UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 30, 215

ALL AGREEMENT AND NON-AGREEMENT STATES
STATE LIAISON OFFICERS

AVAILABILITY OF THE CONCENTRATION AVERAGING AND ENCAPSULATION BRANCH TECHNICAL POSITION (STC-15-031)

Purpose: To inform Agreement and Non-Agreement States and State Liaison Officers of the availability of the U.S. Nuclear Regulatory Commission's (NRC) publication of Revision 1 of the Branch Technical Position on Concentration Averaging and Encapsulation (CA BTP). This revised guidance provides acceptable methods that can be used to perform concentration averaging of low-level radioactive waste (LLW) for the purpose of determining its waste class for disposal. The CA BTP was issued February 25, 2015. (80 FR 10165).

Background: One of the four performance objectives in NRC's LLW disposal regulation is 10 CFR 61.42, "Protection of individuals from inadvertent intrusion." The NRC's LLW disposal regulations in 10 CFR Part 61 classify waste based on its hazard to an inadvertent intruder. The intruder is a person who might occupy a disposal site after closure and unknowingly be exposed to radiation from the waste. Higher waste classifications (defined as A, B, and C in 10 CFR 61.55) reflect the greater hazard each waste class poses, and correspondingly greater controls are needed to manage risk to an inadvertent intruder. Waste classes are defined by the concentrations of certain key radionuclides that are important to intruder dose.

Part 61 (§ 61.55(a)(8)) permits licensees to average radionuclide concentrations in waste in determining its class. Concentration averaging is the mathematical averaging of the radionuclide activities in waste over its volume or mass. Part 61, however, does not specify limitations on the implementation of concentration averaging. Thus, a waste generator could average the concentration of a highly radioactive piece of activated metal from a nuclear power reactor over the volume of a container of slightly contaminated trash to achieve a lower classification of the activated metal. The hazard to the intruder from the activated metal would continue to be present because of the high concentrations of radionuclides in the discrete item of metal. The staff has long recognized that guidance on constraining concentration averaging was needed. Such guidance was first published by the staff in 1983 and then significantly expanded in 1995. The CA BTP provides guidance concerning the averaging allowed by 10 CFR Part 61 by recommending limits on the size and intensity of hot spots (such as individual pieces of highly radioactive activated metal) that could be "averaged away." All four of the commercial LLW disposal facilities in the U.S. reference the 1995 guidance document in whole or in part.

The CA BTP is used by licensees shipping low-level waste for disposal in a licensed facility. These licensees are principally nuclear power reactors and waste collectors and processors. Some materials licensees also ship low-level waste for licensed disposal.

Discussion: The major changes to the technical positions in the CA BTP:

Blending of waste: For mixing of blendable or flowable wastes, such as ion exchange resins, the revised CA BTP contains a performance-based position. Previously, the CA BTP recommended constraints on the *inputs* to a mixture rather than the *output* of the mixing processes. However, the revised CA BTP recognizes that it is the characteristics of the final mixture, or output (i.e., its average concentration and degree of homogeneity) that is most important to the protection of an inadvertent human intruder, not the concentrations of waste inputs prior to mixing.

Mixtures of discrete items: The mixtures of discrete items, or items with high radioactivity concentrations, that are expected to remain intact for long periods of time. Discrete items, for example are activated metals from a nuclear power plant. The 1995 and revised CA BTP recommend constraints on how concentrated the radioactivity can be in individual items, since these items can vary considerably in their radioactivity concentration. The revised position is more closely tied to protection of an inadvertent intruder into a disposal facility .

Encapsulation of sealed sources: Encapsulation is the use of non-radioactive material to surround a source of LLW within a container. Both the 1995 and the revised CA BTP constrain the amount of credit that can be taken for non-radioactive material in determining the waste class and average concentration to the volume of a 55 gallon drum. Using non-radioactive materials to artificially lower the concentration of LLW would enable some high hazard radioactive wastes to be disposed of as a lesser waste class with fewer controls, and thus increase the risk to an inadvertent intruder. While many of the radioactivity constraints for sealed sources of different radionuclides have remained the same, the revised CA BTP specifies constraints for encapsulation of ^{137}Cs sources that are based on a more reasonable, but still conservative exposure scenario for an inadvertent intruder. As a result, the recommended constraint has been increased from 1.1 TBq (30 Ci) to 4.8 TBq (130 Ci) for ^{137}Cs, based on new analysis.

Performance-based regulatory policy: The 1995 CA BTP stated that averaging approaches different from those in the guidance should be approved under NRC's regulation in 10 CFR 61.58. By referencing a provision in the regulations that applies to alternatives to the *requirements* in 10 CFR Part 61 (and not NRC staff guidance like the CA BTP), the staff in effect discouraged performance-based approaches to intruder protection. Instead of referring to 10 CFR 61.58 for obtaining approval of alternative approaches to averaging, the revised CA BTP uses language consistent with other NRC guidance documents. The revised CA BTP also identifies considerations and criteria to be considered for alternative approaches that could be submitted by licensees to disposal facility regulators.

To facilitate implementation of the revised CA BTP, NRC will conduct training for Agreement State regulators. Webinars will be open to all Agreement States.

If you have any questions regarding this correspondence, please contact me at 301-415-3340 or the individual named below:

POINT OF CONTACT: Maurice Heath INTERNET: Maurice.Heath@nrc.gov
TELEPHONE: (301) 415-3137

/RA James Danna for/

Laura A. Dudes, Director
Division of Material Safety, State, Tribal
and Rulemaking Programs
Office of Nuclear Material Safety
and Safeguards

If you have any questions regarding this correspondence, please contact me at 301-415-3340 or the individual named below:

POINT OF CONTACT: Maurice Heath INTERNET: Maurice.Heath@nrc.gov
TELEPHONE: (301) 415-3137

/RA James Danna for/

Laura A. Dudes, Director
Division of Material Safety, State, Tribal
and Rulemaking Programs
Office of Nuclear Material Safety
and Safeguards

DISTRIBUTION:
MSTR r/f
DUWP r/f

ML15100A262

OFC	NMSS/DUWP	LA	NMSS/DUWP	NMSS/MSTR	NMSS/MSTR
NAME	MHeath	AWalker-Smith	GSuber	CEinberg	JDanna for LDudes
DATE	412/15	4/13 /15	4/16/15	4/20/15	4/30/15

OFFICIAL RECORD COPY