DEFENSE NUCLEAR AGENCY
ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE
BETHESDA, MARYLAND 20014

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DEC 29 1981

Director, Region I
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Sir:

This letter is prepared for information only and not as a reporting requirement specified in the AFRRI-TRIGA Reactor License (R-84) not applicable provisions of 10 CFR. The basis for this correspondence was discussed in a telephone conversation between Mr. Robert Gallo, USNRC Region I, and Captain Joseph A. Sholtis, Jr., AFRRI, on 23 December 1981.

I. Description:

While work was underway in connection with our annual shutdown maintenance, variations in K-excess measurements from the norm were observed. It was immediately determined that the problem was associated with the transient rod system. It was also immediately determined that the variations observed in K-excess on 22 and 23 December 1981 were not real but apparent and due to an intermittently changing, but fixed vertical position of the transient control rod from that indicated. After all potential causes associated with the transient rod drive assembly had been checked and exhausted, the transient control rod was physically removed from the core on 23 December 1981 for visual observation while still under water. Upon removal of the transient rod from the core, it was found that one bolt which secures the telescoping section of the transient connecting rod had failed. The transient connecting rod is constructed in sections bolted together and the bolt which holds the upper section to the midsection of the transient connecting rod was missing. This initially allowed free-play vertical motion of the connecting rod over a distance of approximately 3.0 to 3.5 inches, however galling of the two aluminum male and female portions of the coupling between the two sections of the transient connecting rod subsequently had occurred such that the connecting rod was approximately 3.25 inches foreshortened from its normal length. As a result, the transient rod was setting approximately 3.25 inches higher than normal in the core when fully inserted and was being withdrawn approximately 3.25 inches more than what was actually indicated at full withdrawal. Operating on a different and higher portion of the transient control rod worth curve. This caused the erroneous and seemingly high K-excess values that had been obtained on 22 and 23 December 1981. At no time were any of AFRRI's technical specification limits approached or exceeded, nor was there a potential for such. Moreover, all safety systems performed their intended functions as designed.

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II. Corrective Action:

The appropriate sections of the transient connecting rod were removed, inspected, cleaned, and securely fastened together with one additional bolt, i.e. with two bolts total. The connecting rod was then reinstalled and the entire transient rod system was checked operationally for correct action. Transient control rod worth curves are presently being verified and modified as necessary. This malfunction has been appropriately logged and will be included in AFRRI's 1982 Annual Report.

Should you have any questions regarding this correspondence or the subject malfunction, please feel free to contact Major Ronald R. Smoker, Chief, Radiation Sources Division at (202) 295-1096/1048 or Captain Joseph A. Sholtis, Jr., AFRRI Reactor Physicist-In-Charge at (202) 295-1290/1291.

Sincerely,

Paul E Tyler

PAUL E. TYLER
Captain, MC, USN
Director