

December 18, 2000

MEMORANDUM TO: Eugene V. Imbro, Chief
Mechanical and Civil Engineering Branch
Office of Nuclear Reactor Regulation

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SUBJECT: PERFORMANCE OF MOV STEM LUBRICANTS AT ELEVATED
TEMPERATURE - INTERIM REPORT

The subject report, "Performance of MOV Stem Lubricants at Elevated Temperature - Interim Report," INEEL/EXT-2000-001289, November 2000, is being submitted for your use. This is a summary document of the research performed to date on MOV (motor operated valve) stem lubricants at elevated temperature to address the need to provide assurance that MOVs are able to perform their intended safety function under design basis flow and pressure loads. One of the parameters that can affect a MOV's operability is variation in the stem-stem nut coefficient of friction with temperature and age.

Recent testing indicates that an elevated temperature environment can lead to significant increases in the coefficient of friction at the stem/stem-nut interface. Most qualification and in-service testing of valve actuators occurs at ambient plant temperatures, usually 70 to 100°F. Since design basis conditions can lead to valve operating temperatures in the 200 to 300°F range, it is important to determine whether a temperature-induced increase in the coefficient of friction at the stem/stem-nut interface may prevent the required operation of critical valves.

This interim report details the testing performed to-date to understand the performance of MOV stem-stem nut lubricants at elevated temperatures, with observations and preliminary conclusions. The tests indicate that stem-stem nut coefficient of friction can increase significantly at design basis temperatures. For certain stem/lubricant combinations, the stem-stem nut coefficient of friction exceeded 0.15 and repeated strokes caused further increases. Load-sensitive behavior can also change significantly with temperature.

The subject report reflect comments provided by NRR in a memorandum dated October 17, 2000, J. Strosnider to M. Mayfield and in verbal comments provided during an October 24, 2000 meeting with INEEL to discuss the results of the MOV stem lubricant testing at elevated temperature. The subject report is publicly available in the ADAMS system under the accession number ML003777228.

