

February 17, 2004

MEMORANDUM TO: John A. Nakoski, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

FROM: Christopher Gratton, Sr. Project Manager, Section 1 /RA/
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

SUBJECT: SURRY POWER STATION, UNITS 1 AND 2 - FACSIMILE
TRANSMISSION OF ISSUES TO BE DISCUSSED IN A
CONFERENCE CALL (TAC NOS. MC0859 THROUGH MC0869)

A facsimile of the attached questions was transmitted on January 28, 2004, to Mr. Gary Miller of Virginia Electric and Power Company. The questions will be discussed in a conference call with the licensee at a future date concerning the licensee's request for relief dated August 25, 2003. In their request, the licensee proposed to seek relief from the various requirements contained in Title 10 of the *Code of Federal Regulations* Section 50.55a to support Unit 2's fourth 10-year interval inservice inspection program. This memorandum and the attached questions do not convey or represent an NRC staff position regarding the licensee's request.

Docket Nos. 50-280 and 50-281

Attachment: Request for Additional Information

CONTACT: Christopher Gratton, NRR
(301) 415-1055

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DATE	2/17/04	2/17/04	2/17/04

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DRAFT REQUEST FOR ADDITIONAL INFORMATION
ON THE REQUESTS FOR RELIEF SUBMITTED
FOR THE FOURTH 10-YEAR INSERVICE INSPECTION INTERVAL
FOR THE SURRY POWER STATION, UNIT 2
VIRGINIA ELECTRIC AND POWER COMPANY
DOCKET NUMBER 50-281

1. **Relief Request on the Section XI Code Edition to be Used for the Fourth 10-Year Inservice Inspection Interval**

Virginia Electric Power Company (VEPCO, the licensee) states that the fourth 10-year inservice inspection (ISI) interval at the Surry Power Station, Unit 2 (Surry 2) is scheduled to begin on May 10, 2004. The ISI program has been developed in accordance with the 1998 Edition through the 2000 Addenda of ASME Section XI. VEPCO cites 10 CFR 50.55a(g)(4)(iv) which allows the use of later editions, addenda or portions thereof, of ASME Section XI that have been incorporated by reference in paragraph 10 CFR 50.55a(b), subject to approval by the NRC staff. VEPCO has requested approval to use the 1998 Edition with 2000 Addenda of ASME Section XI for the fourth 10-year ISI interval.

Paragraph 10 CFR 50.55a(g)(4)(ii) states that inservice examination of components during successive inspection intervals must comply with the latest edition and addenda that have been incorporated by reference in paragraph (b) of the section 12 months prior to the start of the inspection interval, subject to limitations in (b). Since the fourth interval at Surry 2 begins May 10, 2004, the latest Code referenced in 10 CFR 50.55a(a)(3)(b) 12 months prior to that date is the 2000 Addenda (this is found in the 2003 revision of CFR). Explain why NRC staff approval is required for the use of ASME Section XI, 1998 Edition with 2000 Addenda.

2. **Request for Relief CMP-001, Examination Category B-D, Item B3.120, Full Penetration Welded Nozzles in Vessels, Pressurizer Surge Nozzle Inside Radius Section**

A. VEPCO stated that any ultrasonic examination of the pressurizer surge nozzle could only be described as "best effort," and that a remote visual examination, conducted from the inside of the pressurizer, has very little probability of success. Similar statements were made when requesting the same relief during previous inspection intervals. Given that advancements in ultrasonic testing and remote visual technologies have been made since the previous request, describe what steps have been taken by the licensee to improve the level of inspection for the pressurizer surge nozzle. In addition, provide detailed drawings that show cross-sectional view of the surge nozzle, thermal sleeve, and basket diffuser. The staff requests that these drawings include a list of the material specifications, dimensions of the components, and clearly indicate the interferences on the outside of the vessel for performing ultrasonic examination.

B. VEPCO has provided a basis to support a determination of hardship; however, further information is needed in order for the NRC staff to arrive at reasonable assurance of continued structural integrity for this component. VEPCO states that the calculated cumulative usage factors for operational and design transients in the surge nozzle inner radius are 0.29 and 0.11, for inside and outside surfaces, respectively, and that these values are less than the design limit and provide insight into the potential for failure in this region. Please elaborate on what insights may be derived from the analyses, primarily from the point of view of expected degradation mechanisms and the probability of failure that these mechanisms present, based on operational considerations.

C. VEPCO has stated that the alternative to volumetric examinations will be the Code-required visual VT-2 examinations performed in conjunction with system leakage tests during each refueling outage. Please describe if any augmentation of the visual VT-2 examination will be employed specifically for the surge nozzle, if the Code-required volumetric examination is eliminated.

D. VEPCO also states that Technical Specifications (TS) surveillance requirements related to reactor coolant leak rates and containment atmospheric radioactivity will be satisfied. However, based on recent industry events such as the primary coolant leak at VC Summer, it is unclear whether simply meeting TS is sufficient to indicate that a significant leak is occurring. Please describe any other alternatives the licensee has considered to indicate that a leak associated with the pressurizer surge nozzle may be occurring. In your response, specifically address whether VEPCO has considered any special instrumentation for this region for monitoring potential leakage from the pressurizer surge nozzle or for detecting the containment atmospheric radioactivity levels in the vicinity of the pressurizer surge nozzle.

3. **Request for Relief CMP-002, Examination Category C-G, Item C6.10, Pressure Retaining Welds in Pumps and Valves, Pump Casing Welds**

Please provide drawings of the pumps that detail the location of welds, pump assemblies, and other support components, that limit remote visual examination of the inside surface of the subject welds. In VEPCO's alternative, it is stated that remote visual VT-1 examination of the inside surface of the welds will be performed if the pump is disassembled for maintenance. Please discuss whether the disassembly of these pumps is expected to occur during the fourth inspection interval at Surry 2. Also, describe any inspection history that may have occurred in previous intervals, and the results of these inspections. VEPCO also states that some welds are partially accessible. Provide a list of partially-accessible welds and the expected completion percentages for these welds. Please discuss the degradation mechanisms expected to occur to the pump casings, and how the proposed alternative reasonably ensures the structural integrity of these pressure boundaries.

4. **Request for Relief CMP-003, Appendix I, Article I-2000, Calibration Blocks for Ultrasonic Examination**

VEPCO has provided a few examples of how the existing calibration blocks at Surry 2 deviate from Code requirements. Please provide a comprehensive list of the calibration blocks found to be out of compliance with the Code, describe the features that make these blocks noncompliant, and discuss how these features will affect the ultrasonic calibrations and examinations performed at Surry 2.

5. **Request for Relief CMP-004, IWA-2600, Weld Reference System**

Please state the specific Code requirement for which an alternative is proposed. Also, describe in detail the hardship or unusual difficulty that would be incurred, if required to meet the Code requirements. As an alternative, further describe the licensee's existing weld reference system and how this system provides an acceptable level of quality and safety.

6. **Request for Relief CMP-005, IWA-2600 Weld Reference System, Automated Reactor Pressure Vessel Examinations**

A. Please state the specific Code requirement for which an alternative is proposed. Also, describe in detail the hardship or unusual difficulty that would be incurred, if required to meet the Code requirements. Include information pertaining to making permanent location markers on the inner surface of the vessel, as well as, for future examinations or characterization of detected flaws, whether any examinations may be necessary from the outer surface of the vessel that would require location markers.

B. VEPCO stated that the automated tool establishes a zero point on the reactor pressure vessel (RPV) during each examination, and that electronic encoders on the automated system provide sufficient repeatability. Please describe the tolerances, or location error, that may be expected with the automated system.

C. Clarify whether VEPCO will implement the methods in recently published ASME Code Case N-613-1, or other Code Cases that address proposed reductions of examination volumes, during the fourth inspection interval at Surry 2. If so, discuss how the location accuracy of the automated inspection tool, combined with the validity of as-built drawings of the RPV welds, will ensure that 100% of the reduced volumes are being inspected.

7. **Request for Relief CMP-006, Examination Categories B-B, B-D, and C-A, Pressure Retaining Welds on the Regenerative Heat Exchanger**

A. VEPCO has requested relief from Examination Category B-B, B-D and C-A requirements for welds on Regenerative Heat Exchanger 2-CH-E-3. The welds associated with each of these categories have been identified in CMP-006 Section I and Figure CMP-006-1. Figure CMP-006-1 also shows Class 2 nozzle-to-shell welds 1-05, 1-07, 1-10, 1-12, 1-14, and 1-16. The information provided in the request suggests that these are Category C-B welds and would also be subject to the examination requirements specified in Table IWC-2500-1. However, VEPCO has not included these Class 2 nozzle-to-vessel welds as being within the scope of the request, nor identified any dose burden associated with the examination requirements for these welds. Please

identify the Code Examination Category(s) and examinations being performed for nozzle-to-shell welds 1-05, 1-07, 1-10, 1-12, 1-14, and 1-16 and provide additional explanation regarding the radiation dose burden associated with these welds.

B. Provide detailed drawings that show cross-sectional views of the nozzle-to-vessel, head and shell welds included in this request. The staff requests that the drawings include a list of the materials' specifications, dimensions of the components, and clearly indicate interferences for performing ultrasonic examinations.

C. The Class 1 welds on 2-CH-E-3 can be subject to thermal fatigue loading associated with the loss and subsequent re-initiation of letdown/charging. Design basis transient loadings for these conditions and assumed transient cycle occurrences are generally evaluated as part of ASME Section III Class 1 fatigue analyses. Please identify the design basis cumulative fatigue usage factors associated with Category B-B and B-D welds and discuss the plant's operating occurrences for these design basis type events and their magnitude relative to the design basis transient profiles assumed in the regenerative heat exchanger design report.

8. **Request for Relief SPT-001, Examination Category B-P, System Leakage Tests for Class 1 Pressure Retaining Components**

A. System leakage tests are required to be performed at a pressure corresponding to nominal operating pressure. VEPCO has elected to perform these during the return-to-power sequence at the end of each refueling outage. Because of the sub-atmospheric design of containment at Surry 2, these examinations are performed just prior to reactor start-up by personnel wearing self-contained breathing apparatus (SCBA). The Code requires a maximum examination distance (six feet - Table IWA-2210-1) for direct visual VT-2 examinations. With respect to the contents of Relief Request No. SPT-001, clarify whether VEPCO is proposing to establish a new maximum distance for direct VT-2 examinations or to perform the system leakage tests without erection of temporary scaffolding, or both.

B. If VEPCO confirms that it is proposing to establish a new maximum distance for direct VT-2 examinations, VEPCO states that the visual VT-2 examination maximum distance has been qualified at Surry 2 to extend to nine-feet, nine-inches. Please cite Code references for allowing this new distance qualification. In addition, further describe the qualification process, including all parameters and limitations used for this qualification (e.g., the minimum lighting conditions required, the visual standard used, pass/fail criteria, etc.).

C. On the matter of temporary scaffolding, VEPCO states that any components which cannot be accessed from permanent structures, or with ladders, will be deemed "inaccessible," and the surrounding area (including the floor or equipment surfaces located underneath these components) will be examined for evidence of leakage. This is allowed by Code under IWA-5241(b) and IWA-5242(b), for non-insulated and insulated components, respectively. The NRC staff understands that it may not be feasible, given seismic constraints and personnel hardship considerations, to erect temporary scaffolding to facilitate VT-2 examinations in all areas. Based on the

previous discussion, NRC staff approval concerning the installation of temporary scaffolding may not be required, however, the NRC staff requests that VEPCO provide further clarification on the following items:

- a) Based on direct visual VT-2 access limitations, clarify what percentage of all components in Class 1 systems will be considered “inaccessible.”
- b) Describe the primary system locations that are inaccessible for direct visual VT-2 examination.
- c) Confirm for the subject system leakage tests, that 10-minute (uninsulated components) and 4-hour (insulated components) hold times will be applied prior to performing the visual VT-2 examinations.

9. **Request for Relief SPT-002, Examination Category B-P, System Leakage Tests for Class 1 Small Diameter Vent and Drain Piping**

VEPCO states that the proposed alternative includes approximately 20 connections to the reactor coolant system, all 1-inch or less in diameter, and among these connections are system vent, drain, sample, and instrumentation lines. However, in the basis for relief, VEPCO refers to vent and drain configurations with double isolation. It is unclear whether sample or instrumentation lines, which may not have double isolation, should be included in the proposed alternative. Please list each component item for which this alternative is intended. For each item included in the list, provide a discussion of the function of this item and indicate whether a double isolation valve configuration is present and whether the first isolation valve is normally configured in the closed position. Also, indicate whether there exists any Inconel 600 materials in the subject connections and clarify whether this relief request proposal includes penetrations of primary system vessels, such as the reactor pressure vessel, steam generators, or pressurizer. In addition, further describe the burden associated with the performance of pressurization and visual VT-2 examination of the non-isolable portions of these connections.

10. **Request for Relief SPT-003, Examination Category B-P, System Leakage Tests for Pressure Retaining Partial Penetration Welds on the Reactor Pressure Vessel, Bottom Mounted Instrumentation Nozzles**

A. In lieu of the visual VT-2 required to be performed at normal operating pressure, VEPCO has proposed to examine the bottom mounted instrument (BMI) nozzles on the reactor pressure vessel during each refueling outage, but when the system is not at normal operating pressure (i.e., during cold shutdown) and to use evidence of leakage or corrosion (e.g., indications of the presence of boric acid residue) as the basis for detecting active leakage at these BMI locations. VEPCO has also summarized the environmental conditions (e.g., temperature, confined spaces, limited airflow, and sub-atmospheric conditions) that would be experienced by personnel if the personnel were required to perform these examinations at normal operating pressure. However, no radiation exposure levels have been discussed. Please provide estimates for personnel radiation exposure, if required to perform the examinations per the Code requirements.

B. VEPCO's alternative in Relief Request SPT-003 is to examine the BMI areas during each refueling outage, but only when containment is at atmospheric conditions (i.e., during cold shutdown). Please state whether a direct or remote visual VT-2 "bare-metal" examination of the reactor pressure vessel BMI penetrations will be performed during each refueling. If a direct visual examination is not performed, describe the parameters under which the remote examinations will be performed, including the type and rigor of the examinations, extent of components that will be examined, and the evaluation criteria to be used. State how the presence of boric acid and corrosion products from other sources will be differentiated from active leak(s) at BMI penetrations.