

Selective Application of Revised Source Terms to Operating Nuclear Power Plants

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Abstract

More than 30 years later since 1962 when TID-14844 was promulgated, there has been a big change of the US NRC's regulatory position in using accident source terms for radiological assessment following a design basis accident (DBA). To replace the instantaneous source terms of TID-14844, the time-dependent source terms of NUREG-1465 was published in 1995. In the meantime, the radiological acceptance criteria for reactor site evaluation in 10 CFR Part 100 were also revised. In particular, the concept of total effective dose equivalent has been incorporated in accordance with the radiation protection standards set forth in revised 10 CFR Part 20. Subsequently, the publication of Regulatory Guide 1.183 and the revision of Standard Review Plan 15.0.1 followed in 2000, which provided the licensee of operating nuclear power reactor with the acceptable guidance of applying the revised source term. The guidance allowed the holder of an operating license issued prior to January 10, 1997 to voluntarily revise the accident source terms used in the radiological consequence analyses of DBA. Regarding to its type of application, there suggested full and selective applications. Whether it is full or selective, based upon the scope and nature of associated plant modifications being proposed, the actual application of the revised source terms to an operating plant is expected to give a large impact on its facility design basis. Considering scope and cost of the analyses required for licensing, selective application is seemed to be more appealing to an licensee of the operating plant rather than full application. In this paper, hence, the selective application methodology is reviewed and is actually applied to the assessment of offsite radiological consequence following a LOCA at Ulchin Unit 3&4, in order to identify and analyze the potential impacts due to application of revised source terms and to assess the considerations taken in each application prior to its actual implementation of design modifications.