VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261
November 19, 2001

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

Serial No.:	01- 560
CM/RAB	R0
Docket Nos.:	50-338
	50-339
License Nos.:	NPF-4
	NPF-7

Gentlemen:

VIRGINIA ELECTRIC AND POWER COMPANY (DOMINION)
NORTH ANNA POWER STATION UNITS 1 AND 2
PROPOSED IMPROVED TECHNICAL SPECIFICATIONS
REQUEST FOR ADDITIONAL INFORMATION
ISTS 3.7.7 AND ITS 3.7.9
BEYOND SCOPE ISSUE (TAC Nos. MB 1439, MB1440, MB1451, and MB 1452)

This letter transmits our response to the NRC's request for additional information (RAI) regarding the North Anna Power Station (NAPS) Units 1 and 2 proposed Improved Technical Specifications (ITS). The North Anna ITS license amendment request was submitted to the NRC in a December 11, 2000 letter (Serial No. 00-606). The NRC requested additional information regarding Improved Standard Technical Specification 3.7.7, "Component Cooling," and ITS 3.7.9, "Ultimate Heat Sink." This information was requested in a NRC letter dated September 6, 2001 (TAC Nos. MB1439, MB1440, MB1451, and MB1452).

Attached is the NRC's RAI and our response to the RAI.

If you have any further questions or require additional information, please contact us.

Very truly yours,

Leslie N. Hartz
Vice President - Nuclear Engineering

Attachment

Commitments made in this letter: None

A001

cc: U.S. Nuclear Regulatory Commission
Region II
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Suite 23T85
Atlanta, Georgia 30303-8931

Mr. Tommy Le
U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Mail Stop 12 H4
Rockville, MD 20852-2738

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

Commissioner (w/o attachments)
Bureau of Radiological Health
1500 East Main Street
Suite 240
Richmond, VA 23218

Mr. J. E. Reasor, Jr. (w/o attachments)
Old Dominion Electric Cooperative
Innsbrook Corporate Center
4201 Dominion Blvd.
Suite 300
Glen Allen, Virginia 23060

SN: 01-560
Docket Nos.: 50-338/339
Subject: Proposed ITS RAI
ISTS 3.7.7 and ITS 3.7.9

COMMONWEALTH OF VIRGINIA)
)
COUNTY OF HENRICO)

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Leslie N. Hartz, who is Vice President - Nuclear Engineering, of Virginia Electric and Power Company. She has affirmed before me that she is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of her knowledge and belief.

Acknowledged before me this 19th day of November, 2001.

My Commission Expires: 3-31-04.

Maggie McClure

Notary Public

(SEAL)

Attachment

Proposed Improved Technical Specifications
Response to Request for Additional Information
ISTS 3.7.7, "Component Cooling"
ITS 3.7.9, "Ultimate Heat Sink"

Virginia Electric and Power Company
(Dominion)

North Anna Power Station Units 1 and 2

**North Anna Improved Technical Specifications (ITS) Review Comments
Component Cooling Water (CC) System and Ultimate Heat Sink (UHS)
(TAC Nos. MB1439, MB1440, MB1451, AND MB1452)**

Responses to RAIs:
ISTS Specification 3.7.7, Component Cooling Water (CC) System

In your December 11, 2000, ITS submittal, you stated that the CCW system does not meet any of the four criteria of Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.36 for inclusion of a limiting condition for operation in the Technical Specifications (TS). Therefore, you proposed not to adopt TS 3.7.7, "Component Cooling Water System," for the ITS.

RAI: 1. To support the completion of the review of ITS changes, please identify and list the systems and components (including reactor coolant pump (RCP) motors, RCP seals and residual heat removal system) that require the CCW for heat removal to maintain their operability, and assess the safety significance of the loss of CCW to the identified systems and components that require the CCW for operation. Your response should include:

a. a deterministic assessment to show that the loss of the CCW will not impact the plant design basis or the limiting equipment availability assumptions used in the deterministic analyses to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3), and

Response: The Component Cooling (CC) System provides cooling water to heat exchangers requiring cooling during normal operation and cooldown. The CC System, in turn, is cooled by the Service Water System. Table 1 summarizes the systems that are supported by CC, the CC System design requirements needed to provide that support, and the safety significance of a loss of CC to the supported system.

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Boron Recovery and Primary Grade Water	Provide cooling to • stripper trim coolers • stripper gas compressors • evaporator overhead condensers • evaporator distillate coolers • evaporator distillate pumps • evaporator bottoms cooler cooling loop	None. Loss of CC to the Boron Recovery and Primary Grade Water Systems will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Chemical and Volume Control	Provide cooling to • RCP seal water heat exchanger • non-regenerative heat exchanger • excess letdown heat exchanger	None. Loss of CC to the Chemical and Volume Control System will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Loss of CC to the RCP seal water heat exchanger will not lead to failure of the RCP seals as once-through cooling of the seals is available. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Containment Vacuum	Provide cooling to the containment vacuum pump seal water coolers	None. Loss of CC to the Containment Vacuum System will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Failure of a containment vacuum pump is not an initiator to any accident. Containment vacuum pumps are not assumed to function after an accident. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

North Anna Improved Technical Specifications (ITS) Review Comments Component Cooling Water (CC) System and Ultimate Heat Sink (UHS) (TAC Nos. MB1439, MB1440, MB1451, AND MB1452)

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Containment Ventilation	Provide cooling to the reactor shroud coolers	None. Loss of CC to the Containment Ventilation System will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Following an accident, CC System cooling is not required to the shroud coolers, as supported by the Company's evaluations performed in response to Generic Letter 85-12, "Automatic Trip of Reactor Coolant Pumps," dated February 14, 1986. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Electrical Instrumentation and Computer (EI)[1]	1) Provide the process instrumentation cabinets in the EI system with signals to enable the cabinets to automatically monitor and control system operating parameters; 2) Provide the Emergency Response Facility computer with CC System containment isolation valve position indication	None. Loss of CC to the Electrical Instrumentation and Computer Systems will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. OPERABILITY of the CC System containment isolation valves is required by ITS 3.6.3, "Containment Isolation Valves." Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

[1] Note that the CC System provides computer inputs to the EI System for monitoring containment isolation valve position. The CC System does not provide cooling to the EI System.

North Anna Improved Technical Specifications (ITS) Review Comments
Component Cooling Water (CC) System and Ultimate Heat Sink (UHS)
(TAC Nos. MB1439, MB1440, MB1451, AND MB1452)

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Fuel Pool Cooling and Purification	Provide cooling to the fuel pool coolers	None. Loss of CC to Fuel Pool Cooling and Purification will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. While not described in a DBA or Transient analysis, fuel pool cooling is required during all events. Fuel Pool Cooling and Purification can be provided from either unit's CC System in the event of a loss of CC pumps on one unit. The safety functions for fuel pool cooling and purification are not affected by sharing of the CC Systems. Alternate cooling water from the Service Water System, which is safety-related, can be supplied to the Fuel Pool Cooling and Purification heat exchangers. Therefore, loss of CC System cooling to the Fuel Pool Cooling and Purification System will not be safety significant because of the multiple redundant systems available to perform the function. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Gaseous Waste	Provide cooling to the gaseous waste compressors	None. Loss of CC to the Gaseous Waste compressors will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Primary Vents and Drains	Provide cooling to the primary drains transfer tank cooler	None. Loss of CC to the Primary Vents and Drains System will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Reactor Coolant System	Provide cooling to • RCP upper bearing • RCP lower bearing • RCP stator cooling coils • RCP thermal barrier	None. Loss of CC to the Reactor Coolant System, while important to continued power operation, will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The RCP thermal barrier acts as a backup to seal injection in protecting RCP seal integrity. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Sampling	1) Provide cooling to the following sample coolers: •RCS hot leg •RCS cold leg •gas stripper effluent •residual heat removal system pressurizer liquid space •steam generator •steam generator surface •steam generator blowdown •boron evaporator bottoms •liquid waste evaporator 2) Provide cooling to the Sampling System high radiation sampling coolers	None. Loss of CC to the Sampling System will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Steam Generator Blowdown	Provide cooling to the steam generator blowdown vent condenser and steam generator blowdown heat exchangers	None. Loss of CC to the Steam Generator Blowdown, while important for continued power operation, will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, loss of CC to this system will have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

North Anna Improved Technical Specifications (ITS) Review Comments
Component Cooling Water (CC) System and Ultimate Heat Sink (UHS)
(TAC Nos. MB1439, MB1440, MB1451, AND MB1452)

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
Residual Heat Removal	Provide cooling to the residual heat removal heat exchangers and RHR pump seal coolers	None. Loss of CC to the Residual Heat Removal (RHR) System may affect RHR OPERABILITY. Under the definition of OPERABILITY, for a system to be OPERABLE, all necessary attendant support functions, such as cooling water, must be capable of providing their required functions. The Conditions and Required Actions of the RHR specifications (3.4.6, 3.4.7, 3.4.8, 3.9.5, and 3.9.6) provide appropriate compensatory actions to protect the safety margin provided by the RHR System. Also, the STS MODES of Applicability for the CC System do not coincide with the applicable MODES for RHR (i.e., in the STS, CC is applicable in MODES 1 - 4 and RHR is applicable in MODES 4 - 6.) The RHR System is not a system that is assumed to mitigate the consequences of accidents described in the North Anna UFSAR. As stated in the ISTS Bases for the Specifications listed above, the Residual Heat Removal System does not meet 10 CFR 50.36(c)(2)(ii) criteria 1, 2, or 3. The RHR System only meets Criterion 4 (See NRC Final Policy Statement on Technical Specification Improvements, discussion of Criterion 4). Therefore, loss of CC to the RHR System will not affect 1) installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary, 2) a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier, or 3) a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. Therefore, loss of CC to this system will

Table 1
North Anna Component Cooling System Functions

System Supported by CC	CC System Design Requirement	Safety Significance of a Loss of CC to the Supported System
		have no effect on the plant design basis or the limiting equipment availability assumptions used in the deterministic analysis to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Therefore, based on the information presented in Table 1, loss of CC to the systems and components that require CC for heat removal will not affect safety, and will not affect the plant design basis or the limiting equipment availability assumptions used in the deterministic analyses to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3), as stated in the North Anna ITS submittal:

1. The CC System is not installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary. The CC System does not meet Criterion 1.

2. The CC System is not a process variable, design feature, or operating restriction that is an initial condition of a DBA or Transient Analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The CC System does not meet Criterion 2.

3. The CC System is not a structure, system, or component that is part of the primary success path and which functions or actuates to mitigate a DBA or Transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The CC System in MODES 1, 2, 3, or 4 was evaluated in WCAP-11618 for the generic Westinghouse plant. WCAP-11618 assumed that the CC System served as a support system to various systems which are assumed to function to mitigate various DBAs. However, at NAPS, the CC System is not assumed to function to mitigate any DBAs. The CC System does not meet Criterion 3.

RAI: b. an analysis to show the deletion of CCW TS does not affect the existing TS requirements for the systems and components that rely on the CCW for operation.

Response: The relocation of the CC Technical Specification (TS) to the Technical Requirements Manual (TRM) does not affect the OPERABILITY requirements for any TS systems or components that rely on CC for operation. The Definition of OPERABILITY states that for a system to be OPERABLE, all support functions, such as cooling water, must be capable of providing the

required function. If the CC required function cannot be performed the supported system is inoperable regardless of whether there is a CC TS.

RAI: 2. Criteria 4 states, "A structure, system, or component (SSC) which operating experience or probabilistic risk assessment has shown to be significant to public health and safety," should be included in the TS. In your submittal, you state that, "[a]n evaluation performed by the Company determined that the CCW ... is a non-significant risk contributor to core damage frequency and offsite releases."

a. Please describe the evaluation performed and the criteria used to determine that the CCW is a non-significant contributor to core damage frequency (CDF) and large early release frequency (LERF). Insofar as this evaluation addresses the specific questions raised below, the answers to the specific questions can refer to the description of your evaluation.

Response: The North Anna Probabilistic Risk Assessment (PRA) model is a small-event tree, large fault tree model of the plant. The fault trees include detailed modeling of the CC System cooling to the Reactor Coolant Pump thermal barrier, the Residual Heat Removal pumps and heat exchangers, the non-regenerative heat exchanger and the Spent Fuel Pit coolers. (CC also cools several other potentially contaminated systems that are not modeled.) The CC System fault tree model consists of the major components in each train. Support system dependencies are explicitly modeled. Each component may have one or more failure modes represented. The Risk Achievement Worth (RAW) and Risk Reduction Worth (RRW) are calculated for each failure mode for the zero-maintenance and average-maintenance models, for both CDF and LERF. In the North Anna model, there are no CC components that are individually risk significant by either RAW or RRW, for CDF or LERF, at either the zero-maintenance or average-maintenance conditions. A small number of components appear in the top 90% of the CDF cutsets; however, the individual risk contributions are all clearly minimal. The RAW and RRW CDF for the major components are as follows for the average-maintenance model.

Mark Number	Description	Risk Achievement Worth (CDF/LERF)	Risk Reduction Worth (CDF/LERF)
1-CC-P-1A	Unit 1 Component Cooling Pump 1A	1.19/1	1.003/1
1-CC-P-1B	Unit 1 Component Cooling Pump 1B	1.58/1	1.009/1
2-CC-P-1A	Unit 2 Component Cooling Pump 1A	1/1	1/1
2-CC-P-1B	Unit 2 Component Cooling Pump 1B	1/1	1/1
1-CC-24	1-CC-P-1A Discharge Check Valve	1.49/1	1.002/1
1-CC-47	1-CC-P-1B Discharge Check Valve	1.14/1	1/1
1-CC-E-1A	Unit 1 Component Cooling Heat Exchanger 1A	1/1	1/1
1-CC-E-1B	Unit 1 Component Cooling Heat Exchanger 1B	1/1	1/1
2-CC-E-1A	Unit 2 Component Cooling Heat Exchanger 1A	1.02/1	1.001/1
2-CC-E-1B	Unit 2 Component Cooling Heat Exchanger 1B	1.02/1	1.001/1

RAI: b. Please identify the CCW functions modeled in the probabilistic risk assessment (PRA).

Response: The modeled functions were summarized in the answer to the previous question.

RAI: c. Please describe how the safety significance evaluation addressed external events such as fires, earthquakes, and other external events that could occur at NAPS.

Response: The original Individual Plant Examination for External Events (IPEEE) analysis quantified the impact of fire and screened out the potential risk impact of external flooding, tornadoes, transportation accidents and nearby facility accidents. Seismic events were analyzed using the *Seismic Margins* method.

Fire: The risk due to fire-related failure of CC components was dominated by common cause loss of multiple pumps and/or heat exchangers; individual components contributed several orders of magnitude less to the total plant risk. Neither contribution will be affected by the relocation of the CC Technical Specifications to the TRM.

Seismic: The CC System components and the Auxiliary Building are designed to Seismic Class 1 standards. Thus, the CDF contribution from a seismic event would be minimal. The contribution of the low frequency, high amplitude seismic events is minimized because the CC System components were included on both the IPEEE and the USI A-46 seismic safe-shutdown equipment lists and evaluated to be adequate. The safe-shutdown CC components were selected for one preferred success path and an alternate path, as required by NUREG-1407. In the North Anna IPEEE-seismic effort, of all the safe-shutdown CC System components evaluated, only the CC water pumps had a high-confidence-of–low-probability-of-failure (HCLPF) capacity below the screening value of 0.3g. This HCLPF capacity was 0.29g, which is almost twice the design basis earthquake peak ground acceleration value. Relocation of the CC System to the TRM will not affect the current or future seismic qualification of safety-related components in the CC System.

RAI: d. Please explain how the SSCs will be treated differently after the requirements are relocated. For example, will there be changes in the testing frequency or the reliability of the SSCs?

Response: No changes in the treatment of the CC System are anticipated as a result of the relocation of the Specification to the TRM. Periodic evaluations of system reliability are performed and the results of those evaluations are incorporated into the PRA model.

RAI: e. Please provide an estimate of the change in CDF and LERF assuming that the system is unavailable (the RAW value), the percentages of the current CDF and LERF that include the failure of the system (the Fussell-Vesely value), and an estimate of the change in CDF and LERF expected given the

change in treatment after the requirements are relocated.

Response: A complete loss of the CC System yields a RAW of 36 for CDF and 44 for LERF. However, power operation cannot continue with a complete loss of the CC System. With two subsystems unavailable, the CDF RAW is 1.39 and the LERF RAW is 1.03. The CC System contributes a negligible portion of the total CDF and LERF, based upon the component RRW values listed in the answer to question (a) above. The LERF contribution is comparable. The Fussel-Vesely values for this system is therefore approximately zero. Once the CC Specifications have been relocated, no change is expected to the CDF or LERF because these system requirements will be retained in the TRM.

ITS Specification 3.7.9, Ultimate Heat Sink

In your December 11, 2000, ITS submittal for NAPS, you claimed that the North Anna reservoir does not meet any of the four criteria of 10 CFR 50.36 for inclusion of a limiting condition for operation in the TS. Therefore, you have proposed not to adopt Current TS 3.7.5.1 b. for the ITS.

RAI: 1. To support the completion of the review of ITS changes, please identify and list the systems and components that require the use of the North Anna Reservoir, and assess the safety significance of the loss of the reservoir to these identified systems and components. Your response should include:

a. a deterministic assessment to show that the loss of the North Anna Reservoir will not impact the plant design basis or the limiting equipment availability assumptions used in the deterministic analyses to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3), and

Response: The SW System is cooled by the SW Reservoir with the North Anna Reservoir acting as a backup. The normal source of SW System cooling is the SW Reservoir, which is adequate to provide sufficient cooling for at least 30 days: (a) to permit simultaneous safe shutdown and cooldown of two units, then maintain them in a safe-shutdown condition; and (b) in the event of an accident in one unit, to permit control of that accident safely and permit simultaneous safe shutdown and cooldown of the remaining unit and maintain both units in a safe-shutdown condition. After 30 days, makeup to the SW Reservoir is provided from the North Anna Reservoir as necessary to maintain cooling water inventory, ensuring a continued cooling capability. A postulated loss of the North Anna Reservoir has no safety significance with regards to the SW System accident mitigation function during the 30 days after a DBA.

All systems that perform a safety function and which require cooling during an accident are cooled by the SW System utilizing the SW Reservoir. The SW Reservoir is in use during normal operation and during accident recovery. The North Anna Reservoir is designed to remain functional after a tornado or an operating basis earthquake. The SW Reservoir, including the reservoir spray piping, is designed to withstand the safe shutdown earthquake, but the SW Reservoir spray piping is not designed to withstand tornado missiles. The design conforms to Regulatory Guide 1.27 with regard to the capability of the ultimate heat sink to withstand the most severe natural phenomena, or a single failure of man-made structural features. Further, the design conforms with Regulatory Guide 1.27 with regard to the availability of two sources of water and redundant aqueducts. However, the design functions of the North Anna Reservoir are not part of the safety sequence analysis for North Anna UFSAR Conditions II, III, and IV events. The North Anna Reservoir serves as a backup to the SW Reservoir for mitigation of North Anna UFSAR Chapter 6 and 15 events. Since the North Anna Reservoir does not involve assumptions for initiating events or affect any accident mitigation functions for North Anna UFSAR Conditions II, III, and IV events, a deterministic assessment of safety margin impact is not appropriate. A postulated loss of the North Anna Reservoir water does not affect the plant design basis or the limiting equipment availability assumptions used in the

deterministic analyses to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3).

Therefore, based on the information presented above, loss of the North Anna Reservoir to the systems and components that rely on the reservoir will not affect safety, and will not affect the plant design basis or the limiting equipment availability assumptions used in the deterministic analyses to establish margins of safety (related to 10 CFR 50.36, criteria 1 through 3), as stated in the North Anna ITS submittal:

1. The North Anna Reservoir is not installed instrumentation that is used to detect, and indicate in the control room, a significant abnormal degradation of the reactor coolant pressure boundary. The North Anna Reservoir does not meet Criterion 1.

2. The North Anna Reservoir is not a process variable, design feature, or operating restriction that is an initial condition of a design basis accident or transient analysis that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The North Anna Reservoir does not meet Criterion 2.

3. The North Anna Reservoir is not a structure, system, or component that is part of the primary success path and which functions to mitigate a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier. The Final Policy Statement on Technical Specification Improvements, discussion of Criterion 3, states that Criterion 3 only applies to the primary success path for a particular mode of operation and does not include backup and diverse equipment. As described above, the North Anna Reservoir is a backup system to the primary SW Reservoir. Therefore, the North Anna Reservoir does not meet Criterion 3.

RAI: b. an analysis to show the deletion of North Anna Reservoir TS does not affect the existing TS requirements for the systems and components that rely on the reservoir for operation.

Response: There are no existing TS requirements for systems or components that rely on the North Anna Reservoir for operation. The SW System can utilize the North Anna Reservoir, but does not rely on it. As described, the SW System relies on the SW Reservoir for all normal operation and accident mitigation functions. However, should the SW System rely on the North Anna Reservoir, the relocation of the North Anna Reservoir requirements to the TRM would not affect the OPERABILITY requirements for the SW System. The Definition of OPERABILITY states that for a system to be OPERABLE, all support functions such as cooling water must be capable of providing the required function. If the North Anna Reservoir was acting as the ultimate heat sink and the required function could not be performed, whether or not the North Anna Reservoir is described in the TS, the supported SW System would be inoperable.

RAI: 2. Criteria 4 states, "A structure, system, or component which operating experience or probabilistic risk assessment has shown to be significant to public health and safety," should be included in the TS. In your submittal you stated that, "[a]n evaluation performed by the company determined that the North Anna Reservoir is a non-significant risk contributor to core damage frequency and offsite releases."

a. Please describe the evaluation performed and the criteria used to determine that the reservoir is a non-significant contributor to CDF and LERF. Insofar as this evaluation addresses the specific questions raised below, the answers to the specific questions can refer to the description of your evaluation.

Response: The PRA assessment identified the North Anna Reservoir as a non-significant contributor to the plant CDF and LERF. This assessment was based upon a review of the system and component contribution to risk as quantified. The RAW and RRW CDF for the Auxiliary Service Water (ASW) pumps, which take suction from the lake, are as follows for the average-maintenance model. The ASW pumps can back up the main Service Water pumps.

Mark Number	Description	Risk Achievement Worth (CDF/LERF)	Risk Reduction Worth (CDF/LERF)
1-SW-P-4	Unit 1 Auxiliary Service Water Pump	1.02/1.00	1/1
2-SW-P-4	Unit 2 Auxiliary Service Water Pump	1.00/1.00	1/1

The Circulating Water (CW) System takes suction from the North Anna Reservoir. It provides cooling water to the condenser in support of the steam dumps for decay heat removal. None of the CW components is risk significant. In fact, none of the CW components even appears in the average-maintenance cutsets. Thus the RAW and RRW for all of the individual CW components is one.

RAI: b. Please identify the reservoir functions modeled in the PRA or screened out of the PRA due to high assumed reliability.

Response: The modeled functions were summarized in the answer to the previous question.

RAI: c. Please describe how the safety significance evaluation addressed external events such as fires, earthquakes, and other external events that could occur at NAPS.

Response: The original IPEEE analysis quantified the impact of fire and screened out the potential risk impact of external flooding, tornadoes, transportation accidents and nearby facility accidents. Seismic events were analyzed using the EPRI Seismic Margins method.

Seismic: The ASW System components are designed to Seismic Class 1

standards. Thus, the CDF contribution from a seismic event would be minimal. The contribution of the low frequency, high amplitude seismic events is minimized because the ASW components were included on both the IPEEE and the USI A-46 seismic safe-shutdown equipment lists and evaluated to be adequate. The safe-shutdown ASW components were selected for one preferred success path and an alternate path, as required by NUREG-1407. Relocation of the North Anna Reservoir requirements to the TRM will not affect the current or future seismic qualification of safety-related components in the ASW System.

The CW system was not specifically qualified for the seismic loads. However, the CW system has been rigorously designed; its components are typically large and well restrained. There is little vulnerability to damage from other equipment in the vicinity during a seismic event. The likelihood of a complete failure of the CW system during a design basis seismic event is very low. Based on these facts and the fact that the CW system provides a limited role in accident mitigation, the impact of a seismic event on the system is not a significant contributor to core damage. In other words, if a seismic event tree were developed the CW system would most likely be screened out, based on the limited accident mitigation function provided by this system. The risk importance of the CW system will not be affected by the relocation of the North Anna Reservoir Technical Specifications to the TRM.

Fire: The fire risk was quantified in the IPEEE. However, the areas including the CW pumps and valves, and the ASW pumps, were screened out prior to the calculation. The relocation of the North Anna Reservoir requirements to the TRM will not have any impact on overall plant vulnerability to a fire in these areas.

RAI: d. Please explain how the reservoir will be treated differently after the requirements are relocated.

Response: No changes in the treatment of the North Anna Reservoir requirements are anticipated as a result of the relocation of the Specification to the TRM. Periodic evaluations of system reliability are performed and the results of those evaluations are incorporated into the PSA model.

RAI: e. Please provide an estimate of the change in CDF and LERF assuming that the reservoir is unavailable (the RAW value), the percentages of the current CDF and LERF that include the failure of the system (the Fussell-Vesely value), and an estimate of the change in CDF and LERF expected given the change in treatment after the requirements are relocated.

Response: If the North Anna Reservoir is unavailable, the CDF increases by approximately a factor of 3 and the LERF increases by a factor of 3.5. These numbers are the RAW values. The LERF increase is dominant because in the absence of the steam dumps, only the steam generator Power Operated Relief Valves (PORVs) are available for secondary heat removal following a steam generator tube rupture. However, the TRM will limit power operation when the North Anna Reservoir requirements are not met, so this scenario is

not plausible. The CW System does not appear in the cutsets and thus makes a zero contribution to the current CDF and LERF. As noted in the response to question (a) above, the Risk Reduction Worth (RRW) for the ASW pumps has no value above 1.0 (to within roundoff error), so that its contribution is also negligible. The Fussel-Vesely values for these functions are therefore approximately zero. No change in the CDF or LERF is expected as a result of the requirement relocation, as per the response to question (d) above.