June 22, 2007

Mr. Terry J. Garrett
Vice President Engineering
Wolf Creek Nuclear Operating Corporation
P.O. Box 411
Burlington, KS 66839

SUBJECT: REQUESTS FOR ADDITIONAL INFORMATION FOR THE REVIEW OF THE WOLF CREEK GENERATING STATION, UNIT 1, LICENSE RENEWAL APPLICATION

Dear Mr. Garrett:

By letter dated September 27, 2006, Wolf Creek Nuclear Operating Corporation submitted an application pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 54, to renew the operating license for Wolf Creek Generating Station, Unit 1, for review by the U.S. Nuclear Regulatory Commission (NRC or the staff). The staff is reviewing the information contained in the license renewal application and has identified, in the enclosure, areas where additional information is needed to complete the review.

These requests for additional information were discussed with Lorrie Bell, and a mutually agreeable date for the response is within 30 days from the date of this letter. If you have any questions, please contact me at 301-415-3703 or e-mail VMR1@nrc.gov.

Sincerely,

/RA/

Verónica M. Rodríguez, Project Manager
License Renewal Branch B
Division of License Renewal
Office of Nuclear Reactor Regulation

Docket No. 50-482

Enclosure:
Requests for Additional Information

cc w/encl: See next page

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WOLF CREEK GENERATING STATION, UNIT 1
LICENSE RENEWAL APPLICATION
REQUESTS FOR ADDITIONAL INFORMATION (RAI)

Metal Fatigue Analysis

During the Wolf Creek Generating Station (WCGS) onsite audits the staff reviewed the applicant's license renewal basis document which states that the cumulative usage factors for 24 locations were evaluated using the transfer function method in FatiguePro. FatiguePro performs stresses calculations as a function of the time-varying mechanical and thermal boundary conditions.

The transfer function (i.e., green function) quantifies component stresses due to temperature change, pressure variation, and external mechanical loading change. The transfer function method correlates time-dependent behavior of a component in terms of input and output.

The staff reviewed the FatiguePro user's manual for the transfer function input and calculated output. The staff could not determine if the program appropriately implemented the transfer function methodology to meet the requirements of ASME Code Section III. The staff requested that the applicant demonstrate the validity of its input and output by providing the benchmarking results for pressure, temperature, and moment loadings.

In a letter dated June 7, 2007, WCGS stated that the developer of the FatiguePro, Structural Integrity Associates (SIA), has never benchmarked the transfer functions to an independent standard. The applicant also states that 1D virtual stress was used for its calculation, which was designed to bound the actual stress intensity ranges for all fatigue significant transients. Furthermore, the applicant also states that this type of stress value does not have a name in the professional literature. Based on the discussion with the applicant, the staff indicated that this response requires clarification.

RAI 4.3-1

In its response to audit question TLAAA025 dated June 7, 2007, the applicant stated that the transfer function report defines a 1D virtual stress value that is designed to bound the actual stress intensity ranges for all fatigue significant transients and this type of stress value does not have a name in the professional literature.

(1) Since it cannot be found in the professional literature, the staff requests that the applicant describe in detail how the 1D virtual stress is derived.

(2) The staff requests that the applicant demonstrate how the virtual stress bounds the actual stress intensity ranges for any thermal transient. Show that the stress difference between any two thermal transients is also conservative since the fatigue evaluation is based on stress difference of two events.

RAI 4.3-2

In audit question TLAAA025, the staff requested that the applicant explain how to determine the stress transfer function for pressure and moments by using WCAP-14137 Table E.2-1 as an example to demonstrate the following:

S(pr) = 3.71 (psi/psi pressure)

S(momxz) = 9.4 (psi/applied in-kip bending moment)

S(momy) = 0.0 (psi/applied in-kip torsion)

In its response dated June 7, 2007, the applicant stated that this information was derived from a proprietary stress report rather than computed according to some formula.

The staff notes that WCAP-14137 Table E.2-1 lists a 14 inch schedule 160 pipe stress transfer function. For a standard 14 inch schedule 160 pipe, stress can be calculated with a well known pressure stress equation, bending stress equation, and torsion shear stress equation as shown below:

For axial stress: $S(pr) = pRi^2 / (Ro^2 - Ri^2)$

For maximum hoop stress: $S(pr) = p(Ro^2 + Ri^2) / (Ro^2 - Ri^2)$

$S(bending) = My / I$

$S(torsion\ shear) = My / J$

Therefore, the staff requests that the applicant demonstrate that 1D virtual stress for pressure, bending, and torsion can be benchmarked with close form solutions and that they are within a reasonable percentage of deviation.

Letter to T. Garrett, from V. Rodriguez, dated June XX, 2007

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