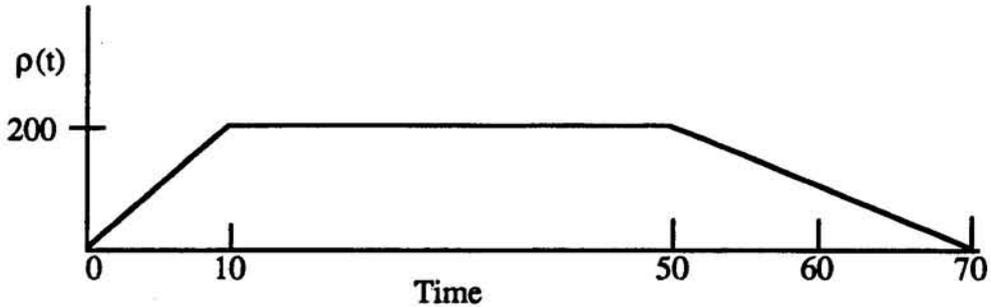


#2

Homework — Reactor Operation at Power

1. A ramp reactivity insertion occurs as shown below:



Complete the following table and draw the reactivity, inverse period, and power profiles as a function of time.

Time	$\rho(t)$	$\dot{\rho}(t)$	$\tau(t)$	Power *
0 ⁻	0 mbeta	0	∞	Steady
0 ⁺	0 mbeta	20 mβ/s		
10 ⁻	200 mbeta	20 mβ/s		
10 ⁺	200 mbeta	0 mβ/s		
50 ⁻	200 mbeta	0 mβ/s		
50 ⁺	200 mbeta	-10 mβ/s		
70 ⁻	0 mbeta	-10 mβ/s		
70 ⁺	0 mbeta	0 mβ/s		

* Indicate if steady, rising, falling, etc.

2. A step reactivity insertion of 200 mbeta occurs with reactor power at 1 kW. What will the power be after 1 minute?
3. If the operator takes no action for the reactor in problem #2. What (if any) inherent safety features will come into effect and why? Indicate which occurs first.
4. Why is a dropped rod accident of serious concern? After all, it makes the reactor subcritical.
5. Why does Xenon peak on shut down of a reactor?