

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

August 14, 2000

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

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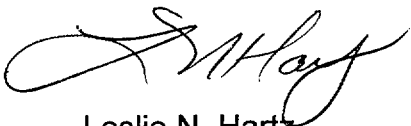
Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA 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 North Anna 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. Harold Christensen, Chief
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Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

NORTH ANNA UNIT 1
SIMULATOR CERTIFICATION
3rd FOUR YEAR REPORT
(1996 - 2000)

NORTH ANNA UNIT 1

SIMULATOR CERTIFICATION THIRD FOUR YEAR REPORT

This North Anna Simulator Certification Four Year Report (1996 - 2000) consist 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 August 1996, a number of modifications have been made to the North Anna 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 North Anna Unit 1 Simulator Certification 1996 four year report was satisfactorily completed, with no test failures.

The Real Time Test was conducted annually during the four-year period. During 1997, 1998, and 1999 the test identified several quarter time peaks, which exceeded 250 milliseconds. The duration of the peaks was less than one second. Evaluation of the integrated response of the simulation indicated that there were no discernable effects to the repeatability or functionality of the simulator. Various modifications have been implemented to resolve this matter.

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

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% of the tests 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.

August 2000 - July 2001

Integrated Tests

- Unit Startup from Cold Shutdown Condition (Mode 5) < 200 °F with a solid pressurizer to Cold Shutdown Condition (Mode 5) at < 200 °F.
- Unit Startup from Cold Shutdown Condition (Mode 5) to Hot Shutdown Condition (Mode 4) less than or equal to 350 °F.

Malfunction Tests

MCA01	FAILURE OF CONTAINMENT INSTRUMENT AIR COMPRESSOR
MCA02	CONTAINMENT INSTRUMENT AIR LEAK
MCA04	INSTRUMENT AIR LEAK
MCC02	FAILURE OF COMPONENT COOLING PUMP TO START
MCC03	COMPONENT COOLING FLOW TRANSMITTER FAILURE
MCC04	COMPONENT COOLING PRESSURE TRANSMITTER FAILURE
MCC05	RCP THERMAL BARRIER LEAK
MCC06	COMPONENT COOLING PUMP SHEARED SHAFT
MCH01	ISOLABLE LETDOWN LINE LEAK IN CONTAINMENT
MCH02	ISOLABLE LETDOWN LINE LEAK OUTSIDE CONTAINMENT
MCH03	ISOLABLE CHARGING LINE LEAK OUTSIDE CONTAINMENT

MCH04	LETDOWN PRESSURE TRANSMITTER FAILURE
MCH05	REACTOR MAKEUP CONTROL BORATES IN THE AUTO MODE
MCH06	LOSS OF COMPONENT COOLING TO NRHX
MCH07	FAILURE OF CHARGING FLOW CONTROLLER
MCH08	FAILURE OF CHARGING FLOW TRANSMITTER
MCH09	REACTOR MAKEUP DILUTION IN AUTO MODE
MCH11	BORIC ACID LINE TO THE BLENDER PLUGGED
MCH12	VCT LEVEL TRANSMITTER FAILURE
MCH13	TUBE RUPTURE IN THE NON-REGENERATIVE HEAT EXCHANGER
MCH15	LOSS OF REACTOR MAKEUP CONTROL
MCH16	LOSS OF CHARGING PUMP
MCH18	LETDOWN PRESSURE CONTROL VALVE FAILS OPEN
MCH21	CHARGING PUMP CHECK VALVE STICKS OPEN
MCN01	LOSS OF CONDENSATE MAKEUP
MCN07	HIGH LEVEL DIVERT VALVE LCV-CN-107 FAILS OPEN
MCN14	CONDENSATE PUMP DISCHARGE CHECK VALVE STICKS OPEN
MCN16	CONDENSER AIR IN LEAKAGE
MCV01	GRADUAL INCREASE IN CONTAINMENT PRESSURE
MEL01	LOSS OF ALL OFF SITE POWER
MEL03	LOSS OF 4160V EMERGENCY BUS
MEL04	LOSS OF 4160V STATION BUS
MEL05	LOSS OF 125V D.C. BUS
MEL06	LOSS OF 480V EMERGENCY BUS
MEL07	LOSS OF 480V STATION BUS
MEL08	LOSS OF EMERGENCY DIESEL GENERATOR
MEL11	MAIN GENERATOR TRIP
MEL12	LOSS OF SEMI-VITAL BUS
MEL13	LOSS OF AC VITAL BUS INVERTER
MEL15	LOSS OF 480V EMERGENCY MCC
MEL16	LOSS OF 480V STATION SERVICE MCC
MEL17	LOSS OF PRIMARY PROCESS RACK POWER SUPPLY

August 2001 - July 2002

Integrated Tests

- Unit Startup from Hot Shutdown Condition (Mode 4) to Hot Standby Condition (Mode3) at 547 °F.
- Unit Startup from Hot Standby Condition (Mode 3) to Startup Condition (Mode 2) with Reactor critical at less than or equal to 5% power.

Malfunction Tests

MFW01	STEAM GENERATOR LEVEL TRANSMITTER FAILURE (0-100%)
MFW04	MAIN FEED PUMP LOW LUBE OIL PRESSURE
MFW05	MAIN FEEDWATER REGULATING VALVE FAILS CLOSED
MFW06	TOTAL LOSS OF FEEDWATER
MFW08	LOSS OF LEVEL ERROR SIGNAL TO S/G LEVEL CONTROL
MFW09	OVERSPEED TRIP OF AUXILIARY S/G FEED PUMP
MFW10	AUXILIARY FEED PUMP CHECK VALVE OPEN
MFW11	AUXILIARY FEED PUMP IMPELLER DEGRADATION
MFW12	MAIN FEED FLOW TRANSMITTER FAILURE
MFW13	MAIN FEEDWATER BREAK UPSTREAM OF FLOW TRANSMITTER
MFW14	AUX FW BREAK DOWNSTREAM BETWEEN FLOW TRANS. & 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	MAIN FEEDWATER REGULATING VALVE FAILS OPEN
MFW19	MAIN FW BREAK BETWEEN FLOW ELEMENT AND CHECK VALVE
MFW21	MAIN FEEDWATER PUMP SUCTION PIPE BREAK
MFW23	AUXILIARY FEEDWATER PUMP TRIPS ON OVERCURRENT
MGW01	ACCIDENTAL RELEASE OF RADIOACTIVE GAS
MMS01	STEAM FLOW TRANSMITTER FAILURE
MMS02	TURBINE FIRST STAGE PRESSURE TRANSMITTER FAILURE
MMS08	RUPTURE OF MS LINE IN CONTAINMENT BEFORE THE FLOW TRANS.
MMS09	RUPTURE OF MAIN STEAM LINE AFTER THE NON-RETURN VALVE
MMS10	RUPTURE OF MAIN STEAM LINE BEFORE THE TRIP VALVE
MMS11	FAILURE OF STEAM DUMP CONTROL AS IS
MMS12	ATMOSPHERIC STEAM RELIEF VALVE STUCK OPEN
MMS13	MAIN STEAM TRIP VALVE FAILS AS IS
MMS14	MAIN STEAM SAFETY VALVE STUCK OPEN
MMS15	STEAM DUMP VALVE STUCK OPEN
MMS16	FAILURE OF STEAM HEADER PRESSURE CONTROL
MMS17	LOSS OF STEAM GENERATOR PRESSURE CHANNEL
MNI01	POWER RANGE UPPER DETECTOR FAILURE
MNI02	POWER RANGE LOWER DETECTOR FAILURE
MNI03	BLOWN POWER RANGE CONTROL FUSE
MNI04	BLOWN POWER RANGE INSTRUMENT FUSE
MNI06	SOURCE RANGE DETECTOR FAILURE (DISCRIMINATOR ERROR)
MNI08	INTERMEDIATE RANGE IMPROPERLY COMPENSATED
MNI09	INTERMEDIATE RANGE DETECTOR FAILURE
MNI10	SOURCE RANGE CHANNEL FAILURE
MNI13	POWER RANGE CHANNEL FAILURE

August 2002 - July 2003

Integrated Tests

- Unit Power Operation, Mode 2 to Mode 1(to include heat balance test).
- Unit Power Operation, Mode 1 to Mode 2.
- Computer Real Time Test.

Malfunction Tests

MQS01	LOSS OF QUENCH SPRAY PUMP
MQS03	FAILURE OF CONTAINMENT HIGH PRESSURE TO INITIATE SPRAY
MQS06	SPURIOUS CONTAINMENT SPRAY ACTUATION
MQS07	DEGRADATION OF INSIDE RECIRC SPRAY PUMP
MRC01	REACTOR COOLANT SYSTEM COLD LEG PIPE RUPTURE
MRC02	REACTOR COOLANT SYSTEM HOT LEG PIPE RUPTURE
MRC03	REACTOR COOLANT SYSTEM PUMP SUCTION LEG PIPE RUPTURE
MRC04	REACTOR COOLANT SYSTEM NON-ISOLABLE LEAK
MRC05	RCP OVERCURRENT TRIP
MRC06	FAILURE OF REACTOR VESSEL LEVEL TRANSMITTER
MRC07	PRESSURIZER PRESSURE TRANSMITTER FAILURE
MRC08	PRESSURIZER LEVEL TRANSMITTER FAILURE
MRC11	REACTOR COOLANT FLOW TRANSMITTER FAILURE
MRC14	FAILURE OF RCP NO. 3 SEAL
MRC15	MSS UNIT FAILURE HI/LOW
MRC17	RTD FAIL HI-LO HOT LEG
MRC18	RTD FAIL HI-LO COLD LEG
MRC19	PRESSURIZER RELIEF VALVE FAILS OPEN
MRC20	PRESSURIZER SPRAY VALVE STUCK OPEN
MRC21	PRESSURIZER SAFETY VALVE STUCK OPEN
MRC22	PRESSURIZER HEATERS FAIL ON (H BUS)
MRC23	J BUS PRESSURIZER HEATERS FAIL ON
MRC24	STEAM GENERATOR TUBE RUPTURE
MRC25	BOTH PRESSURIZER SPRAY VALVES FAIL CLOSED
MRC26	RCP SHEARED SHAFT
MRC29	PRESSURIZER PRESSURE CONTROL FAILS
MRC31	FUEL LEAK
MRC32	PCV-456 SEAT LEAKAGE
MRC33	PT-402 WIDE RANGE PRESSURE TRANSMITTER FAILURE
MRC34	PT-403 WIDE RANGE PRESSURE TRANSMITTER FAILURE
MRC35	PRT LEVEL TRANSMITTER FAILURE
MRC36	PRT PRESSURE TRANSMITTER FAILURE
MRC37	RCS VESSEL FLANGE LEAK TEMPERATURE DETECTOR FAILURE
MRC38	LOSS OF COMPONENT COOLING WATER TO RCP
MRC40	PZR SURGE LINE TEMPERATURE TRANSMITTER FAILURE
MRC41	RCS SPRAY LINE TEMPERATURE TRANSMITTER FAILURE

MRC42	PZR LIQUID/VAPOR TEMPERATURE TRANSMITTER FAILURE
MRC43	PRESSURIZER PORV TEMPERATURE TRANSMITTER FAILURE
MRC44	PZR SAFETY LINE TEMPERATURE TRANSMITTER FAILURE
MRC45	PRT LIQUID TEMPERATURE TRANSMITTER FAILURE

August 2003 - July 2004

Integrated Tests

- Unit Shutdown from Startup Condition with Power less than or equal to 5% (Mode 2) to Hot Standby Condition (Mode 3) at 547 °F.
- Unit Shutdown from Hot standby Condition (Mode 3) to Hot Shutdown Condition (Mode 4) at less than 350 °F.
- Unit Shutdown from Hot Shutdown Condition (Mode 4) to Cold Shutdown Condition (Mode 5) at less than or equal to 200 °F.

Malfunction Tests

MRC46	PRESSURIZER SPRAY CONTROLLER FAILS
MRD01	ROD POSITION INDICATOR FAILURE
MRD06	UNCONTROLLED CONTINUOUS ROD WITHDRAWAL IN AUTO AT MAXIMUM SPEED
MRD07	UNCONTROLLED CONTINUOUS ROD INSERTION (AUTO) AT MAXIMUM SPEED
MRD08	CONTROL RODS MOVE AT MAXIMUM SPEED
MRD09	CONTROL RODS MOVE AT MINIMUM SPEED
MRD10	REVERSE DIRECTION IN AUTO ROD CONTROL
MRD11	RODS REVERSED DIRECTION IN MANUAL
MRD13	ROD CONTROL FAILURE CAUSING B & D BANKS TO MOVE TOGETHER
MRD14	RODS FAIL TO MOVE ON DEMAND IN AUTO
MRD15	RODS FAIL TO MOVE ON DEMAND IN MANUAL OR BANK SELECT
MRD16	DROPPED ROD
MRD21	EJECTED CONTROL ROD
MRD26	STUCK CONTROL ROD
MRD31	AUTO ROD CONTROL CONTROLS TEMPERATURE ABOVE SP
MRD32	FAILURE OF AUTO TRIP TO TRIP REACTOR ANY TIME
MRD33	FAILURE OF ALL ROD STOPS TO BLOCK ROD MOTION
MRD34	REACTOR TRIP BREAKERS OPEN

MRD36	LOSS OF NUCLEAR INSTRUMENT SIGNAL TO ROD CONTROL
MRD38	FAILURE OF REACTOR TRIP ON MANUAL DEMAND
MRH01	RESIDUAL HEAT REMOVAL SYSTEM LEAK

MRH02	RESIDUAL HEAT REMOVAL FLOW TRANSMITTER FAILURE
MRH03	LOSS OF COMPONENT COOLING TO RESIDUAL HEAT REMOVAL
MRH05	LOSS OF RESIDUAL HEAT REMOVAL PUMP
MRH06	RELIEF VALVE STUCK OPEN ON RESIDUAL HEAT REMOVAL SYSTEM
MRM01	AREA RADIATION MONITOR FAILURE
MRM02	PROCESS RADIATION MONITOR FAILURE
MRS01	LOSS OF OUTSIDE RECIRC SPRAY PUMP ON START
MRS02	LOSS OF INSIDE RECIRC SPRAY PUMP ON START
MRS04	RECIRC SPRAY NOZZLES CLOG
MRS05	TUBE LEAK IN RECIRC SPRAY HEAT EXCHANGER
MSI03	LOW HEAD SI PUMP SUCTION SCREEN CLOGS
MSI05	SPURIOUS SAFETY INJECTION
MSI06	FAILURE OF SAFETY INJECTION TO RESET
MSI07	FAILURE OF ONE SAFETY INJECTION TRAIN TO ACTUATE
MSI08	FAILURE OF ANY SAFETY INJECTION SIGNAL TO CAUSE SAFETY INJECTION
MSW01	SERVICE WATER PUMP TRIP
MTU01	TURBINE TRIP DUE TO OVERSPEED
MTU02	FAILURE OF MANUAL TURBINE TRIP TO FUNCTION ON DEMAND
MTU03	FAILURE OF AUTO TURBINE TRIP TO FUNCTION ON DEMAND
MTU12	FAILURE OF AUTO TURBINE RUNBACK
MTU13	SPURIOUS TURBINE RUNBACK
MTU14	REHEATER SAFETY VALVE STUCK OPEN

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 during the month of January. Identified discrepancies are scheduled for resolution during the current year.

The report includes identification of all unresolved Simulator Control Panel discrepancies; indicating 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 for examination.

CONTROL ROOM AND SIMULATOR PANEL COMPARISON UPDATE

A review was conducted of the original submittal report on the North Anna Control Room and Simulator Comparison of Panel Layout and Environment. The review was performed to update the changes made during the prior four years and validate the original differences noted.

Panels that remain non-simulated because of their relative minor training value or their inoperable status in the reference plant are:

STATION AND DIESEL BATTERY MONITORING PANEL
SEISMIC PANEL
SPILLWAY SUPERVISORY PANEL
ROBERTSHAW FIRE PROTECTION PANEL
VIBRATION/LOOSE PARTS MONITORING PANEL

CONTROL ROOM AND SIMULATOR ENVIRONMENTAL REVIEW UPDATE

Environmental differences identified in the initial simulator certification report and subsequently updated by the initial four year certification report 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

- The Rod Control bank step counters were replaced with digital style counters. Physical fidelity and training impact was evaluated and determined not to be a factor.
- Electrical synchrosopes were upgraded from analog to digital.
- Several Westinghouse recorders were upgraded to a paperless style LCD recorder.
- Reactor core cycle upgrades 12, 13, and 14 were installed upon completion of the respective station refueling cycle.

SIMULATOR DISCREPANCIES IDENTIFIED DURING NRC EXAMINATIONS.

There were no simulator discrepancies identified during NRC inspections from October 1996 to May 2000. Simulator discrepancies identified during other simulator training activities are available upon request.

NORTH ANNA UNIT 2
SIMULATOR CERTIFICATION
3rd FOUR YEAR REPORT
(1996 - 2000)

NORTH ANNA UNIT 2 SIMULATOR CERTIFICATION THIRD FOUR YEAR REPORT

The North Anna 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 North Anna Unit 2 Simulator Certification Four Year Report consist of the following sections:

- Simulator Fidelity & Upgrade Report (Attachment 1)

There were no significant differences identified during the previous four years. The North Anna Unit 1 Simulator meets the Unit 2 training needs.

ATTACHMENT 1

SIMULATOR FIDELITY & UPGRADE REPORT

PHYSICAL FIDELITY

A review was conducted of the original submittal report on the North Anna Unit 2 Control Room and Panel Comparison and Environment. The review was performed to update the changes made during the prior four years and validate the original differences noted. No additional differences were identified as a result of the Unit 1 and Unit 2 Control Room Panel Comparison.

UNIT 2 EQUIPMENT PANEL (SIMULATOR)

The Unit 2 Equipment Panel, located in the simulator control room, contains indications and controls for Unit 2 components of systems that are shared between the units. This equipment is located in the main control room specifically on Unit 2 panels, and is simulated only to the extent to allow training to be conducted on systems that require actions to be taken at Unit 2 locations.

ENVIRONMENTAL REVIEW

Environmental differences and differences between the simulator and the Unit 1 Control Room are discussed within the Control Room/Simulator Panel and Environment Comparison Report of the North Anna Unit 1 Simulator Certification Third Four Year Report.