

Safety Corner

What is WASH-1400?

The Probabilistic Risk Assessment (PRA) methodology, which is later known as the Quantitative Risk Assessment (QRA) methodology, is commonly used when statistical data of an event cannot be derived from historical record, either because there is no record available, or the available data were so scarce that they are not considered useful.

The Reactor Safety Study, which was indexed as WASH-1400 (now NUREG-75/014), was published in 1975 for the US Nuclear Regulatory Commission (NRC) as the first major study formally addressed the risks associated with a list of serious accidents at a large Light water reactor (LWR). WASH-1400 assessed the radiological consequences of those serious accidents, and the probability of their occurrence, using an integrated fault tree/event tree approach and a series of state-of-the-art techniques to handle data.

The data and methods used in WASH-1400 were comparatively simple and overly-pessimistic by today's standards as they were based on an early understanding of key phenomenology. WASH-1400 was later peer-reviewed by the "Lewis Committee" in 1977, which broadly endorsed the methodology as the best available, but cautioned that the risk figures were subject to large uncertainties.

Although WASH-1400 drew much criticism and controversy, the report is a milestone risk study that initiated a series of research activities in advancing the state-of-knowledge on the estimation of probability and consequence of accidents associated with advanced technologies. The PRA methodology used in WASH-1400 also formed the basis of all modern risk assessments and safety assessment of modern nuclear power plants and complex engineering systems.

The significance of WASH-1400 was later replaced in due course first by NUREG-1150 ("Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants") and now by a new study being performed by the NRC called the State-of-the-Art Reactor Consequence Analyses (SOARCA). Both studies include state-of-art PRA techniques that are intended to replace or enhance those used in WASH-1400.

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