UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W., SUITE 2900
ATLANTA, GEORGIA 30323-0199

January 24, 1997

NOTE TO: NRC Document Control Desk
Mail Stop O-5-D-24

FROM: Beverly Michael, Licensing Assistant Beverly Michael
Operating Licensing and Human Performance Branch,
Region II

SUBJECT: OPERATOR LICENSING **RETAKE** EXAMINATION ADMINISTERED ON DECEMBER 18, 1996, AT NORTH ANNA POWER STATION - DOCKET NOS. 50-338 AND 50-339 (EXAMINATION REPORT 50-338/96-301)

On December 18, 1996, Operator Licensing Examinations were administered at the referenced facility. Attached, you will find the following information for processing through NUDOCS and distribution to the NRC staff, including the NRC PDR:

Item #1 - a) Facility submitted outline and initial exam submittal, designated for distribution under RIDS Code A070.

b) As given operating examination, designated for distribution under RIDS Code A070.

Item #2 - Examination Report already submitted. Written exam - N/A.

Examination Level (Circle One): (RO) / SRO(I) / SRO(U)
Facility: North Anna
Examiner's Name (print):

Week of Examination: ~~Jan. 29~~ Dec 16, 1996

System / JPM	Safety Function	Planned Follow-up Questions: K/A/G // Importance // Description
1. Control Rod Drive - Retrieve a dropped rod (R...476)	I-001 SIM	a. 003AA2.03 (3.6/3.8) Effects of dropped rod on major plant parameters.
		b. 001K4.03 (3.5/3.8) Given a set of conditions, determine effect on rod control.
2. Chemical and Volume Control - Place excess letdown in service (R...333, re-write for unit-2	II-004 MCR	a. GEN-2.1.25 (2.8/3.1) Given a set of plant conditions, use graphs to determine blended flow.
		b. GEN-2.1.32 (3.4/3.8) Describe the reasons for the procedure precautions.
3. Emergency Core Cooling - Transfer the Safety Injection System from hot-leg to cold-leg injection (R...736) **ALT. PATH / ESF / NEW**	III-006 SIM	a. 011EK3.13 (3.8/4.2) Describe the reasons for swapping from hot-leg back to cold-leg injection.
		b. 006A2.13 (3.9/4.2) Actions required following a spurious SI
4. Residual Heat Removal - Restore RHR Cooling **ALT. PATH / SHUTDOWN / NEW** (LOSS OF CC TO RHR HXs, R...514)	IV-005 SIM	a. GEN-2.1.20 (4.3/4.2) Given a set of conditions, determine required actions.
		b. 005A2.04 (2.9/2.9) Affect of loss of instrument air on RCS temperature.

A070
North Anna Retake
Exam Outline

5. Reactor Coolant Pump - Start a reactor coolant pump (SEAL DELTA-P IS LOST, R..164)	IV-003 SIM	a. GEN-2.1.32 (3.2/3.3) Given a set of conditions, determine RCP start limitations.
		b. 003K5.06 (2.2/2.6) Given a set of plant conditions, determine the effect on calorimetric.
6. Containment Spray - Align containment spray systems (R...216)	V-028 SIM	a. 028K5.01 (3.4/3.9): Given a set of plant conditions, determine hazards.
		b. GEN-2.1.28 (3.2/.3.3) Purpose of sample line heat tracing.
7. Pressurizer Pressure Control - Place NDT protection in service during a natural circulation cooldown (R..577) SHUTDOWN	III-010 SIM	a. 010A4.03 (4.0/3.8) Given a set of conditions describe response of PRZR PORV block valve.
		b. 010A1.09 (3.4/3.7) Given a set of conditions, determine tail pipe temperature.
8. Emergency Diesel Generating - Unload and shutdown an EDG in the control room emergency mode (N...466) AP ACTION	VI-064 IN-PLANT	a. 064A3.06 (3.3/3.4) Given a set of conditions, determine control of EDG.
		b. 064K4.06 (2.8/3.2) Describe when speed droop is in effect.
9. Auxiliary Feedwater - Collapse steam voids in a steam-bound AFW pump (N...935)	IV-061 IN-PLANT	a. 061A2.06 (2.7/3.0) Affect of check-valve back-leakage.
		b. 061K4.02 (4.5/4.6) Given a set of conditions, apply interlocks to control of AFW pump.
10. Component Cooling Water System - Drain the CC system to a LW test tank (N...230) RCA	VIII-008 IN-PLANT	a. 008K4.01 (3.1/3.3) Given a set of plant conditions, determine response of CC pumps.
		b. 008A1.01 (2.8/2.9) Affects on CC flow from shifting common loads.

Examiner: _____ Chief Examiner: _____

NORTH ANNA POWER STATION

ADMINISTRATIVE WALK-THROUGH

SET 1

Examination Level (Circle One): RO / SRO Facility: North Anna Examiner's Name (print):		Week of Examination: Dec. 16, 1996
Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Status Control	JPM - Enter a component into abnormal status.
A.1	Shift Turnover	Given a set of conditions, determine turnover requirements.
		Given a set of conditions, determine qualification of relief.
A.2	Maintenance	JPM - Given a set of plant conditions, prioritize methods of plant cooling.
A.3	Radiation Work Practices	JPM - Review a Radiation Work Permit and obtain a DAD. **NOTE: This JPM will be incorporated into the "RCA" task, N...230 (JPM # 10).**
A.4	Emergency Facilities	Given a set of conditions, determine required actions.
		List those facilities with protection from radiation/airborne.

Examiner: _____ Chief Examiner: _____

ABNORMAL STATUS JPM

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Administrative
Job Performance Measure

INITIAL CONDITIONS

It has been determined during the unit 1 turbine building watchstander's rounds, that the main steam to aux. steam PCV, 1-AS-PCV-105, drifts open with its M/A station in automatic.

The instrument department has identified the problem, but repair parts will not arrive on sight until January 15th, 1997.

Until it can be repaired, the US has directed that the M/A station be placed in manual with zero demand.

The US has directed that this action be documented in abnormal status.

INITIATING CUE

You are to enter the above into abnormal status.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Administrative
Job Performance Measure

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Enter a component into Abnormal Status

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

It has been determined during the unit 1 turbine building watchstander's rounds, that the main steam to aux. steam PCV, 1-AS-PCV-105, drifts open with its M/A station in automatic.

The instrument department has identified the problem, but repair parts will not arrive on sight until January 15th, 1997.

Until it can be repaired, the US has directed that the M/A station be placed in manual with zero demand.

The US has directed that this action be documented in abnormal status.

INITIATING CUE

You are to enter the above into abnormal status.

STANDARDS

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Simulator Ops Network Computer

EVALUATION METHOD

Demonstrate

PERFORMANCE STEPS

1. Select VPPEQS from menu.

   SAT [ ] UNSAT [ ] NOTE _____

2. Enter badge number and password.

   SAT [ ] UNSAT [ ] NOTE _____

3. Select "B. Find by Type".

   SAT [ ] UNSAT [ ] NOTE _____

4. Select "C. Abnormal Status".

   SAT [ ] UNSAT [ ] NOTE _____

5. Select "A. Unit 1 and Common".

   SAT [ ] UNSAT [ ] NOTE _____

6. Press "Insert".

SAT [ ] UNSAT [ ] NOTE _____

7. Enter equipment mark number 1-AS-PCV-105 and required information.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

SHIFT TURNOVER QUESTIONS
(RO)

TOPIC: Shift Turnover

QUESTION #1

QUESTION	ANSWER	S/U
Given the following conditions: • You are the unit-2 OATC. • The SS has just informed you that you must report to "Fitness For Duty" for a random test. Describe the turnover requirements.	If a Control Room Operator with unit duty expects to be away from the assigned station for situations other than meal and restroom breaks, then a complete, formal relief shall be performed. REF. Vision Objective: 13598, OPAP-0005 section 6.2.3	

QUESTION #2

QUESTION	ANSWER	S/U
In the above situation, could Mike Burnette relieve you?	No, the individual does not hold an active license. Determined by referencing Virginia Power Personnel Qualification System (VPPQS) data base. REF. Vision Objective: 13597, OPAP-0005 sections 5.1.5 & 6.1.14	

CORE COOLING ASSESSMENT JPM

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Administrative
Job Performance Measure

INITIAL CONDITIONS

- Unit 1 has been shutdown for 155 hours.
- RCS temperature is 123°F.
- RCS is depressurized to atmospheric.
- "A" RCS loop stops are closed.
- "B" and "C" loop stops are open but de-energized.
- Both PRZR PORVs are blocked open.
- One PRZR safety valve is removed.
- PRZR level is 20%.
- One train of SI (HHSI and LHSI) is operable with both hot and cold leg injection paths.
- The RSWT is at normal operating level.
- The main condenser is open for maintenance.
- All SG levels are at 33%.
- The AFW system is tagged out for maintenance.
- All other systems are operable and in the expected state for this mode of operation.

INITIATING CUE

You are to determine the Alternate Core Cooling Assessment IAW 1-GOP-13.0, 1-GOP-13.1 for normal surveillance. You are not t[illegible]determine time to boiling.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Administrative
Job Performance Measure

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK Determine the Alternate Core Cooling Method(s).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

- Unit 1 has been shutdown for 155 hours.
- RCS temperature is 123°F.
- RCS is depressurized to atmospheric.
- "A" RCS loop stops are closed.
- "B" and "C" loop stops are open but de-energized.
- Both PRZR PORVs are blocked open.
- One PRZR safety valve is removed.
- PRZR level is 20%.
- One train of SI (HHSI and LHSI) is operable with both hot and cold leg injection paths.
- The RSWT is at normal operating level.
- The main condenser is open for maintenance.
- All SG levels are at 33%.
- The AFW system is tagged out for maintenance.
- All other systems are operable and in the expected state for this mode of operation.

INITIATING CUE

You are to determine the Alternate Core Cooling Assessment IAW 1-GOP-13.0, 1-GOP-13.1 for normal surveillance. You are not to determine time to boiling.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

EVALUATION METHOD

Verbal-visual

PERFORMANCE STEPS

1. Enter reason for assessment

   STANDARD

   Records "surveillance".

   SAT [ ] UNSAT [ ] NOTE _____

2. Verify Natural Circulation available.

   STANDARD

   Determines that Nat. Circ. is not available due to AFW and main condenser are tagged out.

   SAT [ ] UNSAT [ ] NOTE _____

3. Verify Reflux Boiling available.

STANDARD

Determines that Reflux Boiling is not available due to AFW and main condenser are tagged out.

SAT [ ] UNSAT [ ] NOTE _____

4. Verify Forced Feed and Spill available.

STANDARD

Determines that:

a. 1 PRZR safety valve is removed, 1 LHSI pump is available, time after shutdown is 1 hour, and RWST level is 50%. **AND/OR**
b. 2 PRZR PORVs are blocked open, 1 LHSI pump is available, time after shutdown is 26 hours, and RWST level is 50%.

CRITICAL STANDARD

Denotes Forced Feed and Spill as Priority 1.

SAT [ ] UNSAT [ ] NOTE _____

5. Verify Gravity Feed and Spill available.

STANDARD

Determines that:

1 PRZR safety valve is removed, time after shutdown is 58 hours, 1 train of SI operable, RWST level is approx. 82%.

CRITICAL STANDARD

Denotes Gravity Feed and Spill as Priority 2.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

RWP REVIEW JPM
(INTEGRATED INTO JPM #10)

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Administrative
Job Performance Measure

INITIAL CONDITIONS

You have been assigned a task in the auxiliary building.

INITIATING CUE

You are to review the applicable RWP and obtain a DAD.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Administrative
Job Performance Measure

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK Review an RWP and obtain a DAD.

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

You have been assigned a task in the auxiliary building.

INITIATING CUE

You are to review the applicable RWP and obtain a DAD.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

EVALUATION METHOD

Perform in-plant

PERFORMANCE STEPS

1. Select applicable RWP on RWP review computer.

   SAT [ ] UNSAT [ ] NOTE _____

2. Review RWP.

   SAT [ ] UNSAT [ ] NOTE _____

3. Obtain DAD from shelf and ensure it reads "PAUSE".

   SAT [ ] UNSAT [ ] NOTE _____

4. Insert DAD into reader.

SAT [ ] UNSAT [ ] NOTE _____

5. Enter TLD/badge number.

SAT [ ] UNSAT [ ] NOTE _____

6. Enter RWP number.

SAT [ ] UNSAT [ ] NOTE _____

7. Scan TLD.

SAT [ ] UNSAT [ ] NOTE _____

8. Acknowledge review of RWP.

SAT [ ] UNSAT [ ] NOTE _____

9. Review personal and RWP information.

SAT [ ] UNSAT [ ] NOTE _____

10. Remove DAD from reader and ensure it is reading "0.000 rem".

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

EPIP QUESTIONS

TOPIC: Emergency Facilities

QUESTION #1

QUESTION	ANSWER	S/U
You are escorting a mechanical chiller tech. rep. in the turbine building when an Alert is declared. What should you do with the tech. rep.?	The "visitor" must be taken to security building for accountability. REF. Emergency Plan, page 6.8	

QUESTION #2

QUESTION	ANSWER	S/U
Which emergency facilities were designed to provide some form of protection from whole body radiation and airborne contamination?	The following emergency facilities were designed to provide some form of protection from whole body radiation and airborne contamination: Main Control Room (MCR), Technical Support Center (TSC), and the Local Emergency Response Facility (LEOF). NOTE: Candidate may mention the Alternate Operation Support Center (OSC), which shares the MCR pressure envelop. REF. Emergency Plan, pages 7.3, 7.4, & 7.5.	

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...476

INITIAL CONDITIONS

Unit was at 100% steady-state operation prior to the event

Control bank A control rod P-10 is at 0 steps, as indicated by individual rod position

1-AP-1.2, "Dropped Rod," has been signed off up to the point of determining the maximum withdrawal rate, and it has been determined that no rate applies.

INITIATING CUE

You are requested to complete the "Dropped Rod Retrieval" attachment 2 in 1-AP-1.2.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...476

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Retrieve a dropped rod (1-AP-1.2).

NOTE TO THE TRAINER AND THE EVALUATOR

You must supply key variable information needed for training or evaluating this task

- BEFORE the session, fill in (or check the blank following the correct information in) all BRACKETED blanks [_____]
- DURING the session, fill in (or check the blank following the correct information in) all NON-BRACKETED blanks _____

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Unit was at 100% steady-state operation prior to the event

Control bank A control rod P-10 is at 0 steps, as indicated by individual rod position

1-AP-1.2, "Dropped Rod," has been signed off up to the point of determining the maximum withdrawal rate, and it has been determined that no rate applies.

INITIATING CUE

You are requested to complete the "Dropped Rod Retrieval" attachment 2 in 1-AP-1.2.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Copy of 1-AP-1.2 signed off to the point of completing the "Dropped Rod Retrieval" attachment

PREFERRED EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Place the control rod bank selector switch in BANK SELECT.

CRITICAL STANDARDS

Candidate places rod control selector switch in the CONTROL BANK A position

SAT [ ] UNSAT [ ] NOTE _____ __

2. Record the affected bank's group step counter reading.

VERBAL-VISUAL CUES

Control bank A group 2 step counter reading is 225.

STANDARD

Candidate records 225 for control bank A group 2 step counter reading.

SAT [ ] UNSAT [ ] NOTE _____

3. Manually reset the group step counter.

CRITICAL STANDARDS

Candidate resets thumbwheels for control bank A group 2 step counters to zero.

SAT [ ] UNSAT [ ] NOTE _____

5. Record the affected bank pulse-to-analog converter reading.

STANDARD

Candidate requests an extra operator to obtain the pulse-to-analog converter reading for control bank A.

DEMONSTRATION CUES

Control bank A pulse-to-analog converter reading is 225.

STANDARD

Candidate records 225 for Control bank A pulse-to-analog converter reading.

SAT [ ] UNSAT [ ] NOTE _____

6. Request an extra operator to reset the pulse-to-analog converter for control bank A.

STANDARD

Candidate requests an extra operator to reset the pulse-to-analog converter for control bank A.

SAT [ ] UNSAT [ ] NOTE _____

7. Open all lift coil disconnect switches for the affected bank, except the switch for the dropped rod.

CRITICAL STANDARDS

Candidate opens all lift coil disconnect switches for control bank A except for rod P-10.

SAT [ ] UNSAT [ ] NOTE _____

8. Independently verify that all lift coil disconnect switches for the affected bank, except the switch for the dropped rod, are open.

DEMONSTRATION CUES

Assume that another operator has performed this step.

SAT [ ] UNSAT [ ] NOTE _____

9. Manually withdraw the affected control rod.

CRITICAL STANDARDS

Candidate commences withdrawaling control rod P-10.

DEMONSTRATION CUES

Reactor Coolant System temperature control will be accomplished by the balance-of-plant operator.

SAT [ ] UNSAT [ ] NOTE _____

10. Continue to withdraw control rod P-10 to 225 steps.

CRITICAL STANDARDS

Candidate withdrawals control rod P-10 to 225 steps.

STANDARD

Candidate records 225 steps.

SAT [ ] UNSAT [ ] NOTE _____

11. Verify that all rods in the affected bank are at the same height and that no rod bottom light is lit.

STANDARD

Candidate verifies all rods in the affected bank are at the same height and that no rod bottom light is lit.

SAT [ ] UNSAT [ ] NOTE _____

12. Close all lift coil disconnect switches.

CRITICAL STANDARDS

Candidate closes all lift coil disconnect switches for control bank A.

SAT [ ] UNSAT [ ] NOTE _____

13. Reset the ROD CONTROL URGENT FAILURE alarm.

STANDARD

Candidate resets the ROD CONTROL URGENT FAILURE alarm.

SAT [ ] UNSAT [ ] NOTE _____

14. Step the affected bank control rods in one step, and verify that group 2, and then group-1, are sequencing properly.

DEMONSTRATION CUES

Assume another operator will complete this procedure.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R...476

TOPIC: I-001 SYSTEM: Rod Control K/A: 003AA2.03 (3.6/3.8)

QUESTION #1

QUESTION	ANSWER	S/U
Explain how each of the following plant parameters change in response to a dropped control rod that does not cause a reactor trip while the unit is at power. • Indicated reactor power • Actual reactor power • Reactor Coolant System $\Delta T/T_{avg}$ • Pressurizer level and pressure • Axial flux difference	• Indicated reactor power will decrease by varying amounts as indicated by the PRNIS due to rod shadowing and the relationship between the dropped rod and detector location. • Actual reactor power should remain constant if steam demand does not change unless the corresponding decrease in T_{avg} causes steam pressure to decrease low enough to reduce steam demand. • Reactor Coolant System ΔT will remain constant if actual power does not change. If power does decrease (for the reasons noted above), ΔT will correspondingly decrease. • T_{avg} will decrease to provide positive reactivity (in response to the negative reactivity inserted by the dropped rod). • PRZR level will decrease in response to the reduced T_{avg} due to "shrinkage" of the RCS as well as the decrease in the programmed pressurizer level that corresponds to the reduced T_{avg}. • Pressurizer pressure will decrease in response to the reduced T_{avg} until the heaters can restore the system to normal operating pressure. • Axial flux will shift upward due to the greater amount of positive reactivity inserted in the top of the core due to the T_{avg} decrease (greater fractional change in density at the top of the core than at the bottom of the core). REF. Vision Objective #: 11025	

TOPIC: I-001 SYSTEM: Rod Control K/A: 1001K4.03 (3.5/3.8)

QUESTION #2

QUESTION	ANSWER	S/U
Given the following conditions: • The unit is holding at 30% power for chemistry. • Rod control is in manual. • Tave is 557°F • Tref unit fails to +4°F above Tave. What would indicated rod speed be if rod control was placed in automatic?	40 steps per minute (SPM) [72 SPM (max. speed) - 8 SPM (min. speed) = 2° mis-match between 3°F and 5°F 32 SPM/°F + 8 SPM (min speed) = 40 SPM REF. Vision Objective #: 6512, PLS DOCUMENT	

11025 Explain how each of the following plant parameters change in response to a dropped control rod that does not cause a reactor trip while the unit is at power.

- Indicated reactor power

  Indicated reactor power will decrease by varying amounts as indicated by the PRNIS due to rod shadowing and the relationship between the dropped rod and detector location. A noticeable tilt/imbalance may be indicated due to the proximity of the dropped rod to the detectors.

- Actual reactor power

  Actual reactor power should remain constant if steam demand does not change unless the corresponding decrease in T_{avg} causes steam pressure to decrease low enough to reduce steam demand. (This should not be the case with minimal SG tube plugging, adequate initial SG pressure and "room" for the governor valves to open in response to the decrease in steam pressure.)

- Reactor Coolant System $\Delta T/T_{avg}$

  Reactor Coolant System ΔT will remain constant if actual power does not change. If power does decrease (for the reasons noted above), ΔT will correspondingly decrease.

  T_{avg} will decrease to provide positive reactivity (in response to the negative reactivity inserted by the dropped rod) to maintain the reactor critical.

- Pressurizer level and pressure

  Pressurizer level will decrease in response to the reduced T_{avg} due to "shrinkage" of the RCS as well as the decrease in the programmed pressurizer level that corresponds to the reduced T_{avg}.

  Pressurizer pressure will decrease in response to the reduced T_{avg} until the heaters can restore the system to normal operating pressure.

- Axial flux difference

  Axial flux will shift upward due to the greater amount of positive reactivity inserted in the top of the core due to the T_{avg} decrease (greater fractional change in density at the top of the core than at the bottom of the core).

6512 Explain the following concepts associated with the output signal generated by the Rod Control System's automatic temperature control unit.

- Differential temperature at which rod motion is initiated at minimum speed

  1.5 °F

- Differential temperature range at which rod speed is linearly increased to its maximum value

  3.0 to 5.0 °F

- Differential temperature range known as the "control rod lockup region"

  -1.0 to -1.5°F and +1.0 to +1.5°F

- Why the lockup region is provided

  A lockup region is included in the program to prevent bistable chattering, when the error signal is near the end of the deadband.

- Differential temperature range known as the "control rod deadband region"

  3.0 °F (-1.5 to +1.5°F)

- Why the deadband region is provided

  A deadband is provided in the rod control program to prevent continuous stepping of the control rods.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...333

INITIAL CONDITIONS

Maintenance on the Normal Letdown System is required

Unit 1 is at 100% power

INITIATING CUE

You are requested to shift from normal to excess letdown flowing to the volume control tank.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...333

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Shift from normal letdown to excess letdown (1-OP-8.5).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Maintenance on the Normal Letdown System is required

Unit is in mode 1

INITIATING CUE

You are requested to shift from normal to excess letdown flowing to the volume control tank.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Review initial conditions, precautions, and limitations.

STANDARD

Candidate reviews initial conditions, precautions, and limitations.

SAT [ ] UNSAT [ ] NOTE _____

2. Verify that component cooling water is being supplied to the excess letdown heat exchanger.

STANDARD

Candidate observes that annunciator G-E2, "EXC LTDN HX CC OUT LO FLOW" is not lit.

SAT [ ] UNSAT [ ] NOTE _____

3. Close excess letdown pressure control valve 1-CH-HCV-1137.

STANDARD

Candidate closes excess letdown pressure control valve 1-CH-HCV-1137.

SAT [ ] UNSAT [ ] NOTE _____

4. Close the breaker for the loop drain header isolation valves.

CRITICAL STANDARDS

Candidate requests that breaker 1-EP-CB-26B-22 for loop drain header isolation valves 1-CH-HCV-1557A, 1557B, and 1557C be closed.

SAT [ ] UNSAT [ ] NOTE _____

5. Place the selector switch for excess letdown flow divert valve 1-CH-HCV-1389 in VCT.

STANDARD

Candidate verifies selector switch for excess letdown flow divert valve 1-CH-HCV-1389 is in VCT.

SAT [ ] UNSAT [ ] NOTE _____

6. Close the letdown orifice isolation valves.

CRITICAL STANDARDS

Candidate closes letdown orifice valves 1-CH-HCV-1200A, 1200B, and 1200C.

SAT [ ] UNSAT [ ] NOTE _____

7. Place normal charging flow control valve 1-CH-FCV-1122 in MANUAL, and close the valve.

CRITICAL STANDARDS

Candidate place normal charging flow control valve 1-CH-FCV-1122 in MANUAL, and closes the valve.

SAT [ ] UNSAT [ ] NOTE _____

8. Open at least one Reactor Coolant System drain valve.

CRITICAL STANDARDS

Candidate opens at least one Reactor Coolant System drain valve (1-CH-HCV-1557A, 1557B, or 1557C).

SAT [ ] UNSAT [ ] NOTE _____

9. Open the excess letdown heat exchanger isolation valve.

CRITICAL STANDARDS

Candidate opens excess letdown heat exchanger isolation valve 1-CH-HCV-1201.

SAT [ ] UNSAT [ ] NOTE _____

10. Open the excess letdown pressure control valve.

CRITICAL STANDARDS

Candidate opens excess letdown pressure control valve 1-CH-HCV-1137.

SAT [ ] UNSAT [ ] NOTE _____

11. Maintain the pressurizer level stable.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R...333

TOPIC: II-004 SYSTEM: Chemical and Volume Control K/A: GEN-2.1.25 (2.8/3.1)

QUESTION #1

QUESTION	ANSWER	S/U
Given the following plant conditions: • RCS boron concentration is 500 ppm. • Desired PG flow rate will be 100 gpm. • BAST concentration is 12,950 ppm Determine the potentiometer settings to achieve a blended flow equal to that of RCS boron concentration.	Use 1-SC-2.1 to determine that boric acid flow should be 4 gpm to achieve a blended flow of 500 ppm. (Note: the following equation can **ONLY** be used if the range of indication starts at ZERO) $Potentiometer\ Setting = \left(\frac{Desired\ Flow\ Rate}{Total\ Rangeof\ Indication}\right) 10$ $6.66 = \left(\frac{100\,gpm}{150\,gpm}\right)10$ $2.0 = \left(\frac{4\ gpm}{20\ gpm}\right) 10$ REF. Vision Objective #: 3966, STATION CURVE BOOK	

TOPIC: II-004
QUESTION #2

SYSTEM: Chemical and Volume Control K/A: GEN-2.1.32 (3.4/3.8)

QUESTION	ANSWER	S/U
Explain the consequences of the following actions when placing excess letdown in service. • Exceeding 130 psig excess letdown pressure • Exceeding 75 psig volume control tank pressure	• This could present an unnecessary challenge to the excess letdown heat exchanger relief valve (150 psig setpoint). Excessive pressure in the excess letdown line (when aligned to the VCT) exerts a higher than normal back-pressure on the #1 RCP seals. • This would present an unnecessary challenge to the VCT relief valve (75 psig relieves to HLLWT's) if the VCT were to be overfilled since there is no divert capability via LCV-1115A while on excess letdown. REF. Vision Objective #: 245, 11715-FM-95 SERIES	

3966 Given the desired concentration of a blended makeup, determine the correct potentiometer settings for the boric acid flow controller and primary grade water flow controller.

Determining the potentiometer settings to achieve a given boron concentration.

245 Explain the consequences of the following actions when placing excess letdown in service.

- Exceeding 130 psig excess letdown pressure

  This could present an unnecessary challenge to the excess letdown heat exchanger relief valve (150 psig setpoint).

  Excessive pressure in the excess letdown line (when aligned to the VCT) exerts a higher than normal back-pressure on the #1 RCP seals.

- Exceeding 75 psig volume control tank pressure

  This would present an unnecessary challenge to the VCT relief valve (75 psig relieves to HLLWT's) if the VCT were to be overfilled since there is no divert capability via LCV-1115A while on excess letdown.

- Rapidly placing excess letdown in service

  This would cause undue pressure/temperature stress on the excess letdown heat exchanger and could cause tube leakage.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...736

INITIAL CONDITIONS

1-E-1, "Loss of Reactor or Secondary Coolant," has directed the transition to 1-ES-1.5, "Transfer From Hot Leg Recirculation to Cold Leg Recirculation"

Safety Injection System is in the hot-leg recirculation mode

1-CH-P-1B was lined up to flow through the boron injection tank header for hot-leg recirculation, but has tripped on over-current and cannot be restarted.

1-CH-P-1C was tagged out at the start of the accident for coupling replacement and will not be available for 18 hours.

1-CH-P-1A is flowing through the alternate header for hot-leg recirculation

INITIATING CUE

You are requested to transfer from hot-leg recirculation to cold-leg recircu'ation in accordance with 1-ES-1.5, "Transfer From Hot Leg Recirculation to Cold Leg Recirculation."

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...736

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Transfer the Safety Injection System from hot-leg to cold-leg recirculation (1-ES-1.5).

ALTERNATE - PATH TOPIC

1-CH-P-1A is the only available charging pump.

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

1-E-1, "Loss of Reactor or Secondary Coolant," has directed the transition to 1-ES-1.5, "Transfer From Hot Leg Recirculation to Cold Leg Recirculation"

Safety Injection System is in the hot-leg recirculation mode

1-CH-P-1B was lined up to flow through the boron injection tank header for hot-leg recirculation, but has tripped on over-current and cannot be restarted.

1-CH-P-1C was tagged out at the start of the accident for coupling replacement and will not be available for 18 hours.

1-CH-P-1A is flowing through the alternate header for hot-leg recirculation

INITIATING CUE

You are requested to transfer from hot-leg recirculation to cold-leg recirculation in accordance with 1-ES-1.5, "Transfer From Hot Leg Recirculation to Cold Leg Recirculation."

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Close the following low-head safety injection pump hot-leg injection valves.
   - 1-SI-MOV-1890A
   - 1-SI-MOV-1890B

   CRITICAL STANDARDS

   Candidate places key switches for 1-SI-MOV-1890A and 1-SI-MOV-1890B in CLOSE.

   SAT [ ] UNSAT [ ] NOTE _____

2. Open the low-head safety injection pump discharge valves.

CRITICAL STANDARDS

Candidate depresses OPEN push-button for 1-SI-MOV-1864A or 1-SI-MOV-1864B.

SAT [ ] UNSAT [ ] NOTE _____

3. Open the low-head safety injection pump cold-leg injection valves.

CRITICAL STANDARDS

Candidate places control switch for 1-SI-MOV-1890C or 1890D in OPEN.

SAT [ ] UNSAT [ ] NOTE _____

4. Verify two charging pumps in service.

STANDARD

Candidate determines that only one charging pump is available.

SAT [ ] UNSAT [ ] NOTE _____

5. Establish charging pump recirc for the running pump.

CRITICAL STANDARDS

Candidate places control switch for 1-CH-MOV-1275A in OPEN.

SAT [ ] UNSAT [ ] NOTE _____

6. Isolate hot-leg injection.

CRITICAL STANDARDS

Candidate depresses CLOSE push-buttons for 1-SI-MOV-1869B and 1869A.

SAT [ ] UNSAT [ ] NOTE _____

7. Establish cold-leg injection flow path.

CRITICAL STANDARDS

Candidate depresses OPEN push-buttons fo. 1-SI-MOV-1867C and/or 1867D, then depresses OPEN push-buttons for 1-SI-MOV-1867A and/or 1867B.

SAT [ ] UNSAT [ ] NOTE _____

8. Verify that normal header cold-leg injection flow exists.

STANDARD

Candidate determines that cold-leg injection flow does not exist.

SAT [ ] UNSAT [ ] NOTE _____

9. Align 1-CH-P-1A to the normal header.

CRITICAL STANDARDS

Candidate places control switch for 1-CH-MOV-1286A in OPEN.

SAT [ ] UNSAT [ ] NOTE _____

10. Clo.. ..arging pump recirc valve for 1-CH-P-1A.

CRITICAL STANDARDS

Candidate places control switch for 1-CH-MOV-1275A in CLOSE .

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R...736

TOPIC: III-006 SYSTEM: Emergency Core Cooling K/A: 011EK3.13 (3.8/4.2)

QUESTION #1

QUESTION	ANSWER	S/U
Explain the reason Safety Injection System is transferred from the hot-leg recirculation mode back to the cold-leg recirculation mode in 1-ES-1.5, "Transfer From Hot Leg Recirculation to Cold Leg Recirculation."	Based on the NAPS ECCS design, the SI flow path should be alternated from the hot legs to the cold legs. This change in flow path is needed to address a concern relating to boron precipitation in the reactor vessel core region. If a relatively large pipe break or leakage occurs in the RCS hot leg and SI is injected into the RCS hot legs, then the boron concentration in the reactor core region may increase and approach the precipitation limit. In order to alleviate this situation, the injection flow path should be changed so the low-head SI pump discharge flows back to the cold legs and the charging pump primary flow path is via the bit with the alternate pump and flow path to the cold leg injection path. REF. Vision Objective #: 13438	

TOPIC: III-006 SYSTEM: Emergency Core Cooling K/A: 006A2.13 (3.9/4.2)

QUESTION #2

QUESTION	ANSWER	S/U
Assuming that a spurious safety injection occurs with the unit at full power, explain the potential long-term consequences of failing to reset the recirculation mode signal using the SI RECIRC MODE RESET push-buttons.	Reseting a Safety Injection signal using the main benchboard's reset pushbuttons DOES NOT RESET the safety injection input signal for automatic swapover of the LHSI pump suction to the containment sump. If this signal is not reset, it could result in the LHSI pumps shifting into the Recirc Mode automatically when RWST level decreases below the lo-lo level setpoint, such as during a refueling, and may destroy the LHSI Pumps. To prevent this from occurring, the operator MUST depress the SI RECIRC MODE RESET pushbuttons after the safety injection signal has been reset. This action is required to reset the safety injection input required to actuate this interlock circuit. REF. Vision Objective #: 3432	

SIMULATOR SETUP

TASK

R...736 Transfer the Safety Injection System from hot-leg to cold-leg recirculation (1-ES-1.5).

CHECKLIST

_____ Recall IC #1 (100% power)

_____ Tag out 1-Ch-P-1C - non-rotaional

_____ Enter malfunction MRC0101, time delay = 10, ramp = 60, start = 0, stop = 100

_____ Go to RUN, and perform 1-E-0 to 1-E-1

_____ When the Safety Injection System swaps to cold-leg recirculation, then perform the steps up through establishing redundant cold-leg injection flow paths (1-CH-P-1B flowing the boron injection tank and 1-CH-P-1A flowing the alternate header)

_____ Swap to hot-leg recirculation in accordance with 1-ES-1.4

_____ Enter the following malfunctions: MCH1602, TD = 0 SEC, TRGR = N/A

_____ Place the simulator in FREEZE

_____ Place the keys in SI-MOV-1890A, 1890B, 1869A, and 1869B

13438 Explain why the Safety Injection System is transferred from the hot-leg recirculation mode back to the cold-leg recirculation mode in 1-ES-1.5, "Transfer From Hot Leg Recirculation to Cold Leg Recirculation."

Based on the NAPS ECCS design, the SI flow path should be alternated from the hot legs to the cold legs. This change in flow path is needed to address a concern relating to boron precipitation in the reactor vessel core region. If a relatively large pipe break or leakage occurs in the RCS hot leg and SI is injected into the RCS hot legs, then the boron concentration in the reactor core region may increase and approach the precipitation limit. In order to alleviate this situation, the injection flow path should be changed so the low-head SI pump discharge flows back to the cold legs and the charging pump primary flow path is via the bit with the alternate pump and flow path to the cold leg injection path.

3432 Assuming that a spurious safety injection occurs with the unit at full power, explain the potential long-term consequences of failing to reset the recirculation mode signal using the SI RECIRC MODE RESET push-buttons.

Reseting a Safety Injection signal using the main benchboard's reset pushbuttons DOES NOT RESET the safety injection input signal for automatic swapover of the LHSI pump suction to the containment sump.

If this signal is not reset, it could result in the LHSI pumps shifting into the Recirc Mode automatically when RWST level decreases below the lo-lo level setpoint, such as during a refueling, and may destroy the LHSI Pumps.

To prevent this from occurring, the operator MUST depress the SI RECIRC MODE RESET pushbuttons after the safety injection signal has been reset.

This action is required to reset the safety injection input required to actuate this interlock circuit.

▲

Refueling water storage tank level is currently 81%, and a large break loss of coolant accident is in progress. Calculate how long it will be before manual swapover to cold leg recirculation is required. Assume the following pumps are running at the specified flow rates:

- "A" and "B" low head safety injection pumps (2500 gpm each)
- "B" and "C" high head safety injection pumps (200 gpm each)
- "A" and "B" quench spray pumps (1900 gpm each)

Disregard the volume of the chemical addition tank.

▲

1.00

▲

30 minutes

▲

32 minutes

▲

60 minutes

▲

63 minutes

▲▲▲▲▲▲▲

Vision objective number-3381

1-SC-5.12

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

JOB PERFORMANCE MEASURE

R...514

INITIAL CONDITIONS

Unit-1 is in mode 4.

It is day 5 of a 30-day refueling outage

1-RH-P-1B is in service with 2 RHR heat exchangers in service

INITIATING CUE

You are the OATC on watch.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

JOB PERFORMANCE MEASURE

R...514

Operator _____ Evaluator _____

Observer _____ Evaluation Date _____

Performance Evaluation [___] Satisfactory [___] Unsatisfactory

TASK

Restore residual heat removal flow (1-AP-11).

ALTERNATE - PATH TOPIC

Running RHR pump has a sheared shaft.

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Unit-1 is in mode 4.

It is day 5 of a 30-day refueling outage

1-RH-P-1B is in service with 2 RHR heat exchangers in service

INITIATING CUE

You are the OATC on watch.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

Residual Heat Removal System flow is restored to normal

TOOLS AND EQUIPMENT

None

EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Check if Reactor Coolant System level is decreasing.

   STANDARD

   Candidate determines that a loss of inventory is not in progress.

   SAT [ ] UNSAT [ ] NOTE _____

2. Verify that the Residual Heat Removal System inlet isolation valves are open.

   STANDARD

   Candidate determines that 1-RH-MOV-1700 and 1701 are open.

   SAT [ ] UNSAT [ ] NOTE _____

3. Verify that the Residual Heat Removal System outlet isolation valves are open.

STANDARD

Candidate determines that 1-RH-MOV-1720A and 1720B are open.

SAT [ ] UNSAT [ ] NOTE _____

4. Check that at least one residual heat removal pump is running.

STANDARD

Candidate determines that 1-RH-P-1B has a sheared shaft and is not to be considered as running.

SAT [ ] UNSAT [ ] NOTE _____

5. Manually close 1-RH-FCV-1605 and 1-RH-HCV-1758.

STANDARD

Candidate closes 1-RH-FCV-1605 and 1-RH-HCV-1758.

SAT [ ] UNSAT [ ] NOTE _____

6. Start one RHR pump.

CRITICAL STANDARD

Candidate starts 1-RH-P-1A.

SAT [ ] UNSAT [ ] NOTE _____

7. Verify RHR system parameters normal.

STANDARD

Candidate determines that RHR system is normal.

SAT [ ] UNSAT [ ] NOTE _____

8. Check service water to CC heat exchangers delta-P normal.

DEMONSTRATION CUES

The auxiliary building watchstander reports that SW to CC heat exchanger delta P is 12 PSID.

STANDARD

Candidate determines that the delta-p is normal.

SAT [ ] UNSAT [ ] NOTE _____

9. Check CC flow to RHR heat exchangers normal.

STANDARD

Candidate determines that CC flow to RHR heat exchangers is normal.

SAT [ ] UNSAT [ ] NOTE _____

10. Return to the procedure in effect.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R...514

TOPIC: IV-005 SYSTEM: Residual Heat Removal K/A: GEN-2.1.20 (4.3/4.2)

QUESTION #1

QUESTION	ANSWER	S/U
Assume the following conditions existed during the performance of the just completed JPM: • Unit 1 is in mode 5. • It is day 5 of a 30-day refueling outage. • RHR pump amps are observed to be oscillating. • RCS level is decreasing rapidly. • The operating crew entered 1-AP-11 • RCS inventory has been stabilized at +7 inches above centerline. • RHR flow has been reduced to equal "design flow" for time after shutdown. What are the next required actions that should be taken?	Since RCS level is +7 inches above centerline, current RHR flow is in the "unacceptable region". The following actions should be taken: 1. Continue RCS makeup. 2. Stop RHR pumps. 3. Go to step 11 REF. 1-AP-11	

TOPIC: IV-005 SYSTEM: Residual Heat Removal K/A: 005A2.04 (2.9/2.9)

QUESTION #2

QUESTION	ANSWER	S/U
Given the following conditions: • Unit 1 is in mode 5 for a refueling outage. • A VCT float has been established. • Core off-load has not yet begun. • An instrument air leak has developed inside containment. • The containment instrument air TV has been closed and outside instrument air pressure is recovering. As containment instrument air decreases to zero, what will happen to RCS temperature and why?	RCS temperature will decrease as 1-RH-HCV-1758 fails open and 1-RH-FCV-1605 fails closed. REF. 11715-FM-94	

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...164

INITIAL CONDITIONS

Unit startup from mode 4 to 3 is in progress

"A" and "C" RCPs are in service

Conditions have been established for starting the "B" RCP

The reactor coolant filter and a mixed bed ion exchanger are in service

INITIATING CUE

You are requested to start the "B" RCP.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...164

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Start a reactor coolant pump.

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Unit startup from mode 4 to 3 is in progress

"A" and "C" RCPs are in service

Conditions have been established for starting the "B" RCP

The reactor coolant filter and a mixed bed ion exchanger are in service

INITIATING CUE

You are requested to start the "B" RCP.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

Failed channel is placed in TEST within one hour

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Review initial conditions, precautions, and limitations.

   STANDARD

   Candidate reviews initial conditions, precautions, and limitations.

   SAT [ ] UNSAT [ ] NOTE _____

2. Ensure seal return MOVs are open.

   STANDARD

   Candidate verifies 1-CH-MOV-1380 and 1381 are open.

   SAT [ ] UNSAT [ ] NOTE _____

3. Verify "B" #1 seal leak off flow is within acceptable limits.

STANDARD

Candidate verifies acceptable flow IAW attachment 1.

SAT [ ] UNSAT [ ] NOTE _____

4. Verify "B" #1 seal delta-P is greater than 200 PSID.

STANDARD

Candidate verifies delta-P is >200 PSID.

SAT [ ] UNSAT [ ] NOTE _____

5. Start the "B" RCP bearing lift pump.

CRITICAL STANDARDS

Candidate places control switch for 1-RC-P-1B1 in START.

SAT [ ] UNSAT [ ] NOTE _____

6. Verify "B" RCP oil pressure start permissive indicating light is on.

STANDARD

Candidate observes that light is lit.

SAT [ ] UNSAT [ ] NOTE _____

7. Verify "B" RCP annunciators are not lit.

STANDARD

Candidate observes that annunciators are not lit.

SAT [ ] UNSAT [ ] NOTE _____

8. Ensure CVCS parameters are within spec.

STANDARD

Candidate determines that CVCS parameters are within spec.

SAT [ ] UNSAT [ ] NOTE _____

9. Ensure CC parameters are within spec.

STANDARD

Candidate determines that CC parameters are within spec.

SAT [ ] UNSAT [ ] NOTE _____

10. Ensure RCS pressure is above required value.

STANDARD

Candidate verifies RCS pressure is > 280 PSIG.

SAT [ ] UNSAT [ ] NOTE _____

11. Verify that bearing lift pump has been running at least 2 minutes.

CRITICAL STANDARDS

Pump has been running at least 2 minutes.

SAT [ ] UNSAT [ ] NOTE _____

12. Start the "B" RCP.

CRITICAL STANDARDS

Candidate places the "B" RCP control switch to START, then to AUTO-AFTER-START.

SAT [ ] UNSAT [ ] NOTE _____

13. Verify RCS flow is increasing.

STANDARD

Candidate observes RCS flow increasing.

SAT [ ] UNSAT [ ] NOTE _____

NOTE TO EVALUATOR: AT THIS POINT, #1 SEAL DELTA-P WILL BEGIN TO DECREASE.

14. Determine that #1 seal delta-P is decreasing to/is going below 200 PSID.

CRITICAL STANDARDS

Candidate stops "B" RCP.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R....57

TOPIC: VII-015 SYSTEM: Nuclear Instrumentation K/A: GEN-2.1.28 (3.2/3.3)

QUESTION #1

QUESTION	ANSWER	S/U
Given the following conditions: • Unit 1 is in mode 3 • The "A" RCP tripped at 1500 due to a faulty relay • The relay has been replaced • At 1615, the OATC started the "A" RCP, but inadvertently stopped it as it was reaching full speed • Another start was attempted at 1645, but it too was unsuccessful When may the next start attempt be made?	The next start attempt may be made at 1715. REF. Vision Objective #: 10499, 1-OP-5.2	

TOPIC: VII-015
QUESTION #2

SYSTEM: Nuclear Instrumentation

K/A: 015A1.01 (3.5/3.8)

QUESTION	ANSWER	S/U
Given the following conditions: • The OATC is performing a computer calorimetric. • The OATC inadvertently omits the heat input from the RCPs. Based on the above, what will the relationship be between actual power and calculated power?	By not considering the heat added by the RCPs, actual reactor power will less than calculated. $\dot{Q}_{Rx} = \dot{Q}_{S/G} + \dot{Q}_{S/G\ Blowdown} - \dot{Q}_{RCP's} - \dot{Q}_{Pzr\ Heaters}$ REF. Vision Objective #: 7804	

10499 List the following requirements associated with starting a reactor coolant pump.

- Time required for the motor to be idle before any start attempt

  Allow motor to idle at least 30 minutes before any restart.

- Time required for the motor to be idle between the third and fourth start attempt

  Allow motor to idle at least 1 hour before fourth attempt.

- Number of start attempts allowed in a two-hour period

  Attempt only three starts in 2 hours.

- Reason for limiting the number of motor starts within a given time period

  To prevent damage to the stator due to overheating

7804 Explain the following concepts concerning the adjustment of the power-range nuclear instruments.

- Qualifications required of personnel who adjust the power-range instruments

  The channel is adjusted by a licensed operator under the direct supervision of a senior reactor operator.

- Parameters used to calculate the secondary plant calorimetric

$$\dot{Q}_{Rx} = \dot{Q}_{S/G} + \dot{Q}_{S/G\ Blowdown} - \dot{Q}_{RCP's} - \dot{Q}_{Pzr\ Heaters}$$

- Maximum difference between the secondary plant calorimetric and the power-range nuclear instrument reading

  Each power range channel at the North Anna Power Station is required to be within two percent of the calorimetric power level.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...216

INITIAL CONDITIONS

Unit 1 tripped from 100% power due to a main generator fault

While stabilizing the unit in 1-ES-0.1, a large break LOCA occurred

The STA has identified an orange path on Containment

INITIATING CUE

You are requested to respond in accordance with 1-FR-Z.1.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...216

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Align the containment spray systems in response to high containment pressure (1-FR-Z.1).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Unit 1 tripped from 100% power due to a main generator fault

While stabilizing the unit in 1-ES-0.1, a large break LOCA occurred

The STA has identified an orange path on Containment

INITIATING CUE

You are requested to respond in accordance with 1-FR-Z.1.

STANDARDS

[illegible] was performed as directed by the procedure referenced in the task statement within [illegible]ntheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

PREFERRED EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Verify Phase A isolation valves closed.

   STANDARD

   Candidate observes Phase A trip valves are closed.

   SAT [ ] UNSAT [ ] NOTE _____

2. Check if CDA is required.

   STANDARD

   Candidate determines that containment pressure has exceeded 28 PSIA.

   SAT [ ] UNSAT [ ] NOTE _____

3. Manually actuate CDA.

CRITICAL STANDARDS

Candidate places both of the CDA switches to INITIATE.

SAT [ ] UNSAT [ ] NOTE _____

4. Verify CC pumps tripped.

CRITICAL STANDARDS

Candidate stops 1-CC-P-1A.

SAT [ ] UNSAT [ ] NOTE _____

5. Stop all RCPs.

CRITICAL STANDARDS

Candidate stops all RCPs.

SAT [ ] UNSAT [ ] NOTE _____

6. Verify Phase B isolation valves closed.

CRITICAL STANDARDS

Candidate closes 1-CC-TV-105A, B, C, 1-CC-TV-102A, C, E, 1-CC-TV-101A, 103A, and 1-IA-TV-102A.

STANDARD

Candidate observes all other Phase B isolation valves are closed.

SAT [ ] UNSAT [ ] NOTE _____

7. Verify at least two service water pumps running.

STANDARD

Candidate observes both SW pumps running.

SAT [ ] UNSAT [ ] NOTE _____

8. Verify SW supply to CC HXs closed.

CRITICAL STANDARDS

Candidate closes 1-SW-MOV-108A.

SAT [ ] UNSAT [ ] NOTE _____

9. Verify SW supply to recirc spray HXs open.

CRITICAL STANDARDS

Candidate opens 1-SW-MOV-103A, 101A, 103D, and 101C.

SAT [ ] UNSAT [ ] NOTE _____

10. Verify SW return from recirc spray HXs open.

CRITICAL STANDARDS

Candidate opens 1-SW-MOV-104A, 105A, 104D, and 105C.

SAT [ ] UNSAT [ ] NOTE _____

11. Verify proper operation of the "H" train containment spray systems.

CRITICAL STANDARDS

Candidate opens 1-QS-MOV-101A and1-RS-MOV-100A.
Candidate starts 1-RS-P-1A, 2A, 3A, and 1-QS-P-1A.

SAT [ ] UNSAT [ ] NOTE _____

12. Verify proper operation of the "J" train containment spray systems.

STANDARD

Candidate observes all "J" equipment operating.

SAT [ ] UNSAT [ ] NOTE _____

13. Verify MSTVs and bypass valves closed.

STANDARD

Candidate observes valves are closed.

SAT [ ] UNSAT [ ] NOTE _____

14. Check if feed flow should be isolated to any SG.

STANDARD

Candidate determines that SGs are not faulted.

SAT [ ] UNSAT [ ] NOTE _____

15. Check containment hydrogen concentration.

EVALUATOR'S CUE

Assume another operator will complete this procedure.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R...765

TOPIC: V-028 SYSTEM: Hydrogen Analyzer K/A: 028K5.01 (3.4/3.9):

QUESTION #1

QUESTION'	ANSWER	S/U
Given the following conditions: • Unit 1 has suffered a LOCA • The crew is cooling down the plant using 1-ES-1.2, "POST-LOCA COOLDOWN AND DEPRESSURIZATION". • Containment sump level is 2.5' • Containment hydrogen concentration is 17%. • They are at the point of isolating accumulators • Unknown to the crew, the wiring to 1-SI-MOV-1865B has been damaged. Given the above conditions, what might occur if a spark developed during the energizing of 1-SI-MOV-1865B, and what indications would the control room see?	Since containment hydrogen concentration is 17%, any spark could cause an explosion, which would cause a spike in containment pressure. REF. Vision Objective #: 5450, 12654, 13008	

TOPIC: V-028 SYSTEM: Hydrogen Analyzer K/A: GEN-2.1.28 (3.2/.3.3)

QUESTION #2

QUESTION	ANSWER	S/U
Why does the procedure require you to place the hydrogen analyzer heat tracing in service?	This maintains sample line temperature at approximately 285°F to prevent condensation and equipment malfunction damage. This heat tracing extends from outside Containment to the inlet to the hydrogen analyzer. REF. Vision Objective #: 5433	

SIMULATOR SETUP

TASK

R.. 765 Place a containment hydrogen analyzer in operation (1-OP-63.2).

CHECKLIST

_____ Recall IC #1 (100% power)

5450 List the following information associated with hydrogen in containment.

- Minimum hydrogen concentration required for hydrogen to burn if ignited
- Minimum hydrogen concentration required for hydrogen to detonate if ignited

Hydrogen characteristics in dry air:

% hydrogen in air by volume	Characteristics
4% to 15%	Hydrogen will burn
15% to 60%	Hydrogen will detonate/explode
60% to 74%	Hydrogen will burn

12654 Explain why an extreme challenge to the containment barrier exists if containment pressure is greater than the design pressure (1-F-0).

The extreme challenge to the containment boundary does not necessarily come from the pressure alone, but rather from the potential additional pressure spike which would accompany a hydrogen ignition inside containment. The total pressure could then potentially exceed the strength of containment. Also, above containment design pressure, leakage may exceed design basis limits.

13008 Explain the following concepts associated with 1-FR-Z.1, "Response to High Containment Pressure."

- Why excessive hydrogen concentration in containment is a concern with respect to containment integrity

  A hydrogen burn/explosion could cause a pressure spike which may challenge the containments integrity.

5433 Explain the following concepts associated with hydrogen analyzer H_2A-HC-101.

- Why the containment sample line is heat traced

  This maintains sample line temperature at approximately 285°F to prevent condensation and equipment malfunction damage. This heat tracing extends from outside Containment to the inlet to the hydrogen analyzer.

- How a low temperature in the heated sample compartment affects detector operability

  Inlet gas is heated to 275 to 300 °F by electric heaters. This elevated temperature is necessary for the operation of the analyzer cell within its designed accuracy. If the temperature drops to 250 degree F, an alarm lamp is energized on the local analyzer panel.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...577

INITIAL CONDITIONS

Residual Heat Removal System is in service

Reactor was manually tripped due to a loss of all reactor coolant pump seal cooling

Unit-1 "H" emergency diesel generator is tagged out for maintenance

Shift supervisor desires to maintain "J" bus powered equipment operable

1-ES-0.2A, "Natural Circulation Cooldown with CRDM Fans," has been completed to the point of determining if systems should be aligned for NDT protection

INITIATING CUE

You are requested to align each pressurizer PORV for NDT protection in accordance with step 22 of 1-ES-0.2A.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

R...577

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Place NDT protection in service during a natural circulation cooldown (1-ES-0.2A, 1-ES-0.2B).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Residual Heat Removal System is in service

Reactor was manually tripped due to a loss of all reactor coolant pump seal cooling

Unit-1 "H" emergency diesel generator is tagged out for maintenance

Shift supervisor desires to maintain "J" bus powered equipment operable

1-ES-0.2A, "Natural Circulation Cooldown with CRDM Fans," has been completed to the point of determining if systems should be aligned for NDT protection

INITIATING CUE

You are requested to align each pressurizer PORV for NDT protection in accordance with step 22 of 1-ES-0.2A.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Pressurizer power-operated relief valve NDT protection keys

Copy of 1-ES-0.2A signed off to the point of determining if systems should be aligned for NDT protection

PREFERRED EVALUATION METHOD

Simulator

PERFORMANCE STEPS

1. Verify that Reactor Coolant System cold-leg temperatures will be less than the required value within one hour.

   SAT [ ] UNSAT [ ] NOTE _____

2. Place one low-head safety injection pump in PULL-TO-LOCK.

CRITICAL STANDARDS

Candidate places control switch for 1-SI-P-1A in PULL-TO-LOCK.

SAT [ ] UNSAT [ ] NOTE _____

3. Place all but one charging pump in PULL-TO-LOCK.

CRITICAL STANDARDS

Candidate places control switches for 1-CH-P-1A and 1C in PULL-TO-LOCK.

SAT [ ] UNSAT [ ] NOTE _____

4. Verify that RCS pressure is less than the required value.

STANDARD

Candidate checks RCS pressure.

SAT [ ] UNSAT [ ] NOTE _____

5. Close pressurizer power-operated relief block valve 1-RC-MOV-1535.

CRITICAL STANDARDS

Candidate closes pressurizer power-operated relief block valve 1-RC-MOV-1535.

SAT [ ] UNSAT [ ] NOTE _____

6. Open pressurizer power-operated relief valve 1-RC-PCV-1456.

CRITICAL STANDARDS

Candidate opens pressurizer power-operated relief valve 1-RC-PCV-1456.

SAT [ ] UNSAT [ ] NOTE _____

7. Close pressurizer power-operated relief valve 1-RC-PCV-1456.

CRITICAL STANDARDS

Candidate closes pressurizer power-operated relief valve 1-RC-PCV-1456.

SAT [ ] UNSAT [ ] NOTE _____

8. Open pressurizer power-operated relief block valve 1-RC-MOV-1535.

CRITICAL STANDARDS

Candidate opens pressurizer power-operated relief block valve 1-RC-MOV-1535.

SAT [ ] UNSAT [ ] NOTE _____

9. Close pressurizer power-operated relief block valve 1-RC-MOV-1536.

CRITICAL STANDARDS

Candidate closes pressurizer power-operated relief block valve 1-RC-MOV-1536.

SAT [ ] UNSAT [ ] NOTE _____

10. Open pressurizer power-operated relief valve 1-RC-PCV-1455C.

CRITICAL STANDARDS

Candidate opens pressurizer power-operated relief valve 1-RC-PCV-1455C.

SAT [ ] UNSAT [ ] NOTE _____

11. Close pressurizer power-operated relief valve 1-RC-PCV-1455C.

CRITICAL STANDARDS

Candidate closes pressurizer power-operated relief valve 1-RC-PCV-1455C.

SAT [ ] UNSAT [ ] NOTE _____

12. Open pressurizer power-operated relief block valve 1-RC-MOV-1536.

CRITICAL STANDARDS

Candidate opens pressurizer power-operated relief block valve 1-RC-MOV-1536.

SAT [ ] UNSAT [ ] NOTE _____

13. Place the pressurizer power-operated relief valve key switches in AUTO.

CRITICAL STANDARDS

Candidate places PRZR power-operated relief valve 1-RC-PCV-1455C and 1456 NDT protection key switches in AUTO.

SAT [ ] UNSAT [ ] NOTE _____

14. Depressurize safety injection accumulators.

VERBAL-VISUAL CUES

Assume that another operator will complete this procedure

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
R...577

TOPIC: III-010 SYSTEM: Pressurizer Pressure Control K/A: 010A4.03 (4.0/3.8)

QUESTION #1

QUESTION	ANSWER	S/U
Given the following conditions: • Unit is operating at 100% power. • 1-RC-PCV-1456 fails open. • Actions to close it IAW 1-AP-44 have failed. • In an attempt to isolate the open PORV, the operator mistakenly takes the control switch for 1-RC-MOV-1535 to CLOSE. • Realizing his error, he immediately takes the switch back to OPEN. Describe the valve's response to these action's.	Once valve travel is initiated by placing the handswitch to the "Open" or "Close" position, the handswitch can be shifted to and maintained in opposite position, but valve travel will continue until either the "full-open" or "full-closed" position is reached. **At that time** the valve will reverse direction and continue stroking until the valve position matches the handswitch position. REF. Vision Objective #: 3499	

TOPIC: III-010 SYSTEM: Pressurizer Pressure Control K/A: 010A1.09 (3.4/3.7)

QUESTION #2

QUESTION	ANSWER	S/U
Given the following conditions: • The unit is operating at 100% power when a PRZR safety valve fails partially open. • PRZR pressure is 1910 PSIG • PRZR vapor temperature is 630°F • RCS Tave is 550°F • PRT pressure is 35 PSIG. What is the PRZR safety valve tail-pipe temperature?	281°F REF. Steam Tables	

3499 Explain the purpose of the following pressurizer components.

- Power-operated relief valve block valves

  Each PORV has a blocking valve (MOV-1535 and 1536) located upstream of it. The motor-operated valves are normally open, but they are used to isolate a PORV which does not fully reseat after opening or is experiencing leakage. These blocking valves are controlled from the MCR. Once valve travel is initiated by placing the handswitch to the "Open" or "Close" position, the handswitch can be shifted to and maintained in opposite position, but valve travel will continue until either the "full-open" or "full-closed" position is reached. **At that time** the valve will reverse direction and continue stroking until the valve position matches the handswitch position. This is to prevent thermalling out the breaker with the valve in mid-position.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

N...466

INITIAL CONDITIONS

Control room is uninhabitable

The 1H emergency diesel generator is carrying the 1H emergency bus in the CRE mode

The 1H EDG started on a UV signal

Normal emergency bus power supply is available

Breaker 15F3 is closed

INITIATING CUE

You are requested to unload and shut down an emergency diesel generator in the control room emergency mode.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

N...466

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Unload and shut down an emergency diesel generator in the control room emergency mode (1-OP-6.5).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Control room is uninhabitable

The 1H emergency diesel generator is carrying the 1H emergency bus in the CRE mode

The 1H EDG started on a UV signal

Normal emergency bus power supply is available

Breaker 15F3 is closed

INITIATING CUE

You are requested to unload and shut down an emergency diesel generator in the control room emergency mode.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

Administrative key

Sync key

1H and 2H diesel swap-over remote panel isolation switch key (#67)

PREFERRED EVALUATION METHOD

Verbal-visual

PERFORMANCE STEPS

1. Verify that the emergency bus normal feeder breaker, 15H11, is open.

   STANDARD

   Candidate verifies that the emergency bus normal feeder breaker, 15H11, is open.

   VERBAL-VISUAL CUES

   The green indicating light for 15H11 is lit.

   SAT [ ] UNSAT [ ] NOTE _____

2. Ensure that breaker, 15F3, is closed.

   STANDARD

   Candidate determines that 15F3, is closed from intial conditions.

   SAT [ ] UNSAT [ ] NOTE _____

3. Turn on the 15H11 synch switch.

   CRITICAL STANDARDS

   Candidate turns on synch switch.

   SAT [ ] UNSAT [ ] NOTE _____

4. Turn the droop/isochronous switch to droop.

   CRITICAL STANDARDS

   Candidate places the droop/isochronous switch in DROOP.

   SAT [ ] UNSAT [ ] NOTE _____

5. Adjust 1H EDG voltage, as required.

STANDARD

Candidate adjusts 1H EDG voltage (incoming) to 1 to 2 volts higher than "C" RSST (running).

VERBAL-VISUAL CUES

1H EDG voltage (incoming) is 120, "C" RSST (running) is 118.

SAT [ ] UNSAT [ ] NOTE _____

6. Adjust 1H EDG speed, as required.

CRITICAL STANDARDS

Candidate adjusts 1H EDG speed until synch scope is moving very slowly (1 rotation in 20 seconds or longer) in the fast direction.

SAT [ ] UNSAT [ ] NOTE _____

7. Verify that no diesel normal shutdown alarms are locked in.

STANDARD

Candidate verifies that no diesel normal shutdown alarms are locked in.

VERBAL-VISUAL CUES

No diesel normal shutdown alarms are locked in.

SAT [ ] UNSAT [ ] NOTE _____

8. Close the emergency bus normal power supply, 15H11.

CRITICAL STANDARDS

Candidate closes 15H11 when synch scope reaches 1-minute to 12 o'clock.

VERBAL-VISUAL CUES

The red indicating light for 15H11 is lit.

SAT [ ] UNSAT [ ] NOTE _____

9. Adjust power factor and turn off the 15H11 synch switch.

STANDARD

Candidate adjusts power factor to 0 KVAR and turns off 15H11 synch switch.

VERBAL-VISUAL CUES

Vars are at 0.

SAT [ ] UNSAT [ ] NOTE _____

10. Adjust the speed and voltage, as required, to unload the diesel.

CRITICAL STANDARDS

Candidate adjusts load to below 100KW over a 2-3 minute period.

VERBAL-VISUAL CUES

Diesel load is 100 KW.

SAT [ ] UNSAT [ ] NOTE _____

11. Open 15H2.

CRITICAL STANDARDS

Candidate opens 15H2.

VERBAL-VISUAL CUES

The green indicating light for 15H2 is lit

SAT [ ] UNSAT [ ] NOTE _____

12. Turn the droop/isochronous switch to droop.

STANDARD

Candidate verifies the droop/isochronous switch is in DROOP.

SAT [ ] UNSAT [ ] NOTE _____

13. Adjust 1H EDG speed to 900 RPM.

STANDARD

Candidate adjusts 1H EDG speed to 900 RPM.

VERBAL-VISUAL CUES

Diesel speed is 900 RPM.

SAT [ ] UNSAT [ ] NOTE _____

14. Turn the droop/isochronous switch to off.

CRITICAL STANDARDS

Candidate places the droop/isochronous switch in OFF.

SAT [ ] UNSAT [ ] NOTE _____

15. Turn the 15H2 synch switch to on.

STANDARD

Candidate places the 15H2 synch switch to on.

SAT [ ] UNSAT [ ] NOTE _____

16. Adjust 1H EDG voltage.

STANDARD

Candidate adjusts 1H EDG voltage (incoming) to 119-120 volts.

VERBAL-VISUAL CUES

1H EDG voltage (incoming) is 120 volts.

SAT [ ] UNSAT [ ] NOTE _____

17. Turn the 15H2 synch switch to off.

STANDARD

Candidate places the 15H2 synch switch to off.

SAT [ ] UNSAT [ ] NOTE _____

18. Cool down the diesel.

STANDARD

Candidate allows the EDG to run for 5 minutes un-loaded.

VERBAL-VISUAL CUES

Assume 5 minutes has ellapsed.

SAT [ ] UNSAT [ ] NOTE _____

19. Ensure 15H2 is in auto-after-trip.

STANDARD

Candidate ensures 15H2 is in auto-after-trip.

VERBAL-VISUAL CUES

15H2 has a green "flag".

SAT [ ] UNSAT [ ] NOTE _____

20. Shutdown the diesel.

CRITICAL STANDARDS

Candidate pushes both ENGINE STOP push buttons.

VERBAL-VISUAL CUES

The diesel is coasting to a stop.

SAT [ ] UNSAT [ ] NOTE _____

21. Check if 1H EDG door was blocked open.

CRITICAL STANDARDS

Candidate checks status of door.

VERBAL-VISUAL CUES

The door was as you found it.

SAT [ ] UNSAT [ ] NOTE _____

22. Verify the control room is habitable.

VERBAL-VISUAL CUES

Assume another operator will complete this procedure.

SAT [ ] UNSAT [ ] NOTE _____

>>>>> END OF EVALUATION <<<<<

JPM QUESTION SHEET

N...466

TOPIC: VI-064 SYSTEM: Emergency Diesel Generator A3.06 (3.3/3.4)

QUESTION #1

QUESTION	ANSWER	S/U
With the emergency diesel generator CRE switch in EMERGENCY, how can the diesel be started and stopped?	Can be started using the blue start pushbutton on CRE panel. Can be stopped using either: 2/2 emergency stop PB's on CRE panel. or 2/2 emergency stop PB's on MCR diesel panel. REF. Vision Objective #: 6299, 11715-ESK-11C	

TOPIC: VI-064 SYSTEM: Emergency Diesel Generator K4.06 (2.8/3.2)

QUESTION #2

QUESTION	ANSWER	S/U
Concerning the emergency diesel generators, when is speed droop in service?	Speed droop is automatically in service whenever: the EDG is supplying power to the 4 Kv emergency bus in parallel with another power source, or the EDG output breaker is synchronized (i.e. synch key on) to close onto an emergency bus that is already powered by another power source, or another power source breaker is synchronized (i.e. synch key on) to close onto an emergency bus that is already powered by the EDG. REF. VISION CBJ. 6305, 11715-ESK-11C	

6299 Identify the push-buttons that will start and stop a diesel generator when each of the following switch alignments exist.

- Mode selector switch in AUTO REMOTE

  2/2 emergency stop PB's on CRE panel
  2/2 emergency stop PB's on MCR diesel panel

- Mode selector switch in MAN REMOTE

  Start pushbutton on diesel panel in the MCR (Auto prelube occurs prior to EDG start)
  2/2 emergency stop PB's on CRE panel
  2/2 emergency stop PB's on MCR diesel panel

- Mode selector switch in MAN LOCAL

  Start pushbutton on EDG skid gageboard
  All automatic starts are blocked
  2/2 emergency stop PB's on CRE panel
  2/2 emergency stop PB's on MCR diesel panel

- CRE switch in EMERG

  Blue start pushbutton on CRE panel
  (All odd # CRE contacts close with CRE switch in emergency)
  2/2 emergency stop PB's on CRE panel
  2/2 emergency stop PB's on MCR diesel panel

6305 Explain the following concepts concerning speed droop on the diesel generators.

- Purpose

  Speed droop stabilizes the load sharing between the generator and a larger (infinite) power source, such as the Virginia Power grid.

- Differences between the two types of speed droop provided

  Speed droop is used during parallel operations. Without the droop characteristics (referred to as isochronous operation), the generator does not have a load sharing characteristic.

- When speed droop is automatically in service

  circuits have droop characteristics inserted whenever:

  1. the EDG is supplying power to the 4 Kv emergency bus in parallel with another power source, or

  2. the EDG output breaker is synchronized to close onto an emergency bus that is already powered by another power source, or

  3. another power source breaker is synchronized to close onto an emergency bus that is already powered by the EDG.

- How the diesel generator would respond to load changes with speed droop <u>in</u> service while carrying the emergency bus alone (<u>non-parallel</u> operation)

  With speed droop control present and the EDG as the sole power supplier to a load, as the generator load increases, the speed set of the mechanical governor is lowered, causing the engine to operate at lower steady-state speeds.

- How the diesel generator would respond to load changes with speed droop <u>out of</u> service while carrying the emergency bus with another source (<u>parallel</u> operation)

  Without the droop characteristics (referred to as isochronous operation), the generator does not have a load sharing characteristic.

  If the flat isochronous EDG characteristic were used, the EDG would pick up no load, all the load, or the load would shift between the two in an unstable manner.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

N...935

INITIAL CONDITIONS

Auxiliary feedwater pump, 1-FW-P-3A, discharge piping upstream of the discharge check valve is hot to the touch

1-FW-P-3A has been tagged out electrically

INITIATING CUE

You are requested to collapse steam voids in 1-FW-P-3A in accordance with 1-OP-31.09. You are not required to clear tags or perform periodic testing.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

Job Performance Measure

N...935

Candidate _____ Evaluator _____

Evaluation Date _____

Performance Evaluation _____ Satisfactory _____ Unsatisfactory

TASK

Collapse steam voids in a steam-bound auxiliary feedwater pump (1-OP-31.09).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Auxiliary feedwater pump, 1-FW-P-3A discharge piping upstream of the discharge check valve is hot to the touch

1-FW-P-3A has been tagged out electrically

INITIATING CUE

You are requested to collapse steam voids in 1-FW-P-3A in accordance with 1-OP-31.09. You are not required to clear tags or perform periodic testing.

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

Tagging was performed in accordance with approved practices

TOOLS AND EQUIPMENT

Administrative key - **CANDIDATE MUST SIMULATE OBTAINING ADMIN. KEY PRIOR TO "UN-LOCKING" ANY ADMIN. LOCK.**

Pipe wrench - **CANDIDATE MUST SIMULATE OBTAINING PIPE WRENCH PRIOR TO "REMOVING" ANY PIPE CAP.**

PREFERRED EVALUATION METHOD

Verbal-visual

PERFORMANCE STEPS

1. Tag out the pump's prime mover.

STANDARD

Candidate notes initial conditions stated that 1-FW-P-3A breaker has been danger-tagged.

SAT [ ] UNSAT [ ] NOTE _____

2. Isolate the pump's suction and discharge paths.

CRITICAL STANDARDS

Candidate unlocks and closes 1-FW-172 and 160.

STANDARD

Candidate checks 1-FW-166 and 162 closed.

SAT [ ] UNSAT [ ] NOTE _____

3. Vent the pump.

CRITICAL STANDARDS

Candidate removes pipe caps from casing vents, and 1-FW-252 and 532 are cracked open.

VERBAL-VISUAL CUES

Assume that several minutes have passed and that 1-FW-PI-156B reads 0 PSIG.

SAT [ ] UNSAT [ ] NOTE _____

4. Throttle open the pump's suction from the emergency condensate storage tank in order to cool the pump's casing.

CRITICAL STANDARDS

Candidate cracks open 1-FW-160.

VERBAL-VISUAL CUES

Assume that several minutes have passed and the pump casing is now cool

SAT [ ] UNSAT [ ] NOTE _____

5. When the pump's casing has been cooled, return the pump to its normal alignment.

CRITICAL STANDARDS

Candidate closes 1-FW-252 and 532.

Candidate opens 1-FW-160 and 172.

STANDARD

Candidate checks 1-FW-166 and 162 closed.

SAT [ ] UNSAT [ ] NOTE _____

6. Clear the tag-out on the pump's prime mover.

VERBAL-VISUAL CUES

Assume that another operator will complete this procedure

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
N...935

TOPIC: IV-061 SYSTEM: Aux. Feed K/A: 061A2.06 (2.7/3.0)

QUESTION #1

QUESTION	ANSWER	S/U
What are the adverse effects of having a steam-bound AFW pump?	If an AFW pump becomes steam bound, the possibility exists that upon starting NPSH will not be available, and the pump will not deliver flow to the steam generator. REF. Vision Objective #: 5977	

TOPIC: IV-061 SYSTEM: Aux. Feed K/A: 061K4.02 (4.5/4.6)

QUESTION #2

QUESTION	ANSWER	S/U
Describe the operator actions required for manually stopping a motor-driven auxiliary feedwater pump from the auxiliary shutdown panel following an automatic start. Assume control has already been transfered to the auxiliary shutdown panel.	If a safety injection signal is present, regardless of which signal actually started the pump, then SI must be reset before the pump can be manually stopped. If no SI signal is present, then the pump can be manually stopped without clearing the AUTO-START signals, however if the control switch is returned to AUTO, the pump will re-start. REF. Vision Objective #:10173, 11715-ESK-5AA/5AB	

5977 Explain the following concepts associated with steam binding of the auxiliary feedwater pumps.

- Probable cause

  The most probable cause of steam binding of an auxiliary feedwater pump is back-leakage through its associated discharge check valves.

- Possible consequences if a pump becomes steam-bound

  If an AFW pump becomes steam bound, the possibility exists that upon starting NPSH will not be available, and the pump will not deliver flow to the steam generator.

- Methods used to detect when a pump may be steam-bound

  The AFW pumps are monitored for possible steam binding by the safeguards operator. Indication of steam binding is a pump casing that is hot to the touch.

10173 List the operator actions required for manually stopping a motor-driven auxiliary feedwater pump from the auxiliary shutdown panel following an automatic start.

If a safety injection signal is present, regardless of which signal actually started the pump, then SI must be reset before the pump can be manually stopped. {If the control room is inaccessible, the pump's control switch could be placed in PULL-TO-LOCK, then the breaker tripped open locally at the breaker cabinet. The breaker will not automatically re-close with the switch in PTL.}

If no SI signal is present, then the pump can be manually stopped without clearing the AUTO-START signals, however if the control switch is returned to AUTO, the pump will re-start.

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

JOB PERFORMANCE MEASURE

N...230

INITIAL CONDITIONS

Component cooling surge tank level is 70%.

INITIATING CUE

You are requested to drain 10% from the component cooling water surge tank to both 1-LW-TK-5A and 1-LW-TK-5B IAW 0-OP-51.3

Virginia Power
North Anna Power Station

REACTOR OPERATOR/SENIOR REACTOR OPERATOR LICENSE CLASS

JOB PERFORMANCE MEASURE

N...230

Operator _____ Evaluator _____

Observer _____ Evaluation Date _____

Performance Evaluation [___] Satisfactory [___] Unsatisfactory

TASK

Drain the Component Cooling Water System to a liquid waste test tank on the auxiliary building watchtation (0-OP-51.3).

TASK COMPLETION TIMES

Approximate = 10 minutes
Actual = ____ minutes

Virginia Power
North Anna Power Station

LICENSED OPERATOR REQUALIFICATION PROGRAM

JOB PERFORMANCE MEASURE

N...230

TASK

Drain the Component Cooling Water System to a liquid waste test tank on the auxiliary building watchtat on (0-OP-51.3).

NOTE TO THE TRAINER AND THE EVALUATOR

Unless a specific evaluator's cue is provided, you should provide a cue indicating that the component or parameter is in the condition specified by the procedure.

INITIAL CONDITIONS

Component cooling surge tank level is 70%.

INITIATING CUE

You are requested to drain 10% from the component cooling water surge tank to 1-LW-TK-5A and 1-LW-TK-5B IAW 0-OP-51.3

STANDARDS

Task was performed as directed by the procedure referenced in the task statement within parentheses (one of the underlined procedures if several are cited)

Self-checking practices were used throughout task performance

Verbal communication related to any of the following modes was conducted in accordance with VPAP-1407

- Emergency communication
- Face-to-face communication
- Giving and acknowledging orders
- Phonetic alphabet
- Telephone communication systems

TOOLS AND EQUIPMENT

None

EVALUATION METHOD

Verbal-visual

PERFORMANCE STEPS

1. Verify that the liquid waste test tank pumps are isolated.

   STANDARD

   Candidate verifies the following valves closed:
   1-LW-76, 1-LW-87, 1-LW-1003

   SAT [ ] UNSAT [ ] NOTE _____

2. Align the desired test tank(s).

   CRITICAL STANDARDS

   Candidate opens 1-LW-86, 1-LW-75, 1-LW-74 and 1-LW-1002.

   SAT [ ] UNSAT [ ] NOTE _____

3. Request the control room operator to monitor component cooling surge tank level.

   STANDARD

   Candidate informs OATC that he will be draining the CC head tank.

   SAT [ ] UNSAT [ ] NOTE _____

4. Begin draining the surge tank to the test tank(s).

   CRITICAL STANDARDS

   Candidate throttles open 1-CC-1012.

   SAT [ ] UNSAT [ ] NOTE _____

5. When notified by the control room operator that the desired surge tank level is reached, secure the draining.

VERBAL-VISUAL CUES

The control room reports that CC surge tank level is 60%.

CRITICAL STANDARDS

Candidate closes 1-CC-1012.

SAT [ ] UNSAT [ ] NOTE _____

6. Secure the test tank(s) alignment.

STANDARD

Candidate closes 1-LW-86, 1-LW-75, 1-LW-74 and 1-LW-1002.

SAT [ ] UNSAT [ ] NOTE _____

> > > > > END OF EVALUATION < < < < <

JPM QUESTION SHEET
N...230

TOPIC: VIII-008 SYSTEM: Component Cooling K/A: 008K4.01 (3.1/3.3)

QUESTION #1

QUESTION	ANSWER	S/U
1-CC-P-1A is running, normal feeder to 1J bus trips open, 1J EDG starts and powers up the bus. What is the status of CC pumps?	Both CC pumps will be running. REF. Vision Objective #: 3656, 11715-ESK-005P/Q	

TOPIC: VIII-008 SYSTEM: Component Cooling K/A: 008A1.01 (2.8/2.9)

QUESTION #2

QUESTION	ANSWER	S/U
Explain how shifting the Component Cooling Water System common loads supply from one unit to the other will affect each unit's reactor coolant pump component cooling water flows.	Since the component cooling water system is normally operated cross-connected between units, shifting common loads has no effect on the system. If the CC system is being operated with the units split, then one unit or the other will supply common CC loads. When the Component Cooling Water System common loads supply is shifted from one unit to the other, the affect on each unit's reactor coolant pump component cooling water flows will be as follows: RCP CC flows will be lowered on the unit supplying common loads because the unit supply header pressure will continue to drop after the recirculation valve (PCV-110) has fully closed. REF. Vision Objective #: 3686, 11715-FM-79 SERIES	

3656 List the following information associated with the component cooling water pumps.

- Power supply to each pump

  The component cooling water pumps are powered from the 4160 volt stub-busses:

- Interlocks associated with manually starting a pump

  To manually start CC pump 1-CC-P-1A, the following conditions must exist:

  No ground or phase overcurrent condition exists

  Normal voltage on the supply bus for at least 20 seconds

  No CDA signal present

- Interlocks associated with automatically starting a pump

  A CC pump will automatically start, provided all of the following conditions exist:

  Selected control switch in AUTO as appropriate (local or remote),

  No CDA signal

  No ground or phase overcurrent condition

  Either:

  Auto-trip signal on opposite pump or undervoltage condition on the opposite bus, assuming no UV/DV signal on supply bus for at least 20 seconds

  Following a UV/DV on supply bus: power restored for at least 15 seconds, but no more than 20 seconds.

- Interlocks associated with automatically tripping a pump

  The following conditions will automatically trip a CC pump:

  Undervoltage condition on the supply bus

  CDA signal

  Ground or phase overcurrent condition

3686 Explain how shifting the Component Cooling Water System common loads supply from one unit to the other will affect each unit's reactor coolant pump component cooling water flows.

Since the component cooling water system is normally operated cross-connected between units, shifting common loads has no effect on the system. If the CC system is being operated with the units split, then one unit or the other will supply common CC loads. When the Component Cooling Water System common loads supply is shifted from one unit to the other will affect each unit's reactor coolant pump component cooling water flows as follows: RCP CC flows will be lowered on the unit supplying common loads because the unit supply header pressure will continue to drop after the recirculation valve (PCV-110) has fully closed.

Simulation Facility: North Anna Scenario No.: 1

Examiners: Paul Steiner Applicants: R. Pickering : RO

Initial Conditions:
100% power.

Turnover:
The scenario will begin with both units at 100 % power. The following unit 1 equipment is unavailable: 1-FW-P-3B is tagged out for scheduled lube oil maintenance (expected to take 18 more hours), 1-FW-P-1B is tagged out for bearing cooling line clean out (expected to take 4 more days). Shift orders are to maintain current plant conditions.

Event No.	Malf. No.	Event Type*	Event Description
0.a.		C:ALL	Failure of single train SI.
0.b		C:RO	Running HHSI pump trips, standby doesn't auto start.
1.0		I:SRO/RO	Continuous Uncontrolled Rod Motion
2.0		I:SRO/RO	PRZR level transmitter fails low.
3.0		C:ALL	Letdown line develops > 10 GPM leak.
4.0		N:ALL R:RO	Ramp unit off-line.
5.0		MT:ALL C:SRO/BOP	SBLOCA. Failure of single train SI.

9/1

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility Author: KEITH M. LINK

Chief Examiner: Paul Steiner

A070
As-Given
Operating Exam
North-Anna-Retake

VIRGINIA POWER

NORTH ANNA POWER STATION

INITIAL LICENSE CLASS

NRC SIMULATOR EXAMINATION
SCENARIO I-1

PICKERING AS RO

NRC SIMULATOR EXAMINATION SCENARIO

EVENT	DESCRIPTION
1.	Continuous Uncontrolled Rod Motion
2.	PRZR Level Failure
3.	Letdown Leak
4.	Ramp Unit Off-Line
5.	SBLOCA

SCENARIO DURATION

60 Minutes

SCENARIO SUMMARY

The scenario will begin with both units at 100 % power. Unit 1 is at 8000 MWD/MTU, Cb = 784 PPM. Aux. steam is being supplied from unit 1's second point extraction steam. The following unit 1 equipment is unavailable: 1-FW-P-3B is tagged out for scheduled lube oil maintenance (expected to take 18 more hours), 1-FW-P-1B is tagged out for bearing cooling line clean out (expected to take 4 more days). Shift orders are to maintain current plant conditions.

The first event will be a failure in the automatic rod control circuitry, resulting in the control rods stepping in at 72 steps per minute. The crew will be expected to respond IAW 1-AP-1.1, "CONTINUOUS UNCONTROLLED ROD MOTION". The RO will place rod control in manual and verify rod motion stopped. The RO will restore Tave and PRZR pressure as required. After the US has requested assistance from the instrument department, and the plant has been stabilized, the next event will occur.

The selected PRZR level channel will fail low resulting in a loss of letdown and the opening of the charging flow control valve. The RO will be expected to respond IAW 1-AP-3, "LOSS OF VITAL INSTRUMENTATION" and take manual control of PRZR level. After the crew has restored letdown and places the failed channel in trip, the next event will occur.

As a result of the loss and restoration of letdown, an un-isolable leak will develop in the letdown system. The crew will be expected to respond IAW 1-AP-5, "UNIT 1 RADIATION MONITORING SYSTEM" and 1-AP-16, "INCREASING PRIMARY PLANT LEAKAGE". An RCS flow balance will indicate an approx. 15 GPM leak that will not be isolated when letdown is secured. The US will direct the crew to commence ramping the unit off-line IAW TS 3.4.6.2. After the unit has been ramped a sufficient amount, the last event will occur.

The leak in the letdown system will increase, resulting in a small break (<2") LOCA. The crew will be expected to respond IAW 1-E-0, "REACTOR TRIP OR SAFETY INJECTION". A single train SI will occur, with the "B" HHSI pump tripping and the standby pump not start automatically. The RO must manually start the "A" HHSI pump. The crew will proceed through 1-E-0 and transition out to 1-E-1, "LOSS OF REACTOR OR SECONDARY COOLANT". The scenario may be terminated after the crew has checked QS pump status, or as directed by the lead examiner.

EVENT 1: Continuous Uncontrolled Rod Motion

TIME

_____ 1. RO identifies control rods stepping inward.

_____ 2. RO determines that rod movement is not called for.

_____ 3. RO places control rod bank selector switch in manual IAW 1-AP-1.1, "CONTINUOUS UNCONTROLLED ROD MOTION."

_____ 4. RO verifies rod motion stopped.

_____ 5. RO checks RCS Tave within 1.5°F of Tref.

_____ 6. Crew maintains stable plant conditions.

_____ 7. US notifies instrument department of problem.

NOTE: STEPS 8 THRU 13 REQUIRED IF Tave/Tref WERE NOT WITHIN 1.5°F.

_____ 8. RO checks Tave less than Tref.

_____ 9. RO verifies Tave greater than 541°F.
_____ RO restores Tave as directed by US.

_____ 10. RO checks PRZR pressure stable or trending to 2235 PSIG.
_____ RO energizes heaters as required.
_____ Crew reduces turbine load if required.

_____ 11. RO checks PRZR level stable.
_____ RO takes manual control of 1-CH-FCV-1122.

COMMENTS:

_____

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EVENT 1: Continuous Uncontrolled Rod Motion

TIME

_____ 12. RO verifies insertion limits not exceeded.
_____ RO restores rods above insertion limit as directed by the US.

_____ 13. RO restores Tave to program as directed by the US.

NOTE: AFTER THE CREW HAS STABILIZED THE PLANT, THE NEXT EVENT WILL OCCUR.

COMMENTS:

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EVENT 2: PRZR Level Failure

TIME

_____ 1. RO identifies various PRZR level alarms

_____ 2. RO identifies PRZR level channel III failing.

_____ 3. US directs crew to perform actions of 1-AP-3, "LOSS OF VITAL INSTRUMENTATION".

_____ 4. RO and BOP verify redundant instrument channel indication normal.

_____ 5. BOP verifies SG level parameters normal.

_____ 6. RO verifies PRZR level indications normal. (NO)
_____ RO performs RNO step and places 1-CH-FCV-1122 in manual and controls PRZR level.

_____ 7. BOP verifies turbine 1st stage pressure indication normal.

_____ 8. RO verifies systems affected by PRZR level channels normal. (NO)
_____ RO performs RNO step and selects operable channel
_____ RO restores charging and letdown as directed by the US.
_____ RO resets PRZR heaters.

_____ 9. Crew verifies remaining vital instrumentation normal.

_____ 10. US refers to TS 3.3.1.1 for operability.

_____ 11. US notifies instrument dept. of failure.

_____ 12. Crew determines that channel should be placed in trip IAW 1-MOP-55.72, "PRESSURIZER LEVEL INSTRUMENTATION".

COMMENTS:

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EVENT 3: Letdown Leak Inside Containment

TIME

_____ 1. Crew identifies annunciator K-D2, "RAD MONITOR SYSTEM HI RAD LEVEL".

_____ 2. Crew identifies 1-RMS-RM-160, containment gaseous, in alarm.

_____ 3. US directs BOP to perform actions of 1-AP-5, "UNIT 1 RADIATION MONITORING SYSTEM".

_____ 4. US directs RO to perform actions of 1-AP-16, "INCREASING PRIMARY PLANT LEAKAGE".

_____ 5. RO verifies PRZR level and RCS subcooling under his control.

_____ 6. RO verifies 1-CH-LCV-1115A not diverted.

_____ 7. Crew identifies containment sump pumping rate has increased.

_____ 8. RO performs RCS flow balance and identifies approx. 24 GPM leak.

_____ 9. US refers to TS 3.4.6.2 for operability.

NOTE: THE OMOC WILL DIRECT A UNIT SHUTDOWN WHEN INFORMED OF RCS LEAK.

_____ 10. US directs crew to ramp unit off-line IAW TS.

COMMENTS:

_____

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_____

EVENT 4: Ramp Unit Off-Line

TIME

_____ 1. US briefs crew on ramp.

_____ 2. RO calculates amount of reactivity change due to ramp.

_____ 3. RO commences lowering Tave using boration/control rods.

_____ 4. BOP commences lowering main turbine load.
_____ Verifies load rate at .3%/min. (may select higher rate until off limiter).
_____ Lowers reference setter.
_____ Pushes GO button.

_____ 5. BOP directs turbine building watchstander to place LP Heater Drain Pumps on recirc and shutdown when power is approx. 94%.

COMMENTS:

_____

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EVENT 5: SBLOCA

TIME

_____ 1. RO identifies rapidly decreasing pressurizer level and pressure.

_____ 2. RO informs the US of RCS conditions.

_____ 3. US directs crew to manually trip the reactor and perform actions of 1-E-0.

_____ 4. Crew trips reactor.

_____ 5. BOP trips turbine.

_____ 6. RO verifies AC emergency busses energized.

_____ 7. Crew checks if safety injection has actuated.

_____ 8. Crew checks if safety injection is required. (YES)

_____ 9. US directs crew to manually initiate SI.

_____ 10. RO and BOP initiate SI.

_____ 11. RO verifies both emergency diesels running. (NO)
_____ BOP starts 1J EDG as directed by the US.

_____ 12. Crew verifies SI pumps running. (NO)
_____ RO performs RNO step and starts 1-CH-P-1A.
_____ BOP performs RNO step and starts 1-SI-P-1B.

_____ 13. BOP verifies main feedwater isolation.

COMMENTS:

_____

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EVENT 5: SBLOCA

TIME

_____ 14. BOP verifies AFW Pumps are running.

_____ 15. Crew verifies Phase "A" isolation.

_____ 16. BOP verifies service water pumps running.
_____ BOP starts 1-SW-P-1B.

_____ 17. Crew checks if MS line should be isolated.

_____ 18. Crew checks if CDA is required. (NO)

_____ 19. Crew checks if QS is required. (NO)

_____ 20. BOP verifies SI flow indicated.

_____ 21. BOP ensures MSR vents aligned to main condenser.

_____ 22. BOP adjusts gland steam as required.

_____ 23. BOP verifies AFW flow.

_____ 24. US directs unit 2 to initiate 0-AP-47, "UNIT OPERATION WITH OTHER UNIT EMERGENCY".

_____ 25. RO checks RCS average temperature.

_____ 26. RO checks RCP trip and charging pump recirc criteria.

COMMENTS:

EVENT 5: SBLOCA

TIME

_____ 27. US notifies STA, initiates EPIPs.

_____ 28. RO checks PRZR PORVs, spray valves, and safety valves closed.

_____ 29. Crew checks SGs not faulted.

_____ 30. Crew checks SGs not ruptured.

_____ 31. Crew checks RCS intact. (NO)

_____ 32. US directs crew to transition to 1-E-1.

_____ 33. STA commences monitoring CSFs.

_____ 34. RO checks RCP trip and charging pump recirc criteria.

_____ 35. BOP checks SGs not faulted.

_____ 36. BOP checks intact SG levels.

_____ 37. Crew checks secondary radiation levels.

_____ 38. RO checks PRZR PORVs.

_____ 39. Crew checks if SI can be terminated.

COMMENTS:

EVENT 5: SBLOCA

TIME

_____ 40. RO/BOP resets CDA.

_____ 41. BOP checks QS pump status.

NOTE: The scenario may be terminated after the crew has checked QS pump status, or as directed by the lead examiner.

COMMENTS:

SIMULATOR OPERATOR'S COMPUTER PROGRAM

SIMULATOR OPERATOR'S COMPUTER PROGRAM
SCENARIO II-1

Initial conditions

1. Recall IC # (100% Power)

2. Ensure Tave, Tref, PDTT level, and VCT level are selected on trend recorders.

3. **ENSURE PRZR LEVEL CONTROL IS SELECTED TO THE "461/460 " POSITION.**

PRELOAD THE FOLLOWING PRIOR TO START OF SCENARIO:

1. MSI0702, TD = 0 (FAILURE OF "J" TRAIN SI)

2. TAGOUT 1-FW-P-3B

3. TAGOUT 1-FW-P-1B

4. MCH1602, TD = O SEC, TRGR = SI1 ("B" HHSI PUMP TRIP ON SI)

	EVENT	MALFUNCTION/OVERRIDE/COMMUNICATIONS
1.	Continuous Uncontrolled Rod Motion	MALFUNCTION: MRD07 TD = 15 SEC TRGR = N/A
2.	PRZR Level Failure	MALFUNCTION: MRC0803 TD = 30 SEC RAMP = 5 START = 50 STOP = 0
3.	Letdown Leak Inside Containment	MALFUNCTION: MRC04 TD = 30 SEC RAMP = 60 START = 0 STOP = 3.5

NOTE: THE OMOC WILL DIRECT A UNIT SHUTDOWN WHEN INFORMED OF RCS LEAK.

	EVENT	MALFUNCTION/OVERRIDE/COMMUNICATIONS
4.	Ramp Unit Off-Line	PROVIDE FEEDBACK AS REQUIRED
5.	SBLOCA	UPDATE MALFUNCTION: MRC04 TD = 0 RAMP = 30 START = 3.5 STOP = 75

Simulation Facility: North Anna Scenario No.: 2

Examiners: Paul Steiner Applicants: R. Pickering BOP

Initial Conditions:
35% power.

Turnover:
The scenario begins with unit 1 at 35 % chemistry hold. The unit had been placed on line the previous shift following a unit trip. The trip was caused when starting 1-FW-P-1B un-coupled following motor bearing replacement. A fault occurred in the breaker for 1-FW-P-1B2 which did not trip and resulted in a loss of the "B" station service bus, this in turn caused a reactor trip due to the loss of 1-RC-P-1B. Unit 2 is at 100 % power with no limiting actions. The following unit 1 equipment is unavailable: 1-FW-P-3B is tagged for scheduled lube oil maintenance, expected to be RTS in 18 hours, 1-FW-P-1B is tagged for breaker repair and is expected to be RTS in 16 hours. Shift orders are to start a second main feedwater pump and ramp the unit to 90% power.

Event No.	Malf. No.	Event Type*	Event Description
0.a		C:BOP	Failure of automatic turbine trip.
1.0		N:SRO/BOP	Start second main feedwater pump.
2.0		I:SRO/BOP	"C" SG level fails low.
3.0		C:ALL	Loss of 1H emergency bus.
4.0		MT:ALL C:SRO/BOP	Loss of all main feedwater pumps, terry-turbine trips on start.

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

Facility Author: KEITH M. LINK

Chief Examiner: Paul Steiner

VIRGINIA POWER

NORTH ANNA POWER STATION

INITIAL LICENSE CLASS

NRC SIMULATOR EXAMINATION
SCENARIO I-2

PICKERING AS BOP

NRC SIMULATOR EXAMINATION SCENARIO

EVENT	DESCRIPTION
1.	Start Second Main Feedwater Pump
2.	Ramp Unit To 90% Power
3.	"C" Steam Generator Level Transmitter Fails Low
4.	Loss Of 1H Emergency Bus
5.	Loss Of Heat Sink

SCENARIO DURATION

60 Minutes

SCENARIO SUMMARY

The scenario will begin with unit 1 at 35 % power, 8000 MWD/MTU, Cb = 1070 PPM, following a forced outage to repair a steam leak in an extraction steam line. Unit 2 is at 100% power, supplying aux. steam from its second point extraction. The following unit 1 equipment is unavailable: 1-FW-P-3B is tagged out for scheduled lube oil maintenance (expected to take 18 more hours), 1-FW-P-1B is tagged out for breaker repair and is expected to be RTS in 16 hours. Shift orders are to start a second main feedwater pump and ramp the unit to 90% power.

The first event will be the starting of a second main feedwater pump by the BOP. After the pump has been started, the next event will occur.

The "C" SG level channel III will fail high requiring the BOP to respond IAW 1-AP-3 and take manual control of "C" SG level. After the crew has placed the failed channel in trip, the next event will occur.

A loss of the 1H emergency bus will occur, with the 1H emergency diesel will failing to start, leaving the bus de-energized. In addition, the BOP will identify that the "B" component cooling water pump did not auto start and manually start it. After the RO completes the diagnostic portion of 1-AP-10, and reports to the US, the last event will occur.

A second "C" SG level channel will fail high, resulting in a loss of all main feedwater pumps on P-14 (HI-HI SG LEVEL). The automatic turbine trip will not occur and the terry turbine AFW pump will trip on over-speed upon starting. This, along with 1-FW-P-3B being tagged out for maintenance and the loss of the 1H emergency bus, will result in the total loss of feedwater to the SGs. The crew will be expected to respond IAW 1-E-0, "REACTOR TRIP OR SAFETY INJECTION", where the turbine will trip manually. Eventually, the crew will transition to 1-FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK." The scenario may be terminated anytime after condensate flow is established to at least 1 SG or as directed by the lead examiner.

EVENT 1: Start a Second Main Feedwater Pump

TIME

_____ 1. BOP revie . initial conditions, precautions, and limitations.

_____ 2. BOP request the turbine building operator to verify the support conditions for the "C" feedwater pump.

_____ 3. BOP verifies that the FW PP 1C LUBE OIL LO PRESS annunciator (1E-H7) is not lit.

_____ 4. BOP places the control switch for the standby condensate pump in PULL-TO-LOCK.

_____ 5. BOP opens feedwater pump recirculation valve 1-FW-FCV-150A, 150B, or 150C.

_____ 6. BOP notes the control switches for the standby feedwater pump are already in PULL-TO-LOCK for its tagout.

_____ 7. BOP places the control switch for the "C1" feedwater pump motor in PULL-TO-LOCK.

_____ 8. BOP closes feedwater pump discharge motor-operated valve 1-FW-MOV-150C.

_____ 9. B P places the control switch for the "C2" feedwater pump motor in START.

_____ 10. BOP verifies that the feedwater pump motor current lowers to a normal value.

COMMENTS:

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_____

EVENT 1: Start a Second Main Feedwater Pump

TIME

_____ 11. BOP places the control switch for the "C1" feedwater pump motor in START.

_____ 12. BOP verifies that the feedwater pump motor current lowers to a normal value.

_____ 13. BOP opens feedwater pump discharge motor-operated valve 1-FW-MOV-150C.

_____ 14. BOP requests that the turbine building operator to place the control switch for the auxiliary lube oil pump in AUTO.

_____ 15. BOP places the control switches for the "C" feedwater pump motors in AUTO-AFTER-STOP.

_____ 16. BOP verifies that feedwater pump discharge motor-operated valve 1-FW-MOV-150C is open.

_____ 17. BOP places the feedwater pump recirculation valve that was previously opened in AUTO.

_____ 18. BOP places the control switch for the standby condensate pump in AUTO-AFTER-STOP.

COMMENTS:

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EVENT 2: "C" Steam Generator Level Transmitter Fails Low

TIME

_____ 1. BOP identifies annunciator F-F2, "SG1B LEVEL ERROR".

_____ 2. BOP identifies "C" SG level channel III failing.

_____ 3. US directs crew to perform actions of 1-AP-3, "LOSS OF VITAL INSTRUMENTATION".

_____ 4. RO and BOP verify redundant instrument channel indication normal.

_____ 5. BOP verifies SG level parameters normal. (NO)
_____ BOP performs RNO step and places "C" MFRV control in manual.

_____ 6. RO verifies PRZR level indications normal.

_____ 7. BOP verifies turbine 1st stage pressure indication normal.

_____ 8. RO verifies systems affected by PRZR level channels normal.

_____ 9. Crew verifies remaining vital instrumentation normal.

_____ 10. US refers to TS 3.3.1.1 for operability.

_____ 11. Crew places channel in trip IAW 1-MOP-55.76, "STEAM GENERATOR LEVEL INSTRUMENTATION".

NOTE: AFTER THE CREW HAS PLACED THE CHANNEL IN TRIP, THE NEXT EVENT WILL OCCUR.

COMMENTS:

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EVENT 3: Loss of 1H Emergency Bus.

NOTE: **PRE-BRIEF UNIT SRO THAT YOU WANT THE BOP TO REMAIN ON THE BOARD FOR THIS EVENT.**

TIME

_____ 1. Crew recognizes loss of 1H Bus.

_____ 2. US directs crew to enter 0-AP-10.

_____ 3. RO commences 0-AP-10 diagnostic.

_____ 4. Crew recognizes that 1H diesel did not re-energize the bus.

_____ 5. BOP identifies 1-CC-P-1B did not auto start.
_____ BOP starts 1-CC-P-1[illegible]

_____ 6. US evaluates T.S. 3.7.3.2, 3.8.1.1 and 3.8.2.1 for equipment lost.

_____ 7. US directs electrical department to investigate loss of 1H emergency bus and 1H EDG.

NOTE: AFTER THE RO/BOP BRIEFS US ON EXTENT OF POWER LOSS, THE NEXT EVENT WILL OCCUR.

COMMENTS:

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EVENT 4: Loss Of Heat Sink

TIME

_____ 1. BOP identifies failure of "C" SG level channel II.

_____ 2. BOP identifies loss of all main feedwater pumps.

_____ 3. BOP identifies that turbine did not automatically trip.

_____ 4. US directs crew to manually trip the reactor and turbine and perform actions of 1-E-0.

_____ 5. Crew trips reactor.

_____ 6. BOP trips turbine.

_____ 7. RO verifies AC emergency busses energized.

_____ 8. Crew checks if safety injection has actuated. (NO)

_____ 9. Crew checks if safety injection is required. (NO)

_____ 10. US directs crew to transition to 1-ES-0.1, "REACTOR TRIP RESPONSE."

_____ 11. Crew identifies red-path on heat sink.

_____ 12. US directs entry into 1-FR-H.1, "RESPONSE TO LOSS OF SECONDARY HEAT SINK."

COMMENTS:

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EVENT 4: Loss Of Heat Sink.

TIME

_____ 13. Crew checks if secondary heat sink is required. (YES)

_____ 14. BOP attempts to establish AFW flow to at least one SG.

_____ 15. RO stops reactor coolant pumps.

_____ 16. Crew attempts to establish feed flow to at least one SG.

_____ 17. BOP verifies at least one condensate pump running.

_____ 18. BOP establishes line-up for feed flow from the condensate system.
_____ BOP opens at least one main feedwater pump discharge MOV.
_____ BOP opens at least one main feedwater reg. bypass valve.

_____ 19. Crew depressurizes RCS.

_____ 20. RO maintains RCS pressure less than 1950 PSIG.

_____ 21. RO blocks low PZR pressure SI.

_____ 22. US verifies condensate feed path aligned.

_____ 23. Crew injects BIT.

_____ 24. Crew depressurizes all SGs to between 610 and 120 PSIG.

_____ 25. RO blocks high steam flow SI.

COMMENTS:

EVENT 4: Loss of Heat Sink.

TIME

_____ 26. BOP verifies condensate flow to at least SG.
___ BOP verifies wide range SG level(s) increasing.
___ RO verifies core exit TCs decreasing.

NOTE: THE SCENARIO MAY BE TERMINATED ANYTIME AFTER ESTABLISHING CONDENSATE FLOW TO AT LEAST 1 SG OR AS DIRECTED BY THE LEAD EXAMINER.

COMMENTS:

SIMULATOR OPERATOR'S COMPUTER PROGRAM

SIMULATOR OPERATOR'S COMPUTER PROGRAM
SCENARIO 2

Initial conditions

1. Recall IC # (30% Power)

2. Ensure Tave, Tref, PDTT level, and VCT level are selected on trend recorders.

PRELOAD THE FOLLOWING PRIOR TO START OF SCENARIO:

1. TAGOUT 1-FW-P-3B

2. TAGOUT 1-FW-P-1B

3. SWITCH OVER-RIDE: EG1H_AUTO_REMOTE, TD = 0, OVRD = OFF, TRGR = N/A

4. 15H2 NOT close: SIMLOCH: ED15H2_LO = T

5. SIMLOCH: MTU03, FAILURE OF AUTO TURBINE TRIP.

6. ON SIMLOCH: CCP1_AUTO_DEFEAT(2) = T (BLOCK AUTO-START OF 1-CC-P-1B)

	EVENT	MALFUNCTION/OVERRIDE/COMMUNICATIONS
1.	Start Second Main Feedwater Pump	PROVIDE FEEDBACK AS REQUIRED
2.	"C" Steam Generator Level Transmitter Fails Low	MALFUNCTION: MFW01 TD = 15 SEC RAMP = 45 SEC START = 50 STOP = 0 POS = Y TRGR = N/A

	EVENT	MALFUNCTION/OVERRIDE/COMMUNICATIONS
3.	Loss Of 1H Emergency Bus	MALFUNCTION: MEL0301 TD = 30 SEC TRGR = N/A -or- SIMLOCH EL15H11_OC = T
4.	Loss Of All Feedwater	MALFUNCTION: MFW01 RAMP = 60 SEC START = 50 STOP = 0 POS = Y TRGR = N/A

Examination Level (Circle One): (RO) / SRO(I) / SRO(U)
Facility: North Anna
Week of Examination: Jan. 29, 1996
Examiner's Name (print): Paul Steire

System / JPM	Safety Function	Planned Follow-up Questions: K/A/G // Importance // Description
1. Control Rod Drive - Retrieve a dropped rod (R...476)	I-001 SIM	a. 003AA2.03 (3.6/3.8) Effects of dropped rod on major plant parameters.
		b. C01K4.03 (3.5/3.8) Given a set of conditions, determine effect on rod control.
2. Chemical and Volume Control - Place excess letdown in service (R...333)	II-004 SIM	a. GEN-2.1.25 (2.8/3.1) Given a set of plant conditions, use graphs to determine blended flow.
		b. GEN-2.1.32 (3.4/3.8) Describe the reasons for the procedure precautions.
3. Emergency Core Cooling - Transfer the Safety Injection System from hot-leg to cold-leg recirculation (R...736) **ALT. PATH / ESF / NEW**	III-006 SIM	a. 011EK3.13 (3.8/4.2) Describe the reasons for swapping from hot-leg back to cold-leg injection.
		b. 006A2.13 (3.9/4.2) Actions required following a spurious SI
4. Residual Heat Removal - Restore RHR Cooling **ALT. PATH / SHUTDOWN / NEW** (SHEARED SHAFT, R...514)	~~IV~~ V-005 X SIM	a. GEN-2.1.20 (4.3/4.2) Given a set of conditions, determine required actions.
		b. 005A2.04 (2.9/2.9) Affect of loss of instrument air on RCS temperature.

5. Reactor Coolant Pump - Start a reactor coolant pump (SEAL DELTA-P IS LOST, R..164)	IV-003 SIM	a. GEN-2.1.32 (3.2/3.3) Given a set of conditions, determine RCP start limitations.
		b. 003K5.06 (2.2/2.6) Given a set of plant conditions, determine the effect on calorimetric.
6. Containment Spray - Align containment spray systems (R...216)	~~VI~~ 028 SIM	a. 028K5.01 (3.4/3.9): Given a set of plant conditions, determine hazards.
		b. GEN-2.1.28 (3.2/.3.3) Purpose of sample line heat tracing.
7. Pressurizer Pressure Control - Place NDT protection in service during a natural circulation cooldown (R..577) SHUTDOWN	III-010 SIM	a. 010A4.03 (4.0/3.8) Given a set of conditions describe response of PRZR PORV block valve.
		b. 010A1.09 (3.4/3.7) Given a set of conditions, determine tail pipe temperature.
8. Emergency Diesel Generating - Unload and shutdown an EDG in the control room emergency mode (N...466) AP ACTION	VII ~~VI~~-064 IN-PLANT	a. 064A3.06 (3.3/3.4) Given a set of conditions, determine control of EDG.
		b. 064K4.06 (2.8/3.2) Describe when speed droop is in effect.
9. Auxiliary Feedwater - Collapse steam voids in a steam-bound AFW pump (N...935)	V ~~IV~~-061 IN-PLANT	a. 061A2.06 (2.7/3.0) Affect of check-valve back-leakage.
		b. 061K4.02 (4.5/4.6) Given a set of conditions, apply interlocks to control of AFW pump.
10. Component Cooling Water System - Drain the CC system to a LW test tank (N...230) RCA	~~VIII~~-008 IN-PLANT XI	a. 008K4.01 (3.1/3.3) Given a set of plant conditions, determine response of CC pumps.
		b. 008A1.01 (2.8/2.9) Affects on CC flow from shifting common loads.

Facility Author: KEITH M. LINK

Chief Examiner: Paul Steiner

Examination Level (Circle One): (RO) SRO
Facility: North Anna Week of Examination: Dec. 16, 1996
Examiner's Name (print): Paul Steiner

Administrative Topic/Subject Description		Describe method of evaluation: 1. ONE Administrative JPM, OR 2. TWO Administrative Questions
A.1	Status Control	JPM - Enter a component into abnormal status.
A.1	Shift Turnover	Given a set of conditions, determine turnover requirements.
		Given a set of conditions, determine qualification of relief.
A.2	Maintenance	JPM - Given a set of plant conditions, prioritize methods of plant cooling.
A.3	Radiation Work Practices	JPM - Review a Radiation Work Permit and obtain a DAD. **NOTE: This JPM will be incorporated into the "RCA" task, N...230 (JPM # 10).**
A.4	Emergency Facilities	Given a set of conditions, determine required actions.
		List those facilities with protection from radiation/airborne.

Facility Author: KEITH MCLINK
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