UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
SAM NUNN ATLANTA FEDERAL CENTER
61 FORSYTH STREET SW SUITE 23T85
ATLANTA, GEORGIA 30303-8931

January 26, 2004

Virginia Electric and Power Company
ATTN: Mr. David A. Christian
Sr. Vice President and
Chief Nuclear Officer
Innsbrook Technical Center - 2SW
5000 Dominion Boulevard
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION - NRC INTEGRATED INSPECTION REPORT NOS. 05000280/2003005 AND 05000281/2003005

Dear Mr. Christian:

On December 27, 2003, the US Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station, Units 1 and 2. The enclosed integrated inspection report documents the inspection findings which were discussed on January 8, 2004, with Mr. Blount and other members of your staff.

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

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green). This issue was determined to involve a violation of NRC requirements. However, because of its very low safety significance and because it had been entered into your corrective action program, the NRC is treating this issue as a Non-Cited Violation in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny this non-cited violation you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the United States Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to the Regional Administrator, Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Surry Power Station.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) 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/

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

Docket Nos.: 50-280, 50-281
License Nos.: DPR-32, DPR-37

Enclosure: Integrated Inspection Report 05000280, 281/2003005
w/Attachment: Supplemental Information

cc w/encl:
Chris L. Funderburk, Director
Nuclear Licensing and
Operations Support
Virginia Electric & Power Company
Electronic Mail Distribution

Richard H. Blount, II
Site Vice President
Surry Power Station
Virginia Electric & Power Company
Electronic Mail Distribution

Virginia State Corporation Commission
Division of Energy Regulation
P. O. Box 1197
Richmond, VA 23209

Lillian M. Cuoco, Esq.
Senior Counsel
Dominion Resources Services, Inc.
Electronic Mail Distribution

Attorney General
Supreme Court Building
900 East Main Street
Richmond, VA 23219

Distribution w/encl:
C. Gratton, NRR
L. Slack, RII EICS
T. Sullivan, NRR (Section 4OA5.5 only)
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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-280, 50-281

License Nos.: DPR-32, DPR-37

Report Nos.: 05000280/2003005, 05000281/2003005

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 & 2

Location: 5850 Hog Island Road
Surry, VA 23883

Dates: September 28 - December 27, 2003

Inspectors: G. McCoy, Senior Resident Inspector
D. Arnett, Project Engineer (Section 1R16)
R. Chou, Reactor Inspector (Section 1R08.1)
J. Canady, North Anna Resident Inspector (Sections 1R01.2, 1R04.1, 1R13, 1R22)
B. Desai, Project Engineer (Sections 1R04.2, 1R05)
L. Garner, Senior Project Engineer (Sections 1R13, 4OA1.1, 4OA3, 4OA5.5)
R. Hamilton, Health Physicist (Section 2OS1)
J. Kreh, Health Physicist (Section 4OA1.2)
J. Lenahan, Senior Reactor Inspector (Sections 1R08.2, 1R08.3, 4OA5.2, 4OA5.3, 4OA5.4)
M. Morgan, North Anna Senior Resident Inspector (Sections 1R04.1, 1R05, 1R13)
E. Testa, Senior Health Physicist (Sections 2OS1, 2OS2, 2PS2)
K. Van Doorn, Senior Reactor Inspector (Section 4OA5.1)

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

CONTENTS

SUMMARY OF FINDINGS

IR 05000280/2003005, IR 05000281/2003005, 9/28/2003 - 12/27/2003; Surry Power Station Units 1 & 2; Inservice Inspection Activities, Integrated Resident Inspector Report.

This report covers a three month period of inspection by resident inspectors, project engineers, health physicists, and senior reactor inspectors. One green non-cited violation (NCV) was identified. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using IMC0 609, “Significance Determination Process,” (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC’s program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC Identified and Self-Revealing Findings

Cornerstone: Barrier Integrity

- Green The inspectors identified a non-cited violation of 10 CFR 50.55a.(b)(2)(ix), for failure to examine the metal liner of the Unit 2 concrete containment in accordance with Subsection IWE of Section XI of the 1992 Edition with the 1992 Addenda of the ASME Code

  Failure to perform inspections of containment moisture barriers, failure to identify defective areas in the moisture barrier, and failure to correct the defects were of greater than minor significance because they could lead to more significant degradation of the containment. The licensee’s inspection procedures were not adequate to identify the degraded moisture barrier and the condition may not have been identified because the licensee’s inspection program was pre-conditioned based on the details shown on drawings and not actual observations. Degradation of the moisture barrier had the potential to permit moisture intrusion into inaccessible areas of the pressure retaining surfaces of the containment liner. The performance deficiency was of very low safety significance because sufficient corrosion of the containment vessel had not occurred to cause an open pathway in the physical integrity of the containment. (Section 1R08.3)

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

Unit 1 started the report period at full power. On October 12, 2003 the unit was shutdown to replace the A main transformer. The unit was restarted on October 20, 2003, and reached full power on October 22, 2003. The unit operated at full power for the remainder of the inspection period.

Unit 2 started the report period in a refueling outage. The unit was restarted on December 1, 2003 and reached full power on December 5, 2003. The unit operated at full power for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection

.1 Hurricane Preparations

a. Inspection Scope

On July 11, 2003, early in the hurricane season, inspectors conducted a tour of all the owner-controlled areas. The purpose of the tour was to evaluate the licensee's preparedness for high winds and hurricane conditions well in advance of the approach of any hurricanes. Emphasis was placed on the identification of any loose material which would become airborne hazards to either the plant or the switchyard during high winds. Inspectors toured the low level, the construction buildings, the sewage treatment plant, the area outside the warehouse, and the vicinity of the gas turbines at Gravel Neck.

b. Findings

No findings of significance were identified.

.2 Cold Weather Preparations

a. Inspection Scope

The inspectors evaluated the implementation of cold weather procedures and performed a walkdown of instrumentation associated with two Unit 1 risk significant systems. The systems assessed for cold weather preparation were the refueling water storage tank (RWST) and the auxiliary feedwater (AFW) system. The instrumentation associated with these systems have the potential of being adversely affected by extreme cold weather conditions. The inspectors verified that the interior of insulated boxes constructed around the level transmitters for the RWST were free of debris, did not have leaks, and had intact insulation. Additionally, the inspectors verified that the

instrumentation near the louvers for the AFW pumps in the Unit 1 safeguards building was properly insulated.

The following documents were reviewed:

- 0-OSP-ZZ-001, “Cold weather preparation;”
- OC-21, “Severe weather checklist;” and
- 0-EPM-1303-01, “Freeze protection inspection.”

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment

.1 Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial walkdowns of the following systems to verify correct system alignment. The inspectors checked for correct valve and electrical power alignments by comparing positions of valves, switches, and breakers to the procedures and drawings listed in the Attachment. Additionally, the inspectors reviewed the corrective action system to verify that equipment alignment problems were being identified and properly resolved. The documents reviewed are listed in the attachment to this report.

- Unit 1 AFW system while the Unit 2 AFW cross-connect was tagged out for maintenance.
- Unit 1 B and C high head safety injection trains while crosstie capability from Unit 2 was unavailable.
- Unit 1 charging pump service water system.

b. Findings

No findings of significance were identified.

.2 Detailed Walkdown

a. Inspection Scope

The inspectors performed a detailed walkdown of the low level and the high level intake structures to determine if the system was capable of performing the intended safety function. The low level intake structure serves as the suction source for the emergency service water pumps, and serves as the inlet for the plant’s ultimate heat sink. The low level intake structure houses the intake screens, the screen wash pumps, the circulating water pumps, and the emergency service water pumps. The walkdown of the intake structure included a configuration verification of these systems, review of the material condition of the system, review of recent maintenance related problems associated with

the system, review of the ongoing corrective maintenance as a result of the effects of Hurricane Isabel, and a discussion of the system status with the system engineer. The documents reviewed are listed in the attachment to this report.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

a. Inspection Scope

The inspectors conducted a tour 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 Surry Power Station Appendix R Report.

- Units 1 and 2 emergency switchgear rooms,
- Units 1 and 2 normal switchgear rooms,
- Units 1 and 2 cable vaults and tunnel,
- Number 1 emergency diesel generator room,
- Main control room, and
- Units 1 and 2 cable spreading rooms.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities

.1 Steam Generator Inspection

a. Inspection Scope

The inspectors reviewed the implementation of the licensee's inservice inspection program for monitoring Unit 2 "B" steam generator (SG), a reactor coolant system (RCS) boundary component. The inspectors reviewed Surry Unit 2 - Fall 2003 SG Monitoring Program Pre-Outage Assessment. The inspectors observed the data acquisition and analyses and reviewed selected inspection records for SG tubes Eddy current examination (ET). The inspectors observed the data analyses including primary, secondary, resolution, and comparison analyses with the previous records. The inspectors reviewed activities to determine that the ET consistently detected previously identified tube imperfections such as dents, pitting, cold leg tube thinning, tube wear, and manufactured burnish marks at the expected locations. The ET inspection methods included Bobbin and Rotating Coils. The inspectors also reviewed Qualification and certification records for examiners.

The above examinations and records were compared to the Technical Specifications (TS), License Amendments and applicable industry established performance criteria to verify compliance.

b. Findings

No findings of significance were identified.

.2 Surry Unit 2 Refueling Outage

a. Inspection Scope

The inspectors reviewed selected Inservice Inspection (ISI) records. The observations and records were compared to the TS and the applicable Code (ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition, with no Addenda) to verify compliance.

The inspectors reviewed non-destructive examination (NDE) reports for the following ISI examinations completed during the Fall, 2003 outage:

- Visual (VT-1) exam report for HL & CL manway nuts and bolts on 2-RC-E-1C, and weld H001-1 on 6" CC-159-151
- Visual (VT-3) exam reports for hydraulic snubbers 2-RH-HSS-027 and 2-RH-HSS-101, spring cans H001A, H002A & B on 12" RC-310-2501R, and spring cans H002, H003, & H004 on 18" CC-14-121
- MT exam report for weld 1-18 on 14" WFPD-109-601
- Visual (VT-1) exam reports 1404, 1423 through 1430, 1432, 1442, & 1443, Augmented Exams of sensitized stainless steel piping
- UT exam report, Augmented Exams, 14 inch ASME Class 2, feedwater pipe welds, weld numbers 1-02, 1-03, and 1-04 on 14" WFPD-113-601
- PT/UT exam report , Augmented Exams, weld numbers 1-12 and 1-13 on 4" RC-314-1502
- Records for repair of indications on heat exchanger 2-RH-E-1A
- Records for replacement of valve number 02-CH-MOV-2287C, on 3-CH-371-1503
- Pre-service PT/VT inspections for weld numbers 0-03A, 0-04A, and 0-05A, on 3-CH-371-1503

Qualification and certification records for examiners, and equipment for selected examination activities were reviewed. A sample of ISI issues in the licensee's corrective action program were reviewed for adequacy. In addition, the inspectors examined snubbers on pipe supports during a walkdown of the Unit 2 containment building. Examination of the snubbers included attachment to supporting structures and piping, fluid levels in reservoirs, absence of fluid leakage from the snubbers, and overall condition of the snubbers.

b. Findings

No findings of significance were identified.

.3 IWE Containment Vessel Inspection

a. Inspection Scope

The inspectors reviewed the licensee's ISI procedures for the containment inspection to determine if the procedures complied with the TS, ASME Boiler and Pressure Vessel Code, Article IWE of Section XI, 1992 Edition and 1992 Addenda, and 10 CFR 50.55a. The inspectors also reviewed records documenting visual inspections performed on the containment building in October 2000, April 2002 and November 2003 to determine if the licensee program for inspection of the containment was being performed in accordance with the requirements specified in Article IWE of Section XI, 1992 Edition and 1992 Addenda, and 10 CFR 50.55a. The inspectors examined the interior surfaces of the containment liner and the moisture barrier at the intersection of the liner and interior concrete floor area.

b. Findings

Introduction

A finding of very low safety significance (Green) was identified by the inspectors involving the identification and correction of a degraded condition in the Unit 2 containment building. This finding was also a non-cited violation of 10 CFR 50.55a(b)(2)(ix), for failure to apply Subsection IWE of Section XI of the 1992 Edition with the 1992 Addenda of the ASME Code to examine the metal liner of the Unit 2 concrete containment.

Description

During examination of the interior surfaces of the containment metal liner, the inspectors identified several areas with degraded coatings and rust on the containment liner at the interface of the metal liner and interior concrete floor at elevation (-) 27' - 7" between column lines C-6 and C-9. Other small areas with degraded coatings were also identified at this interface between column lines C-9 and C-12, and column lines C-1 through C-6. The inspectors also identified that the moisture barrier at the interface between the metal liner plate and interior concrete floor was degraded. Review of the records of previous inspections performed by licensee personnel in 2000, 2002 and 2003 disclosed that the licensee had not identified the degraded moisture barrier, but had identified the degraded coatings. When questioned by the inspectors, licensee personnel indicated that there was no moisture barrier at the concrete - metal liner interface, and provided the original construction drawing, Drawing No. 11448-FC-15B, Foundation Mat Details El (-) 29' -7" Reactor Containment, Surry Power Station, and UFSAR Figure 15.5-1 to the inspectors as evidence that the concrete floor slab was in direct contact with the liner plate, with no gap between the metal liner and concrete. Based on this drawing they concluded that a moisture barrier did not exist. Personnel who performed the inspections stated that there was no moisture barrier present, based on the drawing details, and expressed that what the inspectors observed was a thick layer of protective coatings (gray paint) on the concrete floor which had accumulated at the concrete - liner interface area. Licensee engineers accompanied the inspectors on a walkdown inspection of the Unit 2 containment. The inspectors showed the moisture

barrier to the licensee engineers. Licensee engineers removed a few small sections of the unidentified materials and confirmed that it was a caulking type material. The inspectors noted that the caulking covered a small gap which existed between the metal liner and concrete. That is, the caulking materials sealing the gap served as a moisture barrier. The inspectors identified that the moisture barrier (caulking) was degraded and required repairs in several areas. The purpose of the moisture barrier is to prevent intrusion of water into inaccessible areas, such as the gap between the liner and concrete floor. Water intrusion could cause corrosion of the embedded sections of the containment liner, which is an inaccessible area as defined in Article IWE-1232(a).

Analysis

This issue was considered a performance deficiency affecting the Barrier Integrity cornerstone and was of greater than minor significance because if left uncorrected, the failure to inspect the moisture barrier and correct defects could lead to more significant degradation of the containment. The licensee's inspection procedures were not adequate to identify the degraded moisture barrier and the condition may not have been identified because the licensee's inspection program was pre-conditioned based on the details shown on Drawing No. 11448-FC-15B and UFSAR Figure 15.5-1 and not actual observations. The failure to conduct examinations of the containment moisture barriers, identify the degraded moisture barrier that was identified by the inspectors, and correct the deficiencies were of very low safety significance (Green) because the existing corrosion did not result in an actual open pathway in the physical integrity of the containment.

Enforcement

The failure to examine, identify defects, and repair the degraded moisture barrier was identified as a violation of 10 CFR Part 50.55a(b)(2)(ix), for failure to examine the metal liner of the Unit 2 concrete containment in accordance with the requirements of Subsection IWE of Section XI of the 1992 Edition with the 1992 Addenda of the ASME Code. Subsection IWE of Section XI of the 1992 Edition with the 1992 Addenda of the ASME Code specifies the requirements for visual examination and inservice inspection of the metal liner of concrete containments. Article IWE-2500 requires examination methods to comply with those tabulated in Table IWE-2500. Under Table IWE 2500-1, Item number E1.30 requires a visual inspection of moisture barriers at containment-to-metal interfaces. The containment moisture barrier materials include caulking, flashing, and other sealants used for this application. The specified acceptance standard is IWE-3510. Article IWE-3510.4 specifies visual examination of moisture barriers for wear, damage, erosion, tear, surface cracks, or other defects that permit intrusion of moisture against inaccessible areas of the pressure retaining surface of the containment liner, and requires the correction of any identified defects to the moisture barrier. Contrary to this requirement, the licensee failed to perform visual examinations of moisture barriers, failed to identify defective areas in the moisture barrier, and failed to correct the defects.

As a result of the inspectors' discovery on November 6, 2003, the licensee initiated PI S-2003-5350 indicating that the condition was a condition adverse to quality. However, because the violation was of very low safety significance and was entered into the licensee's corrective action program, the violation is being treated as a non-cited

violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy, and is identified as NCV 05000281/2003005-01, Violation of 10 CFR 50.55a(b)(2)(ix) for Failure to Perform Examinations of the Unit 2 Containment in Accordance with Requirements of Subsection IWE of ASME Section XI.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator performance during simulator training session RQ-03.7-ST-H-2.1 to determine whether the operators:

- were familiar with and could successfully implement the procedures associated with recognizing and recovering from a main steam line break, a loss of condenser vacuum and a loss of secondary heat sink;
- 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 Effectiveness

a. Inspection Scope

For the equipment issues described in the plant issues listed below, the inspectors evaluated the licensee's effectiveness of the corresponding preventive and corrective maintenance. For each selected item below, the inspectors performed a detailed review of the problem history and surrounding circumstances, evaluated the extent of condition reviews as required, and reviewed the generic implications of the equipment and/or work practice problem. Inspectors performed walkdown of the accessible portions of the system, performed in-office reviews of procedures and evaluations, and held discussions with system engineers. Inspectors compared the licensee's actions with the requirements of the Maintenance Rule (10 CFR 50.65) VPAP 0815, "Maintenance Rule Program," and the Surry Maintenance Rule Scoping and Performance Criteria Matrix.

- Plant Issue S-2003-4179, "Damage to low level traveling screens during hurricane Isabel;"
- Plant Issue S-2003-2379, "Failure of the C emergency diesel generator fuel oil pump (1-EE-P-1C) to start;" and
- Plant Issues S-2003-3807 and S-2003-3875, "Oil leakage from Unit 2 A coolant charging pump (2-CH-P-1A)."

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Evaluations

a. Inspection Scope

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

- Unit 1 risk while Unit 2 was defueled and the Unit 2 turbine driven AFW pump (2-FW-P-2), Unit 2 A motor driven AFW pump (2-FW-P-3A), Unit 2 charging system cross connect to Unit 1 (2-CH-447), A and C emergency service water pumps (1-SW-P-1A, 1-SW-P-1C), B auxiliary building filtered exhaust fan (1-VS-F-58B), and the Unit 2 A battery (2-EPD-B-2A) were out of service (OOS) for maintenance;
- Unit 1 risk while Unit 2 was defueled and the Unit 2 turbine driven AFW pump (2-FW-P-2), A emergency service water pump (1-SW-P-1A), Unit 1 turbine driven AFW pump (1-FW-P-2), and the Unit 2 charging system cross connect to Unit 1 (2-CH-447) was out of service for maintenance while the number 1 emergency diesel generator (1-EE-EG-1) and unit 1 A charging pump (1-CH-P-1A) were OOS for testing;
- Unit 2 instrument air compressor (2-IA-C-1), Unit 2 turbine driven AFW pump (2-FW-P-2), Unit 2 C charging pump (2-CH-P-1C), Unit 2 charging system cross connect to Unit 1 (2-CH-447), and Unit 1 Screen well transformer (1-EP-TX-1G) OOS for maintenance during the performance of switchyard maintenance (SWT345) and planned maintenance on the station blackout diesel (0-OSP-AAC-001);
- The Unit 1 A charging pump (1-CH-P-1A) OOS for seal maintenance (emergent work) while the Unit 1 A motor driven AFW pump (1-FW-P-3A) was OOS for testing and both the Unit 1 CC heat exchanger (1-CC-E-1A) and the A control room chiller (1-VS-E-4A) was OOS for planned maintenance; and
- Scope expansion of service water strainer clearance to include the removal of the entire 2A service water header.

b. Findings

No findings of significance were identified.

1R14 Personnel Performance During Nonroutine Plant Evolutions

a. Inspection scope

After the Unit 2 refueling outage, inspectors observed the reactor startup and control rod testing. This evolution was significant because of the installation of a new reactor vessel head and new control rod drive mechanisms. The inspectors observed operator performance, reviewed operator logs, plant computer data, and strip charts to evaluate operator performance and to verify that the response was in accordance with plant procedures.

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 (PI) listed below:

- PI S-2003-4965, “Bushing failure on the Unit 1 turbine drivenAFW pump discharge valve for the B header (1-FW-140);
- PI S-2003-4473, “High vibrations in the upper motor bearing on the Unit 2 B low head safety injection pump (2-SI-P-1B);”
- PI S-2003-5435, “Oil pressure oscillations and air entrained in the oil on the Unit 2 A charging pump (2-CH-P-1B);”
- PI S-2003-5829, “Control of AFW flow to the steam generators when one emergency bus is de-energized.;” and
- PI S-2003-4034, “Excessive gas buildup in the oil of the Unit 1 A main transformer (1-EP-TX-1A).”

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 as of July 3, 2003, to assess the cumulative effects of operator workarounds on the reliability, availability, and potential for mis-operation of a system to verify that there was no increase in overall plant risk. This assessment included increases of initiating event frequencies, effects on multiple mitigating systems, and the ability of operators to correctly respond to abnormal plant conditions.

b. Findings

No findings of significance were identified.

1R17 Permanent Plant Modifications

a. Inspections Scope

The inspectors evaluated the design change package (DCP) for a modification to the low head safety injection (LHSI) pump in the mitigating system cornerstone area. DCP 03-080 added vibration damping supports to the LHSI pump and piping systems. Inspectors verified the following attributes:

- Materials
- Equipment protection
- Structural

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed the post maintenance test procedures and activities associated with the repair or replacement of the following components to determine whether the procedures and test activities were adequate to verify operability and functional capability following maintenance of the following equipment:

- Work Order (WO) 427358, “Replacement of the Unit 2 B main battery (2-EPD-B-2B);”
- WO 493509, “Replacement of the Unit 2 A motor driven AFW pump;”
- WO 500978, “Replacement of plant protection relays AFP1-XB and SV1-XB;”
- WO 495592, “Replacement of thermostat on C control room chiller (1-VS-E-4C);” and
- WO 483558, “Inspection of the thrust bearing on 1-CH-P-1C.”

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

.1 Unit 2 Refueling Outage

a. Inspection Scope

The inspectors performed the inspection activities described below for the Unit 2 refueling outage that began on September 18, 2003, and ended December 5, 2003.

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

During the outage, the inspectors:

- Reviewed RCS pressure, level, and temperature instruments on a random basis to verify that the instruments were configured to provide accurate indication and that allowances were made for instrumentation errors;
- Reviewed the status and configuration of electrical systems on a random basis to verify that those systems met TS requirements and the licensee's outage risk control plan;
- Observed decay heat removal (DHR) parameters on a random basis to verify that the system was properly functioning and providing cooling to the core;
- 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 that containment closure could be achieved when required; 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 TS, 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.

b. Findings

No findings of significance were identified.

.2 Unit 1 Transformer Replacement Outage

a. Inspection Scope

The inspectors performed the inspection activities described below for the Unit 1 forced outage to replace the A main transformer. The outage began on October 12, 2003 and ended on October 20, 2003.

The inspectors confirmed that, when the licensee removed equipment from service, the licensee maintained defense-in-depth for key safety functions and applicable TS, and that configuration changes due to emergent work and unexpected conditions were controlled to minimize total plant risk.

During the outage, the inspectors:

- 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 TS requirements and the licensee's outage risk control plan;
- Reviewed selected control room operations to verify that the licensee was controlling reactivity in accordance with the technical specifications;
- Reviewed the daily risk evaluations to verify that activities, systems, and/or components which could cause unexpected reactivity changes were identified in the risk analysis and were controlled accordingly;

The inspectors reviewed the licensee's plans for changing plant configurations to verify on a sampling basis that TS, license conditions, and other requirements, commitments, and administrative procedure prerequisites were met prior to changing plant configurations.

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.

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:

- 2-OPT-SI-014, “Cold shutdown test of SI check valves to RCS hot and cold legs;”
- 2-EPT-0106-07, “Main station battery 2B performance test;”
- 2-OPT-FW-001, “Motor driven auxiliary feedwater pump 2-FW-P-3A performance test;” and
- 2-OPT-CT-201, “Containment isolation valve leak rate test.”

b. Findings

No findings of significance were identified.

1R23 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the temporary modifications listed below. The inspectors verified that the temporary modification did not affect system operability or availability, that the modification was properly installed and properly identified, and that the licensee evaluated the combined effects of all outstanding modifications. The inspectors also evaluated the associated safety evaluations to verify that they adequately justified implementation.

- SC-03-001 - Compensatory Measures for 1J/2J Switchgear Fire Event, and
- SC-03-002 - Control of Auxiliary Feedwater to Steam Generators with One Emergency Bus De-energized.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety , Public Radiation Safety

2OS1 Access Controls To Radiologically Significant Areas

a. Inspection Scope

Access Controls. Licensee program activities for monitoring workers and controlling access to radiologically significant areas and tasks were inspected. The inspectors evaluated procedural guidance; directly observed implementation of administrative and established physical controls; assessed worker exposures to radiation and radioactive material; and appraised radiation worker and technician knowledge of, and proficiency in implementing Radiation Protection (RP) program activities.

During the onsite inspection, radiological controls for maintenance activities were observed and discussed. The inspectors evaluated the preparation, planning, and implementation of controls for the disassembly of the old reactor head removal and

replacement. The inspectors directly observed the radiation protection activities associated with the Unit 2 reactor head replacement.

Occupational workers' adherence to selected Radiation Work Permits (RWPs) and Health Physics Technician proficiency in providing job coverage were evaluated through direct observations, review of selected exposure records and investigations, and interviews with licensee staff. Occupational exposure data associated with potential radioactive material intakes, and from exposure to direct radiation sources and to discrete radioactive particles or dispersed skin contamination events identified from document review, were reviewed and assessed independently.

RP program activities were evaluated against 10 CFR 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; Updated Final Safety Analysis Report (UFSAR) details in Section 11, Radioactive Waste Management and Section 12, Radiation Protection; Technical Specification Sections 5.41, Procedures, and 5.7, High Radiation Area; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the report Attachment.

Independent Spent Fuel Storage Installation (ISFSI). Access controls and surveillance results for the licensee's ISFSI activities were evaluated by the inspectors. The evaluation included review of ISFSI radiation control surveillance procedures and assessment of ISFSI radiological surveillance data. During tours of the ISFSI cask storage facilities, the inspectors observed access controls, thermoluminescent dosimeter locations, material condition, and radiological postings on the perimeter security fence. The inspectors conducted independent radiation surveys of the ISFSI general areas and casks currently stored on the two Storage Pads. Survey results were compared to current licensee survey data.

Program guidance, access controls, postings, equipment material condition and surveillance data results were reviewed against details documented in applicable sections of the UFSAR; 10 CFR Parts 20 and 72; and applicable licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in Section 2OS1 of the report Attachment.

Problem Identification and Resolution. Licensee Corrective Action Program (CAP) Plant Issues Process (PIPs) documents associated with radiological controls, personnel monitoring, and exposure assessments were reviewed and discussed with responsible licensee representatives. The inspectors assessed the licensee's ability to identify, characterize, prioritize, and resolve identified issues in accordance with applicable Station Administrative Procedures. Corrective Action documents reviewed and evaluated in detail for these program areas are identified in Section 2OS1 of the report Attachment.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls

a. Inspection Scope

As Low As Reasonably Achievable (ALARA). The inspectors evaluated ALARA program guidance and its implementation for ongoing job tasks during the Unit 2 refueling/reactor head replacement outage. The inspectors reviewed, and discussed with licensee staff, ALARA planning, dose estimates, and prescribed ALARA controls for selected outage work activities expected to incur significant collective doses. Those activities included dismantling of the old reactor head, insulation removal/replacement, scaffold installation/removal, nondestructive examination inspections, reactor coolant pump motor and seal maintenance inside containment, air-operated valve maintenance, and motor-operated valve maintenance. Also reviewed were the implementation of dose-reduction initiatives for high person-rem-expenditure tasks and assessment of the effectiveness of source-term reduction efforts. These elements of the ALARA program were evaluated for consistency with the methods and practices delineated in applicable licensee procedures.

The implementation and effectiveness of ALARA planning and program initiatives during work in progress were evaluated. The inspectors made direct field or closed-circuit-video observations of work activities involving the containment recirculation spray sump, the disassembly of the old reactor head, the reactor head upper internals lift, and a reactor coolant filter replacement. Projected dose expenditure estimates detailed in current ALARA planning documents were compared to actual dose expenditures, and noted differences were discussed with cognizant ALARA staff. Changes to dose budgets relative to changes in job scope also were discussed. The inspectors attended pre-job briefings and evaluated the communication of ALARA goals, RWP requirements, and industry lessons-learned to job crew personnel. In addition, the inspectors reviewed internal dosimetry assessments for adequacy of respiratory protection and engineering controls.

Implementation and effectiveness of selected program initiatives with respect to source-term reduction were evaluated. Shutdown chemistry program implementation and the resultant effect on containment and auxiliary building dose rate trending data were reviewed and discussed with the ALARA Coordinator. The inspectors reviewed the licensee's process for generating and evaluating shielding requests. The effectiveness of selected shielding packages installed for the current outage was assessed from a review of survey records.

The plant collective exposure history for the years 2000 through 2002, based on the data reported to the NRC pursuant to 10 CFR 20.2206 (c), was reviewed and discussed with licensee staff, as were established goals for reducing collective exposure. The inspectors examined the dose records of the three declared pregnant workers during 2003 to evaluate current gestation dose. The applicable RP procedure was reviewed to assess licensee controls for declared pregnant workers.

RP program activities and their implementation were evaluated against 10 CFR 19.12; 10 CFR Part 20, Subparts B, C, F, G, H, and J; and approved licensee procedures. In addition, licensee performance was evaluated against Regulatory Guide (RG) 8.8,

Information Relevant to Ensuring that Occupational Radiation Exposures at Nuclear Power Stations will be As Low As Reasonably Achievable, and RG 8.13, Instruction Concerning Prenatal Radiation Exposure. Procedures and records reviewed within this inspection area are listed in Section 2OS2 of the report Attachment.

Problem Identification and Resolution. Five licensee PIPs associated with ALARA activities were reviewed and assessed. The inspectors evaluated the licensee's ability to identify, characterize, prioritize, and resolve the identified issues in accordance with procedure VPAP-1601, Corrective Action. Documents reviewed are listed in Section 2OS2 of the report Attachment.

b. Findings

No findings of significance were identified.

2PS2 Radioactive Material Processing and Transportation

a. Inspection Scope

Radioactive Material Processing. Inspectors reviewed and assessed the solid radioactive waste systems descriptions in UFSAR and current radiological effluent release documentation on quantities and types of radioactive waste disposed.

Inspectors reviewed the radioactive waste (Radwaste) stream analysis data generated pursuant to 10 CFR 61 for various waste types shipped for disposal. A listing of all 10 CFR 61 samples shipped between 3/1/2001 and 4/29/2003 was reviewed to determine if all normal waste streams were being routinely sampled. For each waste stream, scaling factors were reviewed for consistency between samples, appropriate nuclide selection for scaling factors and inclusion of hard to detect and transuranic nuclides.

Inspectors walked down the liquid and solid radioactive waste processing systems. The configurations of these systems were compared to UFSAR and Process Control Program (PCP) descriptions. Radwaste Supervision was interviewed to determine operational status of various processing systems, any recent process or equipment changes and the status of equipment no longer being used. The material condition of the systems, as well as of supporting ventilation and air cleaning systems was discussed with Radwaste Supervision.

Transportation. Inspectors selected six non-exempt shipments and reviewed the shipping documentation for compliance with NRC and DOT requirements. This review included vehicle checklists, NRC Forms 540 and 541 as applicable, vehicle inspection checklists, radiological surveys and assay data, driver special instructions and emergency response information. The radionuclide contents indicated on the manifests were compared to the relative abundances of hard to detect and transuranic nuclides documented in the 10 CFR 61 waste stream analyses. This comparison was to determine if the hard to detect and transuranic nuclides had been included by the application of scaling factors.

Inspectors observed a receipt inspection performed on a vehicle bringing equipment onsite. Subsequently, the inspectors observed the preparation of an outgoing LSA shipment, reviewed surveys, documentation, placarding and labeling for consistency with NRC and DOT requirements. Through this observation the inspectors evaluated the worker's proficiency at performing shipments and preparing packages for shipments.

Radwaste and radiological material shipping activities were evaluated for compliance with 10 CFR Parts 20, 61, 71 and DOT regulations contained in 49 CFR Parts 170-189. Program implementation was reviewed against UFSAR, PCP, licensee procedures, NUREG-1608 "Categorizing and Transporting Low Specific Activity Materials and Surface Contaminated Objects," NUREG-1660 "U. S. Specific Schedules of Requirements for Transport of Specified Types of Radioactive Material Consignments," Branch Technical Position "Waste Form Technical Position", NRC Bulletin 79-19 "Packaging of Low-Level Radioactive Waste for Transport and Burial," and Information Notice 86-20 "Low-Level Radioactive Waste Scaling Factors, 10 CFR Part 61."

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator (PI) Verification

Mitigating Systems Cornerstone

.1 Safety System Unavailability

a. Inspection Scope

The inspectors reviewed licensee records to determine whether the submitted PI values for the following PIs for both Unit 1 and Unit 2 were calculated in accordance with the guidance contained in Nuclear Energy Institute (NEI) 99-02, Revision 2, "Regulatory Assessment Performance Indicator Guideline."

- High Pressure Injection System Unavailability, and
- Heat Removal System Unavailability.

Specifically, the inspectors reviewed portions of the following documents: Operating Logs, the Technical Specification Tracking System database, Performance Tracking sheets, and maintenance history to verify the accuracy of the unavailability times for the subject systems for the period October 1, 2002, through September 30, 2003. The PIs were also discussed with the cognizant engineering personnel.

b. Findings

No findings of significance were identified.

.2 Occupational and Public Radiation Safety

a. Inspection Scope

The inspectors sampled licensee submittals for the performance indicators (PI) listed below for the period from October 3, 2002 through October 6, 2003. To verify the accuracy of the PI data reported during that period, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 1, were used to verify the basis in reporting for each data element.

Occupational Radiation Safety Cornerstone

- Occupational Exposure Control Effectiveness PI

Listings of Plant Issues were reviewed to determine if any appeared to exceed the reporting threshold for both occupational and the public radiation safety performance indicators. Inspectors interviewed the personnel responsible for initial screening of plant issues for performance indicator reporting. The interview was to determine the criteria that would have to be exceeded before a plant issue was flagged as a performance indicator hit. The screening process was discussed in detail and selected records were reviewed by the inspectors as documented in the Sections 2OS1, 2OS2, and 4OA1 of the report Attachment.

Public Radiation Safety Cornerstone

- Radiological Control Effluent Release Occurrence PI

The inspectors reviewed and discussed the Radiological Control Effluent Release Occurrence PI indicator results for the Public Radiation Safety Cornerstone from October 1, 2001, through December 31, 2002. For the review period, the inspectors reviewed data reported to the NRC and evaluated selected radiological liquid and gaseous effluent release data, out-of-service process radiation monitor and compensatory sampling data, abnormal release results, and selected records documented in the Sections 2PS2 and 4OA1 of the report Attachment.

b. Findings

No findings of significance were identified.

4OA2 Problem Identification and Resolution

.1 Daily Review of Plant Issue Reports

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems", and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the

licensee's corrective action program. This review was accomplished by reviewing hard copies of each condition report and attending daily screening meetings.

b. Findings

No findings of significance were identified.

.2 Detailed Review of Individual Issues

a. Inspection Scope

The inspectors performed an in-depth review of the following issues:

- S-2003-3618 and S-2003-4020, Weaknesses found in the wall of the jacket wall cooling hoses of the blackout diesel, and
- S-2003-4800 A bent tappet stem was discovered on the turbine driven auxiliary feedwater pump (2-AFW-P-2) trip mechanism.

Inspectors reviewed the evaluations, corrective actions, and conducted interviews with personnel involved. During this review the inspectors determined whether:

- identification of the problem was complete and accurate,
- the problem was identified in a timely manner,
- the licensee properly classified and prioritized the resolution,
- the licensee evaluated and dispositioned operability and reportability issues,
- the licensee considered extent of condition, generic implications, common causes, and previous occurrences, and
- corrective actions were completed in a timely manner.

b. Findings

No findings of significance were identified.

4OA3 Event Followup

(Closed) Licensee Event Report 05000280, 281/2001-002-000: Control Room Chillers Breakers Improper Trip Rating Resulted in Potential for Breaker Trip.

This item had been partially inspected and the results documented in Section 4OA2 of NRC Integrated Inspection Report Nos. 50-280/02-04 and 50-280/02-04. During this period, the inspectors reviewed test data taken as a part of the modification installed to correct the condition. The inspectors concluded that the licensee's modification was adequate to address the condition and that the earlier configuration had not resulted in a loss of function during postulated events.

4OA5 Other Activities

.1 Replacement of Surry Unit 2 Reactor Pressure Vessel Head (RPVH) Containment Restoration Activities - Liner Plate Restoration (71007)

a. Inspection Scope

The inspectors reviewed containment restoration activities associated with the temporary construction opening as detailed in the licensee's Design Change Package (DCP) 03-012, Restoration of Temporary Access Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement.

Activities associated with liner plate welding were reviewed and compared with the ASME Boiler and Pressure Vessel Code (B&PV), Sections III and VIII, 1968 Edition with Addenda through Summer 1969, and welding controls detailed in Bechtel Power Special Processes Manual (SPM). The inspectors reviewed controls for the full penetration liner plate weld. For the liner plate weld (FW-1), the inspectors: visually inspected the final weld surfaces; observed in-process repair welding and visual (VT) and magnetic particle (MT) inspection activities for weld repair of defects identified by radiographic (RT) examination; and reviewed the original RT film. In addition the inspectors reviewed welder qualification records, welding material testing and certification records, in-process weld records (Field Weld Check Lists - Form WR 5), Quality Control involvement in the welding process, weld maps, radiograph records, and nondestructive examination personnel qualification and certification records.

b. Findings

No findings of significance were identified.

.2 Replacement of Surry Unit 2 Reactor Pressure Vessel Head (RPVH) Containment Restoration Activities - Concrete Restoration (71007)

a. Inspection Scope

The inspectors reviewed Unit 1 and Unit 2 containment restoration activities associated with the temporary construction opening, which was approximately 10 feet by 20 feet in the containment liner and 18 feet by 28 feet at the face of the concrete wall, as detailed in Design Change Packages (DCP) 03-012, Restoration of Temporary Access Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement/Surry/ Unit 1 and DCP 03-014, Restoration of Temporary Access Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement/Surry/ Unit 2.

Relative to installation of concrete for the Unit 1 containment repair, the inspectors reviewed records documenting inspection of the concrete batch plant and the concrete truck mixers. Activities were reviewed to determine if the licensee's inspection of the trucks and batch plant were performed in accordance with the guidance of the National Ready Mixed Concrete Association (NRMCA); the batch plant scales were calibrated in accordance with NRMCA recommendations; and mixer efficiency tests were performed on the truck mixers in accordance with ASTM C-94. The inspectors reviewed the

concrete mix data to ensure that mix proportions for delivered concrete were selected based on trial concrete mix results, that QC acceptance criteria for the plastic concrete were based on the trail mixes, and that the trail mix met concrete strength requirements. In addition, the inspectors reviewed the results of in-process tests performed on the plastic concrete (slump, entrained air, temperature, and unit weight), and results of unconfined compression tests performed on concrete test cylinders to verify concrete met design strength requirements.

Relative to preparations for the Unit 2 containment repair, the inspectors reviewed results of quality control acceptance testing performed on materials (cement, fine and coarse aggregate, water, and admixtures) to be used for batching the concrete. The inspectors also reviewed concrete mix data, batch plant inspection documentation, and truck mixer efficiency test results. The inspectors reviewed the concrete pour card (pre-placement inspection), results of inprocess tests performed on the plastic concrete (slump, entrained air, temperature, and unit weight), results of unconfined compression tests performed on concrete test cylinders which showed concrete exceeded design strength requirements, and records documenting post-placement inspection of concrete curing. In addition, the inspectors reviewed Plant issue S - 2003 - 4387 which documented the discovery of a void which was found in the Unit 2 containment wall concrete during removal of concrete for the temporary access opening. The void was located at the top of a construction access opening for the original construction. The inspectors reviewed Engineering Transmittal ET-NPD-S-03-0231 which documented the extent of the Unit 2 void and provided repair plans and methods.

b. Findings

No findings of significance were identified.

.3 Unit 2 Containment Integrity Test

a. Inspection Scope

The inspectors reviewed test procedures and witnessed the pressure test performed on the Unit 2 containment following completion of concrete restoration in the containment wall after replacement of the Unit 2 reactor vessel head. The inspectors reviewed the results of the pre-test inspection performed on the concrete repair area. The inspectors verified test pre-requisites were met, witnessed pressurization of the containment, examined the repair area during containment pressurization, and observed the calibrated pressure gauges which recorded the containment pressure. The inspectors verified that the specified containment test pressure was attained and held for one hour prior to performing visual inspection of the concrete repair area and witnessed inspection of the repair area by qualified licensee engineers. The inspectors also conducted an independent inspection of the concrete repair area while the containment was pressurized at full test pressure to ensure that the repair area met design requirements.

b. Findings

No findings of significance were identified.

.4 (Closed) Unresolved Item (URI) 05000281/2003003-01: Skyman Polar Crane Structure Seismic Qualification.

This URI was opened concerning a potentially unevaluated structure, referred to as the "Skyman" by the licensee, which had been attached to the Unit 2 polar crane. A similar structure was removed from the Unit 1 crane during a previous outage. The structure, a two tiered, open box-like steel frame had been installed on the Unit 1 and Unit 2 polar cranes in 1977. The Unit 2 structure had an 'as-built' drawing that was completed in May, 1991 (Sketch number 10067-S-1-U2). The inspectors questioned whether calculations were available to demonstrate that the crane to structure arrangement were seismically qualified. During the inspection, documented in Report number 50 - 281/2003003, the licensee could not locate such a calculation.

As a result of the questions, the licensee generated Plant Issue S-2003-1871 and prepared a calculation to determine seismic qualification of the "Skyman". During the current inspection, the inspectors reviewed the calculation, number DEO-0293, Evaluation of Polar Crane With the Addition of the Skyman Platform Structure, Rev. 0, dated June 23, 2003. The conclusions of the calculation were that the skyman structure was acceptable for the seismic design basis loading at Surry. The presence of the structure did not affect operability of the polar crane.

The inspectors concluded that the calculation adequately addressed the issue. The skyman was removed during the current refueling outage as part of plant modification DCP 02-069, Polar Crane Uprate - Unit 2. The inspectors reviewed the modification package which required removal of the skyman to uprate the lifting capacity of the crane from 125 to 140 tons. The inspectors verified the skyman had been removed during a walkdown of the Unit 2 containment building. No findings of significance were identified; therefore, this URI is closed.

.5 (Closed - Unit 2) Temporary Instruction (TI) 2515/152, Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2003-02), Revision 0

a. Inspection Scope

In response to NRC Bulletin 2003-02, the licensee performed a direct visual VT-2 examination of the Unit 2 bottom reactor pressure vessel head. During the week of September 22 - 26, the inspectors performed TI 2515/152 inspection of these activities. The inspection included: (1) review of engineering surveillance procedure 0-NSP-RC-003, "Visual Examination of Reactor Pressure Vessel Bottom Mounted Instrumentation (BMI)," (2) discussions with the licensee's engineer, VT-2 qualified, concerning his knowledge of industry results associated with top and bottom head inspections and experience associated with performing top and bottom head examinations, (3) direct observations of the licensee's VT-2 examination activities for all the BMIs and the bottom head, (4) independent inspections of the BMI and bottom head material conditions, (5) discussion of the examination results with cognizant personnel, and (6) review of VT-2 and medical certifications of the licensee's VT-2 examiner. In addition, the inspectors compared the examination performed to that described in the licensee's 30-day response to NRC Bulletin 2003-002.

b. Findings

There were no findings of significance. From their VT-2 examination the licensee identified no indication of RCS leakage from the BMI nor evidence of general wastage of the bottom reactor pressure vessel head. As a result, the licensee did not perform a volumetric or surface examination. The inspectors concurred with the licensee's conclusions. No areas were identified that required samples to be taken for chemical analysis. The licensee did not perform cleaning of the bottom reactor pressure vessel head.

1. For each of the examination methods used during the outage, the examination was:

   a. performed by qualified and knowledgeable personnel? Yes, the licensee's engineer was VT-2 qualified. He was familiar with the inspection results, including pictures, of the South Texas Project reactor vessel bottom head. In addition he was knowledgeable of top head penetrations issues since he had performed similar type visual inspections on the Surry reactor vessel top heads and was familiar with the North Anna top head penetration issues.

   b. performed in accordance with demonstrated procedures? Yes, was performed in accordance with 0-NSP-RC-003, and the normal licensee VT-2 procedures.

   c. able to identify, disposition, and resolve deficiencies? Yes; however, no deficiencies were identified that required resolution.

   d. capable of identifying pressure boundary leakage as described in the bulletin and/or RPV lower head corrosion? Yes, see answers to questions 2 and 3 below.

2. What was the physical condition of the RPV lower head (e.g. debris, insulation, dirt, boron acid deposits from other sources, physical layout, viewing obstructions)? The licensee removed insulation to allow 360 degree inspection of all the BMI and bottom vessel head interfaces and an inspection of the bottom vessel head around the BMIs. A few BMIs required the use of an inspection mirror to see around the full 360 degrees. Both the engineer and the inspector were able to walk around each BMI tube and touch most areas of the bottom vessel head. Rust stains were observed in and around the BMI / vessel bottom interface; however, the staining was not sufficiently severe to mask boron crystalline deposits. There was no indication of generalized corrosion on the bottom vessel head based upon the good condition of its coating and uniform contour. Boric acid on insulation was from either leakage from the refueling cavity seal or from the reactor vessel top head area (the top head was being replaced this refueling outage).

3. Could small boric acid deposits, as described in the Bulletin 2003-02, be identified and characterized? Yes, the engineer could get within 12 to 20 inches of the penetrations with a portable light source with sufficient intensity to detect small boric acid deposits.

4. What material deficiencies (i.e., cracks, corrosion, etc.) were identified that required repair? None.

5. What, if any, impediments to effective examinations, for each of the applied non-destructive examinations methods, were identified (e.g. insulation, instrumentation, nozzle distortion)? None, see answer 2 above.

This temporary instruction is considered complete on Unit 2.

.6 (Open) Temporary Instruction 2515/153 Reactor Containment Sump Blockage (NRC Bulletin 2003-01)

During the Unit 2 refueling outage, the licensee performed a detailed walkdown of containment to identify inspectors performed a detailed walkdown of the containment sump after a licensee's sump inspection but prior to containment closeout. Inspectors identified multiple areas where some of the outer fine mesh containment sump screens could be bypassed. The openings were slightly larger than the openings in the containment sump screens. These bypass paths were determined not to be significant because the total area was small, they were located on the top of the sump, and the final cylindrical screen around the pump suction was not bypassed. In response to the inspectors observations, the licensee put the issue in the corrective action system (Plant Issue S-2003-5183) and issued Engineering Transmittal S-03-0261 which modified the sump and blocked the identified bypass paths.

On August 7, 2003, the licensee submitted a written response to NRC Bulletin 2003-01. This issue will remain open pending final review of the response and the completion of any resulting follow-up inspections.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On January 8, 2004, the resident inspectors presented the inspection results to Mr. Blount and other members of his staff who acknowledged the findings.

The inspectors confirmed that proprietary information was not provided or examined during the inspection.

ATTACHMENT

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

R. Allen, Manager, Outage and Planning
R. Blount, Site Vice President
B. Garber, Supervisor, Licensing
M. Gafney, Director, Nuclear Station Safety and Licensing
T. Huber, Manager, Engineering
J. Keithley, Acting Manager, Radiation Protection and Chemistry
D. Llewellyn, Manager, Training
R. MacManus, Manager, Nuclear Oversight
B. Stanley, Manager, Maintenance
K. Sloane, Director, Nuclear Station Operations and Maintenance
J. Swientoniewski, Manager, Operations

NRC

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

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000281/2003005-01	NCV	Violation of 10 CFR 50.55a(b)(2)(ix) for Failure to Perform Examinations of the Unit 2 Containment Liner in Accordance with Requirements of Subsection IWE of ASME Section XI (Section 1R08.3)

Closed

05000281/2003003-01	URI	Skyman Polar Crane Structure Seismic Qualification (Section 4OA5.4)
05000280, 281/2001-002-00	LER	Control Room Chillers Breakers Improper Trip Rating Resulted in Potential for Breaker Trip (Section 4OA3)
2515/152, revision 0 (Unit 2)	TI	Reactor Pressure Vessel Lower Head Penetration Nozzles (NRC Bulletin 2003-02) (Section 4OA5.5)

Discussed

2515/153 (Unit 2)	TI	Reactor Containment Sump Blockage (NRC Bulletin 2003-01) (Section 4OA5.6)

List of Documents Reviewed

Section 1R04 - Equipment Alignment

Drawing 11448-FM-68A, sheet 3
Procedure 1-OP-FW-001A, “Auxiliary Feedwater System Alignment”
Procedure 1-OP-CH-001A, “CVCS System Alignment”
Procedure 1-OP-SI-001A, “Safety Injection System Alignment”
Drawing 11448-FM-088B, sheet 2
Drawing 11448-FM-089A, sheet 3
Drawing 11448-FC-9K, Intake Structure
Drawing 11448-FM-136A, Flow Valve Diagrams for Fish Screen Wash
System Health Report for Fish Screens (2003-2)
System Health Report for Service Water (2003-2)
Work Order 00498120, Screen Damage during Hurricane Isabel
Plant Issue S-2003-4156, Low Level Intake Damage By Debris
Procedure O-NSP-CW-001, High Level Intake Structure Canal Level Probes Inspection
Plant Issue S-2003-4179, Sheared Pins due to debris
Plant Issue S-2003-4697, Fish Flume at Low Level is Clogging the environmental house
Plant Issue S-2003-4276, Continuing water/debris backup problems with fish flume line
Plant Issue S-2003-0516, The A and B screens at the Unit 1 High level Intake are running continuously
Plant Issue S-2003-0693, Screen 2-CW-S-!D not rotating
Surry Operator Development Program Module ODP-12, Circulating Water System
Surry Operator Development Program Module ODP-13-S, Service Water System
Surry Updated Final Safety Analysis Report
Procedure 0-AP-12-01, Abnormal Procedure for Loss of Intake Structure
Procedure1-OP-51.5A, “Charging Pump CC & SW Systems Valve Alignment”,
Plant Drawings 11448-FM-071B, sheets 1 and 2 of 2.

Section 1R05 - Fire Protection

UFSAR Chapter 9
Surry Fire Protection Plan
Surry Technical Specifications
VPAP-2401, “Fire Protection Program”

Section 1R08 - Inservice Inspection Activities

SPS-SGMIPP-001 - Steam Generator Monitoring and Inspection Plan - Surry Units 1&2
SRY-SGPMS-002 - Surry Site Specific Eddy Current Analysis Guidelines
Eddy Current Analyst Orientation & Training Program Manual, April 1, 2003
Eddy Current Analyst Orientation & Training Program Instructors Guide

Procedure 2-NPT-RC-001, Rev. 1, Inservice Inspection of Steam Generator Tubes
VPA-03-145, Use of Appendix H Qualified Techniques, Surry Unit 2, Fall 2003 by Westinghouse
Surry Unit 2 Fall 2003, Steam Generator Eddy Current Inspection Summary and Results
S/G Monitoring Program Pre-Outage Assessment Surry Unit 2 - Fall 2003

Section 1R13 - Maintenance Risk Assessments and Emergent Work Control

VPAP-0815, "Maintenance Rule Program"

Section 4OA5 - Other Activities

Design Change Package (DCP) 03-012
ASME Boiler and Pressure Vessel Code (B&PV), Sections III and VIII, 1968 Edition
Bechtel Power Special Processes Manual (SPM).
NDE Procedure, NDE-MT-701, Magnetic Particle Examination
NDE Procedure, NDE-PT-701, Liquid Penetrant Examination for Temperatures 60 through 125° F
NDE Procedure, NDE-PT-703, Liquid Penetrant Examination for Temperatures less than 60° F
NDE Procedure, NDE-UT-702, Ultrasonic Examination of Vessel Welds Less than Two Inches in Thickness
NDE Procedure, NDE-UT-703, Ultrasonic Examination of Vessel Welds Greater than Two Inches in Thickness
NDE Procedure, NDE-UT-703A, Automated Ultrasonic Examination of Vessel Welds Less than Two Inches in Thickness
NDE Procedure, VPAP-1103, Visual Examination Program, VT-1, 2, 3, and General (ISI)
Augumented Inspection Manual, Rev. 34, dated 6/5/03, Attachments 27 and 34
Engineering Procedure, 2-NPT-CT-101, Reactor Containment Building Integrated Leak Rate Test (Type A Containment Testing)
Engineering Procedure, 2-NPT-CT-102, Inspection of Containment Structure
Operation Periodic Test, 0-OPT-CT-101, Containment Liner Individual Weld Leak Chase Channel Testing
Inservice Inspection Manual, Surry Power Station IWE, General Visual Procedure
Plant Issue (PI) S-2003-4531, Paint on Sliding Surface, Hanger number 2-WCMU-HOC22
PI S-2003-4594, Two Reportable Indications from PT on Heat Exchanger 2-RH-E-1A
PI S-2003-4597, Reportable Indications from PT on Integral Attachments to Piping
PI S-2003-4599, Loose Nuts on Support 2-RH-MSS-001
PI S-2003-4962, Excess Metal Removed to Clear Indication
PI S-2003-4996, Rejectable Indications on Welds 1-B07 and 1-B08 on 2-RH-E-1B
Engineering Transmittal ET-CEM-03-0028, Section XI Inspection Indication Resolution for Some of the Indications for PI S-2003-4962 and PI S-2003-4996
Design Change DCP 03-012, Restoration of Temporary Construction Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement / Surry/ Unit 1
Design Change DCP 03-014, Restoration of Temporary Construction Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement / Surry/ Unit 2
National Ready Mixed Concrete Association (NRMCA) Certificate For Bechtel Rustler II Plant, Truck Mix, dated 12/23/02
National Ready Mixed Concrete Association (NRMCA) Certificates for Concrete Truck Mixers,

Williams Concrete truck numbers 26, & 28
Records for calibration of cement and aggregate scales and water meter for the concrete batch plant
Concrete Mixer Uniformity (ASTM C-94) tests performed on truck numbers 26 & 28
Concrete Mix Design data
Result of testing performed on materials for Unit 2 containment repair: cement (ASTM C-150), concrete admixtures, Micro Air lot number 211151639 and Glenium 3030 NS lot number 21203924, fine aggregate (ASTM C-33), and number 57 coarse aggregate (ASTM C-33), and water
Results of testing performed on the plastic concrete used in the Unit 1 containment repair: slump, air content, temperature and unit weight
Bechtel Nonconformance Report numbers NCR S - 020, Void Found in Existing Containment Structure, Unit 2
Engineering Transmittal ET-NPD-S-03-0231, Containment Concrete Structure Void Area Repair, Surry Unit 2
Plant Issue (PI) N-2003-4387, Containment Concrete Structure Void Area Repair, Surry Unit 2.
Bechtel Nonconformance Report numbers NCR S - 009, Void Found in Existing Containment Structure, Unit 1
Engineering Transmittal ET-NPD-S-03-0107, Rev. 1, Containment Concrete Structure Void Area Repair, Surry Unit 1
PI N-2003-2007, Containment Concrete Structure Void Area Repair, Surry Unit 1.
Calculation DEO-0293, Evaluation of Polar Crane With the Addition of the Skyman Platform Structure, Rev. 0, dated 6/23/03
Drawing No. 11448-FC-15B, Foundation Mat details El (-) 29' -7" Reactor Containment, Surry Power Station - Unit 1
Engineering Transmittal ET-CC-00-0002, Rev. 0, Minimum Containment Liner Thickness, Surry Units 1 and 2
Engineering Transmittal ET-NPD-00-0286, Rev. 0, Containment Liner to Floor Joint Interface Inspection Report and Evaluation, Surry Units 1 and 2
Technical Report No. CE-0109, Rev. 4, Inservice Inspection Concrete Containment, ASME Section XI, Subsection IWE
Results of inspection of Unit 2 containment, documented in Procedure 2-NPD-CT-102, Inspection of Unit 2 Containment Structure, completed on 4/12/02 and 11/3/03
PI S-2003-5350, Degraded Moisture Barrier at Containment Liner to Concrete Floor Interface

Section 2OS1 Access Control To Radiologically Significant Areas

Procedures, Guidance Documents, and Manuals

C-HP-1032.061 High Radiation Area Key Control
C-HP-1041.023 Internal Dose Calculation Based on Radionuclide Intake
C-HP-1042.340 Air-Line Hood Use
C-HP-1061.020 Personnel Contamination Monitoring and Decontamination
C-HP-1061.021 Contaminated Skin Dose Assessment

Radiation Work Permits (RWPs)

RWP 03-2-3009: U2 RFO: RHRP Move old RX head from Ctmt. 47', Onload new Rx head

RWP 03-2-3114: U2 RFO: RHRP Disassemble Old RX Vessel Head.
RWP 03-2-3506: U2 RFO: Equipment Movement, Mobilization and Coordination

Records and Data

Plant Issue (PI) S-2003-1278-E1 Root Cause - Purple Tool Found in Construction Side in a Tool Box
PI S-2003-1526-E1 Root Cause - Purple Tool Found on Construction Side
PI S-2003-4024 External Contamination Found by Entrance Whole Body Count
PI S-2003-4217 Individual Breached Radiologically Controlled Area Boundary
PI S-2003-4272 Personnel Contamination Report NO: 03-040
PI S-2003-4308 Particle Contamination
Radiological Survey Map and Map Record ISFSI Perimeter Fence, June 12, 2003
Radiological Survey Map and Map Record ISFSI Perimeter Fence, July 16, 2003
Radiological Survey Map and Map Record Unit #2 Containment 47 Foot Elevation, October 2, 2003

Corrective Action Program (CAP)/Problem Investigation (PI) Process Documents

PI S-2003-4208 Incore Detectors Were Not Placed in Storage Prior to Opening Containment for General Access.
PI S-2003-4435 Security Shift Supervisor was Notified by Health Physics Supervisor That a Contractor Attempted to Secure a DAD to Enter the RCA and was Denied Access Because of Expired Plant Access Training.
PI S-2003-5018 Individual Attempted to Enter RCA Without Proper Training.

Section 2OS2 - ALARA Planning and Controls

Procedures, Guidance Documents, and Manuals

C-HP-1041.024, Declared Pregnant Woman
Radiation Protection Job Guideline (RPJG) 605, Dose Rate Trending Program
RPJG 610, Hot Spot Program
Virginia Power Administrative Procedure (VPAP)-1601, Corrective Action
VPAP-2102, Station ALARA Program
VPAP-2105, Temporary Shielding Program

Radiation Work Permits (RWPs) and ALARA Evaluations

RWP No. 03-2-1505: Filter Change-Out (2-CH-FL-2 Reactor Coolant Filter)
RWP No. 03-2-3101/ALARA Evaluation No. 03-050: RCP Motor and Seal Maintenance Inside Containment
RWP No. 03-2-3106/ALARA Evaluation No. 03-062: MOV Maintenance
RWP No. 03-2-3108/ALARA Evaluation No. 03-061: AOV Maintenance
RWP No. 03-2-3109/ALARA Evaluation No. 03-057: NDE Inspection
RWP No. 03-2-3114/ALARA Evaluation No. 03-041: Dismantle Old Reactor Head
RWP No. 03-2-3507/ALARA Evaluation No. 03-053: Insulation Removal/Replacement and Scaffold Installation/Removal

Records and Data

2003 Station ALARA Goals (undated)
2003 Unit Two Refueling Outage (U-2 RFO) Daily Report of Cumulative Station Exposure and Exposure
2003 U-2 RFO Exposure Reduction Plan (undated) by Department and by RWP, 9/29/2003 Through 10/3/2003 and 11/3/2003 Through 11/7/2003
ALARA Evaluation Log (per VPAP-2102, ALARA Goal Variance Report), Updated Through 11/5/2003
Personnel Radiation Exposure Management System (PREMS) Records for Declared Pregnant Workers (3) During 2003
PREMS RWP Exposure Summary Report, 9/1/2003 to 11/6/2003
PREMS TLD vs. DAD/SRD Exposure for Calendar Years 2000, 2001, 2002
Station and Department ALARA Goals for 2003 (per VPAP-2102), Revisions, Approved 1/17/2003, 8/4/2003, 9/10/2003
Spreadsheet: EPRI Survey Data Points: 1991-2003 (Undated)
Spreadsheet: Unit 2 Containment General Area Dose Rate Trending (Undated)
Surry Power Station Total Annual Exposures and Three-Year Averages for 1995-2006 (Undated)
Surry Power Station Annual Whole Body Exposure Report for Calendar Years 2000, 2001, 2002
Temporary Shielding Request (TSR) No. 03-079, Unit 2 Reactor Cavity Shadow Shield, Approved 9/24/2003
TSR No. 03-081, Shielding to Support Steam Generator Hand Hole, Approved 9/3/2003
TSR No. 03-094, RCP Motor Cubicle, Approved 9/4/2003

CAP/PI Process Documents

Audit 02-07, Radiological Protection and Process Control Program, 1/1/2002
S-2003-0535-E1: Electrical Maintenance was Allocated 27 mrem for 00-FH-CASK-2-19 Reconnection, Whereas Actual Team Dose was 61 mrem, 2/5/2003
S-2003-1827-E1: Station Outage Exposure is not Trending with Projected Exposure, 4/30/2003
S-2003-1918: Station Sensitivity to Exposure and Exposure Reduction has Decreased as Evident by Worker ALARA Practices, Exposure Status Awareness, and Current Exposure Trend, 5/23/2003
S-2003-2160-E1: Dose was Received Unnecessarily by Station Electricians and Vendor Sheet-Metal Craftsmen, 5/13/2003
S-2003-2283-R1: While Reviewing Unit 2 Refueling Outage Scope for Exposure Projections and ALARA Evaluations, it was Identified that RCA Scope was not Adequately Available to Project the Outage Exposure, 5/19/2003
Self-Assessment SPS-SA-03-09, Implementation of SOER 01-1, “Unplanned Radiation Exposures”, 7/29/2003

Section 2PS2 Radioactive Material Processing and Transportation

Procedures, Guidance Documents, and Manuals

HP-1071.040, Packaging And Shipment of Radioactive Material

VPAP-2104, Radioactive Waste Process Control Program (PCP)

Records and Data

10 CFR 61 Sample Validation 10/10/2003
List of 10 CFR 61 Samples, 9/8/2003
Schedule: Radwaste Shipping Schedule, 8/27/2003
Shipment Log: 2003 Radwaste Shipments
Shipment Log: 2003 Shipments
Shipping Papers: B2003-1, 8-120B, Primary Resin
Shipping Papers: G2003-1, 1 Seavan (LSA) + 4 B-25 Boxes (SCO)
Shipping Papers: R2003-2, Missile Shield 2A- Solid Concrete
Shipping Papers: SH-2003-005, 1 Box; 2 Detectors (Shipping Papers Consist of Vehicle Checklists, NRC Form 540 & 541, Vehicle Inspection Record, Special Instructions to Carrier, Various Survey/Assay Data Forms and Emergency Response Information)
Shipping Papers: SH-2003-071, 20' Sea Van, Eddy Current Equipment
Shipping Papers: SH-2003-074, 40' Sea Van, OREX
Waste Stream Report (DAW Scaling Factors), 2/21/2002

CAP/PI Process Documents

Audit 02-07: Radiological Protection and Process Control Program, 10/1/2002
Category 3 Root Cause Evaluation Response S-2003-2120-E1, The Old Reactor Pressure Vessel Head (ORPVH) was not Placed on the Lower Bechtel Closure Plate in the Proper Orientation
PI S-2003-2092, The Special CRDM Part Lengths Box was Found to Have Four Stripped Bolt Holes When Attempting to Secure the Lid After Loading. The Holes Must be Repaired in Order for the Box to be a Suitable "Strong, Tight Container" for 49 CFR Compliance for Radioactive Shipping
PI S-2003-3867, Equipment Shipped to Surry Power Station as Non-Radioactive Material was Found to Contain Measurable Levels of Byproduct Material

4OA1 Performance Indicator Verification

Procedures, Guidance Documents, and Manuals

Health Physics Administrative Procedure-2802, NRC Performance Indicator Program
VPAP-1601, Corrective Action

Records and Data

Listings of Plant Issues Assigned to Health Physics
Regulatory Assessment Performance Indicators - Radiological Protection, 10/3/2002 - 10/6/2003