

CONTROL ROD MOVEMENT OR REPAIR PROCEDURE

Objective: To move the control rods in a safe manner while insuring that the reactor remains in a subcritical configuration.

- Procedure:**
1. Check out the reactor using TRIGA Preliminary Check Sheet (Form NEL-001 B.1).
 2. Remove fuel elements from selected rings which have total reactivity worth at least \$0.50 greater than the total worth of all control rods. List the order of removal and storage positions.

Preplanned Fuel Movement Sequence

	<u>FUEL ELEMENT</u>	<u>STORAGE POSITION</u>	<u>REACTIVITY WORTH</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____
TOTAL WORTH OF FUEL REMOVED			_____
TOTAL CONTROL ROD WORTH			_____
DIFFERENCE (> \$0.50)*			_____

3. Insert cadmium plug into the central irradiator (worth > \$1.00).
4. Withdraw the most reactive rod, not being moved, to its fully up position. An operator must be at the console during all procedures involving positive reactivity insertions.
5. Loosen securing bolts of desired rod and remove from its present position. Following maintenance activity, replace control rod in original core position or locate in new preplanned core position. Record all control rod movements below and in the Operations Log.

<u>Control Rod</u>	<u>Core Position</u>	<u>Moved to</u>	<u>Final Core Position</u>
Safety	_____	_____	_____
Shim-Safety	_____	_____	_____
Regulating	_____	_____	_____

6. Repeat steps 4 and 5 if other control rods are removed. Enter N/A above as necessary for control rods not affected by this procedure.
7. Check rod drive cables for proper tension. Drive control rod

- servo-mechanism to check for freedom of movement.
8. Withdraw the safety rod to its up position.
 9. Remove the cadmium plug.
 10. List all fuel movements to reestablish the core in the critical configuration. (Note: some control rod locations will necessitate adding more fuel than was taken out; therefore, an operator must monitor the power and approach to critical measurements taken to insure that the reactor will be subcritical by $> \$.50$ when all rods are inserted.

Preplanned Fuel Movement Sequence

	<u>FUEL ELEMENT</u>	<u>STORAGE POSITION</u>	<u>CORE POSITION</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____
5.	_____	_____	_____
6.	_____	_____	_____
7.	_____	_____	_____
8.	_____	_____	_____

11. Perform rod worth calibrations using the rod drop procedure (Form NEL-003).

<u>Rod</u>	<u>Worth</u>
Safety	\$ _____
Shim-safety	\$ _____
Regulating	\$ _____

Core Specifications

Shut Down Margin	\$ _____ ($> \$.50$)*
Excess Reactivity	\$ _____ ($< \$ 2.80$)**

12. Date procedure started: _____
13. Date procedure completed: _____
14. Senior Operator approval: _____

* Required by Technical Specification 3.2(1).
** Required by Technical Specification 3.2(4).

Form approved by Reactor Safety Committee:

Reactor Administrator: *Arthur K. Schubert* Date: May 25, 1988