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Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste Licenses Under 10 CFR Part 50, Part 52 and Part 72

Comment On: NRC-2020-0278-0001

Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste

Document: NRC-2020-0278-DRAFT-0004

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Submitter Information

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General Comment

Industry Comments on Draft Regulatory Guide (DG)-1377, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste" [NRC Docket-2020-0278; 86FR326; January 5, 2021]

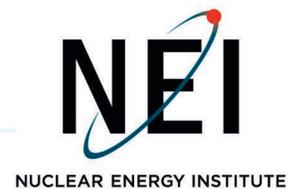
Attachments

02-19-21_NRC_NEI Industry Comments DG-1377 RG 1.21 Rev 3 with Attachment

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February 19, 2021

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Washington, DC 20555-0001
Attn: Program Management, Editing and Announcements Staff

Subject: Industry Comments on Draft Regulatory Guide (DG)-1377, "Measuring, Evaluating, and Reporting Radioactive Material in Liquid and Gaseous Effluents and Solid Waste" [NRC Docket-2020-0278; 86FR326; January 5, 2021]

Reference No: 689

Dear Administration Official:

This letter is sent on behalf of the Nuclear Energy Institute¹ (NEI) and its affected members. We appreciate the opportunity to comment on the U.S. Nuclear Regulatory Commission's (NRC) current draft of Regulatory Guide 1.21 as titled above. We can assure you that industry takes very seriously its commitment to accurate measuring, evaluating and reporting of radioactive material in all its waste streams. In that regard, we routinely look for ways to make our radioactive waste management programs and processes more efficient and risk-informed. As such, we offer the following comments on DG-1377 as made available for comment in the referenced Federal Register Notice.

Current NRC Reporting of Solid Waste is Unnecessarily Burdensome and Not Risk-Informed

Problem: Current industry practice is to either ship radioactive waste directly to a permanent waste disposal site or to a waste processor who subsequently processes and repackages the waste for disposal. These safe practices are performed in accordance with existing plant-specific Technical Specifications (Tech Specs) which require reporting of solid waste effluents. Some of these old Tech Specs required that Waste Class be reported, and Waste Class is only applicable to shipments to a licensed low level waste disposal site. These Tech Specs and the original RG 1.21 both pre-date the advent of off-site processing of radioactive waste. Table A-3 for Solid waste reporting in Rev 1 of RG 1.21 is Subtitled Shipments from the plant "for burial". Taken together, it is clear that the original intent of the Tech Specs and RG 1.21 was to

¹The Nuclear Energy Institute (NEI) is responsible for establishing unified policy on behalf of its members relating to matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect and engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations involved in the nuclear energy industry.

report the quantity of solid low level waste "buried in the soil". Therefore, NRC should interpret the term "release" as follows: gaseous releases are to the air, liquid releases are to the water and solid releases are to the soil.

The current Rev 2 of RG 1.21 Table A-3 for Solid Radioactive Waste reporting requires Waste Class be reported. It should be recognized that waste generators are not able to precisely record or report volume of wastes shipped from the plant to a waste processor. It is only after waste processing occurs (on- or off-site) that an accurate disposal volume is determined and waste classification is technically possible. Then the waste can be manifested for shipment and disposal. Accurate classification of radioactive waste is critical to its safe management and disposal, and we can assure you that industry takes this responsibility seriously. Unfortunately, Rev 2 of RG 1.21 also requires that shipments from a plant to a waste processor be included. Since waste classification of shipments to waste processors cannot be conducted and is not required per 10 CFR part 20, Rev 2 is conflicted. Few, if any, plants have adopted Rev 2 due to this conflict.

NRC proposes for Rev 3 to RG 1.21 that the reporting of Waste Class be eliminated. Apparently, this change is being proposed to enable inclusion of shipments to waste processors and eliminate the above conflict. NRC also submits that this change would reduce the reporting burden. The proposed change would require plants to alter their old Tech Specs on solid radioactive waste reporting. Although these Tech Specs were relocated to Plant procedures per NRC guidance, they were never rescinded by the NRC. Altering these "relocated" Tech Specs will be a new burden to waste generators who adopt Rev 3. In addition, the current desire of NRC to have shipments to waste processors reported is burdensome. Rev 2 of RG 1.21 has a whole paragraph listing examples of radioactive shipments that leave a plant which are not deemed to be waste and need not be reported. There is no national data base of such shipments so plant personnel must comb through all shipments to waste processors and determine which ones actually include waste for ultimate disposal versus those for recycling or decontamination and clearance.

Therefore, we believe that a more risk-informed intent of the NRC requirement is to report the volume and activity of solid radioactive waste "buried in the soil" and not bulk shipments of waste from a generator to a waste processor prior to final disposal. It should also be recognized that, technically, licensees could be cited today for estimating waste volumes of bulk shipments and not properly counting which shipments to processors had "waste". Violations of this nature are not risk-informed and, inherently, not consistent with reporting and tracking wastes legitimately "buried in soil" as captured in RG 1.21. Finally, the current RG 1.21 solid waste reporting burden would be reduced if shipments of waste from the generator and/or their processor to disposal sites were reported since this approach would be consistent with manifest data auto entered by LLW disposal sites into (and retrievable from) the Department of Energy's Manifest Information Management System national database.

Solution: NRC should interpret the phrase "solid waste released" to mean any radioactive waste that is shipped directly from the waste generator to the permanent waste disposal site or any shipment of radioactive waste from the waste processor to the permanent waste disposal site. This interpretation is risk-

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informed, a more accurate account of the "released" waste and is consistent with the manner in which such wastes are reported or and accounted in the DOE's MIMS database. This change would align NRC and DOE on this topic of public interest and be transformational. Specific edits to RG 1.21 to affect this goal as well as other clarifying edits are included in the Attachment.

We look forward to future discussions on this matter. Please reach out to me or my NEI colleague Martin Phalen, Radiation Protection Program Manager with any questions on the content of this letter. Mr. Phalen may be reached at mjp@nei.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Janet Schlueter". The signature is written in a cursive, flowing style.

Janet Schlueter

Attachment: As stated

c: Patricia Holahan, NMSS/DWUP
Steven Garry, NRR/DRA/ARCP

Specific Edits Suggested to Draft Guide-1377 (RG 1.21 Revision 3)

1. Page 39, Section 6. "Solid Radioactive Waste Shipped for Processing or Disposal" – Paragraph 1, last sentence should be edited to read: "The data reported should.....from a plant site for *waste disposal* (i.e., *shipments directly to disposal and waste processor shipments to disposal*)"
2. Page 39, Section 6. "Solid Radioactive Waste Shipped for Processing or Disposal" – Paragraph 5 should be deleted in its entirety as it is not risk-informed nor does it reflect the accepted practice of off-site processing of such wastes.
3. Page 45, Section 9.3 "Solid Waste Shipments" – Paragraph 1 should be edited to read: "Appendix A, Table A-3, provides an acceptable.....report the waste shipped *for direct disposal* (without offsite processing) *and waste processor shipments of waste to disposal*."
4. Appendix A, Page A-5, Table A-3 should be deleted in its entirety and replaced with Table A-3, "Low Level Waste" from Revision 2 of RG 1.21
5. Section 1.6 of the draft guide clarifies requirements for drinking water I-131 sampling. This section does not specify a receptor age group.
 - The section should specify all ages to be considered, just adult age group, etc. It appears from initial calculations that the infant age group actually appears to be the highest dose factor for the iodines and about 3 times higher than adults for I-131. Recommend a basis be included for having only adult dose factors. The critical age group varies by nuclide, with infant apparently predominating the drinking water pathway alone and either adult or child predominating the combined drinking water and ingestion pathways. Recommend some clarification in Section 1.6 to specify that it is considering doses projected to be >1 mrem to the thyroid for any age group over a period of one year.
 - Clarification of the different analyses for I-131 being discussed. Specifically, two different I-131 analysis requirements are involved. I-131 is analyzed in effluents to a level of 1E-6 µCi/ml (per NUREG-1301/2 Table 4.11-1) and the effluent concentration is used in calculating doses (NUREG-1301/2 SR 4.11.1.2) and projecting doses (NUREG-1301/2 SR 4.11.1.3.1). The REMP analysis requirement in NUREG-1301/2 Table 3.12-1 3.c. is what is being clarified. There are a few things that may be worth elaborating on in the Reg Guide. Specifically, the wording is 'dose calculated for the consumption of the water', which implies that the other dose contributor (specifically, freshwater fish ingestion in this case) is not considered in the determination (it should be noted that depending on the nuclide and age group, fish ingestion by far dominates the combined dose factor). Many sites just follow the NUREG-0133 guidance to include the adult, combined drinking water and fish dose parameter for Air and may not currently be determining the drinking water-only doses. A second consideration is that the other 'projected dose' requirements from NUREG-1301/2 are 31-day dose projections, while this is an annual dose projection; more discussion/highlighting of this difference may be worthwhile. Finally, clarification that the projected doses are based on the I-131 concentration in effluents seems like it would be helpful. These are things that are easy to read past after you have been doing this work for a while, but will be helpful in

- clarifying the requirement further and making it more useful for new program owners and for others who are less familiar with the intricacies of the regulatory guidance.
6. Recommend that the abnormal release definition be changed back to revision 1 terminology (i.e. offsite, change abnormal discharge to onsite release, and change the unplanned release and discharge to match the abnormal terminology.) The swap in Rev 2 changing Abnormal Release to be an onsite release seems to be confusing people. Many sites have not adopted Rev 2, and Licensing procedures seem to be written against Rev 1. Also, stations seem to be mixing terminology in their annual reports.
 7. Editorials:
 - Appendix A – Tables, Page A-1 occurs on the pages with Tables A-1, A-1A, A-2, A-2A, A-4, and A-5.
 - Appendix A, several of the Tables are difficult to read. Specifically, Tables A-1 and A-2 should be formatted to make grouping clearer. An example of one approach is shown in Table A-4.
 - Tables A-1 and A-2, % of limit rows should be deleted or explained (i.e. the fraction of the MPC, fraction of dose limit, etc.) Recommend an explanation be given in Section 9 about how to determine the percentages.
 - Table A-4 is missing data in the second column. It appears that it would normally hold units; however, the units are provided with the limits across the rows, so the blank column may be able to be deleted.
 8. Section 5.5 (pg. 35), “These limits apply to doses resulting from licensed and unlicensed radioactive material...” In this case, it seems that ‘unlicensed material’ would be essentially due to activity that had previously been released following licensing requirements. It would be helpful to clarify this, since plants do not dose calculations based on releases from previous years. Similar clarification would be helpful for Section 5.6; given that plants do not calculate doses based on previous year’s effluents that have built up in the environment (for example tritium built up in a lake, or nuclides built up in sediment around the discharge line, etc.). Some of the dose calculations already include the assumption of buildup over a 15 (or 20 or 30) year period; for example, ground plane release from gaseous effluents and shoreline sediment from liquid effluents use a buildup factor for ½ of plant life. The ground plane doses will be accounted for using TLDs. The whole concept of calculating doses based on previous years’ releases is outside of the normal dose calculation methodologies given in RG-1.109.
 9. Section 3.2 first paragraph needs editorial clarification regarding the wording for “long-term annual average” atmospheric dispersion values. Recommend aligning wording within first paragraph of the section with the wording in the last paragraph of the section and change, “the use of long-term (5-year) annual-average...” to read, “the use of long-term (5 or more years) annual-average...”
 10. Appendix A, Page A-1, Tables A-1 and A-2. The row, “% of limit” is believed to be a typo which should have been deleted going from revision 1 to revision 2 of this Reg Guide. The directions to populate this row were present in revision 1 but removed in revision 2. It is unclear what the Reg Guide is requesting in this row, i.e. what “limit” is being referenced. Recommend to delete the row “% of limit”

11. Sections 6 and 9.3 appear to be inconsistent for reporting potentially contaminated DAW, "green is clean." Specifically, section 6.0 discusses shipments that do not need to be reported such as potentially contaminated DAW, "green as clean"; however, 9.3 lists "DAW" shipments as reportable. Recommend to change Section 9.3, to clarify that potentially contaminated DAW "green as clean" shipments are not required to be reported.
12. Sections 6.0 and 9.3 appear to be inconsistent regarding the categories of shipments that should be reported. Specifically, section 6.0 states that the following shipments must be reported: "1. spent resins, filters, evaporator bottoms, etc., 2. dry active waste, 3. irradiated components, and 4. other waste." However, section 9.3 states that the following shipments must be reported: "1. spent resins, filter sludges, evaporator bottoms, etc., 2. dry active waste, contaminated equipment, etc., 3. irradiated components, and 4. other waste. Section 9.3 includes contaminated equipment; however, section 6.0 does not include this type of shipment. If a contaminated equipment shipment is required to be reported, clarification is needed, e.g., disposal of contaminated equipment only versus transport for decontamination, or transfer to another site for their use, etc. Also, would this include a shipment of activated but not necessarily contaminated equipment?"
13. Page 12, "compliance with the effluent reporting requirements of 10 CFR 50.36a."
Comment - Deleted text related to 10CFR72.44(d) ISFSI effluent reports. Does that mean there is going to be another format or guidance provided for that? If so, should that be referenced here?
14. Page 15, "6. the unrestricted area, which may be defined separately for liquid effluents, gaseous effluents, and, if appropriate, other radiological controls such as direct radiation."
Comment - Is this really meant to be an item 6, it appears to be a clarification of what restricted area is, (described under #3).
15. Page 16 and 17, "e.g., refer to the environmental LLDs in NUREG-1301 and NUREG-1302, Table 4.12-1, "Detection Capabilities for Environmental Sample Analysis," or LLDs determined by using the methodology outlined in NUREG-1576. Additionally, licensees should apply plant-process-system knowledge when evaluating leaks and spills."
Comment - Delete the example
16. Page 17, "Although prompt remediation is not a requirement (Ref. 54), remediation should be evaluated and implemented, as appropriate, based on licensee evaluations and risk-informed decision making. Evaluation factors should include (1) the location and accessibility, (2) the concentrations of radionuclides and extent of the residual radioactivity, (3) the efficacy of monitored natural attenuation, (4) the volume of the release, (5) the mobility of the radionuclides, (6) the depth of the water table, and (7) whether "significant residual radioactivity" (see glossary) is expected at the time of decommissioning."
Comment - Suggest adding reference to EPRI Report No. 1021104 "Groundwater and Soil Remediation Guidelines for Nuclear Power Plants," Electric Power Research Institute, Palo Alto, CA, December 2010.
17. Page 18, "NUREG-1301 and NUREG-1302 provide guidance on implementing the environmental monitoring program for I-131 analysis on each composite of drinking water. The sampling and analysis of a drinking water composite sample should be performed when the projected annual thyroid dose from I-131 in drinking water is greater than 1 mrem."

Comment - Is the projection of annual thyroid dose based on the liquid effluent concentration? Is information on how to do this projection provided in another regulatory guide?

18. Page 19, "This RG introduces the term "principal radionuclide" in a risk informed context. A licensee may evaluate the list of principal radionuclides for use at a particular site. The principal radionuclides may be determined based on their relative contribution to (1) the public dose compared to the 10 CFR Part 50, Appendix I, design objective doses .."
Comment - Saying "may be determined... or" makes it sound like there is a choice. Where in fact, a principal radionuclide is determined if it is either of these things. May want to use "and" instead of "or" here? It is clearer when the 1% rule is provided in the paragraph below. There the use of the term "or" is appropriate.
19. Page 21, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous Effluents," Technical Report 1011106 (Ref. 60)."
Comment - Needs to be changed to 1021106
20. Page 23, "(ASTM) D 3370-07" and "ASTM D 3370-095A, "Standard Practices for Sampling Water from Closed Conduits" (Ref. 62)"
Comment - These standards appears to be superseded by D3370-18
21. Page 28, "6. The groundwater monitoring results should be used in the development and testing of a conceptual site model to predict radionuclide transport in groundwater. The conceptual site model is generally considered adequate when it predicts the results of monitoring (sometimes called a calibrated model)."
Comment - When comparing with the previous version, it appears that this is not meant to be #6 but a new paragraph that provides additional information.
22. Page 28, "contaminated material"
Comment - Suggest using term "radioactive material"
23. Page 38, "contributions from I-131, I-133, tritium, and radionuclides in particulate form"
Comment - Do the plants not have to calculate doses due to C-14? If so, how should that be reported? EPRI also has a couple of reports on conducting C-14 dose calculations that may be a useful reference. EPRI Report No. 1024827 "Carbon-14 Dose Calculation Methods at Nuclear Power Plants" published April 2012.
<https://www.epri.com/research/products/00000000001024827>
24. Page 42, "fission and activation gases, iodines/halogens, particulates, tritium, and gross alpha."
Comment - Should carbon-14 not be included here (and subsequent tables) also? If not, where should Carbon-14 be reported?
25. Page 63, "60. Electric Power Research Institute, "Estimation of Carbon-14 in Nuclear Power Plant Gaseous 196 Effluents," Technical Report 1011106, Palo Alto, CA, December 2010."
Comment – Needs to be corrected to 1021106.
26. Page 63, "69. EPRI Report No. 1015118, "Groundwater Protection Guidelines for Nuclear Power Plants," Electric Power Research Institute, Palo Alto, CA, November 2007."
Comment – EPRI Report 1015118 has been superseded by EPRI report 3002000546 "Groundwater Protection Guidelines for Nuclear Power Plants: Revision 1" Electric Power Research Institute, Palo Alto, CA., October 2013.

Also suggest adding EPRI Report No. 1021104 "Groundwater and Soil Remediation Guidelines for Nuclear Power Plants," Electric Power Research Institute, Palo Alto, CA, December 2010.

27. Page 63, Footnote "reports may be purchased from". Comment - Change to "may be obtained from" from EPRI. Saying it may need to be purchased may cause confusion for members who have access to the reports as part of their membership. Add EPRI website: <https://www.epri.com> which is the most convenient way for obtaining reports. Also suggested deleted the fax number for simplicity.