



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

Report Nos.: 50-424/92-08 and 50-425/92-08

Licensee: Georgia Power Company  
P. O. Box 1295  
Birmingham, AL 35201

Docket Nos.: 50-424 and 50-425 License Nos.: NPF-68 and NPF-81

Facility Name: Vogtle 1 and 2

Inspection Conducted: April 13-17, 1992

Inspector: *[Signature]*  
W. P. Kleinsorger, PE  
Reactor Inspector

4/29/92  
Date Signed

Approved by: *[Signature]*  
J. J. Blake, Chief  
Materials and Process Section  
Engineering Branch  
Division of Reactor Safety

4/29/92  
Date Signed

SUMMARY

Scope:

This routine, unannounced inspection was conducted in the areas of Inservice Inspection (ISI), closure of valve encapsulation vessels, NRC Information Notice (IN) 92-22: "Criminal Prosecution and Conviction of The Wrongdoing Committed by a Commercial Grade Valve Supplier" and IN 91-31: "Nonconforming Magnetic Particle (14AM) Prepared Bath".

Results:

With the exception of a few procedural weaknesses discussed in paragraph 2, ISI appeared to be conducted in a conservative manner by well trained personnel. The licensee has taken aggressive and conservative actions in response to IN Nos. 88-48, 91-31 and 92-22.

## REPORT DETAILS

### 1. Persons Contacted

#### Licensee Employees

- \*H. Beacher, Senior Engineer Technical Support
- \*J. Beasley, Assistant General Manager - Operations
- \*S. Chesnut, Manager, Engineering Technical Support
- \*D. Cordes, Senior Nuclear Specialist-SNC/ITS
- \*W. Copeland, Supervisor-Materials
- \*R. Healey, Senior Nuclear Specialist-SNC/ITS
- \*G. Hooper, Engineering Supervisor Technical Support
- \*W. Kitchens, Assistant General Manager - Plant Support
- \*C. Meyer, Operations Superintendent
- \*W. Shipman, General Manager - Nuclear Plant
- \*C. Tippins, Nuclear Specialist SNC/SAER

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, technicians, and administrative personnel.

#### Other Organizations

- \*T. Mozingo, Superintendent Nuclear Operations-Ogelthorpe Power Corp.

#### NRC Resident Inspectors

- \*B. Bonser, Senior Resident Inspector
- R. Starkey, Resident Inspector
- P. Balmain, Resident Inspector

- \*Attended exit interview

### 2. Inservice Inspection (ISI)

The inspector reviewed documents and records, and observed activities, as indicated below, to determine whether ISI was being conducted in accordance with applicable procedures, regulatory requirements, and licensee commitments. The applicable code for ISI is the American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code, Section XI, 1983 edition with addenda through Summer 1983 (83S83). Unit 1 received its Operating Licensee on March 16, 1987, commenced commercial operations on May 31, 1987 and is currently operating in the second 40 month period of the first ten year interval. Unit 2 is in the second outage of the first 40 month period of the first ten year interval. The licensee, Georgia Power Co., contract for the Southern Nuclear Operating Co. (SNC) to provide inservice inspection services. SNC's nondestructive examination personnel, provided by Lambert McGill and Thomas (LMT) and TKS

International Incorporated (TKS), are performing the liquid penetrant (PT), magnetic particle (MT), visual (VT), and ultrasonic (UT) examinations. UT examinations of the reactor vessel flange to vessel weld and the threads in the flange were performed by Dynacon Systems a subsidiary of Westinghouse (W). Steam generator tubing eddy current (EC) examination were accomplished by W. All work is being performed under the envelope of the SNC Quality Assurance (QA) program with the exception of W which worked to the W QA program.

a. ISI Program Review, Units 1 and 2 (73051)

The inspector reviewed the following documents relating to the ISI program to determine whether the plan had been approved by the licensee and to assure that procedures and plans had been established for the applicable activities.

Vogtle Electric Generating Plant Unit 2 - Inservice Inspection Plan Second Refueling Outage Plan (Period 1/Interval 1)

b. Review of NDE Procedures, Units 1 and 2 (73052)

The inspector reviewed the procedures listed below to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were also reviewed for technical content.

W-GBE-ISI-10 (R0)	Qualification of Ultrasonic Manual Equipment for Vogtle Unit 2
W-GBE-ISI-54 (R0)	Manual Ultrasonic Examination for the Reactor Vessel Upper Shell to Flange Weld for Vogtle Unit 2
W-GBE-ISI-55 (R0)	Manual Ultrasonic Examination of Reactor Vessel Threads in Flange for Vogtle Unit 2
W-MRS 2.4.2 GPC-3 (R1)	Eddy Current Inspection of Preservice and Inservice Heat Exchanger Tubing
SNC-AUX-H/F/V-300 (R6)	Procedure (Written Practice) for Qualification and Certification of Non-destructive Examination Personnel
SNC-AUX-H/F/V-303 (R0)	Control of Measuring and Test Equipment
SNC-AUX-V-306 (R1)	Reference System for Marking, Measuring, and Recording

SNC-AUX-V-307 (R3)	Pre-service and Inservice Documentation
SNC-AUX-V-308 (R1)	Pre-service and Inservice Handling and Care of Calibration Blocks Under SCS Control
SNC-UT-V-404 (R4)	Manual Ultrasonic Examination of Full-Penetration Welds
SNC-UT-V-406 (R2)	Manual Ultrasonic Examination of Cast Stainless Full-Penetration Welds
SNC-UT-V-407 (R2)	Manual Ultrasonic Examination of Full-Penetration Welds (.15 Inches to .5 Inches)
SNC-UT-V-411 (R4)	Manual and/or Mechanized Ultrasonic Examination of Pressure Vessel Welds (2 Inches to 12 Inches in Thickness)
SNC-UT-V-413 (R0)	Manual Ultrasonic Examination of Main Loop Branch Connected Welds
SNC-UT-V-416 (R2)	Manual Ultrasonic Examination of Nozzle Inner Radius
SNC-UT-V-417 (R1)	Manual Ultrasonic Examination of Reactor Coolant Pump Motor Flywheels
SNC-UT-V-422 (R1)	Manual Ultrasonic Examination of Bolts and Studs Greater than 2 Inches in Diameter Containing Access Holes
SNC-UT-V-423 (R1)	Manual Ultrasonic Examination of Bolts and Studs
SNC-UT-V-455 (R1)	Qualification of Manual Ultrasonic Instruments
SNC-UT-V-465 (R1)	Ultrasonic Thickness Examination Procedure
SNC-UT-V-855 (R0)	Qualification of Mechanized Ultrasonic Instruments
SNC-MT-V-505 (R1)	Dry Powder Magnetic Particle Examination: Yoke Method
SNC-MT-V-506 (R2)	Wet Florescent Magnetic Particle Examination

SNC-PT-V-605 (R2)	Color Contrast, Solvent-Removable Liquid Penetrant Examination Procedure
SNC-VT-V-715 (R1)	Visual Examination (VT-1)
SNC-VT-V-725 (R1)	Visual Examination (VT-2)
SNC-VT-V-735 (R2)	Visual Examination (VT-3, VT-4)

The following items were noted relative to the review of procedures.

- ASME B&PV Code Section V Article 4 paragraph T-424(h) requires the transducer cable type and length to be specified in UT procedures. The transducer cable type and length specification was missing from the following UT procedures: W-GBE-ISI-54, W-GBE-ISI-55, SNC-UT-V-406, SNC-UT-V-417, and SNC-UT-V-423. It should be noted that the W data sheets for exams performed this outage contained the required cable data. The SNC procedures identified above were not used during this outage.
- ASME B&PV Code Section V Article 7, Paragraph T-733 requires AC and DC Yokes to be calibrated by lifting 10 and 40 Lbs weights respectively. The metric equivalent weight of magnetic particle test plates as specified in procedure Nos SNC-MT-V-505 and SNC-MT-V-506 are 4.5 kg = 9.9 lbs ≠ 10 lbs and 18.1 kg = 39.9 lbs ≠ 40 lbs. In addition the two SNC procedures indicated above state "Each weight shall be weighed on a scale from a reputable manufacturer..." no reference is made to traceable standard weights which conflicts with the notion of "calibration". It should be noted that the certification documentation reflect test plate weights greater than 10 and 40 lbs for the actual weights used. The scales used to verify those weights are traceable to standard weights.
- Although the licensee has an excellent reference system procedure, used for marking, measuring and recording, it is only referenced in a few examination procedures.
- Post examination cleaning is optional in all the SNC UT procedures.

- o The recording criteria for reflectors with amplitudes of from 1% to 49% of DAC is not clear in the following UT procedures: SNC-UT-V-406 and SNC-UT-V-423.

The licensee indicated that they would consider the above observations and make necessary changes to the procedures.

All procedures reviewed appeared to contain the necessary elements for conducting the specific examination. (Except as noted above)

c. Observation of Work and Work Activities, Unit 2 (73753)

The inspector observed work activities, reviewed certification records of NDE equipment and materials, and reviewed NDE personnel qualifications for personnel who had been utilized in the ISI examinations during this outage. The observations and reviews conducted by the inspector are documented below.

This inspection was conducted late in the refueling outage and only one examination remained to be performed.

The inspector observed the PT examination of a 14" pipe to tee weld in an ASME class 2 system. The inspector performed an independent evaluation of the indications obtained to confirm the NDE examiner's evaluation.

The inspector examined the records of approximately 90% to 95% of the 180 UT, MT, PT, and VT examinations conducted during this outage. In addition the inspector reviewed records of the EC and UT examinations performed by W. These records included examination reports and associated evaluation and notification documents, certification documentation for MT yoke calibrations, MT test weights, MT prepared bath, dry MT particles, PT cleaner developer and penetrant, longwave ultraviolet intensity meters, UT reference blocks (step, rompas and IIW), UT instrument calibrations, UT transducers, and NDE examiners qualification and certification data.

A random sample of current examination results were compared with historical examination results. No major discrepancies were noted during the comparison. (five linear and one rounded indication not previously seen were identified during this outage)

No steam generator tubes were plugged during this outage.

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

3. Followup (92701)

- a. NRC Information Notice (IN) 92-22: "Criminal Prosecution and Conviction of The Wrongdoing Committed by a Commercial Grade Valve Supplier".

In IN 88-48, and the two associated supplements, "Report of Defective Refurbished Valves" the staff discussed the problem that Pacific Gas and Electric Company found with what they believed to be a valve manufactured by Henry Vogt Company in a non-safety related system. IN 92-22 discusses the prosecution of the wrongdoer, the president of CMA, and the resulting sentence of three years imprisonment and the payment of \$213,825.03 in restitution to the NRC's licensees, which includes \$34,784.00 due to GPC.

On March 7, 1989, Vogtle discovered non-safety related valve 2-1305-U4-654 leaking, and a repair kit was ordered to effect repairs. The replacement parts would not fit the valve. This occurrence initiated an investigation that determined that the valve, thought to be manufactured by Pacific Valve was in fact counterfeit. The same valve in Unit 1, 1-1305-U4-654, was identical though not leaking. On May 5, 1989, the licensee stopped the leak on the valve in unit 2, and replaced it October 8, 1989. The Unit 1 valve was replaced March 27, 1990. The NRC resident inspector was notified on April 28, 1989. The licensee has apparently taken aggressive and conservative action in response to these Information Notices.

IN 88-48 is further discussed in NRC report 50-424,425/91-22, paragraph 11 a.

- b. NRC Information Notice (IN) 91-31: "Nonconforming Magnetic Particle (14AM) Prepared Bath"

This IN transmitted a Magnaflux Notice which recalled three batches of 14AM MT aerosol prepared bath, and included a warning for six others. The licensee determined that they had used one of the recalled batches in several examinations conducted during the first Unit 2 refueling outage. None of the recalled or warning material was used in Unit 1 examinations. According to

Magnaflux, the Vogtle site has a 98.5% probability of not having used an effected can of the product. Reactor head closure studs No. 1 through 18 and reactor head closure nuts No. 1 through 9 and 19 through 27 were the specific items examined with the recalled material. The licensee decided to reexamine, during the second Unit 2 refueling outage, reactor head closure studs No. 1 through 18 and reactor head closure nuts No. 1 through 9 with a new examination of reactor head nuts No. 10 through 18. If no indications were identified in reactor head closure nuts No. 1 through 9, then only reactor head closure nuts No. 1 through 18 would be reexamined. If indications were identified in reactor head closure nuts No. 1 through 9, then reactor closure nuts No. 1 through 27 would be examined. Reactor head closure nut and stud Nos. 1 through 18 were examined during the second Unit 2 outage with no indications identified. The licensee has taken effective conservative action in response to this IN.

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

#### 4. Closure of Valve Encapsulation Vessels:

The licensee has experienced continuing problems with the sealing of the eight encapsulation vessels, in both units, associated with both trains of the Residual Heat Removal (RHR) and the Containment Spray (CS) systems. The problems have caused the licensee to exceed the vendor drawing specified torque of 125 ft-lbs on the closure fasteners in many cases to effect a seal. This was done after performing calculations and consulting with the vendor, Richmond Engineering Company (RECO). The calculations were to determine the torque required to crush the vendor supplied gasket, without exceeding the allowable stress in the fasteners, in order to effect a seal. Torque values have been as high as 240 ft-lbs in the RHR vessels and 255 ft-lbs on the CS vessels. A Bechtel Power Corp. (BPC) review of the last calculations indicated that appropriate torque levels should be somewhat less than 125 ft-lbs for all the vessels, to ensure that allowable stresses are not exceeded.



It was determined that the allowable stress level in the weld (and the adjacent base material) that attached the flanges to the vessel shells and heads was exceeded. With a change in gasket material type and thickness an effective seal was achieved at torque values of 80 ft-lbs and less.

To reestablish integrity of the vessels, in view of the over stressing of the weldments, the licensee and RECO performed a visual examination of the flanges and found no visual plastic deformation. The weld and heat affected zone on the Unit 1 vessels and the weld and one inch of adjacent base material on the Unit 2 vessels were PT examined with the solvent removable visible dye method with no indications identified. Weld No. 7 on vessel 2-1205-V4-002 was radiographically reexamined. Those radiographs were compared with the original construction radiographs, with no anomalies noted.

The inspector conducted interviews with licensee personnel, reviewed the radiographs, reviewed documentation including work orders, inspection reports, and calculations; and performed a walkdown inspection of two of the Unit 2 vessels.

The cause of the above problems appear to be the failure of the licensee and vendor (RECOs) to consider the stress report for the vessel when calculating the appropriate torque value required to achieve a seal; and the choice of a gasket material that required excessively high torques to achieve a seal.

To prevent recurrence of similar circumstances an appropriate cautionary note was added the licensee's "Bolting/Torquing Manual". This matter is further discussed in NRC Report 50-424,425/92-04.

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

#### 6. Exit Interview

The inspection scope and results were summarized on April 17, 1992, with those persons indicated in paragraph 1. The inspector described the areas inspected and discussed in detail the inspection results. Although reviewed during this inspection, proprietary information is not contained in this report. No dissenting comments were received from the licensee.

## 7. Acronyms and Initialisms

83S83	-	1983 edition summer 1983 addenda
AC	-	Alternating Current
ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
BPC	-	Bechtel Power Corp.
CS	-	Containment Spray
DAC	-	Distance Amplitude Curve
DC	-	Direct Current
EC	-	Eddy Current
ID	-	Identification
IN	-	NRC Information Notice
ISI	-	Inservice Inspection
LMT	-	Lambert, McGill and Thomas
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
No.	-	Number
NPF	-	Nuclear Power Facility
NRC	-	Nuclear Regulatory Commission
OD	-	Outside Diameter
P.E.	-	Professional Engineer
PT	-	Liquid Penetrant
QA	-	Quality Assurance
RECO	-	Richmond Engineering Co.
R	-	Revision
RHR	-	Residual Heat Removal
SNC	-	Southern Nuclear Operating Co
TKS	-	TKS International Inc.
UT	-	Ultrasonic
VT	-	Visual
W	-	Westinghouse