

Process Safety Evaluation of a Nuclear Power Plant through Virtual Process Hazard Analysis (PHA) using the What-If Technique

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Abstract : Energy is a necessity both for the people and the country. The demand for energy is continually increasing, but the supply is not doing the same. The reopening of the Bataan Nuclear Power Plant (BNPP) in the Philippines has been circulating in the media for the current time. The general public has been hesitant in accepting the inclusion of nuclear energy in the Philippine energy mix due to perceived unsafe conditions of the plant. This study evaluated the possible operations of a nuclear power plant, which is of the same type as the BNPP, considering the safety of the workers, the public, and the environment using a Process Hazard Analysis (PHA) method. What-If Technique was utilized to identify the hazards and consequences on the operations of the plant, together with the level of risk it entails. Through the brainstorming sessions of the PHA team, it was found that the most critical system on the plant is the primary system. Possible leakages on pipes and equipment due to weakened seals and welds and blockages on coolant path due to fouling were the most common scenarios identified, which further caused the most critical scenario - radioactive leak through sump contamination, nuclear meltdown, and equipment damage and explosion which could result to multiple injuries and fatalities, and environmental impacts.

Keywords : process safety management, process hazard analysis, what-If technique, nuclear power plant

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