



RECEIVED

2011 APR 27 AM 9:48

RULES AND DIRECTIVES  
BRANCH

CD11-106

April 15, 2011

1/26/2011  
76FR4739  
4

Cindy Bladey, Chief  
Rules, Announcements, and Directives Branch  
Office of Administration  
Mail Stop: TWB-05B01M  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

**Subject: Comments in Response to Docket ID NRC-2011-0022 – Notice of Public Meeting and Request for Comments on Potential Revision of the Branch Technical Position on Concentration Averaging and Encapsulation, January 26, 2011**

Dear Ms. Bladey:

This letter is in response to the subject notice requesting comments on the potential revision to the Branch Technical Position on Concentration Averaging and Encapsulation (BTP). In addition to our general comments, we also provide responses to the nine questions posed in the Notice.

In general, EnergySolutions supports the effort underway by the U.S Nuclear Regulatory Commission (NRC) to revise the BTP. We agree that it is appropriate and prudent to update the BTP not only to make it more risk-informed, but also to better align NRC guidance with the current state-of-the-art of technologies available for the processing and disposal of low level radioactive waste (LLW).

Our support is qualified in that we believe that this guidance likely will be unnecessary at some time in the future. The NRC currently has underway a rulemaking (the unique waste stream rulemaking) that should render the BTP obsolete. It is anticipated that the result of this rulemaking will be to require the use of a site-specific performance assessment to demonstrate compliance with the performance objectives in 10 CFR 61 Subpart C, particularly the protection of the inadvertent intruder. That would constitute a significant improvement over the use of the classification tables in 10 CFR 61.55 for the protection of human health and safety.

Because of the lengthy period of time required to conduct a rulemaking, and because of the uncertainty of the final outcome, the guidance contained in the BTP is necessary at least until the rulemaking is concluded. Given that the Commission has for some time recognized the shortcomings of the current BTP, it is reasonable to update this guidance rather than leave in place the current version. As such, we propose that the revised BTP be issued as interim guidance and then canceled upon completion of the ongoing rulemaking.

E-REDS = ADM-03

SUNSI Review Complete  
Template = ADM-013

6350 Stevens Forest Road, Suite 200 • Columbia, Maryland 21046  
240.565.6200 • Fax: 410.290.8256 • www.energysolutions.com

Call =  
m. Heath (mchb)

The questions in the *Federal Register* notice address technically complex issues. In this letter, we have provided brief answers that in many cases beg more detailed explanation. In order to more fully explore how best to ensure the protection of human health and safety while providing for disposal flexibility, we would welcome the opportunity to meet with NRC staff to discuss these issues in a noticed meeting.

We appreciate the opportunity to comment on this matter. Questions regarding these comments may be directed to me at (240) 565-6148 or [temagette@energysolutions.com](mailto:temagette@energysolutions.com).

Sincerely,



Thomas E. Magette, P.E.  
Senior Vice President  
Nuclear Regulatory Strategy

cc:

Larry Camper, FSME  
Jim Kennedy, FSME  
Greg Suber, FSME  
Maurice Heath, FSME

## **EnergySolutions' Comments on Potential Revision of the Branch Technical Position on Concentration Averaging and Encapsulation**

### **General Comments**

Part 61 provides generic classification tables in section 61.55 to classify waste to be disposed of at low-level waste sites based on the concentration of waste at the time of disposal. Section 61.55 (a)(8) provides that “the concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nancuries per gram.” The BTP has provided averaging guidance for this provision for almost 30 years. However, both the classification tables and the BTP are based on generic disposal environments that do not reflect current disposal practices and modeling. Thus it is unduly prescriptive for sites with site-specific performance assessments.

We are strongly in favor of the NRC’s move to place more emphasis on the use of site-specific performance assessments as a method of demonstrating compliance with the performance objectives. We believe that is a better approach to protecting the public health and safety than reliance on generic classification tables that do not reflect site-specific conditions. Furthermore, we are strongly in favor of revising Part 61 to be risk-informed such that compliance with the performance objectives is demonstrated on a site-specific basis. Until such changes are incorporated into Part 61, we believe it necessary to update the existing guidance so that those improvements that can be achieved through guidance may be realized.

We offer the following answers to the questions posed in the Federal Register notice in order to assist in the effort to improve the existing concentration averaging guidance.

### **Responses to Questions Posed in the *Federal Register* Notice**

1. NUREG-1854, “NRC Staff Guidance for Activities Related to U.S. Department of Energy Waste Determinations—Draft Final Report for Interim Use,” issued August 2007, contains extensive guidance for site-specific evaluations of intruder protection. The approach in the NUREG was endorsed by NRC’s Advisory Committee on Nuclear Waste and Materials, which also recommended that the staff evaluate a broader application of the new concentration averaging methodology to wastes other than “waste incidental to reprocessing.” How could approaches in that guidance be used in revising the CA BTP?

**Response** – Section 3.5.1.1 of NUREG-1854 allows for a variety of methods to average waste for purposes of concentration averaging including mixing exhumed waste from drilling over the intruders well cuttings when spread over the surface. The principle from this NUREG is that the waste concentration should be based on what the reasonably foreseeable receptor will be exposed to. Waste sites can develop waste acceptance criteria (WAC) based on their performance assessments operating under this principle. We propose that the NRC include the NUREG-1854 methods to address concentration averaging in any updated guidance. It is the best guidance available regarding meeting Part 61 performance objectives.

2. Part 61 limits the disposal of Cs-137 to 4,600 Ci/m<sup>3</sup>, yet the CA BTP guidance for disposal of discrete Cs-137 sources recommends a limit of 30 Ci in 0.2 m<sup>3</sup> (150 Ci/m<sup>3</sup>).

Given the large disparity between the CA BTP guidance and Part 61, and given the need to dispose of large Cs-137 sources, should NRC consider revising the 30 Ci in 0.2 m<sup>3</sup> recommendation found in the CA BTP?

**Response** – Yes, NRC should allow averaging over the encapsulated volume and mass relying on the performance assessment that considers an intruder drilling into the source to ensure that the performance objectives are met.

3. The rulemaking for unique waste streams (see SECY-08-0147 and the SRM-SECY-08-0147) will protect the inadvertent human intruder by requiring a site-and waste-specific assessment. The current CA BTP defines acceptable practices for applying the 61.55 tables, to ensure that an inadvertent human intruder is protected (as intended in the draft and final Environmental Impact Statement for Part 61). Given the NRC's move towards site-and waste-specific analyses to demonstrate protection of the intruder—is the CA BTP necessary, or could it be eliminated?

**Response** – The BTP is necessary at least until the NRC completes the rulemaking. Beyond that time, it would no longer be needed for sites with performance assessments that consider reasonably foreseeable intruder scenarios.

4. The volume over which waste concentrations are averaged has a significant effect on waste classification. The current CA BTP addresses averaging over a waste package. Others have suggested that averaging occur over the volume of waste that an inadvertent intruder would be exposed to, or the volume of a disposal trench. What are the pros and cons of these approaches?

**Response** – *EnergySolutions* submits that the BTP should be revised to allow averaging over a volume greater than that of an individual container or package. The advantage of doing so is improved efficiency in the packaging, classification, and shipping of waste without any reduction in the protection afforded the inadvertent intruder. This approach would be appropriate for a site that has prepared a site-specific performance assessment that demonstrates compliance with the performance objectives. That performance assessment would be used to generate the WAC for evaluation of waste acceptance in order to ensure compliance with the performance objectives.

The application of controls at the package level is not necessary for the protection of human health and safety and results chiefly in inefficiencies that translate directly to the loss of disposal capacity. For example, at *EnergySolutions*' Clive Facility, current total activity disposed, when averaged over the entire disposal embankment, is less than three percent of the Class A limits that would be allowed for that volume. This despite the fact that *EnergySolutions* has demonstrated that the site can satisfy the performance objectives while taking waste equivalent to the Class A limits.

Another appropriate application of control would be for a given waste stream. Take for example a large component. If the component is Class A when intact, then that waste stream should be considered Class A for disposal even if segmented and packaged to facilitate transportation for disposal. There would be no difference to an intruder encountering a portion of a large steel vessel as opposed to an intact vessel.

Another example is the waste from the remediation of a decommissioned site. If the waste can be characterized and shown to be Class A, then no additional analysis of individual containers should be necessary because the waste stream would remain Class A when averaged over the disposal cell. This approach would be acceptable for a site that has performed a site-specific performance assessment to demonstrate that the combination of the natural features of the site, engineered features used for disposal, and the waste are adequate to protect public health and safety.

There are no disadvantages to such an approach. A perceived disadvantage is that generators and processors shipping waste for disposal would be lacking in the clear guidelines currently provided by simply applying the concentration limits in 10 CFR 61.55 to each package to be disposed. We do not believe that this is a legitimate concern. The existing rules and guidance do not in fact always provide such clear guidance. EnergySolutions has a team of engineers and health physicists that work with our customers to help interpret regulations, guidelines, and our WAC to ensure that waste is acceptable for disposal. For us to apply this approach for a customer's waste stream would be little different from what we routinely do today and would not impose a new burden.

5. For blending homogeneous waste types, the NRC will be requiring a site and waste-specific intruder analysis, so as to be risk informed and performance based. In requiring a site-and waste-specific analysis for homogeneous waste types, the NRC is moving away from the CA BTP's "factor of 10 rule" for individual contributors to a mixture of homogeneous waste types. Should NRC also move away from the "factor of 10 rule" for non-primary gamma emitters and away from the "factor of 1.5 rule" for primary gamma emitters?

**Response** – Yes. These "rules" are not necessary for ensuring the protection of the intruder who may encounter blended waste. The final waste container, whether prepared by the original generator or an intermediate processor, is what should be considered when evaluating the impact on a future inadvertent intruder. In addition, there is inherent mixing in the disposal cell over time, a significant factor in concluding that the cell can be the suitable area over which to average. Furthermore, in virtually any scenario by which an intruder encounters the waste there is mixing of the waste encountered with both other waste and surrounding material. Selection of appropriate intruder scenarios should address the extent of mixing and the degree of homogeneity in the uncertainty portion of the performance assessment.

6. What limits on the types of LLW that can be blended should be specified in the CA BTP? Specifically, should blending of cartridge filters and sealed sources to form homogeneous mixtures be addressed in the CA BTP?

**Response** – There is no health and safety basis for placing limits on the blending of either of the two types of waste cited in the question. Based upon the information presented at the February 24, 2011 blending workshop, filters should not be given unique treatment as they break down over time to become a homogenous mixture. In particular, filters used in ion exchange resin liners for dewatering should be considered part of the resin waste stream. As to sealed sources, it is important to consider how an intruder would be exposed to such material and factor that into the performance assessment. The same is true for other wastes that may be blended. The

suitability of blended waste for disposal should be established in the WAC, which derive from the performance assessment, which considers site-specific conditions and factors.

7. In the Commission's October 13, 2010, decision on LLRW blending, it stated that "\*\*\*\* [Greater than Class C (GTCC)] waste is a Federal responsibility and \*\*\* should not be made into a State responsibility, even if the waste has been blended into a lower classification." What unique guidance will GTCC waste require in the BTP, given this direction? For example, when should waste be classified? (Waste is currently not required to be classified until it is shipped for disposal).

**Response** – Congress has established that the disposal of GTCC waste is a Federal responsibility. Thus the BTP could specifically prohibit waste that has been packaged for disposal and classified as GTCC from being blended with lower classification waste for the purposes of disposal in a compact facility.

Current NRC regulations establish that waste is classified when it is shipped for disposal. This is entirely appropriate and should not be changed. It is in fact not rational to classify waste until it is prepared for disposal. The classification limits contained in 10 CFR 61.55 exist strictly for the purposes of protecting an inadvertent intruder at a disposal site. The NRC has provided no technical basis for applying these limits in any other context.

There may be legitimate reasons for processing waste that, if packaged for disposal, would be at concentrations that exceed Class C limits. However, because this waste has not been packaged for disposal, it is premature for it to be classified. The BTP should not include guidance that requires classification earlier in the process thereby prohibiting such a scenario. As stated above, there simply exists no basis for doing so.

8. How should NRC consider heterogeneity in waste concentrations in the site-specific intruder analysis? Does there need to be guidance on how to interpret intruder analysis results with respect to waste heterogeneity?

**Response** – Given the diverse site conditions and site-specific intruder scenarios, NRC does not need to provide generic guidance on how to consider heterogeneity in site-specific analyses for most waste forms. Only discrete waste forms – generally irradiated hardware and sealed sources – that are expected to retain their current physical form over an extended period of time should be treated differently in the BTP. The extent to which other waste types are or are not homogeneous is not relevant. These wastes will become mixed over time, and would be further mixed in the process of being encountered by an intruder.

As to the guidance for irradiated hardware and sealed sources, we propose that it be revised so that a disposal package containing irradiated hardware or sealed sources can be averaged over the package, including the package and associated shielding. It would still be necessary to impose some limits on such packages, for example limiting the volume of a package containing sealed sources to a 55-gallon drum.

As noted in the response to item 5, the various intruder scenarios should address how the intruder might be exposed to the source and degree of heterogeneity can be factored into the uncertainty portion of the performance assessment. NRC guidance for addressing uncertainty in

performance assessments would be appropriate; however, NRC already has developed and promulgated such guidance in NUREG-1854. The NRC need only clarify that this guidance applies beyond DOE.

9. 10 CFR 61.55(a)(8) allows for averaging of waste concentrations in determining the classification of waste. Such averaging should continue to protect an inadvertent intruder in a waste disposal facility, one of the four performance objectives in 10 CFR Part 61.
- How do other programs for managing and disposing of waste treat protection of an inadvertent intruder?
  - Do they allow for averaging, and if so, what are the constraints?
  - Could or should NRC harmonize its approach with these other programs? If so, would changes need to be made to NRC regulations, or could they be made in guidance?

**Response** – Internationally and at DOE sites, inadvertent intruders are typically considered in site-specific analyses. WAC are established based on both intruder scenarios and migration of contaminants beyond the burial location. NRC acknowledges and allows averaging for WIR in its guidance NUREG-1854. NRC should extend this guidance to LLW disposal sites as suggested by the ACNW. These changes should be incorporated in NRC regulations as part of the ongoing rulemaking.

This change would harmonize to a great extent the NRC approach with that used by DOE, which is by far the largest generator and disposer of LLW not regulated by NRC. Perfect harmonization, while potentially laudable, likely is unattainable as well as unlikely to yield benefits in the management of LLW or the protection of human health and safety.