

Business Continuity Risk Review for a Large Petrochemical Complex

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Abstract : A discrete-event simulation model was used to perform a Reliability-Availability-Maintainability (RAM) study of a large petrochemical complex which included sixteen process units, and seven feeds and intermediate streams. All the feeds and intermediate streams have associated storage tanks, so that if a processing unit fails and shuts down, the downstream units can keep producing their outputs. This also helps the upstream units which do not have to reduce their outputs, but can store their excess production until the failed unit restart. Each process unit and each pipe section carrying the feeds and intermediate streams has a probability of failure with an associated distribution and a Mean Time Between Failure (MTBF), as well as a distribution of the time to restore and a Mean Time To Restore (MTTR). The utilities supporting the process units can also fail and have their own distributions with specific MTBF and MTTR. The model runs are for ten years or more and the runs are repeated several times to obtain statistically relevant results. One of the main results is the On-Stream factor (OSF) of each process unit (percent of hours in a year when the unit is running in nominal conditions). One of the objectives of the study was to investigate if the storage capacity of each of the feeds and the intermediate stream was adequate. This was done by increasing the storage capacities in several steps and through running the simulation to see if the OSF were improved and by how much. Other objectives were to see if the failure of the utilities were an important factor in the overall OSF, and what could be done to reduce their failure rates through redundant equipment.

Keywords : business continuity, on-stream factor, petrochemical, RAM study, simulation, MTBF

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