Exelon Generation®

200 Exelon Way
Kennett Square, PA 19348

www.exeloncorp.com

March 21, 2016

Ms. Cindy Bladey
Office of Administration
Mail Stop: OWFN-12-H08
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001

Subject: Comments Concerning Concentration Averaging and Encapsulation Branch Technical Position (81FR3166, dated January 20, 2016, Docket ID NRC NRC-2011-0022)

This letter is being submitted in response to the U.S. Nuclear Regulatory Commission's (NRC's) request for comments pertaining to the Concentration Averaging and Encapsulation Branch Technical Position published in the *Federal Register* (i.e., 81FR3166, dated January 20, 2016).

The NRC is requesting comments on whether to formally document a position on contaminated material and contaminated trash. The NRC issued Revision 1 of the Concentration Averaging and Encapsulation Branch Technical Position (CA BTP) in February 2015. The CA BTP provides acceptable methods that can be used to perform concentration averaging of Low-Level Radioactive Waste (LLRW) for the purpose of determining its waste class for disposal. When the NRC issued the revised CA BTP, it noted that one issue, distinguishing contaminated materials from contaminated trash, may need further clarification. The NRC also stated that it would consider whether additional guidance, such as a Regulatory Issue Summary (RIS), would be warranted for distinguishing contaminated materials from contaminated trash.

The NRC is requesting that stakeholders interested in commenting consider and address the questions discussed in Section III, "*Specific Request for Comments,*" of the cited *Federal Register* notice.

Exelon Generation Company, LLC (Exelon) appreciates the opportunity to comment on the CA BTP and offers the attached comments for consideration by the NRC.

If you have any questions or require additional information, please do not hesitate to contact Richard Gropp at (610) 765-5557.

Respectfully,

D. P. Helker

David P. Helker
Manager, Licensing and Regulatory Affairs
Exelon Generation Company, LLC

Attachment: Comments Concerning Concentration Averaging and Encapsulation Branch Technical Position

ATTACHMENT

Comments Concerning Concentration Averaging and
Encapsulation Branch Technical Position

ATTACHMENT

Comments Concerning Concentration Averaging and Encapsulation Branch Technical Position

Background

The U.S. Nuclear Regulatory Commission (NRC) issued Revision 1 of the Concentration Averaging and Encapsulation Branch Technical Position (CA BTP) on February 25, 2015, (i.e., 80FR10165). This revision provided updated guidance on the interpretation of 10 CFR 61.55(a)(8) as it applies to the classification (Class A, B, or C waste) of a variety of different types and forms of Low-Level Radioactive Waste (LLRW). 10 CFR 61.55(a)(8) indicates that radionuclide concentrations can be averaged over the volume of the waste or its weight if the units are expressed as nanocuries per gram (nCi/gm). The average radionuclide concentrations are compared with the waste classification tables in 10 CFR 61.55 to determine the class of the waste. The waste class determines the minimum safety measures to be applied in order to provide reasonable assurance of safe disposal of the waste. The previous version of the CA BTP was published in 1995 (ML033630732).

In developing the revised CA BTP, the NRC identified one issue that may need further clarification. One of the categories of discrete wastes that are subject to additional concentration averaging constraints is "contaminated materials." Both the 1995 and revised CA BTPs define contaminated materials as components or metals on which radioactivity resides on or near the surface in a fixed or removable condition. To demonstrate compliance with these averaging constraints, the radiological characteristics and volumes of individual items are typically determined. However, items with surface contamination may also be categorized as contaminated trash, which has fewer averaging constraints. Both the 1995 and the revised CA BTP used the term "contaminated trash," which is intended to be the equivalent of waste descriptor Codes 39 and 40 (i.e., Compactible Trash and Non-compactible Trash) of NRC Form 541, *"Uniform Low-Level Radioactive Waste Manifest - Container and Waste Description."* Items in contaminated trash do not need to be individually characterized. Instead, a container of contaminated trash can be surveyed to determine its overall radioactivity and its classification determined by dividing the overall activity by the waste volume. Neither the 1995 CA BTP nor draft revisions published for public comment provided guidance for categorizing items as either contaminated materials or contaminated trash. In addition, the NRC received no comments from stakeholders on this issue. The NRC is now addressing whether additional guidance, such as a Regulatory Issue Summary (RIS), is warranted for distinguishing contaminated materials from contaminated trash.

On January 20, 2016, the NRC published in the *Federal Register* (i.e., 81FR3166) a request for comments pertaining to the CA BTP. The NRC is requesting that stakeholders interested in commenting consider and address the questions discussed in Section III, "*Specific Request for Comments,*" of the cited *Federal Register* notice.

Exelon Generation Company, LLC (Exelon) appreciates the opportunity to comment on the CA BTP and offers the comments below to the specific questions cited in the Federal Register notice for consideration by the NRC.

Specific Request for Comments

Question 1

Is additional guidance needed to clarify the distinction between contaminated trash and contaminated material?

Response

Additional guidance similar to the assessment of "Cartridge Filters" as a discrete versus blendable waste is needed for "Contaminated Materials." The logic for cartridge filters has clear numerical limits whereas the logic for contaminated materials is qualitative. The desire is to provide the same level of protection for an inadvertent intruder after the 100-year period of institutional controls has ended; therefore, the same limits should be used for both material types. In the absence of any other guidance, licensees will likely use the numerical values for cartridge filters as a quantitative means to clarify the logic for contaminated materials and provide the same level of protection. Licensees would seek to apply a similar approved NRC methodology rather than create their own.

The CA BTP defines discrete items on Page 12 as those which require characterization as individual items. The CA BTP also provides an exception for when cartridge filters may be treated as blendable waste.

Branch Technical Position Discrete Items

Activated Metals
Sealed Sources
Cartridge Filters (with exceptions)
Contaminated Materials
Components incorporating radioactivity in their design (e.g., radium dial watches)

The BTP clarifies on Page 18 that: *"Contaminated trash is considered to be blendable because it is not expected to contain durable items with significant activity. Process knowledge may be used to determine whether items are expected to have radioactivity in high amounts or concentrations. Similarly, those cartridge filters that can be demonstrated (e.g., through process knowledge) not to contain primary gamma emitters in excess of the values in Table 2 may be treated as blendable waste for the purposes of concentration averaging (see Section 3.3.3). As used in this CA BTP, the primary gamma-emitting nuclides are cobalt-60 (60Co), niobium-94 (94Nb), and cesium-137 (137Cs)."*

The following table provides the definitions for "Blendable Waste" and "Discrete Items." The qualitative terms can be eliminated with the numerical logic used for cartridge filters.

Branch Technical Position Definitions

Term	Definition
Blendable Waste	For the purposes of this CA BTP, a waste type is "blendable" if: (1) the waste can be physically mixed to create relatively uniform radionuclide concentrations or (2) the waste is not expected to contain durable items with ***significant activity***.
Discrete Item	For the purposes of this CA BTP, discrete items are items belonging to one of the following waste types: activated metals, sealed sources, cartridge filters, contaminated materials, and components incorporating radioactivity into their design. Items belonging to these waste types are designated as discrete items in this guidance because (1) they are expected to be durable (i.e., remain intact at the time of intrusion) and (2) items belonging to these waste types often have ***relatively high amounts or concentrations of radioactivity***.

The following table is from the CA BTP and is the numerical criteria used to assess cartridge filters as discrete items versus blendable waste. The same numerical criteria should be applied to contaminated materials to provide for consistent logic and the same level of protection.

Table 2. Recommended Activity Limits of Primary Gamma Emitters Potentially Requiring Piecemeal Consideration in Classification Determinations

Nuclide	Waste Classified as Class A	Waste Classified as Class B	Waste Classified as Class C
^{60}Co	5.2 TBq (140 Ci)	No limit	No limit
^{94}Nb	37 MBq (1 mCi)	37 MBq (1 mCi)	37 MBq (1 mCi)
^{137}Cs	266 MBq (7.2 mCi)	27 GBq (0.72 Ci)	4.8 TBq (130 Ci)

In summary, numerical limits already apply for the assessment of cartridge filters as discrete items versus blendable waste. Application of the same numerical criteria would remove any ambiguity and result in the same level of protection for the inadvertent intruder. In the absence of any other guidance, licensees will likely use the numerical guidance for cartridge filters for contaminated materials to use the NRC's methodology for a similar material.

Question 2

When filling out the Uniform Waste Manifest (UWM)(NRC Forms 540, 541, and 542), how is contaminated equipment (UWM code 33) currently distinguished from contaminated trash (UWM codes 39 and 40)?

Response

The Manifest Code "33 - Contaminated Equipment" may be used for radioactive materials shipments in the shipping software, but material shipments do not require the 541 form; therefore, this code does not typically appear on shipping paperwork. This manifest code is typically not used for waste.

The Manifest Codes "39 - Compactible Trash" and "40 - NonCompactible Trash" are used for waste shipments. Code 39 is used for typical bags of trash, whereas Code 40 is reserved for containers of metal or wood. Containers of Dry Active Waste (DAW) manifested as Code 39 will invariably have some number of durable items interspersed within the container. The Code 40 is typically used for distinct bulk volumes of non-compactible items.

The use of the waste codes is driven by the receiving waste processor or burial site as they desire to code material types in accordance with their processes. During the shipment request process, the shipper describes the material for approval, and ultimately the receiver decides on how the material is to be coded for receipt.

Question 3

Should numerical constraints be developed to clarify the distinction between contaminated materials and contaminated trash? If so, what basis should be used to develop the numerical constraints? If not, what qualitative factors should be considered?

Response

The Table 2 criteria in the CA BTP used for the treatment of cartridge filters as discrete or blendable waste should also be used for contaminated material. Approved methodology already exists within the CA BTP; it should also be applied to another material type. The exposure scenario for the unintended intruder is the same; therefore, the limits should be the same for both material types. Licensees would calculate dose rates which would yield equivalent Curie content to use as field limits by personnel.

Question 4

If numerical values are developed, would activity or concentration constraints be preferable? Would an option to use either be feasible to implement?

Response

As noted in the response to Question 3 above, an approved methodology already exists within the CA BTP for the assessment of cartridge filters; it should also be applied to other contaminated materials.

Question 5

What challenges, if any, do you foresee with implementing numerical thresholds for distinguishing between contaminated trash and contaminated materials? How could these challenges be ameliorated?

Response

As noted in the response to Question 3, an approved methodology already exists within the BTP for the assessment of cartridge filters; it should also be applied to other contaminated materials.

Question 6

Would an emphasis on using process knowledge be sufficient to avoid the unintended consequence of causing licensees to characterize individual pieces of trash that have radionuclide concentrations significantly less than the class limits?

Response

As a material type, DAW possesses little chemical retentive properties for radionuclides like Sr-90 and Cs-137, which would likely produce Class B wastes. Additionally, this material type does not mechanically filter and concentrate significant transuranics to result in Class C waste where the transuranic limits are in units of nCi/gram.

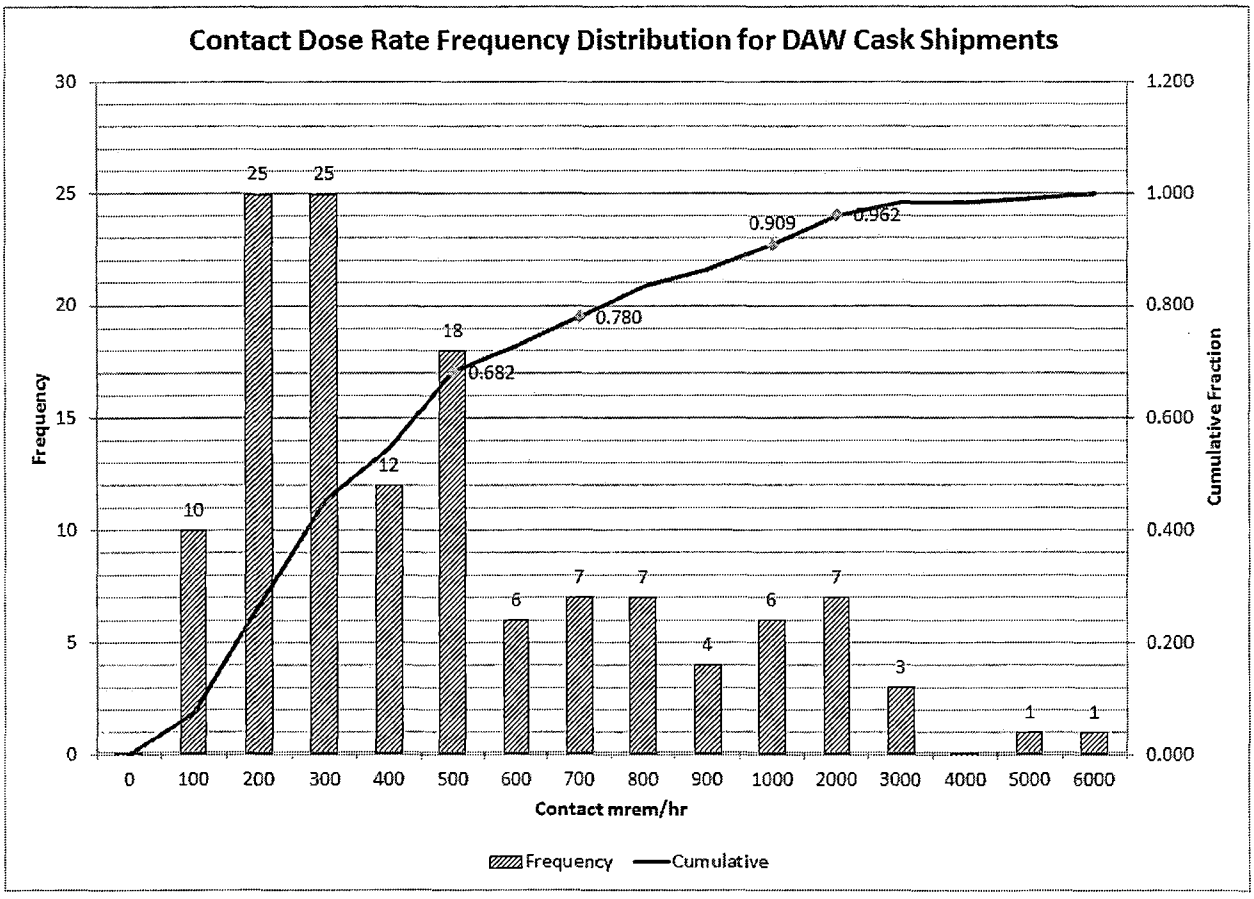
The curie content in Table 2 of the CA BTP used to determine whether cartridge filters can be treated as blendable waste is sufficiently high for DAW to minimize the likelihood of excess handling of Class A wastes and worker radiation exposures.

Question 7

The NRC understands that items referred to as "high rad trash" are placed in containers of contaminated trash and averaged. The NRC also understands that this practice reduces worker exposure as compared to evaluating each item of trash. Please provide examples of "high rad trash," estimated annual volume, areas of the facilities where this waste is generated, and typical contact dose rates (if available).

Response

The following figure provides a distribution of contact dose rates of waste items for two different cask shipments of DAW to a waste processor. Current procedures require DAW with dose rates >300 mrem/hr at 30 cm to be put in a shielded container which skews the distribution towards higher dose-rate DAW. Sites typically generate one liner of high dose-rate DAW each refueling outage (~1/yr).



Question 8

When classifying contaminated trash, is the same sample data (e.g., scaling factors) for determining the radionuclide content of "normal" contaminated trash used for classifying the "'high rad trash"?

Response

DAW is typically Class A waste and, therefore, the required sampling frequency is every 2 years. DAW is a composite of smears of different areas of the plant to sample contaminants of varying ages and distributions to yield a scaling factor for the material for the site. As an example, rags used to wipe a valve have the same radionuclide mix as the high activity valve being shipped as a discrete item, but at a lower magnitude.

Question 9

What process currently is used to determine whether items of "high rad trash" can be disposed of with lower activity contaminated trash or whether items are treated as contaminated materials and averaged with the constraints described for contaminated materials under the 1995 CA BTP?

Response

DAW has historically been shipped to a processor, such that the CA BTP and waste classification is not applicable. Licensees would follow the Waste Acceptance Guide for the processor as primary guidance. DAW would be characterized in the container, unless the processor requested the specific characterization of high dose-rate items such as a cartridge filter.

The 1995 CA BTP on Page 3 states: "Contaminated trash waste, which is composed of a variety of miscellaneous materials, may be considered homogeneous for purposes of waste classification, when placed into containers." This provides the entry condition as a "Homogeneous" material in Section 3.1 of the CA BTP. Section 3.1 pertains to "Mixing of Homogeneous Waste Types or Streams" and provides guidance for homogeneous materials like DAW and resin, etc. Additionally, licensees could use the "Operational Efficiency" provisions of Section 3.1, such that there is no limit to the input concentrations or comparison of the DAW materials put into the container. The final container would be characterized over the entire container for the curie content and subsequent waste class.

If direct shipment to a disposal site were to occur, criteria in the disposal site Waste Acceptance Guide would be the primary guidance. As an example, the Barnwell and Clive disposal site criteria have a section for DAW which includes contaminated metals as part of the definition and large components, but no section that would apply Section 3.4 "Contaminated Materials" as described in the 1995 BTP. Licensees would follow the disposal site criteria and seek clarification in the CA BTP where needed. Licensees would have likely followed the DAW provisions in the Waste Acceptance Guide and Section 3.1 of the 1995 BTP which would not interact with Section 3.4 "Contaminated Materials."

Question 10

Is clarification needed for the term "component" in the definition of contaminated materials used in the 1995 and 2015 CA BTP?

Response

As noted in the response to Question 9 above, there were multiple reasons that Section 3.4 "Contaminated Materials" criteria would not have been used with the 1995 CA BTP.