



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

Report Nos.: 50-424/85-08 and 50-425/85-08

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

Docket Nos.: 50-424 and 50-425

License Nos.: CPPR-108 and CPPR-109

Facility Name: Vogtle 1 and 2

Inspection Conducted: February 25 - March 1, 1985

Inspector: George Hallstrom
G. A. Hallstrom

3/27/85
Date Signed

Approved by: J. J. Blake
J. J. Blake, Section Chief
Engineering Branch
Division of Reactor Safety

3/27/85
Date Signed

SUMMARY

Scope: This routine, unannounced inspection involved 39 inspector-hours on site in the areas of licensee action on previous enforcement matters, construction progress, safety-related structures, safety-related piping, and licensee identified items (50.55(e)).

Results: One deviation and two violations were identified - "Deviation of Commitments to American Welding Society (AWS) Requirements for Inspection of Porosity", "Lack of Materials Control from Instrumentation Satellite Warehouse", and "Failure of Pipe Support Field Installation and Fabrication Procedure to provide for Control of Welding Quality".

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REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *C. W. Hayes, Vogtle Quality Assurance (QA) Manager
- *E. D. Groover, QA Site Manager - Construction
- *C. E. Belflower, QA Site Manager - Operations
- *B. C. Harbin, Manager, Quality Control
- *G. A. McCarley, Project Compliance Coordinator
- *C. C. Miller, Superintendent of Plant Engineering and Services
- *J. O. Dorrough, Administration Manager
- *S. D. Haltom, QA Engineering Support Supervisor
- *J. L. Blocker, Assistant Manager, Quality Control (QC)
- *H. W. Swain, Mechanical QC Section Supervisor
- *J. M. Davis, Nondestructive Examination (NDE) Supervisor
- *M. S. Hairstor, Regulatory Compliance Engineer
- *E. A. Meadows, Regulatory Compliance Plant Engineer
- *S. J. Piedra, QA Engineer
- *A. Caudill, Inservice Inspection (ISI) Plant Engineer
- *R. May, ISI NDE Coordinator
- *A. Maze, Preservice Inspection (PSI) NDE Coordinator

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

Other Organizations

- *D. L. Kinnsch, Project Field Engineer, Bechtel Power Company (BPC)
- *K. W. Caruso, Welding Engineer, BPC
- *P. R. Murphy, Construction Engineer, Oglethorpe Power Company

NRC Resident Inspectors

- *J. F. Rogge, Senior Resident Inspector - Operations
- *R. J. Schepens, Resident Inspector - Construction

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on March 1, 1985 with those persons indicated in paragraph 1 above. The licensee was informed of the inspection findings listed below. The licensee acknowledged the findings with no dissenting comments.

(Open) Deviation 424, 425/85-08-01, Deviation of Commitments to AWS D1.1 Requirements for Inspection of Porosity - paragraphs 3.b. and 6.b.(1)(a).

(Open) Violation 424, 425/85-08-02, Lack of Material Control from Instrumentation Satellite Warehouse - paragraph 5.

(Open) Violation 424, 425/85-08-03, Failure of Pipe Support Field Installation and Fabrication Procedure to Provide for Control of Welding Quality - paragraph 6.a.(2).

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

- a. (Open) Unresolved Item 424, 425/84-17-02, Visual Acceptance Criteria. This item concerns deviations of visual acceptance criteria from the American Welding Society (AWS) D1.1 Structural Welding Code (AWS D1.1-1975). Appendix VC, Revs. 0 thru 8, to Bechtel Specification X4AJ01, Revision 12, includes several requirements for visual acceptance of weldments on Seismic 1 steel structures and supports which are less stringent than those imposed by AWS D1.1-1975.

The licensee provided proposed engineering justification for all deviations during an earlier inspection (Report No. 50-424, 425/84-36). The proposed justification (Log: PFE-3730) had been reviewed and additional concerns were identified to cognizant licensee personnel.

The licensee had been further informed that the exclusion of porosity from visual acceptance criteria would be the subject of a separate unresolved item (424, 425/84-36-09).

Additional Bechtel-sponsored clarification and engineering justification (File: X4A201; Logs: BS5141, BG33246, and PFE-4883) were reviewed during an early 1985 inspection (Report No. 50-424, 425/85-03) and the licensee was informed that engineering justification and clarification were sufficient to resolve all concerns provided adequate clarification could be obtained regarding the acceptance criteria incorporated in Specification No. X2AP01, Division C5, Section No. C5.1, Revision 4, paragraph C.5.1.5.B. versus the engineering justification for category A welds included in PFE-3730. Cognizant licensee personnel informed the inspector that requested clarification was not yet available. This item remains open.

- b. (Closed) Unresolved Item 424, 425/84-36-09, Potential Deviation of Commitments to AWS D1.1 Requirements for Inspection of Porosity. In continuation of discussions described above, the licensee had previously informed the inspector that Appendix VC would be revised to incorporate Category A porosity limits to Category B welds. The licensee had been informed that this change would resolve the concern regarding exclusion of porosity requirements but would require corrective actions to ensure acceptability of welds previously inspected

without stipulated porosity limits. The inspector reviewed the latest corrected acceptance criteria (Revision 9, dated January 23, 1985) and noted that the revisions to paragraph 3.c. did not impose Category A limits for Category B welds. Further, that present wording would not be sufficient to reject clustered porosity as discussed in paragraph 6.b.(1)(c) for weld B5 to P201 bottom on rack R0006. Further, that the pertinent second-tier Pullman Power Product's (PPP) procedure X-18 had not been revised to impose any requirements for inspection for porosity for category B welds. The inspector informed the licensee that due to the above and the final acceptance of the deficient B5 to P201 weld, this item was upgraded to Deviation 424, 425/85-08-01, "Deviation of Commitments to AWS D1.1 Requirements for Inspection of Porosity."

4. Unresolved Items

Unresolved items were not identified during this inspection.

5. Independent Inspection (92706)

Construction Progress (Units 1 and 2)

The inspector conducted a general inspection of the Units 1 and 2 containments and the control building to observe construction progress and construction activities such as welding, material handling and control, house-keeping and storage.

During the above inspection, the inspector noted the lack of arrangements for physical control of access from the PPP satellite warehouse for instrumentation sub-storage on top of the control building. Further that racks containing code-class piping were directly accessible on entering the area. Cognizant personnel informed the inspector that no warehousemen were on duty during second shift and, therefore, no control of access was imposed during that time frame. The inspector informed the licensee that this was considered a lack of conformance to 10 CFR 50, Appendix B, Criterion VIII, as implemented by PPP procedure VII-2 and would be identified as Violation 424, 425/85-08-02, "Lack of Material Control from Instrumentation Satellite Warehouse."

6. Steel Structures and Supports (Units 1 and 2)

The inspector observed welding work activities and reviewed records for steel structures and supports as described below to determine whether applicable code and procedure requirements were being met.

The supports and structures involved were welded by PPP. The applicable codes are as follows:

- Pipe Racks - AWS Structural Welding Code D1.1-79.
- Pipe Whip Restraints - AWS Structural Welding Code D1.1-74.

- o Pipe Supports and Instrumentation Supports - ASME Boiler and Pressure Vessel Code, Section III, 1977 edition with addenda through W77.
- a. Welding Procedure Specifications and Quality Assurance Procedures (55151B)
 - (1) Welding Procedure Specifications (WPS) applicable to the weld joints listed in paragraph 6.b.(1), were selected for review and comparison with the ASME Code as follows:

<u>WPS</u>	<u>Process</u>	<u>PQR</u>
IT8-III/I-1-BR-2	SMAW*	34A, 34B
IT12-III/I-1-OB-12	SMAW/GTAW**	45, 34A, 34B, 55A, 55B, 58

*SMAW - Shielded Metal Arc Welding

**GTAW - Gas Tungsten Arc Welding

The above WPSs and their supporting Procedure Qualification Records (PQRs) were reviewed to ascertain whether essential, supplementary and/or nonessential variables, including thermal treatment, were consistent with Code requirements; whether the WPSs were properly qualified and their supporting PQRs were accurate and retrievable; whether all mechanical tests had been performed and the results met the minimum requirements; whether the PQRs had been reviewed and certified by appropriate personnel; and whether any revisions and/or changes to nonessential variables were noted. WPSs are qualified in accordance with ASME Section IX, the latest edition and addenda at the time of qualification.

- (2) The below listed documents were reviewed to ascertain whether the structural welding program had been approved by the licensee and whether adequate plans and procedures had been established to assure that welding would be controlled and accomplished consistent with commitments and regulatory requirements.

<u>Document No.</u>	<u>Title</u>
PPP-III-4, dated 10/11/84	"Drawing and Design Control Procedure"
PPP-VII-2, dated 10/3/84	"Material Control"
PPP-IX-40, dated 11/30/84	"Instrumentation Installation, Inspection, and Testing"
PPP-IX-50, dated 8/30/84	"Pipe Support Field Installation and Fabrication Procedure"

PPP-IX-65, dated 10/18/84	"Installation and Inspection of Pipe-Whip Restraints"
PPP-X-18, dated 2/2/84	"Field Welding Inspection"
PPP-XV-2, dated 7/11/84	"Procedure for Handling Nonconformances (Field)"
PPP-XV-4, dated 4/26/84	"Hold Tag Usage"
PPP-SI-47, Rev. 5	"Site Instructions for Marking Material, Parts, and Small Items"
PPP-SI-70, Rev. 0	"Instruction for Rework of Accepted Supports"

During the above review, the inspector noted that paragraph 10.21 and attachments 25 and 26 of PPP-IX-50 allowed field changes of weld types (fillet to partial penetration groove) from those specified on design drawings when angular deviations of as-built structural bracing members are within $\pm 4^\circ$ of the angle specified. When this modification is done, no changes of weld symbols on design drawings nor annotation of quality records are completed since the weld is considered acceptable provided minimum effective throat requirements are met; i.e., the required effective throat of the specified fillet weld. QC acceptance of the final partial-penetration groove weld is predicated on meeting this requirement by attachment 26. However, cognizant licensee personnel informed the inspector that past practice has been to accept this type of weld without any fit-up inspection (since this hold point is not specified) to ensure meeting required effective throat. The inspector informed the licensee that the requirement that QC inspection verify effective throat without being able to inspect fit-up is a lack of capability of procedure IX-50 to adequately control the welding involved. This matter is considered a lack of conformance with 10 CFR 50, Appendix B, Criterion IX, and will be identified as Violation 424, 425/85-08-03, "Failure of Pipe Support Field Installation and Fabrication Procedure to Provide for Control of Welding Quality."

b. Visual Inspection of Welds (55155B)

The inspector visually examined completed welds on Unit 1 containment pipe racks, pipe supports, pipe whip restraints, and instrumentation supports as described below to determine whether applicable code and procedure requirements are being met. Applicable design drawings are as follows:

Pipe Racks - MOIG-594-R5 and MOIG-595-R6

Pipe Supports - VI-1202-196-H602, Rev. 0

Pipe Whip Restraints - 1X2D69F031, Rev. 0

Instrumentation Supports - 1X5D400159A, Rev. 1 and sketch
 CX5DPM030, Rev. 0
 1SK5402009-A, Rev. 0 and sketches
 CX5DP8203, Rev. 5
 and CX5DPM070, Rev. 1

- (1) The below listed welds were examined relative to the following: location, length, size and shape; weld surface finish and appearance; transitions between different wall thicknesses; weld reinforcement--height and appearance; joint configurations on permanent attachments and structural supports; removal of temporary attachments, arc strikes and weld spatter; finish-grinding and machining of weld surface, surface finish and absence of wall thinning; surface defects, cracks, laps, lack of penetration, lack of fusion, porosity, slag, oxide film and undercut exceeding prescribed limits.

Rack R0006

Weld Joint

P201 to C4
 P201 to B1
 B5 to P201 Top
 B5 to P201 Bottom

Pipe Support VI-1202-196-H602

Weld Joint

40.5° Cross Brace to Vertical Support member*
 40.5° Cross Brace to Cable Tray Support Steel*

Pipe Whip Restraint PBR-031

Weld Joint

FW-1
 FW-3

Instrumentation Supports

Sketch CX5DPM030 Weld Joints

Weld No. A
 Weld No. B
 Weld No. E

Weld No. F

Sketch CX5DP8203 Weld Joints

Weld No. A

Weld No. B

Sketch CX5DPM070 Weld Joints

Weld No. A

Weld No. B

*Final QC inspection not complete.

During the above inspection, the inspector noted the following:

- (a) Weld joint B5 to P201 bottom on pipe rack R0006 had been QC final accepted with unacceptable porosity. QC inspection personnel informed the inspector that they were unable to reject the weld due to lack of requirements for rejection of porosity in PPP procedure X-18. Independent verification by the inspector and two contractor QC inspectors established that the weld contained clustered porosity sufficient for rejection under present requirements for Category A welds. Additional discussion is reported in paragraph 3.b.
- (b) The connections for the 40.5° cross brace on pipe support VI-1202-196-H602 had been completed as partial penetration groove welds. Design drawing VI-1202-196-H602, Rev. 0, initially specified a 45° cross brace. The angle was field corrected to 40.5° by the Vogtle-Structural Analysis Mobile Unit (V-SAMU) on February 28, 1985. This deviation is outside the $\pm 4^\circ$ allowance specified in procedure IX-50 as reported in paragraph 6.a.(2). In this case, Procedure IX-50 mandates a partial penetration groove weld and fillet welds are not an option. However, the drawing was not corrected from the original fillet welds specified. The inspector requested information as to design calculations substantiating the 40.5° angle and was informed by cognizant licensee personnel that the proper corrections were not made due to an oversight. The inspector noted that failures to properly correct design drawings had been the root causes of previous violations 424, 425/84-30-01 and 424, 425/85-03-01.

The inspector informed the licensee that this matter was considered to be another example of Violation 424, 425/84-30-01 and noted that the response to be developed for violation 424, 425/85-03-01 should be expanded as necessary to consider this example.

- (2) Quality Records for the welds listed in paragraph 6.b(1) were examined relative to the following: records covering visual and dimensional inspections indicate that the specified inspections were completed; the records reflect adequate weld quality; history records are adequate.

c. Welder Qualification (55157B)

The inspector reviewed the licensee's program for qualification of welders and welding operators for compliance with QA procedures and ASME Code requirements. The applicable code for welding qualification is ASME Boiler and Pressure vessel (B&PV) Code, Section IX, as invoked by Georgia Power Company (GPC) Specification X2AG06, Rev. 4, and X4AZ01, Section P.1, Revision 8.

The following welder qualification status records and "Records of Performance Qualification Test" were reviewed relative to the weld joints listed in paragraph 6.b(1).

Weld Symbol

HT-2 PPP
 ZB-3 PPP
 YC-3 PPP
 EZ-4 PPP
 WA-3 PPP

d. Welding Filler Material Control (55152B)

The inspector reviewed the licensee's program for control of welding materials to determine whether materials were being purchased, accepted, stored, and handled in accordance with QA procedures and applicable code requirements. The following specific areas were examined:

- Purchasing, receiving, storing, distribution, and handling procedures, material identification.
- The following welding materials from those currently being used in completion of production welding were selected for review of purchasing and receiving records for conformance with applicable procedures and code requirements:

<u>Type</u>	<u>Size</u>	<u>Heat/Control No.</u>
E7018	3/32"	KK037
E7018	1/8"	LL015
E7018	3/32"	090BBB
E7018	1/8"	KK087

e. Observation of Work - QC Inspector Qualification (55154B)

The inspector reviewed the licensee's program qualifications of welding inspection (QC) personnel for compliance with QA procedures and ASME Code requirements.

The following inspector qualification status records and "QA/QC Inspector Qualification/Certification" records were reviewed relative to inspection of the weld joints listed in paragraph 6.b.(1).

<u>Inspector</u>	<u>Type of Certification</u>
JEY	VT-II
PMH	VT-II
PDB	VT-II
HGS	VT-II

Within the areas examined, no violations or deviations were identified except as reported in paragraphs 6.a.(2) and 6.b.(1)(a).

7. Safety-Related Piping (Unit 1)

The inspector observed welding work activities for safety-related piping as described below to determine whether applicable code and procedure requirements were being met. The applicable code for safety-related piping is the ASME Boiler and Pressure Vessel Code, Section III, Subsections NC and ND, 1977 edition with addenda through winter 1977.

a. Observation of Work (55183B)

The below listed welds were examined in process to determine work conducted in accordance with traveler; welder identification and location; welding procedure assignment; welding technique and sequence; materials identity; weld geometry; fit-up; temporary attachments; gas purging; preheat; electrical characteristics; shielding gas; welding equipment condition; interpass temperature; interpass cleaning; process control systems; identity of welders; qualification of inspection personnel; and weld history records.

<u>Weld No.</u>	<u>ISO No.</u>	<u>Unit</u>	<u>System</u>
W-15	1X5DY00956-B-R1	1	Instrumentation
W-16	1X5DY00956-B-R1	1	Instrumentation
W-21	1X5DY00956-B-R1	1	Instrumentation
W-22	1X5DY00956-B-R1	1	Instrumentation

The following inspector qualification status records and "QA/QC Inspector Qualification/Certification" records were reviewed relative to inspection of the weld joints listed above.

<u>Inspector</u>	<u>Type of Certification</u>
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PDB	VT-II
WDR	VT-II

b. Welding Procedure Specifications (55181B)

Welding Procedure Specifications (WPS) applicable to the weld joints listed in paragraph 7.a., were selected for review and comparison with the ASME Code as follows:

<u>WPS</u>	<u>Process</u>	<u>PQR</u>
38-III/I-8-K1-1	GTAW*	120, 121

*GTAW - Gas Tungsten Arc Welding

The above WPSs and their supporting PQRs were reviewed to ascertain whether essential, supplementary and/or nonessential variables, including thermal treatment, were consistent with Code requirements; whether the WPSs were properly qualified and their supporting PQRs were accurate and retrievable; whether all mechanical tests had been performed and the results met the minimum requirements; whether the PQRs had been reviewed and certified by appropriate personnel; and whether any revisions and/or changes to nonessential variables were noted. WPSs are qualified in accordance with ASME Section IX, the latest edition and addenda at the time of qualification.

c. Welding Filler Material Control (55182B)

The inspector reviewed the PPP programs for control of welding materials to determine whether materials are being purchased, accepted, stored, and handled in accordance with QA procedures and applicable code requirements. The following specific areas were examined:

- Purchasing, receiving, storing, distributing, and handling procedures, material identification
- Welding material purchasing and receiving records for the following materials were reviewed for conformance with applicable procedures and code requirements:

<u>Type</u>	<u>Size</u>	<u>Heat/Control No.</u>	<u>Application</u>
ER308L	3/32"	05394	Safety-Related Piping
ER308L	1/8"	05394	Safety-Related Piping
E308-16	1/8"	54180	Safety-Related Piping
E309L-16	3/32"	GG093	Safety-Related Piping

d. Welder Qualification (55187B)

The inspector reviewed the PPP program for qualification of welders and welding operators for compliance with QA procedures and ASME Code requirements. The applicable code for welding qualification is ASME B&PV Code Section IX as invoked by GPC Specifications X2AG06, Rev. 4, and X4AZ01, Section P.1, Revision 8.

The following welder qualification status records and "Records of Performance Qualification Test" were reviewed relative to the weld joints listed in paragraph 7.a.

<u>Weld Symbol</u>	<u>Application</u>
TF-3	Safety-Related Piping

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

8. Licensee Identified Items (92700)

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

a. (Open) Item 424/CDR 84-66, Containment Pipe-Rack Welds

On July 20, 1984, the licensee notified Region II of a 50.55(e) item involving cracks in Unit 1 containment pipe-rack welds. The final report was submitted on October 17, 1984.

The proposed corrective action plan (DER-061) was reviewed during previous inspections and concerns documented within inspection reports 424/84-30, 424/84-36, and 424/85-03.

The inspector conducted additional discussions with cognizant licensee personnel on the previously listed concerns. Cognizant licensee personnel were informed that necessary repair for welds C10 to B18 on Rack R0003 and P40 to C10 on Rack R0002 should have been listed in PPP Deviation Report (DR), PP-07213 (issued 11/8/84) as they were identified. Further, that all suspect welds identified by the DER-061 analysis of highly restrained joints had been reinspected and repair scheduled under DR PP-07934 issued 12/14/84. Further that hold tags had been issued on 2/27/85 for C10 to B18 on Rack R0003, P40 to C10 on Rack R0002 and several additional welds not identified on DR PP-07934. The inspector concluded that these actions satisfy previous concerns that all known deficient welds be incorporated in the DER-061 corrective action plan. The inspector informed the licensee that this item remains open pending completion of corrective action.

b. (Closed) Item 424, 425/CDR 80-07, Embed Plate Assembly

On December 20, 1978, the licensee notified Region II of a 50.55(e) item involving the improper installation and inspection of embedded plate assemblies. The final report was submitted on November 21, 1979, and amended on April 10, 1980, and June 20, 1980.

The report has been reviewed and determined to be acceptable by Region II. The inspector held discussions with responsible licensee representatives, reviewed supporting documentation, and observed representative samples of work to verify that corrective actions identified in the report have been completed.

c. (Closed) Item 424, 425/CDR 82-21, Use of Derated/Abandoned Embed Plates

On February 22, 1982, the licensee notified Region II of a potential 50.55(e) item involving use of 44 of the abandoned or derated embeds as discussed above. On April 22, 1982, the licensee informed Region II that this item was not reportable due to completion of pertinent engineering evaluation. The inspector reviewed pertinent engineering evaluation and concurred with the conclusion that all derated embeds used were structurally adequate.

d. (Closed) Item 424, 425/CDR 82-25, Embed Plates - 1982

On April 26, 1982, the licensee notified Region II of a 50.55(e) item concerning a lack of anchor-bolt thread engagement for 222 embed plates. The final report was submitted on July 1, 1983. The report has been reviewed and determined to be acceptable by Region II. The inspector held discussions with responsible licensee representatives, reviewed supporting documentation, and observed representative samples of work to verify that corrective actions identified in the report have been completed.

9. Previously Identified Inspector Followup Items

a. (Open) Inspector Followup Item 424, 425/85-03-02, "Adequacy of Temperature Marking Crayons"

This item concerns adequacy of temperature marking crayons. Welding material issue stations are provided with both markal thermomelt and tempilstick temperature indicating crayons. The crayons are issued indiscriminately for use on stainless steel as well as carbon steel weldments. Further, in conformance to GPC procedure GDT-14, Rev. 6, the crayons are used as the reference standard to ensure adequate oven temperature before issuing electrodes requiring moisture control. The inspector reviewed certification information from Tempilstick which verified control of inorganic halogen content and low melting-point

metals as well as assurance that specified melt temperature was accurately indicated on several lots of marking crayons currently being issued for production work. Cognizant licensee personnel informed the licensee that similar information was not yet received from Markal. This item remains open.