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May 2, 2016

ATTN: Document Control Desk,
U.S. Nuclear Regulatory Commission,
Washington, DC 20555-0001

M. Balazik
Project Manager
Research and Test Reactors Licensing Branch

SUBJECT: Docket No. 50-602, Request for Renewal of Facility Operating License R-129

REF: UNIVERSITY OF TEXAS AT AUSTIN - REQUEST FOR ADDITIONAL INFORMATION REGARDING THE LICENSE RENEWAL REQUEST FOR THE NUCLEAR ENGINEERING TEACHING LABORATORY TRIGA MARK II NUCLEAR RESEARCH REACTOR (TAC NO. ME7694)

Sir:

This correspondence clarifies previous submissions related to fuel storage (20.1 and 20.2), and addresses two items from a request for additional information related to proposed Technical Specifications (37.2.4 and 37.2.5).

Request for Additional Information 20.1 and 20.2, Clarification:

RAI 20. The guidance in NUREG-1537 Section 9.2, "Handling and Storage of Reactor Fuel," requests that the licensee provide assurance that subcriticality is maintained under all conditions of fuel handling and storage.

RAI 20.1 During a site visit, the NRC staff noted that fuel elements are stored in what appears to be a non-standard rack for which no analysis is provided in the UT SAR. Please identify all locations covered by the license where fuel elements are stored, identify the types and numbers of fuel elements that are stored, provide details concerning the storage rack or bin geometry, and analysis that demonstrates that such racks or bins provide adequate conditions for storage.

RAI 20.2 Describe any measuring systems used to confirm that acceptable reactivity levels are maintained in storage locations, how those systems are controlled by procedures or UT TRIGA TS, and how they are calibrated.

RESPONSE:

RAI 20.1: The response to the observed new fuel storage addressing 20.1 was misidentified in the March 22, 2013 submission as 20.2. The March 22, 2013 submission is the analysis of new fuel storage requested in RAI 20.1.

RAI 20.2: The response was submitted in 09/12/2012 ("A criticality alarm system is installed to support material under a non-reactor special nuclear material license. No other controls or instrumentation exist specifically to support storage locations").

A020
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Request for Additional Information 37.2.4 and 37.2.5:

RAI 3.72 Proposed UT TRIGA TS 3.3 "Measuring Channels": CONDITION(S) A.4 through A.7 state a series of REQUIRED ACTION(S) that are not sequentially linked.

RAI 37.2.4 Use of the same COMPLETION TIME for each action is contradictory.

RAI 37.2.4 The REQUIRED ACTION(S) A.4.3 and A.4.4 seem to contradict each other.

RESPONSE:

Measuring channels in 3.3 were originally tabulated without individual index-labels. During editorial revisions of the proposed Technical Specifications In 2012, item numbering in section 3.3 was formulated poorly. Unsuitable numbering that could imply a sequence was used to coordinate tabulated measuring channels with unique conditions, actions, and completion. The numbering scheme is therefore revised with unique indexing of each measuring channel as indicated in the attachment, so that COMPLETION TIME for independent measuring channels are unambiguously not in conflict (37.2.4), and specifications (conditions, actions, and completion times) unambiguously not in conflict for the conditions "Continuous Particulate air radiation monitor is not OPERATING" and "Argon monitor is not OPERATING."

Please contact me by one at 512-232-5373 or email whaley@mail.utexas.edu if you require additional information or there is a problem with this submittal.

Thank you,

P. M. Whaley
Associate Director
Nuclear Engineering Teaching Laboratory
The University of Texas at Austin

I declare under penalty of perjury that the foregoing is true and correct.
Executed on May 2, 2016

Steven R. Biegalski
NETL Director

Att: UT TRIGA TECHNICAL SPECIFICATIONS, 3.3 MEASURING CHANNELS

3.3 MEASURING CHANNELS

3.3.1 Applicability

This specification applies to the reactor MEASURING CHANNELS during STEADY STATE MODE and PULSE MODE operations.

3.3.2 Objective

The objective is to require that sufficient information is available to the operator to ensure safe operation of the reactor

3.3.3 Specifications

A	The neutron count rate on the startup channel is greater 2 mW
B-H	The MEASURING CHANNELS specified in TABLE 1 SHALL be OPERATING

TABLE 1: MINIMUM MEASURING CHANNEL COMPLEMENT

MEASURING CHANNEL		Minimum Number Operable	
		STEADY STATE MODE	PULSE MODE
B	Reactor power level[1]	2	1
C	Pool Water Temperature	1	1
D	Fuel Temperature	1	1
E	Pool area radiation monitor[2]	1	1
F	Lower or middle level area monitor[2]	1	1
G	Argon 41 effluent monitor[3]	1	1
H	Particulate air continuous air monitor	1	1

NOTE[1]: One "Startup Channel" required to have range that indicates <10 W
NOTE[2]: High-level alarms audible in the control room may be used
NOTE[3]: When the auxiliary purge system is operating

3.3.4 Actions

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. The neutron count rate on the startup channel is not greater than $x10^{-7}$ %	A.1 Do not perform a reactor startup OR A.2 Perform a neutron-source check on the startup channel prior to startup	A.1 IMMEDIATE A.2 IMMEDIATE

CONDITION	REQUIRED ACTION	COMPLETION TIME
B. Reactor power channels not OPERATING (min 2 for STEADY STATE, 1 PULSE MODE) OR Communications between DAC and control console interrupted > 10 s OR High voltage to reactor safety channel (power level) detector less than 80% of required operating value	B.1 Restore channel to operation OR B.2 ENSURE reactor is SHUTDOWN	B.1 IMMEDIATE B.2 IMMEDIATE
C. Pool water temperature CHANNEL not operable	C.1 Restore channel to operation OR C.2 Monitor pool water temperature OR C.3 ENSURE reactor is SHUTDOWN	C.1 IMMEDIATE C.2 IMMEDIATE AND At least once per hour C.3 IMMEDIATE
D. Fuel temperature CHANNEL not operable	D.1 Restore channel to operation OR D.3 ENSURE reactor is SHUTDOWN	D.1 IMMEDIATE D.3 IMMEDIATE

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. Pool Area Radiation Monitor is not OPERATING	E.1 Restore MEASURING CHANNEL OR E.2 ENSURE reactor is shutdown OR E.3 ENSURE personnel are not on the upper level OR D.4 ENSURE personnel on upper level are using portable survey meters to monitor dose rates	E.1 IMMEDIATE E.2 IMMEDIATE E.3 IMMEDIATE E.4 IMMEDIATE
F. Lower or middle level area monitor is not OPERATING	F.1 Restore MEASURING CHANNEL OR F.2 ENSURE reactor is shutdown OR F.3 ENSURE personnel are not in the reactor bay OR F.4 ENSURE personnel entering reactor bay are using portable survey meters to monitor dose rates	F.1 IMMEDIATE F.2 IMMEDIATE F.3 IMMEDIATE F.4 IMMEDIATE

CONDITION	REQUIRED ACTION	COMPLETION TIME
G. Argon monitor is not OPERATING	G.1 Restore MEASURING CHANNEL OR G.2 ENSURE reactor is shutdown OR G.3.a ENSURE continuous air radiation monitor is OPERATING AND G.3.b Restore MEASURING CHANNEL	G.1 IMMEDIATE G.2. IMMEDIATE G.3.a. IMMEDIATE G.3.b Within 30 working days
H. Continuous particulate air radiation monitor is not OPERATING	H.1 Restore MEASURING CHANNEL OR H.2 ENSURE reactor is shutdown OR H.3.a ENSURE Argon 41 monitor radiation monitor is OPERATING AND H.3.b Restore MEASURING CHANNEL	H.1 IMMEDIATE H.2 IMMEDIATE H.3.a. IMMEDIATE H.3.b Within 30 working days

3.3.5 Bases

Experience has shown that subcritical multiplication with the neutron source used in the reactor does not provide enough neutron flux to correspond to an indicated power level of $2x10^{-7}$ %. Therefore an indicated power of $2x10^{-7}$ % (or 2 mW) or more indicates operating in a potential critical condition, and at least one neutron channel is required with sensitivity at a neutron flux level corresponding to reactor power levels less than

$2x10^{-7}$ % ("Startup Channel"). If the indicated neutron level is less than the minimum sensitivity for the channel, a neutron source will be used to determine that the channels is responding to neutrons to ensure that the channel is functioning prior to startup.

Maximum steady state power level is 1100 kW; neutron detectors measure reactor power level. Chapter 4 and 13 discuss normal and accident heat removal capabilities. Chapter 7 discusses radiation detection and monitoring systems, and neutron and power level detection systems.

Communications between the digital acquisition system and the control console computer is monitored by a periodic signal. If the periodic signal stops, the control system initiates a SCRAM.

General Atomics recommends detector voltages at least 80% of nominal operating value for reliable, accurate nuclear instrumentation. Therefore, if operating voltage falls below the minimum value the power level channel is considered inoperable.

Pool water temperature indication is required to assure water temperature limits are met, protecting primary cleanup resin integrity. Analysis in Chapter 4 and 13 assume a maximum fuel temperature based on protection of resin integrity. Fuel temperature indication provides a means of observing that the SAFETY LIMITS are met.

The upper and lower level area radiation monitors provide information about radiation hazards in the reactor bay. A loss of reactor pool water (Chapter 13), changes in shielding effectiveness (Chapter 11), and releases of radioactive material to the restricted area (Chapter 11) that could cause changes in radiation levels within the reactor bay detectable by these monitors. Portable survey instruments will detect changes in radiation levels.

The air monitors (continuous particulate air- and argon radiation-monitor) provide indication of airborne contaminants in the reactor bay. These channels provide evidence of fuel element failure on independent channels; the particulate air monitor gas has maximum sensitivity to iodine and particulate activity, while the argon channel detects noble gas.

Permitting operation using a single channel of atmospheric monitoring will reduce unnecessary shutdowns while maintaining the ability to detect abnormal conditions as they develop. Relative indications ensure discharges are routine; abnormal indications trigger investigation or action to prevent the release of radioactive material to the surrounding environment. Ensuring the alternate airborne contamination monitor is functioning during outages of one system provides the contamination monitoring required for detecting abnormal conditions. Limiting the outage for a single unit to a maximum of 30 days ensures radioactive atmospheric

contaminants are monitored while permitting maintenance and repair outages on the other system.

SAR Chapter 13 discusses inventories and releases of radioactive material from fuel element failure into the reactor bay, and to the environment. Particulate and noble gas channels monitor more routine discharges. SAR Chapter 11 discusses routine discharges of radioactive gasses generated from normal operations into the reactor bay and into the environment. SAR Chapters 3 and 9 identifies design bases for the confinement and ventilation system. SAR Chapter 7 discusses air-monitoring systems. The 30 day interval is selected as adequate to accomplish complex repairs, and limited enough that with one system functional there is no significant chance that the system will fail during a period that requires detection of airborne radioactivity.