

**Analysis of Public Comments on NUREG/BR-0204 and
Associated Revisions to the Uniform Waste Manifest**

A notice of opportunity for public comment on Draft Revision 3 of NUREG/BR-0204 “Instructions for Completing NRC’s Uniform Waste Manifest” was published on October 30, 2018, in the *Federal Register* (83 FR 54620) with a 60-day comment period ending on December 31, 2018. An extension of the comment period until January 31, 2019, was subsequently published on December 21, 2018 (83 FR 65759). Below is the list of entities that commented on the draft NUREG, as well as the Agencywide Documents Access and Management System (ADAMS) Accession Numbers for their comments. To access ADAMS, go to <http://www.nrc.gov/reading-rm/adams.html>.

Table 1 Comments Received on Draft NUREG/BR-0204, Rev. 3

| Author | Date | Organization | ADAMS ML# |
|-----------------------------|------------------|---|------------------|
| Glen Vickers | January 6, 2019 | Exelon Generation | ML19008A029 |
| Coleman Clint Miller | January 31, 2019 | Member of the Public | ML19036A627 |
| Earl Fordham | January 31, 2019 | State of Washington Department of Health | ML19036A629 |
| Anonymous | January 31, 2019 | U.S. Army Corps of Engineers | ML19036A631 |
| Vern Rogers | January 30, 2019 | EnergySolutions | ML19046A010 |
| Rusty Lundberg | January 31, 2019 | State of Utah Department of Environmental Quality | ML19046A014 |
| Janet Schlueter | January 31, 2019 | Nuclear Energy Institute | ML19046A016 |

The NRC previously collected comments on NUREG/BR-0204, Revision 2 to inform its revisions of the document. In March 2013, the NRC held a public workshop to collect comments specifically on NUREG/BR-0204, Revision 2 (78 FR 11907). The transcript of the public meeting is available at ADAMS Accession No. ML13080A091. The NRC staff also held a public webinar in June 2013 to further discuss the topic with Agreement State staff (ADAMS Accession No. ML13192A182). Written comments were also received from a number of entities (Table 2).

Table 2 Comments Received on NUREG/BR-0204, Rev. 2

| Author | Date | Organization | ADAMS ML# |
|----------------------------------|----------------|------------------------------------|------------------|
| Perry Williams | March 20, 2013 | Studsvik | ML13255A028 |
| Thomas Kalinowski | April 16, 2013 | DW James Consulting | ML13255A027 |
| Clint Miller | April 25, 2013 | Pacific Gas and Electric Company | ML13255A026 |
| Boyd Imai | June 26, 2013 | Utah Division of Radiation Control | ML13255A025 |
| Glen Vickers | June 28, 2013 | Exelon | ML13255A024 |
| Michael Conroy | July 22, 2013 | U.S. Department of Transportation | ML13255A023 |
| Lisa Edwards | August 1, 2013 | Electric Power Research Institute | ML13260A075 |
| John Tauxe and Paul Black | July 24, 2015 | Neptune and Company | ML15211A059 |

Comments received on NUREG/BR-0204 Revision 2 included:

- The guidance for the reporting of hard-to-detect isotopes (*i.e.*, H-3, C-14, Tc-99 and I-129) on the manifest should be revised and/or clarified.
- Portions of NUREG/BR-0204 Revision 2 were not consistent with current Department of Transportation (DOT) regulations and need to be updated.
- The certification statement should be revised to account for shipments that are sent to a processor rather than directly to a disposal facility.
- Clarification is needed regarding attribution.
- Changes to the reporting of waste weight and volume are needed, and
- A number of editorial changes were suggested.

The NRC staff considered all of the comments received on NUREG/BR-0204, Revision 2 when developing Revision 3 and incorporated the suggested changes where appropriate.

Additionally, to address the many comments received on the reporting of the hard-to-detect isotopes (*i.e.*, H-3, C-14, Tc-99 and I-129) on the Uniform Low-Level Radioactive Waste Manifest, staff developed a Regulatory Information Summary (RIS). RIS-15-002, "Reporting of H-3, C-14, Tc-99, and I-129 on the Uniform Waste Manifest," (ADAMS Accession No. ML14272A217) informs addressees of the option to use indirect methods to determine the activity of H-3, C-14, Tc-99, and I-129 reported on the Uniform Low-Level Radioactive Waste Manifest when the radionuclide is present at a concentration less than the lower limit of detection (LLD). The request for comments on the draft RIS was published in the *Federal Register* on June 2, 2014 (79 FR 31348), and the final RIS was published on February 18, 2015.

The NRC also reviewed and considered each of the comments received from the individuals listed in Table 1 on Draft Revision 3 of NUREG/BR-0204 and associated revisions to the Uniform Waste Manifest (NRC Forms 540, 541, and 542), and appropriate changes were made in the final versions. Comments were summarized (with similar comments being combined) and given a single response.

A. Certification Statement

Comment A-1: Two commenters noted that the clarification of the intent of the certification statement was helpful. One commenter also said that the statement, “the person responsible for the packaging and labeling operations must sign and date the certification on the manifest” is not applicable in all cases. The commenter noted that in some cases, a representative of the company other than the one responsible for the packaging and labeling operations might sign the certification. The commenter further stated that DOT regulations allow for other individuals to act as agents for the shipper and to sign the certification.

Response: The NRC staff agrees that DOT and NRC regulations allow for individuals other than “the person responsible for the packaging and labeling operations” to sign and date the certification on the manifest. The requirement for the certification statement in Title 10 of the *Code of Federal Regulations* Part 20 (10 CFR 20) states that “[a]n authorized representative of the waste generator, processor, or collector shall certify by signing...” and does not require the person responsible for the packaging and labeling to be the individual to sign the form. The first sentence in the guidance for Item 10 on NRC Form 540 will be revised to state, “[a]n authorized representative of the waste generator, processor or collector must sign and date the certification statement on the manifest (49 CFR 172.204(d) and 10 CFR 20.2006(c) and 10 CFR Part 20, Appendix G, Section II).”

B. Reporting of Hard-to-Detect Radionuclides

Comment B-1: Two commenters suggested that actual measurements for Tc-99 and I-129 are not available from commercial laboratories and these radionuclides can only be measured in certain Department of Energy (DOE) Research and Development (R&D) facilities. The commenters stated that the use of the LLD values for determining the inventory of these radionuclides would grossly overestimate quantities of these radionuclides in the waste. These commenters suggested that the NRC add the following language to the guidance for block 1 on NRC Form 541 (“Manifest Totals”):

“The shipper may report the activity of H-3 and/or C-14 based on the LLD value and the amount of waste. The use of scaling factors or the use of activation, migration and partitioning calculations may be used for Tc-99 and I-129.”

Response: The 1983 “Final Waste Classification and Waste Form Technical Position Papers” (1983 Branch Technical Position (BTP)) (ADAMS Accession No. ML033630755) provides guidance on the lower limit of detection (LLD) values that should be achieved for radionuclides included in the 10 CFR 61.55 Tables.

This guidance states that the LLD of a technique for direct measurement of a particular radionuclide should be no more than 0.01 times the concentration for that radionuclide listed in Table 1 of Section 61.55, and 0.01 times the smallest concentration for that radionuclide listed in Table 2 of Section 61.55. Commercial laboratories are able to achieve these detection levels. Agreement State regulators have reported that Tc-99 and I-129 have occasionally been detected at levels above the LLD in LLW. Additionally, commercial laboratories could likely improve their detection levels somewhat with the equipment they already have using longer count times.

The regulations in 10 CFR 61.55(a)(8) allow for the use of indirect methods to determine the concentrations of radionuclides for the purpose of waste classification if there is reasonable assurance that the indirect methods can be correlated with actual measurements. NRC RIS 2015-02, "Reporting of H-3, C-14, Tc-99, and I-129 on the Uniform Waste Manifest", provides further information on the option to use indirect methods to determine the inventory of these radionuclides. In RIS 2015-02, the NRC staff notes that "accurately reporting the activities of these radionuclides is important for better decisionmaking regarding the disposal of low-level radioactive waste (LLRW). Overestimation of disposal site inventory could lead to premature loss of disposal system capacity, whereas underestimation of inventory could lead to public health and safety concerns." Although it may be preferable for shippers to report a more accurate inventory rather than a conservative inventory, the practice per RIS 2015-02 has been to allow shippers to use the conservative approach of reporting the activity based on the LLD values. Because the use of this approach does not cause a health or safety concern, the NRC does not have a basis for eliminating this reporting option for shippers.

Though the Uniform Waste Manifest generally provides the best source of inventory information in LLW, the disposal facilities are not required to use this information directly in their Performance Assessment. When developing an inventory for their performance assessment, the disposal facilities can consider the uncertainty from the use of LLD values to report the inventory. Disposal facilities can also use indirect methods to develop the inventory with greater confidence, as is discussed in more detail in NUREG-2175, "Draft Guidance for Conducting Technical Analyses for 10 CFR Part 61." Note that it is generally not acceptable for disposal facilities to assume a value of zero for the inventory of radionuclides that are less than the lower detection limit unless there is adequate justification that the radionuclide is not present in the waste.

No changes are being made to NUREG/BR-0204 or the Uniform Waste Manifest because of this comment.

Comment B-2: One individual commented, regarding the guidance for Item 1 on NRC Form 541, that it allows shippers to estimate the inventory from the LLD values if the measured activity is below the LLD and directs the shipper to include such inventory, if any, in the total inventory.

The commenter stated that Revision 2 of NURG/BR-0204 separated LLD values from measured activity values or indirectly scaled activity values derived from actual measurements. The commenter also questioned if there is a technical basis for converting LLD values to real values and noted that using the LLD values to develop activity would not meet the reasonable assurance requirement for accuracy, which is defined as being within a factor of 10 in the 1983 Branch Technical Position on Waste Classification and Waste Form.

The commenter further noted that converting LLD values to real values could have other adverse consequences due to the number of radionuclides in waste, which are commonly less than the LLD value. According to the commenter, these adverse consequences could include: reducing the calculated fractional abundance of base scaling radionuclides and lead to the under-reporting of difficult-to-measure radionuclides when performing dose-to-curie activity calculations, overestimating the activity of the radionuclide in the waste, and improperly inflating the waste class fraction.

The commenter also said that the list of LLD radionuclides is virtually infinite and that NUREG/BR-0204 did not include proposed logic for what cutoff shippers should use when reporting the radionuclides that are less than the LLD on the manifest.

The commenter recommended that no change should be made to the current logic in Revision 3 of NUREG/BR-0204.

Response: As is discussed in more detail in the response to Comment B-3, the current guidance continues to distinguish between the inventory developed using different methods. NRC regulations require the reporting of the total radionuclide activity in the shipment (10 CFR 20 Appendix G (I)(B)(4)) and the activity of each of the radionuclides H-3, C-14, Tc-99, and I-129 contained in the shipment (10 CFR 20 Appendix G (I)(B)(5)). To meet this regulation, NUREG/BR-0204, Revision 3 states that the reported activity should represent the best estimate of the total activity. The activity of radionuclides that are present at levels below the LLD should not be ignored if this activity is potentially risk-significant. As is noted in the response to Comment B-5, some radionuclides could be risk-significant at concentrations that are less than the LLD value.

As discussed in more detail in comment B-1, NRC practice has been to allow shippers to report inventory that is derived based on the LLD values and there is no basis for removing this option. Additionally, Revision 2 of NUREG/BR-0204 not only allowed this practice but also implied that shippers must report the inventory based on the LLD values in the guidance for Item 1 for NRC Form 541. The NRC staff wrote RIS 15-002 to clarify that shippers could also use indirect methods to report the inventory per 10 CFR 61.55(a)(8). Although it is preferable for the inventory reported to be more accurate, reporting a conservatively estimated inventory (i.e., an inventory that is likely to be an overestimate) does not pose safety issues and is acceptable for meeting the NRC's regulations. If scaling factors, or other indirect methods, developed to determine the activity of hard-to-detect radionuclides are appropriate, then calculating the inventory based on LLD values should result in a conservative estimate. The use of activity derived using LLD values in determining the waste class is discussed in more detail in response to Comment B-4.

Guidance on which radionuclides should be included (i.e., "significant radionuclides") was provided in NUREG/BR-0204, Revision 3 under Item 16 for NRC Form 541. The determination of "significant radionuclides" is also discussed in more detail in the response to Comment B-4 and Comment C-1.

No changes were made to NUREG/BR-0204 or the Uniform Waste Manifest Forms as a result of this comment.

Comment B-3: One comment was received on the new guidance to differentiate between activity that was derived from direct measurements and activity that was developed using indirect methods, such as scaling factors, on NRC Form 541. The commenter said that there should be no attempt to differentiate between values that were derived using direct methods and indirect methods because indirectly scaled activities are considered to be "determined" or "real" activity values for the purposes of reporting activity and waste classification. The commenter noted that guidance in the 1983 BTP on Waste Classification and Waste Form stated, "If the radionuclide is determined through material accountability, direct measurement, inference through direct measurement, or gross radioactivity measurement, this quantity should be reported as determined."

Response: The NRC staff agrees that inventory developed using indirect methods is "real" for the purposes of reporting the inventory and for determining the class of the waste. The purpose of identifying the method used to estimate the inventory (i.e., direct measurement, indirect methods, or based on LLD values) is to add transparency and to provide the disposal facilities with better information to support their performance assessments. The inventory of radionuclides in a disposal facility is a key parameter in the estimation of the potential dose from

the LLW and better information on the inventory will result in better risk-management decisions for the disposal of the LLW. Additionally, the uncertainty in the inventory estimate changes for the different methods. Disposal facilities could use information about the origin of the inventory numbers to develop uncertainty ranges for use in their performance assessments. Also, if a particular method for determining the inventory is found to bias high or low for a particular waste stream (i.e., the indirect method consistently results in a predicted radionuclide activity that is slightly higher or lower than measured activities), the disposal facility could take this into account when developing the inventory and its associated uncertainty in its performance assessment.

No changes are being made to NUREG/BR-0204 or the Uniform Waste Manifest because of this comment.

Comment B-4: One comment was received regarding the instructions for NRC Form 541, Item 17, in which the commenter suggests converting LLD values to real values for the purposes of waste classification. The commenter said that converting LLD values to inflated activity values would adversely affect waste classification and conflicts with 10 CFR Part 61.

Response: The instructions for NRC Form 541, Item 17 provide guidance on the reporting of the class of the waste per 10 CFR 61.55. The purpose of the classification system for LLW is to categorize the LLW by its potential risk in order to manage the safe disposal of the waste in a risk-informed manner. To appropriately determine the class of the waste, sufficient information needs to be known about the concentrations of the radionuclides in the waste. As is stated in the instructions for NRC Form 541, Item 17 in NUREG/BR-0204 Revision 3, the activity of all radionuclides that are identified as “significant” should be included in the determination of waste class, even if they were present at levels less than the LLD.

The 1983 BTP indicates that radionuclides should be determined to be “significant for the purposes of waste classification” if it is present in concentrations greater than 0.01 times the 10 CFR 61.55 Table 1 value or 0.01 times the lowest § 61.55 Table 2 value for that radionuclide.¹ Revision 3 of NUREG/BR-0204 includes this guidance and also indicates that radionuclides that are present at more than 0.01 times the disposal facility’s waste acceptance criteria (WAC), if applicable, are also significant. NUREG/BR-0204, Revision 3 further states that the lower of the values developed either from the tables in 10 CFR Part 61, “Licensing Requirements for Land Disposal of Radioactive Waste,” or the WAC, if applicable, should be used in

¹ The 1983 BTP includes an exception that radionuclides with half-lives less than 5 years are significant only if they individually exceed the Table 1, Column 1 value (i.e., they do not need to be summed to determine significance).

determining whether a radionuclide is “significant.” In some cases, the WAC may be below the lowest Table 1 or 2 value and, in those cases, radionuclides that are greater than or equal to 0.01 (1 percent of) the WAC should be considered significant.

Limited guidance on the use of LLD (or other) values for those radionuclides found to be less than LLDs in waste classification is provided in the NRC 1983 BTP. The 1983 BTP indicates that the LLDs for radionuclides identified in 10 CFR 61.55 should be 0.01 times the 10 CFR 61.55 Table 1 value or 0.01 times the lowest § 61.55 Table 2 value for that radionuclide. These target LLD values are the same as the thresholds used to identify radionuclides that are “significant for the purposes of waste classification” (i.e., those radionuclides that are at or above the targeted LLDs should be considered significant).

Revision 3 of NUREG/BR-0204 also states, “The NRC recognizes that in some cases the threshold for a radionuclide being ‘significant’ based on the above criteria may be below a practical detection level.” The NRC staff expects that this would apply if a site-specific WAC for a given radionuclide was low compared to its practical detection level. As stated in Revision 3 of NUREG/BR-0204, radionuclides that are “significant for the purposes of waste classification” should be included in the classification calculations.

The NRC recognizes that there have been different interpretations that have been used by the industry regarding the inclusion of concentrations of radionuclides in the classification calculations if they are based on LLD values. As is stated in the EPRI Technical Report 3002008189, “Implementation Guidance for the Nuclear Regulatory Commission Branch Technical Position on Concentration Averaging and Encapsulation,” Revision 1:

There are different interpretations of NRC guidance as to the inclusion of concentrations for the radionuclides ^3H , ^{14}C , ^{99}Tc and ^{129}I in waste classification calculations if they are based on LLD values. One interpretation is that these four radionuclides should be included in waste classification even when they are based on LLD values. The examples in this document contain radionuclide quantifications and waste classifications that in some cases are based on LLD measurements from sample data (these are identified in the classification tables with “<” symbols). Another interpretation is that they do not need to be included when they are based on LLD values. Neither interpretation is expected to have a large impact on the waste classification or concentration averaging if the LLD values are consistent with the NRC guidance on LLD values in the 1983 BTP on Waste Classification. This issue is broader than this implementation guide for the NRC BTP on concentration averaging and is relevant to all issues related to waste classification.

NRC staff has been asked to clarify the guidance on this issue and may provide clarification in future guidance. Until such time as the NRC provides further clarification on this issue, EPRI has no position on which approach is used.

The NRC considers the revised guidance for NRC Form 541, Items 16 and 17 to provide this clarification on the inclusion of activities based on LLD values in the waste classification. As stated in Footnote 11 of NUREG/BR-0204 Revision 3:

For radionuclides that were identified as “significant” but were present at concentrations less than the LLD value, the activity assumed in the determination of the waste class should be based on the LLD value or an indirect method, unless there is adequate justification (e.g., based on process knowledge) that the radionuclide is not present in the waste. It is generally not appropriate to assume a value of zero for the activity of a radionuclide that could be present in the waste when determining the waste class.

The NRC agrees with the authors of EPRI Report 3002008189 that inclusion or exclusion of activities generated based on LLD values is not expected to have a significant impact on waste classification when waste is characterized adequately. If assumptions regarding including or excluding activity of “significant” radionuclides derived based on LLD values could change the waste class, additional analysis of the inventory in the waste may be necessary to support a risk-informed decision on the appropriate management of the waste. For example, the waste could be analyzed using a more sensitive analytical method or increased count times to reduce the LLD value. Indirect methods could be justified and used to quantify the activity in the waste for the purposes of waste classification. Alternatively, it is acceptable for a shipper to take the conservative approach of assuming that the radionuclide is present at the LLD value achieved by the laboratory and include it in the waste classification calculation at that concentration. It is not acceptable for a shipper to zero out LLD values for radionuclides that are found to be significant when doing so affects the risk decision (e.g., the waste class).

No changes are being made to NUREG/BR-0204 or the Uniform Waste Manifest because of this comment.

Comment B-5: Two comments were received with suggested edits to the guidance in NUREG/BR-0204 for Item 1, “Manifest Totals,” on NRC Form 541. Both commenters suggested the following edit (noted with underline and italics):

"If the radionuclides are known to be absent based on process knowledge or lab analysis, place a 'NP' (Not Present) in the appropriate space."

Both commenters also suggested adding the following sentence to the end of the third paragraph in the guidance for NRC Form 541, block 1, "Manifest Totals," in NUREG/BR-0204:

"Alternatively, the shipper can enter on the manifest in parenthesis the activity for these radionuclides based on the laboratory reported value below the MDA [minimum detectable activity] and the amount of waste."

One of the commenters also suggested editing the second sentence in the third paragraph of the guidance for NRC Form 541 Item 1, "Manifest Totals," as follows (edit noted with underline and italics):

"The reported total radionuclide activity should represent the best estimate of the total activity and should consider the measured activity, the activity based on the lower limit of detection (LLD) values or indirect methods, as applicable."

Response: The NRC does not agree with the first proposed edit because a lab analysis result of LLD is not sufficient on its own to determine that the radionuclides are not present at levels that could potentially be risk significant. The detection limits for the radionuclides in question (i.e., H-3, C-14, Tc-99, and I-129) are generally high relative to the potential long-term risk from the radionuclides.

Additionally, the guidance given for the LLD values for these radionuclides in the 1983 BTP on Waste Classification and Waste Form (i.e., the LLD should be no more than 0.01 times the concentration in Table 1 or Table 2 of 10 CFR 61.55) corresponds to 10% of the Class A limit for the radionuclides in Table 1 (which includes C-14, Tc-99, and I-129). The Table values in 10 CFR 61.55 were calculated to protect the inadvertent intruder (10 CFR 61.42) and did not address protection of the public and environment (10 CFR 61.41). If a high number of the waste packages received by the disposal facility were to be a substantial fraction of the LLD for radionuclides, such as H-3, C-14, Tc-99, and I-129, the facility may be challenged in meeting the requirements of 10 CFR 61.41. For these reasons, the dose from these radionuclides could exceed the limits specified in NRC's regulations even if they are not present above the detection limit, and it is important to consider the risk from these radionuclides even if they are present at levels that are below the LLD. One of the purposes of the waste manifest is to provide information to the waste disposal site operator for them to use in demonstrating compliance with 10 CFR Part 61, including demonstrating compliance with the requirement for protection of a member of the public in 10 CFR 61.41.

The NRC staff agrees with the intent of the second proposed edit and will add the following to the end of the third paragraph in the guidance for NRC Form 541, block 1:

“Alternatively, the shipper can enter an activity based on the laboratory reported value for the LLD and the amount of waste. Any value based on an LLD should be entered in parenthesis.”

The NRC staff agrees with the third proposed edit and will make these changes to NUREG/BR-0204.

Comment B-6: One commenter noted that, at the time of the comment submission, the NRC was in the process of reviewing EPRI Report No. 3002005564, “Development of Generic Scaling Factors for Technetium-99 and Iodine-129 in Low and Intermediate Level Waste.” This EPRI report provides a generic means for NRC licensees to demonstrate compliance with the requirement to report these two difficult-to-measure radionuclides. The commenter further stated that NRC review and acceptance of the EPRI report as a means to demonstrate compliance would facilitate a consistent industry approach in reporting difficult-to-detect radionuclides and would increase the efficiency of licensee-specific review time and effort. The commenter further noted that, if accepted, the final NUREG/BR should reference the EPRI report.

Response: EPRI submitted their report (No. 3002005564), “Development of Generic Scaling Factors for Technetium-99 and Iodine-129 in Low and Intermediate Level Waste,” dated Nov 30, 2015, to the NRC and this document was accepted for review on July 19, 2018 (ADAMS Accession No. ML18197A414). On March 1, 2019, NRC sent a Request for Additional Information (RAI) to EPRI regarding the submitted report (ML19042A124). In response to this RAI, EPRI responded, in an email to the NRC, requesting that the NRC suspend its review of this report (ADAMS Accession No. ML19091A077). As is described in the RAIs, the NRC needs additional information to support the scaling factors derived in the EPRI report. If, in the future, EPRI requests that the NRC staff continue the review and provide answers to the RAIs, the NRC staff would resume its review of the report.

No changes are being made to NUREG/BR-0204 or the Uniform Waste Manifest because of this comment.

Comment B-7: One commenter recommended that the NRC endorse the Tc-99 and I-129 scaling factors in NUREG/CR-6567, “Low-Level Radioactive Waste Classification, Characterization, and Assessment: Waste Streams and

Neutron-Activated Metals,” for shippers to use without regulatory scrutiny. This commenter suggested that RIS-2015-02 referenced data in NUREG/CR-6567 as a potential source for determining scaled values for Tc-99 and I-129.

Response: RIS-2105-02 did not endorse the use of the scaling factors proposed by an NRC contractor in NUREG/CR-6567. The reference to NUREG/CR-6567 in RIS-2015-02 noted the research previously performed that indicated that the use of the LLD values for Tc-99 and I-129 could result in a significant overestimation of the activities of those radionuclides.

The scaling factors in NUREG/CR-6567 are based on data from over 20 years ago and are based on a limited number of samples. In 2018, EPRI submitted a report to the NRC for review in which the data and scaling factors in NUREG/CR-6567 were evaluated in detail and their potential for use as generic scaling factors was considered. As noted in the response to Comment B-6, NRC staff reviewed this report and issued RAIs, and EPRI subsequently requested that NRC suspend its review of this report. As is noted in those RAIs, the NRC needs additional information to support the generic use of the scaling factors developed in NUREG/CR-6567 and the EPRI report. If EPRI or another entity provides sufficient additional information to support these scaling factors, the NRC could review the basis and make a determination about whether to accept the scaling factors for generic use. As with any other indirect method used to determine the activity of a radionuclide, an individual licensee could use these scaling factors if they can justify that these scaling factors are appropriate for their waste in accordance with 10 CFR 61.55.

No changes are being made to NUREG/BR-0204 or the Uniform Waste Manifest because of this comment.

C. Definition of “Significant” Radionuclides

Comment C-1: One comment was received on the guidance for Item 16 on NRC Form 541, “Radiological Description,” which states that, in some cases, the threshold for a radionuclide being “significant” may be below a practical detection level. The commenter stated that the definition of a significant radionuclide is greater than 0.01 times the 10 CFR 61 Table 1 or Table 2 Column 1 values and the required LLD values are less than 0.01 times the 10 CFR 61 Table 1 or Table 2 Column 1 values and there is no overlap in the definitions of a “significant radionuclide” and requirements for the LLD values. The commenter also stated that if a radionuclide is less than the LLD, then it was not measured and therefore cannot exceed 0.01 times the 10 CFR Part 61 table values.

Response: To manage the disposal of LLW in a risk-informed manner, sufficient information on the radionuclides that cause the most risk (i.e., “significant” radionuclides) is needed. As is stated in NUREG/BR-0204:

A radionuclide is “significant” if it is contained in the waste in concentrations greater than 0.01 times the concentration of that radionuclide listed in Table 1 of 10 CFR 61.55 or 0.01 times the smallest concentration of that radionuclide listed in Table 2 of 10 CFR 61.55. For waste being shipped to a land disposal facility, radionuclides that are present at more than 0.01 times the WAC, if applicable, at the land disposal facility are significant and should also be reported.

The criteria defining “significant” as 0.01 times the Table 1 or Table 2 Column 1 values in 10 CFR 61.55 is based on guidance in the 1983 BTP. The criteria defining “significant” as 0.01 times a site-specific WAC, if applicable, was selected to be comparable to the logic in the 1983 BTP for radionuclides, if any, for which a site-specific WAC was developed for the disposal facility.

The 1983 BTP guidance also states that the LLD values achieved should be less than 0.01 times the Table 1 or Table 2 Column 1 values in 10 CFR 61.55. As the commenter notes, if this guidance is followed, there should not be any overlap between radionuclides that are “significant” and those with activities below the LLD value. However, it is possible that a site-specific WAC could be lower than the values in Table 1 or Table 2 Column 1 values in 10 CFR 61.55 and therefore the radionuclide could be “significant” at concentrations below a practical detection level. NRC expects this situation could occur if a particular radionuclide is more risk-significant for a specific disposal site than it was found to be in the evaluation of generic sites used to develop the 10 CFR Part 61 Classification Tables. Additionally, these table values were determined based on assumptions about a generic disposal facility and did not include the groundwater pathway. The physical properties of a specific disposal facility could cause certain radionuclides to be more risk-significant than for a generic site. For example, if a site has a significant groundwater pathway dose, site-specific WACs could be lower than the 61.55 table values.

As discussed in response to Comment B-4, if a site-specific WAC is low compared to its practical detection level, the threshold for a radionuclide being “significant” may be below a practical detection level.

No changes are being made to NUREG/BR-0204 or the Uniform Waste Manifest because of this comment.

D. Reporting Activity in Package

Comment D-1: One individual commented that the NRC should clarify whether or not the values for NRC Form 540 Item 16 (“Maximum Package Activity”) should be identical to the activity value reported in NRC Form 541 Item 16 (“Radiological Description”). The commenter suggested that these items were not identical and that the NRC should add footnotes to these two items to clarify that these items are not identical, and the commenter provided suggested language for the footnotes.

Response: The NRC staff agrees with this comment and will add the following language as footnotes to the instructions for Item 16 on NRC Form 540 and Item 16 for NRC Form 541:

“The purpose of the “Maximum Package Activity” reported in Item 16 on NRC Form 540 is to ensure safety during transit and compliance with DOT regulations, while the purpose of the reported activity in Item 16 of Form 541 is to support the management of long-term risk at the disposal facility. For this reason, the values reported on Form 540 Item 16 may be different from those reported on Form 541 Item 16. The shipper should follow the specific instructions for Item 16 on NRC Form 540 and Item 16 for NRC Form 541.”

E. Reporting Volume of Waste

Comment E-1: Several comments were received on the reporting of bulk volumes on the UWM.

A commenter indicated that current industry practice for shipments of low-level waste (LLW) to bulk disposal facilities is to manifest bulk shipping volumes as disposal volumes on the 541 Form. In the commenter’s opinion, manifesting a bulk shipping volume for compactible waste as a disposal volume greatly over-estimates the true disposal volume. The commenter also stated that the inaccurate disposal volumes would be auto-populated in the U.S. Department of Energy’s National Manifest Information Management System (MIMS) from the UWM Forms.

The commenter also suggested revising the manifest guidance for such bulk shipments to exempt the shipper from reporting the volume on the 541 Form. In these cases, the disposal site should input accurate disposal volumes in MIMS, providing a technically feasible opportunity to improve the accuracy of MIMS, provide transparency and prolong actual LLW disposal site capacity.

The commenter further states:

Page 10, paragraph 3: Note that Form 541 is for disposal. The disposal volume of bulk waste may not be known at the time of shipment (e.g. compactible trash). Bulk waste is compacted during the disposal process. The bulk shipping volume is noted on Form 540. There is no disposal container. Therefore, the following changes are needed.

- Add “bulk” after uncontainerized.
- Change “Items 5, 6, 11 and 13 are not applicable” to “Blocks 5, 7, 11 and 13 are not applicable; enter NA for the volume in Blocks 1 and 7 for compactable bulk waste. If known, report the *post disposal displacement volume of the waste in Blocks 1 and 7.*”
- Add “*Enter 11 - Bulk Unpackaged Waste in Block 6 for container description.*”

Regarding NRC Form 540, the commenter stated that, for shipment to bulk disposal facilities, both the weight and volume of the waste should be entered in Item 17 on page 9, indicating that this practice would enable the receiving facility to verify the quantities received to confirm that no material was lost in transport. A separate comment regarding NRC Form 540, Item 17 was received that indicated that the “current practice is to enter only the shipping package weight and not the volume. For shipments to bulk facilities, the volume needs to be entered in addition to the weight so the receiving facility can verify the quantity received to prove nothing was lost in transport.” The commenter requested that the following sentence therefore be added: “When shipping to a bulk disposal facility, the shipping container volume and the weight shall be entered.”

Regarding NRC Form 542, the commenter stated, “Page 19, block 11: Reword ‘As Processed/Collected Total’ to ‘Post Processed/Collected Total.’” Also, add: “For bulk waste shipments, the processor should enter the post disposal displacement volume achieved by the disposal facility for that waste type if known.” The commenter stated that these changes will provide a more accurate disposal volume to the national MIMS database.

A third commenter, a disposal site licensee, indicated that the disposal packaged volume should reflect the actual volume generated, packaged, and shipped to disposal facilities in the bulk disposal container, rather than an estimation of what the final placement volume would be in the disposal cell. It was indicated that the latter would be contrary to tracking actual volumes and disagrees with the proposed change regarding the reporting of bulk volume estimates on the NRC Form 541 since the actual volume of waste in the bulk waste received does not change and has no bearing on actual capacity at LLRW disposal facilities. The commenter also indicated that, in the event that MIMS data is being used to track waste volumes generated and disposed of at

U.S. commercial disposal facilities, a reduction factor could be applied to the inventory reported in MIMS to estimate the “post-disposal displacement volume,” which could be used by generators seeking to address the difference between it and waste volumes generated, packaged, and shipped from their facilities.

Response: NRC Forms 540 and 541 have different information and purposes. Most of the information on NRC Form 540 (Shipping Paper) is needed to meet the U.S. Department of Transportation shipping paper requirements for radioactive material shipments. Similarly, most of the information requested on NRC Form 541 is needed to meet 10 CFR 20 Appendix G. The regulations in 10 CFR Part 20, Appendix G (I)(D)(1) refer to “uncontainerized waste” and require that the shipper of the radioactive waste provide its approximate volume and weight on the uniform waste manifest. Neither the regulations nor the guidance exempt the shipper from reporting the volume of the waste that is shipped on the NRC forms. Therefore, the reporting of the actual as-shipped volume of waste (i.e., the volume that is placed in the ground prior to compaction) on NRC Form 541 is required.

Regarding the comment that shippers of bulk waste should enter both the weight and volume of the waste in Item 17 on NRC Form 540, the NRC does not consider this change to be necessary. As stated above, NRC Form 541 requires both waste weight and volume information that would permit receiving facilities to determine if material had been lost in transit, including the volume of the shipping container, volume of the waste, combined weight of the waste and shipping container,² and the weight of the waste. Both NRC Form 540 and NRC Form 541 should have accurate information that reflects the properties of the waste as it is shipped. This includes information for uncontainerized waste.

To further clarify the guidance for reporting the total weight or volume on NRC Form 540, Item 17, the following text was added:

“(Note that on NRC Form 541, the volume of the shipping container, volume of the waste, combined weight of the waste and shipping container, and the weight of the waste will be entered, including for uncontainerized waste.)”

The NRC expects that the disposal facility would use the final, as-disposed volume, in their performance assessment for their site. Because the land disposal facility is responsible for the disposal of the waste, the NRC expects that the land disposal facility would have better information on compaction and post-disposal volume of the waste than the shipper. The NRC therefore

² For uncontainerized waste, it is the weight of the waste (10 CFR Part 20, Appendix G (I)(D)(1)).

considers it more appropriate for the disposal facility to develop the post-disposal volume from the pre-disposal volumes reported by the shipper and their knowledge of disposal practices for their site than for a shipper to estimate the post-disposal volume.

The commenter did not provide a basis, nor has the NRC determined a need, for changing the term “As Processed” to “Postprocessed” for the descriptions in the instructions in the NUREG for Item 11 of NRC Form 542. Therefore, this requested change was not made.

The NRC agrees with the comment to add “Enter 11 - Bulk Unpackaged Waste” for Item 6 on NRC Form 541 and has added this language to NUREG/BR-0204.

MIMS was developed by the U.S. Department of Energy.³ While MIMS is outside of the scope of these NRC document revisions, measures to enhance MIMS and its ability to track post-disposal volume may be considered by the DOE and could constitute a long-term effort.

Comment E-2: Two commenters requested that a new second sentence be inserted into the instructions for NRC Form 542, Item 5 of the NUREG that reads: “This should be the facility where the radioactivity originated.”

Response: Multiple commenters requested that a sentence be added to note that the facility indicated should be “where the radioactivity originated.” However, 10 CFR 20 Appendix G Section I provides definitions for “generator” and “waste generator,” which should be utilized should clarity be needed. Therefore, the NRC will add a footnote (Footnote Number 13) to provide this clarifying information.

Comment E-3: Two commenters requested that a new sentence be inserted into the instructions for NRC Form 542, Item 10 of the NUREG that reads: “In addition, Compact Export Permit numbers, if applicable, shall be noted in this block.”

Response: The instructions for this item currently requests that the compact region or state for the generator of the waste, per 10 CFR Part 20, Appendix G, Section I, be identified. If there is a Compact Export Permit Number, it can be noted on the form, but it will not be required. The NRC has revised the NUREG to include this consideration for NRC Form 542 as follows: “In addition, Compact Export Permit numbers, if applicable, may be noted in this block.”

³ <https://mims.doe.gov/>

The NRC also added a sentence to the guidance to allow shippers to include these or other permit numbers that are issued by the receiving state: "Permit numbers issued by the receiving state (e.g., an out of state access number) may also be noted in this block."

Comment E-4: A comment was received regarding the instructions to report the volume of waste by discrete waste type in Item 13 of NRC Form 541. The commenter noted that the waste types on NRC Form 541 are a mixture of discrete and blendable waste types. The commenter further suggested that the volume of waste should be listed by the different "waste descriptors" in Note 2 of NRC Form 541 instead of reporting the waste by discrete waste type.

Response: The edits to the instructions for Item 13 ("Approximate Waste Volume in Container") of NRC Form 541 in draft Revision 3 of NUREG/BR-0204 to report the volume of waste by "generator and discrete waste type, as applicable" were intended to make the guidance for Item 13 consistent with the instructions for Items 5 ("Container Identification Number/Generator ID Number") and 12 ("Waste Descriptor") on NRC Form 541 in both the Revisions 2 and 3 of NUREG/BR-0204. (Note that item "Waste Descriptor" was Item 11 in Revision 2.) The changes to the text in Item 13 of NRC Form 541 are not intended to change the logic used to determine what information should be reported on the manifest.

The NRC agrees with the commenter that the revised language in Item 13 does not account for blendable waste. The guidance for Items 5, 12, and 13 on NRC Form 541 was edited to clarify that separate rows should be used for each generator. In addition, those items were edited to clarify that for each waste type within the same container, the waste descriptors for the different waste types should be written on separate rows to allow for the provision of radiological descriptions on an individual waste descriptor and individual solidification or stabilization media basis. This information is useful for supporting the source term modeling for the performance assessment for the disposal facility and is also needed to support the determination of the waste class when a volumetrically or weight-averaged concentration is used. Section 3.6 of the 2015 Branch Technical Position on Concentration Averaging and Encapsulation, Revision 1, Volume 1 (CA BTP) (ADAMS Accession No. ML12254B065) states:

As part of this quality assurance program, if the classification of a waste is based on the volumetrically averaged or weight-averaged nuclide concentration, the licensee responsible for classification of the waste should prepare, retain with manifest documentation, and have available for inspection a record documenting the licensee's waste classification analysis. It is generally expected that this record or analysis, in and of

itself, should be sufficient to show that the classification was undertaken in a way consistent with the guidance found in this CA BTP.

The following edits were made to the guidance for NRC Form 541 in NUREG/BR-0204 to add clarity to the guidance and to address this comment:

Item 5 (new text noted with underline):

“Additionally, use separate rows for blendable waste and for each discrete waste type, as defined in 10 CFR Part 20, Appendix G (I)(E) (i.e., activated material, contaminated equipment, mechanical filters, sealed source/devices, and wastes in solidification/stabilization media), within the same container.”

Item 12:

“Using the codes found in Note 2 at the bottom of NRC Form 541, indicate the codes that most specifically describe the type of waste. As described in Item 5 above, for different waste types within the same container, the waste descriptor for the different waste types should be written on a separate row to allow for the provision of radiological descriptions on an individual waste descriptor and individual solidification or stabilization media basis.”

Item 13 (deleted word noted with strikethrough):

“Indicate the approximate volume in cubic meters of containerized waste by generator and ~~discrete~~ waste type, as applicable and as described in the instructions for Items 5 and 12 above (10 CFR Part 20, Appendix G (I)(C)(8)).”

Comment E-5: An individual commented about the language on Item 13 on NRC Form 541 that says that “>85%” may be entered for the waste volume in the container if certain criteria are met. The commenter noted that the 85% criteria is different than the guidance in the 2015 Branch Technical Position on Concentration Averaging and Encapsulation, which states that if a blendable waste exceeds 90% of the fill volume, then the concentration may be averaged over the entire fill volume.

Response: The NRC staff agrees with this comment and the following language will be added to the instructions for Item 13 on NRC Form 541:

“Note that Table 4 of the 2015 Branch Technical Position on Concentration Averaging and Encapsulation states that if a waste container with a single blendable waste stream is more than 90% full of waste (by volume), the nominal interior volume (“fill volume”) of the container may be used. In cases where this 90% criterion is used to

determine the concentration, the fill volume should be reported as >90% rather than >85%. Individual consignees (e.g., land disposal facilities) may have additional requirements for the manner in which the waste volume is reported.”

Although the >85% criterion differs from the criterion in the 2015 Branch Technical Position on Concentration Averaging and Encapsulation, the NRC staff is not deleting the >85% criteria from the guidance to be consistent with past guidance in Revision 2 of NUREG/BR-0204 and to allow licensees some flexibility in the reporting of the waste volume. Individual consignees (e.g., disposal facilities) may have specific requirements for the reporting of the waste volume.

F. Standard for measurement accuracy

Comment F-1: One commenter stated that, because NUREG/BR-0204 requests that the container volume be reported to the nearest hundredth of a cubic meter in Item 7 on NRC Form 541, similar reporting requirements should be included for other weight and volume data included in the manifest forms.

Response: NRC staff has reviewed the text the commenter referred to and has found that there is no regulatory requirement for reporting the requested level of accuracy. The text regarding reporting container volume to the nearest hundredth cubic meter has been removed from NUREG/BR-0204. Waste shippers should follow the weight and volume reporting practices required by the intended waste disposal facility.

G. Transportation Reporting Requirements

Comment G-1: One commenter stated that NRC Form 540 Item 2 instructions have overly detailed regulatory references such that if there are any minor changes to numbering of the supporting regulation then this NUREG will require revision. The current version keeps references at the section level (e.g. 49 CFR 173.410) such that minor changes in numbering or content within that section will not require a change to this NUREG. Also, being overly specific is an error trap for those only looking at the specific reference and missing supporting logic for the implementation or exception for that step. The overall section may have other applicable requirements or exception statements that need to be considered. Overly specific references are throughout the document and recommend use of the current logic of only referring down to the section level throughout the NUREG, like the current revision.

Response: It is to be understood that all applicable requirements should be adhered to, and where beneficial for understanding of the requirements, a title, part,

section, or otherwise may be stated. While having specific citations referenced does result in the need for updating NUREG/BR-0204 when there are changes to the cited regulations, having specific regulatory citations for each requirement listed in the document adds clarity on the basis for the requirement. In addition, when the regulations are changed, corresponding revisions to related regulations and supporting guidance are considerations for the rulemaking process. No changes were made to the text in response to this comment.

Comment G-2: One commenter stated that the text regarding adding the term “special form” to the physical and chemical form description be removed from the instructions to complete Item 14 on NRC Form 541 because “special form” is already included in the proper shipping name (reported in Item 11). The commenter stated that the inclusion of this term could create a confusing conflict with the shipping requirements in 49 CFR 172.

Response: The NRC staff disagrees with the comment. The text regarding the use of “special form” in this section of NUREG/BR-0204 is essentially a quote from 49 CFR 172.203(d)(2), which requires the term “special form” to be included in the description of Class 7 Materials when “special form” is not part of the proper shipping name. No changes were made to the text in response to this comment.

Comment G-3: One individual commented that multiple carrier shipments are not directly addressed in the guidance for NRC Form 540. The comment stated that if two or more carriers will be used for the shipment (e.g. multi-modal shipments) to the licensed disposal facility, the NRC Form 540 identifies the initial carrier but does not provide any information on the subsequent carriers. The NRC Form 540 has an existing provision in Item 7 that allows the attachment of additional information. The commenter believed that it is important to include this information with the shipping paper for all subsequent carriers after the initial carrier until the waste reaches the licensed disposal facility because this information establishes and documents the chain of custody for the waste until it arrives at the licensed disposal facility. The commenter also believes the existing NRC Form 540 should provide instructions to the shipper in Item 6 to utilize Item 7 (“Additional Information”) to identify each carrier name, address, and telephone number in chronological order after the initial carrier until it arrives at the licensed disposal facility.

The commenter recommended the following paragraph be added to the guidance for NRC Form 540 Item 6:

“If two or more carriers will be used for the shipment of LLRW or DOT hazardous material (e.g. multi-modal shipment) to the licensed disposal

facility, indicate in Item 7 that Additional Information on each carrier after the initial carrier shall be included in an attachment. The attachment shall identify the subsequent carrier's name, address and telephone numbers in chronological order after the initial carrier."

Response: The NRC agrees with this comment and the following text was added to the guidance for NRC Form 540 Item 6:

"If two or more carriers will be used for the shipment of low-level radioactive waste to a licensed disposal facility, generator, or processor, provide the information for the first carrier in Item 6. The requested information for additional carriers should be provided in an attachment in chronological order. Include the page count for any such attachment in the total pages for "Additional Information" in Item 7."

Comment G-4: One comment was received on the guidance on the reporting of individual radionuclides on NRC Form 540 Item 15. The comment notes that the revised guidance says to include the radionuclides specified by 173.433(g) and the applicable WAC. The comment further states that NRC Form 540 is the shipping paper for transport and emergency response and the proposed additional requirement does not exist in 49 CFR. The individual commented that WAC requirements will vary by disposal location and that it would be unnecessarily complicated for shippers and shipping software programmers to report radionuclides based on the WAC.

The commenter recommended that there should be no change to the logic in Revision 2 of NUREG/BR-0204, which the commenter said permitted the users to list all radionuclides or the minimum specified by 173.433(g). Finally, the commenter indicated that the proposed new text would create a conflict with 49 CFR.

Response: The NRC staff agrees that the main purpose of NRC Form 540 is to provide information to satisfy DOT requirements and for management of risk during transport and handling of the waste. NRC staff would expect that most, if not all, of the WAC for the land disposal facility would be based on the risk after disposal, not the risk during transport, and would therefore not be applicable to the listing of radionuclides on NRC Form 540. Therefore, the NRC deleted the language stating "and as required by the land disposal facility WAC, as applicable" from the guidance for the radionuclides that should be listed on NRC Form 540.

Although the NRC is not requiring the reporting of additional radionuclides beyond the DOT requirement on NRC Form 540, the NRC also does not find that reporting additional radionuclides beyond the DOT requirements would

result in a conflict with 49 CFR. Disposal facilities can request additional information beyond the minimum required by DOT, and shippers can continue to list additional radionuclides beyond the minimum required by DOT if they prefer.

To add clarity, the instructions for Item 15 on NRC Form 540 were revised as follows:

“See DOT regulations at 49 CFR 172.203(d)(1) and example abbreviations at 49 CFR 173.435. List the radionuclides (as determined by 49 CFR 173.433(g) that are present in the transport package. The radionuclide’s mass number may immediately follow the element symbol (i.e., a dash between the symbol and mass number is not needed). A semicolon and space should separate the listing of multiple radionuclides. Individual consignees (e.g., land disposal facility operators) may require a more extensive reporting of the individual radionuclides than is required by DOT.”

Comment G-5: Two comments were received that suggested that the instructions for NRC Form 540 should include guidance on reporting the railroad reporting mark on the manifest. The comments noted that 49 CFR 172.203(g)(1) requires that “A shipping paper prepared by a rail carrier for a rail car, freight container, transport vehicle or portable tank that contains hazardous materials must include the reporting mark and number when displayed on the rail car, freight container, transport vehicle or portable tank.”

Response: The NRC agrees with these comments and will add the following language to the instructions for NRC Form 540 Item 18, “Identification Number of Package”:

“For waste that is shipped by rail, the reporting mark and number should also be included in this Item (49 CFR 172.203(g)).”

Comment G-6: The instructions to the NRC Form 540 explain in the first paragraph that: “The majority of the information on NRC Form 540 is needed to meet DOT shipping paper requirements. The following are general instructions. Details on DOT requirements can be found in 49 CFR Parts 171, 172, and 173.” This instruction should be specific on when the emergency response phone number is required and acknowledge that it is not required for all shipments using this form.

Response: As indicated in the NUREG, “the shipper must provide an emergency response telephone number or numbers for use in the event of an emergency (49 CFR 172.604).” The emergency response telephone requirements are provided in this regulation and state that this information must be provided for all

hazardous material, which includes Class 7 radioactive material. Therefore, no changes were made as a result of this comment.

Comment G-7: One individual commented that the guidance for NRC Form 540 Item 1 should be revised to clarify which box in Item 1 certain emergency response information (i.e., the name of the person, contract number, or unique identifier) should be placed in. The commenter suggested that the guidance should be revised as follows: “Enter the name of the organization responsible for providing the emergency response information (ERI) as required by 49 CFR 172.604. Enter the name of the person, contract number, or unique identifier assigned by the ERI provider in association with the Organization name.”

Response: The NRC staff agrees with this comment and has changed the guidance for NRC Form 540 Item 1 to the following:

“Enter the name of the organization responsible for providing the emergency response information. Enter the name of the person, contract number, or unique identifier assigned by the emergency response information provider in association with the organization name (49 CFR 172.604).”

Comment G-8: One commenter suggested that clarification is needed for the instructions for providing emergency response information when there are multiple emergency response telephone numbers.

Response: The NRC staff agrees with this comment. The following language will be added to the instructions for Item 1 on NRC Form 540:

“Enter each individual emergency response number immediately following the description of the material in Item 11 (49 CFR 172.604(a)(3)).”

The following language will also be added to the instructions for Item 11 on NRC Form 540:

“As is described in the guidance for Item 1, when multiple emergency response numbers are applicable, each individual emergency response number should be entered immediately following the description of the material in Item 11 (49 CFR 172.604(a)(3)). Enter associated emergency response information (i.e., the name of the organization responsible for providing the emergency response information and the name of the person, contract number, or unique identifier assigned by the emergency response information provider) immediately adjacent to the emergency response numbers. The emergency response numbers should be

formatted in a manner to allow the information to be easily and quickly found (e.g., use of bold font or highlighting).”

Comment G-9: One commenter suggested that clarification is needed within the instructions on where the emergency response guide number should be identified (Item 1 or 11) on the NRC Form 540. The commenter noted that the instructions to the NRC Form 540 in the last sentence of Item 1 states: “Note that additional emergency response information must be available and presented in accordance with 49 CFR 172.602 and 49 CFR 172.604.” The commenter stated that it would be more appropriate to include the emergency response guide number in accordance the instructions in Item 11 in association with the basic shipping description and suggested that the NRC revise the last instruction of Item 11 to the following: “Additional information and description requirements (e.g. emergency response guide number, indication of Reportable Quantity and NRC Certificate of Compliance, if applicable) are specified at 49 CFR 172.203 and will be identified in Item 11.”

Response: The note in Item 1 in the guidance for NRC Form 540 cited in this comment is intended to remind the shipper that the regulations in 49 CFR 172.602 and 49 CFR 172.604 might require additional emergency response information beyond what is to be provided on NRC Form 540. Per 49 CFR 172.602(b)(3), this information can be provided in a document other than the manifest.

The NRC staff agrees that a shipper could include the emergency response guide number in Item 11 on NRC Form 540 and the following text was added to the guidance for Item 11:

“Additional information, such as the emergency response guide number, can also be identified in Item 11. If the shipper chooses to enter the guide number under this item, it should be formatted to be easily and quickly found.”

H. Use of UWM for waste other than LLW

Comment H-1: One commenter stated that NUREG/BR-0204 should acknowledge that some licensed disposal facilities require the use of NRC Forms 540 and 541 for disposal of material other than low-level radioactive waste. Additionally, the commenter suggested that NUREG/BR-0204 be revised to indicate that the term “Non-Regulated Waste or Material” should be inserted in NRC Form 540 Item 11 in cases where the form is used for a package or conveyance that is not a hazardous material for purposes of transportation in commerce.

Response: The NRC staff disagrees with this comment. NRC Forms 540, 541, and 542 were designed for the collection of information necessary to satisfy regulations in 10 CFR. Addressing these non-NRC regulated uses of NRC forms is outside the scope of this document. No changes were made as a result of this comment.

I. Editorial

Comment I-1: One commenter stated that the manifest numbering system requested for Item 8 on NRC Form 540 is overly specific. The commenter suggested allowing a more general approach to manifest numbering to prevent unnecessary administrative non-compliances.

Response: The NRC staff agrees with the comment. The text of NUREG/BR-0204 will be revised to request a unique manifest number be provided without a requirement on the number of characters.

Comment I-2: One commenter stated that the numbering system requested for container and generator identification for Item 5 on NRC Form 541 is overly specific. The commenter suggested a more general approach to numbering be allowed to prevent unnecessary administrative non-compliances.

Response: The NRC staff agrees with the comment. The text of the NUREG/BR-0204 will be revised to simply request a unique Number/Generator ID Number(s) be provided.

Comment I-3: One commenter noted that italics were removed from NUREG/BR-0204 in Revision 3 of the document. The commenter stated that without the italics it is harder to distinguish the important points in the document.

Response: The NRC staff removed the italics from Revision 3 of NUREG/BR-0204 to improve the clarity of the document because the italics in Revision 2 of NUREG/BR-0204 had a specific, and non-standard, meaning and were not used in the typical manner of providing emphasis. NUREG/BR-0204, Revision 2 states, "Note: Information in these instructions that is typed in *italics* is not required by Federal law or regulation. Radioactive shipments that are not manifested under NRC regulations must continue to comply with Department of Transportation (DOT) regulations." In Revision 2 of this document, guidance was frequently written in command language (e.g., "must") and italicized. In developing Revision 3 of the document, the NRC staff revised sentences that were guidance and not regulatory requirements from command language such as "must" to guidance language (e.g., "should"). As part of this effort, the NRC staff also removed the italics because the staff found that using italics to distinguish between guidance and

regulatory requirements was confusing. Although the NRC staff agrees that appropriately used italics can greatly improve the readability of a document, in this case the use of italics could cause confusion about regulatory requirements. No changes were made as a result of this comment.

Comment I-4: Two commenters stated that the reference to the NRC's "2015 Concentration Averaging and Encapsulation Branch Technical Position" should be revised to read "2015 Branch Technical Position on Concentration Averaging and Encapsulation" in the instructions for Item 5 on NRC Form 541 and Footnote 6.

Response: The NRC staff agrees with this comment and the citation has been edited in the instructions for Items 5 and 9 for NRC Form 541 and in the footnotes associated with Items 5 and 16 for NRC Form 541.

Comment I-5: Two commenters suggested that "and should enter NA in this block" should be added to the instructions for block 17 for NRC Form 541 in NUREG/BR-0204 for waste that is shipped to processors.

Response: The NRC staff agrees with this comment and has added this text to NUREG/BR-0204.

Comment I-6: One individual provided several minor editorial comments on NRC Form 541. These comments include:

- Item 1: Place a heavier border between "I-129" and "Source (kg)" to ensure all "Activity (MBq)" fields are obviously enclosed.
- Item 2: Change the "Shipper I.D. Number" to "Shipper ID Number" for consistency with NRC Form 540.
- Item 11: Change "MBq/100cm²" to "MBq/100 cm²" by inserting a space between "100" and "cm²."

Response: The NRC staff agrees with these changes and will make the suggested changes to the forms.

Comment I-7: One commenter recommended that consistent language should be used for the Shipper ID Number on NRC Forms 540, 541, and 542 and that "Identification Number" on NRC Form 542 and in its instructions should be changed to "Shipper ID Number."

Response: The NRC staff agrees with this comment and will change "Identification Number" in Item 1 on NRC Form 542 to "Shipper ID Number." The NRC will also change the language in the first sentence of the instructions for Item 1 for NRC Form 542 to read "Complete the collector's or processor's name, Shipper ID Number, and the shipping date."