Homework #11

Web Problem #11 Nuclear Reactor Design and Analysis

- In analyzing your plant, you begin to be concerned about the reliability of your equipment. Evaluate the reliability, mean time to repair, and suitability of your equipment. Is this equipment suitable for your standard operational (non safety-grade) systems? Is it suitable for your safety systems? (95% reliability for non safety grade and 97.5% for safety grade) Assume a 2 year cycle length for this analysis.
 - a. Heat exchanger 998,750 hours of operation, 10 repairs, 120 total hours of repair time.
 - b. Radial pump 20,000 hours of operation, 1 repair, 5 total hours of repair time.
 - c. Squib valve 750,000 hours of operation, 1 replacement, 1 hours of repair time.
 - d. Tank level indicator 1,000,000 hours of operation, 2 repairs, 20 hours of repair time.
- 2. TEAM PROBLM: Based on your LBE's developed last homework, create (empirically) a set of mitigating systems for your LBE's. This is the beginnings of your safety systems, which function to mitigate your LBE's to prevent release scenarios. Be broad in your thinking, and creative in the progression of your LBE's. In other words, be careful to consider all possible progressions, because it's far better in nuclear safety to over-protect than it is to under-protect.

3. **TEAM PROBLM:** Now, based on the results of the previous problem, consider and decide which two LBE paths are the most serious (in terms of potential for release and frequency). Create event trees for these two LBE paths (initiating event is LBE, and mitigating equipment represents each branch.) Where possible, use google, company files, operational data from LWRs or other data to provide reliability of equipment or procedures. If not possible, make a best guess estimate, noting any assumptions such as cost or desired reliability. Note that although only two LBE's are considered here, your final project will require this analysis for each LBE.