WOLF CREEK
NUCLEAR OPERATING CORPORATION

Forrest T. Rhodes
Vice President Engineering

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ET 93-0111

U. S. Nuclear Regulatory Commission
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Washington, D. C. 20555

Reference: NRC letter dated June 21, 1993, Generic Letter 89-10, Supplement 5, "Inaccuracy of Motor-Operated Valve Diagnostic Equipment"
Subject: Docket No. 50-482: Response To NRC Generic Letter 89-10, Supplement 5

Gentlemen:

The attachment to this letter provides Wolf Creek Nuclear Operating Corporation's (WCNOC) response to the reference. Supplement 5 to Generic Letter 89-10 requires each addressee to provide the NRC with the type of diagnostic equipment used to confirm the proper size, or to establish settings, for motor-operated valves (MOVs) within the scope of the generic letter. The supplement also requires the licensee to report whether they have taken actions or plan to take actions to address the information on the accuracy of MOV diagnostic equipment.

If you have any questions concerning this response, please contact me at (316) 364-8831, extension 4002, or Mr. Kevin J. Moles, at extension 4565.

Very truly yours,

Forrest T. Rhodes
Vice President Engineering

FTR/jra

040083

Attachment

cc: W. D. Johnson (NRC), w/a
J. L. Milhoan (NRC), w/a
G. A. Pick (NRC), w/a
W. D. Reckley (NRC), w/a

A064

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STATE OF KANSAS)
) SS
COUNTY OF COFFEY)

Forrest T. Rhodes, of lawful age, being first duly sworn upon oath says that he is Vice President Engineering of Wolf Creek Nuclear Operating Corporation; that he has read the foregoing document and knows the content thereof; that he has executed that same for and on behalf of said Corporation with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Forrest T. Rhodes
Forrest T. Rhodes
Vice President
Engineering

SUBSCRIBED and sworn to before me this 29 day of Sept, 1993.

Marlin Deachmer
Notary Public

Expiration Date 8-4-94

RESPONSE TO NRC GENERIC LETTER 89-10, Supplement 5

(1) **Within 90 days of receipt of this letter, all licensees are required to notify the NRC staff of the diagnostic equipment used to confirm the proper size, or to establish settings, for MOVs within the scope of Generic Letter 89-10.**

RESPONSE:

The diagnostic testing equipment utilized at the Wolf Creek Generating Station (WCGS) for MOVs is the Valve Operation, Test and Evaluation System (VOTES) produced by Liberty Technologies.

(2) **Within 90 days of receipt of this letter, all licensees are required to report whether they have taken actions or plan to take actions (including schedule and summary of actions taken or planned) to address the information on the accuracy of MOV diagnostic equipment.**

RESPONSE:

The VOTES diagnostic system and Liberty Technologies met their accuracy claims during the MOV Users Group (MUG) Validation Testing at the Idaho National Engineering Laboratories; therefore, this response addresses the concern of the recent 10 CFR Part 21 notification issued by Liberty Technologies dealing with stem material constants and torque correction factors. Wolf Creek Nuclear Operating Corporation (WCNOC) completed a detailed review of this 10 CFR Part 21 notification in January 1993. This evaluation was performed under WCNOC's Industry Technical Information Program and is summarized below. This summary includes the justification and actions taken as a result of the evaluation.

BACKGROUND

In October 1992, WCNOC was notified by Liberty Technologies concerning two 10 CFR Part 21 issues. The report documented the possible use of improper stem material constants and the failure of the diagnostic equipment to account for a torque effect when the calibrator is placed on the threaded portion of a small diameter high-lead threaded valve stem. Both issues could cause potential overthrusts due to the indicated thrust being less than the actual thrust.

The VOTES system is used to verify that thrust values are within design setpoints at a given control switch trip setting. For some calibration configurations, a torque effect exists which has a tendency to understate the measured test thrusts (e.g., actual as-left thrusts are greater than measured values). Liberty Technologies has issued Torque Correction Factors (TCFs) to compensate for this effect. On the basis of the TCF, a new overall VOTES system accuracy can be calculated. Additionally, more accurate stem material constants have been developed by Liberty Technologies that affect the calibrations and the as-left thrust values. The revised material constants

also result in the as-left thrust being understated. Thrust margins are not in question; however, exceeding thrust limits are of concern and the combined effect of the TCF, material correction factor and revised overall VOTES system accuracy must be applied to past test data to determine the true as-left thrust values.

Liberty Technologies provided information that supported an estimate of the true thrust values through numerical calculations. Liberty Technologies also developed VOTES software, version 2.3, to assist in these corrections. These corrections could only be estimated based upon the fact that the stem thread coefficient of friction would also have to be known for the particular test being evaluated. Since WCNOC had performed only a limited number of diagnostic tests, utilizing the VOTES Torque Cartridge (VTC) for torque measurement, the stem thread coefficient of friction was unknown. Therefore, the evaluation by WCNOC was based upon recommendations made by Liberty Technologies for estimating the corrected thrust and torque values.

ACTIONS TAKEN

As a result of the above issues identified by Liberty Technologies, a condition for potential overthrusts existed. WCNOC evaluated the effects of improper stem material constants and the torque correction on both immediate and long-term use of MOVs previously VOTES tested at WCGS. The scope of the evaluation was narrowed to the most recently performed (as-left) VOTES tests, since these tests reflect the present configuration of the valves. Additionally, past MOV overthrust occurrences at WCGS were also reviewed to determine potential problems from past test results. This assessment determined that these issues do not have a significant impact on the capability of the MOVs to perform their safety function.

Torque and material corrections were applied to each MOV's calibration data in order to determine the corrected as-left thrust values in accordance with Liberty Technologies' guidance contained in the 10 CFR Part 21 notification. The corrected torque switch trip and maximum thrust settings were then adjusted by the new VOTES system accuracy in order to determine the potential worst case as-left thrust and torque values. These values were then evaluated in the following manner:

(1) Maximum thrust values were compared to valve structural capabilities. This comparison determined whether or not any valve components were subjected to thrusts greater than the previously determined allowable values

(2) Maximum thrust values were compared to actuator structural capabilities. This comparison determined whether the actuators were overthrusted beyond the thrust ratings published by Limitorque.

(3) Maximum torque values were compared to actuator torque ratings. This determined whether the actuator was subjected to overtorque conditions above the torque ratings published by Limitorque.

(4) The estimated torque switch trip torque was compared to the reduced voltage actuator capability. Since this capability is a torque limit, the motor design limit from the latest calculation was converted to thrust via the stem factor. This determined whether the as-left torque

switches were set low enough, based upon the motor gearing capability under reduced voltage, to trip the torque switch to prevent actuator (motor) damage.

After these comparisons were made, the results indicated that no operability concerns existed, but other corrective actions were necessary for the longer term operational reliability of the MOVs. The corrective actions included:

(1) Writing work requests to inspect potentially overthrusted/overtorqued actuators for damage.

All valves with an overthrust and/or overtorque beyond the Limitorque and Kalsi Engineering extended thrust ratings were replaced during the sixth refueling outage (2nd quarter, 1993) and will be inspected in accordance with Limitorque recommendations prior to replacement in any other safety-related applications.

(2) Readjusting torque switch settings, where necessary.

All valves that had torque switch settings higher than necessary, as established by Engineering, were tested and readjusted during the sixth refueling outage.

(3) Revising the plant procedure governing VOTES testing.

Plant procedure MGE E00P-13, "MOV Diagnostic Testing," for VOTES testing was revised prior to the sixth refueling outage to incorporate all changes necessary due to the torque and material correction factors prior to any new VOTES tests being performed.

(4) Upgrading the VOTES diagnostic equipment used at WCGS to the new 2.3 software version.

All VOTES computers utilized at WCGS, whether WCNOC owned or leased, were upgraded to the new VOTES software (version 2.3) that incorporates the torque and material correction factor changes prior to any new VOTES tests being performed during the sixth refueling outage.

(5) Revising the vendor manual associated with the VOTES diagnostic system.

WCNOC vendor manual E-025-00009 that contains the VOTES testing instruction manual was revised prior to the sixth refueling outage for the new VOTES software changes.

(6) Training all personnel associated with VOTES testing on the changes due to this issue.

Prior to the sixth refueling outage two separate training classes were conducted by both WCNOC and Liberty Technologies personnel to ensure that all individuals associated with VOTES testing were cognizant and knowledgeable of the 10 CFR Part 21 issues and procedure changes.

SUMMARY

No operability concerns were identified as a result of this evaluation. All MOVs potentially overthrusted and/or overtorqued have been identified and replaced. These removed actuators will be inspected during the refurbishment process prior to being re-installed in the plant. Any valves with excessively high torque switch settings have since been adjusted to appropriate levels. Procedures and vendor manuals have been revised appropriately. All plant personnel involved with VOTES testing were not only trained prior to further VOTES testing after this change was identified, but now have proven capabilities through the successful completion of approximately 400 VOTES tests being performed during the sixth refueling outage. Each of these tests was performed to the new VOTES software, version 2.3, with the torque and material correction factors.