Calvert Cliffs Nuclear Power Plant

1650 Calvert Cliffs Parkway
Lusby, Maryland 20657

CENG[SM]
a joint venture of
Constellation Energy · EDF

CALVERT CLIFFS
NUCLEAR POWER PLANT

September 19, 2011

U. S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Document Control Desk

SUBJECT: Calvert Cliffs Nuclear Power Plant
Unit No. 1; Docket No. 50-317
Pressurizer Heater Sleeve Replacement Telephone Call

REFERENCE: (a) Letter from Mr. J. Stanley (CCNPP) to Document Control Desk (NRC), dated January 31, 2011, Relief Request for Modifications to Pressurizer Heater Sleeve and Lower Level Nozzle Penetrations (RR-PZR-01)

On August 18, 2011, Calvert Cliffs Nuclear Power Plant, LLC (Calvert Cliffs) conducted a telephone conference call with the Nuclear Regulatory Commission in regards to Calvert Cliffs Unit 1 pressurizer heater sleeve replacement relief request that was requested in Reference (a). During the telephone conference it was agreed that Calvert Cliffs would provide a summary statement concerning the corrosion evaluation that was performed in support of the Unit 1 pressurizer heater sleeve replacement project. The summary statement is provided in Attachment (1).

Should you have questions regarding this matter, please contact Mr. Douglas E. Lauver at (410) 495-5219.

Very truly yours,

Jennifer Sanders for JJ Stanley

James J. Stanley
Manager – Engineering Services

JJS/KLG/bjd

Attachment: (1) Summary Statement of Corrosion Evaluation

A047
NRR

cc: D. V. Pickett, NRC
W. M. Dean, NRC
Resident Inspector, NRC
S. Gray, DNR

ATTACHMENT (1)

SUMMARY STATEMENT OF CORROSION EVALUATION

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On January 31, 2011, Calvert Cliffs submitted relief request RR-PZR-01 for approval to perform modifications to Calvert Cliffs Unit 1 pressurizer heater sleeve and lower level nozzle penetrations to mitigate the potential for primary water stress corrosion cracking. As part of the engineering evaluation performed in support of this relief request, a corrosion evaluation was conducted to evaluate potential corrosion mechanisms associated with the pressurizer heater sleeve and lower level nozzle modifications. This corrosion evaluation methodology and results are considered proprietary by the vendor company.

The existing pressurizer heater sleeves, plugged heater sleeve, and lower level nozzles are fabricated from Alloy 600 and welded to the pressurizer shell inside surface with Alloy 82/182 weld material. These locations are identified as being susceptible to primary water stress corrosion cracking. The replacement heater sleeves and lower level nozzles are Type 316/316L stainless steel with the associated stainless steel weld metal. The modification to all the pressurizer heater sleeves utilize a half nozzle approach where a portion of the existing heater sleeve will be removed, the outer portion of the penetration is bored out to a larger dimension to accept the replacement sleeve and a new pressure boundary weld is established. This modification results in a small gap between the inside diameter weld and the original heater sleeve that leaves low alloy steel exposed to primary coolant. A similar situation also exists with the modification performed on the lower level nozzles.

The corrosion evaluation conducted in support of this relief request evaluated potential corrosion mechanisms. The evaluation determined that galvanic corrosion, hydrogen embrittlement, stress corrosion cracking and crevice corrosion are not a concern for the low alloy steel that is exposed to primary coolant. The corrosion evaluation calculates the amount of material loss due to general (uniform) corrosion over time under both at power (low oxygen) and shut down (moderate oxygen) conditions. A structural integrity evaluation used the expected rates of corrosion to determine that the calculated material loss of the exposed low alloy steel would be insignificant over a 40 year period. Similarly for the replacement stainless steel components, general corrosion, galvanic corrosion, crevice corrosion, and hydrogen embrittlement were also determined not to be a concern. Stress corrosion cracking of the stainless steel components was also determined not to be a concern because two of the three necessary synergistic elements of stress corrosion cracking (susceptible material and aggressive environment) are minimal or not present. Although some residual stress will likely be present adjacent to the weld of the stainless steel components, this will not likely cause crack initiation or propagation because the other two necessary elements are minimal or not present.