VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

W. L. STEWART
VICE PRESIDENT
NUCLEAR OPERATIONS

September 21, 1984

Serial No. 253D
EC:BSD:baj:2000N
Docket Nos. 50-338
339
License Nos. NPF-4
NPF-7

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
Attention: Mr. James R. Miller, Chief
Operating Reactors Branch No. 3
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gentlemen:

GENERAL DESIGN CRITERIA 17 ANALYSIS
VIRGINIA ELECTRIC AND POWER COMPANY
NORTH ANNA UNIT NOS. 1 AND 2

Your letter of April 17, 1984 requested that Vepco provide a monthly status update for completing remaining open items regarding General Design Criteria 17 Analysis for North Anna Units 1 and 2. The attachment of this letter provides a complete report on our GDC-17 compliance for Units 1 and 2.

As we stated in our June 4, 1982 letter, Serial No. 316, we plan to have completed the modifications by the second refueling outage of each unit after September 1, 1982. This means we will complete the regulatory commitments, except motor control center contactor coils, by the end of the present Unit 2 Outage.

The control circuitry for the new load sheds, the blocking of auto starting of large non-1E motors, tripping of the 34.5 KV reactors and the bypassing of the time delays on the load tap changers (LTCs) of the Reserve Station Service Transformers (RSSTs) is integrated as a single installation and is cross tied between the two units. The work presently being completed on Unit 2, especially work within control cabinets, could result in unnecessary accidental activation of these systems. Therefore, the control circuitry for these modifications for Units 1 and 2 will not be energized until Unit 2 begins its startup. The GDC-17 analysis for North Anna predicted worst case voltage profiles for a simultaneous Unit 1 Containment Depressurization Actuation and a

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trip of Unit 2 with the Unit 2 loads transferring from the Station Service Transformers to the RSSTs. Since any Unit 2 loads running prior to start up will already be loaded on the RSSTs, the LTCs of the RSSTs will have already adjusted for this load. The voltage fluctuation on the Reserve Station Service buses, based on our GDC-17 analysis assumptions, will be minimal due only to starting of emergency bus loads for Unit 1.

The motor control center contactor coil test results are scheduled to be available to Vepco in early February 1985 and our final report will be available in March 1985. These dates have changed from those stated in our previous letter, because the assumed heat rise was higher than the actual heat rise. This has required longer thermal aging. This item is further discussed in the attachment to this letter.

We will continue to provide you with updates per your request.

Very truly yours,

W. L. Stewart

Attachment

BSD/baj

cc: Mr. James P. O'Reilly
Regional Administrator
Region II

Mr. M. W. Branch
NRC Resident Inspector
North Anna Power Station

NORTH ANNA UNIT 1
STATUS AND SCHEDULE FOR GDC-17 ANALYSIS
COMMITMENTS

Item I: Operating Restrictions:

Commitment A: Generator bus voltage must be maintained at an adequate level to ensure acceptable voltages are maintained on a "J" emergency bus fed from a station service bus.

Status A: There is no "J" bus fed from a Unit 1 station service bus at present. If a tie is installed, an operating procedure will be implemented for Unit 1.

Commitment B: Load on a station service bus must be limited when a "J" emergency bus is fed from it.

Status B: There is no "J" bus fed from a Unit 1 station service bus at present. If a tie is installed, an operating procedure will be implemented for Unit 1.

Commitment C: If Vepco installs the Unit 2 emergency to station service bus ties, then, when the emergency bus 2H is transferred to and fed from station service bus 2C, emergency bus 2J must be transferred to a power source other than Reserve Station Service Transformer C within 1 hour.

Status C: This commitment does not affect Unit 1.

Commitment D: The existing load shed, which is initiated when both units load to the Reserve Station Service Transformers (RSSTs), will be enabled at all times when 1) one unit is on line and the other unit is in startup, 2) both units are on line, and 3) both units are in startup.

Status D: The existing load shed is enabled at all times when 1) one unit is on line and the other is in startup, 2) both units are on line, or 3) both units are in startup. The load shed has been deenergized with both units in refueling but will be enabled when unit 2 begins start-up.

Commitment E: A program will be established to ensure station operations is consistent with the assumptions made in the GDC-17 analysis. The program will specify the appropriate corrective actions to be taken if transmission system voltage goes outside the range of 505 KV to 535 KV.

Status E: Vepco has implemented a system-wide operating procedure to address this commitment and has provided these procedures in our letter of July 1, 1982 (Serial No. 374).

Item II: Modifications

Commitment A: Rerate all motor operated valves (MOVs) to assure starting at predicted voltages. Motors on certain MOVs may have to be replaced. (The full scope for MOV rerating/motor replacement is still being developed.) In our February 26, 1982 letter, Serial No. 076, we stated 126 MOVs were involved. In January 20, 1984 letter, Serial No. 038, we stated only 56 MOVs would be required to operate during the period when voltage is between 80 and 90 percent.

Status A: Motor operated valves, which are required to operate during an emergency when the voltage on the 480 volt bus is predicted to be between 80 and 90 percent of the rated motor voltage, have been reviewed and analyzed. The results of the review and analysis indicated that the motors for these valves will operate at the reduced voltage predicted by our GDC-17 analysis.

Commitment B: Install a load shed scheme to remove certain motors when Unit 2 transfers to the RSSTs simultaneously with a Safety Injection (SI) or Containment Depressurization Actuation (CDA) occurrence on Unit 1.

Status B: The installation of the new control circuitry for Unit 1 has been completed. The control circuitry for this item and items II C, E, F, and H is integrated and was issued as a single design. The control circuitry ties between Unit 1 and Unit 2.

The control circuitry affects loads on Unit 2 and initiating contacts come from both Unit 1 and Unit 2. Until Unit 2 completes its refueling and starts up, this circuitry does not need to be energized since the Unit 2 loads will be fed from the Reserve Station Service Transformers (RSSTs). These loads will not be required to transfer to RSSTs. The RSST load tap changers, therefore, do not have to react to Unit 2 loads to return the voltage to the normal level.

Commitment C: Trip the 34.5 KV reactors in the switchyard when an SI or CDA occurs on either unit.

Status C: The installation of new control circuitry for the Unit 1 has been completed. The control circuitry for this item and Items II B, E, F, and H is integrated and was issued as single design.

The control circuitry which initiates the trip of the reactors can be initiated in either the Unit 1 or Unit 2 control cabinets. Work on Unit 2 has not been completed and this work may cause accidental operation. Therefore, we will not energize this circuitry until Unit 2 begins its startup. Our GDC-17 analysis did not assume any benefit from tripping the 34.5 KV reactors since the reactors are not energized at all times. Therefore, voltage rise benefits due to tripping them were not included in the analysis.

Commitment D: Install overvoltage alarms on 4160 and 480 volt emergency buses to alert station personnel to the need to protect equipment against high voltage.

Status D: The modification has been completed and placed in service on Unit 1.

Commitment E: Modify RSST load tap changer (LTC) control to eliminate all delays in LTC responses during the first three minutes of an SI or CDA event on either unit and on transfer of unit load to the RSS system.

Status E: The control circuitry for this item and items II, B, C, F, and H is integrated and was issued as a single design. The installation of the new control circuitry for Unit 1 has been completed. We have encountered some problems with the new LTC control cards and are actively pursuing resolution with the vendor.

The control circuitry which initiates the elimination of delays in the LTC responses can be initiated in either the Unit 1 or Unit 2 control cabinets. Work on Unit 2 has not been completed and this work may cause accidental operation. Therefore, we will not energize this circuitry until Unit 2 begins its startup. Unit 2 will be fed from the Reserve Station Service during the time prior to its return to service. This means the LTC will not need to react to the addition of Unit 2 loads. The addition of Unit 2 loads to the RSSTs were assumed in our analysis and these additional loads are a primary reason for bypassing the time delays.

We believe the problems posed by accidental operation of the LTC time delay bypass exceeds the value of bypassing the time delay prior to Unit 2 startup.

Commitment F: Block the auto starting of large non-IE motors, when the station service bus feeding the motor is fed from the same source as an emergency bus of a unit experiencing an SI or CDA.

Status F: The installation of the new control circuitry for Unit 1 has been completed. The control circuitry for this item and item II, B, C, E, and H is integrated and was issued as a single design.

The control circuitry which initiates the blocking of the auto starting of certain large non-IE motors is initiated based on signals from both units. Work on Unit 2 has not been completed, and this work may cause accidental operations. Therefore, we will not energize this circuitry until Unit 2 begins its startup. This blocking of auto starts on Unit 1 would occur if Unit 1 loads transferred to the Reserve Station Service while Unit 1 or Unit 2 SI or CDA signals were activated. The blocking of auto starts for Unit 1 station service bus "B" would occur if emergency bus "1H" is fed from it and Unit 1 SI or CDA signals were activated.

We believe the problems posed by accidental operation of the auto start blocking scheme exceeds the value of the auto blocking circuit.

Commitment G: Eliminate the automatic transfer of emergency buses from the Reserve Station Service to the Normal Station Service.

Status G: The modification of these control circuits has been completed and placed in service on Unit 1.

Commitment H: When a unit experiences an SI or CDA and the "G" bus tie breaker is closed, then all circulating water pumps on the unit experiencing the accident will be tripped.

Status H: The installation of the new control circuitry for Unit 1 has been completed. The control circuitry for this item and Items II B, C, D, and F is integrated and was issued as a single design.

The control circuitry which initiates the tripping of circulating water pumps when the "G" bus tie breaker is closed and either unit experiences an SI or CDA can be initiated by control circuitry in either unit. Work on Unit 2 has not been completed and this work may cause accidental operation of this load shed. We, therefore, will not energize this circuitry until Unit 2 begins its startup.

In order to minimize the need for this load shed prior to Unit 2 startup, the station will make all reasonable efforts to keep the "G" bus tie breaker open prior to Unit 2 startup.

Item III: Additional Commitments

Commitment A: In our letter of July 7, 1983 (Serial No. 326), Vepco stated that tests would be performed on motor control center contactor coils to determine the effects of overvoltage. In our letter of March 26, 1984 (Serial No. 326A), we stated our current schedule for completing the overvoltage test by May, 1984, obtaining a test report in June, 1984, and providing results to the NRC in July 1984.

Status A: Based on our presently available information we anticipate the test report will be available to Vepco in February, 1985. Based on the receipt of the report in February, Vepco will submit the results to the NRC in March, 1985. Additional thermal aging time has been necessary as a result of over estimating the actual contactor coil heat rise. The measured heat rise has been lower than expected, thus requiring longer thermal aging time.

Based on the aging which has been completed, the life of the contactor coils exceeds 10 years. Three of the ten size 1 coils have failed during thermal aging. We are presently evaluating the effect of this on test completion. We continue to believe that this is not a serious concern and that no immediate corrective actions will be required. However, we do anticipate replacement of size 1 coils may be required at some future date.

NORTH ANNA UNIT 2
STATUS AND SCHEDULE FOR GDC-17 ANALYSIS
COMMITMENTS

Item I: Operating Restrictions:

Commitment A: Generator bus voltage must be maintained at an adequate level to ensure acceptable voltages are maintained on a "J" emergency bus fed from a station service bus.

Status A: An operating procedure has been implemented to comply with this requirement for Unit 2.

Commitment B: Load on a station service bus must be limited when a "J" emergency bus is fed from it.

Status B: An operating procedure has been implemented to comply with this requirement for Unit 2.

Commitment C: If Vepco installs the Unit 2 emergency to station service bus ties, then, when the emergency bus 2H is transferred to and fed from station service bus 2C, emergency bus 2J must be transferred to a power source other than Reserve Station Service Transformer C within 1 hour.

Status C: Vepco has not installed the Unit 2 Emergency to station service bus ties and their installation is not presently scheduled. Vepco will implement an operating procedure to comply with this requirement if bus ties are installed as designed.

Commitment D: The existing load shed, which is initiated when both units load to the Reserve Station Service Transformers (RSSTs), will be enabled at all times when 1) one unit is on line and the other unit is in startup, 2) both units are on line, and 3) both units are in startup.

Status D: The existing load shed is enabled at all times when 1) one unit is on line and the other is in startup, 2) both units are on line, or 3) both units are in startup. The load shed has been deenergized with both units in refueling but will be enabled when unit 2 begins start-up.

Commitment E: A program will be established to ensure station operations is consistent with the assumptions made in the GDC-17 analysis. The program will specify the appropriate corrective actions to be taken if transmission system voltage goes outside the range of 505 KV to 535 KV.

Status E: Vepco has implemented a system-wide operating procedure to address this commitment and has provided these procedures in our letter of July 1, 1982 (Serial No. 374).

Item II: Modifications

Commitment A: Rerate all motor operated valves (MOVs) to assure starting at predicted voltages. Motors on certain MOVs may have to be replaced. (The full scope for MOV rerating/motor replacement is still being developed.) In our February 26, 1982 letter, Serial No. 076, we stated 128 MOVs were involved. In January 20, 1984 letter, Serial No. 038, we stated only 56 MOVs would be required to operate during the period when voltage is between 80 and 90 percent.

Status A: Motor operated valves, which are required to operate during an emergency when the voltage on the 480 volt bus is predicted to be between 80 and 90 percent of the rated motor voltage, have been reviewed and analyzed. The results of the review and analysis indicated that the motors for these valves will operate at the reduced voltage predicted by our GDC-17 analysis.

Commitment B: Install a load shed scheme to remove certain motors when Unit 2 transfers to the RSSTs simultaneously with a Safety Injection (SI) or Containment Depressurization Actuation (CDA) occurrence on Unit 1.

Status B: The control circuitry for this item and items II C, E, F, and H is integrated and was issued as a single design.

The control circuitry affects loads on Unit 2 and initiating contacts come from both Unit 1 and Unit 2. Until Unit 2 completes its refueling and starts up, this circuitry does not need to be energized since the Unit 2 loads will be fed from the Reserve Station Service Transformers (RSSTs). Unit 2 outage related work has begun and is scheduled to be completed during the refueling outage. The new circuitry will not be considered operable until the end of the Unit 2 outage.

Commitment C: Trip the 34.5 KV reactors in the switchyard when an SI or CDA occurs on either unit.

Status C: The control circuitry for this item and Items II B, E, F, and H is integrated and was issued as single design.

Unit 2 outage related work has begun and is scheduled to be completed during the refueling outage. The new circuitry will not be considered operable until the end of the Unit 2 outage.

The control circuitry which initiates the trip of the reactors can be initiated in either the Unit 1 or Unit 2 control cabinets. Work on Unit 2 has not been completed and this work may cause accidental operation. Therefore, we will not energize this circuitry until Unit 2 begins its startup. Our GDC-17 analysis did not assume any benefit from tripping the 34.5 KV reactors since the reactors are not energized at all times. Therefore, voltage rise benefits due to tripping them were not included in the analysis.

Commitment D: Install overvoltage alarms on 4160 and 480 volt emergency buses to alert station personnel to the need to protect equipment against high voltage.

Status: D The Design Change Package for Unit 2 is at North Anna and outage related work has begun and is scheduled to be completed during the present refueling outage.

Commitment E: Modify RSST load tap changer (LTC) control to eliminate all delays in LTC responses during the first three minutes of an SI or CDA event on either unit and on transfer of unit load to the RSS system.

Status E: The control circuitry for this item and items II B, C, F, and H is integrated and was issued as a single design.

Unit 2 outage related work has begun and is scheduled to be completed during the refueling outage. The new circuitry will not be considered operable until the end of the Unit 2 outage. We have encountered some problems with the new LTC control cards and are actively pursuing resolution with the vendor.

The control circuitry which initiates the elimination of delays in the LTC response can be initiated in either Unit 1 or Unit 2 control cabinets. Work on Unit 2 has not been completed and this work may cause accidental operation. Therefore we will not energize this circuitry until Unit 2 begins its startup. Unit 2 will be fed from the Reserve Station Service during the time prior to its return to service. This means the LTC will not need to react to the addition of Unit 2 loads.

We believe the problems posed by accidental operation of the LTC time delay bypass exceeds the value of bypassing the time delay prior to Unit 2 startup.

Commitment F: Block the auto starting of large non-IE motors, when the station service bus feeding the motor is fed from the same source as an emergency bus of a unit experiencing an SI or CDA.

Status F: The control circuitry for this item and item II B, C, E, and H is integrated and was issued as a single design.

Unit 2 outage related work has begun and is scheduled to be completed during the refueling outage. The new circuitry will not be considered operable until the end of the Unit 2 outage.

The control circuitry which initiates the blocking of the auto starting of certain large non-IE motors is initiated based on signals from both units. Since work on Unit 2 has not been completed, and this work may cause accidental operations, we will not energize this circuitry until Unit 2 begins its startup.

Commitment G: Eliminate the automatic transfer of emergency buses from the Reserve Station Service to the Normal Station Service.

Status G: This does not apply to Unit 2.

Commitment H: When a unit experiences an SI or CDA and the "G" bus tie breaker is closed, then all circulating water pumps on the unit experiencing the accident will be tripped.

Status H: The control circuitry for this item and items II B, C, E, and F is integrated and was issued as a single design.

Unit 2 outage related work has begun and is scheduled to be completed during the refueling outage. The new circuitry will not be considered operable until the end of the Unit 2 outage.

The control circuitry which initiates the tripping of circulating water pumps when the "G" bus tie breaker is closed and either unit experiences an SI or CDA can be initiated by control circuitry in either unit. Since work on Unit 2 has not been completed and this work may cause accidental operation of this load shed, we will not energize this circuitry until Unit 2 begins its startup.

Item III: Additional Commitments

Commitment A: In our letter of July 7, 1983 (Serial No. 326), Vepco stated that tests would be performed on motor control center contactor coils to determine the effects of overvoltage. In our letter of March 26, 1984 (Serial No. 326A), we stated our current schedule for completing the overvoltage test by May, 1984, obtaining a test report in June, 1984, and providing results to the NRC in July 1984.

Status A: Based on our presently available information we anticipate the test report will be available to Vepco in February, 1985. Based on the receipt of the report in February, Vepco will submit the results to the NRC in March, 1985. Additional thermal aging time has been necessary as a result of over estimating the actual contactor coil heat rise. The measured heat rise has been lower than expected, thus requiring longer thermal aging time.

Based on the aging which has been completed, the life of the contactor coils exceeds 10 years. Three of the ten size 1 coils have failed during thermal aging. We are presently evaluating the effect of this on test completion. We continue to believe that this is not a serious concern and that no immediate corrective actions will be required. However, we do anticipate replacement of size 1 coils may be required at some future date.