MITR Reactor Manipulations Assignment

Using the data you collected during the reactor manipulation exercise, please answer the following questions:

1. When Greg initially brought the reactor power down from 4.5MW to 50kW, the core temperature fell from about 50C to 24C. What was the reactivity insertion caused by the decrease in temperature?

2. What was the total prompt negative reactivity insertion to achieve the decrease in power (using the prompt drop approximation)? Is this is agreement with the reactivity inserted according to the shim worths (provided) and height changes that you recorded?

3. Describe the effects of xenon poisoning after the reduction in power. For either of the power increases from 1 MW to 2 MW, what was the maximum reactivity insertion? (please provide the data that you use to make this calculation)

4. For either of the power decreases from 2 MW to 1 MW, what was the maximum negative reactivity insertion? (please provide the data that you use to make this calculation)

5. From the doubling time experiment: The reactor was brought from 2.0 microamperes to 4.0 microamperes in 47 seconds. What was the reactor period during the power increase? How much reactivity was added in that time, based on the shim blade worth curves?

22.091 / 22.903 Nuclear Reactor Safety
Spring 2008