UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-1257

May 21, 2015

Mr. Ronald A. Jones
Vice President, New Nuclear Operations
South Carolina Electric and Gas
P. O. Box 88 (Mail Code P40)
Jenkinsville, SC 29065-0088

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3 – NRC SIMULATION FACILITY INSPECTION REPORT 05200027/2015301, 05200028/2015301

Dear Mr. Jones:

On April 3, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of the simulation facilities at Virgil C. Summer Nuclear Station Units 2 and 3 (VCS). The enclosed inspection report documents the inspection results, which the inspectors discussed on April 23, 2015, with Mr. Andy Barbee and other members of your staff.

The inspection partially completed Inspection Procedure (IP) 41502, Nuclear Power Plant Simulation Facilities. In your letter designated NND-15-0026 of January 16, 2015, you requested NRC approval to designate the VCS simulation facilities as a Commission Approved Simulation Facility (CAS) pursuant to the requirements of 10 CFR 55.46(b). On March 30, 2015, your staff provided a letter designated NND-15-0199 that provided updated information for the request to approve the VCS simulation facilities as a CAS.

This inspection initiated an assessment of the simulation facility performance, simulation facility program adequacy and implementation, and the simulator deficiency reporting system. The inspectors examined a sample of activities performed by your staff to ensure that the VCS 2A and 2B simulation facilities were being tested in accordance with ANSI/ANS-3.5-1998, "Nuclear Power Plant Simulators for Use in Operator Training and Examination." Additionally, the inspectors reviewed the established programs and processes related to continued assurance of simulator fidelity in accordance with 10 CFR 55.46(d). The inspectors reviewed selected test procedures and programmatic procedures, reviewed simulator test records, observed activities, and interviewed personnel.

Based on the results of this inspection, no findings were identified. In accordance with Inspection Manual Chapter (IMC) 0613 section 17.02, the Enclosure to this report includes documentation of the scope of the inspection and the factual observations of the inspectors.

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 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).

Should you have any questions concerning this letter, please contact us.

Sincerely,

/RA/

Eugene F. Guthrie, Chief
Operations Branch 2
Division of Reactor Safety

Docket Nos.: 5200027, 5200028
License Nos: NPF-93, NPF-94

Enclosure: Inspection Report 05200027/2015301 and 05200028/2015301 w/Attachment: Supplemental Information

cc: (See page 3)

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cc: (See page 3)

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NAME	MEEKS	GUTHRIE	KELLUM	JUNGE			
DATE	5/20/2015	5/21 /2015	5/11/2015	5/13/2015	5/	5/ /2015	5/ /2015
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Letter to Ronald A. Jones from Eugene F. Guthrie dated May 21, 2015

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION UNITS 2 AND 3 – NRC SIMULATION INSPECTION REPORT 05200027/2015301, 05200028/2015301

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Region II

Docket Numbers:	5200027 5200028
License Numbers:	NPF-93 NPF-94
Report Numbers:	05200027/2015301 05200028/2015301
Licensee:	South Carolina Electric & Gas
Facility:	Virgil C. Summer Nuclear Station Unit 2 Virgil C. Summer Nuclear Station Unit 3
Location:	Jenkinsville, SC
Inspection Dates:	February 23 – April 3, 2015
Inspectors:	M. Meeks, Senior Operations Engineer J. Kellum, Senior Reactor Engineer
Approved by:	Eugene F. Guthrie Branch Chief Operations Branch 2 Division of Reactor Safety

Enclosure

SUMMARY OF FINDINGS

Inspection Report (IR) 05200027/2015301, 05200028/2015301; 02/23/2015 through 03/26/2015; Virgil C. Summer Nuclear Station Unit 2, Virgil C. Summer Nuclear Station Unit 3, simulation facility inspection report.

This report covers an announced, infrequently performed inspection completed by regional and headquarters inspectors. No findings were identified. The Nuclear Regulatory Commission's (NRC's) program for overseeing the construction of commercial nuclear power reactors is described in IMC 2506, "Construction Reactor Oversight Process General Guidance and Basis Document."

A. NRC-Identified and Self Revealed Findings

No findings were identified.

B. Licensee-Identified Violations

No findings were identified.

1. CONSTRUCTION REACTOR SAFETY

Cornerstones: Design/Engineering, Procurement/Fabrication, Construction/Installation, Inspection/Testing

IMC 2504, Construction Inspection Program: Inspection of Construction and Operational Programs

1P01 Simulator Inspection (41502)

a. Inspection Scope

The inspectors partially completed Inspection Procedure (IP) 41502, Nuclear Power Plant Simulation Facilities. The inspectors examined a sample of activities performed by the licensee's staff to ensure that the VCS 2A and 2B simulation facilities were being tested in accordance with the ANSI/ANS-3.5-1998 standard, "Nuclear Power Plant Simulators for Use in Operator Training and Examination." Additionally, the inspectors reviewed and assessed the licensee's established programs and processes related to continued assurance of simulator fidelity in accordance with 10 CFR 55.46(d). The inspectors reviewed selected test procedures and programmatic procedures, reviewed simulator test records, observed activities, and interviewed personnel.

As detailed in the Enclosure to the licensee's letter NND-15-0026, the VCS simulation facility is comprised of two AP1000 full scope simulators, designated "2A" and "2B." Both simulators are referenced to VCS Unit 2 and are intended to be maintained functionally identical.

The simulation facility design, models, and software are based upon what the reactor vendor has designated as the "Baseline 7" milestone for Instrumentation and Controls (I&C). The Baseline 7 milestone document established a set of requirements to ensure the integrated I&C system design is consistently implemented within various core I&C platforms and systems. The VCS simulation facility was also updated with various modifications (in close coordination with the reactor vendor) as new I&C issues or design changes were identified and resolved during the finalization of the AP1000 design and/or initial test program.

The licensee committed to meet the requirements of ANSI/ANS-3.5-1998, as endorsed by Revision 3 of NRC Regulatory Guide 1.149, "Nuclear Power Plant Simulation Facilities for Use in Operator Training and License Examinations." This standard establishes the functional requirements for full scope nuclear power plant control room simulators used for operator training and examination. The ANSI/ANS-3.5 standard requirements for testing are specifically implemented in VCS procedures VC2-IST-0001, "V.C. Summer Training Simulator Annual and Core Cycle Testing – Unit 2A/B," and VC2-IST-0002, "V.C. Summer Training Simulator Malfunction Testing – Unit 2A/B."

1. On-Site Simulation Facility Testing and Test Results

As detailed in the attached list of documents reviewed, the inspectors reviewed simulator test results and records for three steady-state tests, two simulator capability tests, and a sample of 18 malfunction tests. For the transient tests, the initial sample recommended by IP 41502 section 02.03.b.1. was expanded to review all eleven transient tests required by ANSI/ANS-3.5 due to an issue identified by the inspectors, which is detailed in section 1P01.b.1.(b) of this report. Along with the official test records, inspectors also reviewed test data provided by the licensee from test runs that were performed to verify simulator response following installation of the simulator modifications mentioned above.

At the time of this inspection, the licensee did not provide any test records related to Scenario Based Testing (SBT), simulator core performance testing, or simulator post-event testing (reference IP 41502 section 02.03.b.4, 02.03.c, and 02.03.d.). As a note, in accordance with section 3.4.3.2 of the 2009 revision of the ANSI/ANS-3.5 standard, SBT is only required to be performed for (1) NRC initial license examination scenarios, (2) licensed operator requalification annual examination scenarios, and (3) scenarios used for reactivity control manipulation experience. The licensee has yet to administer any of these three required scenario types. These test records will be reviewed at a later date, once they are available, in order to complete the IP 41502 inspection.

The inspectors also observed and reviewed the simulation facility performance during two simulator “scenarios.” These two “scenarios” were developed by the NRC to assess simulation facility performance under controlled conditions. The licensee provided a team of three AP1000 Senior Reactor Operator (SRO) certified individuals to operate the simulation facility using the appropriate procedures for the associated events and transients as requested by the NRC inspectors.

2. Simulation Facility Procedural Development

The inspectors reviewed a sample of the licensee’s procedures related to the simulation facility conduct of testing, documentation of simulation facility issues requiring assessment and potential corrective actions, simulation facility modifications, and the use of the simulation facility for operator training and operator testing/evaluations. The inspectors ensured the procedures developed for the VCS simulation facility correctly reflected ANSI/ANS-3.5 requirements, where applicable, and were consistent with recognized practices as reflected in currently operating reactor plant reference simulators. The inspectors also reviewed a representative sample of the VCS training department procedures where there was associated involvement with the simulation facility

The inspectors reviewed the licensee’s procedures related to maintaining examination and test integrity consistent with the requirements of 10 CFR 55.49.

3. Simulation Facility Programs for Assurance of Continued Simulator Fidelity

In addition to reviewing the specified procedural requirements that define the VCS simulation facility programs for assurance of continued simulator fidelity, the inspectors also reviewed the licensee’s simulator deficiency reporting (SDR) program, including open and closed deficiencies. The inspectors reviewed licensee records related to the

determination of whether simulator discrepancies resulted in an impact on operator training, the determination of the impact of identified simulator discrepancies on the pass/fail criteria of the associated test results, and the licensee's training needs analysis of selected simulator discrepancies. The training needs analysis process provides a comprehensive framework to review and evaluate the impact of identified deficiencies on the operations training program.

The inspectors compared the SDRs identified by the licensee against the simulator test records and results in order to assess the effectiveness of the licensee's program for identification and prioritization of issues, reporting, evaluation, schedule for implementing timely corrective actions, and corrective actions. The inspectors assessed whether the licensee was effectively identifying any simulator discrepancies that could result in negative training of operators. The inspectors verified whether or not the licensee adequately captured simulator problems and deficiencies; and that corrective actions were performed, tracked, trended, and completed in a timely fashion commensurate with the safety significance of the item. Implicit in the inspector's review is confirmation that the corrective actions taken did not introduce new errors into the simulation facility modeling and response (reference IP 41502 section 02.02.a.2 and 02.02.b.5).

4. Overall Summary of IP 41502 Completion

In summation, the inspectors completed the following IP 41502 inspection requirements: 02.02.b.1.(a) through (d), 02.02.b.4.(a) through (c), 02.02.b.5, 02.02.b.6(c) and (d). Some of the above inspection requirements may be repeated at the discretion of the NRC in the future. Due to the construction status of the reference unit during the inspection timeframe, the following inspection requirements of IP 41502 were not begun and will need to be completed at a later date: 02.02.b.1.(e), 02.02.b.2, 02.02.b.3, 02.02.b.4(d) through (e), and 02.02.b.6(a) and (b).

b. Assessment

1. On-Site Simulation Facility Testing and Test Results

(a) Steady-State Test Results. ANSI/ANS-3.5-1998 section 4.1.3.1 requires steady-state testing and specifies certain key parameters to be within certain expected tolerances throughout the steady-state test, as compared to reference unit data. Licensee procedure VC2-IST-0001, "V.C. Summer Training Simulator Annual and Core Cycle Testing – Unit 2A/B," section 6.2.3, "Acceptance Criteria for Steady State Accuracy and Repeatability Tests," contains the same criteria as is listed in the ANSI/ANS-3.5 simulator standard. The inspectors found that the licensee had identified: (1) the 75% power steady state test resulted in a required parameter, Power Range Nuclear Instrumentation (PRNI) readings, that was high out-of-tolerance for the entire test, and (2) the 50% power steady state test had a required parameter, Pressurizer level, that was low out-of-tolerance for the entire test. The inspectors identified that for both cases, the facility had marked the test results as "satisfactory." The licensee had identified other parameters that were out-of-tolerance for these two tests and had generated SDR VC-1501-10 to document these other parameters; however, SDR VC-1501-10 did not identify either the PRNI reading or the Pressurizer level reading that were outside the required tolerances during the test performance.

The inspectors questioned the licensee's overall evaluation of these test results, and why an SDR had not been generated for the Pressurizer level and PRNI parameters being out-of-tolerance.

The licensee entered this issue into their corrective action program as part of CR-NND-15-00380. As a corrective action, the licensee re-performed the 50% and the 75% steady-state tests with corrected initial conditions for PRNI readings and Pressurizer level, as appropriate. During the performance of these tests, PRNI readings and Pressurizer level were observed to remain within the specified tolerance bands during the entire test run time. The other parameters associated with SDR VC-1501-10 were again observed to be out-of-tolerance during the test.

After the inspectors questioned the overall evaluation of the test results again, the licensee re-performed the 50% and 75% steady-state tests an additional time, with initial conditions for the parameters associated with SDR VC-1501-10 matching the reference unit data spreadsheet that had been provided by the reactor vendor. These tests resulted in all required parameters meeting the required tolerances as specified in the ANSI/ANS-3.5 standard.

After evaluating the licensee's corrective actions, the inspectors determined that the licensee met the requirements of ANSI/ANS-3.5 with regards to steady-state testing parameters.

(b) Transient Test Results. ANSI/ANS-3.5-1998 section B1.2 stated that the acceptance criteria for the 11 transient tests required by section B3 (for Pressurized Water Reactors (PWRs)) is as listed in section 4.1.4 of the standard. Licensee procedure VC2-IST-0001, "V.C. Summer Training Simulator Annual and Core Cycle Testing – Unit 2A/B," section 6.4.3 contains the same required acceptance criteria for transient tests as listed in the ANSI/ANS-3.5 standard. Specifically, Section 6.4.3.c. of VC2-IST-0001 stated: "The simulator shall not fail to cause an alarm or automatic action if the reference unit would have caused an alarm or automatic action under identical circumstances." Section 6.4.3.d of VC2-IST-0001 stated: "The simulator shall not cause an alarm or automatic action if the reference unit would not cause an alarm or automatic action under identical circumstances." However, the inspectors questioned whether the licensee had documented evidence of alarm response verification for their transient tests, because they had not provided any.

The licensee entered this issue into their corrective action program as part of CR-NND-15-00380. The licensee performed an analysis of the alarm record printouts that were retained for all of the transient tests using AP1000 SRO-certified Subject Matter Experts. The inspectors verified that the results of this review certified that all alarms that had annunciated were expected, that no unexpected alarm had annunciated, and that no SDRs had been generated as a result of the alarm review of the transient test results.

After evaluating the licensee's corrective actions, the inspectors determined that the licensee met the requirements of ANSI/ANS-3.5 with regards to alarm response verification during transient testing.

(c) "Scenario" Results. The inspectors questioned the response of the simulation facility's modeling of Core Exit Thermocouple (CET) response in a superheated core

condition (inadequate core cooling). The inspectors noted that all of the CETs were oscillating across a range of several hundred degrees Fahrenheit during a condition where there was no source of coolant injection to the reactor vessel.

The licensee captured this observation as SDR VC-1502-07. A similar issue was also observed during ISV testing and entered into the licensee's corrective action program as part of CR-NND-15-00557. The licensee, as part of the corrective action program continues to evaluate, in coordination with the reactor vendor, actions required to resolve this issue.

2. Simulation Facility Procedural Development

As a result of the issues identified by the inspectors, the licensee made several other procedural changes with revision 1 of VC2-IST-0001 and revision 1 of VC2-IST-0002, as part of the corrective actions of CR-NND-15-00380, including the following:

- removed language stating that steady-state tests run for 60 minutes duration vice the 20 minutes specified in the various procedural attachments (VC2-IST-0001, 6.2.2)

- added specific instructions for alarm evaluation to the transient tests (VC2-IST-0001, 6.3.4)

- added a listing of expected priority 1 and 2 alarms to all transient tests (ex: VC2-IST-0001, Attachment IX, Step 2.8 and 2.9)

- added a statement at the end of all transient tests to evaluate the alarm data (ex: VC2-IST-0001, Attachment IX, Step 2.13)

- added additional test acceptance criteria to both procedures (ex: VC2-IST-0001, 6.3.3 (e) and 6.3.5; VC2-IST-0002, 6.1.2.a (5))

- added statements requiring SDR generation to both procedures (ex: VC2-IST-0001, 6.3.5; VC2-IST-0002, 6.1.3).

The licensee also modified procedure VCS-TQP-1103, "Simulator Conduct of Operations and Configuration Management," to add a simulator Training Needs Assessment form and associated details on the approval process, as listed in condition report CR-NND-15-00565. These procedural changes will formalize and improve the auditability of the licensee's training needs assessment process.

After evaluating the licensee's corrective actions, the inspectors determined that the licensee procedures related to the simulation facility met the requirements of the ANSI/ANS-3.5 standard.

3. Simulation Facility Programs for Assurance of Continued Simulator Fidelity

(a) Licensee Identification of Diverging Trends in Test Data. ANSI/ANS-3.5-1998 section B1.2 states that the acceptance criteria for the 11 transient tests required by section B3 (for PWRs) is as listed in section 4.1.4 of the standard. Section 4.1.4 of the

standard also provides acceptance criteria for malfunction tests. Licensee procedure VC2-IST-0001, "V.C. Summer Training Simulator Annual and Core Cycle Testing – Unit 2A/B," section 6.4.3 gave the same required acceptance criteria for transient tests as is listed in the ANSI/ANS-3.5 standard. Specifically, Section 6.4.3.a. of VC2-IST-0001 stated: "Any observable change in simulator parameters corresponds in direction to the change expected from actual or best estimate response of the reference unit to the malfunction." Licensee procedure VC2-IST-0002, "V.C. Summer Training Simulator Malfunction Testing – Unit 2A/B," section 6.1.2 gave the same acceptance criteria for malfunction tests as listed in the ANSI/ANS-3.5 standard. Specifically, Section 6.1.2.b stated: "Any observable change in simulator parameters corresponds in direction to the change expected from actual or best estimate response of the reference unit to the malfunction." The inspectors identified multiple instances (five malfunction tests and four transient tests) where the licensee documented diverging trends in test results, *e.g.,* the response of certain 2A simulator parameters did not correspond in direction to the response of the same parameters on the 2B simulator for the same test. All of these tests, identified by the inspectors, were evaluated by the licensee as satisfactory, and no SDR(s) had been generated. The inspectors questioned why SDRs were not needed for the diverging test parameters.

The licensee entered this issue into their corrective action program as one of the issues of CR-NND-15-00380. As a corrective action, the licensee performed an extent-of-condition review of their simulation facility test records and generated six new SDRs (VC-1502-10 through -15) as a result of this review. The licensee further evaluated these six issues by performing training needs analyses.

The licensee's corrective action program will continue to evaluate the actions that will be needed to fully resolve each SDR associated with these issues. The inspectors' initial assessment of the licensee's process and actions on these six SDRs was that the licensee was taking acceptable actions to correct the identified deficiencies.

(b) Preliminary Review of Issues Identified via Integrated System Validation Testing. Integrated System Validation (ISV) is a process used to establish the adequacy of the Human Factor Engineering (HFE) design using 'person-in-the-loop tests' in dynamic simulated plant conditions at the reactor vendor simulation facility. The purpose of ISV is to validate the adequacy of the HFE design rather than to validate and develop design input. ITAAC 3.2.00.01c.i for the ISV for VCS had not yet been completed. However, IP 41502 section 02.02.b.6(a) allowed for parallel performance of the inspection procedure before the ITAAC for the ISV was completed primarily because the licensee entered the known preliminary results, which are normally treated as a draft information, into the SDR process.

Based on the preliminary results of the ISV at the reactor vendor's remote simulation facility, approximately 15 "priority 1" or high priority human factor engineering deficiencies (HEDs) were identified and communicated to the licensee. In order to evaluate and assess the impact of these preliminary HEDs on simulator performance, operator training, and operator evaluations, the licensee generated SDRs, where appropriate, and conducted training needs analyses on all issues that resulted in generation of an SDR. The inspectors reviewed 11 SDRs and 11 training needs analyses related to the "priority 1" HEDs associated with the preliminary ISV results. The licensee further entered these HEDs in the corrective action program as CR-NND-15-00557 and CR-NND-15-00558.

The licensee will continue to evaluate/assess the impact of identified HEDs on operator training, and will continue to implement additional corrective actions, in order to fully resolve all of the HEDs identified via the ISV process. However, the inspectors determined that the licensee had appropriately entered the 15 "priority 1" HEDs into their programs and initiated corrective actions, including both changes associated with the conduct of operator training and "other than training" solutions.

c. Findings

No findings were identified.

4. OTHER INSPECTION RESULTS

4OA6 Meetings, Including Exit

.1 Exit Meeting

On February 26, 2015, the inspectors conducted a preliminary exit meeting with Mr. R. Jones, Vice President New Nuclear Development, and other members of his staff. The inspectors verified that no proprietary information would be included in the inspection report.

On March 13, 2015, the inspectors conducted a debrief-level conference call with Mr. Andy Barbee and other members of the VCS staff to discuss additional materials that had been provided by the licensee and to inform the licensee of the remaining concerns of the inspection team.

On April 23, 2015, the inspectors conducted an official final exit of this partial inspection via conference call with Mr. Andy Barbee and other members of the VCS staff. The inspectors verbally summarized each of the specific issues that are documented in this report, and answered questions posed by licensee personnel.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

A. Barbee, Director Nuclear Training
K. Balch, Unit 2/3 Simulator Engineer
J. Bouknight, Supervisor – Nuclear Licensing
E. Carter, Requal Training Supervisor
R. DeLap, Operations Supervisor
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R. Jones, Vice President New Nuclear Operations
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J. Lawter, Supervisor Simulator Engineering
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S. Meier, Initial Training Supervisor
P. Mothena, Unit 2/3 Manager Nuclear Training
K. Myhren, Control Room Supervisor
M. Sanders, Unit 2/3 Simulator Operations Specialist
B. Stokes, GM Engineering Services SCE&G
G. Travers, Licensing Units 2/3
M. Youmans, Simulator Engineering Consultant-GTTSi

NRC Personnel

None

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

None

LIST OF DOCUMENTS REVIEWED

Simulator Deficiency Reports and Training Needs Analysis:

VC-1502-07, CETC LOCA Response
VC-1502-10, AO Rod Response
VC-1502-11, SGWLC and Rod Control
VC-1502-12, Pressurizer Level Response
VC-1502-13, Power Load Imbalance Variations
VC-1502-14, Steam Generator Wide Range Level Response at Dryout
VC-1502-15, Steam Generator Parameters "Bell Ringing"
VC-1503-07, ISV Pri-1 HED-1 RNS Procedure
VC-1503-08, ISV Pri-1 HED-2 CMT Indications
VC-1503-09, ISV Pri-1 HED-3 CMT Indications
VC-1503-10, ISV Pri-1 HED-4 ADS-4 DAS
VC-1503-11, ISV Pri-1 HED-9 RNS Isolation in SDP-1
VC-1503-12, ISV Pri-1 HED-10 Misdiagnosed SGTR
VC-1503-13, ISV Pri-1 HED-11 Placing RNS In Service Concerns
VC-1503-14, ISV Pri-1 HED-12 AOP-702 Step Missed
VC-1503-15, ISV Pri-1 HED-13 Failed to Identify CCS Leak
VC-1503-16, ISV Pri-1 HED-14 Alarm Overload
VC-1503-17, ISV Pri-1 HED-15 Shutdown Bank Indicated 265 Steps

Plant Condition Reports:

CR-NND-15-00380, Issues Resulting From IP 41502 Inspection
CR-NND-15-00557, Other Than Training Items From ISV Pri-1 HEDs
CR-NND-15-00558, Training Needs Analysis Items From ISV Pri-1 HEDs
CR-NND-15-00565, Modify VCS-TQP-1103

Procedures:

VC2-IST-0001, V.C. Summer Training Simulator Annual and Core Cycle Testing – Unit 2A/B
VC2-IST-0002, V.C. Summer Training Simulator Malfunction Testing – Unit 2A/B
VCS-TQP-0103, Training Oversight for Accredited Training Programs
VCS-TQP-0104, Simulator Review Group
VCS-TQP-0414, Conduct of Simulator Training and Evaluation
VCS-TQP-801A, Initial Licensed Operator (ILO) Training Curriculum (Cold License)
VCS-TQP-1101, Simulator Discrepancy Reporting
VCS-TQP-1102, Scenario Based Testing
VCS-TQP-1103, Simulator Conduct of Operations and Configuration Management

Simulator ANSI/ANS-3.5-1998 Limits Exceeded Tests:

AP-STS-002, Simulated Limits Exceeded

Simulator ANSI/ANS-3.5-1998 Malfunction Tests:

AP-MALF-01-2, LOCA Outside Containment
AP-MALF-01-5, PZR Safety Valve Fails Open
AP-MALF-02-1, Loss of Instrument Air
AP-MALF-03-5, Loss of Offsite Power
AP-MALF-03-6, Loss of Switchgear Bus ES-1

AP-MALF-03-7, Loss of Switchgear Bus ES-2
AP-MALF-03-14, Loss of EK-13
AP-MALF-04-1, Reactor Coolant Pump Shaft Break
AP-MALF-04-2, Reactor Coolant Pump Locked Rotor
AP-MALF-10-1, Loss of All Heat Sinks
AP-MALF-12-2, Uncoupled Rod
AP-MALF-14-1, Fuel Clad Failure
AP-MALF-17-1, Inadvertent Operation of CMTs at Power
AP-MALF-17-2, Inadvertent Operation of PRHR HX at Power
AP-MALF-20-1, Main Steam Line Break Outside Containment
AP-MALF-23-2, Loss of Normal Feedwater Flow with Failure of PXS-V108
AP-MALF-23-3, Large Break LOCA with Failure of PXS-V108
AP-MALF-24-3, ATWS with Turbine Trip

Simulator ANSI/ANS-3.5-1998 Normal Evolution Tests:

AP-OPS-EVO-001, Plant Startup From Cold to Hot Standby
AP-OPS-EVO-002, Nuclear Startup Hot Standby to Rated Power

Simulator ANSI/ANS-3.5-1998 Real Time/Repeatability Tests:

AP-STS-001, Real Time and Repeatability

Simulator ANSI/ANS-3.5-1998 Steady State Tests:

AP-OPS-SS-001, Steady State Performance at 50% Power
AP-OPS-SS-002, Steady State Performance at 75% Power
AP-OPS-SS-003, Steady State Performance at 100% Power

Simulator ANSI/ANS-3.5-1998 Appendix B Transient Tests:

AP-OPS-T-001, Manual Reactor Trip
AP-OPS-T-002, Simultaneous Trip of All Feedwater Pumps
AP-OPS-T-003, Simultaneous Closure of All MS Isolation Valves
AP-OPS-T-004, Simultaneous Trip of All Reactor Coolant Pumps
AP-OPS-T-005, Single Reactor Coolant Pump Trip
AP-OPS-T-006, Main Turbine Trip Without Reactor Trip
AP-OPS-T-007, Maximum Rate Power Ramp
AP-OPS-T-008, Maximum Size Rupture with Loss of Offsite Power
AP-OPS-T-009, Maximum Size Unisolable Main Steam Line Rupture
AP-OPS-T-010, Slow Primary System Depressurization to Saturated Condition
AP-OPS-T-011, Maximum Design Load Rejection

Miscellaneous Documents:

Letter NND-15-0026, Request for a Commission-Approved Simulation Facility, 01/16/15
Letter NND-15-0199, Request for a Commission-Approved Simulation Facility – Revision 1, 03/30/15
Listing of Open Simulator Deficiency Reports, 02/23/15
Listing of Closed Simulator Deficiency Reports, 02/23/15
Simulator “Affects Training” List from VCS Unit 2 Simulators January SRG Status Report
Simulator Review Group (SRG) Minutes; 10/09/14, 12/10/14, 02/19/15, and 03/23/15

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ANS	American Nuclear Society
ANSI	American National Standards Institute
CAS	Commission Approved Simulation Facility
CET	Core Exit Thermocouple
CFR	Code of Federal Regulations
CR	Condition Report
HED	Human Factor Engineering Discrepancy
HFE	Human Factor Engineering
I&C	Instrumentation and Controls
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
ISV	Integrated System Validation
ITAAC	Inspection, Test, Analysis, and Acceptance Criteria
NRC	U. S. Nuclear Regulatory Commission
PARS	Publicly Available Records
PRNI	Power Range Nuclear Instrument
PWR	Pressurized Water Reactor
SBT	Scenario Based Testing
SDR	Simulator Deficiency Report
SRO	Senior Reactor Operator
VCS	Virgil C. Summer Nuclear Station Units 2 and 3