

VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555-0001

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VIRGINIA ELECTRIC AND POWER COMPANY
SURRY INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI)
SPECIAL REPORT ON NUHOMS DRY SHIELDED CANISTERS LOADED TO
INCORRECT HEAT LOAD LIMITS

This report is submitted in accordance with NUHOMS Certificate of Compliance 1030, Amendment 0, Technical Specification 2.2.3 which requires a 30 day special report when any Functional and Operating Limit of Section 2.1 is violated.

Fuel assemblies loaded into four NUHOMS Dry Shielded Canisters (DSC) were above the decay heat limit for the loading zones in two of the center four zones and in effect had the Zone "1a" and Zone "1b" locations reversed. As a result, the DSC Zone "1b" heat load limits were exceeded in some cases for these DSCs at the time of loading. The four affected DSCs are: DOM-32PTH-001-C, -002-C, -003-C, and -009-C. The improper fuel assembly orientation was caused by a flawed evaluation of the interface between the DSC loading map and the station DSC loading procedure. The evaluation did not ensure that the loading process would result in the correct orientation in the transfer cask and subsequently in the horizontal storage module. The orientation requirement was not included in engineering procedures governing DSC loading map preparation.

Upon discovery, an extent of condition review was performed on all Surry DSCs and verified that all other heat load limits were met. Decay heat loads for all fuel assemblies loaded in the four affected DSCs were reviewed. All DSC loadings were determined to be below the DSC total heat load limit and the combined Zone 1a and Zone 1b total heat load limit when loaded. Decay heat loads for all affected assemblies were determined as of the date of discovery. All five of the affected assemblies now have decay heat loads that meet the decay heat limits for their location within the DSC.

It was verified that the design basis shielding analysis bounded the as-loaded DSCs. The design basis shielding analysis assumes a DSC loading of 32 assemblies having source terms applicable to assemblies generating 1.5 kW of decay heat, which bounds

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the as-loaded DSCs. Reactivity parameters for the DSCs were verified to be unaffected by the loading error and remain bounded by the design basis analysis assumptions.

An evaluation conservatively bounding the as-loaded configurations of the affected DSCs has been performed. This evaluation was performed consistent with the methods and assumptions used for the 32PTH DSC thermal analysis provided in the NUHOMS HD FSAR. The evaluation conservatively assumes decay heat loads consistent with the FSAR loading pattern configuration that achieves the maximum fuel clad temperature results, except for the Zone 1b locations. The Zone 1b locations were increased to bound the as-loaded heat loads of the affected assemblies. This analyzed configuration bounds the various heat load patterns for the affected DSCs. This also conservatively increases the total DSC decay heat to greater than the current design basis analysis decay heat, and results in a combined Zone 1a and 1b total decay heat load greater than the allowable decay heat load for this region. Consistent with the NUHOMS HD FSAR, the evaluation assumes an ambient temperature of 115°F consistent with off-normal storage conditions for determining the maximum fuel cladding and component temperatures. This evaluation concludes fuel cladding temperatures did not exceed the fuel cladding temperature design limit of 400°C (752°F) for storage or transfer conditions. Further it shows that the DSC fuel compartment and support rail temperatures were bounded by those used in the design basis analysis, indicating there is no impact on the current design basis structural evaluation of the DSC basket due to the error. The evaluation also concludes that the maximum DSC internal pressures would have remained below the design limit for the as-loaded configurations.

Actions to prevent recurrence include: 1) reviewing NUHOMS Technical Specifications (TS) governing the loading process to ensure that any other areas requiring clarification are identified, addressed, and documented; 2) revising the procedure governing the loading map process to include all issues identified in the Technical Specification review, as well as other information identified as important to prevent recurrence; and 3) providing training on this issue to all personnel qualified to prepare DSC loading maps. These actions will be completed prior to loading additional DSCs.

All four DSCs are currently considered operable and performing their intended safety functions; all post-loading surveillance parameters are within acceptable limits. A TS exemption will be submitted, within ninety days from the date of this report, to allow continued storage of the affected fuel assemblies in their associated DSCs.

The NRC Operations Center was notified of the event at 1140 hours on March 25, 2011 under Event Notification EN#46698.

This report has been reviewed by the Facility Safety Review Committee and will be forwarded to the Management Safety Review Committee for its review.

Very truly yours,

A handwritten signature in black ink, appearing to read "Gerald T. Bischof". The signature is fluid and cursive, with a large loop at the end.

Gerald T. Bischof,
Site Vice President
Surry Power Station

Commitments contained in this letter: TS Exemption will be submitted within 90 days of the date of this letter

cc: U. S. Nuclear Regulatory Commission
Region II
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NRC Senior Resident Inspector
Surry Power Station