

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 6, 2000

Director, Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555-0001

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Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
SIMULATOR FACILITY FOUR YEAR CERTIFICATION REPORTS

Pursuant to 10 CFR 55.45(b)(5)(ii), we are submitting the Simulator Facility Four Year Certification Reports for Surry Units 1 and 2. The intent of these reports is to document our continuing compliance with ANSI/ANS 3.5-1985, as modified or endorsed by Regulatory Guide 1.149, dated April 1987. These reports are included as an attachment to this letter.

If you have any questions or require additional information, please contact Mr. John Hayden at (804) 273-2707.

Very truly yours,



Leslie N. Hartz
Vice President - Nuclear Engineering and Services

Attachment

Commitment Summary: There are no new commitments as a result of this letter.

A001

cc: Mr. Michael E. Ernstes, Chief
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U. S. Nuclear Regulatory Commission
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Mr. R. A. Musser
NRC Senior Resident Inspector
Surry Power Station

SURRY UNIT 1
SIMULATOR CERTIFICATION FOUR YEAR REPORT

This Surry Simulator Certification Four Year Report (1996 - 2000) consists of the following sections:

- Previous Four-Year Simulator Test Results Summary (Attachment 1)
- 2001 - 2004 Simulator Test Schedule (Attachment 2)
- Simulator Fidelity & Upgrade Report (Attachment 3)

ATTACHMENT 1 PREVIOUS FOUR-YEAR SIMULATOR TEST RESULTS SUMMARY

Since October 1996, a number of modifications have been made to the Surry simulator. Testing, which verified simulator fidelity acceptable for training and certification, has been completed. Discrepancies uncovered during the previous four years are scheduled to be resolved in a timely manner. The testing schedule in the Surry Unit 1 Simulator Certification 1996 Four-Year Report was satisfactorily completed, with no test failures.

Based upon the testing conducted, and their results, the Surry simulator is acceptable for licensed operator training and retraining.

MALFUNCTION MODIFICATIONS

The following malfunctions were modified to meet changing training requirements.

MMS10 FAILURE OF AUTO STEAM DUMPS AS IS

To meet the continued needs of operator training, malfunction MMS10 logic was changed to allow individual mechanical failure of the main steam dump valves. MMS10 was changed to "FAILURE OF MAIN STEAM DUMPS (MECHANICAL)." This is a generic malfunction. Implementation on individual main steam dump valves will cause the valve to fail in the position it is in when the malfunction is activated. An additional malfunction, MMS17 "FAILURE OF MAIN STEAM DUMPS CLOSED", was created and added to the certification testing list. This malfunction prevents any electronic open signal from controlling the main steam dump valves. The main steam dumps may be opened manually by using an instructor variable.

MRD03 LOGIC FAILURE CAUSING TWO BANKS TO MOVE AT THE SAME TIME

Modification of the malfunction logic was made to cause Control Bank A&D to move at the same time if MRD0301 was activated, and Control Bank B&C to move at the same time if MRD0302 was activated. This allows the malfunction response to be consistent with the reference plant response on a failure of the Bank Overlap Unit.

ATTACHMENT 2
2001 - 2004 SIMULATOR TEST SCHEDULE

The next four-year simulator test schedule follows. The tests are divided in such a manner as to ensure that 25% are performed each year, thereby ensuring that all testing is completed within the four-year time frame specified.

SIMULATOR PERFORMANCE TEST SCHEDULE

The performance testing to be conducted over the next four years will consist of the following tests.

- The Steady State Tests of ANS-3.5-1985 Appendix B section B.2.1 will be conducted annually.
- The Transient Performance Tests of ANS-3.5-1985 Appendix B section B.2.2 will be conducted annually.
- The Computer Real Time Test will be conducted annually.

November 2000 - October 2001

Integrated Tests

- Plant Heatup from Cold Shutdown to Intermediate Shutdown.
- Plant Heatup from Intermediate Shutdown to Hot Shutdown.
- Computer Real Time Test

Malfunction Tests

MCA01	INSTRUMENT AIR LEAK
MCA02	CONTAINMENT INSTRUMENT AIR COMPRESSOR IA-C-4A,B TRIP
MCA04	CONTAINMENT INSTRUMENT AIR HEADER LEAK
MCA08	INSTRUMENT AIR COMPRESSOR OVERLOAD TRIP
MCC01	LOSS OF CC WATER TO SW THROUGH CC HX'S

Malfunction Tests

MCC03 OVERLOAD TRIP OF COMPONENT COOLING WATER PUMP
MCC04 LOSS OF COMPONENT COOLING TO NON-REGENERATIVE HEAT EXCHANGER
MCC05 THERMAL BARRIER LEAK TO CC SYSTEM
MCH01 RCP SEAL WATER INJECTION FLOW TRANSMITTER FAILURE
MCH02 ISOLABLE LETDOWN LINE OUTSIDE CONTAINMENT
MCH03 CHARGING LINE LEAK DOWNSTREAM FCV-1122 OUTSIDE CONTAINMENT
MCH05 LOSS OF CHARGING PUMP
MCH06 NON-REGENERATIVE HEAT EXCHANGER TEMPERATURE CONTROLLER TC-1144B FAILS
MCH11 RCP SEAL WATER INJECTION PRESSURE TRANSMITTER FAILURE
MCH12 RCP SEAL WATER RETURN HEADER TEMPERATURE TRANSMITTER FAILURE
MCH13 TUBE RUPTURE IN THE NON-REGENERATIVE HEAT EXCHANGER
MCH17 SEAL WATER RETURN FILTER CLOGS
MCH19 VCT LEVEL CONTROLLER FAILURE
MCH20 FUEL MELT
MCH21 VCT LEVEL TRANSMITTER FAILURE
MCH22 VCT PRESSURE TRANSMITTER FAILURE
MCH23 VOLUME CONTROL TANK TEMPERATURE TRANSMITTER FAILURE
MCH24 BORIC ACID FLOW CONTROLLER 1113 FAILURE
MCH25 PRIMARY WATER FLOW CONTROLLER 1114 FAILURE
MCH28 FAILURE OF CHARGING FLOW CONTROLLER
MCH29 FAILURE OF CHARGING FLOW TRANSMITTER
MCH31 REGENERATIVE HEAT EXCHANGER OUTLET TEMPERATURE TRANSMITTER CH-TE-1123
MCH35 LOW PRESSURE LETDOWN FLOW TRANSMITTER FAILURE
MCH36 LETDOWN PRESSURE CONTROLLER (PC-1145) FAILURE
MCH37 LOW PRESSURE LETDOWN LINE PRESSURE TRANSMITTER PT-1145 FAILURE
MCH38 REGENERATIVE HEAT EXCHANGER LETDOWN TEMPERATURE TRANSMITTER FAILURE
MCH39 LETDOWN LINE RELIEF LINE TEMPERATURE TRANSMITTER FAILURE
MCH40 LOW PRESSURE LETDOWN LINE TEMPERATURE TRANSMITTER FAILURE

Malfunction Tests

MCH41	NON-REGENERATIVE HEAT EXCHANGER OUTLET TEMPERATURE TRANSMITTER FAILURE
MCN01	LOSS OF CONDENSATE PUMP, OVER CURRENT
MCN02	AIR LEAK INTO MAIN CONDENSER CN-SC-1A & 1B BOOT
MCN03	HOTWELL LEVEL CONTROLLER FAILURE LC-CN-102
MCN05	CONDENSATE LINE LEAK BETWEEN CN_114 AND FCV-CN-107
MCN08	LOSS OF AIR EJECTOR LOOP SEAL
MEL01	LOSS OF ALL OFFSITE POWER
MEL02	MAIN GENERATOR TRIP

November 2001 - October 2002

Integrated Tests

- Unit start up operations (Hot Shutdown to Full Power).
- Computer Real Time Test

Malfunction Tests

MEL07	LOSS OF 4160V STATION BUS
MEL08	LOSS OF SCREENWELL TRANSFORMER
MEL09	LOSS OF EMERGENCY DIESEL GENERATOR
MEL12	LOSS OF 480V EMERGENCY SWITCHGEAR
MEL13	LOSS OF 480V EMERGENCY MOTOR CONTROL CENTER
MEL14	LOSS OF SEMI-VITAL BUS
MEL17	LOSS OF 125V D.C. BUS
MEL18	LOSS OF 480V STATION SWITCHGEAR
MEL19	LOSS OF 480V MOTOR CONTROL CENTER
MEL20	LOSS OF AC VITAL BUS
MEL21	LOSS OF 4160V EMERGENCY BUS
MFW01	MAIN FEEDWATER PUMP RECIRC VALVE FAILS OPEN
MFW02	MAIN FEEDWATER REGULATING VALVE FAILS CLOSED
MFW04	MAIN FEED PUMP LOW LUBE OIL PRESSURE
MFW05	MAIN FEEDWATER BREAK BETWEEN FLOW TRANSMITTER AND DISCHARGE CHECK VALVE
MFW07	AUX FEED PUMPS FW-P-3A/B OVERCURRENT TRIP

Malfunction Tests

MFW08	AUX FEED PUMP TURBINE WONT STOP
MFW10	AUXILIARY FEED PUMP CHECK VALVE OPEN
MFW12	MAIN FEED PUMP SUCTION LINE BREAK
MFW13	STEAM GENERATOR LEVEL TRANSMITTER FAILURE (0-100%)
MFW14	AUXILIARY FEEDWATER BREAK DOWNSTREAM OF FLOW TRANSMITTER AND CHECK VALVE
MFW15	MAIN FEEDWATER BREAK DOWNSTREAM OF CHECK VALVE OUTSIDE CONTAINMENT
MFW16	MAIN FEEDWATER BREAK IN CONTAINMENT
MFW17	DEGRADATION OF MAIN FEED PUMP
MFW18	STEAM GEN MAIN FEED FLOW TRANSMITTER FAILURE
MFW19	STEAM GEN MAIN FEED FLOW CONTROLLER FAILURE
MFW20	STEAM GEN WIDE RANGE LEVEL TRANSMITTER FAILURE
MFW21	STEAM GEN AUXILIARY FEED FLOW TRANSMITTER FAILURE
MFW22	STEAM GEN MAIN FEED HEADER PRESSURE TRANSMITTER FAILURE
MFW23	TOTAL LOSS OF FEEDWATER
MMS01	RUPTURE OF MAIN STEAM LINE AT HEADER
MMS03	RUPTURE OF MAIN STEAM LINE UPSTREAM OF FLOW ELEMENT
MMS04	RUPTURE OF MAIN STEAM LINE BEFORE THE TRIP VALVE
MMS06	MAIN STEAM TRIP VALVE FAILS AS IS
MMS07	MAIN STEAM SAFETY VALVE FAILS OPEN
MMS08	STEAM GEN STEAM FLOW TRANSMITTER FAILURE
MMS09	MAIN STEAM TRIP VALVE FAILS SHUT
MMS10	FAILURE OF MAIN STEAM DUMPS (MECHANICAL)
MMS11	MAIN STEAM HEADER PRESSURE TRANSMITTER FAILURE
MMS13	STEAM GEN PRESSURE TRANSMITTER FAILURE
MMS14	TURBINE FIRST STAGE PRESSURE TRANSMITTER FAILURE

November 2002 - October 2003

Integrated Tests

- Decreasing power from (100% full power level) to Hot Shutdown conditions.
- Computer Real Time Test

Malfunction Tests

MMS15	STEAM GENERATOR PORV CONTROLLER FAILURE
MMS17	FAILURE OF MAIN STEAM DUMPS CLOSED
MNI01	SOURCE RANGE CHANNEL FAILURE
MNI02	SOURCE RANGE DETECTOR FAILURE (DISCRIMINATOR ERROR)
MNI03	INTERMEDIATE RANGE CHANNEL UNDERCOMPENSATION
MNI04	INTERMEDIATE RANGE CHANNEL OVERCOMPENSATION
MNI05	INTERMEDIATE RANGE CHANNEL FAILURE
MNI06	FAILURE OF IR TO ALLOW SR BLOCK
MNI07	LOSS OF INSTRUMENT POWER TO POWER RANGE CHANNEL
MNI08	POWER RANGE CHANNEL UPPER DETECTOR FAILURE
MNI09	POWER RANGE CHANNEL LOWER DETECTOR FAILURE
MNI10	POWER RANGE CHANNEL FAILS
MRC01	REACTOR COOLANT SYSTEM COLD LEG PIPE RUPTURE
MRC02	REACTOR COOLANT SYSTEM HOT LEG PIPE RUPTURE
MRC03	REACTOR COOLANT SYSTEM SUCTION LEG PIPE RUPTURE
MRC04	REACTOR COOLANT SYSTEM NONISOLABLE LEAK
MRC05	RCP OVERCURRENT TRIP
MRC07	FAILURE OF NARROW RANGE T-HOT INSTRUMENT / RTD
MRC08	TAYLOR MATH UNIT FAILURE HI/LO
MRC11	FAILURE OF NARROW RANGE T-COLD INSTRUMENT / RTD
MRC14	FAILURE OF RCP SEAL #3
MRC15	PRZR PRESSURE CONTROLLERS FAILURE
MRC16	PRZR REL/SFTY VV LINE TEMPERATURE TRANSMITTER FAILURE
MRC17	PRESSURIZER LEVEL CONTROL FAILURE
MRC20	BOTH PRZR SPRAY VALVES FAIL SHUT
MRC21	PRESSURIZER SAFETY VALVE FAILS OPEN
MRC22	PRZR SPRAY VALVE FAILS OPEN
MRC24	STEAM GENERATOR TUBE RUPTURE
MRC25	PRESSURIZER HEATERS GROUP FAIL ON
MRC26	RCP SHAFT SHEARS
MRC30	LOSS OF SEAL INJECTION FLOW TO RCP
MRC31	REACTOR COOLANT FLOW TRANSMITTER FAILURE
MRC34	RCS WIDE AND NARROW RANGE PRESSURE TRANSMITTER FAILURE
MRC37	PRESSURIZER RELIEF TANK PRESSURE TRANSMITTER FAILURE
MRC38	LOSS OF COMPONENT COOLING WATER TO RCP
MRC40	PRESSURIZER PORV LEAKAGE
MRC42	PRESSURIZER TEMPERATURE TRANSMITTER FAILURE

Malfunction Tests

MRC45 PRESSURIZER RELIEF TANK TEMPERATURE TRANSMITTER
FAILURE
MRC46 REACTOR VESSEL LEAKOFF TEMPERATURE TRANSMITTER
FAILURE
MRC48 PRESSURIZER PRESSURE TRANSMITTER FAILURE
MRC49 PRESSURIZER LEVEL TRANSMITTER FAILURE
MRC50 PRESSURIZER RELIEF TANK LEVEL TRANSMITTER FAILURE

November 2003 - October 2004

Integrated Tests

- Unit cooldown from Hot Shutdown to Intermediate Shutdown.
- Unit cooldown from Intermediate Shutdown to Cold Shutdown.
- Computer Real Time Test

Malfunction Tests

MRD01 CONTINUOUS ROD WITHDRAWAL, MANUAL OR AUTO
MRD02 CONTINUOUS ROD INSERTION MANUAL OR AUTO
MRD03 LOGIC FAILURE CAUSING TWO BANKS TO MOVE AT THE SAME
TIME
MRD04 AUTO AND MANUAL ROD CONTROL INOPERABLE
MRD05 CONTROL BANKS IN SPEED FAIL TO 72 SPM
MRD06 CONTROL BANKS IN SPEED FAIL TO 8 SPM
MRD07 CONTROL BANKS W/D SPEED FAIL TO 72 SPM
MRD08 CONTROL BANKS W/D SPEED FAIL TO 8 SPM
MRD09 CONTROL BANK MOVES OUT WHEN IN DEMANDED IN AUTO
MRD10 CONTROL BANK MOVES IN WHEN OUT DEMANDED IN AUTO
MRD12 DROPPED CONTROL ROD
MRD13 EJECTED CONTROL ROD
MRD15 REACTOR TRIP BREAKERS OPEN DUE TO UV COIL FAILURE
MRD16 INDIVIDUAL ROD POSITION INDICATION FAIL
MRD18 FAIL OF AUTO TRIP TO SCRAM RX
MRD19 FAILURE OF ALL ROD STOPS TO BLOCK ROD MOVEMENT
MRD20 STUCK ROD
MRD21 FAILURE OF REACTOR TRIP BUTTON

Malfunction Tests

MRH01	RESIDUAL HEAT REMOVAL SYSTEM LEAK
MRH02	LOSS OF RESIDUAL HEAT REMOVAL PUMP
MRH04	HCV-1758 CONTROLLER OUTPUT FAILURE
MRH05	RHR FLOW CONTROLLER FC-1605 FAILS
MRH06	RELIEF VALVE STUCK OPEN ON RESIDUAL HEAT REMOVAL SYSTEM
MRM01	AREA RADIATION MONITOR FAILS
MRM02	PROCESS RADIATION MONITOR FAILURE
MRS06	LOSS OF OUTSIDE RECIRC SPRAY PUMP
MRS07	LOSS OF INSIDE RECIRC SPRAY PUMP
MRS08	LOSS OF CONTAINMENT SPRAY PUMP
MRS11	GRADUAL INCREASE IN CONTAINMENT PRESSURE
MSI03	SAFETY INJECTION HOT LEG FLOW TRANSMITTER FAILURE
MSI04	SAFETY INJECTION TOTAL FLOW TRANSMITTER FAILURE
MSI05	LHSI PUMP FLOW TRANSMITTER FAILURE
MSI06	SAFETY INJECTION COLD LEG FLOW TRANSMITTER FAILURE
MSI07	SAFETY INJECTION ACCUMULATOR TRANSMITTER FAILURE
MSI08	FAILURE OF SAFETY INJECTION RESET TIMER
MSI10	LOW HEAD SAFETY INJECTION PUMP IMPELLER DEGRADATION
MTU01	TURBINE TRIP DUE TO SOLENOID FAILURE
MTU04	FAILURE OF MANUAL TURBINE TRIP
MTU13	FAILURE OF AUTOMATIC TURBINE RUNBACK
MWD01	DROPPED SPENT FUEL ASSEMBLY IN THE SPENT FUEL PIT
MWD03	ACCIDENTAL RELEASE OF RADIOACTIVE GAS

ATTACHMENT 3 SIMULATOR FIDELITY & UPGRADE REPORT

PHYSICAL FIDELITY

Physical fidelity is verified with an item-by-item comparison of the Simulator Control Room to a series of Unit 1 Plant Control Room photographs that are taken annually. Identified discrepancies are scheduled for resolution during the current year.

The report includes all unresolved Simulator Control Panel discrepancies and identifies the work to be performed based on training impact, cost effectiveness, and other considerations as appropriate. Also included are discrepancies identified as requiring no action. Generic Control Room/Panel differences have been identified as necessary.

The simulator Physical Fidelity Report is not included with this report; however, it is available upon request.

CONTROL ROOM AND SIMULATOR PANEL COMPARISON

A review was conducted of the original and the latest four-year submittal reports on the Surry Control Room and Simulator Comparison of Panel Layout. The review was performed to update the changes made during the prior four years and to validate the original differences noted.

The review of the Control Room and Simulator Panel Comparison is not included with this report; however, it is available upon request.

Panels that remain non-simulated because of their relative minor training value are:

ROBERTSHAW FIRE PROTECTION PANEL
STATION FIRE PROTECTION PANEL
FLOOD CONTROL PANEL (Hardware only installed)

CONTROL ROOM AND SIMULATOR ENVIRONMENTAL REVIEW

Environmental differences identified in the original and updated four-year simulator certification reports have been reviewed and found to have no impact on training. Based upon the review results, the simulator is acceptable for operator training and retraining.

OTHER SIMULATOR UPGRADES INSTALLED

- Reactor core cycles upgrades 15 and 16 were installed upon completion of the respective station refueling cycle.
- The Operating System (O/S) of the full scope simulator computer system was upgraded from SUN Solaris 2.5 to 2.6. This applied the latest version of O/S, compiler, system security, and Year 2000 system patches
- Instructor Console was upgraded to provide more Initial Condition (IC) slots from 100 to 245. The Protected IC Group is now numbered 1-30. There are four Scenario Groups that are numbered 31-70: LORP, LORP EXAM, RO/SRO, RO/SRO EXAM. Each Group is individually password protected. The Non-Protected IC Group is numbered 71-125.
- The Auxiliary Shutdown Panel was moved outside the Simulator Control Room for realistic training of control room evacuation.

SIMULATOR DISCREPANCIES IDENTIFIED DURING NRC EXAMINATIONS.

Based on Initial License Exam Reports dated August 21, 1997 and May 14, 1999 no simulator discrepancies were found or noted.

SURRY UNIT 2
SIMULATOR CERTIFICATION FOUR YEAR REPORT

The Surry Power Station is a two-unit station, operating from a common control room. The respective unit control panels are identical in their configuration and layout with respect to the operator. A few auxiliary systems panels present a mirror image layout to the operator in order to maintain an overall balanced appearance of the control room.

This Surry Unit 2 Simulator Certification Four-Year Report (1996 - 2000) consists of the following sections:

- Simulator Fidelity & Upgrade Report (Attachment 1)

There were no significant differences identified during the four-year period. The Surry Unit 1 Simulator meets the Unit 2 training needs.

**ATTACHMENT 1
SIMULATOR FIDELITY & UPGRADE REPORT**

PHYSICAL FIDELITY

A review was conducted of the original and the latest four-year submittal reports on the Surry Control Room and Simulator Comparison of Panel Layout. The review was performed to update the changes made during the prior four years and to validate the original differences noted. This comparison also identifies any differences between Unit 1 and Unit 2 Control Room Panels.

The review of the Control Room and Simulator Panel Comparison is not included with this report, however, it is available upon request.

Panels specific to Unit 2 operation that remain non-simulated because of their relative minor training value are:

VICTOREEN RADIATION MONITORING
INCORE FLUX DISTRIBUTION PANEL
NUCLEAR INSTRUMENTATION PANEL
CONTAINMENT HIGH RADIATION MONITORING PANEL
EMERGENCY DIESEL GENERATOR #2 PANEL
EMERGENCY DIESEL GENERATOR #3 PANEL (UNIT 2 SIDE)
TURBINE SUPERVISORY PANEL
REACTOR COOLANT PUMP VIBRATION PANEL
SECONDARY CHEMISTRY MONITORING PANEL
VERTICAL BOARD #1
VERTICAL BOARD #2
POAST ACCIDENT MONITORING PANEL
BENCHBOARD #1
BENCHBOARD #2
PLANT COMPUTER P-250 OPERATOR STATION
RADIATION MONITORING PANELS

ENVIRONMENTAL REVIEW

Environmental differences between the simulator and the Unit 1 Control Room are discussed within the Surry Unit 1 Certification Four-Year Report.