



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

Report Nos.: 50-424/88-23 and 50-425/88-33

Licensee: Georgia Power Company  
P. O. Box 4545  
Atlanta, GA 30302

Docket Nos.: 50-424 and 50-425

License Nos.: NPF-68 and CPPR-109

Facility Name: Vogtle 1 and 2

Inspection Conducted: June 6-10, 1988

Inspector:

*J. J. Blake*  
G. A. Hallstrom

*6/30/88*  
Date Signed

Accompanying Personnel: M. M. Glasman

Approved by:

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

*6/30/88*  
Date Signed

SUMMARY

Scope: This routine, unannounced inspection was conducted in the areas of Containment Penetrations (Unit 2), Housekeeping and Materials Control (Unit 2) Actions on previous inspection findings (Units 1 and 2) and Licensee Identified Items (50.55(e)) (Unit 2).

Results: In the areas inspected, violations or deviations were not identified. Programmatic strengths were demonstrated in management involvement in assuring quality and responsiveness to NRC initiatives. However, the potential for weakness relative to resolution of technical issues is indicated by New Unresolved Item (UNR) 425/88-33-01\*, an additional example of conditions which caused violation 424/88-05-02 and need for additional technical response to UNR 424/88-03-03, 425/88-02-03.

\*Unresolved Items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- J. Austenkampe, Engineering Support Superintendent
- \*P. Baker, Maintenance Welding Engineer, Operations
- \*J. Gilmartin, Mechanical Staff Engineer, Construction
- \*S. Green, Maintenance Supervisor, Operations
- \*E. Groover, Quality Assurance (QA) Site Manager, Construction
- \*H. Handfinger, Project Start-up Manager
- \*R. Pinson, Vice President, Construction
- \*K. Pointer, Senior Plant Engineer, Nuclear Safety and Compliance (NSAC),  
Operations
- W. Ramsey, Project Engineering Manager
- \*P. Rice, Vice President and Project Director

Other licensee employees contacted included construction craftsmen, engineers, technicians, mechanics, and office personnel.

#### Other Organizations

- \*J. Agold, Southern Company Services (SCS), Preservice Inspection  
Supervisor
- D. Carlson, Bechtel Power Corporation (BPC), Codes Engineer
- \*J. Jamison, BPC, Test Engineer
- R. Pope, BPC, Mechanical Staff Engineer
- \*D. Smith, Oglethorpe Power Corporation (OPC), Construction Engineer

#### NRC Resident Inspectors

- \*R. Schepens, Senior Resident Inspector (Construction)

\*Attended exit interview

### 2. Containment Penetrations (Unit 2) (53051, 53053, 53055)

The inspectors observed welding and nonwelding activities for Unit 2 containment penetrations as described below to determine whether applicable code and procedure requirements were being met.

The applicable code for penetrations described herein is the ASME Boiler and Pressure Vessel Code 1977 Edition with addenda through Summer 1976. The penetrations were fabricated by AMETEK Incorporated and installed by Chicago Bridge and Iron Incorporated (CBI). Process piping was welded to the penetrations by Pullman Power Products (PPP) or GPC.

a. Procedure Review

The inspectors examined procedures associated with the penetrations listed in Paragraph 2.b. below to determine whether the following specific activities were controlled and performed to the appropriate requirements:

- ° Shipping, receipt, identification, storage, handling, and protection of penetration assemblies and associated components, including protection of the assemblies and the associated components after installation is completed.
- ° Installation methods, including assembly, erection, and welding.
- ° Testing (NDE and leak testing) and inspection, including leak control or leak testing components which are part of the penetration assembly and which form part of the containment pressure boundary.

During the above examination the inspectors noted that programmatic controls and FSAR commitments were essentially the same as were in place for Unit 1 and had been previously examined by GPC Readiness Review (Module 8) and NRC (See Report No. 50-424/86-18). Cognizant licensee personnel agreed but noted that all penetrations in the random sample selected for review had been fabricated by AMETEK. Therefore no CBI shop welds were made between the flued head and tailpiece as had been done for some Type II penetrations on Unit 1. Also the CBI sketches on the document packages were uniform in omitting this weld as being outside the scope of CBI work.

b. Observation of Work

Since the available window for observation of work activities associated with containment penetrations was past, the inspectors elected to complete a field examination of a random sample of installed penetrations using "as-built" design drawings together with quality documentation listed in Paragraph 2c. to determine whether:

- ° Penetration components/assemblies and installed material meet purchase specifications.
- ° Method of assembly of components is consistent with design drawings and work specifications.
- ° Measures exist and are in force to protect installed penetrations from construction debris, physical damage, and hostile environments.
- ° Installation activities were conducted with reference to specified procedures and by qualified personnel where required.

- ° Nondestructive Examination (NDE) was performed in accordance with procedures, and examination personnel are qualified.
- ° Inspection (QC) activities were performed as required by proper procedures and by properly qualified personnel.

Fabrication Isometric	Penetration	System	Penetration		Process
<u>Dwg. No.</u>	<u>No.</u>	<u>Description</u>	<u>Type</u>	<u>Material</u>	<u>Pipe Size</u>
2K4-1202-225-01 R/5	44	Nuclear Service Cooling Water (NSCW) - Return from Reactor Cavity Cooling Train A	II	SS-304L	8"
2K4-1201-077-01 R/6	63	Reactor Coolant System (RCS) Pressurizer Relief Tank Makeup	II	SS-304	3"
2K4-1222-013-01 R/2	87	Containment Leak Rate Test	II	CS-106B	8"
2K4-1202-209-01 R/4	92	NSCW Supply to Containment Cooler, Train B	II	SS-304L	8"
2K4-1302-107-01 R/6	104	Auxiliary Feedwater	I	CS-106B	6"

During the above examination the inspectors noted a discrepancy between the as-built condition of Penetration No. 87 and Drawing No. 2K4-1222-013-01 R/2. The drawing indicates that penetration-to-process pipe field weld 015-W-03 connects Spool Piece No. 015-S-04 rather than Spool Piece 015-S-02 as actually installed. Spool Piece 015-S-04 is actually connected to nearby Penetration No. 68 (another penetration for Containment Leak Rate Test) by Field Weld 013-W-04. Additional investigation by cognizant licensee personnel determined that the as-built condition of Penetrations Nos. 87 and 68 had been properly determined by Field Change Request No. M-FCRB-18285. Engineering review of the as-built condition was completed (Deviation Report No. NC-43) and dispositioned use-as-is since identical configurations and valves were involved. Drawing 2K4-1222-013-01 had not been properly corrected due to a drafting error. MFCRB-6P was issued to correct the error. The inspectors noted that minimal safety significance was associated with this particular error. However, the error was sufficient to raise NRC concern regarding the potential for inadequate incorporation of as-built corrections to

design drawings. Cognizant licensee personnel were informed by the inspectors that a random sample of as-built design drawings versus field conditions would be examined in a subsequent inspection to resolve NRC concern on this matter pending completion of that review this matter would be identified as Unresolved Item 425/88-33-01, Proper Incorporation of as-built corrections to Design Drawings.

c. Records Review

The inspectors reviewed pertinent records associated with the penetrations listed in Paragraph 2b to determine conformance with requirements for receipt inspection and material certification, installation and testing, nonconformance/deviation records, and qualification of craft, QA and inspection (QC) personnel.

This review included the welding and Nondestructive Examination (NDE) associated with the flued head-to-tail piece shop welds by AMETEK, the penetration-to-guard pipe field welds by CBI and the process pipe-to-flued head field welds by PPP and GPC. The following types of documentation were reviewed.

- CBI Stores release for item or material
- Certified Material Test Report (CMTR) for material
- AMETEK shop drawing for item or assembly
- AMETEK shop weld records
- CBI sketches and record table for field welds
- PPP/GPC travelers for pipe field welds
- CMTRs for filler metals
- NDE Reports for welds involved
- Welder Qualifications for welders involved
- Qualification records of NDE/QC personnel
- Vendor Certificate-of-Conformances (COCs) for NDE materials

During the above examinations, violations or deviations were not identified. Also, the inspectors noted programmatic strengths in the areas of management involvement and immediacy of responses to NRC initiatives or concerns. The potential for weakness associated with UNR 425/88-33-01 is considered minimal.

3. Reactor Coolant and Safety-Related Piping (Unit 2)

The inspectors examined nonwelding activities for reactor coolant and safety-related piping to determine whether applicable code and procedure requirements were being met. The applicable code is the ASME Boiler and Pressure Vessel Code, Section III, 1977 Edition with Addenda through W77.

Review of Nonwelding Quality Records (49055) and (49065)

The inspectors selected various reactor coolant and safety-related piping components (e.g., pipe, fittings and weld-in components) for

review of pertinent records to determine conformance with procurement, storage and installation specifications and QA/QC site procedures.

Records of the following items were selected for review to ascertain whether they (records) were in conformance with applicable requirements relative to the following areas: material test reports/certifications; vendor supplied NDE reports; Nuclear Steam Service Supply quality release; site receipt inspection; storage; installation; vendor nonconformance reports.

<u>Item</u>	<u>Heat/Control No.</u>	<u>System</u>
6" Sched 160 SS-316N Pipe	14-338	RCS Pressurizer & Releaf
" " "	10-214	RCS Pressurizer & Releaf
" " "	10-214	RCS Pressurizer & Releaf
12" Sched 100 SS-316N Pipe	10-213	RCS Pressurizer Safety & Releaf
" " "	10-214	RCS Pressurizer Safety & Releaf
" " "	11-226	RCS Pressurizer Safety & Releaf
12" Sched 120 SS-316N Pipe	10-212	RCS Pressurizer Safety & Releaf
14" Sched 160 SS-316 Pipe	J6568	RCS Pressurizer Surge Line
" " "	J6569	RCS Pressurizer Surge Line
" " "	J6570	RCS Pressurizer Surge Line
16" Sched 160 SS-316 Pipe	L4016	RCS Pressurizer Surge Line
10" Sched 140 SS-316 Pipe	13-351	SI Accumulator-to-Cold Leg
" " "	6-809	SI Accumulator-to-Cold Leg
" " "	7-298	SI Accumulator-to-Cold Leg
" " "	13-712	SI Accumulator-to-Cold Leg
" " "	10-213	SI Accumulator-to-Cold Leg

During the above examinations, violations or deviations were not identified. However the inspectors noted that all materials listed above with exception of the pressurizer surge line were received from the vendor supplying material as discussed in Paragraph 6.b.

#### 4. Independent Inspection: Effort

Housekeeping (54834B), Material Identification and Control (42902B), and Material Control (42940B)

The inspectors conducted a general inspection of Unit 2 containment to observe activities such as housekeeping, material identification and control; material control, and storage.

During the above inspection, the inspectors observed uncontrolled water leakage from flushing operations due to blocked drain lines on five gallon buckets being used to contain leaking fittings on the temporary flushing return header located on Level 1 at Column 13. Leakage on permanent plant armed electrical equipment was occurring between the inner and outer shield walls from Column 11 to Column 13, from operating deck to bottom of containment (Level 1 to Level C). The inspectors estimated the leakage at approximately 3 gpm and noted that approximately one hour was required, after informing cognizant licensee personnel, to secure the leakage.

Cognizant licensee personnel began an investigation to determine the root cause of the uncontrolled leakage and completed an inspection to ensure that water damage had not occurred to the permanent plant-electrical equipment involved. No damage was identified.

The inspectors concurred with the licensee's position that this example of uncontrolled leakage had minimal safety significance since damage to permanent plant equipment had not occurred. The inspectors also noted that NRC concern was diminished due to the attention focused on uncontrolled leakage by top level GPC project management. The inspectors informed cognizant licensee personnel that need for further NRC review on this matter would be identified as Inspector Followup Item 425/88-33-02, Protection of Permanent Plant Equipment from Uncontrolled Leakage.

5. Licensee Identified Items (92700)

Prior to the inspection, the licensee identified the following items under 10 CFR 50.55(e).

a. (Closed) Item 425/CDR 86-117, Main Steam Safety Valve Ring Settings

On May 14, 1986, the licensee notified Region II of a 50.55(e) item concerning improper ring settings on Crosby Main Steam Safety Valves (MSSVs). I&E Information Notice 86-05 was issued by the NRC to alert recipients of a potentially significant problem pertaining to spring actuated MSSVs. Tests in the fall of 1984 were conducted to determine full flow from Crosby Model 6R10 MSSVs. The results of the tests indicated that the valves could not achieve the required disc travel with the factory-set ring setting (+155 notches).

Each main steam line at the Vogtle Electric Generating Plant is provided with five spring loaded safety valves. The relief capacity of these valves is designed to protect the steam generator and the main steam system from overpressurization. The main steam safety valves used at the Vogtle Electric Generating Plant are Crosby Model 6R10. The valves are required to be in compliance with ASME Section III, Division 1, as defined in the 1974 Code Edition, and Addenda through Winter 1975. This code states, in part, that safety valves shall operate without chattering and attain full lift at a pressure less than 3% above the setpoint pressures.

As a result of the I&E Notice, Georgia Power Company tested five of the twenty main steam safety valves for Unit 1. The results of the test indicated that with the as-shipped ring settings, the valves would not attain sufficient lift to provide full relief capacity.

Subsequently, all twenty - Unit 1 valves were shipped to Crosby's high flow test facility for testing and adjustment. The ring settings were adjusted to increase the disc travel and to enable the valves to achieve their design relief capacity. This item was closed for Unit 1 (See NRC Inspection Report No. 424/86-83) but remained open for Unit 2 pending completion of corrective actions (testing and readjustment of Unit 2 MSSVs on Crosby's high flow test facility). The inspectors held discussions with responsible licensee representatives and reviewed supporting documents to verify that corrective actions have been completed. This item is considered closed.

b. (Closed) Item 425/CDR 86-127 Containment Cooling Units

On October 9, 1986, the licensee notified Region II of a potentially reportable 50.55(e) item associated with failure of containment cooling units to deliver design air flow. The licensee reported in a letter dated October 31, 1986 that this condition is not reportable pursuant to the requirements of 10 CFR 50.55(e) or 10 CFR 21. The inspectors reviewed engineering evaluations and calculations and concurred that the reduced flow rate had no impact on plant safety since for both normal and accident conditions;

- (1) The original design flow rates were significantly higher than the flows required to conform to the required design criteria; and
- (2) The change in the containment cooler performance (heat removal capacity) due to a reduction in air flow is insignificant.

This item is considered closed.

c. (Closed) Item 425/CDR 87-138 Main Steam Isolation Valve (MSIV) Overpressurize

On January 23, 1987, the licensee notified Region II of a 50.55(e) item concerning the possibility for hydraulic and nitrogen pressure in the MSIV actuators to exceed design pressure during accident conditions. This item was reported for Unit 1 as LER 87-002, Potential Failure of MSIVs to Close Following Postulated Small Steam Line Breaks. LER 87-002 was closed for Unit 1 (See NRC Inspection Report No. 424/87-15) but the matter was held open for Unit 2 pending completion of corrective actions.

Corrective action taken for each MSIV was installation of a relief valve in the hydraulic line to the solenoid valve which opens the MSIV.

Testing by the MSIV supplier of the modified configuration under an accident environment was also completed. The inspectors reviewed the technical report of completed testing of the Rockwell A-290 MSIV actuator after exposure to the postulated accident environment (320°F for 1 hour) and concurred with BPC's conclusion that the test demonstrated the operability of the actuator during a postulated design basis accident environment. The inspectors also held discussions with responsible licensee representatives and reviewed supporting documents to verify that corrective actions have been completed. This item is considered closed.

6. Action on Previous Inspection Findings (92701, 92702)

The inspectors examined licensee actions on previous inspection findings. Results are as follows.

- a. (Closed) Inspector Followup Item 425/88-02-01, Weld Filler Metal Left Abandoned

This item concerned poor housekeeping conditions in Unit 2 containment and the reactor auxiliary building which were demonstrated by examples of abandoned used and unused electrodes. Safety significance had been considered minimal since no improper use of filler metals was observed. The inspectors had noted a general improvement in plant housekeeping (with exception the of the uncontrolled leakage reported in Paragraph 4) and no additional examples of abandoned weld filler metals were identified. The inspectors held discussions with cognizant licensee personnel to ensure that good housekeeping practices continue to be followed. This item is considered closed.

- b. (Open) Unresolved Item 424/88-03-02; 425/88-02-02 Potential for Banded Microstructure in Cold Leg Accumulator Piping

This item concerns the potential for inadequate heat treatment (incomplete solution annealing) and attendant lack of corrosion resistance of 10" SS-316 Safety Injection piping installed on Units 1 and 2. The potential was initially evidenced due to need for a special ultrasonic technique due to "velocity shift" to complete preservices inspections in Unit 1 piping. These special examinations were discussed in the Unit 1 Preservice Summary Report to NRC (NRR) dated June 25, 1987 (GPC file No. SL-2702). The report noted that "Since the calibration block was fabricated from the same material as used in plant, the characteristics were the same. A piece of this material was subjected to metallurgical analysis. The results from the analysis showed that this material has an abnormal banded microstructure rather than a uniform equiaxed microstructure which results from incomplete annealing. This condition does not effect the structural integrity of the component."

NRC concern regarding the potentially degraded material characteristics had been identified during a January 5-13, 1988, inspection of

preservice inspection activities on Unit 2 (See Report No. 50-425/88-02) and the following specific concerns regarding the subject materials were documented.

- (1) What are the locations in Units 1 and 2 of all material on the subject order?
- (2) Are the corrosion characteristics of partially recrystallized/banded material documented, especially in the weld HAZ's?
- (3) Were the mechanical properties on the certification for partially recrystallized or fully recrystallized samples? Are the mechanical properties known for material in the partially recrystallized/banded condition?
- (4) Is there reason to believe that there may be a problem with the fatigue resistance of partially recrystallized/banded material?
- (5) The directionality of mechanical properties (tensile, fatigue) should be addressed.
- (6) The adequacy of the Class 1 ultrasonic tests must be addressed.
- (7) What is the adequacy of other material ordered from this vendor?
- (8) Why is the subject material partially recrystallized/banded? (Is the banding in this material due to microsegregation, or incomplete annealing?)

Subsequent to the above, GPC responded with a second metallurgical report from material of the same heat identification (HT No. 13-351) as for the initial report. The conclusion of the second report was that an abnormal banded microstructure did not exist in the subject material. During review of this report, the inspectors noted a significant difference in the chromium content of the two samples (16.47% versus 17.42%) which could indicate that the samples were from different heats of material. The inspectors informed cognizant licensee personnel of their view that insufficient data had been collected to verify the existence or absence of abnormal banded microstructure for the material in question. However, the special UT technique had been required for several heats of SS-316 piping from the same vendor in both Units 1 and 2 and is a clear indication that potential for inadequate heat treatment exists.

Cognizant licensee personnel informed the inspectors that the special UT technique had been required for the majority of 10" sched 140 Safety Injection piping in both units from the accumulator valve to cold leg connections. Further that other piping from the subject vendor had demonstrated the velocity shift phenomena but not to the extent to require use of the special ultrasonic technique.

The GPC project engineering manager provided an action plan to the inspectors which constituted GPC commitment to actions necessary to resolve NRC concern on this matter. Essential elements of the action plan are as follows.

- ° Perform metallographic examination of the material, photomicrographs of the grain structure (polish and etch calibration block using electrolytic, oxalic acid).
- ° Perform corrosion tests (ASTM A-262, Practice A) on the material (excess calibration block material, HT #13-351).
- ° Determine the microstructure of material (e.g., Is the grain structure equiaxed throughout the wall thickness?).
- ° Determine the corrosion resistance of the material (e.g., Is the material, as received, susceptible to intergranular corrosion?).
- ° Continue efforts to locate original pictures and samples done by Associated Metallurgical Consultants, Inc. in February 1985.
- ° Show NRC Inspectors the Photographs from the work done by Law Engineering in March 1988.
- ° Results of work above will be evaluated by GPC to determine the appropriate course of action.

This matter remains open pending NRC review of results from the GPC action plan reported above.

- c. (Open) Unresolved Item 424/88-05-01; 425/88-04-01, Abandoned Pipe Support for Safety Injection Piping

This item reflects NRC concern associated with an apparently abandoned uncompleted support located directly above Unit 1 safety injection swing check valve 1-1204-263-3 IN (1V501204-241-02). The partially completed support included a length of 4X4 Tube Steel which had been machine cut at an angle, and partially welded to an embed such that the other end was directly over the valve and perpendicular to the longitudinal axis of the piping involved. The support appeared to infringe on the hot pipe seismic separation clearances required to be verified during as-built and construction turnover inspections. The partially completed weld was unpainted and had been in place long enough for moderate rusting (in an enclosed pumphouse).

The inspectors reviewed corrective actions completed through this inspection on the above matter. Cognizant licensee personnel stated that a seismic engineering analyses had been completed and indicated that the support could have remained in place without damage during an Operating Basis Earthquake (OBE).

Further that the majority of effort on this matter to date had been expanded to inspect a smart sample (over 500) of embeds versus design drawings throughout the power block. A total of four additional examples of discrepancies had been identified.

These samples were not associated with pipe supports; i.e. potential concerns regarding the as-built inspections associated with the IEB 79-14 verification program were not substantiated. Initial conclusions by licensee personnel were that the completed inspections demonstrated adequate conformance between as-built embed drawings and field conditions.

The inspectors concurred with the licensee's actions reported above. However, this matter was held open pending final analyses of the additional discrepancies reported above. The inspectors informed cognizant licensee personnel that programmatic strengths were demonstrated on this matter in the areas of management involvement, responsiveness to NRC initiatives and resolution of issues from a technical standpoint.

d. (Open) Violation 424/88-05-02, Lack of Materials Control

This item reflects NRC concern associated with improper application of welding rod heat/lot/classification identification (flag tags) by operations maintenance tool room personnel on 18" length bare welding rods. GPC Procedure 25340-C, Revision 0, Section 3.3.3 requires that 18" length bare rods be procured with a flag attached to one end of each length. Further GPC Procedure 25330-C, Revision 5, does not allow tool room attendants to attach flag tags and further requires that bare welding rods be controlled so that heat, lot and/or control number identification was maintained.

The licensee's formal response to Region II on this matter dated March 10, 1988 (GPC file No. SN-4179) included a summary of corrective actions; anticipated full compliance by April 8, 1988, and further noted that "The weld filler in the Maintenance Toolroom and the Nuclear Operations Warehouse has been inspected for compliance with Procedure 25340-C...Maintenance Engineering conducted another review of the Nuclear Operations Warehouse on March 4, 1988, for any discrepant weld filler materials that do not meet the requirements of Procedure 25340-C. Four DCs were initiated as a result of Maintenance Engineering's review of the Nuclear Operations Warehouse and remain to be dispositioned. In addition, QC has initiated an Inspection Plan #RM-M-01, Rev. 0, "Receipt Inspection of Weld Filler Material," which will verify flag tagging of weld rods regardless of whether the weld rods were procured offsite or were transferred from the Construction Warehouse."

During examinations of the corrective actions reported above, the inspectors noted an additional example of missing flag tags. A compartment of bare 18" length welding rods (3/32" diameter ER308L -

Heat No. 05394) also included several lengths which were missing flag tags. The inspectors noted that safety significance was minimal in that there existed a high probability that the unidentified rods were ER308L rods. However, this situation was not in accordance with the requirements of Procedure 24330-C that rods be controlled to maintain identification and further demonstrated the potential for loss of identity due to loose flag tags.

Cognizant licensee personnel agreed that the initial corrective actions described in S.-4179 would be reviewed and additional steps taken to prevent a similar recurrence. The inspectors informed cognizant licensee personnel that this matter would remain open pending additional N.C review during a subsequent inspection. The inspectors further noted that another repetition of this example would be considered to demonstrate programmatic weaknesses associated with materials control and completion of adequate corrective actions.

#### 7. Exit Interview

The inspection scope and results were summarized on June 10, 1988, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Although reviewed during this inspection, proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

(Open) Unresolved Item 425/88-33-01, Proper Incorporation of as-built corrections to Design Drawings, Paragraph 2.b.

(Open) Inspector Followup Item 425/88-23-02, Protection of Permanent Plant Equipment from Uncontrolled Leakage, Paragraph 4.