

WOLF CREEK

NUCLEAR OPERATING CORPORATION

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ET 12-0019

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Reference: Letter dated July 5, 2012, from M. A. Galloway for B. E. Holian, USNRC, to J. Remer, NEI, "Draft License Renewal Interim Staff Guidance, LR-ISG-2012-01, "Wall Thinning Due to Erosion Mechanisms""

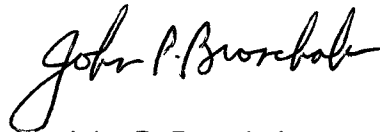
Subject: Docket No. 50-482: Wolf Creek Nuclear Operating Corporation's Comments on Draft License Renewal Interim Staff Guidance, LR-ISG-2012-01, "Wall Thinning Due to Erosion Mechanisms"

Gentlemen:

In the Reference above, the Nuclear Regulatory Commission (NRC) staff notified the Nuclear Energy Institute (NEI) of the opportunity to comment on the draft License Renewal Interim Staff Guidance (LR-ISG), LR-ISG-2012-01, "Wall Thinning Due to Erosion Mechanisms." Attached are Wolf Creek Nuclear Operating Corporation's (WCNOC) comments concerning draft License Renewal Interim Staff Guidance LR-ISG-2012-01. These comments were also submitted to NEI for inclusion in their compilation of industry comments.

This letter contains no regulatory commitments. If you have any questions concerning this matter, please contact me at (620) 364-4085, or Mr. Gautam Sen at (620) 364-4175.

Sincerely,



John P. Broschak

JPB/rit

Attachment

cc: B. J. Benney (NRC), w/a
E. E. Collins (NRC), w/a
N. F. O'Keefe (NRC), w/a
Senior Resident Inspector (NRC), w/a

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Wolf Creek Nuclear Operating Corporation,s (WCNOC's) Comment on the Draft License Renewal Interim Staff Guidance (LR-ISG), LR-ISG-2012-01, "Wall Thinning Due to Erosion Mechanisms"

The following table identifies the section of LR-ISG-2012-01 being commented on in the first column, the WCNOC comment in the second column, and the proposed resolution in the third column.

Section in Document	Comment	Proposed Resolution
General	The inclusion or addition of mechanical erosion mechanisms into the Flow Accelerated Corrosion (FAC) Aging Management Program (AMP) (XI.M17) would be confusing and possibly detrimental to the currently well bounded and structured industry FAC programs. The susceptibility bases of industry FAC programs are clearly defined and the inclusion of erosion mechanisms would cross many of those boundaries.	Create plant specific program Aging Management Review (AMR) lines or create a separate AMP for mechanical erosion mechanisms in Engineered Safety Features (ESF) and Steam & Power Conversion Systems. Consider management of erosion in safety related cooling water systems with AMP XI.M20, "Open-Cycle Cooling Water System."
General	LR-ISG-2012-01 does not address a key consideration of operating experience associated with many of the erosion related phenomena such as damaging cavitation, or solid particle impingement. Many plants have chosen to "manage" or address erosion phenomena with a design modification or in some cases with a periodic replacement program. Both of these "management" techniques are examples of operating experience that does require an aging management program.	Create plant specific program AMR lines or create a separate AMP for mechanical erosion mechanisms in ESF and Steam & Power Conversion Systems. Consider management of erosion in safety related cooling water systems with AMP XI.M20.
General	Throughout the LR-ISG-2012-01 document the Revision 2 and Revision 3 to (Nuclear Safety Analysis Center) NSAC-202L are referenced and used. It doesn't seem appropriate to continue referencing an older revision (Rev. 2).	Only reference NSAC-202L-Revision 3. This document has been out since 2006, and all sites should adhere to the Revision 3 requirements.
General	The inclusion or addition of mechanical erosion mechanisms into the clearly defined and bounded FAC AMP (XI.M17) would require significant program changes and	Create plant specific program AMR lines or create a separate AMP for mechanical erosion mechanisms in ESF and Steam & Power Conversion Systems. Consider management of

	<p>conflicts with NSAC 202L-Revision 3 and associated predictive codes such as CHECKWORKS. Do prediction models exist for erosion mechanisms? During aging management program reviews several exceptions would be required to incorporate management of erosion into the FAC program. For example management of erosion in cooling water systems and several ESF systems would require an exception to the FAC program exemptions for fluid temperatures less than 200F, systems with high levels of dissolved oxygen, and systems with stainless steel (chrome content) piping. In addition, NSAC 202L-Revision 3 states that if wall thinning is being developed by a mechanism other than FAC an appropriate inspection program should be developed.</p>	<p>erosion in safety related cooling water systems with AMP XI.M20.</p>
<p>General</p>	<p>LR-ISG-2012-01 clearly defines FAC and erosion as two different aging mechanisms that cause loss of material. Detection, analysis, and corrective action associated with erosion related phenomena such as damaging cavitation, and solid particle impingement are beyond the predictive tools of the FAC program. Generic Aging Lessons Learned (GALL) includes specialized aging management program such as XI.M33, "Selective Leaching" and XI.M35, "OTI of ASME Code Class 1 Small-Bore Piping for unique aging mechanisms and/or component considerations."</p>	<p>Create plant specific program AMR lines or create a separate AMP for mechanical erosion mechanisms in ESF and Steam & Power Conversion Systems. Consider management of erosion in safety related cooling water systems with AMP XI.M20.</p>
<p>Page 2, First full Paragraph, 3rd Sentence</p>	<p>The CHECWORKS™ software does not specifically "identify locations susceptible to wall thinning" or "predict susceptible locations related to erosion." Susceptibility is defined and documented by programs engineers based on specific criteria and the software evaluates or predicts a relative rate of FAC wear for each component in the susceptible lines.</p>	<p>Reword: For example, the "monitoring and trending" program element of GALL Report AMP XI.M17 includes the use of software to identify locations most susceptible to wall thinning due to FAC, but the software does not identify locations most susceptible to erosion.</p>

Page 3, 3 rd Full Paragraph, Last Sentence	The operating experience (OE) at Callaway (in 1999) and Dresden (in 2007) are cited as examples of combined FAC and erosion. Callaway may have been an example but it was not clear from the lab analysis. The Dresden OE could not have contained a FAC element since the material was FAC-resistant P11 chrome-moly steel.	Reword: The staff's review of operating experience has shown that, in some cases, wall thinning may be caused by a combination of mechanisms, which includes FAC and some type of erosion.
Changes to the FAC AMP Page 3	At the end of the second paragraph in the "Changes to FAC AMP" section, there is a reference to Callaway 1999; this is obviously a reference to the failure OE from Callaway. This OE event was attributed in part by both FAC and Erosion mechanisms. There is still a disagreement in the industry between the site, and Electric Power Research Institute (EPRI), as to whether the report on this issue performed by an outside vendor is accurate.	Consider comments by EPRI, which have been communicated between the current Callaway site FAC Program Engineer, and EPRI experts on FAC and Wall Thinning mechanisms. They have extensively reviewed this OE, and are revisiting the incident to support the comments to this ISG.
All Page 3, 3 rd Paragraph in section "Changes to FAC AMP"	While many FAC susceptible locations are modeled and wear predicted using software such as CHECWORKS, a very large portion of the program scope is included in the Susceptible Non-modeled (SNM) (Non-modeled) evaluation. The value added by the new CHECWORKS erosion module which is soon to be released will be minimal and only useful in the System Susceptible Evaluation (SSE) (modeled) scope. EPRI TR 1011231, "Recommendation for Controlling Cavitation, Flashing, Liquid Droplet Impingement, and Solid Particle Erosion in Nuclear Power Plant Piping Systems," and 112657, "Revised Risk-Informed Inservice Inspection Evaluation Procedure," are discussed and compared as being used together for erosion monitoring.	Don't count on the use of any modifications to currently used program software, such as CHECWORKS, to greatly improve the industry's ability to predict or inspect for potential mechanical erosion induced wall thinning. Components which will be monitored for erosion thinning should not be treated similarly to SNM, as suggested in the ISG. SNM components inspections are strategically chosen at known likely problem areas based upon component geometry, and then generalities are made for the wall thinning of the components and lines. Choosing locations which are more likely to experience erosion and actually finding anything of value would be very unlikely.
Page 4, First Paragraph, Last Sentence	Although this sentence does not specifically imply that mechanical erosion mechanisms should be covered in the FAC program it may lead to some expectations and these concerns have been noted in the	Reword: Although every plant site may not encounter erosion mechanisms, if ongoing monitoring activities of wall thinning due to erosion are occurring.

	general comments above.	they should be included in an AMP.
Page B-5 (& D-5), Table IX.F	In the entry under Erosion, in the sentence that states, "Erosion is the progressive loss of material due to the mechanical interaction between a surface and a high-velocity fluid," this statement is incorrect. High-velocities are not required, especially for solid particle erosion as velocities ~ 5 feet per second have been shown to cause damage in raw water systems (e.g., Service Water Systems).	Reword: Erosion is the progressive loss of material due to the mechanical interaction between a surface and a fluid.
Page B-6 (& D-6), Item #1	Recommend revising "piping and components" to read "piping, piping components, and piping elements" since these are the only components listed in the marked up pages of the GALL included in the ISG. This would improve the clarity of the scope.	Reword: Revise "piping and components" to read "piping, piping components, and piping elements" to be consistent with other GALL component types.
Page B-6 (& D-6), Item #2	The noted conditions are effective in reducing or eliminating FAC but have minimal impact on erosion mechanisms.	Reword: However, it is noted that monitoring of water chemistry to control pH and dissolved oxygen content, and selection of appropriate piping material, geometry, and hydrodynamic conditions, are effective in reducing FAC and but not erosion mechanisms.
Page B-7 (& D-7), Item #4	It is uncertain at what level of wall thinning an extent of review is required. Element 4 states "If wall thinning due to an erosion mechanism (e.g., cavitation, flashing, droplet impingement, or solid particle impingement) is identified, then the applicant performs an extent-of-condition review to identify other components that are comparably susceptible to the same mechanism"	Include criteria to define when an extent of review is required.
Page B-7 (& D-7), Item #5, Line 5	The sentence that begins, "It is recognized ..." misrepresents the design and usage of CHECWORKS. CHECWORKS™ is a "best estimate" program and as such its predictions are adjusted by inspection data to pass through the center of the inspection data.	Reword: Inspection data from every refueling outage is input into CHECWORKS™ to ensure that the predictive model is properly re-calibrated.

Page B-7 (& D-7), Item (#5), second paragraph, first sentence	Element 5 does not identify a preferred methodology to be used to "predict the remaining service life of the component."	Identify the methodology preferred by the NRC to "predict the remaining service life of the component."
Page B-8 (& D-8), Item #7, second sentence	The paragraph is accurate, but it would be clearer to modify the second sentence.	Reword: For FAC, long-term corrective actions could include adjusting operating parameters or selecting resistant materials.
Page B-8 (& D-8), Item (#10), second sentence	<p>Five examples of operating experience are cited as "... other than FAC or a combination of mechanisms." Looking at the five:</p> <ul style="list-style-type: none"> • Point Beach – FWH shell was due to FAC alone according to EPRI review. • Callaway - may have been an example but it is not clear from the lab analysis. • Peach Bottom – cavitation erosion, abrasive erosion (i.e., solid particle erosion), and water jet cutting • Dresden – liquid droplet impingement • Quad Cities – "erosion" <p>While wall thinning caused by a combination of mechanisms may occur, it is not common.</p>	Reword: Observed wall thinning may be due to mechanisms other than FAC or, less commonly, due to a combination of mechanisms.