Interagency Technical Evaluation Paper for Section 127(f) of the Bioterrorism Act of 2002

Prepared by the Federal Radiological Preparedness Coordinating Committee Subcommittee on Potassium Iodide

DHS/FEMA, NRC, HHS, DHS, DOE, USDA, FDA, NIH, DOL, DOE/NNSA, DOD/Naval Reactors/AFFRI

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calculation example provided in Section 1.6 of this document assumes a 0.5-percent leakage rate per day and a containment volume of about 286,000 cubic feet. The leakage rate would vary with pressure and temperature and is rated at about 1430 cubic feet per day, at 56 pounds pressure and 281 °F. If a containment building fails, it is expected that it would fail at a penetration or closure fixture. While such a failure is important and would lead to a radiological release, the failure is not catastrophic, as might be communicated through the use of the term "containment failure." The areas where a failure might occur are usually enclosed by additional structures or buildings. Any radioactive release must travel through those areas before exiting to the environment. The significant radiological release, including radioactive iodine, is primarily an aerosol, which tends to adhere to surfaces and will diminish by deposition before entering the environment.

1.4 Updated Analyses

The NRC previously published studies predicting significant offsite consequences from very unlikely accidents (e.g., WASH-1400). These studies were performed using assumptions that are now known, as a result of extensive experimental research conducted since the accident at Three Mile Island, not to reflect actual nuclear accident behavior. In addition, plants improvements have been implemented by the industry, which improved plant capabilities to in preventing or mitigating the consequences of accidents that can potentially lead to offsite consequences. As a result, the NRC does not currently consider such consequence studies to represent the likely outcome of serious accidents. In order to improve on past-analyses, the NRC developed the MELCOR code, which uses the results from over twenty years of national and international severe accident and sources term research program. The MELCOR code has been used by the staff, to provide a more realistic evaluation of severe accident initiation and progression, radiological release, and offsite consequences for nuclear power plants.

As part of the ongoing refinement in severe accident and off-site consequence analysis, the NRC has begun the State-of-the-Art Reactor Consequence Analyses (SOARCA)[14] project. The SOARCA project is a combined effort of the Offices of Nuclear Regulatory Research (RES), Nuclear Reactor Regulation (NRR), and Nuclear Security and Incident Response (NSIR) to: (1) evaluate and update, as appropriate, analytical methods and models for realistic evaluation of severe accident progression and offsite consequences; (2) develop state-of-the-art reactor consequence assessments of severe accidents and replace such analyses as NUREG CR-2239, "Technical Guidance for Siting Criteria Development," dated December 1982; and (3) identify mitigative measures that have the potential to significantly reduce risk of offsite consequences.

To conduct the analyses, staff will use an improved understanding of source terms and severe accident phenomenology, and credit the use of severe accident mitigation strategies and procedures that were not in place when the 1982 study was performed. In addition to better understanding of accident phenomenology, the analyses will include design, operation, and emergency preparedness improvements to more accurately reflect plant performance and emergency response activities. The combined effect of code improvements, plant's improvements, realistic consideration of mitigative actions, results in substantial decrease in accident consequences.

[14] http://www.nrc.gov/about-nrc/regulatory/research/soar/overview.html