NPRE 457: HW 37

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There were some massive design flaws in the SL-1 design. The biggest design flaw was there was a control rod with far too much neutronic worth. The main control rod was worth enough neutronically to cause super-prompt criticality when removed. The second design flaw was the ability to remove this control rod – this rod should not have been able to be removed. Additionally, there were two major human errors. The first human error was the plant maintenance shift workers changing shift and changed shifts without reinstalling the grippers to the control rod drive mechanism. However, the biggest human error was the operator removing the control rod the full 28 inches, which killed everyone inside. There were also equipment failures. The first equipment failure was the gripper was not attached to the control rod drive mechanism – this allowed the operator to remove the most worth control rod. The final equipment failure was the bowing of reactor structural materials that caused the control rod to be sticky and hard to remove. The bowing could have caused the operator to pull harder than they should have, which caused the release of the control rod.