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

July 28, 2003

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. 05000280/2003003 AND 05000281/2003003

Dear Mr. Christian:

On June 28, 2003, the U. S. 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 July 16, 2003, with Mr. R. 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. No findings of significance were identified by the NRC.

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, 281/2003003
w/Attachment: Supplemental Information

cc w/encl: See page 2

cc w/encl:
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SIGNATURE	RXM1	GJM1	MAS1	MSL1 for	RPC1	BRC	ATB for
NAME	RMusser	GMcCoy	MScott	BBearden	RCarrion	BCrowley	RHamilton
DATE	7/23/2003	7/23/2003	7/23/2003	7/22/2003	7/22/2003	7/22/2003	7/22/2003
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

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DATE	7/24/2003	7/23/2003	7/28/2003				
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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.: 05000280/2003003 and 05000281/2003003

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 & 2

Location: 5850 Hog Island Road
Surry, VA 23883

Dates: April 6 - June 28, 2003

Inspectors: R. Musser, Senior Resident Inspector
G. McCoy, Resident Inspector
B. Bearden, Senior Resident Inspector, Browns Ferry (Section 1R08)
R. Carrion, Project Engineer (Section 4OA5.6)
B. Crowley, Consultant (Sections 4OA5.2, .3, .4, and .5)
L. Garner, Senior Project Engineer (Sections 1R04.2 and 1R12)
R. Hamilton, Health Physicist (Section 4OA5.7)
J. Kreh, Health Physicist (Section 4OA5.7)
R. Naidu, Senior Reactor Inspector, NRR (Sections 4OA5.2, .3, .4, and .5)
M. Scott, Senior Reactor Inspector (Section 4OA5.1)

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

SUMMARY OF FINDINGS

IR 05000280/2003-003, 05000281/2003-003; 04/06/2003 - 06/28/2003; Surry Power Station Units 1 & 2, Routine Integrated Report.

The report covered a three-month period of inspection by resident inspectors, project engineers, health physicists, senior reactor inspectors and a consultant. No findings of significance were identified. 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

No findings of significance were identified.

B. Licensee-Identified Violations

None

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at power until April 20, 2003, when the unit was shut down for a scheduled refueling outage. The unit was returned to power operation on June 17, 2003, and operated at power for the remainder of the reporting period.

Unit 2 operated at power the entire reporting period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R04 Equipment Alignment

.1 Partial System Walkdowns

a. Inspection Scope

For the systems identified below, the inspectors reviewed plant documents to determine correct system lineup, and observed equipment to verify that the system was correctly aligned:

- Number 2 emergency diesel generator (EDG) while the number 3 emergency diesel generator and the 1J 4160V bus were removed from service for maintenance,
- Unit 2 A and B DC buses while the number 2 EDG was removed from service for maintenance (Drawing 11548-FE-10A), and
- The A and C emergency service water (ESW) pumps while the B ESW pump was out of service.

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed a walkdown of the Alternate AC (AAC) diesel generator to determine if the system was correctly aligned, support systems were operable, and via visual observations of components and instrumentation if the system was capable of performing its design function. The inspectors reviewed system health reports for the first quarter of 2003 and the 4 quarters of 2002, outstanding work orders and design modifications, and plant issue reports issued in 2002 and 2003. Performance history was discussed with the cognizant engineer. Documents reviewed included:

- 0-OP-AAC-001A, "AAC Diesel Generator Systems Alignment,"
- 0-MOP-AAC--002, "Return to Service of The AAC Diesel Generator,"
- Updated Final Safety Analysis Report (UFSAR) Section 8.4.6, "Alternate AC (AAC) System,"
- Plant Issue S-2001-2863, starting air compressor failed,
- Plant Issue S-2002-2178, starting air compressor cylinder head crack,
- Plant Issue S-2002-0075, alternate feed breaker to 0M1 bus failed to close, and
- Plant Issue S-2002-2082, alternate feed breaker to 0M1 bus failed to close.

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") in the following areas:

- Main control room,
- Unit 1 cable vault,
- Unit 2 cable vault,
- Emergency service water pump house,
- Unit 2 normal switchgear room, and
- Auxiliary building, 3' level.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities

a. Inspection Scope

The inspectors observed in-process Inservice Inspection (ISI) work activities and reviewed selected ISI records. The observations and records were compared to the Technical Specifications (TS) and the applicable Code (ASME Boiler and Pressure Vessel Code, Sections V and XI, 1989 Edition, with no Addenda) to verify compliance.

The inspectors reviewed the weld examination report and radiographs for the following completed weld repairs:

- Weld W-9 Three inch ASME Class III Feedwater piping weld
- Weld 1-18-A 14 inch ASME Class III Feedwater piping weld

- Weld 2-06A Ten inch ASME Class II Residual Heat Removal (RHR) piping weld
- Weld 2-07A Ten inch ASME Class II RHR piping weld
- Weld 2-08 Ten inch ASME Class II RHR piping weld
- Weld 3-13A Ten inch ASME Class II RHR piping weld

The inspectors observed calibration of ultrasonic examination (UT) equipment, portions of ongoing manual UT examinations, and Liquid Penetrant (PT) surface examinations of the following ASME Class 2 welds:

- Weld 1-07 Six inch Safety Injection (SI) piping weld
- Weld 2-01 Six inch SI System piping weld

Additionally, the inspectors reviewed non-destructive examination (NDE) reports for the following completed PT and UT examinations:

- UT exam report 806, 10 inch ASME Class 2, SI pipe weld, 3-BFA
- UT exam report 808, Steam Generator "C" vessel weld 2-05
- UT exam report 809, 14 inch ASME Class 2, feedwater pipe welds, 1-01, 1-02, and 1-03
- PT exam report 3326, 10 inch ASME Class 2, SI pipe weld, 3-BFA

The inspectors also observed activities and reviewed selected inspection records for the eddy current examination (ET) of the steam generators (SG). The records were compared to the TS, License Amendments and applicable industry established performance criteria to verify compliance. Approximately 23 examples of bobbin and rotating coil inspection ET data were reviewed to evaluate the adequacy of completed data analysis.

Qualification and certification records for examiners, equipment and consumables, and NDE procedures for the above ISI examination activities were reviewed.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors observed licensed operator performance during simulator training session RQ-03.4-ST-1 to determine whether the operators:

- were familiar with and could successfully implement the procedures associated with recognizing and recovering from a steam generator tube rupture;
- recognized the high-risk actions in those procedures; and,
- were familiar with related industry operating experience.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed the licensee's effectiveness in addressing failures associated with 1-EE-P-1C, the Number 3 EDG Fuel Oil Transfer Pump. These failures were documented in Plant Issues S-2003-1442, 2206 and 2379. The inspectors assessed the licensee's corrective actions, root cause evaluations and work practices, applicability to the other EDGs, and handling of these issues under the Maintenance Rule, 10 CFR 50 Appendix B and TSs. Work history and previous failures for the last three years were reviewed utilizing information from the licensee's work order system and through discussions with engineering personnel.

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 B charging pump (1-CH-P-1B), Unit 2 emergency borate valve (2-CH-MOV-2350) and the blackout diesel (0-AAC-DG-0M) out of service for maintenance;
- Unit 1 defueled, Unit 1 turbine driven auxiliary feedwater pump (1-FW-P-2) unavailable, Unit 2 crosstie from Unit 1 C charging pump (1-CH-P-1C) and Unit 1 B auxiliary feedwater pump (1-FW-P-3B) tagged out, and setting up for Unit 1 H bus logic test.
- Unit 1 defueled, Unit 1 turbine driven auxiliary feedwater pump (1-FW-P-2) unavailable, B ESW pump (1-SW-P-1B), Unit 1 RWST suction (1-CH-MOV-1115C) isolated, Unit 1 Boric Acid blender (1-CH-208) tagged out, Emergency switchgear room flood protection dike removed, Unit 1 B battery (1-EPD-B-1B) disconnected, and Unit 1 J protective relay testing in progress.
- Unit 1 defueled, Unit 1 turbine driven auxiliary feedwater pump (1-FW-P-2) unavailable, Unit 1 RWST suction (1-CH-MOV-1115C) isolated, B auxiliary building filtered exhaust fan (1-VS-F-58B), Number 3 emergency diesel generator (3-EE-EG-1), and Unit 1 B auxiliary feedwater pump (1-FW-P-3B) unavailable, Unit 1 B battery disconnected with Unit 1 A and B DC busses crosstied, and

- D control room chiller (1-VS-E-4D), Unit 1 A and C steam generator power operated relief valves (1-MS-101A, 1-MS-101C), Unit 1 emergency condensate makeup tank (1-CN-TK-3), Unit 1 B boric acid transfer pump (1-CH-P-2B), Unit 2 A-1 uninterruptable power supply inverter (1-EP-UPS-2A-1-INVERTER), and Unit 1 C charging pump (1-CH-P-1C) out of service.

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 03-0149, RVLIS Full Range Capillary Line Bubbles,
- ET S 03-0141, Acceptance of Elevated Oil Pressure on 1-CH-P-1B,
- Plant Issue S-2003-1794, Number 1 EDG access door left open, and
- ET S 03-0063, Through-wall leak in 1-SW-MOV-103A

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 March 10, 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.

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:

- Uninterruptible Power Supply 1B-2 return to service testing following maintenance in accordance with 1-MOP-EP-004, “Removal from Service and Return to Service of UPS 1B-2 Components,”
- 1B Charging Pump return to service testing following replacement in accordance with 1-OSP-SI-002, “Charging Pump Head Curve Verification,”
- Work Order (WO) 0427349-01 B battery replacement,
- 1-OPT-RS-003, “Flow Test of Inside Recirculation Spray Pumps 1-RS-P-1A and 1-RS-P-1B," and
- 1-OPT-FW-003, “Turbine Driven Auxiliary Feedwater Pump 1-FW-P-2.”

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities

a. Inspection Scope

The inspectors performed the inspection activities described below for the Unit 1 refueling outage that began on April 20, 2003, and ended June 17, 2003.

The inspectors reviewed the licensee’s outage risk control plan, ”Unit 1 2003 Refueling Outage Safety Assessment,” and VPAP-2805, “Shutdown Risk Program” 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 TS cooldown restrictions were followed.

The inspectors assessed that, when equipment was removed from service, the licensee maintained defense-in-depth commensurate with the outage risk control plan for key safety functions and applicable TSs, 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 reactor coolant system (RCS) pressure, level, and temperature instruments to verify that those instruments were installed and configured to provide accurate indications, 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;

- Observed decay heat removal 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 TSs;

- 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 TSs 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 TSs and approved procedures.

The inspectors reviewed the licensee's plans for changing plant configurations to verify on a sampling basis that TSs, 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.

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-OPT-SI-015, "SI Accumulator MOV Stroke Test," (an inservice test)
- 1-NPT-CT-101, "Reactor Containment Building Integrated Leak Rate Test (Type A Containment Testing),"/Inservice Inspection of Containment Concrete,
- 1-EPT-1801-02, "Bus 1J Protective Relay Testing,"
- 0-OPT-VS-011, "Control Room Leakage Test Using the Unit 1 Cable Tunnel Air Bottles,"
- 1-NSP-RX-014, "Rod Exercise Test," and
- 1-OPT-FW-007, "Turbine Driven AFW Pump Steam Supply Line Check Valve Test."

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluation

a. Inspection Scope

The inspectors observed an emergency response training drill conducted on June 18, 2003, to assess the licensee's performance in emergency classification, notification, and protective action recommendation development. This drill included the response actions taken by the shift operating crew in the simulator and will contribute to the Emergency Response Performance Indicator statistics.

b. Findings

No findings of significance were identified.

4 OTHER ACTIVITIES

4OA1 Performance Indicator Review

.1 Reactor Coolant System Specific Activity Performance Indicator

a. Inspection Scope

The inspectors performed a periodic review of the "Reactor Coolant System Specific Activity" performance indicator for Units 1 and 2. Specifically, the inspectors reviewed

this performance indicator from the second quarter of 2002 through the first quarter of 2003. Inspectors evaluated whether the performance indicator was calculated in accordance with the guidance contained in NEI 99-02, "Regulatory Assessment Performance Indicator Guideline." Documents reviewed included chemistry logs and TSs.

b. Findings

No findings of significance were identified.

.2 Safety System Unavailability Performance Indicator

a. Inspection Scope

The inspectors performed a periodic review of the "Safety System Unavailability" performance indicators for the residual heat removal system and the emergency AC power system which were submitted during the last three quarters of 2002 and the first quarter of 2003. This review included the applicable performance indicators for both Unit 1 and Unit 2. Inspectors evaluated whether the performance indicator was calculated in accordance with the guidance contained in NEI 99-02. 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 Activities

.1 Review of Unit 1 Reactor Pressure Vessel Head (RPVH) Replacement Lifting and Transportation Program Activities

a. Inspection Scope

From April 29 to May 2, the inspectors reviewed the licensee's heavy load lifting and transportation program for the head load path to ensure that it meets the UFSAR and regulatory requirements for application to the Unit 1 reactor head replacement. The criteria used was from Inspection Procedure 71007, the licensee's Generic Letters 81-07 and 85-11 responses and records, NUREG-0612, and ASME B30.2-1976. Two design change packages (DCPs) were involved.

The inspectors reviewed a vendor generated DCP 03-011 and walked down the vendor prepared head movement path into and out of containment. The inspectors evaluated: path loading details; containment wall opening area; the outside runway and its supporting structure; the lift ring for the head(s); and, the 300 Ton Manitowoc-M250 Mobile Crane condition. The inspectors reviewed crane maintenance records and crane operator qualification information.

The inspectors reviewed a second DCP 02-068 including post modification testing for the modification of and enhancements to the Unit 1 polar crane, which was to be modified prior to the lift of the heavier new head. Additionally, the inspectors reviewed: the procedures for polar crane use; polar crane operator qualification records; Work Plan and Inspection Record 61.0; and, procedures for head lifts.

b. Findings

Introduction: One Unresolved Item was identified in that a potentially unevaluated structure, referred to as the "Skyman" by the licensee, was attached to the operating Unit 2 polar crane. During the outage, the above crane DCP removed a similar structure from the Unit 1 crane.

Description: The licensee had identified that the Unit 1 polar crane was to have a structure [called Skyman] removed from the polar crane trolley during the crane upgrade. The two tiered, open box-like frame structures had been installed on Unit 1 and Unit 2 polar cranes in or about 1977 when the steam generators were replaced. The Unit 2 structure had an 'as-built' drawing that was done in May 1991 (SEO-1718). The inspectors asked if there were calculations on the crane to structure arrangements that would demonstrate the seismic qualification of the assembly. During the inspection, the licensee could not locate such a calculation. As a result of the questions, the licensee generated Plant Issue S-2003-1871.

Analysis: The Unit 1 polar crane DCP has a very detailed seismic analysis in the modification supporting documents. The modal analysis was done without the Skyman structure attached. That was one of the reasons that the structure was to be removed. Seismic analysis is addressed in 10 CFR 50, Appendix A, General Design Criteria 2, and specifically in 10 CFR 100, Appendix A, Section VI. Certain systems, components, and structures are required to remain functional if an earthquake should occur. In normal plant operation, implicit in this requirement, is that equipment such as the polar crane not be dislodged by the earthquake and damage critical equipment in containment nor that parts of the crane assembly become missiles to cause the loss of function to those same equipment. The added structure to the Unit 2 crane could potentially cause detrimental changes to the polar crane response to an earthquake or the structure could possibly become dislodged in a earthquake thus becoming a missile. UFSAR Table 15.2-1 lists the containment [polar] crane as being seismic in design (Class I criteria). Although the size, orientation, and relative low mass of the structure did not appear to be structurally unsound and susceptible to a seismic event, this could not be clearly determined at the time of the inspection.

Enforcement: Pending the licensee's evaluation of the seismic acceptability of the Unit 2 polar crane assembly and the acceptability of the structure on its polar crane, this item will remain an Unresolved Item, 50-281/2003003-01, Skyman Polar Crane Structure Seismic Qualification.

.2 Containment Liner Plate Restoration Activities

a. Inspection Scope

The inspectors reviewed 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 the licensee's Design Change Package (DCP) 03-012, "Restoration of Temporary Access Opening in the Containment Structure for Reactor Pressure Vessel Head Replacement / Surry / Unit 1."

Activities associated with containment 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 and the associated leak chase channel welds. For the liner plate weld (FW-1), the inspectors: visually inspected the final weld surfaces; observed in-process welding and inspection activities (visual (VT) and magnetic particle (MT)) for weld repair of defects identified by radiographic (RT) examination; observed portions of vacuum testing; and reviewed the original and repair RT film. For the leak chase channel welds, the inspectors observed a portion of the in-process welding activities for field welds (FWs) 3, 4, 5, 6, 7, 8, 18, 19, 20, 21, 23, 24, 25, 27, 31, and 32. Also, a portion of the VT and MT inspections of leak chase FWs 32, 33, 34, 35, 36, 38, 39, 40, 41, 42A, 42B, 43A, 43B, 44, 46, 47, and 48 was witnessed. The inspectors also observed a portion of the pressure testing of leak chase channels and liner plate weld after re-welding the containment liner. In addition to observation of in-process work, the inspections included: review of welding procedure (including supporting procedure qualification records), review of welder qualification records, review of welding material testing and certification records, observation of welding material issue and use control, review of in-process weld records (Field Weld Check Lists - Form WR 5), review of Quality Control (QC) involvement in the welding process, review of MT and RT examination records for the completed liner plate weld, and review of QC and nondestructive examination (NDE) personnel qualification and certification records.

The inspectors reviewed activities associated with installation of containment reinforced concrete and compared activities with the applicable Code, ACI 318-63, Part IV-B, Building Code Requirements for Reinforced Concrete Institute, 1963. Rebar cadwelding splicing activities were reviewed and compared with the following applicable requirements: Bechtel specifications for procurement and installation, equivalent to Surry Power Station specifications used during original construction; the ASME B&PV Code, Section III, Division 2, 1995 Edition with 1996 Addenda, the applicable Code for splice system qualification tests; cadweld operator qualification consistent with ASME Section III, Subsection CC-4333.4; and AWS D1.4-98, the applicable Code for welded splices.

The inspectors observed in-process cadwelding for splices 2-V22B, 1-H12R, and 1-H11R; observed QC inspections, including in-process and final acceptance, of

cadwelding activities; reviewed in-process Cadweld Splice Records (Form C-CAD-63) for splices 1-H9L, 1-H9R, T1-H9L, T1-H9R, 1-H10R, 1-H10L, T1-H10R, T1-H4L, T1-H4R, T1-H8L, and T1-H8R; visually inspected completed cadwelds 1-H4L, 1-H4R, 1-H5L, 1-H5R, 1-H6L, and 1-H6R; and reviewed cadwelder and QC inspection personnel qualification records for all cadwelders and QC inspectors.

b. Findings

No findings of significance were identified.

.3 Reactor Pressure Vessel Closure Head (RPVH) Activities

a. Inspection Scope

The inspectors observed the control rod drive mechanism (CRDM) installation activities performed by Framatome ANP (FANP), Lynchburg, VA, and Juenot, France, related to the RPVH, and reviewed records of the welds that had been performed. The following records were reviewed:

- Production Weld Data Sheets documenting the canopy seal welds attaching plugs 27, 28, 29, 30, 31, 32, 35, 36, 37, 38, and 43 to the CRDM flanges. At Surry Unit 1, plugs were installed and seal welded to cap the CRDM nozzles in the place of the partial length CRDMs.
- "Y" insert tack welds to CRDM flanges.
- Removal of "Y" inserts (that were welded by unqualified welders), liquid penetrant (PT) examination of surface after removal, and the tack welding a "Y" insert by a qualified welder.
- PT examinations of the canopy seal welds attaching plugs to the nozzles.
- Material certification on the PT material used.
- Qualification records for the weld procedure specifications.
- NDE personnel qualifications.
- Certified material test reports (CMTRs) of the weld material used during the welding operations.
- Nonconformance report (NCR) 602568 initiated by FANP during the welding to identify that unqualified welders tack welded "Y" inserts to CRDM housing nozzles. The inspectors verified the NCR was properly dispositioned, and corrective action taken.

The inspectors reviewed additional quality records which are listed in the documents reviewed section of the attachment to this report to verify that work was accomplished and documented in accordance with requirements.

b. Findings

No findings of significance were identified.

.4 Quality Assurance (QA) Oversight

a. Inspection Scope

The inspectors reviewed licensee procedures relative to QA oversight of contractor activities for the RPVH replacement as detailed in Dominion Procedure NOD-GL-4. In addition, the inspectors observed in-process QA oversight activities for containment restoration and CRDM installation. The inspectors also reviewed a sample of Dominion Oversight Team Activity Reports, Dominion Oversight Management Summary Reports, Dominion Vendor/Subcontractor Surveillance Reports, Bechtel Quality Surveillance Reports, Framatome Quality Control Surveillance Reports, Bechtel NCRs, and Framatome Condition Report (CRs) and NCRs, all documenting QA observations and findings, to ensure that adequate oversight was being applied.

b. Findings

No findings of significance were identified.

.5 Review of Dominion's 10 CFR 50.59 Evaluations for the Replacement RPVH

a. Inspection Scope

The inspectors reviewed the following replacement RPVH DCPs and associated 10 CFR 50.59 evaluations:

DCP 02-053," Reactor Vessel Head Replacement / Surry, Unit 1"
DCP 03-012, "Temporary Access Opening in Containment for Reactor Pressure Vessel Head Replacement / Surry Unit 1"

The DCPs were reviewed to verify that changes between the original RPVH and the replacement RPVH, and modifications resulting from installation of the replacement RPVH were properly evaluated in accordance with 10 CFR 50.59.

b. Findings

No findings of significance were identified.

.6 Containment Concrete Restoration Activities

a. Inspection Scope

The inspectors reviewed 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, estimated to require approximately 68 cubic yards of concrete to restore, 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/Surry/ Unit 1."

Relative to the installation of concrete, the inspectors witnessed placement of concrete in the containment wall to restore the temporary construction opening. The inspectors observed the concrete forms to ensure tightness and cleanliness and that excessive amounts of water had not accumulated in low spots, and that reinforcing steel and cadwelded splices were clean. The inspectors reviewed placement activities to ensure that activities pertaining to concrete delivery time, free fall, flow distance, layer thickness, placement rate, and concrete consolidation conformed to industry standards established by the American Concrete Institute. The inspectors also witnessed the testing of the plastic concrete for slump, air entrainment, temperature, and unit weight, and the preparation of the concrete cylinders for testing as specified by applicable American Society for Testing and Materials (ASTM) requirements. In addition, the inspectors reviewed activities to ensure that concrete placement activities were continuously monitored by licensee quality control and quality assurance personnel.

The inspectors reviewed concrete batching activities, including storage and separation of materials. The inspectors reviewed results of quality control acceptance testing performed on materials (cement, fine and coarse aggregate, and admixtures) used for batching the concrete. The inspectors also reviewed records documenting inspection of the concrete batch plant and the concrete truck mixers and pumpers to determine if the licensee's equipment met the recommendations of the National Ready Mixed Concrete Association (NRMCA). 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 trial mixes, and that the trial mix met concrete strength requirements.

b. Findings

No findings of significance were identified.

.7 Reactor Vessel Head Replacement Radiation Protection Inspection

a. Inspection Scope

Various aspects of the licensee's radiation protection program controls, planning, preparation, and implementation for reactor pressure vessel head replacement activities were reviewed and evaluated. Specifically, the inspectors reviewed and evaluated as low as is reasonably achievable (ALARA) planning; dose estimates and dose tracking, exposure controls including temporary shielding; contamination and airborne radioactivity controls; radioactive material management; radiological work plans and controls; emergency contingencies; and project staffing and training plans.

ALARA planning packages for the reactor head replacement were reviewed. The radiation, contamination, and airborne radioactivity surveys in the packages were reviewed for radiological work conditions and the adequacy of prescribed postings and surveys. The inspectors reviewed the radiation work permits (RWPs) in the packages to determine projected exposure, expected conditions, electronic dosimeter dose and dose rate alarm settings, dosimetry requirements, protective clothing/equipment, worker instructions and radiation protection (RP) technician instructions. Revisions to ALARA exposure estimates were reviewed and evaluated against changing work

scope/radiological conditions. The ALARA packages from the Surry head replacement were contrasted with those from the North Anna head replacements to determine if lessons learned had been implemented, and the lessons learned reports were evaluated for content. In addition, the inspectors reviewed internal dosimetry assessments for adequacy of respiratory protection and engineering controls. Corrective action documentation was reviewed for significant trends or recurring problems with work practices and controls. The source terms and resulting doses from the two North Anna head replacements were compared to the Surry head replacement by the inspectors and used as a basis for assessing the ALARA planning. The inspectors reviewed the temporary shielding program and its implementation during the outage.

The inspectors interviewed the RP project leads for both day and night shifts to identify contingencies, problems, and changes in work scope that were incurred during the reactor head replacements. These interviews included reviewing work scope documentation, and contingency plans for each step in the relocation of the heads from the reactor vessel to the burial site.

Project staffing and training issues were discussed with the Radiation Protection Manager (RPM) and his staff health physicists.

RP program activities and their implementation were evaluated against Title 10 Code of Federal Regulations (10 CFR) 19.12; 10 CFR 20, Subparts B, C, F, G, H, and J; and approved licensee procedures. Licensee guidance documents, records, and data reviewed within this inspection area are listed in the documents reviewed section of the attachment to this report.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

On July 16, 2003, 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.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Adams, Manager, Engineering
R. Allen, Manager, Outage and Planning
R. Blount, Site Vice President
B. Foster, Director, Nuclear Station Safety and Licensing
B. Garber, Acting Supervisor, Licensing
D. Llewellyn, Manager, Training
R. MacManus, Manager, Nuclear Oversight
B. Stanley, Manager, Maintenance
T. Sowers, Director, Nuclear Station Operations and Maintenance
T. Steed, Manager, Radiological Protection
J. Swientoniewski, Manager, Operations
T. Travis, NDE Coordinator

NRC

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

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000281/2003003-01	URI	Skyman Polar Crane Structure Seismic Qualification (Section 4OA5.1)

LIST OF DOCUMENTS REVIEWED

Section 1R08 - Inservice Inspection Activities

Procedures
NDE-7.01 General Requirements for Non-Destructive Examination, Rev. 6
NDE-MT-101, Magnetic Particle Examination, Rev. 7
NDE-MT-901, Magnetic Particle Examination (ISI), Rev. 1
NDE-PT-101, Liquid Penetrant Examination, Rev. 9
NDE-PT-901, Liquid Penetrant Examination (ISI), Rev. 1
NDE-RT-901, Radiographic Examination (ISI), Rev. 1
NDE-UT-901, Ultrasonic Examination of Piping Welds (ISI), Rev. 0

Other Documents
SPS-SGMIPP-001 - Steam Generator Monitoring and Inspection Plan - Surry Units 1&2, Rev. 4 - August 2002
SRY-SGPMS-002 - Surry Site Specific Eddy Current Analysis Guidelines, Rev. 7
Eddy Current Analyst Orientation & Training Program Manual, April 1, 2003
Surry Unit 1 S1R18 April 2003, Steam Generator Eddy Current Inspection, Inspection Results
Virginia Power Eddy Current Analysis Orientation and Training Program Instruction Guide
Acquisition Technique Specification Sheets
Analysis Technique Specification Sheets
Surry Unit 1&2 Plugging History
Surry Unit 1 ECT Inspection Program History
SG Monitoring Program Pre-Outage Assessment - Spring 2003 - Surry Unit 1, 3/19/03
Station Level Assessment RP-02-07, Pre-INPO SG Review, 7/29/02

Section 4OA5 - Other Activities

Section 4OA5.1:

Procedures
0-MCM-1304-03, Polar Crane Upgrade for 1-CR-CRN-1 and 2-CR-CRN-1, Rev. 0
0-EPM-2302-01, Inspection of Stored Motors, Rev. 3 [with records on polar crane spare motor]
0-MCM-1150-0, Reactor Disassembly and Reassembly, Rev. 13
VPAP-0809, NUREG-0612 Heavy Load Program, Rev. 7

Other Documents
Engineering Transmittal NPD S 03-0103, Evaluation of Haul Route for Replacement Reactor Pressure Vessel Head, Surry Power Station, Rev.0 [dated 5/7/03]
Plant Issue - S-2003-1871, Crane Trolley Structures, 5/2/03
DCP 03-011, Rigging and Handling of RPV Heads, Surry Unit 1, 4/16/03
DCP 02-068, 01-CR-CRN-1, Polar Crane Uprate/Surry/Unit 1, 3/20/03
Calculation No. P.O. No. 02-132382, Polar Crane, Trolley Feasibility Study, Polar Crane Uprate, Rev. 1
Load Test Certification for Head Suspension Ring 2655-630-A, Dated Feb. 21, 2003
Calculation SEO-1718, Polar Crane Rigging Structure, Rev. 0, Addendum No. 2 [EWR 990-296, Unit 2]
Calculation DEO-0027, Polar Crane Rigging Structure Evaluation, Unit 1, Rev.0
NRC to VEPCO, Mr. W.L. Stewart, Serial # 566, Control of Heavy Loads NUREG-0612 - Phase II, June 18, 1984
NRC to VEPCO, To All Licensee for Operating Reactors, Serial # 85-507, Completion of Phase II of “Control of Heavy Loads at Nuclear Power Plants” NUREG-0612, July 9 1985
Memorandum [VEPCO] From: R.F. Saunders to C.M. Robinson, Innsbrook Technical Center, Regulatory Commitments Pursuant to NUREG-0612: Control of Heavy Loads at Nuclear Power Plants, September 19, 1989
Virginia Power Job Performance Measure 7, Crane and Hoist Program, Rev. 0 [reviewed qualified operator list]
DWG 24841-130-C-105, Reactor Pressure Vessel Head Replacement Project -RPVH Lift Crane, Rev. 0

Work Plan and Inspection Record No. R-RIG-61, Rig RPV Heads, Rev. 0
300 Ton Manitowoc - M250 Series 1 Lifting Capacities - Heavy Lift Boom + Fixed Jib
Manitowoc M-250 Crane Inspection Certificate Performed on Feb. 28, 2003
Manitowoc Crane Operator Qualifications

Section 4OA5.2, .3, .4, and .5:

Dominion RPV Head Replacement Project Work Plan and Inspection Record (WPIR) No. C-LPR-62, Rev. 0
P1-REBAR(0.59 CE), Welding Procedure Specification, Rev. 2
P1AT-Lh(CVN-20°F), Welding Procedure Specification, Rev. 1
Procedure CP-C-2, CADWeld Rebar Splices, Rev. 1
Bechtel Nondestructive Examination Standard RT-ASME III CL B S69, Radiographic Examination, Rev. 3
Bechtel Nondestructive Examination Standard MT-ASME III CL B S69, Magnetic Particle Examination, Rev. 2
Cooperheat-MQS Test and Inspection Procedure 25.A.101, Vacuum Box Testing of Containment Liners, Rev. 2
Dominion Nuclear Oversight Department Guideline NOD-GL-4, Dominion Reactor Vessel Head Replacement Projects Nuclear Oversight Quality Plan, Rev. 1
Bechtel Welding Specification WFMC-1, Welding Filler Material Control, Rev. 1
Vendor Procedure 'Form - 84.3', Welding and NDE Matrices, Rev. 3
Bechtel Special Processes Manual For Surry Units 1&2 RPV Head Replacement Project, Rev. 2
Bechtel Procedure WQ-1.18, Welder Performance Qualification Specification (ASME Section IX), Rev. 0
Bechtel Procedure B-GWS-1, General Welding Standard, Rev. 10
Bechtel Procedure GWS-Structural.6, General Welding Standard, Rev. 0
Bechtel Procedure GWS-REBAR.5, General Welding Standard Arc Welding of Reinforcement Steel, Rev. 0
DCP N0. 02-053, Reactor Vessel Head Replacement / Surry, Unit 1
DCP No. 03-012, Restoration of Temporary Access Opening in Containment for Reactor Pressure Vessel Head Replacement / Surry Unit 1
MT Reports MT-05, MT-06, MT-07, and MT-08 for Liner Plate Weld (FW-1)

RT Film and Reader Sheets for Liner Plate Weld (FW-1) Segments 7-7.5, 10.5-11.0, 19.0 - 19.5, 38.0-38.5, 38.5-39.0, 45.5-46.0, 48.0-48.5, 17.5- 18.0 (Expansion), and 21.0-21.5 (Expansion) and 18.8-19.5 (Repair)
Cadwelder Qualification Records for Bechtel Cadwelders 003, 043, 080, 082, 101, 103, 109, 117, 124, 125, 133, 135, 144, 147, 156, 1253, and 6390
Certification # 649600-2 dated April 17, 2003, for Calibration for Machine Used for Testing Cadweld Qualification Specimens
0-OPT-CT-01, Containment Liner Individual Weld Leak Chase Chanel Testing, Rev. 000 VT-2 Certification for Surry Level II Examiner for leak chase pressure testing
Welder Qualification Test Records for Bechtel Welder Symbols BM-10, BM-11, BM-14, BM-17, BM-19, BM-20, BM-21, and BM-22
Personnel Qualification and Certification Records for Four Cooperheat MQS NDE Examiners

Personnel Qualification and Certification Records a Six Bechtel QC Inspectors and 1 Level III NDE Examiner (RT)
Sample of Dominion RVHR Project Oversight Team Activity Reports dated 4/10/03 through 5/14/03
Sample of Dominion RVHR Project Nuclear Oversight Team (PNOT) Management Summary Reports dated 04/12/2003 through 05/03/2003
Sample of Bechtel Quality Surveillance Reports 24841-SI-QSSS-03-005 through 24841-SI-QSSS-03-0037
Sample of Bechtel NCRs
Sample of Framatome CRs and NCRs
Sample of Framatome Quality Control Surveillance Reports dated 5/2/03 - 5/11/03
Dominion RPVHR Project Vendor/Subcontractor Surveillance Reports N1-009, N1-006, and N1-004
Plant Issue S-2003-2137, Variations in Containment Wall Thickness
Bechtel NCR S008, Existing Nelson Stud Problems
Bechtel NCR S010, Existing Nelson Stud Problems
Plant Issue S-2003-1966-E1, Existing Nelson Stud Problems
Plant Issue S-2003-2088-R1, Existing Nelson Stud Problems
Plant Issue S-2003-2007-R1,R2, R3,R4, R5, Void in Containment Concrete
Calculation CE-1426, Containment Liner & Concrete Parametric Study, Rev. 0
Dominion Engineering Transmittal ET S-03-0107, Containment Concrete Structure Void Area Repair, Rev. 1
Bechtel Welding Receiving Inspection and Material Certification Records: E7018 (Lots 2S210C01, 2S210C02, 4D215A04, and 2J027A01
Framatome Procedure 54-ISI-240-41, Visible Solvent Removable Liquid Penetrants Examination Procedure, dated February 12, 2003
Framatome 55-PQ7181-02, Procedure Qualification Record, Jeumont Industries Canopy Seal Weld Procedure Qualification dated December 22, 2003. (SA-451 Grade CPF8 UNS J92600 to SA-336 Grade F304 UNS 530400)
Framatome 55-PQ7190-01, Procedure Qualification Record, Jeumont Industries Canopy Seal Weld Procedure Qualification, Manual Gas Tungsten Arc Welding Repairs dated December 22, 2002
Framatome 55PQ-7195-02, Procedure Qualification Record, Jeumont Industries Canopy Seal Weld Procedure Qualification dated January 28, 2003. (SA479 Grade 316 / 316L UNS S31600 / S31603 to SA-336 Grade 304 UNS S30400)

Section 4OA5.6:

Procedures
Dominion RPV Head Replacement Project Work Plan and Inspection Record (WPIR) Job No. 24841, Rev. 0
Dominion Vendor Procedure RPV Head Replacement Project Construction Procedure - Cadweld Rebar Splices, Procedure No. CP-C-2.1, Rev. 1
Dominion Vendor Procedure RPV Head Replacement Project Construction Procedure - Concrete Operations, Procedure No. CP-C-2.1, Rev. 0
Dominion Vendor Procedure RPV Head Replacement Project Construction Procedure - Testing of Cadweld Rebar Splices, Procedure No. CP-C-11.1, Rev. 0

Specifications

Dominion RPV Head Replacement Project Technical Specification for Material Testing Services, Specification No. 24841-120-C101, Rev. 6

Dominion RPV Head Replacement Project Technical Specification for Purchase of Ready-Mix Concrete Qualified as Safety-Related, Specification No. 24841-120-C321, Rev. 9

Dominion RPV Head Replacement Project Technical Specification for Placement of Ready-Mix Concrete Qualified as Safety-Related, Specification No. 24841-120-C322, Rev. 3

Certifications and Analysis

Certificates of Conformance for Concrete Production Facilities. Note that these included the batch plant, including the dispensing equipment; the mixer trucks; the field scales; and the pumper trucks

Portland Cement Test Summaries, including chemical and physical analyses

Personnel Resumes and Personnel Qualifications (MACTEC), Specification No. 24841-130-SC-017-003-01

MACTEC Quality Assurance Manual, Specification No. 24841-120-SC-017-001-01

Section 4OA5.7:

Procedures

Corporate Health Physics Procedure C-HP-1032.030 Radiation Surveys, Rev. 2

C-HP-1032.040, Contamination Surveys, Rev. 4

C-HP-1032.050, Airborne Radioactivity Surveys, Rev. 3

C-HP-1032.060, Radiological Posting and Access Control, Rev. 1

C-HP-1041.020, DAC Hour Determination Based on Bioassay Results, Rev. 1

C-HP-1041.021, Radioactive Intake Determination Based On Bioassay Results, Rev. 1

C-HP-1041.023, Internal Dose Calculation Based on Radionuclide Intake, Rev.1

Temporary Health Physics Procedure T-HP-1071.050 Preparing the Reactor Pressure Vessel Head (RVPH) For Shipment, Expires 12/31/2003, Rev. 0

Records

Spreadsheet: Doses incurred on RWPs 2008, 2009, 2113, 2114 and 2509 day by day compared to projected. 6/2/2003

Spreadsheet: North Anna and Surry Power Stations Comparison of CRDM [Control Rod Drive Mechanism] Contact and 30cm Dose Rates (mRem/hr), 5/15/2003

Spreadsheet: 2003 U1 RF Outage Exposure Goals, 5/15/2003

Spreadsheet: 2003 U1 RF Outage Exposure Projection, Rev. 7, 5/15/2003

Spreadsheet: 2003 U1 RF Outage Exposure Projection, Rev. 8, 6/2/2003

Spreadsheet: Framtome ANP Surry Unit One Nuclear Station Head Replacement task by task ALARA Estimates/Schedule (not dated)

Temporary Shield Request (TSR) 03-047, Shielding of CRDM Racks during RX [Reactor] Vessel Head disassembly and reassembly, 4/4/2003

TSR 03-048, Shielding of CRDM Storage Racks to reduce GA dose rate at work area during RX Vessel Head disassembly/reassembly, 4/17/2003

TSR 03-049, Shielding of General Area surrounding RX Head Stand during RX Vessel Head disassembly, 4/4/2003

TSR 03-050, Reduce GA [dose rate] for workers on 'dance floor' by hanging shielding on handrail, 4/4/2003.
TSR 03-051, Shielding of new RX Vessel Head to reduce GA dose rate at work area during RX Vessel Head reassembly, 4/4/2003
TSR 03-052, Low Dose Waiting Area and GA Dose Rate reduction using mobile walls, 4/4/2003
TSR 03-053, Shielding of hot spots for equipment (weld boxes) and machining of RX Vessel Head parts, 4/10/2003
TSR 03-054, Shielding of General Area surrounding RX Head Stand during RX Vessel Head disassembly, 4/10/2003
TSR 03-055, Shielding Curtains on New RX Head Platform scaffolding to reduce GA dose rates for NDE [Non-Destructive Examination] and other work, 4/10/2003
TSR 03-056, Shield Box while stored in Yard- Surry, 4/14/2003
TSR 03-057, Shielding Annulus For Rx Head Project, 4/17/2003
TSR 03-058, Removal of CRDM's from Reactor Vessel Head, 4/29/2003
Drawings: FSK-C-008, Shielding Plate for RT, 2/11/2003
Drawings: FSK-C-016, RT Shielding (Mounted on forklift), 3/16/2003
Radiography Plan: Unit 1 Surry RPVHR [Reactor Pressure Vessel Head Replacement] Radiography Shot Plan, 5/12/2003
Radiation Work Permit 03-2-2008, U1 RFO [Refueling Outage]: RHRP [Reactor Head Replacement Project] Cut/Remove/Reinstall Ctmt liner and build runway system. Install auxiliary jib crane. Includes paint removal and other associated support, Rev.0, 4/14/2003
Surry-ALARA Man-Rem Estimate Worksheet for RWP 03-2-2008, not dated
Various surveys to support RWP 03-2-2008, various dates
Work in Progress ALARA Review, RWP 03-2-2008, 40% complete, 5/5/2003
Work in Progress ALARA Review, RWP 03-2-2008, 75% complete, 5/13/2003
Work in Progress ALARA Review, RWP 03-2-2008, 90% complete, 5/26/2003
Radiation Work Permit 03-2-2009, U1 RFO: RHRP Move old RX head from ctmt headstand and place on runway cart, move to crane enclosure and prep for shipping. Includes moving new replacement head into ctmt., Rev.0, 4/16/2003
Surry-ALARA Man-Rem Estimate Worksheet for RWP 03-2-2009, not dated
Various surveys to support RWP 03-2-2009, various dates
Work in Progress ALARA Review, RWP 03-2-2009, 95% complete, 5/12/2003
Work in Progress ALARA Review, RWP 03-2-2009, 90% complete, 5/15/2003
Work plan: ORPVH [Old Reactor Pressure Vessel Head] Loading onto WMG Bottom Plate, not dated
Work plan: ORPVH Removal and Rigging International Demob Plan, not dated
Radiation Work Permit 03-2-2113, U1 RFO: RHRP Installation of shield plates & encapsulate old RX Head. Move in bottom shield plate to head stand, install bottom shield plate onto old RX head, install Bechtel top hat, encapsulate old RX head. Includes lifting head to verify any water between closure plate and head (remove water as required)., Rev.0, 4/14/2003
Surry-ALARA Man-Rem Estimate Worksheet for RWP 03-2-2113, not dated
ALARA Evaluation 03-033, RWP 03-2-2113, 4/10/2003
Unit 1 Old Reactor Head Encapsulation Plan, not dated
Various surveys to support RWP 03-2-2113, various dates
Work in Progress ALARA Review, RWP 03-2-2113, 95% complete, 5/16/2003

Work in Progress ALARA Review, RWP 03-2-2113, 100% complete, 5/13/2003
Post Job Review RWP 03-2-2113, 6/5/2003
Radiation Work Permit 03-2-2114, U1 RFO: RHRP Disassemble Existing / Assemble New RX vessel head. Removal and storage of head cables, MI cables, RPI [Rod Position Indication] stacks, CRDM coil stacks, ventilation shrouding & head vent. Removal and mod of the RX head service structure, perform cutout of CRDMs prep CRDMs, modify shield doors. Includes all associated support., Rev.8, 5/24/2003
ALARA Action Plan 03-034, RWP 03-2-2114, Dismantle Old Rx Head and Replace Parts on New Head During Unit 1 Head Replacement Project, 4/14/2003
Station ALARA Committee Pre-Job ALARA Review, RWP 03-2-2114, 4/14/2003
Surry -ALARA Man-Rem Estimate Worksheet for RWP 03-2-2114, not dated
Framatome ANP Reactor Vessel Closure Head Replacement Project Dose Projections, not dated.
TEDE ALARA Evaluation, RWP 03-2-2114(several independent tasks separately evaluated), 4/18/2003
Surry -ALARA Man-Rem Estimate Worksheet for RWP 03-2-2114, (revised) not dated
Package containing several Framatome ALARA dose estimates by individual task, not dated
Listing of air sample data for samples taken to support RWP 03-2-2114
Work in Progress ALARA Review, RWP 03-2-2114, task: Scaffold for Rx Head -27', 2% complete, 4/23/2003
Work in Progress ALARA Review, RWP 03-2-2114,task: Disassemble Rx Head 4/30/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Scaffold for Rx Head -27', 25% complete, 5/1/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Disassemble Rx Head, 5/5/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Disassemble Rx Head, 50% complete 5/13/2003 Work in Progress ALARA Review, RWP 03-2-2114, task: CRDM Installation on new head, 5/13/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: CRDM refurb for Rx Head, 75% complete, 5/11/2003
Work Plan : Plan for Cutting Conoseals From the Old RVCH [Reactor Vessel Closure Head]
Work in Progress ALARA Review, RWP 03-2-2114, task: Reactor Vessel Head Replacement-Disassemble/Reassemble Reactor Head, 65.4% complete (Framatome Estimate), 5/11/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Disassemble the Unit Reactor Head, 65% complete (Dominion Estimate), 5/13/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Disassemble the existing and assemble the new RX vessel head, 70% complete, 5/13/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Reactor Vessel Head Replacement-Disassemble/Reassemble Reactor Head, 5/16/2003
Work in Progress ALARA Review, RWP 03-2-2114, task: Reactor Vessel Head Replacement-Re-assemble the new Reactor Head. Includes associated support., 85% complete, 5/20/2003
Radiation Work Permit 03-2-2502, U1 RFO: Outage Radiological Protection Support Work includes HP Tech job coverage, surveying and monitoring; Chemistry Sampling, ALARA Shielding and Flushing Activities, Decon Activities and RP walkdowns and inspections., Rev. 1, 5/11/2003

Correspondence: From Fred Short, Framatome ANP ALARA Engineer to Framatome ANP Site Managers, RE: Dose Performance Evaluation for Dominion's Surry Power Station Unit One Reactor Vessel Closure Head Replacement Project, 5/30/2003
Correspondence: From T.F. Steed (Surry Radiation Protection Manager) to File, RE: Unit 1 Outage Exposure, 5/30/2003
White Paper: Surry Unit 1 Head Replacement Lessons Learned., not dated
White Paper: Rx Head Disassembly/ Assembly Steps
Surry Unit 1 January 2003 Forced Outage Primary Chemistry Shutdown Report,5/29/2003
Surry Unit 1 EOC 18 (04-2003) Primary Chemistry Shutdown Report, 5/28/2003
Surry Power Station ALARA Committee(SAC) Meeting Minutes, 4/14/2003

Plant Issue Documents
Plant Issue- S-2003-2062, Incorrect data provided to Framatome regarding material CRDM drive housings made of.,5/8/2003
Plant Issue- S-2003-2120, The Old Reactor Pressure Vessel Head (ORPVH) was not placed on the lower Bechtel closure plate in the proper orientation.,5/12/2003
Plant Issue- S-2003-2327, During welding CRDM No. 317 (position B-8) as part of the Surry Power Station Unit 1 Reactor vessel Head Replacement Project, a melt thru occurred., 5/16/2003