

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

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ET 01-0006

U. S. Nuclear Regulatory Commission  
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- References:
1. NRC Generic Letter 96-06, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions," dated September 30, 1996
  2. WCNOC Letter ET 97-0004, dated January 29, 1997, from R. Muench to USNRC
  3. WCNOC Letter WM 98-0100, dated September 28, 1998, from O. Maynard to USNRC
  4. WCNOC Letter WM 99-0042, dated June 29, 1999, from O. Maynard to USNRC
  5. WCNOC Letter ET 00-0010, dated February 29, 2000, from R. Muench to USNRC

Subject: Docket No. 50-482: Second Supplemental Response to Generic Letter 96-06 (TAC No. M96887)

Gentlemen:

This letter provides the results of recently completed analyses that serve to clarify and correct information provided to the NRC concerning Wolf Creek's actions relative to Generic Letter 96-06 (Reference 1).

Reference 1 was issued identifying Nuclear Regulatory Commission (NRC) concerns with equipment operability and containment integrity during design basis accident conditions. It requested that all addressees submit information relative to these issues and required that all addressees submit written responses to the NRC relative to actions taken to address these issues.

Reference 2 provided Wolf Creek Nuclear Operating Corporation's (WCNOC's) required 120 day response to Reference 1 and provided analyses and actions related to: 1) waterhammer in the containment cooler water system; 2) flashing or two-phase flow in the containment cooler water system; and 3) potential overpressurization of isolated water filled sections of piping. In response to the NRC's Request for Additional Information (RAI) related to these issues, Wolf

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Creek provided Reference 3. Reference 4 notified the NRC that WCNOG had completed the analyses and modifications to address concerns identified in Reference 1.

Subsequent to issuing Reference 4, telephone conversations between WCNOG and NRC staff members from November, 1999 to February, 2000 resulted in the NRC requesting additional information. Reference 5 provided this requested supplemental information. Further telephone conversations with NRC staff on June 8, 2000 and August 2, 2000 revealed the NRC had additional questions regarding the information provided by Wolf Creek. As a result, WCNOG agreed to:

1. review the analyses previously performed concerning the waterhammer issue,
2. revise the analyses as necessary, and
3. provide the results of those analyses to the NRC.

WCNOG has reviewed the previous waterhammer analyses and has requested Altran to revise the analyses to address the questions asked by the NRC. Altran revised the analyses to improve the discussion of sonic velocity in the Wolf Creek Essential Service Water (ESW) System and to change the allowable American Society of Mechanical Engineers (ASME) stress limits from emergency condition limits to accident condition limits. Altran provided revised waterhammer analyses consisting of Technical Reports 96227-TR-01, Rev. 4 and 96227-TR-03, Rev. 1, including clarification of Table 4 (presented as Table 3 in 96227-TR-03, Rev. 1), describing the bases for the limiting waterhammer loading. Note that THERM ACCD (Thermal Accident Condition) loading is provided as a reference only and not as a stress requirement for pressure boundary components (see discussion under paragraph 2.3, "Acceptance Criteria", on page 11 of Technical Report 96227-TR-03). New tables, providing support stress margins for trains A and B respectively, are included in Attachment B as Table B-3.0 on page B-46 and Table B-5.0 on page B-173 of Technical Report 96227-TR-03. The revised waterhammer analyses, including test results, are enclosed.

During an August 2, 2000, phone conversation, the NRC staff requested three specific items to assist in the evaluation of the WCNOG response to Generic Letter 96-06. These items are:

1. The NRC requested a copy of a reference paper used as a basis for determining air release in the draining fluid. This paper was identified as: W Zielke and H-D Perko, "Gas Release in Transient Pipe Flow."
2. The NRC requested the calculated stresses given in Table 4 of Technical Report 96227-TR-03, Rev. 0, be identified as being based on the limiting waterhammer (condensation-induced or column closure waterhammer). The NRC also requested that a similar table showing the stress margins for supports be provided.
3. The NRC inquired about the uncertainty of test data relied on for the determination of several pressure pulse characteristics (such as rise time) provided in response to Reference 1. WCNOG explained that the most conservative data of several tests were used. WCNOG was asked to provide a copy of the test data.

In response to the above request , the following enclosures are provided:

1. W Zielke and H-D Perko, "Gas Release in Transient Pipe Flow" © BHRA Fluid Engineering Proceedings of the 6<sup>th</sup> International Conference on Pressure Surges, 1990, pages 3-14.
2. The revised waterhammer analysis, Technical Reports 96227-TR-01, Rev. 4, and 96227-TR-03, Rev. 1, including clarification of Table 4 describing the bases for the limiting waterhammer loading.
3. Test data as requested is provided as Appendix E to Technical Report 96227-TR-01, Rev. 4. A copy of the test data was previously provided to the NRC as Appendix E to Technical Report 96227-TR-01, Rev. 3.

During telephone conversations between WCNOG and the NRC on June 8, 2000 and August 2, 2000, WCNOG identified several errors in Reference 5. A paragraph in the cover letter for Reference 5 contained incorrect information. On page two of Reference 5, in the next to last paragraph of the letter, Wolf Creek incorrectly indicated that the WCNOG contractor, Altran, did not explicitly consider condensation-induced waterhammer in the analysis. Altran considered condensation-induced waterhammer in sections 5.4 and 5.5 on pages 21 through 26 of Altran technical report 96227-TR-01, Revision 3. This report was provided to the NRC as part of Reference 3.

Additionally, the previously mentioned paragraph incorrectly referenced a draft EPRI Technical Basis Report, TR-113594. The analyses did not rely on this draft EPRI report in the WCNOG waterhammer analysis. The attachment to the letter in Reference 5 also refers to the EPRI report. This is incorrect. No reference to the EPRI effort is needed in the justification of the analysis of waterhammer stresses for WCNOG pursuant to Generic Letter 96-06.

This submittal contains no additional regulatory commitments.

If you have any questions concerning this matter, please contact me at (316) 364-4034, or Mr. Tony Harris at (316) 364-4038.

Very truly yours,



Richard A. Muench

RAM/rlr

Attachment: 1 - Affidavit

Enclosures

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cc: J. N. Donohew (NRC), w/a, w/e  
W. D. Johnson (NRC), w/a  
E. W. Merschoff (NRC), w/a  
Senior Resident Inspector (NRC), w/a

