

A Review of Criticality Accidents in Process Operations Worldwide

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An effort has been underway in Los Alamos for several years working with our Russian colleagues and counterparts in criticality safety in order to understand and document past criticality accidents in their country. Due to the rarity of such events in process operations, only six such accidents were documented in the original, 1967 edition of the Los Alamos report "A Review of Criticality Accidents" by W. R. Stratton. These were all accidents that had occurred in U. S. facilities. D. R. Smith of Los Alamos updated this document in 1989, and yet in the intervening 22 years there had been reported only two additional process facility accidents, one in the U.K. and one in the U.S.

With the release of information from Russia during the last few years, the world now has the benefit of knowledge gained from 13 additional accidents. These, along with the recent criticality accident that occurred during this past year in Japan, are all documented in the recently published second revision to the accident report, maintaining its original title. These 22 process accidents provide a significant base from which to understand those features that are most common to such occurrences and provide lessons learned which are valuable to preventing future accidents.

These 22 accidents have also been reviewed and analyzed from a neutronic point of view and compared to experimental knowledge gained in critical experiment laboratories over the years. This information should prove extremely valuable to analysts and managers as they struggle to cost effectively control the likelihood of these rare events.