



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION II  
245 Peachtree Center Avenue  
NE Suite 1200  
Atlanta, Georgia 30303-1257

April 30, 2010

Mr. David A. Heacock  
President and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, VA 23060-6711

SUBJECT: SURRY POWER STATION – NRC INTEGRATED INSPECTION REPORT  
05000280/2010002 and 05000281/2010002

Dear Mr. Heacock:

On March 31, 2010, the United States Nuclear Regulatory Commission (NRC) completed an inspection at your Surry Power Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 20, 2010, with Mr. Bischoff and other members of your staff.

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

This report documents one NRC identified finding of very low safety significance (Green) which was determined to involve a violation of NRC requirements. However, because of the very low safety significance and because the finding was entered into your corrective action program, the NRC is treating the finding as a non-cited violation (NCV) consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN.: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator Region II; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Surry Power Station.

In addition, if you disagree with the characterization of any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region II; and the NRC Resident Inspector at the Surry Power Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

In accordance with 10 CFR 2.390 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 the NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Gerald J. McCoy, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000280/2010002 and 05000281/2010002  
w/Attachment: Supplemental Information

cc w/encl. (See page 3)

VEPCO

2

In accordance with 10 CFR 2.390 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 the 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/

Gerald J. McCoy, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000281/2010002 and 05000281/2010002  
w/Attachment: Supplemental Information

cc w/encl. (See page 3)

X PUBLICLY AVAILABLE    ☐ NON-PUBLICLY AVAILABLE    ☐ SENSITIVE    X NON-SENSITIVE  
ADAMS: X ☐ Yes    ACCESSION NUMBER: ML101200347    X SUNSI REVIEW COMPLETE

OFFICE	RII:DRP	RII:DRP	RII:DRP	RII:DRS	RII:DRS	RII:DRS	RII:DRS
SIGNATURE	CRW by email	JHN by email	GMcCoy for	JBH4	WRL	RNP1	NDK1 by email
NAME	CWelch	JNadel	TLighty	JHamman	WLewis	RPatterson	NKarlovi
DATE	04/27/2010	04/29/2010	04/30/2010	04/28/2010	04/27/2010	04/27/2010	04/27/2010
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
OFFICE	RII:DRS	RII:DRS					
SIGNATURE	AXS2	GMcCoy for					
NAME	ASengupta	CStansberry					
DATE	04/28/2010	04/30/2010					
E-MAIL COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY

DOCUMENT NAME: I:\RPB5\SURRY\REPORTS\2010\10-02\SUR10-02 FINAL.DOC

cc w/encl.

Gerald T. Bischof  
Site Vice President  
Surry Power Station  
Virginia Electric and Power Company  
Electronic Mail Distribution

B. L. (Sonny) Stanley  
Director, Nuclear Safety and Licensing  
Virginia Electric and Power Company  
Electronic Mail Distribution

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

Chris L. Funderburk  
Director, Nuclear Licensing & Operations Support  
Virginia Electric and Power Company  
Electronic Mail Distribution

Ginger L. Alligood  
Virginia Electric and Power Company  
Electronic Mail Distribution

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

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

Senior Resident Inspector  
Surry Power Station  
U.S. Nuclear Regulatory Commission  
5850 Hog Island Rd  
Surry, VA 23883

Michael M. Cline  
Director  
Virginia Department of Emergency Services Management  
Electronic Mail Distribution

VEPCO

4

Letter to David A. Heacock from Gerald J. McCoy dated April 30, 2010.

SUBJECT:     SURREY POWER STATION – NRC INTEGRATED INSPECTION REPORT  
              05000280/2010002 and 05000281/2010002

Distribution w/encl:

C. Evans, RII

L. Slack, RII

OE Mail

RIDSNRRDIRS

PUBLIC

RidsNrrPMSurry Resource

**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION II**

Docket Nos.: 50-280, 50-281

License Nos.: DPR-32, DPR-37

Report No: 05000280/2010002 and 05000281/2010002

Licensee: Virginia Electric and Power Company (VEPCO)

Facility: Surry Power Station, Units 1 and 2

Location: 5850 Hog Island Road  
Surry, VA 23883

Dates: January 1, 2010 through March 31, 2010

Inspectors: C. Welch, Senior Resident Inspector  
J. Nadel, Resident Inspector  
T. Lighty, Project Engineer  
J. Hamman, Reactor Inspector (Section 1R17)  
W. Lewis, Reactor Inspector (Section 1R17)  
R. Patterson, Reactor Inspector (Section 1R17)  
A. Sengupta, Reactor Inspector (Section 1R17)  
C. Smith-Stansberry, Reactor Inspector (Section 1R17)  
R. Fanner, Reactor Inspector (Section 1R17)

Approved by: Gerald J. McCoy, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosure

## SUMMARY OF FINDINGS

IR 05000280/2010-002 and 05000281/2010-002; 01/01/2010 – 03/31/2010; Surry Power Station, Units 1 and 2, Post Maintenance Testing.

The report covered a 3 month period of inspection by resident inspectors and an announced inspection by regional engineering inspectors. One Green finding, which was a non-cited violation (NCV), was identified. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). The cross-cutting aspect was determined using IMC 0310, "Components Within The Cross-Cutting Areas." 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.

### Cornerstone: Mitigating Systems

Green. The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action" for failure to identify that a non-conservative error had been introduced into the Unit 1 A main station battery quarterly technical specification surveillance procedure (CR 366388). The licensee modified the procedure to eliminate the non-conservative error.

The inspectors determined the failure to identify a non-conservative error which was introduced into the TS quarterly surveillance procedure following the replacement of individual battery cells, was a condition adverse to quality and a performance deficiency which was reasonably within the licensee's ability to foresee and correct, and should have been prevented. The finding was more than minor because if left uncorrected the non-conservative error in 1-EPT-0103-01 would have the potential to lead to a more significant safety concern. Specifically, this is because the error was large enough to mask cell degradation and an inoperable cell. The finding was associated with the equipment performance attribute of the reactor safety mitigating systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of the safety related 125 VDC station batteries that provide class 1E backup power to risk significant components needed to prevent undesirable consequences during a loss of offsite power event. The finding was evaluated using MC-0609, Attachment 4, "Phase 1 - Initial Screening and Characterization of Findings," and determined to be of very low safety significance (Green) because operability of the Unit 1 A battery was not lost and the error was removed prior to the next quarterly surveillance. This finding had a cross cutting aspect in the area of problem identification and resolution because the licensee did not evaluate and communicate relevant external OE, including vendor recommendations, to affected internal stakeholders in a timely manner (P.2(a)). Specifically, the caveat to have cells on a float charge for 72 hours was not fully evaluated when the battery cells were replaced. (Section 1R19)

### Licensee Identified Violations

None

Enclosure

## REPORT DETAILS

### Summary of Plant Status

Both Unit 1 and 2 operated at or near full rated thermal power (RTP) throughout the inspection period.

### REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

#### 1R01 Adverse Weather Protection

##### a. Inspection Scope

The inspectors reviewed the licensee's preparations for extreme cold weather predicted for January 4 – 8, 2010. Inspection focused on verification of design features and the licensee's implementation of their cold weather procedures to protect mitigating systems from adverse weather effects. The inspectors reviewed station procedures 0-OSP-ZZ-001, "Cold Weather Preparations;" OC – 21, "Severe Weather Checklist;" and 0-ECM-1205-01, "EDG Room Temperature Monitoring and Compensatory Measures for Extreme Low Room Temperatures;" and walked down areas vulnerable to cold weather. The inspectors, on a sampling basis, verified action items from the cold weather procedures were complete; which included verifying the proper position of roll-up doors, ventilation louvers, thermostat settings, and that piping insulation and heat tracing was installed and operable in areas susceptible to a cold environment. The areas walked down include: the auxiliary and safeguards buildings, the turbine building, the AFW systems in the main steam valve houses, EDG rooms, refueling water storage tank level instrumentation, and the low level intake structure. The inspectors verified weather related problems were being identified, entered into the corrective action program, and properly addressed.

##### b. Findings

No findings of significance were identified.

#### 1R04 Equipment Alignment

##### .1 Partial Walkdown

##### a. Inspection Scope

The inspectors performed a partial walkdown of the four risk-significant systems identified below to verify the redundant or diverse train for equipment removed from service was operable and/or that the system was properly aligned to perform its designated safety function following an extended outage. During the walkdown, the inspectors verified the positions of critical valves, breakers, and control switches by in-field observation and/or review of the main control board. To determine the correct

Enclosure



configuration to support system operation, the inspectors reviewed applicable operating procedures, station drawings, the Updated Final Safety Analysis Report, and the Technical Specifications. The inspectors attempted to identify any discrepancies that could impact the function of the system, and, therefore, potentially increase risk.

- #1 emergency diesel generator (EDG) on January 25 while EDG #2 was out for testing
- Unit 1 B battery and inverter on January 14 during replacement of battery cells in the A battery bank
- Station blackout emergency diesel generator on February 17 during maintenance on the Unit 2 B uninterruptible power supply
- Unit 1 auxiliary feedwater system on March 2 following testing of the A motor driven AFW pump and motor operated valves

b. Findings

No findings of significance were identified.

.2 Complete System Walkdown

a. Inspection Scope

The inspectors performed a full system walkdown of the Unit 1 and Unit 2 DC Power systems to verify the systems were properly aligned and capable of performing their safety function, and to assess their material condition. During the walkdown, the inspectors verified breaker positions were in the proper alignment, component labeling was accurate, hangers and supports were functional, and local indications were accurate. The plant health report, system drawings, condition reports, the UFSAR, and Technical Specifications were reviewed and outstanding deficiencies were verified to be properly classified and not affect system operability and capability to perform its safety function. The inspectors reviewed the corrective action program to verify equipment alignment issues were being identified and resolved.

b. Findings

No findings of significance were identified.

1R05 Fire Protection

.1 Quarterly Fire Protection Reviews

a. Inspection Scope

The inspectors conducted a defense-in-depth (DID) review for the seven fire areas listed below by walkdown and review of licensee documents. The reviews were performed to evaluate the fire protection program operational status and material condition and the adequacy of: (1) control of transient combustibles and ignition sources; (2) fire detection

Enclosure

and suppression capability; (3) passive fire protection features; (4) compensatory measures established for out-of-service, degraded or inoperable fire protection equipment, systems, or features; and (5) procedures, equipment, fire barriers, and systems so that post-fire capability to safely shutdown the plant is ensured. The inspectors reviewed the corrective action program to verify fire protection deficiencies were being identified and properly resolved.

- Fire zone 1, Unit 1 cable vault
- Fire zone 3, Unit 1 emergency switchgear room
- Fire zone 6, # 1 emergency diesel generator room
- Fire zone 8, # 3 emergency diesel generator room
- Fire zone 2, Unit 2 cable vault
- Fire zone 4, Unit 2 emergency switchgear room
- Fire zone 5, main control room

b. Findings

No findings of significance were identified.

.2 Annual Fire Drills

a. Inspection Scope

The inspectors observed a fire brigade drill held on March 4, 2010, to evaluate the readiness of the licensee's personnel to fight fires. Aspects considered in the evaluation include: the control room operators' response, including identification of the fire location, dispatch of the fire brigade, and sounding of alarms; the number of individuals assigned to the fire brigade; response timeliness; use of protective clothing and self-contained breathing apparatus; the brigade team leader's command and control, use of pre-fire plan strategies, briefs, and delegation of assignments; fire hose deployment and reach; approach into the fire area; effectiveness of communications among brigade members and between the brigade and the control room; search for victims, smoke evacuation, and the drill's objective and acceptance criteria. The inspectors observed the post drill critique and verified noted deficiencies or areas for improvement were captured.

b. Findings

No findings of significance were identified.

## 1R06 Flood Protection Measures

### .1 Internal Flooding

#### a. Inspection Scope

The inspectors reviewed the Updated Final Safety Analysis Report and Individual Plant Examination of Non-Seismic External Events and Fires to identify those areas that can be affected by external and internal flooding. Based on the reviews, the inspectors walked down the Unit 1 and 2 turbine building basements, the emergency switchgear rooms, and mechanical equipment rooms 3, 4, and 5. The inspectors observed and assessed the condition and availability of temporary or removable flooding barriers, flooding dikes, floor drain backflow preventers, the sealing of holes and penetrations between flood areas, the adequacy of water tight doors, and the operability of flooding alarms and installed sump pumps. The inspectors verified on a sampling basis that completed surveillance tests of the turbine building flood detectors and circulating water (CW) system motor operated isolation valves were satisfactory, and the flood shields were properly installed over the CW system flexible piping connections. The inspectors reviewed the corrective action program and verified internal flooding related problems were being identified and properly addressed.

#### b. Findings

No findings of significance were identified.

## 1R11 Licensed Operator Regualification Program

### .1 Resident Inspector Quarterly Review

#### a. Inspection Scope

The inspectors observed a licensed operator simulator exam given on January 13 and 14, 2010. The exam, administered using scenarios RQ-10.1-SE-9 (Rev. 0) and RQ-10.1-SE-10 (Rev. 0), involved both operational transients and design basis events. The inspector verified that simulator conditions were consistent with the scenario and reflected the actual plant configuration (i.e., simulator fidelity). The inspector observed the crew's performance to determine whether the crew met the scenario objectives; accomplished the critical tasks; demonstrated the ability to take timely action in a safe direction and to prioritize, interpret, and verify alarms; demonstrated proper use of alarm response, abnormal, and emergency operating procedures; demonstrated proper command and control; communicated effectively; and appropriately classified events per the emergency plan. The inspector observed the evaluators' post scenario critiques and confirmed items for improvement were identified and would be discussed with the operators to further enhance performance.

#### b. Findings

No findings of significance were identified.

Enclosure

## 1R12 Maintenance Effectiveness

### a. Inspection Scope

For the equipment issue described in the condition report listed below, the inspectors evaluated the effectiveness of the corresponding licensee's preventive and corrective maintenance. 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. The 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 Matrix.

- CR 328213 – Boric acid storage pump 1-CH-P-2D delta pressure gauge in the inoperable range during surveillance testing.

### b. Findings

No findings of significance were identified.

## 1R13 Maintenance Risk Assessments and Emergent Work Control

### a. Inspection Scope

The inspectors evaluated, as appropriate, for the five work activities listed below: (1) the effectiveness of the risk assessments performed before maintenance activities were conducted; (2) the management of 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. The inspectors verified that the licensee was complying with the requirements of 10 CFR 50.65(a)(4) and the data output from the licensee's safety monitor associated with the risk profile of Units 1 and 2. The inspectors reviewed the corrective action program to verify deficiencies in risk assessments were being identified and properly resolved.

- On-line green risk condition for Units 1 and 2 during replacement of battery cells in the Unit 1 A battery and removal of the emergency switchgear room flood barrier on January 14
- On-line green risk condition for Units 1 and 2 during sustained freezing conditions January 4 – 8
- On-line green risk condition for Units 1 and 2 during severe cold weather coincident with a declared high wind advisory for Surry County on February 10
- On-line green risk condition for Units 1 and 2 during replacement of emergency switchgear room, cable tunnel and MER #3 backflow preventers on February 7

Enclosure

- On-line green risk condition for Units 1 and 2 during planned maintenance on the intake canal low canal level indication circuitry on March 23

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the five operability evaluations, listed below, affecting risk-significant mitigating 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, the impact on TS Limiting Conditions for Operation and the risk significance. The inspectors' review included verification that determinations of operability followed procedural requirements of OP-AA-102, "Operability Determination." The inspectors reviewed the corrective action program to verify deficiencies in operability determinations were being identified and corrected.

- CR 365150, discovery of Unit 2 B battery positive terminal cable found exceeding minimum specified bend radius
- CR 366388, Unit 1 A battery identified with high electrolyte level in six cells after cell replacement
- CR 364602, Unit 1 containment particulate and gaseous radiation monitors exhibiting flow oscillations after return to service following maintenance
- CR 371403, emergency service water pump 1-SW-P-1C high motor vibes on non-IST points
- CR 370247, safety injection accumulator 1-SI-TK-1C discharge check valve back-leakage (ODM 0000100 Rev. 2)

b. Findings:

No findings of significance were identified.

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed selected samples of evaluations to confirm that the licensee had appropriately considered the conditions under which changes to the facility, Updated Final Safety Analysis Report (UFSAR), or procedures may be made, and tests conducted, without prior NRC approval. The inspectors reviewed evaluations for seven changes and additional information, such as drawings, calculations, supporting

Enclosure

analyses, the UFSAR, and Technical Specifications (TS) to confirm that the licensee had appropriately concluded that the changes could be accomplished without obtaining a license amendment. The seven evaluations reviewed are listed in the List of Documents Reviewed.

The inspectors reviewed samples of changes for which the licensee had determined that evaluations were not required, to confirm that the licensee's conclusions to "screen out" these changes were correct and consistent with 10CFR50.59. The 21 "screened out" changes reviewed are listed in the List of Documents Reviewed.

The inspectors evaluated engineering design change packages for 13 material, component, and design based modifications to evaluate the modifications for adverse effects on system availability, reliability, and functional capability. The 13 modifications and the associated attributes reviewed are as follows:

- DCP 07-024, 2008 Unit 2 Flow Accelerated Corrosion Modifications
- LSM 2-07-013, SI Flow Transmitter 2940 Replacement
- DCP 06-041, RWST Level ESFAS Function to Support GSI-191 Containment Sump Modifications
- DCP 07-014, Replacing Reactor Coolant Pump Component Cooling Relief Valves
- DCP 07-048, Replacement of 1-SW-262/268 and 2-SW-442/445 with a Swing Check Valve
- DCP 07-031, Install New AFW Isolation MOV Auto Open Signal Configuration
- DCP SU-09-0002, Reactor Coolant Pump Seal Replacement
- DCP 07-017, Fusing of EDG MCC Loads
- DCP 04-064, EDG Combustion Air Inlet Filter Bank Vendor Recommended Modifications
- CGD 10000001580, MCR Chiller Control Panels – SWR Reset
- EE 10000002835, 125 VDC Switchboard 50 Amp Circuit Breaker
- DCP 07-032, Delete HPHD Pump Autostart Signal
- DCP SU-09-0029, RC Taylor Math Unit Fuse Installations

Documents reviewed included procedures, engineering calculations, modification design and implementation packages, work orders, site drawings, corrective action documents, applicable sections of the living UFSAR, supporting analyses, Technical Specifications, and design basis information. The inspectors additionally reviewed test documentation to ensure adequacy in scope and conclusion. The inspectors review was also intended to verify that all details were incorporated in licensing and design basis documents and associated plant procedures.

The inspectors also reviewed selected CRs and the licensee's recent self-assessment associated with modifications and screening/evaluation issues to confirm that problems were identified at an appropriate threshold, were entered into the corrective action process, and appropriate corrective actions had been initiated and tracked to completion.

Enclosure

b. Findings

No findings of significance were identified.

1R18 Plant Modificationsa. Inspection Scope

The inspectors reviewed the three identified temporary plant modifications listed below to verify: (1) that the design and licensing bases, and performance capability of risk-significant systems, structures, and components (SSCs) were not degraded through modification; (2) that modifications performed during increased risk-significant configurations do not place the plant in an unsafe condition; and, (3) that the modification did not affect system operability or availability as described by the TS and UFSAR. The inspectors reviewed applicable procedures, engineering calculations, the modification design and implementation package, work orders, drawings, corrective action documents, the UFSAR and TS, supporting analyses, and design basis information. Inspectors witnessed aspects of the modification implementation and observed/reviewed aspects of the post-modification testing.

- Temporary plant modification S1-09-142, "Jumper out cell #21 to restore operability of 1-EPD-B-1A main station battery"
- Temporary plant modification S1-10-143, "Jumper out cell #11 to restore operability of 1-EPD-B-1A main station battery"
- Temporary plant modification S1-10-144, "Install piping to add oil to the top of main feedwater pump 1A (1-FW-P-1A) slinger ring to reduce bearing temperature"

b. Findings:

No findings of significance were identified.

1R19 Post Maintenance Testinga. Inspection Scope

For the eight risk-significant maintenance activities listed below, the inspectors reviewed the associated post maintenance testing (PMT) procedures and either witnessed the testing and/or reviewed completed records to assess whether: (1) the effect of testing on the plant had been adequately addressed by control room and/or engineering personnel; (2) testing was adequate for the maintenance performed; (3) test 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) test 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 reviewed the corrective action program to verify PMT deficiencies were being identified and corrected. Documents reviewed are listed in the Attachment to this report.

Enclosure

- Preventive maintenance on 2-SI-MOV-2862B and quick look testing, W.O. 38102347276
- Corrective maintenance on containment particulate radiation monitor, 1-RM-RMS-159, due to a filter tear indication, W.O. 38102721741
- Corrective maintenance to replace cells 3, 21, and 22 in the unit 1 battery 1-EPD-1A, due to degradation from cracking, W.O. 38102588642
- Preventative maintenance and eddy current exam on control room chiller 1-VS-E-4A, W.O.38102586240
- Corrective maintenance to replace valve 2-SW-TCV-208A, W.O. 38102743736
- Preventive maintenance for #3 EDG relay replacement; W.O. 38102241043
- Preventive maintenance for #3 EDG 18 month overhaul; W.O. 38102455624
- Preventive maintenance for #3 EDG air motor replacement; W.O. 38102613991

b. Findings

Introduction: The inspectors identified a Green NCV of 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action;" for failure to identify that a non-conservative error had been introduced into the Unit 1 A main station battery quarterly technical specification surveillance procedure (CR 366388). The licensee modified the procedure to eliminate the non-conservative error.

Description: On January 14, 2010, the licensee replaced six cells in the 60 cell Unit 1 A battery which were degraded due to cracks in the plastic lids. Post maintenance testing required performance of the quarterly TS surveillance test procedure, 1-EPT-0103-01; which requires the electrolyte specific gravity, temperature, and level be recorded for each cell and compared to specific acceptance criteria. There are acceptance criteria for both the individual cell readings and the average values for the entire battery. The licensee performed the test immediately after re-terminating the battery following installation of the six replacement cells. The inspectors noted the vendor manual recommends waiting a minimum of 72 hours before taking specific gravity readings while on a float charge. Additionally, 1-EPT-0103-01 includes a precaution that cells should be on a float charge for 72 hours prior to performing the procedure. However, several one-time-only changes were made to the procedure to allow taking some data immediately after re-terminating the battery and neither the vendor recommendation nor the precaution was fully evaluated. The licensee noted no abnormalities during the test and all results were within the acceptance criteria.

Eleven days after the battery replacement, the inspectors walked down the A battery and identified electrolyte level in all six replaced cells had risen above the high level mark, and one cell's level was greater than ¼ inch above the high level mark, placing the cell into an "alert" condition. The electrolyte level of all cells is maintained at the midpoint between the high and low level marks and all replacement cells were recorded at the midpoint when the battery was returned to service on January 14, 2010. The quarterly surveillance procedure incorporates correction factors for temperature and level which are then applied to the measured values for individual cell specific gravity. These corrected values are used in the comparison to the acceptance criteria to determine both individual cell and collective battery operability. In this case however, the level increase

Enclosure



was caused by natural changes within the battery electrolyte that were a direct result of the installation process and the disruption of the float charge on the installed cells. Since the mass of liquid in the new cells did not change when the level increased, the level correction factor required by 1-EPT-0103-01 became a non-conservative error affecting the corrected specific gravity of the replaced cells. When this error was identified the magnitude was greater than the “alert” band of the acceptance criteria, meaning that an inoperable cell could meet the acceptance criteria and be recorded as fully operable, masking battery cell degradation.

Analysis: The inspectors determined the failure to identify a non-conservative error which was introduced into the TS quarterly surveillance procedure following the replacement of individual battery cells, was a condition adverse to quality and a performance deficiency which was reasonably within the licensee’s ability to foresee and correct, and should have been prevented.

The finding was more than minor because if left uncorrected the non-conservative error in 1-EPT-0103-01 would have the potential to lead to a more significant safety concern. Specifically, this is because the error was large enough to mask cell degradation and an inoperable cell. The finding was associated with the equipment performance attribute of the reactor safety mitigating systems cornerstone, and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of the safety related 125 VDC station batteries that provide class 1E backup power to risk significant components needed to prevent undesirable consequences during a loss of offsite power event. The finding was evaluated using MC-0609, Attachment 4, “Phase 1 - Initial Screening and Characterization of Findings,” and determined to be of very low safety significance (Green) because operability of the Unit 1 A battery was not lost and the error was removed prior to the next quarterly surveillance.

This finding had a cross cutting aspect in the area of problem identification and resolution because the licensee did not evaluate and communicate relevant external OE, including vendor recommendations, to affected internal stakeholders in a timely manner (P.2(a)). Specifically, the caveat to have cells on a float charge for 72 hours was not fully evaluated when the battery cells were replaced.

Enforcement: 10 CFR 50, Appendix B, Criterion XVI, “Corrective Action” requires, in part, that conditions adverse to quality be promptly identified and corrected. Contrary to the above, the licensee failed to identify the non-conservative impact on technical specification surveillance acceptance criteria caused by battery cell replacement activities. Because this finding is of very low safety significance, has been entered into the licensee’s corrective action program as CR 367879, and has been corrected; this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy. NCV 05000280/2010002-01: Failure to identify a non-conservative error in the quarterly TS surveillance for the Unit 1 A battery.

Enclosure

1R22 Surveillance Testinga. Inspection Scope

The inspectors witnessed and/or reviewed test records for the seven risk-significant surveillance tests listed below, to determine whether the SSCs selected meet Technical Specifications (TS), the Updated Final Safety Analysis Report (UFSAR), and licensee's procedure requirements and demonstrate that the SSCs are capable of performing their intended safety functions (under conditions as close as practical to accident conditions or as required by TS) and their operational readiness.

In-Service Testing:

- 2-OPT-CS-006, Rev. 12, Unit 2 RWST, Chemical Injection Tank, and Containment Spray System MOV Stroke Test

Surveillance Testing:

- 1-OPT-EG-001, Rev. 45; Number 1 Emergency Diesel Generator Monthly Start Exercise Test
- 0-OSP-AAC-003, Rev. 3; Automatic Start Test of AAC Diesel Generator
- 2-OPT-EG-001, Rev. 53; Number 2 Emergency Diesel Generator Monthly Start Exercise Test
- 1-EPT-0103-01, Rev. 12; Main Station Battery 1A Quarterly Check

RCS Leakage:

- 1-OPT-RC-10.0, Rev. 30, Unit 1 Reactor Coolant Leakage – Computer Calculated
- 2-OPT-RC-10.0, Rev. 29, Unit 2 Reactor Coolant Leakage – Computer Calculated

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP6 Drill Evaluationa. Inspection Scope

The inspectors observed the emergency response training drill conducted on February 9, 2010, to assess licensee performance in event classification per the emergency plan, protective action recommendations, and off-site notifications. The drill required emergency plan response actions be taken by personnel located in the simulator control room, the technical support center (TSC), and local emergency operating facility (LEOF). The inspectors observed conduct of the drill from the TSC and the subsequent critique

Enclosure

performance. This drill is included in the Emergency Response Performance Indicator Statistics.

b. Findings

No findings of significance were identified.

#### 4. OTHER ACTIVITIES

##### 4OA1 Performance Indicator (PI) Verification

a. Inspection Scope

The inspectors sampled licensee data for the Performance Indicators (PIs) listed below. To assess the accuracy and completeness of the submitted PI data and whether the PIs were properly calculated during the period reviewed, PI definitions and guidance contained in NEI 99-02, "Regulatory Assessment Indicator Guideline," Rev. 4, were used to verify the basis for each data element.

##### Initiating Event Cornerstone

The following Unit 1 and 2 PIs were reviewed from the fourth quarter 2008 through the fourth quarter 2009. Documents reviewed included NRC inspection reports, licensee event reports, operator logs and station performance indicators.

- Unplanned Scrams per 7000 Critical Hours.
- Unplanned Power Changes per 7000 Critical Hours
- Unplanned Scrams With Complications

b. Findings

No findings of significance were identified.

##### 4OA2 Identification and Resolution of Problems

###### .1 Daily Reviews of items Entered into the Corrective Action Program:

As required by NRC Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished by reviewing daily CR report summaries and periodically attending daily CR Review Team meetings.

.2 Annual Follow-up of Selected PI&R Issues

CR 364061 Minimum Shift Manning Requirements Not Met

a. Inspection Scope

The inspectors selected CR 364061 and its associated root cause evaluation (RCE - 000999) for follow-up based on the potential adverse impact on the licensee's ability to meet the emergency plan's minimum staffing requirements. The inspectors reviewed the CR and RCE against the applicable performance attributes contained in NRC inspection procedure 71152, "Problem Identification and Resolution."

b. Findings

Introduction: An unresolved item (URI) was identified by the inspectors relating to maintenance of the required minimum onsite manning in accordance with the licensee's Emergency Plan.

Description: On January 4, 2010, the licensee identified issues relating to the Emergency Plan minimum manning requirements for maintenance personnel. They subsequently initiated CR364061 in their CAP and the respective root cause evaluation, RCE000999, for appropriate corrective actions. The inspectors reviewed RCE000999 and require additional information from the licensee to appropriately characterize a performance deficiency which may be greater than minor. This issue is identified as URI 05000280, 281/2010002-02, Emergency Plan Minimum Staffing.

4OA3 Event Follow-up

1. Licensee Event Report (LER) 05000281/2009-001-00

a. Inspection Scope

The inspectors reviewed LER 05000281/2009-001-00, "Manual Reactor Trip Initiated to replace a Rod Control Data Logging Card" and related documents to assess the LER's accuracy, appropriateness of the corrective actions, potential violation of NRC requirements, and generic issues. The LER documents the November 29, 2009, manual reactor trip inserted during physics startup testing following failure of the A114 Supervisory Data Logging Card which caused a loss of rod position step counter indications for shutdown bank B and control banks B and D.

b. Findings

No findings of significance were identified and no violation of NRC requirements occurred.

Enclosure

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspector Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with the licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

###### b. Findings

No findings of significance were identified.

#### 4OA6 Meetings, Including Exit

##### Exit Meeting Summary

An interim exit with licensee management and staff was conducted on January 28, 2010, to discuss the results of the DRS engineering inspection. Proprietary information reviewed by the team as part of routine inspection activities was returned to the licensee in accordance with prescribed controls.

On April 20, 2010, the inspection results were presented to Mr. Bischoff and other members of his staff, who acknowledged the findings. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

Enclosure

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

M. Adams, Director, Station Engineering  
G. Bischof, Site Vice President  
B. Garber, Supervisor, Licensing  
K. Grover, Manager, Operations  
A. Harrow, Supervisor, Electrical Systems  
R. Johnson, Manager, Outage and Planning  
R. Manrique, Supervisor, Primary Systems  
C. Olsen, Manager, Site Engineering  
L. Ragland, Supervisor, Health Physics Operations  
K. Sloane, Plant Manager (Nuclear)  
B. Stanley, Director, Station Safety and Licensing  
M. Wilda, Supervisor, Auxiliary Systems  
J. Eggart, Manager, Radiation Protection & Chemistry  
B. Hilt, Supervisor, HP Technical Services  
D. White, Supervisor, ALARA  
D. Godwin, Supervisor, Nuclear Engineering

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

#### **Opened**

05000280, 281/2010002-02	URI	Emergency Plan Minimum Staffing (Section 40A2.2)
--------------------------	-----	--

#### **Opened and Closed**

05000280, 281/2010002-01	NCV	Failure to identify a non-conservative error in the quarterly TS surveillance for the Unit 1 A battery (Section IR19)
--------------------------	-----	---

#### **Closed**

05000281/2009-001-00	LER	Manual Reactor Trip Initiated to replace a Rod Control Data Logging Card (Section 40A3)
----------------------	-----	---

## **LIST OF DOCUMENTS REVIEWED**

### **Section 1R01: Adverse Weather Protection**

0-OSP-ZZ-001, Rev. 9, Cold Weather Preparation  
0-ECM-1205-01, Rev. 2 EDG Room Temperature Monitoring and Compensatory Measures  
For Extreme Low Room Temperatures  
Operations Checklist OC-21, dated January 8, 2010

### **Section 1R04: Equipment Alignment**

1-OPT-FW-004, Rev. 4 AFW Valve Position Verifications  
DWG 11448-FM-068A, Rev. 53; Feedwater System Surry Unit 1  
DWG 11448-FE-1G, Rev. 36; 125V DC Line Diagram Surry Unit 1  
DWG 11448-FE-10A, Rev. 28; Wiring Diagram 125V DC Surry Unit 1  
DWG 11548-FE-1G, Rev. 32; 125V DC Line Diagram Surry Unit 2  
DWG 11548-FE-10A, Rev. 23; Wiring Diagram 125V DC Surry Unit 2

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

UFSAR Appendix 9C, Re. 41, Flood Control System  
GMP-012, Rev. 8, Roving and Stationary Flood Watch Responsibilities  
0-AP-13.00, Rev. 21, Turbine Building or MER 3 Flooding

### **1R12 Maintenance Effectiveness**

CR 328213  
CR 363782

### **Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 01/06/2010  
Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 01/08/2010  
Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 01/14/2010  
Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 02/05/2010  
Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 02/06/2010  
Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 02/07/2010  
Surry Unit1 and Unit 2 Safety Monitor PSA Look Ahead for 03/23/2010

### **Section 1R15: Operability Evaluations**

OP-AA-102 Rev. 5, "Operability Determination.

### **Section 1R17: Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications**

#### **Full Evaluations**

DCP 05-049, NRC GSI-191 Containment Sump Strainer Design  
DCP 06-012, Zinc Injection Pump Installation  
DCP SU-09-00078, Startup on AFW and Carbohydrazide Usage and Evaluation  
LSM 2-07-013, SI Flow Transmitter 2940 Replacement  
Eval 09-001, Revision of minimum assumed Inside & Outside Recirc. Spray Pumps, Rev. 0

DCP 07-031, Install New AFW Isolation MOV Auto Open Signal Configuration  
 S1-09-140, Temporary Modification – Alternate Power Source for 1-FC-P-1B, 10/21/09

#### Screened Out Items

DCP SU-09-0002, Reactor Coolant Pump Seal Replacement  
 DCP 07-017, Fusing of EDG MCC Loads  
 DCP 04-064, EDG Combustion Air Inlet Filter Bank Vendor Recommended Modifications  
 DCP 09-0023, Charging Component Cooling System Maximum pH  
 ET 09-0023, Environmental Qualification Life Extension for 1-RC-RTD-1313/1323 and 2-RC  
 RTD-2313/2323, Rev. 0  
 ET 09-0062, Engineering Evaluation for Mechanical Agitation of 01-SI-82, Rev. 0  
 ET 09-0124, Turbine Building Flood Protection Interim Measures, Rev. 0  
 DCP 07-024, 2008 Unit 2 Flow Accelerated Corrosion Modifications  
 DCP 07-048, Replacement of 1-SW-262/268 and 2-SW-442/445 with a Swing Check Valve  
 DCP 07-014, Replacing Reactor Coolant Pump Component Cooling Relief Valves  
 ET-S-07-0079, Establish IST Comprehensive Values for RHR, HHSI and IRS Pumps, Rev. 2  
 ET-S-08-0024, IST Comprehensive Test Values for Unit 2 HHSI and LHSI Pumps, Rev. 0  
 ET-S-08-0043, EGS Quick Connect Installation, Rev. 0  
 ET-S-09-0018, EGS Quick Connect Installation, Rev. 0  
 ET-S-09-0021, RCP Seal Injection Isolation Valves, Rev. 0  
 ET-S-07-0110, SI Check Valve Modification, Rev. 2  
 DCP 07-034, Hathaway Annunciator System Upgrade  
 DCP 06-054, Replace Plant Computer System Voltage Transducers  
 DCP 07-032, Delete HPHD Pump Autostart Signal  
 DCP SU-09-0029, RC Taylor Math Unit Fuse Installations  
 DCP 07-009, CRDM Cable and Connector Upgrade Unit 1

#### Modifications

DCP 07-024, 2008 Unit 2 Flow Accelerated Corrosion Modifications  
 LSM 2-07-013, SI Flow Transmitter 2940 Replacement  
 DCP 06-041, RWST Level ESFAS Function to Support GSI-191 Containment Sump  
 Modifications  
 DCP 07-014, Replacing Reactor Coolant Pump Component Cooling Relief Valves  
 DCP 07-048, Replacement of 1-SW-262/268 and 2-SW-442/445 with a Swing Check Valve  
 DCP 07-031, Install New AFW Isolation MOV Auto Open Signal Configuration  
 DCP SU-09-0002, Reactor Coolant Pump Seal Replacement  
 DCP 07-017, Fusing of EDG MCC Loads  
 DCP 04-064, EDG Combustion Air Inlet Filter Bank Vendor Recommended Modifications  
 CGD 10000001580, MCR Chiller Control Panels – SWR Reset  
 EE 10000002835, 125 VDC Switchboard 50 Amp Circuit Breaker  
 DCP 07-032, Delete HPHD Pump Autostart Signal  
 DCP SU-09-0029, RC Taylor Math Unit Fuse Installations

#### Basis Documents

Technical Specifications, Current

Attachment



Updated Final Safety Analysis Report, Current  
 Technical Requirements Manual, Current  
 DBD-SPS-SI, Safety Injection Design Bases, Rev. 15  
 DBD-SPS-EG, Emergency Diesel Generator System Bases, Rev. 14

#### Condition Reports

CR 363870, Unit 2 'A' Zinc Injection Pump not running during log rounds, 1/3/2010  
 CR 333852, Engineering Evaluation of 1-SI-82 Required Mechanical Agitation, 5/7/09  
 CA144609 Engineering to complete ER-AA-FAC-1002 initiate actions as required, 08/25/2009  
 CR 344107 U2 MS System FAC Piping Replacement, 08/09/2009  
 CR 143356 Engineering to determine & initiate required actions (small bore susceptible non-modelled lines), 08/10/2009  
 CR 333293 Horizontal Pipe near 1-BD-180 has Significant Wall Thinning, 05/09/2008  
 CR 098554 CP 10" Tee will require Replacement/Repair, 05/09/2008  
 CR001000, Turbine Driven AFW Pump High flow Issue, dated 09/05/06  
 CR333349, Isolation Fuse for Unit 1 Taylor Math Units  
 CR091326, Chemistry Reported a Low U2 Zinc Concentration, 02/19/2008  
 CR091072, Chemistry Reported 2-CH-P-3A Had Lost Its Prime, 02/13/2008

#### Self Assessments

SPS 50.59 QRT Summary, 2009 Final Report, 12/21/2009  
 EPCT 09.2, Engineering Rigor, Product Quality and 50.59 Review, Training Delivered 6/17/09  
 EPCT 09.3, Design Basis/Plant Safety Analysis, Training Delivered 9/14/2009

#### Procedures

CH-99.400, RCS Primary Zinc Control, Rev. 4  
 CM-AA-CRS-100, GSI-191 Program Standards, Requirements, and Guidance for the Containment Recirculation Sump, Rev. 1  
 OPT-SI-014, Cold Shutdown Test of SI Check Valves to RCS Cold Legs, Rev. 18  
 DNAP-3004, 10CFR 50.59, 72.48 changes, tests, experiments, Rev 4  
 ER-AA-FAC-10, Flow Accelerated Corrosion program, Rev 1  
 ER-AA-FAC-1001, FAC Susceptibility Analysis & Modeling, Rev 1  
 ER-AA-FAC-1002, FAC Inspection & Evaluation Activities, Rev 3  
 ER-AA-FAC-1003, FAC Operational Experience & Reviews, Rev 2  
 MS-AA-PRO-402, Purchasing Orders, Rev 0  
 GMP-006, Removal and Replacement of Safety & Non-Safety related Piping Systems, Rev 3  
 1-OPT-FW-006, Auxiliary Feedwater MOV Test, Rev. 12  
 2-PT-18.8, Charging Pump Service Water Performance, Rev. 28  
 0-NAT-E-003, Control Circuitry Check/Initial Energization, Rev. 0  
 1-OPT-RH-003, RHR System Operability Test, Rev. 16  
 1-OPT-RS-003, Flow Test of Inside Recirculation Spray Pumps, Rev. 26  
 1-OSP-GW-001, Electric Hydrogen Recombiners, Rev. 2  
 0-MCM-0434-02, Setpoint Test of Safety and Relief Valves, Rev. 23  
 0-OPT-ZZ-008, ASME System Pressure Tests, Rev. 7  
 1-IPM-RH-FI-1605A, RHR Heat Exchanger ASME Pump Program 1-RH-FI-1605A, Rev. 4

1-IPM-RH-DPI-1600, RHR ASME Pump Program 1-RH-FI-1605A, Rev. 5  
 1-IPM-RS-PI-001, Recirculation Spray System ASME Pump Program, Rev. 9  
 0-OP-VS-006, Control Room and Relay Room Ventilation System, Rev 57  
 1J-B4, HP HTR DR RCVR TK HI-LO LVL, Rev 0  
 0-ECM-0303-01, Fuse Inspection and Replacement, Rev 3  
 0-OP-FC-004, Operating Spent Fuel Pit Pumps, Rev 6  
 0-ECM-0306-02, Motor Control Center Maintenance, Rev 47  
 2-IPM-RC-T-408A, Delta T and  $T_{avg}$  Control, Rev 7  
 1-AP-18.00, Loss of HP Heater Drain Pump/Network 90 Failure, Rev 4  
 1-OP-CH-001A, CVCS System Alignment, Rev. 19  
 1-OP-CH-009, VCT Operations, Rev. 20  
 S-07017-0-2FE9AS, Wiring Diagram 480V MCC 2G1-1A, 1B, and 2H1-1A, Rev. 1

### Work Orders

38102656162, Secure Scaffolding IAW ET-S-09-0124, 10/22/2009  
 38102656163, Remove Scaffolding at 02-RH-33 IAW ET-S-09-0124, 11/20/2009  
 38074316301, Open/Inspect 01-SI-82-CKVALV for Body to Bonnet Leak, 11/2/2007  
 38102562273, Inspect/Repair 01-SI-82-CKVALV, planned 10/24/2010  
 38079419501, Replace 02-SI-FT-2940 IAW LSM SU-2-07-013, 4/27/08  
 38077868206, SD Piping Tee Up Stream of 2-SD-68  
 00363890-03, Removal and Replacement of safety and Non-safety related Piping Systems  
 38102458468, Charging Pump Service Water Performance test, dated 05/27/09  
 38102255205, RHR System Operability Test, dated 04/19/09  
 38102255197, Flow Test Inside Recirculation Spray Pump, dated 05/02/09  
 38102514735, Scheduled Replacement of RCP B Seal Injection Inlet Isolation, 11/01/09  
 38102514731, Scheduled Replacement of RCP C Seal Injection Inlet Isolation, 11/01/09  
 38102514733, Scheduled Replacement of RCP A Seal Injection Inlet Isolation, 11/01/09  
 38079716701, Replacing RCP CC Relief Valves Test Data Sheet, Dated 03/02/09  
 38079716801, Replacing RCP CC Relief Valves Test Data Sheet, Dated 03/02/09  
 38079716901, Replacing RCP CC Relief Valves Test Data Sheet, Dated 03/02/09  
 38079515001, Replace Relief Valve IAW DCP 07-014, dated 10/16/08  
 38079715601, Replace Relief Valve IAW DCP 07-014, dated 10/16/08  
 38079795501, Remove/Install Valve IAW DCP 07-048, dated 07/09/2009  
 38102129432, ASME SECT XI RHR FI-1605A, dated 09/18/08  
 38102136522, ASME Ref.PM-Spool Piece Test Gage, dated 08/27/2008  
 38102556627, Implement DC to Install Fuses  
 38102675360, Hydrazine Skid tubing Installation/Removal, 11/30/2009  
 38102685355, Orbisphere Assembly Tubing Installation/Removal, 11/30/2009  
 38051706501, Upgrade to the Oil Bath Air Filters for DCP 04-064 on #3 EDG, 11/17/2008

### Calculations

SU-CALC-ICC-EE-0129, CSA Calculation for Surry Power Station Units 1 & 2 Hotleg SI Header Flow Indication (HHSI), rev 3  
 SU-CALC-MEC-ME-0771, Minimum Delivered HHSI Flow for LOCA Analysis and CH/HHSI Pump Flow Test Acceptance Criteria, Surry 1 & 2, rev1  
 SU-CALC-MEC-ME-0771, Minimum Delivered HHSI Flow for LOCA Analysis and CH/HHSI

Pump Flow Test Acceptance Criteria, Surry 1 & 2, rev2  
 SEQ-1159, Seismic Qualification of Pipe Anchor, 05/10/89  
 EE-0035, Emergency Diesel Generator Loading Analysis, Rev. 2, dated 11/06/06  
 ME-08-07, Max AFW Pump Flow and NPSHr Analysis, Rev.1  
 ME-0071, Velan Design Specifications for valves Without Cobalt, date 09/29/93  
 ME-0813, Max AFW Pump Flow and NPSHr Analysis, Rev.1  
 SM-1475, LOCA Containment Peak Pressure and Depressurization Analyses, Rev. 0  
 SM-1476, Surry GOTHIC Analysis of NPSH Available for the LHSI and RS Pumps, Rev. 1  
 EE-0499, DC Vital Bus Short Circuit Current, Rev 2  
 SU-CALC-EEP-EE-0497, SR 480V Load Center Coordination, Rev. 2

### Drawings

11548-FM-1D, Mach Loc Reactor Cont Plan EI (-)27'-7" Surry Power Station – Unit 2, Rev. 13  
 5965D01, Master Reference Drawing Surry Units 1&2, rev 9  
 5969D28, Rack Arrangement No. 5 Surry Units 1&2, rev 8  
 5965D80A, Interconnecting Wiring Diagram Safety Injection Line Flow Surry Power Station – Unit 2, rev 14  
 11548-FE-4AC, Wiring Diagram Nuclear Instrumentation Process Racks 5&6 Surry Power Station – Unit 2, rev 14  
 11548-FE-11AG, Loading Table Vital Bus Distribution Panels 2-IIA& 2-IVA, rev 11  
 11448-FK-3B, Instrument Piping Auxiliary building Surry Power Station- Unit 1 & 2, rev 25  
 S-07024-2-2WFPD145, Isometric drawing, Gland Steam LP1-Inboard Gland Seal Supply, Rev 1  
 11448-WFPD-21, Isometric drawing, Secondary Inspection S/G Feedwater Train A, Rev 13  
 11448-FAC-068A, Susceptibility drawing, Feedwater System Unit 1, Rev 2  
 11448-ESK-6BY, Elementary Diagram 480V Circuits MOV, Rev. 19  
 11448-FM-072A, Flow/Valve Operating Numbers Diagram, Rev. 22  
 11548-FE-1L, 480V One Line Diagram, Unit 2, Rev 57  
 11448-FE-1J, 480V One Line Diagram, Unit1, Rev 37  
 11548-FE-18CQ, Wiring Diagram Spent Fuel Cooling Pump 1-FC-P-1B, Rev 1  
 11448-FE-1G, 125VDC One Line Diagram – Unit 1, Rev 36  
 11448-FE-3EZ, Wiring Diagram Net 0 Cabinet 1-FW-CAB-100, Unit 1, Rev 0  
 11448-FE-8R, Wiring Diagram 4160 Bus 1B HP Heater Drain Pump 1-SD-P-1A, Rev 15  
 11448-FE-4AP, Wiring Diagram Rack 27 & 28 Unit 1, Rev 7  
 11448-FE-3BU, Wiring Diagram Main Control Board Rear Panel, Rev 20  
 11548-FM-088A, Sh. 2, Flow/Valve Operating Numbers Diagram Chemical and Volume Control System, Rev. 24  
 11448-FM-088A, Sh. 4, Flow/Valve Operating Numbers Diagram Chemical and Volume Control System, Rev. 31  
 S-06012-0-M-400, Sh. 1, Zinc Injection Pump Tie-In to CVCS System, Rev. 4  
 S-06012-0-M-400, Sh. 2, Zinc Injection Pump Tie-In to CVCS System, Rev. 1  
 11448-FB-046B, Sh. 1, Flow/Valve Operating Numbers Diagram Emergency Diesel Generator #2, Rev. 23  
 11448-FB-046B, Sh. 2, Flow/Valve Operating Numbers Diagram Emergency Diesel Generator #2, Rev. 12  
 11448-FB-046B, Sh. 3, Flow/Valve Operating Numbers Diagram Emergency Diesel Generator #2, Rev. 1

### Other Documents

DQR-DES-ENG-AA-14, 50.59 Screens, Rev. 1  
 DQR-DES-ENG-AA-16, 50.59 Evaluations, Rev. 1  
 DCP SU-09-0020, Installation of Personnel Barriers in the U1/U2 Containment and Aux Building, 5/1/09  
 ET-NAF-07-0093, Westinghouse Best Estimate Loss of Coolant Accident Analysis Parameter Value Assumptions for Reanalysis Surry Power Station Units 1 and 2, Rev. 0  
 CA 140561, CA to Engineering to Revise 50.59/72.48 Screening for DC SU-09-0014, 6/17/2009  
 DC-SU-09-0014, DCUR 09-0294, Containment System Scaffold Upright Storage Rack Details, 7/23/09  
 ET S-95-0455, Mechanical Agitation of Check Valves, Rev. 0  
 VTM V637-00011, Velan Check Valves 2-1/2" – 24", Rev. 1  
 SU-VTM-000-38-R711-00002, Model 1153 Series D AlphaLine Pressure Transmitters for Nuclear Service, Rev 1  
 EP-0036, Tech Report, Results of Secondary Piping & Component Inspection Program, 26836C/slip#176804/customer PO#45685307, Certified Materials Test Report  
 DNAP-3004, Piping Specification (page 42), Rev 15  
 ET-NAF-06-0045, Evaluation of Proposed Change to FW-MOV-151/251, Rev. 0  
 ET-S-07-0079, Establishing IST Comprehensive Values for RHR, HHSI & IRS, Rev. 2  
 EWR-90-025, Evaluation of Valves (1/2-CH-294, 297 & 300), dated 04/18/90  
 ET-CME-00-0017, CC Relief Valve Seat Evaluation, Rev. 0  
 QDR-N/S-34.4, Qualification Documentation EGS Connects  
 RO-08.2, Training Log for Operator Actions Referenced in DCP-07-031, dated 02/26-03/28/08  
 Plant Issue-S-2006-1708, Removed 01-CC-RV-114A for testing, Dated 05/01/06  
 Plant Issue-S-2006-1715, Removed 01-CC-RV-113C for testing, Dated 05/01/06  
 Plant Issue S-2005-2695, Voltage Transducers Discovered to be Over Ranged Unit 2  
 Plant Issue S-2005-1289, Voltage Transducers Discovered to be Over Ranged Unit 1 and 2  
 Procurement Technical Evaluation 10000001580, Version 1  
 PE Inspection Plan 2513  
 Surry Type 1 Study NP-2753A, 07/28/94  
 PO 45593432, EL- pushbutton switch  
 Surry DC Cross-Tie Study  
 DCP 97-004, Spent Fuel Pool cooling Pump Power Upgrade & Piping Reclassification Surry 1&2, 11/25/97  
 Root Cause 000028, CRDM Head Cables  
 DCP 03-048, Replacement Vessel Head Assembly Upgrade Package, Unit 2  
 Temporary Modification S1-07-098, Control rod K-8 cable replacement  
 NCRODP-36-S, MCR/ESGR I&C and Alarms, 01/14/10  
 NCRODP-28-S, High Pressure Drain Subsystem, 12/17/08  
 SU-VTM-000-38-R085-00001, Operating Manual/Final Zinc Addition Skid for Dominion Generation Surry Power Station, Rev. 5  
 PE-09-42, Westinghouse PWR Zinc Addition Guidelines, Rev. 1  
 SU-VTM-000-38-E035-00001, Operating Manual 999 System Generating Plant, Rev. 44

### **Section 1R18: Plant Modifications**

NEI-96-07, Rev. 1, Guidelines for 10 CFR 50.59 Implementation.  
 S1-09-142, Rev. 1, Jumper out cell #21 to restore operability of 1-EPD-B-1A main station

battery

S1-10-143, Rev. 0, Jumper out cell #11 to restore operability of 1-EPD-B-1A main station

battery

S1-10-144, Rev. 0, Temporary modification to add oil to the top of main feedwater pump 1A (1-FW-P-1A) slinger ring to reduce bearing temperature

#### **Section 1R19: Post-Maintenance Testing**

0-ECM-1509-06, Rev. 20;

IMP-C-RM-36, Rev. 35, Radiation Monitoring System Maintenance

0-MPM-0210-01, Rev. 24, Control Room Chillers Performance Checks

0-MCM-0414-07, Rev. 5, Service Water System Copes-Vulcan Model D-100-60 and D-100-1200 Direct Acting Control Valve Overhaul

0-MCM-1001-01, Rev. 8; Threaded Fastener Inspection and Replacement

0-OPT-ZZ-008, Rev. 7; ASME System Pressure Test

2-OPT-CH-001, Rev. ; Charging Pump Operability and Performance Test for 2-CH-P-1A (partial only)

0-OPT-EG-009, Rev. 40; Number 3 Emergency Diesel generator Major Maintenance Operability Test

#### **Section 1R22: Surveillance Testing**

ET NAF 98-0069, Rev. 1, Evaluation of Negative Leak Rate Results Observed During Performance of OPT-RC-10.0 Reactor Coolant System Leak Rate Test

Technical Report NE 1381, Evaluation of Surry Power Station Reactor Coolant System Leak Rate Calculation dated August 2003

2-OPT-CS-006, Rev. 12, RWST, Chemical Addition Tank, and Containment Spray System MOV Stroke Test

0-OSP-AAC-003, Rev. 3; Automatic Start Test of AAC Diesel Generator

2-OPT-EG-001, Rev. 53; Number 2 Emergency Diesel Generator Monthly Start Exercise Test

1-EPT-0103-01, Rev. 12; Main Station Battery 1A Quarterly Check

#### **Section 4OA1: Performance Indicator Verification**

NEI 99-02, Regulatory Assessment Performance Indicator Guideline.

ER-AA-SPI-1001, Rev. 1, Implementation of the Consolidated Data Entry Reporting for Mitigating System Performance Index

## LIST OF ACRONYMS

ADAMS	Agencywide Document Access and Management System
ALARA	As Low As Reasonably Achievable
CA	Corrective Action
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
DOT	Department of Transportation
EDG	Emergency Diesel Generator
HP	Health Physics
HPT	Health Physics Technician
HPAP	Health Physics Administrative Procedure
HRA	High Radiation Area
IMC	Inspection Manual Chapter
ISFSI	Independent Spent Fuel Storage Installation
JPM	Job Performance Measures
LHSI	Low Head Safety Injection
NCV	Non-cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OD	Operability Determination
PARS	Publicly Available Records
PCP	Process Control Program
PI	Performance Indicator
QS	Quench Spray
RAB	Reactor Auxiliary Building
RCE	Root Cause Evaluation
RCP	Reactor Coolant Pump
RCS	Reactor Coolant System
RFO	Refueling Outage
RP	Radiation Protection
RTP	Rated Thermal Power
RWP	Radiation Work Permit
SDP	Significance Determination Process
SR	Surveillance Requirements
TDAFWP	Turbine Driven Auxiliary Feedwater Pump
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
VEPCO	Virginia Electric and Power Company
VHRA	Very High Radiation Area
VPAP	Virginia Power Administrative Procedure
WO	Work Order
ALARA	As Low As Reasonably Achievable
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Condition Report
HP	Health Physics
HPT	Health Physics Technician