

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

April 5, 2007

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

Serial No. 07-0109A  
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. Replacement of the piping is necessary because the exterior surface of the piping is exhibiting general corrosion. Attachment 4 of the February 26, 2007 letter provides discussion of the Replacement Plan and Provisions for Backup Cooling, including use of the chillers in Mechanical Equipment Room 1 (MER-1) as a backup cooling supply.

During a March 15, 2007 phone call with the NRC staff to discuss the proposed change, the staff requested additional information regarding justification of the use of the MER-1 chillers as the backup cooling supply in the event that both chilled water loops become inoperable during piping replacement activities. The attachment provides information in response to the NRC request. The information provided in the attachment does not affect the significant hazards consideration determination or environmental assessment that were previously provided in support of the proposed license amendment request.

A second item also discussed during the March 15, 2007 phone call was our request for NRC approval of the proposed change by October 31, 2007 to support planned entry into the first 45-day AOT early in 2008. The staff indicated that they are unable to commit to the requested 8-month review and asked what the impact would be if NRC approval was granted by the end of February 2008 (i.e., a one-year review). Dominion indicated that a February 2008 approval would impact the planned replacement

schedule in that the Phase III effort (using the first temporary 45-day AOT) could not be completed prior to the Spring 2008 Unit 2 refueling outage. However, NRC approval by January 4, 2008 would permit completion of the Phase III effort prior to the Spring 2008 refueling outage. Therefore, our request for NRC approval of the proposed change is modified from October 31, 2007 to January 4, 2008. As indicated during the phone call, Dominion is available to meet with the NRC staff at the staff's convenience to facilitate review of the proposed change.

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

Attachment: Response to Request for Additional Information - Use of the MER-1 Chillers as the Backup Cooling Supply

Commitments made in this letter:

1. In order to address a severe weather concern while in a temporary 45-day or 14-day AOT, chilled water piping replacement activities during Phases III through VI will be suspended, if the conditions detailed below exist, in order to minimize the possibility of a concurrent loss of the operating chilled water loop due to a construction-related or other failure. Suspension of the replacement activities eliminates the need to rely on the backup cooling supply as a compensatory action during specific severe weather conditions. The existing procedure addressing abnormal environmental conditions already directs actions to be taken based on specific weather conditions. The directed actions will be augmented to suspend Phases III through VI piping replacement activities based on the following weather conditions:
  - Declaration of a tornado warning for Surry County.
  - Hurricane force winds (greater than 73 mph) expected in Surry County within 24 hours.
2. A preliminary MCR heatup calculation is currently being finalized. The final calculation results concerning the expected MCR heatup will be provided to the NRC by May 18, 2007.
3. A calculation will be performed to verify adequate chilled water flow from the backup cooling supply. The calculation results of the expected flow from the backup cooling supply will be provided to the NRC by July 16, 2007.

cc: U.S. Nuclear Regulatory Commission  
Region II  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW  
Suite 23 T85  
Atlanta, Georgia 30303

Mr. N. P. Garrett  
NRC Senior Resident Inspector  
Surry Power Station

Commissioner  
Bureau of Radiological Health  
1500 East Main Street  
Suite 240  
Richmond, Virginia 23218

Mr. S. P. Lingam  
NRC Project Manager  
U. S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Mail Stop 8G9A  
Rockville, Maryland 20852



**Attachment to Letter Serial No. 07-0109A**

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

**Response to NRC Request for Additional Information -  
Use of the MER-1 Chillers as the Backup Cooling Supply**

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

**Response to NRC Request for Additional Information -  
Use of the MER-1 Chillers as the Backup Cooling Supply**

**NRC Request for Additional Information**

During a March 15, 2007 phone call with the NRC staff to discuss the proposed change, the staff requested additional information regarding justification of the use of the Mechanical Equipment Room 1 (MER-1) chillers as the backup cooling supply in the event that both chilled water loops become inoperable during piping replacement activities.

The following information is provided in response to the NRC request.

**Response to NRC Request for Additional Information**

**Applicable Technical Specification Requirements**

TS 3.23.C.2 currently requires that four air handling units (AHUs) per unit must be operable above cold shutdown. By letter dated July 5, 2006 (Serial No. 06-387), a proposed TS change was requested to include requirements and action statements for inoperability of two or more AHUs on a unit. Following NRC approval and implementation of that proposed TS change, when a chilled water loop (two AHUs per unit) is taken out of service for maintenance or repair, a 7-day allowed outage time (AOT) on each unit will be entered (TS 3.23.C.2.a.1 and TS 3.23.C.2.b.1 from the July 5, 2006 letter). By letter dated February 26, 2007 (Serial No. 07-0109), another TS change was requested to permit the use of temporary 45-day and 14-day AOTs to facilitate chilled water piping replacement activities.

**Reliance upon the Backup Cooling Supply**

As stated in the July 5, 2006 and February 26, 2007 letters, the design basis of the Main Control Room (MCR) and Emergency Switchgear Room (ESGR) Air Conditioning System (ACS) is to maintain the MCR and ESGR envelope temperature within the equipment design limits for 30 days of continuous occupancy after a design basis accident (DBA). The MCR and ESGR ACS, including the chilled water portion of the system, is safety-related and seismically qualified. During the chilled water piping replacement when a chilled water loop is out of service for replacement, the applicable TS AOT on each unit will be entered, and the operating redundant, safety-related, and seismically qualified chilled water loop will continue to provide chilled water. In the event that a DBA occurs during this time, the operating loop would continue to provide chilled water. While in the TS AOTs, an additional single failure need not be postulated, consistent with the licensing basis for TS systems. Therefore, the use of the backup cooling supply from the MER-1 chillers is not required following a DBA.

The backup cooling supply from the MER-1 chillers is provided as a defense-in-depth measure for the unlikely occurrence of a loss of the safety-related chilled water supply during chilled water piping replacement activities planned for periods when both units are at power (i.e., normal plant operation, not a DBA scenario). Attachment 4 of the February 26, 2007 letter provides discussion of the Replacement Plan, each phase of which includes discussion of Provisions for Backup Cooling. As discussed, the backup cooling supply is being provided to mitigate a loss of the safety-related chilled water supply (i.e., loss of the operating chilled water loop due to a construction-related or other failure while the other loop is isolated) during the Phases III through VI piping replacement activities. In the event that both chilled water loops become inoperable, the station will comply with TS-required action to shut down both units.

The following assessment provides justification for use of the MER-1 chillers as the backup cooling supply in the unlikely event of the loss of the safety-related chilled water supply during piping replacement activities.

### **Background Regarding MER-1 Chillers 1-VS-E-3A and 1-VS-E-3B**

The proposed TS change in the July 5, 2006 letter reflected the completion of permanent modifications to the MCR and ESGR ACS. These permanent modifications included the installation of two safety-related chillers in MER-5 (1-VS-E-4D and 1-VS-E-4E). Prior to the installation of the MER-5 chillers, the Surry Appendix R analysis took credit for the use of a cross-connect between the MCR and ESGR ACS safety-related chillers in MER-3 (1-VS-E-4A, 1-VS-E-4B, and 1-VS-E-4C) and the non-safety-related Service Building chillers in MER-1 (1-VS-E-3A and 1-VS-E-3B). The purpose of the cross-connect was to allow the MER-1 chillers to support safe plant shutdown in the event of a loss of the MER-3 chillers due to a fire in MER-3, the MCR, or the ESGR. When it was later recognized that this chiller configuration did not achieve strict compliance with Appendix R, a design change was implemented to install two safety-related chillers in MER-5 (1-VS-E-4D and 1-VS-E-4E). Although no longer credited in the Appendix R analysis, the cross-connect capability from the MER-1 chillers to the MER-3 chillers remains in place and may be used as the backup cooling supply during the chilled water piping replacement activities, as described in Attachment 4 of the February 26, 2007 letter.

### **Chiller Capacity Comparison**

The rated capacity of the chillers is as follows:

- MER-1 chillers 1-VS-E-3A and 1-VS-E-3B: 90 tons of cooling (air cooled).
- MER-3 chillers 1-VS-E-4A, 1-VS-E-4B, and 1-VS-E-4C: 90 tons of cooling at a 95°F service water temperature.
- MER-5 chillers 1-VS-E-4D and 1-VS-E-4E: 104 tons of cooling at a 95°F service water temperature.

### **Capability of the Backup Cooling Supply**

Based on an ESGR heatup calculation using space heat loads representative of normal operation and summer ambient conditions, a loss of chilled water event (i.e., loss of the operating chilled water loop while the other loop is isolated during replacement activities) would result in higher than normal temperatures in the ESGR. However, given the passive heat sinks available (concrete, steel) and operator actions to open doors and to provide cooling by portable fan(s), the ESGR space temperature at 24 hours after a loss of chilled water event would remain within equipment design limits. Since the MCR heat load is significantly lower than the ESGR load, MCR temperatures are expected to be lower than those in the ESGR. A preliminary MCR heatup calculation supports this expectation. This preliminary calculation is currently being finalized. The final calculation results concerning the expected MCR heatup results will be provided to the NRC by May 18, 2007.

Based on the calculations cited above, sufficient time is available to align and start the backup cooling supply from one of the two MER-1 chillers. With the backup cooling supply in operation, it is expected that the temperatures would be close to those of normal operation. A calculation will be performed to verify adequate chilled water flow from the backup cooling supply. The calculation results of the expected flow from the backup cooling supply will be provided to the NRC by July 16, 2007.

Attachment 4 in the February 26, 2007 letter indicates that chilled water restoration will be accomplished by use of the backup supply and/or by repairs. If a construction-related or other failure occurs on the operating chilled water loop with the other loop isolated, it is estimated that a repair to the damaged loop could be accomplished in approximately 12 hours. Such a repair would be accomplished using the guidance in the Chilled Water System Piping Contingency Plan, identified as a compensatory action in Attachment 4 in the February 26, 2007 letter. Thus, it is anticipated that cooling could be reestablished from the restored operating loop before space temperatures would exceed the equipment design limits.

As noted in Attachment 4 in the February 26, 2007 letter, there is a period of time during Phases II, III, and IV where ESGR and/or MCR cooling, if needed, would be provided by fans or other portable temporary means, because backup cooling from the MER-1 chillers would not be available. The results of the ESGR and MCR heatup calculations (discussed above) will determine actions needed with respect to opening doors or providing cooling by fans or other portable temporary means. Also as noted in the February 26, 2007 letter, procedural direction will be developed to include these contingency actions for ESGR and MCR cooling.

### **Power Supply for MER-1 Chillers**

Normal and emergency power is provided to the MER-1 chillers from power transfer cabinet located in MER-1. The normal non-safety-related power supply (from station

service) to the transfer cabinet is via 1-EP-BKR-1B2-1-2B (1-VS-E-3A) and 1-EP-BKR-1C1-2-2D (1-VS-E-3B) located in the Normal Switchgear Room. The emergency power supply to the transfer cabinet is via 1-EP-BKR-1J1-1-5D (1-VS-E-3A) and 1-EP-BKR-2H1-1-4C (1-VS-E-3B) located in the ESGR. The transfer from normal power to emergency power for the MER-1 chillers is accomplished by manual action within the power transfer cabinet, as directed by procedure.

The power requirements for the MER-1 chillers have been reviewed with respect to emergency diesel generator (EDG) loading. The EDG loading for the MER-1 chillers is slightly higher than the loading for the MER-3 chillers. However, the EDG loading when powering the 1J and 2H emergency buses has significant margin to accommodate the slight increase for the MER-1 chillers.

### **MER-1 Chiller Reliability**

The MER-1 chillers are currently used to provide cooling to office areas in the Service Building. Preventive maintenance, testing, and trending of the non-safety-related MER-1 chillers is not as rigorous as that for the safety-related MER-3 and MER-5 chillers. However, as stated in Attachment 4 in the February 26, 2007 letter, one of the planned compensatory actions during chilled water piping replacement activities is the following:

“Prior to initiating Phases III through VI of the chilled water piping 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 supply.”

This planned compensatory action provides a high level of confidence that the MER-1 chillers will be available and reliable during the piping replacement activities.

### **Location of MER-1 Chillers/Service Building Design**

Chillers 1-VS-E-3A and 1-VS-E-3B are located in MER-1 in the Service Building on the 42' elevation. The Service Building is located in the Unit 1 alleyway and on the north side of the Turbine Building. The locations of the Service Building, MER-1 and chillers 1-VS-E-3A and 1-VS-E-3B are shown on the attached figure.

The Service Building structure design (at the 42' elevation) with respect to wind and seismic considerations is as follows:

- Wind: The Service Building is capable of resisting wind speeds on the order of 95 mph while remaining within the elastic limit.
- Seismic: The Service Building structure is capable of withstanding a design basis earthquake (DBE) event without collapse.

## **Seismic Considerations**

Although the MER-1 chillers 1-VS-E-3A and 1-VS-E-3B are non-safety-related and non-seismic, they have been evaluated from a seismic perspective. By a November 26, 1997 letter (Serial No. 97-665), the Summary Report for Individual Plant Examination of External Events (IPEEE) – Seismic was transmitted to the NRC in response to Supplements 4 and 5 to Generic Letter 88-20. Appendix A of the Summary Report presents a Safe Shutdown Equipment List (SSEL). The SSEL includes the MER-1 chillers 1-VS-E-3A and 1-VS-E-3B. These chillers were walked down and inspected by a seismic review team. Based on the walkdown and inspection, these chillers were screened from further evaluation and their High Confidence of Low Probability of Failure (HCLPF) capacity was judged to be greater than 0.3g (twice the value of the Surry DBE). The NRC Safety Evaluation for the Surry IPEEE was issued on June 29, 2000. In addition, as noted above, the Service Building is capable of withstanding a DBE event without collapse.

Furthermore, as stated in Attachment 1 in the February 26, 2007 letter, the risk evaluation performed to support the temporary 45-day and 14-day AOTs considers the impact of seismic events and concluded that the risk associated with the proposed TS change is acceptably small. Note that the risk evaluation did not credit the backup cooling supply. If the backup cooling supply had been credited, the risk associated with the proposed TS change would be reduced.

Based on this information, no further action needs to be taken to address seismic considerations.

## **Severe Weather Considerations**

Severe weather events of interest are tornadoes and hurricanes. In this area, tornadoes are typically associated with major weather fronts with severe thunderstorms; in this case, there would be advance notice of the approach of impending weather. In addition, due to the nature of a hurricane's development, there is advance warning of a hurricane's approach toward the mid-Atlantic states.

An abnormal procedure is in place and provides guidance for impending abnormal environmental conditions, including tornadoes and hurricanes. An Operations Checklist is used in conjunction with the abnormal procedure to prepare for expected severe weather. The abnormal procedure directs that:

- various measures be taken if a tornado watch or warning has been declared for Surry County and
- the first unit be placed between 200°F and 345°F based on hurricane force winds (greater than 73 mph) expected in Surry County within 24 hours, and the second unit be placed between 200°F and 345°F based on hurricane force winds (greater than 73 mph) expected in Surry County within 12 hours.

The impact of severe weather on Surry was evaluated by the NRC in NUREG/CR-4550 (Vol. 3, Rev. 1, Part 3, pages 3-28 through 3-34) and also in Surry's Individual Plant Examination of External Events (Serial No. 94-692, December 14, 1994, pages 5-18 through 5-19). In both cases, the risk due to tornadoes and high winds, including hurricanes, was not quantified because the plant's Category I structures were designed to withstand a Design Basis Tornado. Although MER-1 is not in a Category I structure, as noted above, the Service Building (at the 42' elevation) is capable of resisting wind speeds on the order of 95 mph (while remaining in the elastic limit).

Thus, severe weather considerations become a concern with respect to the proposed TS change only if the following three events occur concurrently:

- Entry into a temporary 45-day or 14-day AOT for piping replacement activities.
- A loss of the safety-related chilled water system function during piping replacement activities (i.e., loss of the operating chilled water loop while the other loop is isolated during replacement activities), resulting in reliance upon the backup cooling supply.
- Severe weather with forecasted wind speeds that could potentially compromise the availability of the backup cooling supply. Based on the Service Building design (at the 42' elevation), the wind speed of potential concern is on the order of 95 mph and greater.

In order to address a severe weather concern while in a temporary 45-day or 14-day AOT, chilled water piping replacement activities during Phases III through VI will be suspended, if the conditions detailed below exist, in order to minimize the possibility of a concurrent loss of the operating chilled water loop due to a construction-related or other failure. Suspension of the replacement activities eliminates the need to rely on the backup cooling supply as a compensatory action during specific severe weather conditions. As noted above, the existing procedure addressing abnormal environmental conditions already directs actions to be taken based on specific weather conditions. The directed actions will be augmented to suspend Phases III through VI piping replacement activities based on the following weather conditions:

- Declaration of a tornado warning for Surry County.
- Hurricane force winds (greater than 73 mph) expected in Surry County within 24 hours.

Suspension of the replacement activities under these specific weather conditions will eliminate any severe weather-related concern while in the temporary 45-day or 14-day AOTs.

## **Conclusion**

Based on the assessment presented herein, the use of the MER-1 chillers as the backup cooling supply in the unlikely event of the loss of the safety-related chilled water supply during piping replacement activities is appropriate and is justified.

