

APPENDIX

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

NRC Inspection Report: 50-188/86-01

License: R-88

Docket: 50-188

Licensee: Kansas State University
Department of Nuclear Engineering
Manhattan, Kansas 66505

Facility Name: Kansas State University

Inspection At: Manhattan, Kansas

Inspection Conducted: April 30 through May 1, 1986

Inspector:

M. E. Skow
M. E. Skow, Project Engineer, Project
Section A, Reactor Projects Branch

5/30/86
Date

Approved:

J. P. Jaudon
J. P. Jaudon, Chief, Project Section A,
Reactor Projects Branch

5/30/86
Date

Inspection Summary

Inspection Conducted April 30 through May 1, 1986 (Report 50-188/86-01)

Areas Inspected: Routine, unannounced inspection of Class II Research and Test Reactors Operations. Specific areas inspected included operating logs, emergency plans, operating procedures, operator requalification training, surveillance, experiments, audits, safety committee, and a general site tour.

Results: Within the area inspected, no violations or deviations were identified.

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DETAILS1. Persons ContactedPrincipal Licensee Personnel

- *R. E. Faw, Director, KSU Reactor Facility
- *J. F. Higginbotham, Reactor Supervisor
- *N. D. Eckhoff, Department Head, Nuclear Engineering
Department/Chairman, Reactor Safeguards Committee
- D. Whitfill, Reactor Operator
- J. Daniels, Reactor Operator

*Denotes those attending the exit interview.

2. Class II Research and Test Reactors Operations Procedure

The purpose of this inspection was to ascertain by interviews, record reviews, and observations that the operation of the reactor was conducted safely and in accordance with regulatory requirements. In this regard, the NRC inspector interviewed operating personnel; toured the site; and reviewed operating logs, the emergency plans, operating procedures, and the records of operator requalification training, surveillances and experiments conducted, audits completed, and committee meetings held.

Operating logs and maintenance records were reviewed principally for the periods April through August 1985 and for April 1986. Items reviewed included operating parameters and maintenance and surveillance records. Strip charts were reviewed for April 1986 and compared with the corresponding operating logs.

Operating procedures were reviewed by the NRC inspector. A morning tour by the Reactor Supervisor, a startup, and a shutdown were observed by the NRC inspector. The startup that was observed for the day was the first startup of the day, during which time the criticality calculation was performed. This was required by Procedure 15, "TRIGA MK II Reactor Startup," dated February 19, 1982. Procedure 15 requires that the criticality calculation be performed during the first startup of the day with the reactor at a steady state power level between 2 and 1000 watts. The NRC inspector observed and noted that the criticality calculation was performed instead at 1-watt steady state power level. During discussions, the licensee stated that the 2-watt lower limit in the procedure was an arbitrary, administrative limit to ensure that the reactor had attained criticality prior to performing the calculation. On this occasion, the licensee stated that samples were still in the reactor from the previous day and that the low power level had been chosen for minimal impact on the experimental neutron irradiation samples due to be removed and analyzed. While acknowledging the error, the licensee stated that the intent of the

procedural requirement had been met and that the operators were subsequently instructed to perform the calculations at a minimum of 10 watts. The criticality calculation was performed again that day at 10 watts. Because this was not considered by the NRC inspector to be safety significant and an isolated occurrence, this occurrence was not considered a violation.

During the review of the operating logs, the NRC inspector noted that the water temperature in the reactor was recorded in centigrade because the water temperature instrument read in Centigrade while the Technical Specification for maximum water temperature was 120°F. The NRC inspector questioned two of the reactor operators and found that they did not know the temperature for the technical specification limit in Centigrade, although they knew the limit in Fahrenheit. The temperature instrument also had a channel to display fuel temperature. Associated with this channel was an adjustable redline which could initiate an automatic shutdown of the reactor if fuel temperature became too high. By an apparent coincidence, the redline position for the fuel temperature scale corresponded to a water temperature about 3°C below the Technical Specification limit. Although the redline had no capability to initiate an automatic shutdown for high water temperature, the operators used the redline as an unofficial administrative limit to water temperature.

The NRC inspector also noted that the conductivity meter on the control panel was color coded and coincided with color codes on the channel selector switch. There were no labels identifying where the various channels measured conductivity. During discussions with operators, the NRC inspector concluded that the operators knew where each channel measured conductivity. However, the NRC inspector suggested that the operating logs or instrument labels be clarified for the temperature instrument and the conductivity meter. The licensee agreed to clarify instrument panel labels.

The requalification plan, training records, and examinations were reviewed. The NRC inspector conducted discussions with operators and observed operations. Operators appeared knowledgeable and professional in their operation of the reactor.

Surveillance records appeared complete and surveillance accomplishment appeared timely. Experiments appeared to have received appropriate levels of review approval. The effects of experiments on reactivity had been predicted and monitored. The NRC inspector noted that the licensee accounted for irradiated items. The Emergency Plan and drill recorded were reviewed and appeared to be adequate. Audit reports dated January 7, 1986, and July 15, 1985, were reviewed; no discrepancies in these audits were found.

The NRC inspector also reviewed a report to the NRC by the licensee dated April 9, 1986. The licensee committed to perform a certain corrective action on a daily basis whenever the reactor was operated and to record the corrective action on the daily checklist form, KSUTMII-3. The NRC

inspector found that the corrective action was being performed and that a permanent record of the corrective action had been made on the operating log for each item checked. The licensee stated that the notation was made in the log until the stamp that had been ordered to modify the daily checklist was received. The stamp was received during the inspection, and the licensee started making the notations on the daily checklist. Because the corrective action was being accomplished and recorded on a permanent record pending modification of the checklist, the NRC inspector did not consider this to be a deviation.

No violations or deviations were identified.

3. Exit Interview

An exit interview was held on May 1, 1986, with those personnel denoted in paragraph 1 of this report. At the meeting, the scope of the inspection and the findings were summarized.