May 14, 1999

Virginia Electric and Power Company
ATTN: Mr. J. P. O'Hanlon
Senior Vice President-Nuclear
Innsbrook Technical Center
5000 Dominion Boulevard
Glen Allen, VA 23060

SUBJECT: NRC RETAKE EXAMINATION REPORT NOS. 50-338/99-301 AND 50-339/99-301

Dear Mr. O'Hanlon:

On April 8, 1999, a NRC Operator Licensing retake written examination was administered to an employee of your company who had applied for a license to operate the North Anna Power Station. The examination results are documented in the enclosed report.

The Facility Post-Examination Comments are included in this report as Enclosure 2. Enclosure 3 is the NRC Resolution of post-examination comments. A copy of the written examination questions and answer key, as noted in Enclosure 4, was provided to the members of your training staff.

The reactor operator (RO) applicant did not pass the retake examination.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any questions concerning this letter, please contact me at (404) 562-4638.

Sincerely,

(Original signed by H. O. Christensen)

Harold O. Christensen, Chief
Operator Licensing and
Human Performance Branch
Division of Reactor Safety

Docket Nos. 50-338, 50-339
License Nos. NPF-4, NPF-7

Enclosures: (See Page 2)

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IE42

Enclosures: 1. Report Details
2. Facility Post-Examination Comments
3. NRC Resolution of Facility Post-Examination Comments
4. Written Examination and Answer Key (RO and SRO)
(Document Control Desk Only)

cc w/encl:
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COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME: G:\LA\NOR\NA99301.WPD

U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos.:	50-338, 50-339
License Nos.:	NPF-4, NPF-7
Report No.:	50-338/99-301, 50-339/99-301
Licensee:	Virginia Electric and Power Company
Facility:	North Anna Power Station, Units 1 & 2
Location:	1022 Haley Drive Mineral, Virginia 23117
Date:	April 8, 1999
Examiners:	Richard S. Baldwin, Chief License Examiner
Approved by:	Harold O. Christensen Operator Licensing and Human Performance Branch Division of Reactor Safety

Enclosure 1

EXECUTIVE SUMMARY

North Anna Power Station Units 1 & 2
NRC Examination Report No. 50-338/99-301 and 50-339/99-301

On April 8, 1999, the licensee administered a NRC Operator Licensing written retake examination in accordance with the guidance of Examiner Standards, NUREG-1021, Interim Revision 8. This examination implemented the operator licensing requirements of 10 CFR §55.41 and §55.45.

One Reactor Operator (RO) candidate received the written retake examination.

Operations

- The licensee developed written retake examination met the requirements of NUREG-1021. The RO candidate failed the retake examination. (Section O5.1)

- Candidate Pass/Fail

	SRO	RO	Total	Percent
Pass	0	0	0	0
Fail	0	1	1	100

Report Details

I. Operations

O5 Operator Training and Qualifications

O5.1 Initial Licensing Examinations

a. Scope

The licensee administered an announced operator licensing initial written retake examination on April 8, 1999. The written examination was a combined effort of the Surry and the North Anna training departments. The examination was administered under the requirements of an NRC security agreement, and in accordance with the guidelines of the Examiner Standards (ES), NUREG-1021, Interim Revision 8. One Reactor Operator (RO) applicant received the written retake examination.

b. Observations and Findings

The licensee developed the RO written retake examination. All materials were submitted to the NRC on schedule. A NRC examiner reviewed, modified as necessary, and approved the examination prior to administration.

The organization of the submitted examination materials expedited the examination review process. Relevant portions of the reference materials were attached to each test item allowing for faster retrieval of the associated reference.

This was the licensee's third time at developing a NRC administered examination in accordance with the pilot program guidance. The examiner noted that the quality of the licensee's submittal was satisfactory. During discussions with the licensee, test item modifications were made to question stems or distractors. Aside from minor editorial changes to clarify or improve the language of the questions, the number of technical errors noted were minimal. Most requested changes were to assure clarity in the question stem and to enhance the plausibility of incorrect distractors. The final examination was considered a good product, in that, it could identify a less than competent candidate.

The facility licensee submitted post-examination comments for three written examination questions, of which the NRC accepted (see Enclosures 3 and 4). The acceptance of these comments did not change the outcome of the grading for the candidate.

c. Conclusions

The licensee submitted retake examination met the requirements of NUREG-1021.

The examiner reviewed the results of the written examination and found that the candidate did not pass the retake examination.

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened:

None

Closed:

None

Discussed:

None

VIRGINIA ELECTRIC AND POWER COMPANY

RICHMOND, VIRGINIA 23261

April 15, 1999

Mr. Richard S. Baldwin
Operator Licensing and Human Performance Branch
United States Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, Georgia 30303

Serial No. 99-233
NAPS/JHL
Docket Nos. 50-338
50-339
License Nos. NPF-4
NPF-7

Dear Mr. Baldwin:

VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA POWER STATION UNITS 1 AND 2
OPERATOR LICENSE EXAMINATION COMMENTS

In accordance with ES-402 of NUREG 1021, Virginia Electric and Power Company hereby makes official submittal of comments concerning the NRC examination administered at North Anna Power Station on April 8, 1999. Detailed question-by-question comments on the written examination are attached.

If you have any questions, please contact Mr. H. A. Royal at (540) 894-2446.

Very truly yours,

W. R. Matthews
Site Vice President

Attachment

Commitments made in this letter: None

ENCLOSURE 2

cc: Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. M. J. Morgan
NRC Senior Resident Inspector
North Anna Power Station

Mr. H. O. Christensen, Chief
Operator Licensing and Human Performance Branch
U. S. Nuclear Regulatory Commission
Region II
Atlanta Federal Center
61 Forsyth Street, SW, Suite 23T85
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bc: Dr. A. H. Friedman - IN2NE
Mr. J. B. Scott, Jr. - NAPS
Mr. P. A. Kemp - NAPS
Mr. D. A. Sommers - IN2SE
Licensing File - GOV 02-54B
Records Management - GOV 02-54B (bc original) - IN-GW

CONCURRENCE

P. A. Kemp Jay Silberstein for

H. A. Royal H. Ashley Royal

N. L. Lane FOR LARRY LANE

C. L. Funderburk

Commitments (Stated or Implied)/ Internal Actions:

1. None

Verification of Accuracy:

1. Information provided by training on validation of examination questions.
2. NUREG 1021.

Required Changes to the UFSAR or the QA Topical Report:

1. None

North Anna Power Station
Comments on NRC Written Examination
Administered on April 8, 1999

27.
The following conditions exist while RHR is in service on unit 1:

- Hot leg temperature is 232°F.
- RCS pressure is 310 psig and decreasing rapidly.
- Containment sump level is increasing.
- Containment pressure is 9.8 psia and increasing slowly.
- Pressurizer level is 19% and decreasing.
- Charging flow is at maximum.

Which ONE of the following describes the reason that safety injection control switches are NOT manually actuated in response to these conditions?

a) Avoid unnecessary actuation of containment phase A isolation.

b) SSPS fuses are pulled with the plant in this condition.

c) Avoid unnecessary start of emergency diesel generators.

d) Prevent RCS overpressurization.

Correct Answer: d)

K/A: APE025.K2.03 10CFR55: 41.7/45.7

References: NCRODP-88.6-LP-7 Objective: 12530

Plausible Distractors:

a) Phase A **would** actuate, AP-17 directs manual actuation of phase A isolation.

b) SSPS fuses **are** pulled during unit shutdown, but not until RCS temperature is less than 200°F.

c) EDGs **would** start, but are not required unless bus undervoltage exists.

COMMENT: In accordance with Technical Specification 3.5.3, a maximum of one charging pump shall be operable when RCS cold leg temperature is less than 235°F. Operating procedure 1-OP-3.3 directs rendering all but one charging pump inoperable within one hour before reducing RCS cold leg temperature below 235°F. The Tech Spec basis for this action is to provide assurance that a mass addition pressure transient can be relieved by the operation of a single PORV (only one train of LTOPs is assumed to operate). Further, Tech Spec 3.4.9.3 requires LTOPs to be operable with RCS cold leg temperature below 235°F. The Tech Spec basis for LTOPs operability is to protect the RCS from overpressurization if a charging pump starts and injects into a water-solid RCS. Therefore, the basis for not actuating SI during a shutdown LOCA (prevent RCS overpressurization) does not apply for the stated plant conditions. The question has no correct answer.

RECOMMENDATION: Delete the question.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS – Tavg LESS THAN 350°F

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be OPERABLE:

a. One OPERABLE charging pump#,

b. One OPERABLE low head safety injection pump#, and

c. An OPERABLE flow path capable of automatically transferring fluid to the reactor coolant system when taking suction from the refueling water storage tank or from the containment sump when the suction is transferred during the recirculation phase of operation or from the discharge of the outside recirculation spray pump.

APPLICABILITY: MODE 4.

ACTION:

a. With no ECCS subsystem OPERABLE because of the inoperability of either the charging pump or the flow path from the refueling water storage tank, restore at least one ECCS subsystem to OPERABLE status within 1 hour or be in COLD SHUTDOWN within the next 20 hours.

b. With no ECCS subsystem OPERABLE because of the inoperability of the low head safety injection pump, restore at least one ECCS subsystem to OPERABLE status or maintain the Reactor Coolant System T_{avg} less than 350°F by use of alternate heat removal methods.

c. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

A maximum of one charging pump and one low head safety injection pump shall be OPERABLE and capable of injecting into the RCS whenever the temperature of one or more of the RCS cold legs is less than or equal to 235°F except two charging pumps may be OPERABLE and capable of injecting into the RCS during pump switching operations.

ECCS SUBSYSTEMS (Continued)

With the RCS temperature below 350°F, one OPERABLE ECCS subsystem is acceptable without single failure consideration on the basis of the stable reactivity condition of the reactor and the limited core cooling requirements.

The limitation for a maximum of one charging pump and one low head safety injection pump to be OPERABLE and the Surveillance Requirement to verify that a maximum of one charging pump and one low head safety injection pump is capable of injecting into the RCS below 235°F provides assurance that a mass addition pressure transient can be relieved by the operation of a single PORV.

Having more than one charging pump OPERABLE during pump switching operations is allowed. This is acceptable based on pump switching being a momentary action under the direct administrative control of a licensed operator. Rendering a charging pump inoperable for this requirement may be accomplished by methods such as placing the control switch in the pull-to-lock position, tagging of the power supply breaker, or closing of the pump discharge valve. If the pump discharge valve is used to render a pump inoperable during solid water operation, the valve will be deenergized and tagged in the closed position.

The Surveillance Requirements provided to ensure OPERABILITY of each component ensures that at a minimum, the assumptions used in the safety analyses are met and that subsystem OPERABILITY is maintained.

In the event of modifications to an ECCS subsystem that could alter the subsystem flow characteristics, a flow balance test shall be performed. The flow balance test criteria are established based on the system performance assumed in the safety analysis (minimum flow limit) and on HHSI pump runout protection (maximum flow limit). In performing the flow balance, the effects of flow measurement instrument uncertainties accounting for system configuration and the variability between installed pumps must be properly considered.

Numerical acceptance criteria for the flow balance test are specified in surveillance test procedure. These criteria are established based on the following considerations:

1) The total injected flow to the core (assuming spillage of the branch line with the highest flow) must meet or exceed that assumed in the safety analysis. The limiting safety analysis is the loss of coolant accident (LOCA) analysis. This criterion may vary, particularly since the inputs to the safety analysis controlled by LCO 6.9.1.7 may vary with reload cycle. The safety analysis flow requirements are thus established by the currently applicable LOCA analysis which has demonstrated compliance with the ECCS acceptance limits of 10 CFR 50.46.

2) The total pumped flow must be less than the HHSI pump runout limit. This flow varies with the specific HHSI pump assumed to operate during the accident. Since the HHSI pumps also function as normal charging pumps, their characteristics, including runout limits, will vary over service life.

REACTOR COOLANT SYSTEM

LOW-TEMPERATURE OVERPRESSURE PROTECTION

LIMITING CONDITION FOR OPERATION

3.4.9.3 Two power-operated relief valves (PORVs) shall be OPERABLE with lift settings of (1) less than or equal to 500 psig whenever any RCS cold leg temperature is less than or equal to 235°F, and (2) less than or equal to 395 psig whenever any RCS cold leg temperature is less than 150°F.

APPLICABILITY: MODE 4 when the temperature of any RCS cold leg is less than or equal to 235°F, MODE 5, and MODE 6 when the head is on the reactor vessel and the RCS is not vented through a 2.07 square inch or larger vent.

ACTION:

a. With one PORV inoperable in MODE 4, restore the inoperable PORV to OPERABLE status within 7 days or depressurize and vent the RCS through at least a 2.07 square inch vent within the next 8 hours.

b. With one PORV inoperable in MODES 5 or 6, either (1) restore the inoperable PORV to OPERABLE status within 24 hours, or (2) complete depressurization and venting of the RCS through at least a 2.07 square inch vent within a total of 32 hours.

c. With both PORVs inoperable, complete depressurization and venting of the RCS through at least a 2.07 square inch vent within 8 hours.

d. With the RCS vented per ACTIONS a, b, or c, verify the vent pathway at least once per 31 days when the pathway is provided by a valve(s) that is locked, sealed, or otherwise secured in the open position; otherwise, verify the vent pathway ever 12 hours.

e. In the event either the PORVs or the RCS vent(s) are used to mitigate an RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or RCS vent(s) on the transient, and any corrective action necessary to prevent recurrence.

f. The provisions of Specification 3.0.4 are not applicable.

Low-Temperature Overpressure Protection

The OPERABILITY of two PORVs or an RCS vent opening of greater than 2.07 square inches ensures that the RCS will be protected from pressure transients which could exceed the limits of Appendix G to 10 CFR Part 50 when one or more of the RCS cold legs are less than or equal to 235°F. Either PORV has adequate relieving capability to protect the RCS from overpressurization when the transient is limited to either (1) the start of an idle RCP with the secondary water temperature of the steam generator less than or equal to 50°F above the RCS cold leg temperatures or (2) the start of a charging pump and its injection into a water-solid RCS.

Automatic or passive low temperature overpressure protection (LTOP) is required whenever any RCS cold leg temperature is less than 235°F. This temperature is the water temperature corresponding to a metal temperature of at least the limiting RT_{NDT} + 50°F + instrument uncertainty. Above 235°F administrative control is adequate protection to ensure the limits of the heatup curve (Figure 3.4-2) and the cooldown curve (Figure 3.4-3) are not violated. The concept of requiring automatic LTOP at the lower end, and administrative control at the upper end, of the Appendix G curves is further discussed in NRC Generic Letter 88-11.

Surveillance limits are established for the pressure in the backup nitrogen accumulators to ensure there is adequate motive power for the PORVs to cope with an inadvertent start of a high head safety injection pump in a water solid condition, allowing adequate time for the operators to respond to terminate the event.

5.15 Do the following within one hour BEFORE the lowest RCS T_c reaches 235°F: **(Reference 2.4.6)**

5.15.1 Render all but one Charging Pump inoperable and circle switch position below:

_____ • 1-CH-P-1A RUN / PULL-TO-LOCK

_____ • 1-CH-P-1B RUN / PULL-TO-LOCK

_____ • 1-CH-P-1C (H) RUN / PULL-TO-LOCK

_____ • 1-CH-P-1C (J) RUN / PULL-TO-LOCK

5.15.2 Place the control switch for one LHSI Pump in PULL-TO-LOCK. Mark the remaining pump N/A:

_____ a. 1-SI-P-1A, A LOW HEAD SI PUMP

_____ b. 1-SI-P-1B, B LOW HEAD SI PUMP

5.15.3 Test PRZR PORVs using the following Periodic Test Procedures : **(Reference 2.2.16)**

_____ • 1-PT-212.29, Valve Inservice Inspection (1-RC-PCV-1455C) NDT Protection Response Time Test

_____ • 1-PT-212.30, Valve Inservice Inspection (1-RC-PCV-1456) NDT Protection Response Time Test

76.
During 100% power operation on unit 2, the "B" containment air recirculation fan trips. Local investigations reveal the autotrip indicator (white button) extended on the fan's power supply breaker.

Which ONE of the following actions is required to remedy the situation?

a) Rotate the control switch to PULL-TO-LOCK to reset the 86 device; one restart attempt from the MCR is allowed.

b) Have the operator locally reset the breaker (with SRO concurrence), restart the fan locally at the breaker.

c) Have the operator locally reset the breaker (with SRO concurrence), restart the fan from the MCR; one restart attempt from the MCR is allowed.

d) The Electricians MUST investigate prior to restart.

Correct Answer: d)

K/A: SYS022.A2.01 10CFR55: 41.5/43.5/45.3/45.13

References: OPAP-0006 Objective 13599

Plausible distractors:

a) 4160V breakers have an 86 device which is reset by going to PTL, this is a 480V load.

b) This would require an approved troubleshooting plan.

c) This action would only be approved on a 480V MCC breaker with a thermal overload device. Not a 480V switchgear breaker.

COMMENT: The action that is stated in "c" has actually been performed at North Anna for a very similar set of plant conditions. The Supervisor of Shift Operations conferred with the Electrical Supervisor and determined that 480-volt switchgear breakers should be treated the same way as 480-volt MCC breakers. Surry interprets OPAP-0006 differently than North Anna. Due to this difference of interpretation, "d" is incorrect because it states "MUST" investigate. If it stated "SHOULD" investigate, it would be correct. If deemed necessary, actions will be taken to establish commonality between the two stations. All operators will receive training concerning any changes that result from establishing commonality.

RECOMMENDATION: Change the correct answer from "d" to "c."

VIRGINIA POWER

Memorandum

[redacted]

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To: **J. B. Scott, Jr.** **North Anna Power Station**

From: **P. E. Hahn** **April 15, 1999**

OPAP-0006 Interpretation

The station interpretation of OPAP-0006, Sect. 6.9.3 is as follows. The statement, "At the discretion of the Shift Supervisor, thermal overload devices may be reset once," applies to 480-volt MCC breakers **and** to 480-volt bus breakers. The auto-trip indicator (white RESET button) on a 480-volt bus breaker is to be treated the same as a thermal overload reset pushbutton on a 480-volt MCC breaker. The Shift Supervisor can authorize resetting the 480-volt bus breaker overload device once.

Philip E. Hahn
Electrical Supervisor

pc: file

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b. The Tag-Out should include the annunciator in accordance with OPAP-0010, Tag-Outs. **(Surry)**

6.7.6 A walkdown of Station annunciator panels should be performed weekly. **(North Anna)**

a. Any annunciators in alarm should be noted along with the cause of the alarm and the corrective action required for clearing the alarm.

b. The weekly review of the Station annunciator panels should be performed by an Operations Supervisor. The Operations Supervisor should submit a report to the Operation and Maintenance Superintendents.

6.8 Response to Indications

6.8.1 Instrument readings should be believed and treated as accurate unless proven otherwise.

6.8.2 If an unexpected reading occurs on an instrument, other indications should be observed to check the reading, if possible.

6.8.3 Abnormal or unexpected indications should be promptly investigated to determine the cause of the problem so immediate corrective action can be taken and promptly reported to the Unit SRO.

6.8.4 If an instrument or indication is determined to be malfunctioning or inaccurate, the device should be appropriately labeled, the Unit SRO notified, and a Maintenance Work Request initiated.

6.9 Resetting Protective Devices

6.9.1 Prior to resetting a protective device, the cause for the device tripping should be determined.

6.9.2 Prior to resetting a protective device, at a minimum, it shall be verified that no abnormal condition exists.

6.9.3 At the discretion of the Shift Supervisor, thermal overload devices may be reset once.

6.9.4 Reactor Trips require a full investigation in accordance with VPAP-1404, Reactor Control.

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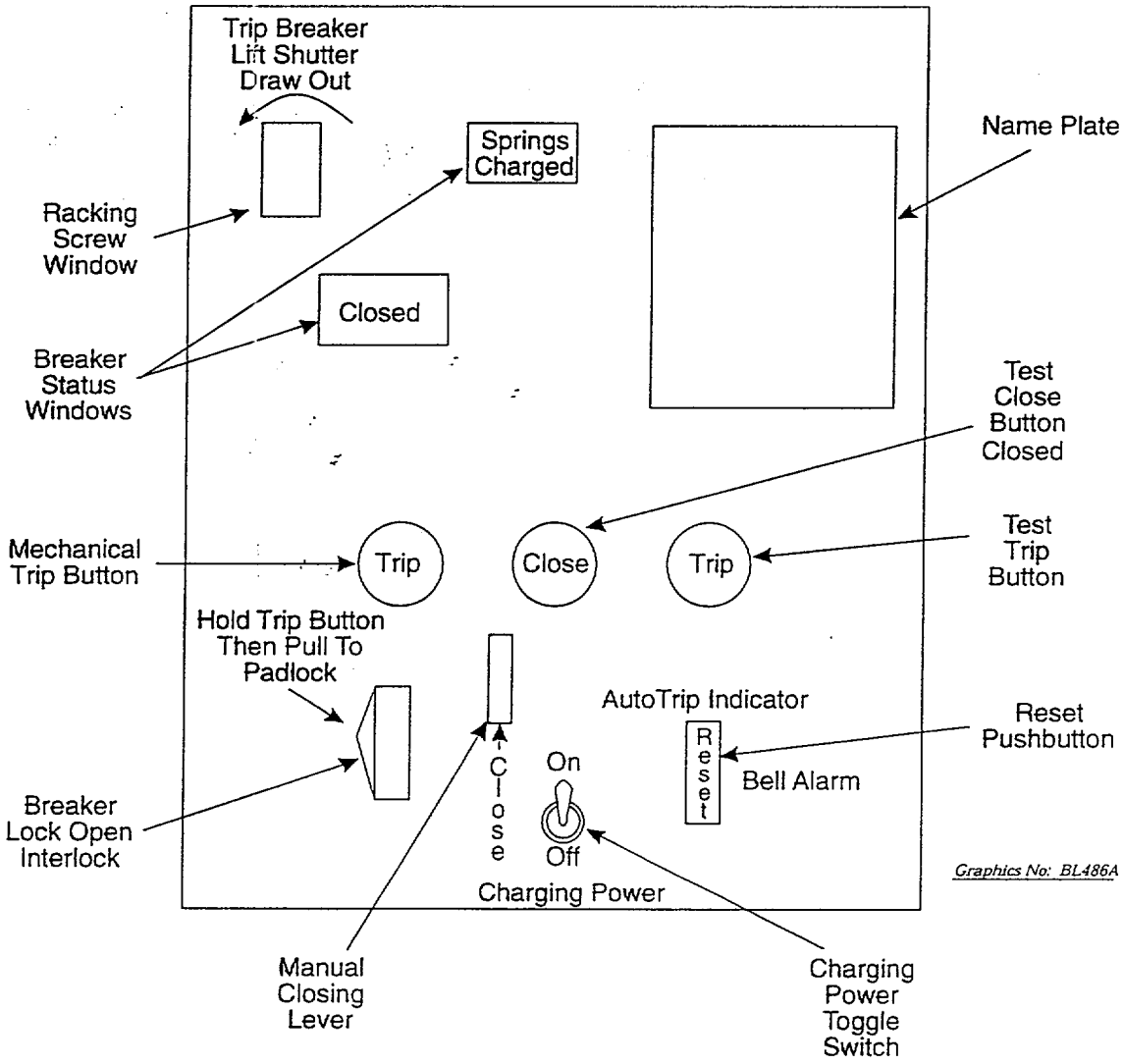
ATTACHMENT 1

(Page 1 of 1)

TYPICAL 480-VOLT BREAKER



TYPICAL 480-VOLT BREAKER

89.
The following conditions exist on unit 1:

- A reactor startup is in progress.
- Control bank "C" is at 76 steps.
- Source range counts have stabilized after the second doubling.
- The latest 1/M plot indicates criticality is projected at 110 steps on "C" bank.

Which ONE of the following actions is required of the control room team?

a) Suspend the 1/M plot and pull rods to criticality.

b) Insert all control banks to zero steps and review the ECP calculation.

c) Borate ≥ 10 gpm and insert all control banks to zero steps.

d) Insert all control banks and rack out the MG set supply breakers.

Correct Answer: c)

K/A: GEN2.2.1 10CFR55: 45.1

References: 1-OP-1.5 Objective 10493

Plausible Distractors:

a. 1/M plot is suspended and rods are pulled to criticality when control rods are within the ECP "window."

b. If criticality is imminent below the ECP lower limit, this would be correct.

d. These are the required actions for another reactivity sensitive event (loss of SR instruments).

COMMENT: Insufficient information was provided in the question stem for the candidate to answer the question. Key to answering the question was knowing whether the 1/M plot after the **first** doubling projected criticality to occur above or below the insertion limit. The question stem did not include information regarding the 1/M plot after the first doubling. The startup procedure cautions the operator to consider uncertainties in the 1/M plot before declaring criticality imminent below the low admin ECP limit. A general guideline that is used during startup certification training is that **two consecutive 1/M plots** should indicate that criticality will occur before declaring criticality imminent below the low admin ECP limit. This same philosophy applies when considering whether criticality will occur below the insertion limit.

RECOMMENDATION: Delete the question.

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Comply with the following guidelines when marking steps N/A:

- IF the conditional requirements of a step do not require the action to be performed, THEN mark the step N/A.
- IF any other step is marked N/A, THEN have the Shift Supervisor (or designee) approve the N/A and justify the N/A on the Procedure Cover Sheet.

4.2 WHENEVER positive reactivity is added to the core, THEN criticality should be anticipated.

4.3 Do NOT make sudden changes in the RCS temperature or boron concentration at low power or during startup.

4.4 IF the Control Rods are withdrawn and criticality has NOT been achieved in at least 8 hours, THEN insert the Control Rods and perform a Shutdown Margin Calculation.

4.5 WHEN RCS temperature is greater than 350° F, THEN Control Rod Drive Mechanism Cooling air is required.

4.6 Operations not requiring the completion of preceding steps may be performed out of sequence at the discretion of the Shift Supervisor.

4.7 The unit should not be taken critical outside the Administrative Limits for the Estimated Critical Position calculated in 1-OP-1C. IF criticality is imminent and the control rods are below the Low Administrative Limit OR criticality was NOT attained with the control rods at the High Administrative Limit, THEN the unit should be placed in a stable shutdown condition AND the startup evaluated before criticality is again approached.

4.8 Consider uncertainties in the 1/M measurement before declaring criticality imminent below the Low Administrative ECP Limit. This will avoid unnecessary halts in control rod withdrawal.

4.9 Changing plant conditions such as RCS temperature, Xenon worth, or RCS boron concentration may affect the ECP calculations.

e. The inaccuracies due to the core geometry, detector, and source locations tend to decrease as k_{eff} approaches 1.

(1) To avoid unnecessary halts in control rod withdrawal, the operator is cautioned to consider the uncertainties in the 1/M plot prior to declaring criticality imminent below the low administrative. A general guideline to use is to declare criticality imminent only after two consecutive 1/M plots indicate that criticality will occur below the low administrative limit.[10377]

C. Reactor Startup

1. OP-1.5 provides instructions for unit startup from a hot standby condition of Keff <.99 and Tavg at ~ 547°F (Mode 3) to a startup condition of Keff ≥.99 with the reactor critical at ≤5% power with Tavg ~ 547°F (Mode 2).

a. Preparations for Taking the Reactor Critical

b. Initial conditions

(1) Unit is in hot standby, with appropriate mode 3 entry procedure completed.

(2) The steam dumps are operable in steam pressure mode or the SG PORVs are operable. (ready to remove heat at POAH)

(3) SGs are at normal operating levels. (heat sink)

_____ 5.35 Plot the Rod Height information of Step 5.34 on the horizontal axis (0.0) of Attachment 4, 1/M Plot.

_____ 5.36 Record the Rod Height from the Core Operating Limits Report:
Control Rod fully withdrawn position: _____steps **(Reference 2.4.6)**

5.37 Review the following:

_____ 5.37.1 Within 15 minutes of withdrawing any rods in Control Banks A, B, C, or D when approaching Reactor Criticality, the Shutdown Rod Banks must be verified to be fully withdrawn.

_____ 5.37.2 The lowest operable RCS T_{ave} must be at least 541° F within 15 minutes of achieving Reactor Criticality.

_____ 5.37.3 Criticality must be anticipated at any time during a positive reactivity addition.

_____ 5.37.4 A licensed CRO or SRO will always directly control the withdrawal of Control Rods to achieve Criticality.

5.37.5 IF criticality will be achieved with Control Rods below the Rod Insertion Limit, THEN the following must be done immediately:

_____ a. Start a boration of at least 10 gpm and continue until the required SDM is restored.

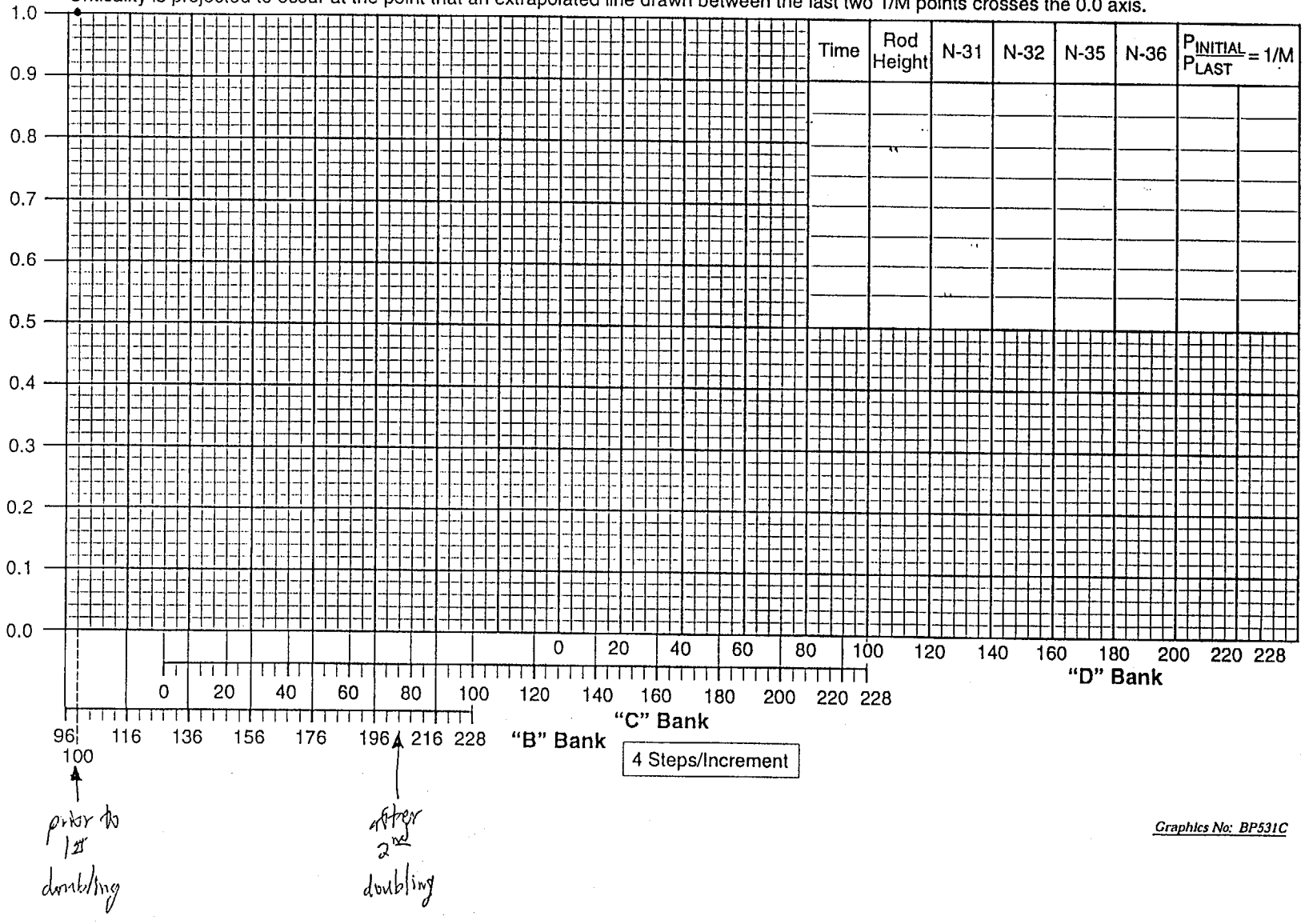
_____ b. Insert all Control Banks to Zero steps.

_____ c. Notify the Superintendent of Operations or the Operations Manager On Call before continuing.

_____ 5.37.6 WHEN approaching criticality, THEN all attendant instrumentation, such as NIs, NR-45, audio count-rate, annunciators, and IRPIs, must be closely monitored.

ATTACHMENT 4
(Page 1 of 1)
1/M PLOT

Criticality is projected to occur at the point that an extrapolated line drawn between the last two 1/M points crosses the 0.0 axis.



Graphics No: BP531C

NRC RESOLUTION OF FACILITY RECOMMENDATIONS

Question # 27: *Recommendation accepted.* The question will be deleted due to it having no correct answer.

Question # 76: *Recommendation accepted.* The answer key will be changed to reflect that distractor "c" is the only correct answer.

Question # 89: *Recommendation accepted.* The question will be deleted due to it having no correct answer.