



Standard Guide for Evaluating Disposal Options for Concrete from Nuclear Facility Decommissioning¹

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INTRODUCTION

Numerous nuclear facilities containing large amounts of concrete are scheduled for decontamination and decommissioning over the next several decades. Much of this concrete is either not contaminated or only lightly contaminated on or near the surface. However, since concrete is slightly porous, it has the potential to be contaminated volumetrically. Volumetric contamination is more difficult to measure than surface contamination, and currently there are no release guidelines for volumetrically contaminated concrete. As a result, large volumes of concrete are often disposed of as radioactive waste at a large cost.

Under certain conditions, the depth or amount of contamination may be limited such that a case can be made for concrete release for other purposes outside of regulatory control. These cases are likely to be ones where the radioactive contamination is shallow and is limited to a depth that can be removed by scabbling (removal of the concrete surface), or where the depth can be estimated based on the history and condition of the concrete. In addition to surface contaminated concrete, some facilities contain activated concrete where the depths of contamination vary. This type of concrete should be handled on a case-by-case basis. Accurate measurements of the radiation source are difficult for activated concrete, because the activated portions of the embedded metal or concrete are partially shielded by the concrete that lies between the source and the measuring device. Care must be taken to measure radiation levels of activated concrete accurately, so actual radiation levels are documented and used when applying release criteria.

This standard guide applies to nonrubbelized concrete that is still in place with a defined geometry and known history where the depth of contamination can be measured or estimated based on its history. It is not practical to measure radiation levels of concrete rubble. The process outlined here starts with characterizing the concrete in place, then evaluating the dose to the public and cost of various disposal options.

1. Scope

1.1 This standard guide defines the process for developing a strategy for dispositioning concrete from nuclear facility decommissioning. It outlines a 10-step method to evaluate disposal options for radioactively contaminated concrete. One of the steps is to complete a detailed analysis of the cost and dose to nonradiation workers (the public); the methodology and supporting data to perform this analysis are detailed in the appendices. The resulting data can be used to balance dose and

cost and select the best disposal option. These data, which establish a technical basis to apply to release the concrete, can be used in several ways: (1) to show that the release meets existing release criteria, (2) to establish a basis to request release of the concrete on a case-by-case basis, (3) to develop a basis for establishing release criteria where none exists.

1.2 This standard guide is based on the “Protocol for Development of Authorized Release Limits for Concrete at U.S. Department of Energy Sites,” (1)² from which the analysis methodology and supporting data are taken.

1.3 Guide E1760 provides a general process for release of materials containing residual amounts of radioactivity. In

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² The boldface numbers in parentheses refer to a list of references at the end of this standard.