#1

Homework — Subcritical Multiplication and Reactor Startup

1. The fear that a nuclear reactor could explode as a weapon is very real to some people, although it has no basis in fact. What aspect of the physics of reactor design precludes such an occurrence?

2. A reactor source registers 100 neutrons/minute. The reactor is then adjusted so that the value of K-effective is 0.75. What count level will be registered on the detector?

3. A reactor operator withdraws the control blades by four inches and observes that the count rate doubles. How much further should the rods be withdrawn to attain criticality?

4. Predict the critical position from the following data:

Blade Height	Count Rate
0	100
2	140
4	175
6	700

5. The reactor power is 50% of rated and the period is 200 seconds. When will the reactor attain full power?

6. Why should PuBe sources not be left in an operating reactor?

7. Why would a competent reactor operator approach criticality very slowly?