

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

November 25, 2008

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

Serial No. 08-0676
NL&OS/ETS R3
Docket Nos. 50-338/339
License Nos. NPF-4/7

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
REQUEST FOR ADDITIONAL INFORMATION
PROPOSED LICENSE AMENDMENT REQUEST
ONE-TIME RISK-INFORMED EXTENSION TO THE COMPLETION TIME
FOR EDG FUEL OIL STORAGE TANK RECOATING

In a December 17, 2007 letter (Serial No. 07-0803), Dominion requested amendments, in the form of changes to the Technical Specifications to Facility Operating License Numbers NPF-4 and NPF-7 for North Anna Power Station Units 1 and 2. The proposed change will permit a one-time extended 14-day Completion Time for each of the two underground diesel fuel oil storage tanks to permit removal of the current coating and recoating of the tanks in preparation for use of ultra-low sulfur diesel (ULSD) fuel oil. In a November 6, 2008 e-mail, the NRC requested that Dominion provide additional design and operational information regarding the EDG Fuel Oil System and consider additional compensatory measures prior to entry into the proposed extended Completion Time.

Dominion has evaluated and will implement the compensatory measures prior to entering extended Completion Times for the recoating/repair of each for the underground fuel oil storage tank (UFOST). The specific compensatory measures and the EDG Fuel Oil System design and operational information are provided in the attachment to this letter.

If upon entry into the extended Completion Times, conditions change regarding the switchyard or the grid, plant risk will be managed in accordance with Dominion's Tier 3, Risk-Informed Plant Configuration Control Management Program.

Since the submittal of the proposed license amendment, initial testing of the UFOST coating has been completed by the coatings vendor. These results do not indicate an incompatibility between the existing coating (Carbo Zinc II) and the ULSD fuel oil. Other independent testing is being considered prior to a final engineering evaluation by Dominion regarding coatings compatibility. Subject to completion of these activities, Dominion is continuing to prepare for a coating replacement and requests NRC continued review to support this activity.

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ATTACHMENT

**REQUEST FOR ADDITIONAL INFORMATION
ONE-TIME RISK-INFORMED EXTENSION TO THE COMPLETION TIME
FOR EDG FUEL OIL STORAGE TANK RECOATING**

**VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2**

**REQUEST FOR ADDITIONAL INFORMATION
ONE-TIME RISK-INFORMED EXTENSION TO THE COMPLETION TIME
FOR EDG FUEL OIL STORAGE TANK RECOATING**

Background

The NRC staff is reviewing the Dominion license amendment request (LAR) dated December 17, 2007, and has determined that the following additional information is required to complete its evaluation.

Question 1

Per NAPS UFSAR Chapter 8.3.1.1.1:

"There are two 100%-capacity diesel generators for each unit. The diesel generators will automatically start when a safety injection signal is received, a 90% degraded voltage level for 56 seconds is sensed on the bus, or approximately 74% voltage for 2 seconds exists on the bus".

For a loss-of-offsite power (LOOP) event at both units and a Loss-of-Coolant Accident (LOCA) at one of the units, the four emergency diesel generators (EDGs) will automatically start and run.

- A) Based on this design, provide an evaluation of the fuel oil consumption and the impact on the duration of EDG(s) operation with only one fuel oil storage tank available.
- B) With four EDGs operating, there is a potential for four fuel oil transfer pumps operating simultaneously. Describe the consequences of any vortexing effects in the fuel oil storage tank and operability of the transfer pumps.
- C) The LAR describes an above ground non-safety-related tank as a potential source for additional fuel oil. Provide clarification on the design of the gravity feed system to the underground tanks and periodicity of any surveillances performed to verify the flow path.

Dominion Response Question 1

- A) The design basis of the EDG and fuel oil system is to support two fully loaded EDGs for seven days of continuous operation from the underground fuel oil storage tanks (UFOST). The available run time for four EDGs running fully loaded on one UFOST is discussed below:
 - A fully loaded EDG (3,000 kW) will consume 3.93 gpm (15.72 gpm for four diesels fully loaded).

- Fuel consumption of a fully loaded EDG for 7 days = 39,614.4 gallons (158,457.6 gallons for four EDGs)
- TS minimum underground tank volume = 45,000 gallons
- Unusable tank volume = 1,979.49 gallons, which equals 12" of fluid height in UFOST to prevent any vortex concerns.

$$\left(\frac{45,000 \text{ gallons} - 1,979.49 \text{ gallons}}{4 \times 3.93 \text{ gpm}} \right) = 2,737 \text{ min} \left[\frac{1 \text{ hour}}{60 \text{ min}} \times \frac{1 \text{ day}}{24 \text{ hours}} \right] = 1.9 \text{ days}$$

Based on the above calculation, one UFOST containing a TS minimum volume will support operation of four EDGs fully loaded for 1.9 days.

Prior to taking an EDG UFOST out of service for inspection/repair the current TS require that:

- A minimum volume of 100,000 gallons of FO is available onsite.
- The other UFOST contains at least 45,000 gallons.
- Verification that a minimum of 50,000 gallons of replacement FO is available offsite and transportation is available to deliver that volume of FO within 48 hours.
- The onsite volumes are required to be verified every 12 hours.

These requirements would also apply prior to entry into extended Completion Times.

- B) Vortexing is a product of the flow rate out of the tank (into the suction pipe) and the diameter of the suction pipe. The formula from ANSI/HI 9.8, "Pump Intake Design," 2000 is shown below:

$$S = D + 0.574 \left(\frac{Q}{D^{1.5}} \right)$$

Where:

- S - The submergence distance from the suction inlet to the fluid surface necessary to prevent vortexing (inches)
- D - The inlet diameter of the suction pipe (2.341 inches)
- Q - The flowrate through the inlet (gpm)

The 'S' value from the above equation is 4.9 inches or 0.408 feet above the suction. The suction pipe is 6 inches above the tank bottom. This correlates to an unusable volume of 1979.49 gallons (the volume in the UFOST at 12 inches of fluid height). As noted above, one underground EDG UFOST can support four EDGs running fully loaded for 1.9 days, which is ample time to either transfer FO from the above ground tank or receive FO from offsite.

- C) The 210,000 gallon above ground tank is the normal supply to the two underground fuel oil storage tanks 2A and 2B. Fuel oil is gravity fed through two normally shut isolation valves, a high flow trip valve and a check valve for each tank.

Although there is no specific surveillance performed for functionality, the gravity feed line is used approximately quarterly to transfer fuel oil to the two UFOSTs. In addition, on a five year periodicity the gravity feed line is hydrostatically tested in accordance with the Code of Virginia.

Question 2

The NRC staff has requested that additional compensatory measures/restrictions be employed during the outage of the fuel oil tanks. The additional restrictions include:

1. Procedures shall be established to assure that the following provisions are invoked when an EDG UFOST is inoperable for an extended completion time (CT) in Technical Specification (TS) 3.8.3.
2. The condition of the offsite power supply and switchyard will be evaluated prior to entering the extended EDG UFOST CT for elective maintenance.
3. Determine acceptable grid conditions for entering an extended EDG UFOST CT to perform elective maintenance. An extended EDG UFOST CT will not be entered to perform elective maintenance when grid stress conditions are high.
4. No elective maintenance will be scheduled in the switchyard that would challenge offsite power availability and no elective maintenance will be scheduled on the main, auxiliary [station service], or startup [reserve station service] transformers associated with the unit during the proposed extended EDG UFOST CT.
5. The system dispatcher will be contacted once per day to ensure no significant grid perturbations are expected during the extended EDG UFOST CT.
6. The turbine-driven AFW pump will not be removed from service for planned maintenance activities during the extended EDG UFOST CT.
7. Assure operating crews are briefed on the EDG UFOST work plan and procedural actions regarding:
 - LOOP and Station Black Out
 - 4 kV safeguards bus cross-tie [Unit 2 emergency bus cross-tie]
 - Reactor Coolant System bleed and feed
8. Weather conditions will be evaluated prior to entering the extended EDG CT for elective maintenance. An extended EDG UFOST CT will not be entered for elective maintenance purposes if official weather forecasts are predicting severe conditions (tornado or thunderstorm warnings).
9. No elective maintenance will be scheduled for the plant DC system.
10. Assess the overall impact of maintenance on plant risk using a Configuration Risk Management Program before entering TS for planned EDG UFOST maintenance activities.

Dominion Response Question 2

Dominion has evaluated the additional compensatory measures and commits to implement the compensatory measures prior to entering the extended Completion Times for the EDG UFOST recoating/repair of each tank. If plant conditions change during the extended Completion Time, the risk impact will be managed by the Maintenance Rule Program as required by 10CFR50.65(a)(4).