RULES AND DIRECTIVES BRANCH

WASTE CONTROL SPECIALISTS LLC

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Division of Administrative Services
Office of Administration
Mail Stop: TWB-05-B01M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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(2)

References:
(1) Texas Radioactive Material License No. R04100, Amendment 04

(2) Letter from J. Scott Kirk, CHP (WCS), to Annette L. Vietti-Cook (NRC), re: "NRC Commissioners' Briefing Regarding Waste Blending (SECY-10-0043)," dated June 10, 2010

(3) Letter from J. Scott Kirk, CHP (WCS), to Larry Camper (NRC), re: "Supplemental Information Regarding Potential Radiological Impacts to an Intruder Resident from Blended Low-Level Radioactive Waste," dated January 8, 2010

(4) Federal Register, *Notice of Public Meeting and Request for Comments on the Potential Revision of the Branch Technical Position on Concentration Averaging and Encapsulation*, Volume 76, Number 17, published on January 26, 2011

(5) Letter from Robert J. Lewis (NRC), to All Agreement States and Michigan, re: "Summary of Existing Guidance for Reviewing Large-Scale Low-Level Radioactive Waste Blending Proposals (FSME-11-024)," dated March 17, 2011

Subject: WCS Comments Regarding Potential Revision of the Branch Technical Position on Concentration Averaging and Encapsulation, Docket ID NRC-2011-0022

Dear Ms. Bladey:

Waste Control Specialists LLC (WCS) is pleased to provide comments pertaining to the potential revision of the subject *Branch Technical Position (BTP) on Concentration Averaging and Encapsulation* as requested in the U.S. Nuclear Regulatory Commission's (NRC's) Federal Register Notice dated January 26, 2011 (Reference 4).

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WCS previously provided substantive comments to the NRC regarding the blending of Low-Level Radioactive Waste (LLW) (Reference 2). WCS commends the NRC for adopting our recommendation to categorize waste blended at the upper bounds of the Class A concentrations as a Unique Waste Stream, similar to Depleted Uranium.

WCS also previously provided an analysis (Reference 3) to demonstrate the potential radiological hazards that waste blended to the upper limits of Class A LLW poses to the public after expiration of the 100-year institutional control period. The NRC independently reviewed and confirmed that the methods[1] used by WCS were consistent with the applicable regulatory guidance, the results were accurately calculated, and that the potential radiation doses to the intruder were unacceptably high, as discussed in SECY-10-0043.

WCS' comments contained herein address: (1) need for providing a definition for blending and dilution, (2) protection of the intruder, (3) methods needed to address homogeneity, (4) consistent limits for discrete sources of ^{137}Cs, (5) need for coordination between the NRC and Agreement States, and (6) issues related to potential blending of Greater-Than-Class C (GTCC) LLW and 10 CFR 20 Appendix G.

NEED FOR DEFINING BLENDING AND DILUTION

The NRC is currently revising the BTP to implement the Commissioners' directive (Staff Requirements Memorandum [SRM] for SECY-10-0043) to include provisions that would allow for the blending of Class B/C LLW to lower its concentrations, and thus allow its disposal as Class A LLW at the EnergySolutions facility located in Clive, Utah, facility.

While blending of radioactive waste is only one of eight major areas of the BTP, clarification in a revised BTP is needed to distinguish "blending" from "dilution." The NRC staff has previously stated (SECY-10-0043) that "blending" is limited to the mixing of LLW with different concentrations of radionuclides, which results in a relatively homogenous mixture that may be appropriate—if sufficient Class A LLW has been included in the mix—for disposal in a licensed facility. "Dilution" on the other hand has been described by the NRC (SECY-10-0043) as "the intentional mixing of waste with clean or uncontaminated material to lower its waste classification or to release it into the general environment."

The NRC has acknowledged that these terms have often been used synonymously (as noted in SECY-10-0043), which has led to various inconsistencies in interpretations of NRC policy. WCS encourages the NRC to expand this portion of the BTP to specifically define these terms, as well as to discuss the potential for introduction of other uncontaminated materials (such as stabilization reagents, coal combustion products or other process additives) that may be used or added in the waste treatment or blending process. Revisions to the BTP should provide guidance to waste generators/processors and Agreement States on whether uncontaminated materials may

[1] WCS used the NUREG/CR-4370, *Update of Part 61 Impacts Analysis*, to evaluate the radiological impacts to the resident intruder.

be considered in calculating the overall radionuclide concentration for the purpose of waste classification. Clarification in the BTP is also needed to ensure that the introduction of such materials does not inadvertently change the waste characteristics such that it would require waste management practices under the Resource Conservation and Recovery Act and regulated by the U.S. Environmental Protection Agency.

The NRC should also consider defining "blending" and "dilution" as part of the forthcoming rulemaking to revise Title 10 of the Code of Federal Regulations, Part 61 (10 CFR 61). Defining such terms in rulemaking is needed because NRC licensees are only required to comply with codified regulations and Agreement States are not required to use or to enforce regulatory guidance.

INTRUDER PROTECTION—RISK-INFORMED AND PERFORMANCE-BASED APPROACH

On February 24, 2011, the NRC held a public meeting in Rockville, Maryland, to discuss possible revisions to the BTP. At this meeting much of the discussions were focused on the likelihood of a future site resident unknowingly intruding into buried radioactive waste. WCS agrees that the NRC should ensure that an inadvertent intruder is protected by using a risk-informed, performance-based approach as part of any revision to the BTP. However, for the process to be risk-informed, the NRC should focus additional attention on the radiological consequences that would be incurred than simply on the likelihood of intrusion occurring after institutional controls have expired.

The intruder analysis for a generic site that was performed by WCS (Reference 3) and independently reviewed by the NRC was intended to provide risk-informed insights to the hazards of disposing of waste blended to the upper bounds of the Class A limit. This analysis assumed that the future site resident exhumed waste materials after the 100-year institutional control period had expired. WCS' analysis did not give credit for any controls that were not required for Class A LLW by regulation, as specified in 10 CFR 61. This analysis clearly demonstrated that intrusion into waste blended to the upper bounds of the Class A limits after expiration of the institutional control period could pose significant and unacceptably high radiation doses. The purpose of the analysis was intended to underscore the point that waste blended to just below the Class B concentration limit should require additional controls that are not mandated by regulations, or otherwise the consequences to the intruder could result in unacceptably high doses of radiation. Such controls may reasonably include requiring disposal at depths greater than 5 meters, reinforced concrete canisters (including a lid), and/or additional intruder barriers.

WCS encourages the NRC to continue past practices that demonstrate a conservative but reasonable approach ensuring the protection of an inadvertent intruder. Such approaches would continue to assume that a future resident intrudes into the waste with a 100% probability. An intruder analysis should be performed to calculate the radiological consequences to the intruder after the institutional control period expires. Should the analysis indicate that the consequences

to the intruder is unacceptably high[2] then additional controls, such as deeper burial or intruder barriers would be needed to prevent or mitigate the radiological consequences. If additional controls are required as a result of the intruder analysis then additional engineering analysis may also be needed to ensure that the controls or barriers will not degrade or fail to perform their intended function for as long as the calculated radiological consequences are deemed unacceptably high. WCS encourages the NRC to broaden the discussions in the BTP of using such risk-informed methods needed to demonstrate that the intruder will be protected after the institutional control period has expired.

The 1995 BTP's Enclosure 2, *Basis for Concentration Averaging and Encapsulation Guidance for Classification of Discrete (Heterogeneous) Wastes Reflected in Revised Branch Technical Position*, accounts for radiation doses to an intruder encountering waste concentrations at the upper end of the Class C limits. However, it does not address the radiological risks to an intruder encountering waste at the upper end of the Class A limits. WCS encourages the NRC to include a similar analysis in revisions to the BTP for waste blended to the upper end of the Class A limits after institutional controls have expired to transparently communicate to Agreement States and other stakeholders the hazards associated with this Unique Waste Stream.

HOMOGENEITY

The NRC recently published interim guidance (IG) that was issued to the Agreement States (Reference 5) addressing specific actions which should be taken to ensure that waste blended by a waste processor in one state would not become problematic in the Agreement State hosting a disposal facility. The IG addressed several major topics including determining homogeneity, waste classification, and radionuclide concentrations. WCS is supportive of the actions recommended to be taken by the Agreement States to ensure that blended waste remains homogenous, is properly characterized, and would not adversely impact the resident intruder.

The definition of homogeneity in the IG is somewhat vague. WCS encourages the NRC to provide a more robust definition that includes measurable parameters. Such a definition would ensure that this important characteristic is uniformly implemented by all regulators.

WCS encourages the NRC to revise the BTP to provide specific requirements on the types of measurements and numbers of samples from the blending equipment needed to demonstrate that the average concentration and measurement uncertainty are known to a limit that would be acceptable to the NRC and Agreement States.

WCS agrees with the NRC that for some waste streams it may be difficult to demonstrate that the samples of waste in process tanks or individual disposal containers are representative of all the waste. Waste streams comprising primarily gamma-emitting radionuclides are not as

[2] The NRC did not establish by rule a level of protectiveness for the intruder. However, regulatory guidance recommends an annual limit of 500 millirems (5.0 mSv) to protect the intruder. Additionally, the current radiation protection standard for a member of the public is established at 100 millirems/year (1.0 mSv/year) pursuant to 10 CFR 20.1301.

problematic as those waste streams containing radionuclides whose signature is based on alpha and beta particle emissions (e.g., $^{239/240}Pu$, ^{63}Ni, and ^{99}Tc). Therefore, given the importance of understanding the measurement uncertainty in relation to potential impacts to the intruder, the NRC should provide specific examples on acceptable methods needed to address the five sources of uncertainty discussed in the IG. WCS believes that such examples, including a requirement for the waste processors to collect independent verification samples from the generator's waste stream, will be very useful to the Agreement States that are reviewing any future license amendment requests related to large-scale blending.

DISCRETE SOURCES OF CESIUM-137

As discussed in the public meeting held in Rockville, Maryland, on February 24, 2011, during the development of the 1995 BTP, it was assumed that a future site resident would intrude into the waste once the institutional control period had expired because the behavior of the resident 100+ years into the future was "unknowable." Additionally, the guidance constrained the limit for discrete sources containing ^{137}Cs at 30 Curies (Ci) when compared to the actual regulatory limit of 4600 Ci for Class C LLW when 10 CFR 61.55 was established in 1981. This constraint was believed prudent to prevent future radiological accidents involving sealed sources, such as the accident involving a sealed source containing ^{137}Cs that was scavenged from an abandoned hospital site in Goiânia, Brazil, that resulted in four fatalities and contaminated almost 250 individuals.

The BTP is silent on the reasons for the differences between the ^{137}Cs limits contained in the BTP and the concentration tables in 10 CFR 61.55. WCS encourages the NRC to include the discussions on the aforementioned lessons learned from previous radiological accidents involving sealed sources so that stakeholders using the BTP have a clear understanding of the rationale behind this limit. Such background information would provide clarity, transparency and would also ensure the rationale extends beyond the institutional knowledge of the NRC staff.

WCS agrees that the NRC should revise the BTP to increase the Class C concentrations of discrete sources of ^{137}Cs from 30 Ci to 4600 Ci consistent with the limit specified in 10 CFR 61.55. However, the NRC is strongly encouraged to include guidance in the BTP to Agreement States hosting a LLW disposal facility to evaluate the need for engineered controls to protect an intruder. Ensuring that an exhumed sealed source is readily identifiable is not in-and-of-itself sufficient to protect public health as evidenced by past radiological accidents. The use of a steel or reinforced concrete canisters that are resistant to intrusion, coupled with disposal at depths greater than 10 meters, are needed not only to address potential impacts to public health but also for reasons of national security.[3]

[3] The International Atomic Energy Agency's *Code of Conduct on the Safety and Security of Radioactive Sealed Sources* lists Category 1, 2, and 3 thresholds for ^{137}Cs at 3000 Ci, 30 Ci, 3 Ci, respectively. Concentrations exceeding these thresholds for Category 1 and 2 sources are Radioactive Material Quantities of Concern and are subject to the NRC's requirements for Increased Controls. Sealed sources exceeding Category 3 thresholds have historically been associated with numerous radiation accidents internationally.

AGREEMENT STATE COORDINATION

WCS encourages the NRC to include a section in the BTP regarding the importance of coordination between the Agreement States that regulate the processing/blending of radioactive waste and the Agreement States hosting a disposal facility. Information contained in the IG is an excellent starting point. WCS believes that such interactions between Agreement States are paramount to ensure that licensed activities conducted in one Agreement State do not adversely impact the ability to safely dispose of radioactive waste within the border of the Agreement State hosting a disposal facility. Otherwise, certain waste streams, such a blended waste, could be returned to the waste processor and become potentially stranded if a disposal outlet is not readily accessible.

GREATER-THAN-CLASS C LLW AND 10 CFR 20 APPENDIX G

The Commissioners directed NRC staff not to include waste at GTCC concentrations in the scope of the Part 61 site-specific analysis rulemaking (i.e., blended waste should not include any GTCC component) because GTCC waste is a federal responsibility under the Low Level Radioactive Waste Policy Act of 1980, and as amended in 1985, and not one belonging to the States even if the waste is blended to into a lower classification.

The IG directs Agreement States that review requests from licensees to blend waste to consider the Commissioners' position on GTCC. It furthers states that generators and processors can determine waste concentration (and the implied waste classification) using any one of the methods in the NRC's Waste Classification Technical Position, including 10 CFR 20, Subpart G and 10 CFR 61.55.

The NRC has expressed their position during deliberations on waste blending (SECY-10-0043) regarding the interpretation of 10 CFR 20, Appendix G, that <u>licensees are only required to classify waste at the time of its disposal and not at any intermediate steps in the waste management process</u>.

WCS encourages the NRC to better clarify the timing on when GTCC LLW should be classified (i.e., at the point of generation or the point of disposal) with the Agreement States that regulate the processors and those hosting a disposal facility. As discussed in SECY-10-0043, Texas has a more stringent regulation that requires waste classification at the point of generation, not at the point of disposal. This could serve as an example to other Agreement States desiring to prevent blended GTCC LLW from entering their borders.

WCS believes that without this clarification, an Agreement State may not be provided with transparent guidance that is needed should they decide to impose more stringent requirements than contained in 10 CFR 20, Subpart G, on when the waste should be classified to avoid a shift in the responsibility for providing a waste disposition pathway for GTCC LLW from the Federal government to the States.

CONCLUSIONS

WCS commends the NRC for its efforts in revising the BTP in a risk-informed and performance-based manner. Revisions to the BTP should provide for consistent interpretation regarding acceptable practices for determining the proper classification of Class A, B, and C LLW to facilitate the safe disposal at a licensed facility long after the institution control period has expired. WCS believes that acceptable practices and clear definitions of "blending" and "dilution" in a revised BTP are urgently needed. The BTP should also bridge the discussions that are needed between Agreement States that regulate waste processors and those that host a disposal facility to ensure that waste may be safely dispositioned.

WCS believes clear guidance is also required to prevent blending GTCC, thereby enabling GTCC disposal to become an Agreement State responsibility rather than a federal responsibility. This guidance needs to be made uniformly enforceable in the forthcoming 10 CFR 61 rulemaking if not before.

WCS agrees that a safe disposal solution is needed to both protect public health and our national security. These objectives are mutually inclusive to demonstrate that disposal of Class B/C LLW, including sealed sources, can be safe not only in the short term, but for many generations to come. WCS believes that its licensed and soon to be open facility in Andrews County, Texas, can provide a long-term national solution.

WCS requests that a copy of all correspondence regarding this matter be submitted directly to my attention by fax (575-394-3427) or email (skirk@valhi.net). Thank you for your consideration of this submission.

Sincerely,

J. Scott Kirk, CHP
Vice President, Licensing, Corporate Compliance & Radiation Safety Officer

cc:

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