Suggested Improvements to Three Mile Island’s Miscellaneous Waste Evaporator System

Overview
The TMI nuclear generation plant utilizes a waste evaporator system to reduce the volume of waste and prepare it for disposal. The efficiency of the system in terms of time, cost, and concentration has decreased. The goal of the design team is to identify and propose solutions for each issue, in an effort to decrease the frequency of waste disposal.

Objectives
The main areas of concern identified were the influent of contaminants, faulty waste storage tanks, and an inefficient waste disposal strategy. Prospective solutions for each concern were researched and evaluated. The most effective solutions were integrated to the design team’s proposed system.

Approach
- The waste system was examined as a whole in order to identify the main components of concern.
- Three problems were identified: contaminants entering the system, the damaged CWST, and the low concentration of waste.
- The impact for each problem was determined based on information gathered by TMI
- Possible solutions were explored and researched
- Each solution was evaluated given the projects material, operational, and economic constraints
- Three solutions were incorporated: operating the existing oil skimmer and improving drain culture, repairing the CWST and adding a carbon fiber liner, and adding drum dryer
- The benefits of each solution for each component were analyzed.

Outcomes
- Operating the oil skimmer and improving drain culture will reduce the influent of contaminants.
- Repairing and adding carbon fiber lining to will recommission the faulty waste storage tanks
- Adding a drum dryer to the system will decrease the volume of disposed waste.
- Implementation of these recommendations will
  - save $9,695,000 in operation costs over a period of 15 years.
  - Reduce waste disposal volume by 85-90%
  - Cost $680,000 to add carbon fiber liner and Drum Dryer
  - only cost $53,000 per year for disposal compared to $760,000 per year for disposal

Proposed Miscellaneous Waste Evaporator System