

RADIATION CENTER



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February 1, 1993

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

Reference: Oregon State University TRIGA Reactor (OSTR),
Docket No. 50-243, License No. R-106

Subject: Operation in Violation of a Limiting Condition for Operation

Gentlemen:

On January 25, 1993, A. G. Johnson, Director of the OSU Radiation Center, telephoned Mr. Al Adams, OSTR Project Manager at U.S. Nuclear Regulatory Commission (NRC) headquarters, and Mr. Robert Patc of the NRC's Region V office to notify them that a surveillance item required by section 4.3.1.e under Limiting Conditions for Operations in the OSTR Technical Specifications had been performed late. This letter constitutes the required follow-up written report.

BACKGROUND INFORMATION

A brief review of the processes used by the OSTR reactor operations staff to manage surveillance and maintenance (S&M) items will help in understanding this event, its causes, and the corrective actions. All S&M items, including those required by the Technical Specifications, are listed in one of four tables according to their performance frequency (i.e., monthly, quarterly, semi-annual, or annual). A copy of the semi-annual S&M record sheet is attached for reference. There are three columns of dates associated with each S&M item: the target date, the date not to be exceeded, and the date the item was completed. It is the aim of the reactor operations staff to complete each S&M item close to the specified target date. Target dates are carried over from one S&M record sheet to the next by adding the appropriate time interval. For example, in the case of semi-annual S&M items, the target dates are kept about six months apart in order to maintain the desired frequency and avoid the creep in dates which can occur if items are performed a few days after the target date and the actual performance date is used to establish the next target date. The date not to be exceeded in the table is the date obtained by adding the maximum time interval allowance (in this case 7 and one-half months) to the date when the item was last completed. The operations staff, therefore, plans to perform each S&M item on or about the target date, but in

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every case always before the date not to be exceeded. With this methodology, S&M items are performed at the required frequency, without having creep in the target dates, and in a manner that allows needed flexibility in reactor operation. This system has been developed over several years and has thus far worked very well.

DESCRIPTION OF OCCURRENCE AND CAUSES

Technical Specification 4.3.1.e requires that "The reactor shall be pulsed semi-annually (interval not to exceed seven and one-half months) to compare fuel temperature measurements and peak power levels with those of previous pulses of the same reactivity value." On the semi-annual S&M sheet for the period July 1 through December 31, 1992, the target date for the semi-annual pulse was July 8, 1992, and the date not to be exceeded was September 24, 1992. Because the reactor is not pulsed very frequently, the reactor operations staff decided to take advantage of a pulse performed on June 1, 1992 and used it to fulfill the Technical Specification S&M requirement for a semi-annual pulse. Hence, the entry for the date completed was June 1, 1992. This was approximately five weeks before the target date.

The reactor operations staff routinely prepares the next S&M record sheet near the beginning of the time interval that the sheet covers. However, they did not prepare the semi-annual record sheet for the first half of 1993 until near the end of the work day on Friday, January 22, 1993. At this time it was recognized that the new date not to be exceeded for the semi-annual pulse during the first six months of 1993 had in fact passed. Due to the early completion of the previous semi-annual pulse, the next date not to be exceeded became January 16, 1993 (7 and one-half months after June 1, 1992). When the new target date was entered on the current S&M sheet as January 12, 1993 (six months after the previous target date of July 8, 1992), and a new date not to be exceeded was calculated based on the last semi-annual pulse, the failure to perform the pulse on time became apparent. The required pulse was performed on January 25, 1993, nine calendar days and four working days past the allowed interval.

The primary cause of this event stems from the fact that the action dates for the new semi-annual S&M record sheet were not filled in until late in the month. An auxiliary cause was the early completion of the previous semi-annual pulse.

CORRECTIVE ACTIONS

The Reactor Administrator, Dr. Briar, Dodd, was notified of the missed date at 7:50 am Monday, January 25, 1993. He investigated the situation and reported it to the Radiation Center Director as soon as he entered work that morning. The reactor operations staff was instructed not to resume reactor operation until

authorized by the Reactor Administrator. The Chairman of the Reactor Operations Committee (ROC) was immediately notified upon entry to work and an ROC meeting was held at 10:30 a.m. The ROC was briefed on the situation and then discussed causes, and corrective and preventive actions.

Upon approval of reactor restart by the ROC, the corrective action consisted of performing the required pulse after lunch on January 25, 1993. All pulse parameters were normal compared to previous similar pulses.

MEASURES TO PREVENT REOCCURRENCE OF SUCH AN EVENT

It was decided that one preventive action, to be implemented immediately, would be sufficient to preclude reoccurrence of this event. In the future, instead of waiting for the beginning of the next time interval to enter all the new action dates on the new S&M record sheets, the reactor operations staff will enter the next target date and the next date not to be exceeded on the new S&M record sheet as soon as an S&M item has been completed. In this manner, each S&M item will always have the correct date not to be exceeded written down. A longer term corrective action which will be investigated will be to computerize the S&M date tracking system to provide timely reminders to the operations staff.

CONCLUSIONS

Although there were no radiological or reactor safety factors associated with the event described in this report, the OSTR staff regrets that such an event occurred. Our reactor program continues to operate under a policy where safety and compliance with regulatory requirements are of the utmost importance, and support from the University's administration makes it clear that they fully underwrite this mode of operation. In conclusion, we would like to make the following points:

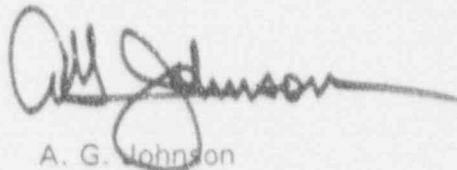
1. The OSTR system for tracking S&M items has been operating successfully for many years, and an unusual set of circumstances led to the semi-annual pulse being performed late.
2. The missed item was performed only four working days late. It was quickly recognized, and timely notifications and corrective actions have been implemented.
3. Data collected from required semi-annual pulses in a program that is not otherwise pulsing can be obtained in a more appropriate and timely manner, if and when operational pulsing is required. In keeping with this, the OSTR staff is considering proposing a change to the affected Technical Specification which would require that a test pulse be

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performed prior to routine operational pulsing when a six month or more non-pulsing interval has occurred, rather than performing a routine semi-annual pulse. This type of change would establish a requirement which is more consistent with ANS/ANSI Standard 15.1 which states that "Surveillance tests, (except those specifically required for safety when the reactor is shutdown) may be deferred during reactor shutdown; however, they must be completed prior to reactor startup." Although the OSTR itself was not shutdown, the pulse mode was not being routinely used and certainly could be regarded as inactive (or shutdown).

We hope you find this report responsive to the NRC's requirements. Should there be questions regarding the information in this report or should you require more information, please let me know. It is our intent that this report be as complete and helpful as possible.

Yours sincerely,



A. G. Johnson
Director

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cc: Standardization and Non-Power Reactor Project Directorate, Division of
Reactor Projects III, IV, V and Special Projects, Office of Nuclear
Reactor Projects, Washington, D. C. 20555 ATTN: Mr. Al Adams
Regional Administrator, USNRC, Region V
USNRC, Region V, ATTN: Mr. Leroy Norderhaug
USNRC, Region V, ATTN: Mr. Phil Qualls
Oregon Department of Energy, Salem, Oregon, ATTN: Mr. D. Stewart-Smith
Prof. S. E. Binney, Chairman, Reactor Operations Committee
Prof. B. Dodd, Reactor Administrator
Prof. J. F. Higginbotham, Senior Health Physicist
T. V. Anderson, Reactor Supervisor
A. D. Hall, Reactor Operator

SURVEILLANCE & MAINTENANCE TO BE PERFORMED						LIMITS	AS FOUND	TARGET DATE	DATE NOT TO BE EXCEEDED**	DATE COMPLETED	REMARKS & INITIALS
*1	FUNCTIONAL CHECKS OF REACTOR INTERLOCKS					NO WITHDRAW	a1				
		a) NEUTRON SOURCE COUNT RATE INTERLOCK				≥ 5 cps	a2				
		b) TRANSIENT ROD AIR INTERLOCK				NO PULSE	b				
		c) PULSE PROHIBIT ABOVE 1 kW				≥ 1 kW	c				
		d) TWO ROD WITHDRAWAL PROHIBIT				1 only	d				
		e) PULSE MODE ROD MOVEMENT INTERLOCK				NO MOVEMENT	e				
		f) MAXIMUM PULSE REACTIVITY INSERTION LIMIT				≤ 52.50	f				
		g) PULSE INTERLOCK ON RANGE SWITCH				NO PULSE	g				
*2	SAFETY CIRCUIT TEST	PERIOD SCRAM				≥ 3 sec					
*3	CONTROL ROD WITHDRAWAL, INSERTION & SCRAM TIMES		TRANS	SAFE	SHIM	REG					
		a) SCRAM					≤ 2 sec	a			
		b) WITHDRAWAL					≤ 50 sec	b			
		c) INSERTION					≤ 50 sec	c			
*4	PULSE COMPARISON (PREVIOUS PULSE): PULSE # _____ \$ _____ MW _____ °C					$\leq 20\%$ CHANGE	PULSE # _____ \$ _____ MW _____ °C				
*5	REACTOR BAY VENTILATION SYSTEM SHUTDOWN TEST					DAMPERS CLOSE IN ≤ 5 SECONDS	4TH FLOOR _____ 1ST FLOOR _____				
*6	CALIBRATION OF THE FUEL ELEMENT TEMPERATURE CHANNEL					$\pm 2^\circ\text{C}$					
*7	MATERIALS BALANCE REPORT/FUEL MANAGEMENT					REPORTS DONE/ - EVEN BURNUP		APRIL 15 OCTOBER 15	APRIL 30 OCTOBER 30		
*8	CLEANING & LUBRICATION OF TRANSIENT ROD CARRIER INTERNAL BARREL					3-IN-1 or GUN OIL	CLEANED _____ OILED _____				
*9	LUBRICATION OF BALL-NUT DRIVE ON TRANSIENT ROD CARRIER					3-IN-1 or GUN OIL	MOLY KOTE _____ OILED _____				
10	LUBRICATION OF THE ROTATING RACK BEARINGS					10 W OIL	OILED _____				
11	CONSOLE CHECK LIST (OSTROP 15.11)					OSTROP 15.11					
12	CONSTANT AIR MONITOR RECORDER MAINTENANCE										

* License Requirements.

** Date not to be exceeded is only applicable to marked (*) items. It is equal to the date last time plus 7 1/2 months.

SURVEILLANCE / MAINTENANCE TO BE PERFORMED			LIMITS	AS FOUND	TARGET DATE	DATE NOT TO BE EXCEEDED**	DATE COMPLETED	REMARKS & INITIALS
13								
14	STANDARD CONTROL ROD MOTOR CHECKS			OILED				
15	FLUKE FUEL TEMPERATURE INSTRUMENT "D" CELL CHECK		TEST POSITION READ > 800°C					
16	ION CHAMBER RESISTANCE MEASUREMENTS WITH MEGGAR INDUCED VOLTAGE	A. SAFETY CHANNEL	NONE (Info Only)					
		B. % POWER CHANNEL	NONE (Info Only)					
17	FISSION CHAMBER RESISTANCE CALCULATION $R = \frac{800V}{\Delta I}$	@ 100 V. I = _____ AMPS @ 900 V. I = _____ AMPS $\Delta I =$ _____ AMPS R = _____ Ω	NONE (Info Only)					
18	FUNCTIONAL CHECK OF HOLDUP TANK WATER LEVEL ALARMS		OSTROP 15.18	HIGH _____ FULL _____ GREEN _____ LIGHT _____				

* License Requirements.

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