VIRGINIA ELECTRIC AND POWER COMPANY
RICHMOND, VIRGINIA 23261

August 1, 2005

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Serial No. 05-453
NL&OS/GDM R0
Docket Nos. 50-280
50-281
License Nos. DPR-32
DPR-37

VIRGINIA ELECTRIC AND POWER COMPANY
SURRY POWER STATION UNITS 1 AND 2
LICENSE AMENDMENT REQUEST
PROPOSED INCREASE IN THE LEAD ROD AVERAGE BURNUP LIMIT

By letter dated March 17, 2005 (Serial No. 05-108), Virginia Electric and Power Company (Dominion) requested amendments to the Operating Licenses and Technical Specifications for Surry Power Station Units 1 and 2 to increase the lead rod average burnup from 60,000 MWD/MTU to 62,000 MWD/MTU. Surry Units 1 and 2 are currently restricted to a lead rod average burnup of 60,000 MWD/MTU. In a letter dated July 6, 2005, the NRC staff requested additional information in order to continue their review of the license amendment requests. The NRC's questions and the associated Dominion responses are provided in the attachment.

If you have any questions or require additional information, please contact Mr. Gary D. Miller at (804) 273-2771.

Very truly yours,

Leslie N. Hartz
Vice President – Nuclear Engineering

Attachment

Commitments contained in this letter: None

cc: U.S. Nuclear Regulatory Commission
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Serial No. 05-453
Docket Nos. 280, 281
Subject: TS Change Request RAI– Lead Rod Average Burnup Limit

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 the 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 forgoing document in behalf of that Company, and that the statements in the document are true and correct to the best of her knowledge, information, and belief.

Acknowledged before me this 1ST day of August, 2005.

My Commission Expires: May 31, 2006

Vicki L. Hull
Notary Public

(SEAL)

Request for Additional Information
Proposed Increase in the Lead Rod Average Burnup Limit
Surry Power Station Units 1 and 2

By letter dated March 17, 2005 (Serial No. 05-108), Virginia Electric and Power Company (Dominion) requested amendments to the Operating Licenses for Surry Power Station Units 1 and 2 to increase the lead rod average burnup from 60,000 to 62,000 MWD/MTU. Surry Units 1 and 2 are currently restricted to a lead rod average burnup of 60,000 MWD/MTU. In a letter dated July 6, 2005, the NRC staff requested additional information to continue their review of the license amendment requests. The NRC questions and associated Dominion responses are provided below.

NRC Question 1

Typically, fuel assemblies with individual fuel rods approaching a rod average burnup of 60,000 MWD/MTU are in their third operating cycle with a correspondingly high assembly average burnup. This high assembly average burnup means they will have less reactivity vis-à-vis fresh assemblies or assemblies in their second operating cycle. Power will shift away from the low reactivity assemblies, increasing power, peaking, temperature, and burnup in the higher reactivity assemblies. Increasing the lead rod average burnup will exacerbate the power shift by allowing fuel assemblies with higher burnups to be utilized in the core pattern or allowing high burnup assemblies to be 'burned' longer. The licensee's LAR focuses on the fuel assemblies with the high burnup. Please include the impact of the extended burnup on other assemblies in the core.

Dominion Response

Scoping calculations performed by Dominion evaluated the impact of the use of the higher lead rod burnup limit on all assemblies in the core over a range of possible uses. Some scenarios had a negligible impact on the balance of the core while other uses had an incremental effect. In all instances, the scoping cycles were required to meet the same limits (including the approved peaking factors). The incrementally higher burnups that the Surry fuel batches could achieve and the resulting effects on the rest of the core were considered and reflected in the analyses described in the "Technical Evaluation" section of Dominion's March 17, 2005 submittal.

NRC Question 2

Please clarify whether the analyses provided are for a transition or equilibrium cycle and whether they are bounding analyses.

Dominion Response

Dominion's analysis evaluating the lead rod average burnup limit increase to 62,000 MWD/MTU considered both the "transition" cycles and the eventual "equilibrium" use of higher burnup fuel in all phases of the analysis (core design, fuel rod design, fuel assembly mechanical design, safety analyses, and radiological consequences). The scoping calculations were bounding in nature as they assumed the maximum anticipated use of the higher lead rod burnup limit.

NRC Question 3

In paragraph 4.4.1.3 of Reference 1, the licensee states a maximum region average burnup has been conservatively defined that, if not exceeded, ensures that the prompt neutron lifetime assumed for the current Surry safety analyses remains applicable. What is the maximum region average burnup and how was it determined?

Dominion Response

The current safety analysis limit for maximum prompt neutron lifetime for Surry Power Station is twenty-six (26) microseconds. The prompt neutron lifetime increases as burnup increases, as fuel enrichment decreases, as reactor power decreases, and as the amount of burnable poison decreases. Region average burnups have been calculated at parametric values of fuel enrichment, assuming no burnable poison, such that the prompt neutron lifetime is below the safety analysis limit (including a conservative margin). The following results were obtained:

Enrichment	Allowable Burnup
$\geq$ 2.9 w/o	$\leq$ 44,000 MWD/MTU
$\geq$ 3.1 w/o	$\leq$ 50,000 MWD/MTU
$\geq$ 3.4 w/o	$\leq$ 59,000 MWD/MTU

Therefore, as long as the region average burnup is less than these limiting burnups, at the applicable fuel enrichment, no violation of the safety analysis limit for prompt neutron lifetime is possible. On a reload basis, the region average burnups at EOC can be compared to the above limits to verify the safety analyses remain bounding.

Note: Since the original license submittal to extend the burnup limit, Dominion has begun to transition to the use of SIMULATE (DOM-NAF-1-P-A) to calculate core average prompt neutron lifetime directly. This is currently the preferred method for determining this value.

NRC Question 4

In paragraph 4.4.2.3 of Reference 1, the licensee indicates there are maximum region average burnups used in heat load calculations. How do these maximum region average burnups compare with the maximum region average burnups used in the prompt neutron lifetime analysis?

Dominion Response

The maximum region (batch or sub-batch) burnups associated with the heat load analysis are unrelated to those used for prompt neutron lifetime. Batch size, batch relative power sharing, cycle length, and cycle load factor estimates from fuel management planning are used to derive the batch burnups used in the reference heat load calculation (see Response for Question 3 for the determination of the prompt neutron lifetime burnups). These estimates include a small amount of conservatism to increase the likelihood that they will remain bounding for subsequent cycles. Fuel management planning is periodically updated to account for changes in actual or planned fuel usage, and the adequacy of the reference heat load calculation burnup limits is reviewed each cycle.