



UNITED STATES  
NUCLEAR REGULATORY COMMISSION

REGION II  
SAM NUNN ATLANTA FEDERAL CENTER  
61 FORSYTH STREET, SW, SUITE 23T85  
ATLANTA, GEORGIA 30303-8931

October 26, 2007

Virginia Electric and Power Company  
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 - INTEGRATED INSPECTION REPORT  
05000280/2007004 AND 05000281/2007004 and 07200055/2007001

Dear Mr. Christian:

On September 30, 2007, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station Units 1 and 2, and the Surry Independent Spent Fuel Storage Installation. The enclosed report documents the inspection results which were discussed on October 11, 2007, with Mr. Sloane and members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel. Based on the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and any response 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/**

Eugene F. Guthrie, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Docket Nos.: 50-280, 50-281, 72-055  
License Nos.: DPR-32, DPR-37

Enclosure: NRC Integrated Inspection Report 05000280/2007004 and 05000281/2007004  
and 07200055/2007001 w/Attachment: Supplemental Information

cc w/encl: (See page 2)

October 26, 2007

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Letter to David A. Christian from Eugene F. Guthrie, dated October 26, 2007

SUBJECT: SURRY POWER STATION - INTEGRATED INSPECTION REPORT  
05000280/2007004 and 05000281/2007004 and 07200055/2007001

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U.S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.: 50-280, 50-281, 72-055

License Nos.: DPR-32, DPR-37

Report No.: 05000280/2007004, 05000281/2007004, 07200055/2007001

Licensee: Virginia Electric and Power Company (VEPCO)

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

Location: 5850 Hog Island Road  
Surry, VA 23883

Dates: July 1, 2007 - September 30, 2007

Inspectors: J. Reyes, Acting Senior Resident Inspector  
E. Riggs, Acting Senior Resident Inspector  
D. Arnett, Resident Inspector  
S. Atwater, Health Physicist, RIV (Section 4OA5)

Approved by: E. Guthrie, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000280/2007004, 05000281/2007004, 07200055/2007001; 07/01/07 - 09/30/07; Surry Power Station Units 1 and 2; and Independent Spent Fuel Storage Installation; routine integrated report.

The report covered a three-month period of inspection by resident inspectors, and one regional health physicist. No findings of significance were identified. The significance of the finding is indicated by the color (Green, White, Yellow, Red) using IMC 0609, 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 4, dated December 2006.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified

B. Licensee-Identified Violations

One violation of very low safety significance, which was identified by the licensee, has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and the corrective action tracking number are listed in Section 4OA7 of this report.

Enclosure

## REPORT DETAILS

### Summary of Plant Status

Unit 1 operated at or near full Rated Thermal Power (RTP) for the entire reporting period.

Unit 2 operated at or near full RTP for the entire reporting period.

### 1. REACTOR SAFETY

#### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity**

#### 1R01 Adverse Weather Protection

##### Hot Weather Preparations

##### a. Inspection Scope

On July 6, 2007, the licensee entered Operations Checklist 21, "Severe Weather checklist," when temperatures were predicted to be in the mid to high 90's. The inspectors reviewed the checklist, reviewed operator logs, and performed focused walk downs in the turbine building, auxiliary building, safeguards, fire pump house, high level and low level intakes to verify proper operator actions were being performed.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### Partial System Walkdown

##### a. Inspection Scope

The inspectors conducted partial equipment alignment walkdowns to evaluate the operability of selected redundant trains or backup systems while the other train or system was inoperable or out of service (OOS). The walkdowns included, as appropriate, reviews of plant procedures and other documents to determine correct system lineups, and verification of critical components to identify discrepancies which could affect operability of the redundant train or backup system. Additionally, the inspectors reviewed the corrective action system to verify that equipment alignment problems were being identified and properly resolved. Specific documents utilized for this inspection sample are listed in the Attachment to this report. The following three systems were included in this review:

- "A" and "B" Emergency Service Water Pumps, 1-SW-P-1A and 1-SW-P-1B, while the "C" Emergency Service Water Pump, 1-SW-P-1C, was OOS for maintenance

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- Unit 2, “B” Containment Spray Pump, 2-CS-P-1B, while “A” Containment Spray Pump was OOS for maintenance
- Number 1 and 3 Emergency Diesel Generators (EDGs), while the Number 2 EDG was OOS for surveillance testing

b. Findings

No findings of significance were identified.

1R05 Fire Protection

Fire Area Tours

a. Inspection Scope

The inspectors conducted inspections in 12 areas of the plant to verify that combustibles and ignition sources were properly controlled, and that fire detection and suppression capabilities were intact. The inspectors selected the areas based on a review of the licensee’s safe shutdown analysis and probabilistic risk assessment based sensitivity studies for fire-related core damage sequences. Specific documents utilized for this inspection sample are listed in the Attachment to this report. Inspections of the following areas were conducted during this inspection period:

- Unit 1 Cable Vault and Tunnel (2)
- Unit 2 Cable Vault and Tunnel (2)
- Mechanical Equipment Room (MER) #1 (1)
- MER #2 (1)
- MER #3 (1)
- MER #5 (1)
- Black Battery Room (1)
- Emergency Diesel Generator (EDG) room #3 (1)
- Technical Support Center (1)
- Alternate AC Diesel Room (1)

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures

Internal Flooding

a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and the Individual Plant Examination of Non-Seismic External Events and Fires for analyzed

internal floods. Walkdowns were performed in the turbine building, emergency switchgear room (ESGR), and MER #3. In addition, after removal of the flood dikes for the ESGR and MER #3, the inspectors verified proper restoration of the flood control dams. The documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program

a. Inspection Scope

The inspectors observed licensed operator simulator training on September 11, 2007, to verify that operator performance was adequate, evaluators identified and documented crew performance problems, and training was conducted in accordance with licensee procedures. The scenario involved draining down the RCS to the standpipe. During the drain down, an air leak in the standpipe from a Swagelok fitting occurred followed by a thru wall leak in the letdown line. The inspectors observed crew performance in terms of: communications; ability to take timely and proper actions; prioritizing, interpreting, and verifying alarms; correct use and implementation of procedures, including alarm response procedures; and timely control board operation and manipulation, including high-risk operator actions. Additionally, the inspectors observed the oversight and direction, provided by the shift supervisor, including the ability to identify and implement appropriate Technical Specification (TS) actions and properly classify the simulated event.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness

a. Inspection Scope

For the two equipment issues described in the condition reports (CR) 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 associated circumstances, evaluated the extent of condition reviews, as required, and reviewed the generic implications of the equipment and/or work practice problem. Inspectors performed walkdowns 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.

- CR 19197, Low head Safety Injection (SI) pump head tank low level
- CR 17149, Change in vibration on 1-SW-P-1A, "A" Emergency Service Water Pump

b. Findings

No findings of significance were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated the following attributes for the eight selected safety system components (SSCs) and activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of the assessed risk; (3) that, upon identification of an unforeseen situation, necessary steps were taken to plan and control the resulting emergent work activities; and (4) that maintenance risk assessments and emergent work problems were adequately identified and resolved.

- Plan of the Day (POD) for the week of July 16-21, for scheduling changes and risk impact including rescheduling of risk significant surveillances
- POD for the week of July 23-27, for scheduling changes and risk impact including the extension of 1-VS-E-4A condenser replacement and removal of flood dikes resulting in a slightly elevated (yellow) risk condition
- POD for the week of August 5-11, for scheduling changes and risk impact including the issuance of a maximum emergency generation alert for the Dominion portion of the grid due to excessively high temperatures and the subsequent rescheduling of activities with the potential to impact generation or generation reliability
- POD for the week of August 12-18, for scheduling changes and risk impact including problems with the B train of the Unit 1 Hathway system, the failure and replacement of the 01-RP-TSW-PB2-HANDSW, and emergent work on 1-VS-E-4D and 1-VS-E-4B
- POD for the week of September 3 - 7, for emergent work on 2-SI-P-1A, Unit 2 "A" Safety injection pump and scheduling changes that impacted risk significant surveillances
- POD for the week of September 9 - 14, for emergent work after the #2 emergency diesel generator surveillance was completed unsatisfactory and was out of service for additional time to perform maintenance and post maintenance testing

- POD for the week of September 17 - 21, for operations with one charging pump intermediate seal cooler tagged out for replacement, and an unavailable auxiliary feed water pump
- POD for the week of September 23 - 28, for operations in yellow risk condition, during testing of pressurizer power operated relief valves and block valves

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed selected operability evaluations affecting risk significant systems, to assess, as appropriate: (1) the technical adequacy of the evaluations; (2) whether continued system operability was warranted; (3) whether other existing degraded conditions were considered; (4) if compensatory measures were involved, whether the compensatory measures were in place, would work as intended, and were appropriately controlled; and (5) where continued operability was considered unjustified and the impact on TS limiting condition for operations. Documents reviewed are listed in the Attachment to this report. The inspectors reviewed the following six operability evaluations:

- CR 13873, Addition of 1.5 pints of oil to upper oil pot of 1-RH-P-1B, Residual Heat Removal Pump
- CR 11384, Improper material selection for bolting on SI pipe
- CR 11479, Extent of condition results for CR 11384, Improper material selection for bolting on SI pipe
- CR 20234, Declared main control room boundary inoperable
- CR 19599, #2 EDG Speed Sensing Panel SSP1 failed for the 40 and 125 permissive
- CR 11965, Door seals are torn on control room annex door, 1-BS-DR-14

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing

a. Inspection Scope

The inspectors reviewed post maintenance testing (PMT) procedures and/or test activities, as appropriate, for selected risk significant systems to assess whether: (1) plant testing had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) acceptance

criteria were clear and adequately demonstrated operational readiness consistent with design and licensing basis documents; (4) test instrumentation had current calibrations, range, and accuracy consistent with the application; (5) tests were performed as written with applicable prerequisites satisfied; (6) jumpers installed or leads lifted were properly controlled; (7) test equipment was removed following testing; and (8) equipment was returned to the status required to perform its safety function. The inspectors observed testing and/or reviewed the results of the following six tests listed below:

- Maintenance Work Order (MWO) 78100501, Troubleshoot and repair Safety Injection Relay 02-SI-RLY-LS200C5XA
- MWO 764634-01, Perform maintenance on 2-SI-MOV-2862A, Low Head Safety Injection Pump A suction from RWST
- MWO 471348-05, Replace and test New Condenser on 1-VS-E-4A, "A" Main Control Room Chiller
- MWO 765645-01, Perform maintenance on 1-VS-AC-1, Main Control Room Air Handling Unit
- MWO 766191-01, Perform maintenance on 2-CH-MOV-2275A, Charging Pump Miniflow Recirculation Valve Pump "A"
- MWO 786448-01, Replace speed sensor module on the #2 Emergency Diesel Generator and perform post maintenance test

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing

a. Inspection Scope

The inspectors witnessed surveillance tests and/or reviewed test data of the ten risk-significant SSCs listed below to assess, as appropriate, whether the SSCs met TS, the UFSAR, and licensee procedural requirements. The inspectors also determined if the testing effectively demonstrated that the SSCs were ready and capable of performing their intended safety functions.

Surveillance Tests

- 2-PT-8.5, Consequence Limiting Safeguards Logic (Hi-Hi Train)
- 1-OPT-RX-005, Control Rod Assembly Partial Movement
- 2-IPT-FT-RP-SI-001B, Train B Safeguards Actuators Logic Functional Test
- 1-PT-8.4, Consequence Limiting Safeguards Logic (Hi Train)
- 2-PT-8.1, Reactor Protection System Logic (For Normal Operations)

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- 1-PT-8.5, Consequence Limiting Safeguards Logic (Hi-Hi Train)
- CH-11.201, Sampling Primary Demineralizer Influent

#### Inservice Test

- #1 Emergency Diesel Generator Monthly Start Exercise Test
- #3 Emergency Diesel Generator Monthly Start Exercise Test

#### Reactor Coolant System (RCS) leakage detection surveillance

- 1-OPT-RC-10.0, Reactor Coolant Leakage, Computer Calculated

#### b. Findings

No findings of significance were identified.

### 1R23 Temporary Plant Modifications

#### a. Inspection Scope

The inspectors reviewed documents and observed portions of the installation of one temporary modification. Among the documents reviewed were system design bases, the UFSAR, TS, system operability/availability evaluations, and the 10 CFR 50.59 screening. The inspectors observed, as appropriate, that the installation was consistent with the modification documents, was in accordance with the configuration control process, adequate procedures and changes were made, and post installation testing was adequate. The following item was reviewed under this inspection procedure:

- MWO 768789-02, Replacement of 0-AAC-EG-1 annunciator power supply with a Procedurally Controlled Temporary Modification specified in a one time only version of GMP-E-139, Internal Wiring.

#### b. Findings

No findings of significance were identified.

## **Cornerstone: Emergency Preparedness**

### 1EP6 Drill Evaluation

#### a. Inspection Scope

The inspectors observed the announced emergency response training drill conducted on September 5, 2007, to assess the licensee's performance in emergency classification, off-site notification and protective action recommendations. The drill included emergency response actions taken by the management team in the Technical Support Center. This drill evaluation is included in the Emergency Response Performance

Enclosure

Indicator statistics.

b. Findings

No findings of significance were identified.

4. **OTHER ACTIVITIES**

4OA1 Performance Indicator Verification

.1 Initiating Events Cornerstone -Scrams with Loss of Normal Heat Removal Performance Indicator

a. Inspection Scope

The inspectors performed a periodic review of the "Scrams with Loss of Normal Heat Removal" performance indicator for Units 1 and 2. Specifically, the inspectors reviewed this performance indicator for the second quarter of 2007. 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 applicable daily status reports, monthly operating reports, licensee event reports, and operator logs.

b. Findings

No findings of significance were identified.

.2 Barrier Integrity Cornerstone - 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 fourth quarter of 2006 through the second quarter of 2007. 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 applicable daily status reports, monthly operating reports, licensee event reports, and chemistry logs.

b. Findings

No findings of significance were identified.

.3 Mitigating Systems Cornerstone - Safety Systems Functional Failure Performance Indicator

a. Inspection Scope

The inspectors performed a periodic review of the "Safety Systems Functional Failure" performance indicator for Units 1 and 2. Specifically, the inspectors reviewed this performance indicator from the fourth quarter of 2006 through the second quarter of 2007. 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 applicable daily status reports, monthly operating reports, licensee event reports, and operator logs.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems

.1 Daily Review of Plant Issues

a. Inspection Scope

As required by Inspection Procedure (IP) 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 daily screening of items entered into the licensee's corrective action program (CAP). This review was accomplished by reviewing copies of CRs, attending daily screening meetings, and accessing the licensee's computerized database.

b. Findings

No findings of significance were identified.

.2 Focused Review

a. Inspection Scope

The inspectors performed an in-depth review of the failure to follow procedure trend code. This issue was documented in CRs 16600 and 17455 in the licensee's corrective action program. The review was performed to ensure the full extent of the issue was identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspectors evaluated the CRs against the requirements of the licensee's corrective action program as delineated in Station Procedure PI-AA-200, "Corrective Action", Rev 0 and 10 CFR 50 Appendix B, Criterion XVI, "Corrective Action."

b. Findings

No findings of significance were identified.

4OA3 Event Follow-up 71153

(Closed) LER 05000281/2006002-00, Spurious Actuation Results in Unit 2 Trip and Loss of Offsite Power

On October 7, 2006, a spurious actuation of the main turbine's overspeed protection circuit resulted in a secondary transient and lifting of the moisture separator crossunder relief valves. The unit was manually tripped. The lifting relief valves caused turbine building siding to be detached and ejected into the "A" and "C" Reserve Service Station Transformers (RSST) electrical conductors. This resulted in a loss of normal offsite power to both Unit 1 and one of the Unit 2 emergency buses. The inspection activities and evaluation of the risk significance of this event are discussed in detail in Inspection Report (IR) 050000280,281/2006005, Section 4OA3, and in IR 050000280,281/2006011. This LER is closed.

4OA5 Other Activities

.1 (Closed) Unresolved Item (URI) 05000280,281/2007002-01, Failure to properly reactivate an RO license.

The inspectors reviewed the circumstances and information regarding the reactivation of the licensed reactor operator referenced in URI 05000280,281/2007002-01. The risk significance and disposition of this issue is discussed in Section 4OA7 of this report.

.2 Operation of an Independent Spent Fuel Storage Installation (ISFSI)

a. Inspection Scope

The inspectors observed the first loading of the NUHOMS-HD dry fuel storage cask system. Procedures HP-1061.500 and Radiation Work Permit (RWP) 07-0-1102 provided controls to limit the exposure of individuals involved in the spent fuel canister loading. The loading operations with the highest potential for overexposure or contamination included transfer cask removal from the spent fuel pool, removal of the annulus seal, transfer cask decontamination, welding the canister lids, draining the canister, and inserting the canister into the Horizontal Storage Module (HSM).

The transfer cask annulus survey indicated that the annulus seal had been effective in preventing contamination of the outside surface of the canister. The MGP Telepole and Ludlum Model 12-4 Rem Ball instruments were used extensively for performing radiation surveys.

Criticality monitoring and alarm systems were installed in all areas where spent fuel was handled. The criticality monitoring system consisted of 6 area radiation monitors with

audible alarms. Area radiation monitor 1-RM-RI-153 was located on the fuel handling bridge. This monitor also had a remote readout in the control room. A portable Eberline AMS-4 area radiation monitor was located on the south wall of the spent fuel pool, directly south of the cask loading area. Four MGP Instrument ANP-50 area radiation monitors were placed in north bay of the decontamination building. One ANP-50 was located on each level at the 27', 33', 38', and 45' elevations. Each monitor had a remote readout in the weld control center. The criticality alarm system was observed in operation throughout the first NUHOMS system loading.

Overall, the ALARA measures were effective. The total exposure projected for the first canister was 0.703 person-rem and the actual was 0.581 person-rem. This was consistent with an industry average of 0.300 to 0.700 person-rem for first loadings. Additionally, there were no personnel contamination events.

The inspectors observed the first loading of the NUHOMS-HD dry fuel storage cask system. Dry fuel canister loading was performed in accordance with Procedures 0-OP-FH-072 and 0-OP-FH-073. The major operations were:

- Raising the transfer cask from the north bay of the decontamination building and lowering it into the cask loading area of the spent fuel pool
- Loading the spent fuel into the canister
- Installing the canister shield plug
- Removing the transfer cask from the spent fuel pool and returning it to the north bay of the decontamination building
- Removing the annulus seal and performing a contamination survey to determine seal effectiveness
- Pumping the water out of the canister
- Backfilling the canister with helium
- Vacuum drying the canister
- Final helium backfilling
- Raising the transfer cask from the north bay of the decontamination building and downloading it onto the transfer trailer in the crane enclosure building
- Hauling the transfer trailer from the crane enclosure building to the ISFSI
- Removing the transfer cask lid and ram access cover
- Inserting the canister into the horizontal storage module

Procedure adherence was exercised at all times and place keeping was accurate. All surveillance requirements were met, including vacuum drying time limits, helium leak rate testing, and HSM air inlet and outlet vent inspections.

The inspectors reviewed selected completed procedures during the first loading of the NUHOMS-HD dry fuel storage cask system. This was the Surry Power Station's first use of the NUHOMS-HD dry cask storage system, and all procedures were new. The procedures had been developed consistent with Chapters 8 and 9 of the NUHOMS-HD FSAR. The procedures had been field validated through internal dry runs, and approved through the licensee's administrative programs prior to fuel loading. All requirements from the NUHOMS-HD FSAR, NRC SER, Certificate of Compliance, and Technical

Specifications had been incorporated into the applicable procedures. The procedures also included normal, abnormal, and emergency conditions. The licensee verified all procedures to be consistent with the NUHOMS-HD FSAR, with no deviations. Therefore the procedures did not require 10 CFR 72.48 reviews.

The inspectors reviewed the licensee's fuel selection program prior to first loading of the NUHOMS-HD dry fuel storage cask system. In 1986, prior to the first dry fuel storage operations, all spent fuel assemblies and insert components stored in the spent fuel pool were evaluated for re-use in the reactor core. Each fuel assembly was subjected to a visual examination and ultrasonic testing. The specific fuel assemblies and insert components that were unacceptable for re-use in the core were classified as "restricted" and were documented in Technical Report NE-0728. Causes for the restricted classification included cladding failure, stuck Burnable Poison Rod Assembly (BPRAs), damaged rod control cluster (RCC), bent spider vane, lodged debris, grid damage, severe rod bow, broken spring clamp, top nozzle spring screw failure, potential or confirmed inter-granular stress corrosion cracking of the 304 stainless steel thimble tube sleeves, and visible rod failure.

Since 1986, the licensee has maintained the restricted list through visual examination of all fuel assemblies removed from the reactor core and through sipping of all fuel assemblies from operating cycles with chemistry indications of cladding failure. All spent fuel assemblies with cladding failures or other mechanical anomalies have been identified. Prior to each dry fuel storage campaign, the licensee reviews the restricted list to identify fuel assemblies that are not acceptable for core reload but may be acceptable for dry storage.

A review of the ISFSI Fuel Assembly and Insert Component Certification and Loading Map indicated that the spent fuel assemblies selected for loading into the first NUHOMS-HD canister met the Technical Specification requirements for assembly type, cladding integrity, decay heat load, and physical design characteristics. The loading configuration met the technical specification requirements for various combinations of spent fuel assembly enrichment, burnup, cooling time and decay heat. All minimum cooling times were met for the combinations of spent fuel to be loaded.

Loading Procedure 0-OP-FH-072 required a post loading verification to ensure the canister was loaded in accordance with the canister loading map. This verification was performed during the first canister loading and no anomalies were identified.

The inspectors reviewed selected completed procedures for physical inspection and inventory of the ISFSI and completed an evaluation to determine whether records had been established for all spent fuel in storage in the ISFSI; that duplicate records are maintained by the licensee; and an inventory has been conducted on all spent fuel stored in the ISFSI at least every 12 months.

The inspectors reviewed the Surry Power Station programs prior to first loading of the NUHOMS-HD dry fuel storage cask system to determine if the station infrastructure was adequate for continued maintenance and operation of the ISFSI once it was loaded.

Enclosure

The corrective action program was reviewed, including the process for identifying root causes, assigning corrective actions, closing out corrective action reports, and trending and tracking root causes and trends. The corrective action program was found to be adequately implemented in support of ISFSI operations.

During first loading of the NUHOMS-HD system, continuous field oversight was provided by Quality Assurance and frequent oversight was provided by Shift Operations.

The inspectors observed the licensee's final dry run exercise prior to first loading of the NUHOMS-HD dry fuel storage cask system. The dry run exercises ensured that the ISFSI personnel had been trained, the equipment had been tested, and the procedures had been developed to the extent necessary to safely load spent fuel from wet storage in the spent fuel pool to dry storage at the ISFSI.

All of the operations involved in loading spent fuel from wet storage in the spent fuel pool to dry storage at the ISFSI were demonstrated during the dry runs. In addition, the canister unloading sequence was demonstrated or simulated. The unloading operations included retrieving the canister from the horizontal storage module back into the transfer cask, obtaining a canister gas sample, and re-flooding the canister with spent fuel pool water.

The inspectors reviewed the licensee's heavy loads program prior to first loading of the NUHOMS-HD dry fuel storage cask system. The analysis of the design functions of the Surry Power Station spent fuel pool and spent fuel storage racks were documented in Technical Report NE-0746, and were approved by the NRC. Handling of the NUHOMS OS187H transfer cask was evaluated against the NRC approved analysis and shown to be bounded. The licensee incorporated movement of the transfer cask and canister into their existing heavy loads program and updated the UFSAR. The 10 CFR 50.59 screening was reviewed and found to be adequately implemented.

The licensee had performed evaluations for spent fuel cask drops in the spent fuel pool, and had documented the results in Chapter 9, Appendix B.1.5 of the Surry Power Station UFSAR. Based on the results of these evaluations, the licensee installed impact limiters at the bottom of the spent fuel pool in the cask loading area, and had restricted the first three rows of storage racks to storage of fuel assemblies with decay times of at least 150 days.

The impact limiters and the loading restriction on the first three rows of storage racks ensured that during a cask drop: a) the spent fuel pool would not be damaged and no significant spent fuel pool leakage would be expected if the spent fuel pool liner were punctured; b) the fuel assemblies would remain subcritical if the storage racks were damaged by a cask tip-over; and c) the radiological consequences of a cask drop were within the limits of 10 CFR 100. The evaluations further determined that damage to the spent fuel pool piping would not cause the pool to drain, and that there were no safe shutdown systems under the travel path. The load drop analyses determined that all lifts during dry fuel storage operations were non-critical lifts. There were no changes to the crane, yoke and heavy loads program since the last inspection. The same

equipment had been used since 1986.

b. Findings

No findings of significance were identified.

4OA6 Management Meetings (Including Exit Meeting)

Exit Meeting Summary

On October 11, 2007, the resident inspectors presented the inspection results to Mr. Sloane, Surry Plant Manager, and other members of licensee management who acknowledge the findings.

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

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and was a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as a non-cited violation (NCV).

- 10 CFR 55.53(f), Conditions of a License, states in part, that the licensee has completed a minimum of 40 hours of shift functions under the direction of an operator or senior operator, as appropriate, and in the position to which the individual will be assigned. The 40 hours must have included a complete tour of the plant and all required shift turnover procedures. On November 17, 2006, a reactor operator (RO) reactivating his license did not perform a complete plant tour in the Auxiliary Building or Fuel Building, under the direction of an active RO or Senior RO. This violation was documented in the licensee's CAP as CR006467. This finding was determined to be of very low safety significance because it was only related to the program for maintaining active licenses.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

M. Adams, Director, Nuclear Station Safety and Licensing  
M. Crist, Manager, Operations  
B. Garber, Supervisor, Licensing  
J. Grau, Manager, Nuclear Oversight  
E. Hendrixson, Director, Site Engineering  
D. Jernigan, Site Vice President  
L. Jones, Manager, Radiation Protection and Chemistry  
C. Luffman, Manager, Protection Services  
R. Simmons, Manager, Outage and Planning  
K. Sloane, Director, Nuclear Station Operations and Maintenance  
B. Stanley, Manager, Maintenance  
M. Wilson, Manager, Training

NRC

E. Guthrie, Chief, Branch 5, Division of Reactor Projects, Region II

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened

None

Opened and Closed

None

Closed

05000281/2006002-00	LER	Spurious Actuation Results in Unit 2 Trip and Loss of Offsite Power
05000280,281/2007002-01	URI	Failure to properly reactivate an RO license

## LIST OF DOCUMENTS REVIEWED

### **Section 1R05: Fire Protection**

#### Plant Procedures

Surry Power Station, Appendix R Report  
VPAP-2401, Fire Protection Program  
1-FS-FP-101, Unit 1 Cable Vault Penetration Area, Elevation 15 feet - 0 Inches  
1-FS-FP-102, Unit 1 Cable Vault Tunnel, Elevation 9 Feet - 6 Inches and 15 feet - 0 Inches  
2-FS-FP-101, Unit 2 Cable Vault Penetration Area, Elevation 15 feet - 0 Inches  
1-FS-FP-102, Unit 2 Cable Vault Tunnel, Elevation 9 Feet - 6 Inches and 15 feet - 0 Inches  
1-FS-FP-126, Mechanical Equipment Room Number 1, Elevation 45 Feet - 3 Inches  
2-FS-FP-126, Mechanical Equipment Room Number 2, Elevation 45 Feet - 3 Inches  
0-FS-FP-115, Mechanical Equipment Room Number 3, Elevation 9 Feet • 6 Inches  
0-FS-FP-224, Mechanical Equipment Room 5, Elevation 27 Feet • 6 Inches  
0-FS-FP-166, Black Battery Room Elevation, 27 Feet - 6 Inches  
0-FS-FP-123, Diesel Generator Room Number 3, Elevation 27 Feet • 6 Inches  
0-FS-FP-133, Technical Support Center, Elevation 27 Feet • 6 Inches  
0-FS-FP-225, Alternate AC Diesel Room • Construction Site, Elevation 35 Ft

### **Section 1R06: Flood Protection Measures**

#### Plant Procedures

0-MPM-1900-01: Periodic inspection of Flood and spill Protection Dikes, Dams, and Expansion  
Joint Shields  
0-ECM-0901-02: Opening and Sealing of Fire Barriers  
0-EPM-0805-01: Station Flood Detection Testing  
0-AP-13.00: Turbine Building or MER 3 Flooding  
0-AP-13.01: Uncontrollable Turbine building flooding  
0-AP-37.01: Abnormal Environmental Conditions

#### Maintenance Work Orders

MWO 731353-01: Dikes, Dams, shields Inspection  
MWO 733145-01: Flood Detection Testing

### **Section 1R12: Maintenance Effectiveness**

0-MCM-0703-01, Emergency Service Water Pump Diesel Engine Service and Inspection  
0-MCM-0114-02, Emergency Service Water Pump Coupling, Clutch, Right Angle Drive, and  
Related Component Maintenance  
0-MCM\_0114-01, Emergency Service Water Pump Maintenance  
Service Water System Health Reports for the First, Second, Third, and Fourth Quarters of 2006  
and the First and Second Quarters of 2007  
MWO 72696313, Replacement of 1-SW-P-1A with spare pump

Other Documents

**Section 4OA2: Identification and Resolution of Problems**

Plans and Procedures

VPAP-1501, Deviations, Rev. 18

VPAP-1601, Corrective Action, Rev. 23

EPIP-1.01, Emergency Manager Controlling Procedure, Revs. 48 and 49

Dominion Central Reporting System Handbook

PI-AA-200, Corrective Action, Rev 0

Condition Reports (CR)

CR 15396 Personnel Exceeding Administrative limits

CR 15591 Chemistry OLCMS verification data out of service and not circled in logs

CR 15878 A vendor was performing maintenance under an Operations Dept. Lockout

CR 16600 Pressure drop testing of cask CNS 8-120B

CR 16850 Missed analysis for placing new primary bed in service (SFP IX)

CR 17023 PCS point P0442A, "S/G C STM PRESS CH4", indicates "Bad"

CR 17433 1-FH-CRN-15 was left energized when not in use

CR 17455 Critical Observation of 0-MPM-0300-01

CR 18067 The additional preservice exam requirement was not specified by Engineering

**Section 4OA5: Operation of an Independent Spent Fuel Storage Installation (ISFSI)**

Plans and Procedures

General Order 26, Independent Spent Fuel Storage Installation (ISFSI) - Spent Fuel Transport, Rev. 3

General Order 16, Owner Controlled Area (OCA) - Security Checkpoint Operations, Rev. 36

Security Plan Implementing Procedure (SPIP) 006 - Authorized Personnel Access Control, Rev. 7

SPIP 007 - Visitor Authorization and Sign-In, Rev. 12

SPIP 010 - Physical Security Barrier Protection, Rev. 9

SPIP 013 - Security Patrols, Rev. 13

SPIP 018 - Security Records, Rev. 8

## LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Program
CR	Condition Report
EDG	Emergency Diesel Generator
ESGR	Emergency Switchgear Room
HSM	Horizontal Storage Module
IP	Inspection Procedure
IR	Inspection Report
ISFSI	Independent Spent Fuel Storage Installation
MER	Mechanical Equipment Room
MWO	Maintenance Work Order
NRC	Nuclear Regulatory Commission
OCA	Owner Controlled Area
OOS	Out of Service
PARS	Publicly Available Records
PMT	Post Maintenance Testing
POD	Plan of the Day
RCS	Reactor Coolant System
RO	Reactor Operator
RTP	Rated Thermal Power
RWP	Radiation Work Permit
SDP	Significance Determination Process
SI	Safety Injection
SPIP	Security Plan Implementing Procedure
SSC	Structures, systems and Components
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VEPCO	Virginia Electric and Power Company