

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

June 28, 2007

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

Serial No. 07-0443
SPS-LIC/CGL R1"
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
PROPOSED TECHNICAL SPECIFICATIONS CHANGE
TEMPORARY 45-DAY AND 14-DAY ALLOWED OUTAGE TIMES TO REPLACE
MAIN CONTROL ROOM AND EMERGENCY SWITCHGEAR ROOM
AIR CONDITIONING SYSTEM CHILLED WATER PIPING
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

By letter dated February 26, 2007 (Serial No. 07-0109), Virginia Electric and Power Company (Dominion) requested amendments to Facility Operating License Numbers DPR-32 and DPR-37 for Surry Power Station Units 1 and 2. The proposed change will permit the use of temporary 45-day and 14-day allowed outage times (AOTs) to facilitate replacement of Main Control Room (MCR) and Emergency Switchgear Room (ESGR) Air Conditioning System (ACS) chilled water piping. In a letter dated May 31, 2007, the NRC requested additional information regarding information we provided in an April 5, 2007 letter (Serial No. 07-0109A). In addition, on June 5, 2007, the NRC requested additional information regarding our May 31, 2007 letter (Serial No. 07-0381). Dominion's response to these NRC requests is provided in Attachments 1 and 2.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Very truly yours,



Gerald T. Bischof
Vice President – Nuclear Engineering

Attachments: 1) Response to May 31, 2007 NRC Request for Additional Information
2) Response to June 5, 2007 NRC Request for Additional Information

Commitments made in this letter:

1. The existing Abnormal Procedure for Abnormal Environmental Conditions and the existing Severe Weather Operations Checklist will be revised to include the following actions while in the temporary 45-day or 14-day allowed outage times (AOTs) for Phases III through VI piping replacement activities:
 - Upon MCR notification of severe thunderstorms for the area, an assessment will be conducted to review the status of the chilled water piping replacement activities, to initiate evaluation of potential suspension of replacement activities, and to monitor the severe weather.
 - Upon MCR notification of a tornado watch in Surry County, additional assessment will be conducted to review the status of the replacement activities and to evaluate the need for suspension of replacement activities.
 - As noted in the April 5, 2007 letter, upon MCR notification of a tornado warning in Surry County, piping replacement activities will be suspended.

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Attachment 1

**Proposed Technical Specifications Change -
Temporary 45-day and 14-day AOTs to Replace
MCR and ESGR Air Conditioning System Chilled Water Piping**

Response to May 31, 2007 NRC Request for Additional Information

**Surry Power Station Units 1 and 2
Virginia Electric and Power Company
(Dominion)**

Response to May 31, 2007 NRC Request for Additional Information

- 1. With regard to the attachment to your letter dated April 5, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML070960037), please provide additional details of the procedure that will be in place for notification of impending abnormal weather conditions including tornadoes and hurricanes. For example, would an individual be assigned to remain ready to receive immediate and direct notification of approaching severe weather as issued by the National Oceanic and Atmospheric Administration (NOAA)? How would the individual receive the notification (e.g., by a direct telephone call from the local National Weather Service forecast office, by continuously monitoring the appropriate NOAA weather radio channel)? What information would be obtained and what is the estimated time frame for acquisition?*

Dominion Response

The Surry Main Control Room (MCR) receives telephone notification from the Dominion System Operations Center (SOC) of severe thunderstorm activity, tornado watch or tornado warning, projected hurricane conditions, high winds, and high temperatures in the Surry Power Station area. The SOC provides immediate notification to the Surry MCR upon receipt of the information by the SOC from any of the following sources:

- a private weather service located in Boston, Massachusetts,
- the Dominion Weather Center located at the Dominion Technical Center in Glen Allen, Virginia,
- monitoring of weather conditions in the SOC also located at the Dominion Technical Center in Glen Allen, Virginia.

Since the Dominion SOC and the Surry MCR are both manned at all times, notification of severe weather to the Surry MCR occurs promptly and without delay.

- 2. Page 5 of the attachment to your letter dated April 5, 2007, notes that measures would be taken if a tornado watch or warning has been declared for Surry County. What length of time would be required to suspend activities to a safe level once NOAA issued either of these declarations? In particular, page 6 of the attachment states that actions would be taken upon declaration of a tornado warning for Surry County. The Nuclear Regulatory Commission staff notes that issuance of a tornado warning means that a tornado has been sighted or indicated by weather radar. Therefore, please provide justification that adequate time remains to suspend activities to a safe level if it is likely that one or more tornadoes have already formed in the general site area. How large is Surry County and where is the Surry Power Station located within the county? That is, given that severe weather conditions may cover a large area, may move quickly, and that predicting with complete assurance when and where tornadoes will develop and move within the severe storm area is not realistic, please justify that basing decisions to take action on a declaration for Surry County is sufficient.*

Dominion Response

As indicated in our April 5, 2007 letter (Serial No. 07-0109A), in this geographical area, tornadoes are typically associated with major weather fronts with severe thunderstorms. Thus, there would be advance notice of impending severe weather. The attached map shows the location of Surry Power Station within Surry County.

As noted in the response to question 1 above, the Surry MCR receives immediate telephone notification from the Dominion SOC of severe thunderstorm activity, tornado watch, or tornado warning. Upon receipt of notification from the SOC, the existing Abnormal Procedure for Abnormal Environmental Conditions and/or the existing Severe Weather Operations Checklist are/is initiated immediately. Two of the entry conditions for the existing Abnormal Procedure are: 1) notification of severe weather for the area, and 2) tornado watch or warning declared for Surry County. The Operations Checklist includes actions to be taken to prepare for expected high winds and/or heavy rain. The Abnormal Procedure and the Operations Checklist will be revised to include the following actions while in the temporary 45-day or 14-day allowed outage times (AOTs) for Phases III through VI piping replacement activities:

- Upon MCR notification of severe thunderstorms for the area, an assessment will be conducted to review the status of the chilled water piping replacement activities, to initiate evaluation of potential suspension of replacement activities, and to monitor the severe weather.
- Upon MCR notification of a tornado watch in Surry County, (additional) assessment will be conducted to review the status of the replacement activities and to evaluate the need for suspension of replacement activities.
- As noted in the April 5, 2007 letter, upon MCR notification of a tornado warning in Surry County, piping replacement activities will be suspended.

Suspension of replacement activities will include work stoppage and placement of replacement activities into a safe condition. It is expected that the piping replacement work would be stopped immediately upon contact from the MCR. The work stoppage will minimize the possibility of the loss of the operating chilled water loop due to a construction-related failure, thus eliminating the need to rely on the backup cooling supply as a compensatory action. The amount of time required to place the work activity into a safe condition will be contingent upon the status of the replacement activities; however, this effort will be prompt and without delay. With the assessments and reviews planned in the event of severe weather during the replacement activities, we anticipate that sufficient time would be available to make necessary decisions and take appropriate actions.

3. *Does the Protected Equipment program include required support equipment (e.g., emergency power supply and associated breakers, fire protection, flood protection, etc. needed to assure operation of the Protected Equipment)?*

Dominion Response

The Protected Equipment Program does not include required support equipment or support functions associated with the protected equipment. Requirements associated with support equipment or support functions are specified elsewhere, such as in the Technical Specifications, the Technical Requirements Manual, procedures, etc.

4. *Are portable equipment and material located near Protected Equipment or near Protected Equipment piping secured to prevent damage to the Protected Equipment or piping during a seismic event?*

Dominion Response

An existing Administrative Procedure for Seismic Housekeeping provides guidelines to reduce the risk to safety-related and safe-shutdown equipment from impact by portable items that have the potential to roll, fall, slide, overturn, or otherwise cause an impact leading to a hazardous effect during an earthquake. The guidelines in this Administrative Procedure will be used during replacement activities.

5. *Are the non-safety water chillers (Service Building water chillers 1-VS-E-3A and 1-VS-E-3B) in scope for the Maintenance Rule? If they are, are they classified as (a)1 or (a)2?*

Dominion Response

Non-safety-related Service Building chillers 1-VS-E-3A and 1-VS-E-3B are not in scope for the Maintenance Rule.

Although these chillers are not in scope for the Maintenance Rule, note that our February 26, 2007 letter (Serial No. 07-0109) indicated that, prior to initiating Phases III through VI of the replacement activities, it will be verified that there is no outstanding required maintenance on chillers 1-VS-E-3A and 1-VS-E-3B that could affect the ability of the chillers to provide the backup cooling supply.

6. *What is the Maintenance Rule classification for the main control room (MCR) and emergency switchgear room (ESGR) water chillers and Air Handling Units (AHUs) ((a)1 or (a)2)?*

Dominion Response

The MCR and ESGR ACS chillers and AHUs are in scope for the Maintenance Rule. Chillers 1-VS-E-4D and 1-VS-E-4E are currently classified (a)(1). Chiller condenser tube leakage due to service water flow-induced erosion is the reason for the (a)(1)

classification for these chillers. Corrective actions to address the flow-induced erosion are ongoing.

Chillers 1-VS-E-4A, 1-VS-E-4B, and 1-VS-E-4C, as well as the eight AHUs (1-VS-AC-1, 1-VS-AC-2, 1-VS-AC-6, 1-VS-AC-7, 2-VS-AC-6, 2-VS-AC-7, 2-VS-AC-8, 2-VS-AC-9,) are currently classified as (a)(2).

7. *Are Maintenance Risk Assessments for equipment out-of-service updated daily to account for plant changes and for forecasted weather?*

Dominion Response

Page 18 of 23 in Attachment 1 to the February 26, 2007 letter (Serial No. 07-0109) states that the tool used for risk assessment is the Safety Monitor. The Safety Monitor is used to assess the risk associated with planned maintenance, as well as emergent configurations. The Safety Monitor is updated on a daily basis, as well as more frequently to assess emergent conditions. Provisions (i.e., Environmental and Test Factors) are included in the Safety Monitor to address special conditions, including severe thunderstorms and tornadoes or hurricanes.

8. *The increased Allowed Outage Time (AOT) for the Chilled Water System increases the probability of a loss of both trains of cooling to the MCR and to the ESGR. Has an analysis been completed, including the effect of heat stress on the operators and high area temperatures on equipment and instrumentation, showing both units can be shutdown in accordance with the Technical Specifications (TS 3.23.C.2) during design basis high ambient temperature days with a loss of all cooling to the MCR and to the ESGR?*

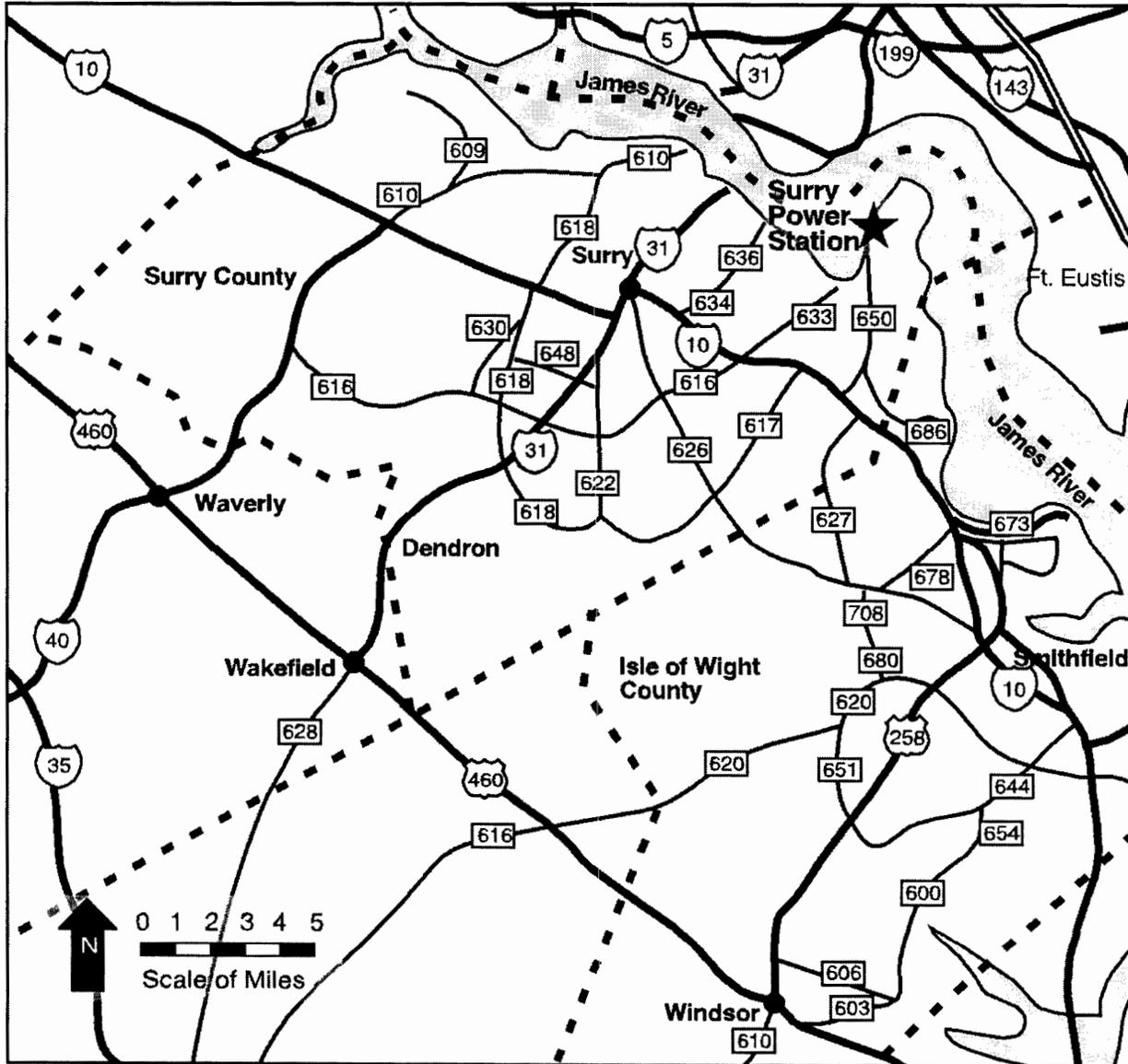
Dominion Response

As stated in our May 31, 2007 letter (Serial No. 07-0381), the impact of chilled water system loss on MCR and ESGR room temperatures has been analyzed using the GOTHIC code. The GOTHIC code is a thermal-hydraulic computer program that is well-suited for room heatup analyses. Assuming a loss of chilled water flow with bounding ambient conditions (i.e., summer outside air temperature), the GOTHIC analyses predict maximum bulk air temperatures in the MCR and the ESGR of 105°F and 120°F, respectively, at 24 hours. The analyses assume that, within 24 hours, cooling is reestablished (either by repair of the damaged chilled water loop or by use of the backup cooling supply). No compensatory measures were assumed in the MCR analysis, while the ESGR analysis includes modeling of compensatory measures (e.g., opening ESGR doors and placement of a portable exhaust fan). The GOTHIC results contain conservatism in that the majority of the heat sink mass associated with the MCR and ESGR equipment has not been credited in the analyses. As a point of comparison, data taken during routine chiller testing at North Anna in 2003 suggests that the temperature rise predicted by GOTHIC may be fairly conservative. The North

Anna data showed that the MCR and ESGR temperatures increased approximately 5°F and 10°F, respectively, in a 45-minute period and the rate of temperature increase had begun to decrease. In contrast, the Surry GOTHIC results show corresponding temperature rises of approximately 20°F and 25°F during the same time period.

In the event of a loss of ESGR cooling, an existing Abnormal Procedure addressing Loss of ESGR Cooling will be used during replacement activities, if required. If the ESGR temperature is greater than or equal to 87°F, this procedure directs actions (e.g., opening ESGR doors and placement of temporary fans) to reduce the ESGR temperature. A CAUTION is included in this Abnormal Procedure indicating that ESGR temperature above 120°F may affect vital instrumentation. Thus, compensatory actions will be taken to maintain the ESGR temperature within 120°F.

Regarding a loss of MCR cooling, compensatory actions to maintain the MCR temperature within 120°F are not necessary, based on the GOTHIC analysis. With respect to operator comfort in the MCR, an existing Administrative Procedure addressing Heat Stress Management will be used during replacement activities, if required. This Administrative Procedure provides guidelines for working in hot environments with an ambient temperature greater than 95°F (excluding containment entries) and addresses the use of cooling garments, which are available for use, if needed. The MCR Operations staff would don cooling garments to maintain operator comfort, if required. In addition, consultation with Operations personnel has concluded that no concern is anticipated with respect to the ability of the MCR operators to shut down both units, as required by TS for chilled water system loss.



Surry Power Station Area Map

Attachment 2

**Proposed Technical Specifications Change -
Temporary 45-day and 14-day AOTs to Replace
MCR and ESGR Air Conditioning System Chilled Water Piping**

Response to June 5, 2007 NRC Request for Additional Information

**Surry Power Station Units 1 and 2
Virginia Electric and Power Company
(Dominion)**

Response to June 5, 2007 NRC Request for Additional Information

1. *In response to RAI #1 [in the May 31, 2007 Dominion letter], the licensee discussed the assumed equipment impacts to a loss of switchgear room cooling as failure of various electrical busses. However, the licensee did not identify the assumed impacts to a loss of control room cooling. The licensee stated that no alternate cooling was modeled (item D), so if control room cooling from the chillers is lost, does the PRA model simply assume core damage? If not, what is modeled as the plant impact?*

Dominion Response

- Loss of Main Control Room Cooling Initiating Event

In the PRA model used for this assessment, once cooling from the chilled water system is lost, the Main Control Room (MCR) is assumed to be overheated and MCR evacuation is required. Note that this assumption has subsequently been determined to be conservative, as indicated in the Dominion Response to the Question 1 in the May 31, 2007 letter (Serial No. 07-0381) and in the May 14, 2007 letter (Serial No. 07-0109B). In the event of MCR evacuation, an existing Abnormal Procedure for Main Control Room Inaccessibility directs the operators to mitigate the consequences of the event and to stabilize the plant condition. The PRA model event tree used to analyze the loss of MCR cooling transient considers five functions:

- Manual Reactor Trip - Step 5 of this Abnormal Procedure directs the operator to trip the reactor manually. If the operator fails to trip the reactor, then it is assumed to lead to core damage.
- Emergency Switchgear Room (ESGR) Cooling - In a loss of MCR cooling transient, chilled water is not assumed to be required to maintain adequate ESGR cooling. However, forced air (air handling unit) operation from at least one air handling unit is required per the room heatup calculation to maintain acceptable temperatures inside the ESGR. Failure of all ESGR air handling units is assumed to lead to core damage.
- Operator Transition to Auxiliary Shutdown Station - During the loss of MCR cooling transient, operation of controls at the Auxiliary Shutdown Panel (ASP) is required to control the secondary heat sink (auxiliary feedwater). The failure of the ASP control is assumed to lead to core damage.
- RCS Boundary Intact - In a plant shutdown from the ASP, a potential challenge and sticking open of the pressurizer power operated relief valves (PORVs) is assumed with the same probability as in the general transient event tree. If the pressurizer PORVs or the PORVs' block valves cannot be closed to maintain the reactor coolant system integrity, then it is assumed to lead to core damage.

- Auxiliary Feedwater Available - Because of the inability to utilize main feedwater, condensate, or feed and bleed during a loss of MCR cooling transient, successful operation of the Auxiliary Feedwater System is necessary to provide secondary heat removal to prevent core damage.

If any one of the above five functions fails, then the PRA model assumes that core damage will occur.

- Consequential Loss of Main Control Room Cooling Events

The consequential loss of MCR cooling is modeled in the Mechanical Equipment Room (MER) #3 flooding, MER #5 flooding, and loss of offsite power initiating events. Consequential loss of MCR cooling event trees utilize the same assumptions as the loss of MCR initiating event tree.

2. *In response to RAI #1, the licensee identified the acceptance criteria for chilled water and room coolers. However, it is not clear if the PRA model includes only the five chillers in the scope of the TS, or if the nonsafety chillers are also considered. The licensee stated that no alternate cooling was modeled (item D), which would imply that other chillers or cooling methods are not credited. A clarification as to the specific scope of the chilled water and MCR/ESGR cooling system PRA models, both for initiating events and mitigation, is requested.*

Dominion Response

Surry's non-safety related chillers are not credited in the MCR/ESGR initiating event or mitigation portions of the PRA model.