials

Section VI, Rev. 7 of the McGuire Nuclear Station's Welding Manual is the controlling document for issuing welding materials to the field and will be implemented during the upcoming SGRP. Responsibility for its implementation was assigned to the Maintenance Superintendent. The responsibility for ensuring that proper welding materials were used on each safety-related application has been assigned to the QA-QC Manager. Work Orders and Welding Issue Slips were used to track weld material issued for QA condition welding. Issue slips must stay with the filler metal at all times while in the field. The procedure requires each welder to withdraw their own filler metal but permits additional welders to use the same material provided its withdrawn on the same Work Order, the same issue slip and work is in progress in the same local area. Welders were required to keep filler metal in their presence at all times, except when they must be separated, they were required to secure the material under lock and key. In a similar manner, the procedure addressed issuance and control of spooled filler metal and bare TIG wire. Coated electrodes could be issued with or without heated portable ovens which were set to operate between 200°F and 250°F. Coated material will be issued in sufficient quantities to last for a period of 12 hours, however, when jobs were expected to last longer than the 12 hour limit, then the material must be kept in energized portable rod ovens that could be secured. The amount of coated electrodes that could be issued at any one time was limited to ten pounds.

In addition, the procedure prescribed actions to be taken in the event that material or an accompanying issue slip was lost. The current revision (7), of this procedure was written, approved and issued by the licensee during the time frame of this inspection. By this review, the inspectors ascertained that the subject procedure provided controls to assure control and accountability of filler metal.

Training of Contractor QA/QC Inspectors for SGRP

The licensee was actively pursuing the services of contractor QA/QC inspectors for use during the SGRP. Through discussions with cognizant QA/QC supervisors and field personnel, the inspectors ascertained that approximately 90% of the QC Inspectors during the SGRP will consist of contracted QC personnel. Procedure QA-142, Vendor QC Inspector Acceptance, had been issued to handle orientation and training of all contracted QC inspectors. All QC inspectors contracted to work during the SGRP will have been certified and qualified by their current employer to the requirements of ANSI N45.2.6-1978 Standard. Onsite training responsibilities have been assigned to the cognizant Level III examiners. These responsibilities include: specifying QA/QC training courses and plans, preparation and approval of examinations, providing capability demonstrations, reviewing certifications for Level I and II inspectors, administration and grading, and periodic assessment of performance. Procedure NSD-105, Implementation Criteria, Work Force

Requests, Process and In-Processing, was the implementing procedure for this training. Inspector candidates will be expected to demonstrate that they have achieved a good understanding of the training material and obtain a minimum grade of 80% on a written examination.

Conclusion:

Based on discussions with cognizant licensee personnel and procedure review, the inspectors ascertained that the licensee's training program for vendor QA/QC inspectors was adequate.

Welding Readiness Assessment for SGRP Unit 1

In January 1997, the licensee assembled a task group consisting of DPC and industry personnel with welding and QA experience to make an assessment of McGuire's readiness for welding activities associated with Unit 1 steam generator replacement. One of the team's objectives was to determine whether McGuire had taken the steps necessary to correct welding issues raised during Catawba's Unit SGRP, see RII Report No. 50-413,414/96-12. Some of the issues which were outlined in the scope of this assessment included: communications, testing/qualification of welders, use of automated welding machines in production, planning, training and Regulatory Issues. The assessment team completed their work on January 16, 1997, and issued their findings in a report dated February 4, 1997. The inspectors reviewed the report and subsequently met with members of the assessment team to discuss their findings and their recommendations which are summarized below. The assessment team found that an effective core organization was in place. This organization was making preparations for the upcoming SGRP, including lessons learned from Catawba's SGRP. However, the team found that communications between implementing accountables, the workforce and the technical support group were in need of improvements to permit free flow of technical information and speedy resolution of production problems.

The welding orientation training was found to be on target in that it had provided good technical information and lessons learned material to welders, pipe fitters and welding QC inspectors. The team recommended that engineers and technical specialist be given formal training on the welding processes and the welding program to the extent that it was commensurate with their responsibilities. Testing welders in situations where access to the weld joint presented a challenge was not meeting expectations. The team recommended certain changes to the program which would allow for the use of scale mock-ups representing actual field conditions instead of the present setup. The team found that the welding machine operators had acquired the necessary skills to operate the automatic welding equipment on a limited basis. However, because of their limited training, they lacked the skills in equipment trouble shooting and could not go beyond the scope of their limited training.

The team recommended that selected technical personnel be given the necessary training to allow them to diagnose equipment problems in the field and to correct them in a timely manner, otherwise they are to seek expert assistance.

In reference to the overall licensee corporate structure for long-term support of the welding program, the team noted that the program, roles and responsibilities continued to be fragmented and without a single point ownership even after the welding Quality Improvement Team's (QIT) recommendations which were reported in September 23-27, 1996. This observation was particularly apparent to team members not associated with Duke. These members were less than certain that the initiative would succeed in resolving the issues identified by NRC and the Licensee. The team pointed to an apparent lack of urgency to fill the NGO corporate position (i.e., corporate owner of the welding program). In addition, the team found that only minimal progress had been made to address the QIT recommendation that welding be established as a primary skill in ESS. The team found no formal mechanism in place to provide feedback and recommend improvements to the corporate and site (McGuire), welding program manuals owners. In conclusion, the team suggested that under the existing fragmented organizational structure, correctable welding related problems could go undetected and could recur at this station or between stations.

c. Conclusions

Modifications to the automated welding equipment, coupled with the experience gained through their use, improved the production rate and the quality of shop fabricated feedwater welds. Continued welding of actual pipe size weld coupons with automatic welding equipment should continue to improve weld quality and the welders expertise in this process. The licensee's support of this initiative demonstrates a commitment in training of welders to state of the art equipment which should improve weld production and quality.

Radiography has improved significantly and achieved a quality which can be rated a strength. Similarly, postweld heat treatment of CF welds was considered a strength in that it was performed by well-trained personnel using improved equipment and appropriate procedures. Results met code requirements and were well documented. As stated above, the work of the assessment team provided a good evaluation of DPC's welding program. The work was well planned and thorough. Areas where corrective actions were warranted were documented and for the most part completed. However, some of the long range objectives (i.e., corporate ownership of the welding program) had not been completed at the close of this inspection.

M2.1 Control of Maintenance Activities

a. Inspection Scope

The inspectors performed inspections in the Unit 1 reactor building areas to observe and evaluate licensee control of ongoing maintenance activities during the removal of the original steam generators and removal of interferences. The inspectors also evaluated the SGRP maintenance personnel performance against the guidance outlined in Steam Generator Replacement Project Housekeeping Plan and Nuclear Station Directive (NSD) 104, "Housekeeping, Material Condition, and Foreign Material Exclusion".

b. Observations and Findings

The inspectors observed removal of interferences, installation of restraints and cutting of process piping to facilitate steam generator removal and replacement. Temporary blocking devices were installed inside piping systems or temporary covers were installed to limit the spread of foreign material when performing activities such as grinding or cutting. Although some loose tools and equipment was identified, the inspectors noted that equipment was staged and adequately controlled to minimize spill intrusion into safety systems. Work areas were basically kept orderly by maintenance personnel performing the activities. Tools and equipment not being used were stored in tool boxes or tagged. Cleanliness zones were established to prevent the introduction of foreign material into systems or components during the performance of maintenance.

Fire protection controls were established to minimize the potential for fires due to hot maintenance activities (i.e., welding, grinding). As the outage progressed, the licensee incorporated revisions to the fire protection policy to address minor omissions.

c. Conclusion

The inspectors concluded that the licensee's control of work activities relating to the removal of the original steam generators was good. Fire protection controls were adequate.

III. Engineering

E1 Conduct of Engineering (50001)

E1.1 Procurement and Code Compliance

a. Inspection Scope

The inspector reviewed activities associated with the replacement of the steam generators that will occur during the next Unit 1 outage scheduled to start in February 1997.

b. Observations and Findings

The inspectors reviewed pressure vessel material certifications, post weld heat treatment records, a sample of non-conformance records relating to these replacement steam generators, and observed performance of selective area magnetic particle (MT) inspection on replacement steam generator number 4.

Certifications for the following materials were reviewed:

Steam Generator No. 2

- Lifting Trunion, material-SA 508, Class (Cl) 3, Ht. No. 25057
- Tube Sheet, SA 508, Cl. 3, Ht. No. 92Y4123-1
- Shell Can No. 1, SA 533 Type B, Cl. 1, Ht. No. 2658-3
- Steam Drum Can No. 2, SA 533 Type B, Cl. 1, Ht. No. 2670-1 Steam Generator No. 3
- Primary Head, SA 508, Cl. 3, Ht. No. 93W3-1-1
- Shell Can No. 2, SA 533 Type B, Cl. 1, Ht. No. 2689-3
- Steam Drum Can No. 1, SA 533 Type B, Cl 1, Ht. No. 2676-1 Weld Metal Material Certifications
- Covered Electrode 8018 C3, 5/32 inches diameter, Ht. No. 432K3591
- Submerged Arc wire L-Tech 44, 5/32 inches diameter, Ht. No. 044115 combined with Marathon 458 Flux, Batch No. 0942.

All of the material certifications met the requirements specified in the appropriate section of the ASME Code.

The inspectors selected and observed the magnetic particle testing of several areas on Steam Generator No. 4. Areas selected were ones that

would be most susceptible to delayed cracking during fabrication of the steam generator, i.e., manual repairs, manual weld buildups, and areas which had large mass (tube sheet area). The areas that were selected were as follows:

- Weld No. 65, Secondary Shell to Tube Sheet, Radiography Areas 2-3, 3-4, 6-7, 9-10, 34-35, and 35-36 (Radiography Testing resulted in manual weld repairs in these areas).

- Weld Nos. 240/243, Inspection Port Weld Buildups on Can No.3

- Weld No. 32, Manual Buildups on Tube Sheet for Blowdown Line

- Weld No. 213, Hand Hole Forging to Shell Weld (Can No. 3)

No indications were detected during the magnetic particle testing.

c. Conclusions

The inspectors concluded that the review of the material certifications indicate that the plate, forgings, and weld filler metal identified in the certifications meet the applicable ASME Code requirements specified. The selective area magnetic particle inspections performed during this inspection period did not reveal any indications and indicated code compliance for the testing performed in these areas by the vendor and the licensee.

E1.2 Review of SGRP Lifting and Transport Program for Unit 1

a. Inspection Scope

The inspectors examined the Steam Generator Replacement Project (SGRP) lifting equipment erected outside the Unit 1 Reactor Building; reviewed the adequacy of the SGRP lifting and transport programs, procedures and load test records, assuring that they were prepared and tested in accordance with regulatory requirements, appropriate industrial codes, and standards; and verified that the maximum anticipated loads to be lifted would not exceed the capacity of the lifting equipment and supporting structures.

b. Observations and Findings

The inspectors reviewed the lifting programs, documents, procedures, calculations, drawings, and load test records that control the SGRP activities.

The licensee listed ANSI codes and NUREG 0612, Control of Heavy Loads at Nuclear Power Plants, 1980 as references in the SGRP Lifting Program. These references will be used as guidelines or standards for the SGRP

lift activities. ANSI N45.2.15, Hoisting, Rigging, and Transporting of Items for Nuclear Power Plants, 1981 was used to perform 110 percent load tests required for the erected Outside Lifting System (OLS) and transporters which will transfer the steam generators from or to the storage facility.

The licensee established procedures and calculations for removal, transport, and installation of the old Westinghouse and new Babcock and Wilcox steam generators. Calculation MCC-1201.37-00-0021, Heavy Load Drop in Containment During Steam Generating Placement was performed for the impact analysis to the equipment or components inside the containment for the accidental drop of the steam generators. Procedure TO/1/A/9600/87, Contingencies for SGRP Heavy Load in Containment, Rev. 1 was prepared for emergencies.

The inspectors reviewed Drawing MCSK-19270-01, SGRP SG Haul Route, Rev. 1 and Calculation MCC-1151.03-00-0003, SGRP SG Transport Path Evaluation of Buried Pipe and Components, Rev. 0. The inspectors concluded that the licensee engineers adequately performed the drawing and calculation in a professional manner except for some minor discrepancies due to underconservatism found in the calculation. However, the licensee engineers recalculated the component stresses and verified that the new calculated stresses were still within the allowable limits. Therefore, the inspectors determined that the drawing and calculation were adequate and acceptable.

The licensee planned to install and utilize after reactor shutdown a new temporary lifting device (TLD) inside the reactor building consisting of a constructed frame and an original hoist which had been previously tested and used during plant construction. The new TLD will be installed on top of the Polar Crane Girders (PCGs) and used to lift the steam generators inside the reactor building. The original TLD (original hoist, previous frame) was originally load tested on the PCGs per ANSI N45.2.15 during construction. The licensee planned to inspect the PCGs and new TLD before and after each steam generator lift. Impact analyses in the case of SG accidental drops during the lifting or transfer operation were performed by the licensee.

The crane inspection and load test records performed for preparation of the SGRP lift were reviewed by the inspectors to verify that the licensee successfully performed the required inspections and load tests. During review the load test record for Procedure TN/1/B/9260/00/02C, Outside Lifting System Load Test, Rev. 0, the inspectors found that the individual who signed and dated for the steps of the crane operation was not a qualified crane operator. The licensee, however, stated that the specific steps required to be performed by qualified crane operators were actually performed by the qualified crane operators even though they did not sign and date in the steps of the procedures. The inspector determined that two qualified crane operators did perform the entire crane operation and signed in the job briefing sheet. However, a

craft foreman on the ground signed in the locations of the procedure steps for the two crane operators in order to verify that those steps were performed and completed because these operators were seated inside the crane cab during the crane lift operations. The inspectors verified that these two operators were qualified crane operators and that, for this lift, the procedure was adequately implemented. The licensee stated that they plan to review the training and qualification process to ensure that all heavy lifts utilize currently qualified lift operators.

The inspectors walked down the OLS erected outside the reactor building equipment hatch, on-site fabrication facility for refining the steam generators, and a retired steam generator concrete building (facility). The OLS will consist of an erected overhead crane and a similar rail road system. The rail system had not been completed. The railroad system will extend inside the reactor building to pick up or deliver the steam generators. Then the overhead crane system will lift the steam generators to or from a transporter. The transporter will transfer the old steam generators to the storage facility for temporary storage until the licensee decommissions the reactor vessel in the permanent storage location in the future.

Essentially, the lifting and transporting systems for the SGRP were either identical or similar to the Catawba Nuclear Plant Unit 1, another Duke Power plant with similar design. Duke successfully replaced the steam generators in that unit in June 1996. Therefore, Duke Power has had experience in the handling of replacement steam generators.

c. Conclusions

The inspectors concluded that the required lifting plan, path, calculation, and analyses generated for the safe lifting and transfer operations of the old and new SGs were adequate. The inspectors concluded that the erected lifting system, the on-site fabrication facility, the storage facility, and the plan of the rail system were adequate and can achieve the intended function for the SGRP.

E1.3 Evaluation of Temporary Pipe Restraints during Unit 1 Steam Generator Replacements (50001)

a. Inspection Scope (50001)

The inspectors reviewed the licensee's plan to provide temporary pipe restraints during the SGRP to verify the adequacy of these activities. Temporary restraints for cut piping and generator supporting pad columns were planned for the systems and supports such as main steam line, main feed water line, etc.

b. Observations and Findings

The licensee planned to provide the following seven supporting systems with temporary restraints in order to perform the cutting of existing pipe and to provide temporary restraints to stabilize the existing piping and the steam generators during the lifting operations:

- Removal and Reinstallation of Steam Generator
- Main Steam Line
- Upper Lateral Supports
- Lower Lateral Supports (including column supports)
- Main Feed Water Line
- Auxiliary Feed Water Line
- Misc. Supports for Tubing, Small Pipes, Conduit, etc.

The inspectors discussed with the licensee engineers the process and theory of cutting the piping and providing the temporary supports. The licensee generated necessary procedures, drawings, calculations, work orders, and other documents for the temporary restraint systems. The temporary restraint system is especially important to the main steam line which was pulled to make the connection and weld to the steam generators creating pre-stresses on the pipe during plant construction. The main steam pipe could possibly move as much as 3" in one direction after cutting if adequate temporary supports were not provided. To prevent piping movement after cutting, the licensee planned to insert temporary load stops into constant and variable spring restraints to change the restraint types from variable or flexible supports to rigid. The snubbers will be replaced temporarily with rigid struts to establish the rigid restraints. The maximum movement will be only 1/4" in one direction when the pipe is cut after all the temporary restraints have been installed. This small movement will slightly alter the pipe stresses, but the pipe stresses will still be within the allowable stresses based on the applicable codes.

The main difference between McGuire and Catawba Unit 1 during the SGRP is the extension of the main feed water line. McGuire plans to extend the main feed water line from the existing inlet located near the bottom of the steam generators to the upper location of the steam generators near the top. This extension required modification on the feed water line before the installation of the new steam generators.

c. Conclusions

The inspectors concluded that the engineering staff was knowledgeable in SGRP activities and that the licensee had conducted adequate preparations to include supporting calculations, drawings, procedures, and other documents to ensure the SGRP was an acceptable program.

E2 Engineering Support of Facilities and Equipment

E2.1 SGRP Design and Planning

a. Inspection Scope

The inspectors reviewed modifications and associated 10 CFR 50.59 safety evaluations for the SGRP to determine if design controls and safety evaluations met applicable regulatory requirements and licensee administrative controls. Regulatory requirements included ANSI N45.2.11-1974, Quality Assurance Requirements for the Design of Nuclear Power Plants, 10 CFR 50.59, 10 CFR 50 Appendix B, FSAR, and the licensee's Quality Assurance Program implementing procedures. The following Nuclear Station Modifications (NSMs) were reviewed:

19210 Remove/Install SG Enclosures
19420 Main Feed (CF) System Piping Reroute
19510 Main Steam
19610 Nuclear Sampling
19710 Blowdown/Wet Lay-up (BB/BW) System Reroute
19815 S/G Instrumentation
19915 Auxiliary Feedwater System Reroute

b. Findings/Observations

SGRP design control procedures were consistent with regulatory requirements and the licensee's QA program. The NSMs reviewed by the inspector demonstrated appropriate implementation of regulatory and licensee administrative design controls. Adequate post modification inspections and tests were specified in the NSMs. The modifications were scheduled for installation during the upcoming SGRP outage.

The implementing procedure for 10 CFR 50.59 evaluations, NSD 209, provided adequate guidance for performing these evaluations. Personnel performing the evaluations on SGRP modifications were adequately qualified. The evaluation documentation was generally good in that it included adequate details to justify the conclusions. The inspector reviewed the FSAR Chapter 15.2.8 Feedwater Pipe Break Analysis Calculation, DPC-1552.08-00-0140, revision 0, and concluded the NSM 19420 CF System Piping Reroute Safety evaluation adequately addressed analysis assumptions and conclusions.

Self-assessment in this area was provided by a licensee review of revisions to modification Final Scoping Documents and NSMs to verify that appropriate impact evaluations were performed on the associated 50.59 evaluations. This self assessment conducted in the week prior to this inspection identified several minor documentation deficiencies which were promptly resolved.

c. Conclusions

Design controls implemented for the Unit 1 Steam Generator Replacements were consistent with applicable regulatory requirements and the licensee's Quality Assurance Program. Additionally, safety evaluations for SGRP modifications adequately implemented the 10 CFR 50.59 regulatory requirements. Self-assessment in this area was adequate.

IV. Plant Support

S1 Conduct of Security and Safeguards Activities

a. General Comments

A routine announced inspection was conducted during February 3-6, 1997, in the area of established security practices in preparation for steam generator replacement project activities. In the areas inspected, no violations or deviations were identified. However, the procedures were not clear as to the method of monitoring and observing the protected area during darkness. Subsequently, an Inspector Follow-up item (50-369, 370/97-02-01) was issued.

V. Management Meetings

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on March 10, 1997. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

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Nazar, M., Superintendent, Maintenance
Robinson,M., McGuire SGRP Project Manager
Sample, M., Manager, Steam Generator Maintenance Group
Sharpe, R., SGRP Licensing
Teague, M., SGRP Senior Engineer
Thomas, K., Superintendent, Work Control
Hallman, W., SGRP Manager
Violette, D., Training Specialist

NRC

S. Shaeffer, Senior Resident Inspector, McGuire
M. Sykes, Resident Inspector, McGuire
P. Fredrickson, Special Inspection Branch Chief, DRS, RII
J. York, Regional Inspector
R. Moore, Regional Inspector
R. Chou, Regional Inspector
W. Stansberry, Regional Inspector
N. Economos, Regional Inspector

INSPECTION PROCEDURES USED

IP 50001: Steam Generator Replacement Project Inspection

ITEMS OPENED, CLOSED, AND DISCUSSED

OPENED	TITLE
None	

Enclosure

LIST OF ACRONYMS USED

ANSI	American Nuclear Standards Institute
ASME	American Society of Mechanical Engineers
BB/BW	Blowdown/Wet Lay-up
CF	Main Feedwater (system)
CFR	Code of Federal Regulations
ESS	Electrical System Support
FSAR	Final Safety Analysis Report
FWDS	Field Weld Data Sheet
MT	Magnetic Particle
NSD	Nuclear Station Directive
NSM	Nuclear Station Modification
OLS	Outside Lifting System
PCG	Polar Crane Girder
PWHT	Postweld Heat Treatment
QA/QC	Quality Assurance/Quality Control
QIT	Quality Improvement Team
SG	Steam Generator
SGRP	Steam Generator Replacement Project
TIG	Gas Tungsten Arc
TLD	Temporary Lifting Device