



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
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January 28, 2002

Virginia Electric and Power Company
ATTN: Mr. David A. Christian
Sr. Vice President and
Chief Nuclear Officer
Innsbrook Technical Center - 2SW
5000 Dominion Boulevard
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**SUBJECT: SURRY NUCLEAR POWER STATION - NRC INTEGRATED INSPECTION
REPORT NOS. 50-280/01-04, 50-281/01-04, AND 72-002/01-04**

On December 29, 2001, the NRC completed an inspection at your Surry Power Station, Units 1 and 2, and the Surry Independent Spent Fuel Storage Installation. The enclosed report documents the inspection findings which were discussed on January 14 with Mr. Blount and January 28, 2002, with Mr. Turko along with other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selective procedures and records, observed activities, and interviewed personnel.

No findings of significance were identified by the NRC.

Immediately following the terrorist attacks on the World Trade Center and the Pentagon, the NRC issued an advisory recommending that nuclear power plant licensees go to the highest level of security, and all promptly did so. With continued uncertainty about the possibility of additional terrorist activities, the Nation's nuclear power plants remain at the highest level of security and the NRC continues to monitor the situation. This advisory was followed by additional advisories, and although the specific actions are not releasable to the public, they generally include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with law enforcement and military authorities, and more limited access of personnel and vehicles to the sites. The NRC has conducted various audits of the Virginia Electric and Power Company's response to these advisories and Surry Power Station's ability to respond to terrorist attacks with the capabilities of the current design basis threat. From these audits, the NRC has concluded that the Surry Power Station security program is adequate at this time.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system

(ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA Larry Garner for/

Kerry D. Landis, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket Nos.: 50-280, 50-281, 72-002
License Nos.: DPR-32, DPR-37, SNM-2501

Enclosure: Inspection Report Nos. 50-280/01-04,
50-281/01-04 and 72-002/01-04

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-280, 50-281, 72-002
License Nos.: DPR-32, DPR-37, SNM-2501

Report No.: 50-280/01-04, 50-281/01-04, 72-002/01-04

Licensee: Virginia Electric and Power Company (VEPCO)

Facilities: Surry Power Station, Units 1 & 2
Surry Independent Spent Fuel Storage Installation

Location: 5850 Hog Island Road
Surry, VA 23883

Dates: September 30 - December 29, 2001

Inspectors: R. Musser, Senior Resident Inspector
K. Poertner, Resident Inspector
G. McCoy, Resident Inspector
W. Bearden, Reactor Engineer (Partial Sections 4OA5.2 and 4OA5.3)
D. Jones, Senior Health Physicist (Sections 2OS1, 2OS2, 4OA5.4)
R. Hamilton, Health Physicist (Sections 2OS1, 2OS2, 4OA5.4)

Approved by: K. Landis, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Attachments: 1. Supplemental Information
2. List of Documents Reviewed

SUMMARY OF FINDINGS

IR 05000280-01-04, IR 05000281-01-04, IR 07200002-01-04, on 9/30 - 12/29/2001; Virginia Electric and Power Co.; Surry Power Station Units 1 & 2 and Independent Spent Fuel Storage Installation. Resident Inspector Integrated Report.

The inspection was conducted by resident inspectors, a senior health physicist, a health physicist and a reactor engineer. No findings of significance were identified by the NRC. The significance of the findings is indicated by their color (Green, White, Yellow, Red) using IMC 0609 "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website.

A. Inspector Identified Findings

- None.

B. Licensee Identified Violation

- One violation of very low safety significance which was identified by the licensee has been reviewed by the inspectors. The licensee entered this violation in their corrective action program. The violation is listed in Section 4OA7 of this report.

Report Details

Summary of Plant Status

Unit 1 operated at power until October 14 when the Unit was shutdown for a scheduled refueling outage. The Unit was returned to power operation on December 8, 2001, and operated at power for the remainder of the reporting period.

Unit 2 operated at power until November 20 when the Unit was shutdown to perform reactor vessel head inspections. The Unit was returned to power operation December 1, 2001, and operated at power for the remainder of the reporting period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather

a. Inspection Scope

The inspectors verified that plant design features and procedures protected plant mitigating systems from adverse cold weather effects. Specifically, the inspectors reviewed the licensee's preparations for cold weather as described in procedure 0-OSP-ZZ-001, "Cold Weather Preparation," rev. 3-P1 and 0-ECM-1303-01, "Freeze Protection Inspection," rev. 11, to verify that the preparations limited the risk of weather related initiating events, ensured accessibility to accident mitigation system equipment, and adequately protected accident mitigation systems from adverse weather effects.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns

a. Inspection Scope

The inspectors conducted partial equipment alignment walkdowns to evaluate the condition of the selected redundant trains or backup systems listed below, with the other train or system inoperable or out of service. The walkdowns included, as appropriate, reviews of plant procedures and other documents to determine correct system lineups, and verification of critical components to identify any discrepancies which could affect the condition of the redundant train or backup system. The intent of the review was to reasonably verify the condition of the redundant train/system when the other train/system is out-of-service. The following systems were included in this review:

- Control room bottled air system while the system was partially tagged out for H bus logic testing (procedure 0-OP-VS-008, rev. 7, PAR 1 and drawing 11448-FB-041B, sheet 2 of 3, rev. 5);
- Unit 1 H bus electrical equipment while the J bus was removed for maintenance (drawings 11448-FE-1D, sheet 1 of 1, rev. 17, 11448-FE-1F, sheet 1 of 1, rev. 22, 11448-FE-1Q, sheet 1 of 1, rev. 10); and,
- Unit 1 Outside Recirculation Spray System-both trains (procedure 1-OP-RS-001A, rev. 3-P1 and drawing 11448-FM-084B, sheet 2 of 2, rev. 28).

b. Findings

No findings of significance were identified.

1R05 Fire Protection

Fire Area Walkdowns

a. Inspection Scope

The inspectors conducted tours of the following areas to assess the adequacy of the fire protection program implementation. The inspectors checked for the control of transient combustibles and the condition of the fire detection and fire suppression systems (using "SPS Appendix R Report," rev. 17) in the following areas:

- Fuel Building;
- Auxiliary Building;
- Number 2 Emergency Diesel Generator Room;
- Unit 1 Emergency Switchgear Room;
- Unit 2 Cable Spreading Room; and,
- Mechanical Equipment Room 3.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspections Scope

The inspectors observed licensed operator performance during simulator training session RQ-01.7-ST-1-H/T-1.1, Small Break Loss of Coolant Accident (LOCA)/Cooldown, to determine whether the operators:

- were familiar with and could successfully implement the procedures associated with recognizing and recovering from a small break LOCA;
- recognized the high-risk actions in those procedures; and,
- were familiar with related industry operating experiences.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors sampled portions of selected structures, systems, and components (SSCs) listed below, to assess the licensee's implementation of the Maintenance Rule (10 CFR 50.65) and to determine effectiveness of maintenance efforts that apply to scoped SSCs. The inspectors reviewed the licensee's implementation of the Maintenance Rule using VPAP 0815, "Maintenance Rule Program," rev. 11, and the Surry Maintenance Rule Scoping and Performance Criteria Matrix, rev. 12. Reviews focused, as appropriate, on: (1) characterization of failed SSCs; (2) safety significance classifications; (3) 10 CFR 50.65 (a)(1) or (a)(2) classifications; and (4) the appropriateness of performance criteria for SSCs classified as (a)(2) or goals and corrective actions for SSCs classified as (a)(1). The selected SSCs were associated with the following plant issues:

- S-2001-2975, Number 1 Emergency diesel generator failed to start;
- S-2001-2890, Breaker 25H3 anti-pump contact degraded;
- S-2001-3326, 1B CCHX throughwall leak;
- S-2001-3317, B spray valve shift to manual control;
- S-2001-3029, Pressurizer safety valve as-found setpoint low; and,
- S-2001-2234, 1-VS-E-4A tripped during testing.

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluations

a. Inspection Scope

The inspectors verified the adequacy, accuracy, and completeness of plant risk assessments performed prior to any changes in plant configuration for maintenance activities or in response to emergent conditions. When applicable, inspectors verified the licensee entered the appropriate risk category in accordance with plant procedures. Specifically, the inspectors reviewed:

- Simultaneous removal from service of the blackout diesel (0-AAC-DG-0M) and the failure of the Unit 1 containment pressure instrument channel P-LM-100C;
- Simultaneous removal from service of the number 2 switchyard transformer (230 KV to 34.5 KV), A reserve station transformer (1-EP-RST-A), number 1 emergency diesel generator (EDG) (1-EE-EG-1), Unit 1 turbine driven auxiliary feedwater pump (1-FW-P-2), Unit 1 B motor driven auxiliary feedwater pump (1-FW-P-3B) and B component cooling heat exchanger (1-CC-E-1B);

- Simultaneous removal from service of the B, C and D component cooling heat exchangers (1-CC-E-1B, 1-CC-E-1C, 1-CC-E-1D) and the Unit 1 turbine driven auxiliary feedwater pump (1-FW-P-2);
- Simultaneous removal from service of Unit 2 instrument air dryer (2-IA-D-1), Unit 2 screenwell transformer (2-EP-TX-2G), Unit 1 turbine driven auxiliary feedwater pump (1-FW-P-2), 3B central air conditioning water chiller (1-VS-E-3B), D control room/emergency switchgear room HVAC system chiller (1-VS-E-4D) and the 2A bearing cooling water heat exchanger (2-BC-E-1A) and the performance of the Unit 1 B motor driven auxiliary feedwater pump test (1-OPT-FW-002);
- Simultaneous removal from service of the Unit 1 H stub buss, the A emergency service water pump (1-SW-P-1A), the alternate power supply to the 4A control room chiller (1-VS-E-4A), and the performance of 1-IPT-CC-CW-L-103, Intake Canal Level Probe 1-CW-LS-103 Time Response Test and Channel Calibration; and,
- Removal from service of number 2 EDG (2-EE-EG-1), Unit 2 blender isolated for testing, 2-RC-PCV-2255B in manual control, Unit 2 B train reactor head and pressurizer vents isolated.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors evaluated the technical adequacy of the operability evaluations to ensure that operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The operability evaluations were described in the engineering transmittal (ET) and plant issues listed below:

- ET S-01-0283, rev 0, Engineering justification of the electrical capability of 01-RH-MOV-1720A and 01-RH-MOV-1720B;
- S-2001-2814, Existing procedures do not verify a complete functional test of both EDG start circuit relays;
- S-2001-3629, Unit 2 turbine driven auxiliary feedwater pump (2-FW-P-2) in alert for differential pressure;
- S-2001-3325, Two individual cell voltages were found in alert on 1B station battery (1-EPD-B-1B); and,
- S-2001-3326, Through-wall leak on the 1B Component Cooling Heat Exchanger.

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed the licensee's list of identified operator workarounds dated September 21, 2001. The inspectors reviewed the cumulative effects of operator workarounds on: the reliability, availability and potential for misoperation of any plant system; the frequency of initiating events; and the ability of operators to respond in a correct and timely manner to plant transients and accidents.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed post-maintenance test (PMT) procedures and/or test activities, for selected risk significant mitigating systems to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) test equipment was removed following testing; and (7) equipment was returned to the status required to perform its safety function. The inspectors observed testing and/or reviewed the results of the following tests:

- 2-OP-EG-001 - Return to service testing of the Number 2 EDG following maintenance on the base tank level switch and engine tachometer;
- Work Order (WO) 387815-03, Replacement of the Unit 1 A motor driven auxiliary feedwater pump (1-FW-P-3A);
- WO 444410-01, Replacement of breaker 1-EP-BKR-15H11 with a refurbished breaker;
- WO 360470-01, Overhaul of the Unit 1 C non-return valve (1-MS-NRV-101C);
- WO 460091-01, Installation of an orifice in an instrument air line; and,
- WO 450131-01, Replace number 1 EDG generator bearing and housing.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

.1 Unit 1 Refueling Outage

a. Inspection Scope

The inspectors evaluated the licensee's Unit 1 refueling outage activities (October 14 through December 8, 2001). The following activities were reviewed:

- Prior to and during the outage, the inspectors reviewed the licensee's outage risk control plan ("Unit 1 2001 Refueling Outage Safety Assessment," rev. 1 through rev. 14 and VPAP-2805, "Shutdown Risk Program," rev. 5) to verify that the licensee had appropriately considered risk, industry experience and previous site specific problems, and to confirm that the licensee had mitigation/response strategies for losses of key safety functions;
- During the cooldown which preceded the outage, the inspectors reviewed portions of the cooldown process to verify that technical specification cooldown restrictions were followed;
- The inspectors confirmed that, when the licensee removed equipment from service, the licensee maintained defense-in-depth commensurate with the outage risk control plan for key safety functions and applicable technical specifications, and that configuration changes due to emergent work and unexpected conditions were controlled in accordance with the outage risk control plan;
- The inspectors examined clearance tags on charging system tagout number 1-01-CH-0081 to verify that tags were properly hung and that associated equipment was appropriately configured to support the function of the clearance;
- Reviewed reactor coolant system (RCS) pressure, level, and temperature instruments to verify that those instruments were installed and configured to provide accurate indication; and that instrumentation error was accounted for;
- Reviewed the status and configuration of electrical systems to verify that those systems met technical specification requirements and the licensee's outage risk control plan;
- Observed decay heat removal (DHR) parameters to verify that the system was properly functioning;
- Observed spent fuel pool operations to verify that outage work was not impacting the ability of the operations staff to operate the spent fuel pool cooling system during and after core offload;
- Reviewed system alignments to verify that the flow paths, configurations, and alternative means for inventory addition were consistent with the outage risk plan;
- Reviewed selected control room operations to verify that the licensee was controlling reactivity in accordance with the technical specifications;
- Reviewed the outage risk plan to verify that activities, systems, and/or components which could cause unexpected reactivity changes were identified in the outage risk plan and were controlled accordingly;
- Observed licensee control of containment penetrations to verify that the licensee controlled those penetrations in accordance with the refueling operations

technical specifications and could achieve containment closure for required conditions; and,

- The inspectors reviewed fuel handling operations to verify that those operations and related activities were being performed in accordance with technical specifications and approved procedures.

The inspectors reviewed the licensee's plans for changing plant configurations to verify on a sampling basis that technical specifications, license conditions, and other requirements, commitments, and administrative procedure prerequisites were met prior to changing plant configurations. The inspectors reviewed RCS boundary leakage and the setting of containment integrity. The inspectors examined the spaces inside the containment building prior to reactor startup to verify that debris had not been left which could affect performance of the containment sumps.

The inspectors reviewed various problems that arose during the outage to verify that the licensee was identifying problems related to refueling outage activities at an appropriate threshold and entering them in the corrective action program. The inspectors specifically reviewed the plant issues listed below, because these were initiated during the refueling outage and were considered significant:

- S-2001-2905, "A" hot leg RTD throughwall leakage;
- S-2001-2970, Water/oil mixture observed at crankcase air box drain during number 1 EDG test run; and,
- S-2001-3028, "A" RHR pump exhibited low flow and elevated vibration levels during testing.

b. Findings

No findings of significance were identified.

.2 Unit 2 Reactor Vessel Head Inspection Outage

a. Inspection Scope

The inspectors evaluated the licensee's Unit 1 refueling outage activities (November 20 though December 1, 2001). The following activities were reviewed:

- Prior to and during the outage, the inspectors reviewed the licensee's outage risk control plan ("Unit 2 2001 Head Inspection Outage Risk Assessment," rev. 1 and rev. 2 and VPAP-2805, "Shutdown Risk Program," rev. 5) to verify that the licensee had appropriately considered risk, industry experience and previous site specific problems, and to confirm that the licensee had mitigation/response strategies for losses of key safety functions;
- During the cooldown which preceded the outage, the inspectors reviewed portions of the cooldown process to verify that technical specification cooldown restrictions were followed;
- The inspectors confirmed that, when the licensee removed equipment from service, the licensee maintained defense-in-depth commensurate with the outage risk control plan for key safety functions and applicable technical

specifications, and that configuration changes due to emergent work and unexpected conditions were controlled in accordance with the outage risk control plan;

- For selected components which were removed from service, the inspectors examined clearance tags to verify that tags were properly hung and that associated equipment was appropriately configured to support the function of the clearance;
- Reviewed RCS pressure, level, and temperature instruments to verify that those instruments were installed and configured to provide accurate indication and that instrumentation error was accounted for;
- Reviewed the status and configuration of electrical systems to verify that those systems met technical specification requirements and the licensee's outage risk control plan;
- Observed decay heat removal (DHR) parameters to verify that the system was properly functioning;
- Reviewed system alignments to verify that the flow paths, configurations, and alternative means for inventory addition were consistent with the outage risk plan;
- Reviewed selected control room operations to verify that the licensee was controlling reactivity in accordance with the technical specifications; and
- Reviewed the outage risk plan to verify that activities, systems, and/or components which could cause unexpected reactivity changes were identified in the outage risk plan and were controlled accordingly.

The inspectors reviewed the licensee's plans for changing plant configurations to verify on a sampling basis that technical specifications, license conditions, and other requirements, commitments, and administrative procedure prerequisites were met prior to changing plant configurations. The inspectors reviewed RCS boundary leakage and the setting of containment integrity. The inspectors examined the spaces inside the containment building prior to reactor startup to verify that debris had not been left which could affect performance of the containment sumps.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

For the surveillance tests listed below, the inspectors examined the test procedure and either witnessed the testing and/or reviewed test records to determine whether the scope of testing adequately demonstrated that the affected equipment was functional and operable:

- 1-IPT-CC-CW-L-103, "Intake Canal Level Probe 1-CW-LS-103 Time Response Test and Channel Calibration," rev. 5;
- 1-OPT-ZZ-001, "ESF Actuation with Undervoltage and Degraded Voltage-1H Bus," rev. 16-OTO1;

- 1-OPT-FW-003, "Turbine Driven Auxiliary Feedwater Pump 1-FW-P-2," rev. 15;
- 1-OPT-ZZ-002, "ESF Actuation with Undervoltage and Degraded Voltage-1J Bus," rev. 16;
- 1-OPT-EG-001, "Number 1 Emergency Diesel Generator Monthly Start Exercise Test," rev. 17; and,
- 1-OPT-CT-210, "Refueling Containment Integrity," rev. 14.

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed Temporary Modification S2-01-002, "Defeat of an invalid high level alarm for the number 2 emergency diesel generator base tank," to determine whether system operability/availability was affected, that configuration control was maintained, and that the associated safety review adequately justified implementation.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety

2OS1 Access Control To Radiologically Significant Areas

a. Inspection Scope

The inspectors reviewed the licensee's procedures for access control into airborne radioactivity areas, radiation areas, high radiation areas, and very high radiation areas. The procedures were evaluated for consistency with the requirements in 10 CFR 20 for posting, surveying, and controlling access to radiologically significant areas. The inspectors toured the plant to determine whether radiological postings, barricades, and surveys were appropriate and consistent with the licensee's access control procedures for radiologically significant areas. The areas observed included several locked high radiation areas and four active work locations in the Unit 1 Containment Building and eleven locked high radiation areas in the Auxiliary Building. The dose rates at various locations on each elevation in the Unit 1 Containment Building were independently surveyed by the inspectors to determine whether the dose rates were consistent with the dose rates recorded on posted survey maps. Selected Radiation Work Permits (RWPs) typically used for work in radiologically significant areas were evaluated for incorporation of the procedurally established access controls. The RWP specified alarm set points for electronic dosimeters were evaluated for appropriateness with regard to the expected work area dose rates. The licensee's procedurally established access controls for highly

activated non-fuel materials stored in the spent fuel pool were also evaluated by the inspectors for consistency with 10 CFR 20. Access control procedures for very high radiation areas and areas which may become very high radiation areas during changing plant conditions were reviewed and discussed with radiation protection management and supervision. Adherence to access control procedures and RWP specified access controls by radiation workers and radiation protection technicians working at selected job sites were observed by the inspectors. On October 24, 2001, the inspectors attended the pre-job briefing for radiographic testing of the Unit 1 "A" steam generator feedwater line to determine whether access and As Low As Is Reasonable Achievable (ALARA) controls were adequately addressed and consistent with licensee procedures.

The documents examined during the inspection are listed in Attachment 2.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

The plant collective exposure history for the years 1992 through 2000, based on the data reported pursuant to 10 CFR 20.2206 (c), was reviewed and discussed with the licensee. The inspectors observed and evaluated job site implementation of ALARA controls and radiation worker performance at selected high exposure job sites in the Unit 1 Containment Building during the Unit 1 2001 refueling outage (RFO). The work controls established for selected Radiation Work Permits (RWPs) were evaluated by the inspectors for consistency with the ALARA planning and controls prescribed by the ALARA Action Plans for work in the Unit 1 Containment Building. The inspectors also independently verified that the job site dose rates were consistent with the dose rates recorded on the pre-job survey maps for the selected work areas in Unit 1 Containment. Records of year-to-date individual radiation exposures sorted by work groups were examined by the inspectors for significant variations of exposures among workers. Exposure tracking during the Unit 1 outage and records of exposures to declared pregnant workers year-to-date (YTD) 2001 were also reviewed. Incurred exposures were evaluated for consistency with 10 CFR 20 dose limits and the guidance provided in Regulatory Guide 8.29. Selected elements of the licensee's source term reduction and control program were examined to determine whether the program was effective in reducing exposure. Specific areas reviewed included hot spot monitoring and reduction, primary chemistry shut down controls, radiation field monitoring and trending, and temporary shielding. The inspectors evaluated the effectiveness of problem identification and resolution for selected radiation protection related issues. The review included issues identified and entered into the corrective action program during the Unit 2 2000 RFO (October-November 2000) and during July through mid-October 2001. The review also included radiation protection program audits and self assessments performed during 2000 and 2001. The inspectors evaluated that information to determine whether substantive issues were identified, appropriately characterized with regard to safety significance and adequately addressed. Through the above reviews and observations, the licensee's ALARA program implementation and practices were evaluated by the

inspectors for consistency with Technical Specifications and 10 CFR Part 20 requirements.

Documents examined during this inspection are listed in Attachment 2.

b. Findings

No findings of significance were identified.

4 OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Review

“Safety System Unavailability” PI

a. Inspection Scope

The inspectors verified the Safety System Unavailability Performance Indicator for the high head safety injection systems for Units 1 and 2 submitted during the third quarter of 2000 and the first three quarters of 2001. The inspectors also verified the Safety System Unavailability Performance Indicator for the heat removal (Auxiliary Feed Water) system which were submitted during the first three quarters of 2001. To verify the PI data, the inspectors reviewed control room logs, maintenance rule records and searched plant issue reports.

b. Findings

No findings of significance were identified.

4OA5 Other

.1 Review of World Association of Nuclear Operators (WANO) Report

The inspectors and the branch chief reviewed the final WANO report for the January 2001 evaluation. There were no safety significant issues discussed that warranted additional NRC attention.

.2 (Closed) Temporary Instruction 2515/145 "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-01)" - Unit 1

a. Inspection Scope

The inspectors reviewed the licensee’s visual inspection program associated with the Unit 1 reactor Vessel head penetration (VHP) in response to NRC Bulletin 2001-01. The guidelines for the inspection were provided in NRC TI 2515/145. The program review included observation of portions of the remotely monitored VHP examinations, review of qualifications for examination personnel, and review of licensee and contractor

procedures. Discussions were also held with contractor representatives and other licensee personnel.

b. Findings

All the inspection activities associated with TI 2515/145 for Unit 1 are complete. The Office of Nuclear Reactor Regulation (NRR) is reviewing the acceptability of the licensee's Bulletin 2001-01 response, i.e., if the visual inspections performed were qualified visual inspections as described in the Bulletin. Specific inspection results for each item in the TI are discussed below.

- 1) Verification that visual examination was performed by qualified and knowledgeable personnel.

The inspectors reviewed qualification documentation for the licensee personnel responsible for performance of the VT-2 examinations. In addition to the ASME Section XI required training, the inspectors noted that the examination personnel had conducted additional training including site specific procedures for the examinations and formal training depicting the boric action deposits discovered on the VHPs at the Oconee and Crystal River Nuclear Stations. The inspectors interviewed the examination personnel and noted that they were knowledgeable of specialized qualification criteria. All examination personnel were qualified as Level III VT-2.

- 2) Verification that visual examination was performed in accordance with approved and adequate procedures.

The inspectors reviewed Framatome Procedure, 02-6011328-00, "Reactor Head Nozzle Penetration Remote Visual Inspection Plan For Surry Unit 1," and the licensee's VHP inspection procedure 0-NSP-RC-002, "Visual Examination of Reactor Pressure Vessel Head Penetration Nozzles," rev. 0, which were approved by licensee management for use during the VHP visual inspection. The inspectors noted that the approved acceptance criteria and/or critical parameters for VHP leakage were applied in accordance with the procedure.

- 3) Verification that the licensee was able to identify, disposition, and resolve deficiencies.

The inspectors noted that the approved inspection plan specifically described nozzle indexing and provided adequate guidance to ensure that visual examinations included 100% circumferential coverage of each VHP.

- 4) Verification that the licensee was capable of identifying the PWSCC phenomenon described in the bulletin.

Based on the adequate resolution of the remote video examination equipment, the 100% circumferential coverage of each VHP, and the qualification of the examination personnel the inspectors concluded that the licensee was able to, and did identify leakage from VHP nozzles.

- 5) Evaluate condition of the reactor vessel head (debris, insulation, dirt, boron from other sources, physical layout, viewing obstructions).

The inspectors noted examples of leakage sources during the examination process. Significant boron deposits were noted in the vicinity of penetration 27, while popcorn deposits were noted at penetration 40. Debris/insulation/boron deposits were also noted at penetrations 18, 26, 30, 39, 47, 51, 57, 59, 60, 63, 65, and 69 which did not allow for the completion of a qualified visual inspection. During a subsequent visual inspection effort, the licensee was able to remove the debris from penetrations 26, 30, 57, and 60 using low pressure air. A qualified visual inspection was satisfactorily completed on these penetrations. The licensee was able to adequately view the remainder of each of the 65 CRDM nozzles and the reactor head vent nozzle during the visual examinations.

Based on results of the VT-2 examination, the licensee determined that penetrations 18, 27, 39, 40, 47, 51, 59, 63, 65, and 69 required further evaluation. These nozzles were then subjected to additional non-destructive examinations (NDE). Specifically, Ultrasonic examinations (UT) from under the head on the ID of the penetrations and liquid penetrant (PT) examinations of the J-Groove welds (OD) were performed on those nozzles. The inspector reviewed the results of three nozzles (penetration 27, 40, and 65).

Procedure 54-ISI-105-00 was used for axial and circumferential UT scanning of the ID of the nozzles. These mechanized scans used blade probes for inspection of the nozzle ID from the gap between the thermal sleeve and the nozzle. The inspection techniques had been previously demonstrated capable of detecting PWSCC type manufactured cracks as well as cracks from Ocone head penetration samples. The inspectors found that the UT Inspections were being performed in accordance with approved and demonstrated procedures with trained and qualified inspection personnel. All examiners had significant experience, including experience inspecting VHPs.

Additionally, the inspectors reviewed the results of PT examinations of the J-Groove weld of the nozzle for those three penetrations. Several indications which required repairs were identified as the result of those PT examinations.

- 6) Evaluate ability for small boron deposits, as described in the bulletin, to be identified and characterized.

Based on the visual inspection techniques utilized, the licensee was able to detect small boron deposits on the reactor vessel head.

- 7) Determine extent of material deficiencies (associated with the concerns identified in the bulletin) which were identified that required repair.

Following NDE examinations, the licensee determined that repairs of penetrations 18, 27, 40, 47, 65, and 69 were required (NDE results were satisfactory on penetrations 39, 51, 59 and 63). These repairs were conducted in accordance with the methodology referenced in the ASME Section XI relief request submitted to the NRC on October 30, and supplemented on December 3, 2001. The relief request was verbally approved by the Office of Nuclear Reactor Regulation in a phone conversation with the licensee.

- 8) Determine any significant items that could impede effective examinations and/or ALARA issues encountered.

No ALARA issues or examples of significant items that could impede the visual examination process were noted during observation of the visual examinations.

.3 (Closed) TI 2515/145 - Unit 2

a. Inspection Scope

The inspectors reviewed the licensee's visual inspection program associated with the Unit 2 reactor VHP in response to NRC Bulletin 2001-01. The guidelines for the inspection were provided in NRC temporary inspection (TI) procedure TI 2515/145, "Circumferential Cracking of Reactor Pressure Vessel Head Penetration Nozzles (NRC Bulletin 2001-01). The program review included observation of portions of the remotely monitored VHP examinations, review of qualifications for examination personnel, and review of licensee and contractor procedures. Discussions were also held with contractor representatives and other licensee personnel.

b. Findings

All the inspection activities associated with TI 2515/145 for Unit 2 are complete. NRR is reviewing the acceptability of the licensee's Bulletin 2001-01 response, i.e., if the visual inspections performed were qualified visual inspections as described in the Bulletin. Specific inspection results for each item in the TI are discussed below.

- 1) Verification that visual examination was performed by qualified and knowledgeable personnel.

The inspectors reviewed qualification documentation for the licensee personnel responsible for performance of the VT2 examinations. In addition to the ASME Section XI required training, the inspectors noted that the examination personnel had conducted additional training including site specific procedures for the examinations and formal training depicting the boric action deposits discovered on the VHPs at the Oconee and Crystal River Nuclear Stations. The inspectors interviewed the examination personnel and noted that they were knowledgeable of specialized qualification criteria. All examination personnel were qualified as Level III VT-2.

- 2) Verification that visual examination was performed in accordance with approved and adequate procedures.

The inspectors reviewed Framatome Procedure, 02-6011871-00, "Reactor Head Nozzle Penetration Remote Visual Inspection Plan For Surry Unit 2," and the licensee's VHP inspection procedure 0-NSP-RC-002, "Visual Examination of Reactor Pressure Vessel Head Penetration Nozzles," rev. 0, which were approved by licensee management for use during the VHP visual inspection. The inspectors noted that the approved acceptance criteria and/or critical parameters for VHP leakage were applied in accordance with the procedure.

- 3) Verification that the licensee was able to identify, disposition, and resolve deficiencies.

The inspectors noted that the approved inspection plan specifically described nozzle indexing and provided adequate guidance to ensure that visual examinations included 100% circumferential coverage of each VHP. Although the examination procedure provided specific follow-up actions for indications or deficiencies, no indications of leakage were identified during the visual examinations.

- 4) Verification that the licensee was capable of identifying the PWSCC phenomenon described in the bulletin.

Based on the adequate resolution of the remote video examination equipment, the 100% circumferential coverage of each VHP, and the qualification of the examination personnel the inspectors concluded that the licensee would have identified any potential leakage resulting from PWSCC cracking of VHP nozzles.

- 5) Evaluate condition of the reactor vessel head (debris, insulation, dirt, boron from other sources, physical layout, viewing obstructions).

The inspectors noted that no significant examples of insulation, leakage sources, debris, dirt, or other physical impediments impede the examination. The licensee was able to adequately view each of the 65 CRDM nozzles and the reactor head vent nozzle during the visual examinations. The inspectors observed that the licensee used low pressure air to remove small amounts of loose debris at the interface of the reactor head and VHP.

- 6) Evaluate ability for small boron deposits, as described in the bulletin, to be identified and characterized.

Based on the visual inspection techniques utilized, the licensee was able to detect small boron deposits on the reactor vessel head. The inspectors noted that the reactor head was generally clean and free of any significant deposits. Several small loose flakes of paint, debris, boric acid or insulation were found and moved to allow complete viewing during the examinations.

- 7) Determine extent of material deficiencies (associated with the concerns identified in the bulletin) which were identified that required repair.

No examples of VHP leakage or material deficiencies were identified during the visual examinations.

- 8) Determine any significant items that could impede effective examinations and/or ALARA issues encountered.

No ALARA issues or examples of significant items that could impede the visual examination process were noted during observation of the visual examinations.

.4 Radiological Controls for the Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

The inspectors evaluated implementation of selected elements of the licensee's radiological control program for the ISFSI. Those controls were evaluated for conformance with the ISFSI Technical Specifications (TSs) pertaining to dose rates from the spent fuel storage casks and for monitoring radiation dose levels at the ISFSI boundary fence. The inspectors reviewed the licensee's survey reports for the most recent surveys of the casks currently in storage and the boundary fence to determine whether the dose rates were within the TS limits. The inspectors performed independent surveys for the general area gamma and neutron dose rates at the ISFSI boundary fence and for contact dose rates on each cask stored on pad number 1 to determine whether those dose rates were consistent with the licensee's recorded survey results. The inspectors also verified by direct observation that thermoluminescent dosimeters (TLDs) were in place on each side of the ISFSI boundary fence as required by TS. The TLD results for CY 2000 and the first quarter of CY 2001 were reviewed to determine whether the radiation doses at the boundary fence were within TS limits.

Documents and procedures examined during the inspection are listed in Attachment 2.

4OA6 Meetings

Exit Meeting Summary

The inspectors presented the inspection results to Mr. Blount and to Mr. Turko and other members of licensee management on January 14 and 28, 2002, respectively.

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

4OA7 Licensee Identified Violation

The following finding of very low significance was identified by the licensee and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

<u>NCV Tracking Number</u>	<u>Requirement Licensee Failed to Meet</u>
NCV 50-280/01004-01	Technical Specifications 6.4.A.8 requires detailed written procedures be provided for Refueling Operations. Technical Specification 6.4.D requires that procedures described in Specification 6.4.A shall be followed. On November 11, 2001, the licensee failed to follow procedure 0-OP-4.8, in that the transfer of a spent fuel assembly was initiated prior to clearing the top of its storage position. This issue has been documented in the licensee's corrective action program as Plant Issue S-2001-3275. (No Color)

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Adams, Manager, Engineering
R. Allen, Manager, Maintenance
R. Blount, Site Vice President
M. Crist, Manager, Nuclear Oversight
B. Foster, Director, Nuclear Station Safety and Licensing
D. Llewellyn, Manager, Training
M. Small, Supervisor, Licensing
T. Sowers, Director, Nuclear Station Operations and Maintenance
T. Steed, Manager, Radiological Protection
J. Swintoniewski, Manager, Operations
E. Turko, Supervisor, Station Nuclear Safety

NRC

K. Landis, Chief, Branch 5, Division of Reactor Projects, Region II

ITEMS OPENED AND CLOSED

Opened and Closed

50-280/01004-01 NCV failure to refueling procedure (Section 40A7)

Closed

2515/145 - Unit 1 TI Circumferential Cracking of Reactor Pressure Vessel
Head Penetration Nozzles (Section 40A5.2)

2515/145 - Unit 2 TI Circumferential Cracking of Reactor Pressure Vessel
Head Penetration Nozzles (Section 40A5.3)

LIST OF DOCUMENTS REVIEWED

Section 2OS1:

VPAP-2101, rev. 18, Radiation Protection Program
C-HP-1032.060, rev. 0, Radiological Posting and Access Control
C-HP-1061.110, rev. 1, Radiological Control Areas
HPAP-1032, rev. 3, Radiological Survey Program
HP-1071.020, rev. 1, Controlling Contaminated Material
2001 Surry Fall Refueling Outage Radiography
RWP Nos. 2009, 2011, 2017, 2020, 2025, 2101, 2103, and 2107

Section 2OS2:

HPAP-2802, rev. 1 NRC Performance Indicator Program
VPAP-2102, rev. 8 Station ALARA Program
VPAP-2105, rev. 5 Temporary Shielding Program
C-HP-1091.251, rev. 0, ALARA Program: Surveillance and Evaluations
C-HP-1061.120, rev. 0, Hot Particle Control
CH-93.120, rev. 14, Chemistry Shutdown Controls
C-HP-1041.024, rev. 1, Declared Pregnant Woman
Surry Power Station Radiological Protection Department "Plant Issue Trend First Quarter 2001"
(Self assessment / audit) 5/9/2001
Surry Power Station Radiological Protection Department "Plant Issue Trend Second Quarter
2001" (Self assessment / audit) 7/24/2001
Audit 01-07: "Radiological Protection / Chemistry" (Surry and North Anna)
Surry Power Station Radiation Protection Job Guideline "Dose Rate Trending Program"
rev. 0
ALARA Coordinating Committee "Five Year ALARA Plan"
Memorandum POW 36-76 E.C. Frese to T.F. Steed and D.D. Brock 12/8/2000 "Surry Unit 2
End of Cycle 16 Early Boration Evaluation"
Memorandum POW 36-76 E.C. Frese to W.A. Thornton 6/6/2000 "Surry Unit 1 End of Cycle 16
Early Boration Evaluation"
ALARA Memorandum Leonard Rollins to Distribution 6/18/2001 "Hot Spot Reduction"
Memorandum L. Rollins to Distribution 7/12/2001 "Dose Rate Trending Program"
ALARA Program Evaluation 7/1998-6/2001 Attachment 1 to procedure C-HP-1091.251,
"Station ALARA Program" Surry Power Station Self Assessment

Section 4OA5.4:

Technical Specifications License Number SNM-2501 (ISFSI)
Surry ISFSI SAR Amendment 14
Health Physics Periodic Test, rev. 8, "Independent Spent Fuel Storage Installation (ISFSI)
Radiological Surveillance" 0-HPT-ISFSI-001
Radiation Protection Job Guidelines "Spent Fuel Loading"