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

Report Nos.: 50-302/94-11

Licensee: Florida Power Corporation
3201-34th Street, South
St. Petersburg, FL 33733

Docket Nos.: 50-302 License Nos.: DPR-72

Facility Name: Crystal River Nuclear Plant Unit 3

Inspection Conducted: April 18 - 22 and May 2 - 6, 1994

Inspectors: N. Economos — Date Signed: 6/1/94

for N. Economos
B. R. Crowley — Date Signed: 6/1/94

Approved by: J. J. Blake, Chief — Date Signed: 6/1/94
Materials and Processes Section
Engineering Branch
Division of Reactor Safety

SUMMARY

Scope:

This routine, announced inspection was conducted on site in the areas of Inservice Inspection (ISI), including inspection and repair of steam generator tubes. In addition, Erosion/Corrosion (E/C) activities and corrective actions for previous inspection findings were inspected.

NOTE: The terms Erosion/Corrosion (E/C) and Flow Assisted Corrosion (FAC) are used interchangeably in this report.

Results:

In the areas inspected, two violations (VIOs), one regarding failure to follow ISI Procedural Requirements - paragraphs 2.c.(2), (4), and (5) and the other regarding plant specific Eddy Current Test (ET) performance demonstration test administered without approved written program - paragraph 3., were identified. No deviations were identified.

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Relative to ISI, adequate performance was observed. With exception of the one violation identified during performance of an MT inspection, ISI inspections were being performed in a professional manner by qualified personnel in accordance with approved procedures. Eddy Current (ET) examination of the two once through steam generators (OTSGs) performed in accordance with Technical Specification (TS) requirements and the NRC Confirmatory Action Letter dated April 26, 1994, resulted in plugging of seven tubes in OTSG "A" and nine tubes in OTSG "B". Four tubes were pulled from OTSG "B" for further nondestructive and failure analysis.

The licensee has a pro-active E/C program in place that should ensure that thinned piping is identified before failure. The E/C program does not include small bore (< 2-1/2" in diameter) piping, but plant history indicates that small bore piping has not been a problem.

Four weaknesses were identified as follows: (1) lack of procedures providing details for Nuclear Quality Control (NQC) surveillance of ISI activities and orientation of contractor examiners to site/outage nondestructive examination (NDE) procedures, (2) poor storage of ultrasonic (UT) calibration blocks, (3) not furnishing weld joint details to the NDE examiner, and (4) lack of a second party review of ET data.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

T. Austin, Principle Mechanical Engineer
#*G. Boldt, Vice President Nuclear Production
#*L. Cecilia, Nuclear Project Engineer
#*G. Cowles, Senior Nuclear Results Engineer
#D. Bates, Supervisor Nuclear Quality Control
#*P. Dixon, Nuclear Project Engineer
*J. Eilola, Senior Nuclear Quality Control (NQC) Inspector
#*D. Gulling, ISI Specialist
#*P. McKee, Director Quality Programs
#*B. McLaughlin, Nuclear Regulatory Specialist
#*L. Moffatt, Manager Nuclear Plant Technical Support
S. Primo, Senior Nuclear Mechanical Engineer
P. Ross, Nuclear Engineer
R. Thompson, Senior Nuclear Engineer
J. Warren, Welding Engineer
#*R. Widell, Director, Nuclear Operations Site Support

Contractor Personnel

S Herman, Site Task Leader, B&W Nuclear Technologies (BWNT)
J. Griffith, Senior Engineer, Production Development Group, BWNT
R. Himmelspack, Qualified Data Analyst, BWNT
G. Pillow, Task Leader Tube Sleeving, BWNT
H. Smith, ET Level III, BWNT

Other licensee and contractor employees contacted during this inspection included engineers, QA/QC personnel, security force members, technicians, and administrative personnel.

NRC Employees

#*R. Butcher, Senior Resident Inspector
#T. Cooper, Resident Inspector
B. Long, Project Engineer
J. York, Project Engineer

*Attended exit interview on April 22, 1994
#Attended exit interview on May 6, 1994

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Inservice Inspection

The inspectors reviewed documents and records 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, with the extent of examinations of class 1 and 2 pipe welds determined by the requirements of the 1974 Edition with Addenda through the Summer 1975. The 2nd, 10-Year interval ends March 14, 1997. The licensee submitted the ISI plan for the 2nd interval on February 9, 1988. The NRC requested additional information by letter dated April 25, 1991. Additional information was submitted on June 7, 1991. The Safety Evaluation Report (SER) was issued April 13, 1992. Ten Relief Requests for the 2nd, 10-Year plan have been issued. All have been approved, or determined not to need approval, by NRC letters dated April 19, 1988, September 28, 1988, May 30, 1990, September 13, 1991, March 11, 1992, July 3, 1992, and July 23, 1993.

The licensee is currently in the 3nd, 40-Month period of the 2nd, 10-Year interval. The period and interval end on March 14, 1997. The current outage (10th outage, ninth refueling) is the 1st refueling outage (RFO) of the period.

The licensee's ISI/Steam Generator Section in the Nuclear Plant Technical Support organization is responsible for the ISI NDE program and plans. Contractors implement the inspection program and plans using contractor inspection personnel, management, procedures and QA controls. B&W Nuclear Technologies (BWNT) is the current contractor. NDE procedures are reviewed and approved by FPC's Materials Technology Department. Contractor Administrative and NDE Procedures are approved through the FPC Plant Review Committee (PRC).

a. ISI Program Review (73051)

The inspectors reviewed the following documents related to the ISI program:

- Inservice Inspection Program For ASME Class 1, 2, and 3 Components Crystal River Unit 3, dated 3/1/93
- AI-701, Revision 10, Conduct of Inservice Inspection and Steam Generator Engineering Section
- 1993/94 Inservice Examination Manual For Florida Power Corporation Crystal River Unit 3, Fuel Outage #9
- ISI-1, Revision 8, Administrative Procedure For Control of Inservice Inspection Procedures and Procedure Qualifications
- ISI-2, Revision 8, Administrative Procedure For Records Management
- ISI-3, Revision 1, Administrative Procedure For Preparation and Processing of Change Authorizations

- ISI-20, Revision 15, Administrative Procedure For the Written Practice of Personnel Qualification In Magnetic Particle Examination

- ISI-21, Revision 17, Administrative Procedure For the Written Practice of Personnel Qualification In Ultrasonic Examination

- ISI-22, Revision 15, Administrative Procedure For the Written Practice of Personnel Qualification In Liquid Penetrant Examination

- ISI-24, Revision 17, Administrative Procedure For the Written Practice of Personnel Qualification In Eddy Current Examination

- ISI-25, Revision 17, Personnel Certification - Visual Examinations

- ISI-61, Revision 21, Administrative Procedure For Approval and Control of B&W Prepared Manuals and Reports

- ISI-62, Revision 6, Administrative Procedure For the Control of Customer Supplied Documents

- ISI-69, Revision 19, Administrative Procedure For Processing Nondestructive Examination Data

- ISI-50, Revision 11, Technical Procedure Describing Surface Requirements of Welds, Adjacent Base Metal, and Components For Nondestructive Examination

- ISI-55, Revision 4, Technical Procedure For Sulfur Content Analysis

- Inservice Inspection Repair and Replacement Program, Revision 5

- NEP 229, Revision 3, ASME Section XI Repair/Replacement Program

The documents were reviewed to verify:

- The plan had been approved by the licensee

- Relief requests had been approved by NRR

- The services of an Authorized Nuclear Inservice Inspector (ANII) had been procured and that the ANII was involved in ISI-activities.

- Procedures and plans had been established (written, reviewed, approved and issued) to control and accomplish the following applicable activities: program organization including identification of commitments and regulatory requirements, preparing plans and schedules, and qualification, training,

responsibilities, and duties of personnel responsible for ISI; NDE personnel qualification requirements; and guidance for identifying and processing relief requests.

As documented in NRC Inspection Report 50-302/92-14, NRC identified weaknesses in the ISI program relative to licensee field overview and technical involvement in ISI activities. Since the 92-14 inspection, improvements have been made in this area of the program (see paragraph 4. below). One improvement was to involve FPC NQC NDE personnel in overview of ISI field activities, including review and approval of personnel certifications and equipment calibration records. However, this effort was not proceduralized to define the extent of the NQC surveillance or the qualification of personnel who perform the overview. Another area not proceduralized was the orientation of contractor NDE personnel to site/outage specific NDE procedures and requirements. The lack of procedures in these two areas could have contributed to the violations identified in paragraph 2.c. below and is considered a weakness in the ISI program.

b. Review of Procedures (73052)

The inspectors reviewed the following NDE procedures to determine whether these procedures were consistent with regulatory requirements and licensee commitments. The procedures were reviewed in the areas of procedure approval, requirements for qualification of NDE personnel, compilation of required records, and division of responsibility between the licensee and contractor personnel. In addition, the procedures were reviewed for technical adequacy and conformance with ASME, Sections V and XI, and other licensee commitments/requirements.

- ISI-80, Revision 21, Maintenance of Nondestructive Examination Equipment
- ISI-240, Revision 31, Penetrant Examination of Welds and Base Materials, Including Studs and Nuts
- ISI-270, Revision 29, Wet or Dry Methods of Magnetic Particle Examination of Welds, Studs, Bolts and Pump Fly Wheels
- ISI-350, Revision 26, Visual Examination of Welds and Surface Conditions
- ISI-362, Revision 11, Identification and Layout of Welds and System Components
- ISI-120, Revision 30, Ultrasonic Examination of Piping Welds Joining Similar Materials
- ISI-130, Revision 25, Ultrasonic Examination of Vessel Welds and Nozzle Inside Radius Sections

- ISI-182, Revision 2, Ultrasonic Examination of Reactor Coolant Piping Welds Joining Similar and Dissimilar Materials

- ISI-353, Revision 7, Visual Examination of Pipe Hangers, Supports, and Restraints

- ISI-119, Revision 14, Ultrasonic Examination of Stainless Steel and Nickel Base Alloy Weld Seams

- ISI-418, Revision 10, Technical Procedure for the Multi-Frequency Eddy Current Examination of OTSG Tubing in 177 OTSG Using MIZ-18/18A

- ISI-460, Revision 16, Technical Procedure for the Evaluation of Eddy Current Data of Nuclear Grade Steam Generator Tubing

- ISI-430, Revision 8, Eddy Current Examination of Sleeved OTSG Tubes

- ISI-510, Revision 13, Rotating Pancake Coil (RPC) System Operating Procedure

- ISI- 512, Revision 0, Rotating Field Eddy Current System Operating Procedure

Within these areas violations or deviations were not identified.

c. Observation of Work and Work Activities (73753)

The inspectors observed work activities, reviewed NDE personnel qualification records, and reviewed certification records of NDE equipment/materials, as detailed below. The inspectors verified: availability of and compliance with approved NDE procedures, compliance with Code requirements, use of knowledgeable NDE personnel, and use of NDE personnel qualified to the proper level. In addition, general inspection quality, including in-process documentation, and inspection results were evaluated.

(1) Liquid Penetrant Examination (PT)

The inspectors observed the in-process PT examination of the welds listed below. Observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of an acceptable examination.

Examinations Observed

ISO/DWG	FIGURE NO.	SYSTEM
SK-19.1	B4.5.387	Pressurizer Spray
SK-1AC.8	B4.1.7	Pressurizer
SK-2.2	C2.1.105	Decay Heat

(2) Magnetic Particle (MT) Examination

The inspectors observed in-process MT examination of the welds listed below. The observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

Examinations Observed

ISO/DWG	FIGURE NO.	SYSTEM
SK-108.1	C2.1.153	Feedwater
SK-16.1	B4.5.237	Reactor Coolant

During observation of MT inspection of weld C2.1.153, the inspectors noted that the examiner was not removing excess particles in accordance with procedure requirements. Paragraph 7.2.2 of procedure ISI-270 requires that, "Excess particles shall be removed by means of dry-air current of sufficient force to remove excess particles without disturbing particles which are indicative of discontinuities." The examiner was removing the excess particles by blowing with his mouth, resulting in a poor inspection technique. This failure to follow procedure requirements is identified as violation (VIO) 302/94-11-01 Failure to Follow ISI Procedural Requirements.

After the inspectors questioned the inspection technique, the BWNT Task Leader had the inspection re-performed. No indications were identified.

(3) Ultrasonic (UT) Examination

The inspectors observed the in-process UT examinations as indicated below. The observations were compared with the inspection attributes of the applicable procedure and the ASME B&PV Code to verify the performance of acceptable examinations.

Examinations Observed

ISO/DWG	FIGURE NO.	SYSTEM
SK-105.2	C2.1.127	Feedwater
SK-1AC.8	B4.1.8	Pressurizer Spray
SK-16.1	B4.5.237	Reactor Coolant
SK-2.2	C2.1.105	Decay Heat
*SK1AC.8	B2.2.3	Pressurizer
.....	C2.3.20	Main Steam
.....	C2.3.20A	Main Steam

* The inspectors witnessed re-UT inspection of an indication identified during UT inspection of this weld. The weld is a nozzle to top head weld in the pressurizer. Preliminary results indicated a possible defect approximately 1" long by 0.6" through-wall. On May 6, at the completion of the NRC inspection, the licensee and their contractor were still evaluating the indication to more accurately determine its nature and size.

During observation of calibrations for the above UT inspections, the inspectors noted that the UT calibration blocks, although stored inside the plant, were stored in an uncontrolled atmosphere and were not coated for protection against corrosion. Although, the blocks used for the current outage had been cleaned and appeared to be undamaged, allowing the blocks to rust could eventually damage the machined calibration reflectors and affect inspection results. The licensee stated that they were aware of the poor storage of the blocks and had plans, after the outage, to clean all of the blocks and add a protective coating to prevent rusting. The inspectors stated that the poor storage condition of the blocks was a weakness in the ISI program.

UT inspection of the Main Steam (MS) welds (Figures C2.3.20 and C2.3.20A, welds at MSV-56) were augmented examinations performed in response to questions relative to the high energy line break (HELB) program at Crystal River. A postulated terminal end break was identified at the six inch emergency feedwater pump turbine steam supply lines at their connection to the 24" MS lines. At the connections, six inch weldolets are welded to the 24" MS lines with six inch by three inch reducers between the weldolets and 3 inch valves

(MSV-55 and MSV-56). Since stresses used in the analysis assumed the welds attaching the six inch weldolets to the 24" pipes and to the reducers, are free of flaws, the NRC recommended by letters dated December 16, 1992, and September 14, 1993, that these two welds at both MSV-55 and MSV-56 be surface and volumetrically examined. By letter dated March 4, 1993, the licensee agreed to inspect the welds at MSV-56, but did not consider it necessary to inspect the welds at MSV-55. By letter dated March 7, 1994, the NRC reiterated the need to inspect welds at both MSV-55 and MSV-56. The following summarizes the inspectors' review of this matter:

- In observing the UT inspection of the two welds at MSV-56, the inspectors found that the NDE examiner did not know the configuration of the welds before attempting to inspect the welds. The ISI program indicated that the weld connecting the six-inch line to the 24-inch MS line was a sweepolet type joint. However, a drawing showing the weld joint details had not been provided for the examiner; therefore, the examiner was not sure of the joint design. After attempting to inspect the welds, the examiner concluded that, because of the configuration, only limited UT could be performed on both welds (weldolet to 24" pipe and weldolet to reducer).

- After the attempted inspections and prompting by the inspectors, the licensee pulled drawings for the joints and determined that the weld connection to the 24" MS pipe was actually a weldolet type joint and not a sweepolet. Since this weld is a groove weld, all on the outside of the 24" pipe, and due to the continuous change in contour at the intersection of the weld and the 24" pipe, meaningful UT inspection is possible for only a portion of the weld. Because of the slope of the weldolet surface and the short straight section of the reducer, the weldolet to reducer weld is not suitable for UT inspection.

Failure to provide the examiner details of the joint design being inspected indicates a weakness in planning for ISI inspections.

- The licensee decided to radiograph the six inch weldolet to reducer weld and propose MT inspection to complement the limited UT inspection of the sweepolet to 24" pipe weld.

- It was noted that the NRC correspondence specified both volumetric and surface examinations. The inspectors pointed out that the ISI plan only specified volumetric inspection.

- One of the reasons, identified in the licensee's March 4, 1993 letter, for not performing inspection on the welds at MSV-55 was the need to remove massive jet shields and pipe whip restraints to gain access to the welds. The inspectors noted that it appears the welds at MSV-55, although more accessible with the removal of the structural whip restraints, can be inspected without removal of the major portion of the restraints.

At the close of the inspection, the licensee was discussing the extent and methods of inspections with NRR.

(Note: Subsequent to the completion of this inspection, the Senior Resident Inspector informed the inspectors that the licensee had also inspected the welds at MSV-55.)

(4) Personnel Qualifications

The inspectors reviewed BWNT personnel qualification documentation as indicated below for examiners who performed the examinations detailed in paragraphs (1), (2), and (3) above. These personnel qualifications were reviewed in the following areas: employer's name; person certified; activity qualified to perform; current period of certification; signature of employer's designated representative; basis used for certification; and, annual visual acuity, color vision examination, and periodic recertification.

EXAMINER RECORDS REVIEWED

Method	Level	NUMBER
ET	I	8
ET	II	12
ET	IIA	12
ET	III	4
PT	I	1
PT	II	6
MT	I	1
MT	II	5
UT	I	1
UT	II	5
VT	II	5

During observation of inspection activities and review of the above qualification records, the inspectors noted the following:

Section 7.8, Revision 5, Audit, Inspection, and Surveillance of Service Contractors, of the Nuclear Procurement & Storage Manual requires review and approval of contractor personnel certifications and equipment calibration records by FPC QC.

These requirements are implemented by Guide 5, Revision 2, Verification of Certification for Personnel, Equipment, and Consumable, of the Inservice Section Manual. Paragraph 3.2 of Guide 5 requires verification by the ISI Section that certification records for all NDE contractor personnel conducting examinations are reviewed by QC. Paragraph 3.3 of Guide 5 requires verification by the ISI Section that calibration records for NDE Contractor's equipment used for NDE are submitted to NQC prior to beginning work on site.

The inspectors identified the following cases where these procedures were not followed for approval of personnel certification records:

- One ET Analyst was performing analysis before his certification records arrived on site.

- Qualification records for three ET Analysts and one ISI NDE (PT, MT, and UT) examiner had not been reviewed and approved by NQC. In addition, eye examination records were missing from the file of one of the analysts.

These are additional examples of VIO 302/94-11-01 identified in paragraph 2.c.(2) above.

(5) Equipment Certification Records

Equipment/material certification records, as listed below, for equipment/materials used in the inspections detailed in paragraphs (1), (2), and (3) above were reviewed to ensure compliance with applicable requirements.

Equipment Type	Equipment Identification
Penetrant Cleaner	Batch 93M04P
Penetrant	Batch 93E04K
Penetrant Developer	Batch 93J03P
Penetrant Developer	Batch 89L03P
MT Powder	Batch 88C025
MT Powder	Batch 89J014
MT Yoke	M&TE 16002
MT Yoke	M&TE 16207
UT Transducer	Serial 2198-9400
UT Transducer	Serial 2199-94001
UT Transducer	Serial E10963
UT Transducer	Serial I22613
UT Transducer	Serial E10963
UT Transducer	Serial LZ-A1
UT Transducer	Serial 28445
UT Transducer	Serial C24263
UT Transducer	Serial C09251
UT Transducer	Serial E10969

Equipment Type	Equipment Identification
UT Transducer	Serial E1186
UT Transducer	Serial K19484
UT Transducer	Serial 210B-94001
UT Transducer	Serial 210A-94001
UT Transducer	Serial LH4289
UT Instrument	Serial 136-234B
UT Instrument	Serial 31459-1511
UT Instrument	Serial 136-234B
UT Instrument	Serial 136-229B
UT Couplant	Batch 092051
Thermometer	M&TE 15352
Thermometer	M&TE 15355
Thermometer	M&TE 15361

As noted in paragraph (4) above, Inservice Inspection Manual Guide 5 requires the ISI Section to verify that calibration records for NDE Contractor's equipment used for NDE are submitted to NQC prior to beginning work on site, and Section 7.8 of the Nuclear Procurement & Storage Manual requires review and approval of contractor equipment calibration records by FPC QC. During review of certification records above, the inspector noted that the ET equipment calibration records had not been submitted to NQC prior to beginning work. In addition, calibration records for UT Instrument Serial No. 31459-1511 had not been approved by NQC. These are additional examples of VIO 302/94-11-01 identified in paragraph 2.c.(2) above.

(6) Repair and Replacement (R&R) Activities

In addition to review of the R&R procedures identified in paragraph 2.a. above, the inspectors examined the R&R activities associated with replacement of a cracked thermal sleeve at High Pressure Injection (HPI) inlet to the Reactor Coolant cold leg near valve MUV-37. The following summarizes the review by the inspectors:

- Based on previous Problems with HPI thermal sleeves, inspection of the four HPI thermal sleeves has been added to the ISI program as augmented inspections. The inspections are identified in the ISI program as Figures XO.3.1, XO.3.2, XO.3.3 and XO.3.4 and the inspection is by radiography (RT).

- The inspectors reviewed the RT film for the cracked sleeve at MUV-37. The RT film revealed a 360 degree crack in the hard rolled section of the sleeve. The crack appeared to be 100% through wall (later removal of the sleeve verified that the sleeve was in two pieces). The licensee reported that the appearance of the cracked surfaces indicated that

the sleeve had been cracked for some time. The inspectors also reviewed the RT film for the sleeve at valve MUV-36. No cracks were evident in this film.

A metallurgical and failure analysis is planned to determine the cause of the failed sleeve.

- The inspectors discussed the planned repair/replacement with responsible licensee personnel and reviewed the R&R package for cutting the HPI piping and replacing the cracked sleeve. The package reviewed included: Work Request NU 0319003, ASME Section XI Repair and Replacement Evaluation, Inspection Plans, and Weld Travelers. The Work Package was compared with the requirements of the above referenced R&R procedures and the ASME Section XI requirements and no problems were identified.

- The thermal sleeve was being replaced by cutting the HPI piping upstream and downstream of valve MUV-37, cutting the HPI nozzle to safe-end weld, and removing the sleeve with the safe-end. Re-installation required installing a new safe-end and thermal sleeve and adding two new pipe welds where the piping was cut upstream and downstream of MUV-37. The nozzle to safe-end weld was a dissimilar metal, stainless to Inconel butter, weld and the other two welds were stainless to stainless.

  The new thermal sleeve was a new design, previously used on the HPI/MU nozzle downstream of valve MUV-43 in 1982. The original sleeve that failed was expanded to contact the nozzle bore near entry into the cold leg and hard rolled into the bore of the safe-end. The areas that were expanded and rolled were thicker than the remainder of the sleeve. Small weld buttons in the bores of the safe-end and nozzle were used to preclude the sleeve from leaving the nozzle if it came loose. The new sleeve was made from thicker material and the expanded and rolled sections were longer and thicker than for the old sleeve. In addition, the valve end of the sleeve was tapered to fit the counterbore of the new safe-end. Small weld buttons were used to keep the sleeve from rotating and from leaving the nozzle should it come loose.

- The inspectors observed the new thermal sleeve and the new safe-end and observed preparations for mockup training for rolling the new sleeve into the nozzle. Machined mockups, with tightly controlled dimensions for training and qualification for the rolling process, were also observed.

- Welding Services Inc. (WSI) was contracted by FPC to perform the welding associated with the sleeve replacement. The inspectors discussed the welding

activities with the FPC Welding Engineer and WSI personnel. All welding was performed with the automatic GTAW process. The inspectors reviewed the following Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs) covering the welding:

WPS A043297
WPS A08230
WPQ A08256-404.13
WPQ A08256-403.7-C.I.
WPQ 00001
WPQ M08253-194

These WPSs and PQRs were compared with ASME Code requirements and no problems were identified. At the conclusion of the NRC inspection, welding was in progress.

Repair and replacement activities were being accomplished in accordance with procedures and were well controlled.

RESULTS

In the areas inspected, one violation, as noted in paragraphs 2.c.(2), (4), and (5) was identified. No deviations were identified.

Adequate performance was observed. With exception of the one violation, ISI inspections were being performed in a professional manner by qualified personnel in accordance with approved procedures. Neat and orderly records were being generated and maintained.

Three weaknesses were identified as follows: (1) lack of procedures detailing NQC surveillance of ISI activities and orientation of contractor examiners to site/outage NDE procedures, (2) poor storage of UT calibration blocks, and (3) not furnishing weld joint details to the NDE examiner.

3. Eddy Current (ET) Examination (73753)

See paragraph 2. above for applicable Code and documentation of review of procedures, personnel qualification records, and equipment qualification records.

Background

Eddy Current examinations performed on tubes of both once through steam generators (OTSGs) during refueling outage 8 revealed extensive low amplitude signals (signal-to-noise (S/N) ratios less than 5:1). Metallurgical examinations performed on pulled tube samples revealed that the subject signals were associated with low-volume, pit-like indications resulting from intergranular attack (IGA) on tube OD surfaces. In addition to the aforementioned tests, the licensee performed burst pressure tests to demonstrate that the degradation was not safety-

significant, in that the structural integrity of the effected tubes met the requirements of Regulatory Guide 1.121; see Confirmatory Action Letter (CAL), No. 2-94-004, S. A. Varga to P. Beard, April 26, 1994. Because, the CR-3 Technical Specifications addressed dispositioning of tube indications solely in terms of percent of through-wall dimensions, the licensee determined, and NRR agreed, that the subject criteria did not apply to existing IGA-type flaws responsible for the low S/N at CR-3. On April 19, 1994 the licensee proposed by memorandum, 3F0494-09, certain criteria for addressing low signal-to-noise ratio indications identified during the current (RFO-9) refueling outage. The technical aspects of the submittal and inspection plan are summarized below.

- Inspect approximately 23% of the total tubes of each OTSG with bobbin probe. The sample would be selected on a random basis except that it would include all inservice tubes with previously recorded degraded indications and S/Ns. This sample also included certain tubes in the lane region of the OTSGs.

- Tubes with S/Ns less than 5:1, and bobbin voltages equal to or exceeding 2 volts, would be considered as defective and repaired.

- Disposition all indications with S/Ns greater than 5:1 in accordance with existing TS requirements.

- Conduct an initial 20% motorized rotating pancake coil (MRPC) sample inspection for tube locations exhibiting bobbin voltages equal to or exceeding 0.5 volts. This sample would exclude locations exhibiting bobbin voltages equal to or greater than 2 volts. This sample excluded locations inspected during previous outages with MRPC and which exhibited indications exceeding the proposed MRPC sizing criteria (i.e., axial length equal to or exceeding 0.25 inches or circumferential length equal to or exceeding 0.60 inches) at that time. (Tubes with these previously observed MRPC indications would be repaired.) Locations selected for the initial 20% MRPC sample would include all locations where MRPC inspections during previous inspections revealed indications exceeding one-half of the proposed MRPC sizing criteria. The balance of the locations selected for the initial 20% MRPC sample would include the locations with the largest available bobbin indications. The median bobbin voltage for all locations included in the 20% initial MRPC sample would be identified. Sample selection, examination and expansion for locations with bobbin voltages less than the mean voltage of 1.06 volts, would be as follows:

  * Should 1% of these locations exhibit MRPC indications equal to or exceeding the aforementioned MRPC sizing criteria, select a 10% sample from the remaining locations with S/Ns less than 5:1 beginning with the highest remaining voltages. Sample expansions would continue in this manner until fewer than 1% of the locations in a given sample were found to exceed the MRPC size criteria. Sample expansions would be terminated when all locations with bobbin indications above 0.7 volts had been MRPC

inspected. All tubes with MRPC indications equal to or exceeding the MRPC sizing criteria would be repaired.

- Perform preventive sleeving of 164 tubes in the lane region of each OTSG.

- Pull four tube samples with indications at the 7th and 9th tube support plates and distorted tube sheet signals at the lower support plate. Perform destructive and non-destructive examinations of these tubes to evaluate the flaw morphology, causal factors, structural and leakage integrity implications, and field detection capabilities. Submit the results of the RFO-9, OTSG tube pull examinations to NRR, no later than November 30, 1994.

a. Inspection Plan

Through discussions with cognizant personnel, document review and observations, the inspectors obtained the following plan for examination, tube repair, tube pulls and results.

	OTSG "A"	OTST "B"
	Bobbin Coil	
•Pre-Sleeve Lane and Wedge Tubes	164	164
•Remaining lane Region Tubes	222	208
•1st Sample	497	499
•2nd Sample	994	998
•4th Sample	1987	1995
•Tube Pull Candidates	∅	8
Totals	3864	3872

Confirmatory examinations, using MRPC, were performed on the population of tubes in the lane region above.

Following is a summary of confirmatory MPRC examinations. The method and the population of samples selected for these examinations was in response to the submittal and to understandings delineated in the aforementioned CAL.

	OTSG "A"	OTSG "B"
Special Interest 20%		
•Tubes with Indications ≥ 0.9 volts	40	125
•Total Numbers of Indications	50	141

	OTSG "A"	OTSG "B"
Expansion Samples No. 1		
•Tubes with Indications from 0.8 to 0.9 volts	20	53
•Total Number of Indications	24	54
Expansion Sample No. 2		
•Tubes with Indications from 0.74 to 0.8 volts	20	53
•Total Number of Indications	23	56
Expansion Sample No. 3		
•Tubes with Indications from 0.7 to 0.7 volts	16	45
•Total Number of Indications	17	46

b. Inspection Results and Dispositioning of Defective Tubes

Following completion of the planned examinations and analysis of data, the licensee identified the following tubes where repair action was required.

Sample	OTSG "A"	OTSG "B"
•Standard Bobbin S/Ns > 2Vs	22-79, 2.71 volts 73-85, 2.09 volts	97-43, 3.24 volts
•Tubes with S/N > 5:1 MRPC Sizing Criteria 20% Sample	28-92, 0.27" axial	119-63, 0.25" axial 54-98, 0.35" axial 85-124, 0.34" axial
•First 10% Sample	28-93, 0.3" axial	∅
•Second 10% Sample	∅	32-71, 0.26" axial
•MRPC Identified not in sizing sample, plugged, numerous indications	27-91	
•MRPC Sized based on RF8 data, not included in RF8 Inspection	34-72, 0.29" axial	70-125, 0.31" axial
Unidentified Foreign Object inside tube	77-37	∅

Sample	OTSG "A"	OTSG "B"
Technical Specifications, ≥ 40% Trough Wall		26-10, 49% 0.92 volts, RF8-NDD 41-53, 41% 1.27 volts, RF8-0.88 volts 92-28, 55% 1.6 volts RF8-1.39 volts

The tubes pulled from OTSG "B" for investigation were 68-46, 72-49, 109-71 and 136-26. The seven defective tubes in OTSG "A" and the 13 devective tubes in OTSG "B" including those pulled were plugged Welded plugs were used to secure the holes in the tubesheet created by the pulled tubes.

Preventive Sleeving of Tubes in Lane Region: Only 163 tubes were sleeved in each of the OTSGs. One of the candidate tubes in OTSG "A" was plugged because a foreign object was found lodged inside the tube which precluded the sleeving operation; and in S\G "B" a candidate tube contained debris from a previous tube end repair operation, and as such it was not possible to insert the sleeve at this time.

c. Tubes Plugged

At the completion of this inspection the inspector obtained the following list of tubes plugged per OTSG.

	OTSG "A"	OTSG "B"
Tubes Plugged Prior to RFO 9	42	120
Tubes Plugged during RFO 9	7	13
Total Tubes Plugged	49, < 1%	133, < 1%

d. Data Acquisition

Data acquisition, analysis and repair of tubes was being performed by B&W Nuclear Technologies (BWNT), following the applicable code, Technical Specifications requirements, industry guidelines and regulatory commitments. Some of the controlling documents reviewed were as follows:

Crystal River Unit No. 3
Steam Generator Regulatory
Guide 1.121 Evaluation Rev. 2

SP-305, Rev. 17, Surveillance Procedure, OTSG Inservice Inspection

Crystal River Unit No. 3
Eddy Current Data
Analysis Guidelines, Rev.1

Other documents applicable by reference included:

Regulatory Guide 1.83, Rev.1

EPRI NP-6201, Rev. 3, PWR Steam Generator Examination guidelines

Through discussions with cognizant licensee and BWNT personnel the inspectors ascertained that BWNT was doing primary and secondary analysis and, resolution of data analysis discrepancies. Computer Data Screening (CDS) analysis was used for secondary analysis for reporting tube degradation detected by the bobbin coil. The CDS system was qualified by performance demonstration in both, fully automated and interactive modes.

Within these areas the inspector noted that under this arrangement there were no provisions for a second independent party review. One organization (BWNT) performed acquisition, analyzed the data and issued resolutions where discrepancies occurred. The lack of a second independent analyst/reviewer was of a greater concern because the licensee presently lacks inhouse expertise that is qualified to perform data analysis and thereby make an independent assessment or evaluation of the analyzed data. The inspectors discussed these concerns with FPC management and informed them that this concern would be identified as a programmatic weakness. This matter was discussed at length with the staff at NRR who concurred with the inspectors position.

Data Analyst Performance Demonstrations

In the course of reviewing personnel qualification records, the inspectors reviewed the results of site specific performance demonstration tests. Within this area the inspectors noted the following:

- Through discussions with cognizant BWNT personnel and document review the inspectors noted that performance demonstration training for data analyst candidates were conducted without an approved written program/practice. As such, it was not possible to verify the content and adequacy of classroom and laboratory training requirements, course outline including the number of instruction hours and examination requirements, practical examination requirements, qualification criteria, written and practical re-examination requirements in the event of failure to obtain a passing grade. Failure to perform activities important to safety in accordance with documented

instructions is in violation of 10 CFR 50, Appendix B, Criterion V, and is identified as, VIO 302/94-11-02, Plant Specific ET Performance Demonstration Test Administered Without Approved Written Program.

- Review of the data analysts performance demonstration test results disclosed that four individuals failed the initial practical examination. For individuals failing the initial test, the test records showed only the retest grades and did not include the retests given. In that all retests had a grade score of 80, the inspectors discussed with BWNT supervisor, the retraining and retesting given these individuals. Through these discussions the inspectors ascertained that the four individuals were briefed on the type of tube indications they had missed, allowed to review the applicable data and were subsequently graded. The inspectors indicated that assignment of a passing grade without a re-examination was highly unusual and further supports the need for administrative controls i.e., written practice, in this area. Other discrepancies identified in personnel records during this review, are discussed under paragraph 2.c.(4), Personnel Qualifications, elsewhere of this report.

e. Work Observation:

Eddy current standard bobbin probe examinations were performed with the MIZ-18 remote data acquisition units (RDAUs) and 0.510" diameter multifrequency bobbin differential coils. Examination frequencies of 600 khz and 200 khz differential, were used to satisfy code requirements. The 200 khz frequency was used as a mix component and for defect confirmation. The 600khz/200khz differential mix was used as the primary mix. This mix provided carbon steel support suppression for indication measurements at tube support plate intersections, tubesheet crevices and free spans when associated with deposits. Tubes were scanned at the rate of 14 inches/second. Tube location was verified once every 20 tubes. The inspector observed bobbin examinations, confirmatory motorized rotating pancake coil (MRPC) examinations, and analysis, as applicable, on the following OTSG "B" tubes:

Row	Column	Acquisition Method	Disk	Comment
90	67	Bobbin	5	Cal Group-33
89	71	Bobbin	5	Cal Group-33
89	70	Bobbin	5	Cal Group-33
89	66	Bobbin	5	Cal Group-33
88	72	Bobbin	5	Cal Group-33
86	68	Bobbin	5	Cal Group-33
87	68	Bobbin	5	Cal Group-33
87	69	Bobbin	5	Cal Group-33

The inspector witnessed system calibration performed on April 20, 1994 at 1110 hundred hours. The calibration, identified as Cal Group 45, was performed using calibration standard No 1237447-B. Results were recorded on Disk-5B, OTSG "B".

Analysis

Row	Column	Method	Comment
26	9	Bobbin	Cal Group 45
25	8	Bobbin	Cal Group 45
26	10	Bobbin	Cal Group 45
25	4	Bobbin	Cal Group 45
24	8	Bobbin	Cal Group 45
24	7	Bobbin	Cal Group 45
22	2	Bobbin	CaL Group 45

In addition to these observations, the inspectors observed resolution of bobbin indications in 27 tubes between rows 136 through 142 which were recorded in CAL No. SGB3CCAL00031.

Documentation of Resolutions

As required by the Analysis Guidelines, Dwg. 1217317A, the lead analyst issues an EDDYNET comparison file report (CFR), on a daily basis. This report documents resolutions of discrepancies between the primary and secondary analysts. The inspector observed resolution of such discrepancies preformed on 19 tubes in OTSGs "A" and "B". The discrepancies were recorded on Cal No. SGA3HCAL00007, 00009 and 00012 in OTSG "A" and Cal No. SGR3HCAL00012, 00013 and 00024 in OTSG "B" respectively.

f. Steam Generator Tube Repair

Tube Sleeving

Steam generator tubes with indications exceeding acceptance criteria were either plugged or sleeved as determined appropriate by the license and BWNT. Sleeves used during this outage were made from Inconnel I-690 material, produced in accordance with ASME Code Section III, NB 1986 Edition with 1986 Addenda.

Tube material for sleeve fabrication was produced from heats 764371 and 753957 and purchased from Sandvick Tube Inc. under purchase order, BWA09066LE. Sleeve dimensions were 80" long, 0.525" OD and 0.045" wall thickness. BWNS certificate of conformance was part of data package No. 23-1229173-01 used to certify compliance with applicable code and quality assurance requirements. The subject sleeves wee used to repair 163 OTSG tubes in the lane region in each of the two generators.

Through TV monitors used to observe OTSG tube inspection and repair activities, the inspector observed sleeving operations in OTSG "A". Sleeves were installed into the parent tube and subsequently expanded in three locations, i.e., two roll-expansions at the tube support plate and one at the upper tubesheet location. Within these areas the inspector observed roll expansions of certain tube-ends at the upper tubesheet of OTSG "A". This step was necessary to correct damage on the tube ends sustained several years ago when a loose part was left inadvertently in the upper bowl. The repair/roll expansion was performed in accordance with procedure No. 1217323A Rev. 1, Field procedure for OTSG Tube End Repairs at CR-3 Nuclear Station. NCR 94-00208 Rev. 1 issued to address the aforementioned tube-end damage was applicable by reference. The inspector observed this activity/repair performed on tubes in columns 4 through 12 in Row 78 of OTSG "A". The sleeving operation was performed using the following two procedures:

- 1154519A Rev. 17 Field Procedure for OTSG Tube Sleeving

- 1157633A Rev. 16 Tool Operating Instruction

The inspectors observed roll expansion of sleeves in tubes 16 through 22 in Row 75. Results of torques achieved and applicable sign-offs were documented on OTSG Sleeving Checklist Sheet No. 3, Inclosure 1 to dwg No. 1154519 Rev. 17.

Installation of Remote Welded Plugs

Once all four of the designated tubes were successfully pulled from OTSG "B", BWNT took steps to prepare the tubesheet holes for welding of the plugs. One of these activities called for spot-facing the area around the circumference of the tube hole to assure flatness of the surrounding seating surface. The inspectors observed this operation on two of the four tubesheet holes and concurred with QA/QC that adequate flatness had been achieved.

Welding of the plugs was performed using the remote automatic gas tungsten arc welding (GTAW) process. The inspectors reviewed the following documents for content and compliance with applicable code requirements. ASME Code Section XI, 1989, Edition and IWB-4232, was applicable by reference.

SPP-2	General	Procedure of Arc Welding
51-1205304	Rev. 1	Welding specification
55-1221788	Rev. 1	Component Engineering and Field Service Welding Manual
WCP-4		Welding material Control

Task Development Letter Rev. 0		Remote Weld Plugging, Task 087
02-1210920A	Rev. 1	VT-1 Visual Examination of OTSG Tube Plug Welds
WGT-30	Rev. 2	Welder Qualification Testing

Welding of these plugs was identified as an ASME Code Section XI Repair, implemented under BWNT's QA Program. Other documents reviewed included welding procedure qualification records-6470, 6471, 6472 and 6473 which indicated the procedure had been qualified in the flat and overhead positions; welder performance qualification test records for nine individuals and the following materials certifications:

Item	Description
Plugs: Part No. 1204793-001 S/N 6977-12-291 -306 -308 -318	QA Data package: 23-1206047-003 HT No. NX6977HK12, Inconel-690 CMTR No. 86407 ASME Section III 1986 Edition
Filler Metal Wire S/N 18883 and 18898 Diameter 0.03"	P/N: 1178500-002 Ht No. NX7906D SFA 5.14, ERNICR-3

As stated earlier, welding of the plugs was performed using the remote automatic GTAW process. The plugs were welded to the clad surface on the tubesheet, with a fillet weld having an 0.035" throat minimum produced using a stringer bead technique. On the final day of this inspection, May 6, 1994, the inspectors observed welding of the first plug in tube hole 136-26. The weld was fabricated well within the specified essential variables of the qualified procedure and passed VT-1 inspection performed remotely with the aid of a TV monitor.

RESULTS

One violation as noted in paragraph d. was identified. No deviations were identified.

One weakness relative to the lack of a second party review of ET data was identified.

4. Flow Accelerated Corrosion (FAC) Program (49001)

See NRC Inspection Reports 50-302/92-14, and 50-302/92-28 for documentation of previous inspections in this area.

In response to Generic Letter (GL) 89-08, Erosion/Corrosion Pipe Wall Thinning, licensees have implemented long term Erosion/Corrosion (E/C) or FAC programs. The current inspection evaluated the status of various aspects of the Crystal River program to determine if a defined program was in place and if it appeared the scope of the program was adequate to identify degraded piping. The following is a summary of the inspection activities and results:

a. Program Status

Based on discussions with licensee personnel, review of the documents listed in paragraph b. below, and the observations listed in paragraph c. below, the following actions have been completed by the licensee:

- Two site engineers are assigned to implement the FAC program.

- A detailed program and implementing procedures have been issued.

- A detailed susceptibility study of all plant systems has been completed. All susceptible systems or portions of systems, with pipe diameters $\geq$ 2-1/2" are included in the program.

- Component selections for inspections are based on (1) EPRI CHECMATE Model, (2) Keller's Method, (3) plant experience, (4) industry experience, and (5) engineering judgement.

- The program is being converted to the EPRI CHECWORKS Programs, including CHECMATE and CHEC-NDE. CHECMATE modeling has been completed on the safety related portion of the "A" Feedwater system and additional modeling is planned. Also, plans are being developed to backfit all previous FAC data into CHECK-NDE so that the previous data can be used with CHECWORKS.

b. Review of Procedures

The inspectors reviewed the following documents which defined the FAC program:

- Preventive Maintenance Procedure PM-251, Revision 6, Erosion/Corrosion Inspection Program Turbine Piping Systems

- E/C Calculation M92-0047 (CR-3 Erosion/Corrosion Susceptibility Profile)

c. Observations and Reviews

In addition to review of the above program, procedures, and plans, the inspectors observed activities and reviewed other aspects of the FAC program as detailed below:

- For the current outage, 55 components were inspected.

- Grid layout was observed for components HD-15A-2R, HD-16A-1T, EX-1A-2E, and EX-1B-2E. In addition, UT thickness data and analysis was reviewed for components HD-15A-2R, EX-1A-2E, and EX-1B-2E.

- The inspectors examined licensee's past practice and future plans for material replacements for FAC degraded piping, i.e., practices for replacing "like-for-like" or upgrading to better materials. The general practice is to replace degraded carbon steel with Cr-Mo material. For very aggressive areas, stainless steel replacement materials are used.

- The program currently does not include small bore (< 2-1/2" diameter) piping. However, based on discussions with the E/C Engineer, FAC of small bore piping has not been a problem at Crystal River since most small bore lines are superheated steam. Since 1982, only about 5 or 6 pinhole leaks have occurred in small bore piping and these have all been in socket weld elbows in steam trap dumps to the condenser.

- Other than the small bore area noted above, there have only been two other through-wall pinhole leaks in the last 10 years requiring "Furmanite" repairs due to FAC. These two leaks were in Turbine Cross Under piping drains. Plans are to replace these areas with Cr-Mo material. Based on the past plant history, it appears the FAC program has been effective in preventing FAC induced pipe leaks.

RESULTS

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

The licensee has a pro-active FAC program. The detailed program, dedicated personnel and resources, and the plans for implementing the EPRI CHECWORKS Programs illustrate this pro-active approach.

5. Licensee Actions on Previous Inspection Findings (92702)

(Closed) VIO 302/92-14-01, Inadequate Procedure and Drawings for ISI Activities

See NRC Inspection Report 50-302/92-28 for documentation of a previous inspection of corrective actions for this violation.

This violation involved: (1) generic use of BWNT UT procedure, ISI-119, Rev.11, without controlling the equipment and test parameters so that examination sensitivity could be verified and repeated, and (2) the failure of ISI calibration block drawings to reflect the as-built condition of the blocks. The licensee's letter of response is dated

August 21, 1992. The letter of response has been reviewed and found to be acceptable. The inspectors reviewed the status of corrective actions as detailed below.

The licensee attributed the violation to weaknesses in the ISI program that, for item (1), did not require a technical review of vendor ISI procedures by the licensee prior to implementation by the contractor and, for item (2), did not provide specific guidelines for receipt inspection or proper handling of calibration blocks.

For item (1), the licensee took immediate corrective action to revise the procedure in question at the time the violation was identified. In addition, the procedure was reviewed by EPRI. Their comments were reviewed and the procedure revised as appropriate. Relative to item (2), all calibration blocks were inspected and as-built drawings were obtained or generated for all calibration blocks. In addition to these specific corrective actions, a number of improvements have been made in the ISI program. One improvement was moving the ISI organization from the Maintenance Department to Site Engineering Support. Other corrective actions included revision of the ISI program to require:

- Technical review of ISI procedures by the licensee and receiving inspection of ISI calibration blocks

- Review of personnel qualification and certification records by FPC NQC

- Review of equipment calibration records by FPC NQC

- Surveillance of in-process NDE activities by FPC NQC

The inspectors reviewed the above corrective actions including:

- Review of the revised Inservice Inspection Manual and control procedures

- Review of the revised UT procedure ISI-119

- Review of EPRI comments to UT procedure ISI-119

- Review of revised calibration block drawings

- Review of evidence of NQC surveillance of in-process ISI activities, including review of QC Surveillance Summary dated April 16, 1994

- Review of documentation of NQC review of personnel qualification and equipment calibration records

Based on the above corrective actions, this item is closed.

6. Exit Interview

The inspection scope and results were summarized on April 22 and May 6, 1994, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection findings listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee relative to the violations identified. However, the licensee stated that they did not agree with the weakness relative to the need for a 2nd party review of ET data and results.

(Open) VIO 302/94-11-01, Failure to Follow ISI Procedural Requirements - Paragraph 2.c.

(Open) VIO 302/94-11-02, Plant Specific ET Performance Demonstration Test Administered Without Approved Written Program - Paragraph 3.

(Closed) VIO 302/92-14-01, Inadequate Procedure and Drawings for ISI Activities

7. Acronyms and Initialisms

ANII	-	Authorized Nuclear Inservice Inspector
ASME	-	American Society of Mechanical Engineers
B&PV	-	Boiler and Pressure Vessel
BWNT	-	B&W Nuclear Technologies
CAL	-	Comfirmation of Action Letter
CDS	-	Computer Data Screening
CFR	-	Comparsion File Report
CR	-	Crystal River
Cr-Mo	-	Chromium Molybdenum
DH	-	Decay Heat System
E/C	-	Erosion/Corrosion
EPRI	-	Electric Power Research Institute
ET	-	Eddy Current Test
FAC	-	Flow Accelerated Corrosion
FPC	-	Florida Power Corporation
GL	-	NRC Generic Letter
GTAW	-	Gas Tungsten Arc Welding
HELB	-	High Energy Line Break
HPI	-	High Pressure Injection
IGA	-	Intergranular Attack
ISI	-	Inservice Inspection
ISO	-	Isometric Drawing
MRPC	-	Mechanized Rotating Pancake Coil
MS	-	Main Steam System
MT	-	Magnetic Particle
NDE	-	Nondestructive Examination
NQC	-	Nuclear Quality Control
NRC	-	Nuclear Regulatory Commission
NRR	-	Nuclear Reactor Regulation
OSTG	-	Once Through Steam Generator

PQR	-	Procedure Qualification Record
PRC	-	Plant Review Committee
PT	-	Liquid Penetrant
QA	-	Quality Assurance
QC	-	Quality Control
RFO	-	Refueling Outage
RII	-	NRC Region II
R&R	-	Repair and Replacement
RT	-	Radiographic Test
SER	-	Safety Evaluation Report
SG	-	Steam Generator
S/N	-	Signal to Noise Ratio
TS	-	Technical Specification
UT	-	Ultrasonic Test
VIO	-	Violation