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From: "McBaugh, Debra" <Debra.McBaugh@DOH.WA.GOV>
To: "'gep@nrc.gov'" <gep@nrc.gov>
Date: 11/19/02 1:44PM
Subject: Comments on Draft NUREG 1761

Dear Mr. Powers:

Please find attached our comments on the draft NUREG 1761 Radiological Surveys for Controlling Release of Solid Materials. I also embedded them below in case the attachment won't open. In addition, a hard copy will follow from our director, Gary Robertson.

We appreciate the opportunity to comment on this very important issue. If you have any questions, please do not hesitate to contact me.

<<NUREG 1761 DOE comments .doc>>

DMcB

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The Department of Health works to protect and improve the health of the people of Washington State.

Comments on Draft NUREG-1761
Radiological Surveys for Controlling Release of Solid Materials
November 17, 2002

Release of potentially radioactively contaminated material is an issue we are all grappling with. As state regulators, we are pleased that NRC took on the task of determining how such surveys would be done, even though the limit has not yet been established. For the most part, the draft document is well written and the approach taken is one we can back. We particularly appreciate the reference to and use of the guidelines in the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Using a MARSSIM-like approach is a welcome concept for states. MARSSIM was developed and agreed to by the major federal agencies dealing with cleanup of facilities and land. States are trained in the process and accept its use by their licensees. Using this approach for release of solid materials is, therefore, more easily understood and consistent with the way we release land and facilities. Please find below our specific comments regarding this draft NUREG.

* The roadmap outlined in chapter 2 and clearly depicted in Figures 2.1 and 3.1 is useful and should be retained in the document. The figures provide a good overview of the process and the questions that must be answered.

* Part of the MARSSIM guidelines is use of the Data Quality Objective (DQO) process. Chapter 3 of this NUREG describes how to apply DQO

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E-RIDS = ADM-03
Add = G. Powers (GEP)

to release of materials. This chapter provides both insight into the issues that should be considered and a clear picture of the philosophy used to develop the surveys.

* Section 3.5 - Develop a Decision Rule. This section would benefit from clarification to making it easier to use. Much of it is probably clear to someone who performs surveys and regularly uses the MARSSIM process, however, this is not the case for state regulators. Many states have no decommissioning projects and when they occur the regulators only review licensee procedures; they do not perform the work.

Specifically a sentence should be added to line 742. After the sentence "When the decision rule is based on a single measurement, it is essentially a detection decision, and the appropriate framework for considering such decision rules is in the MDC calculations" add a sentence "When it is based on an average, the decision is based on statistical requirements." Further clarification is needed in the next two paragraphs as well.

* Since NRC chose to use "special units" in their regulations and, hence, the states do as well, NUREGS and particularly the tables in this NUREG should include these values. Licensees and state regulators should not have to use calculators and conversion factors.

* Line 932: This does not flow from the discussion of surface activity to dose-based. "The standards were to be dose-based; hence....." Clarify which standards this refers to, new, proposed, future?

* Appendix B on Instrumentation is a helpful and thorough summary and should be retained in the final document.

CC: "Conklin, Al" <Al.Conklin@DOH.WA.GOV>, "Cowley, Richard" <Richard.Cowley@DOH.WA.GOV>, "Elsen, Mike" <Mike.Elsen@DOH.WA.GOV>, "Frazee, Terry" <Terry.Frazee@DOH.WA.GOV>, "Odlaug, Mike" <Mike.Odlaug@DOH.WA.GOV>, "Robertson, Gary" <Gary.Robertson@DOH.WA.GOV>

COMMENTS ON DRAFT NUREG-1761, RADIOLOGICAL SURVEYS for CONTROLLING RELEASE of SOLID MATERIALS (DOE-RL and CONTRACTOR COLLATED COMMENTS)

GENERAL COMMENTS

There are no specific concerns with respect to the overall layout and are pleased to see this draft included reference to and use of the guidelines in the "Multi-Agency Radiation Survey & Site Investigation Manual" (MARSSIM) and the recent ANSI N13.12 standard, "Surface and Volume Radioactivity Standards for Clearance." The discussion on process knowledge is also good, especially lines 1089-1092 noting that "process knowledge concerning solid material is **critical**" for release. Similarly, the breakdown of expected radionuclides from several nuclear processes in Section 4.3.2, pages 29 and 30, is a useful inclusion. The classification system included in Section 4.4 is consistent with the non-impacted and impacted criteria in MARSSIM, using a graded approach for those solid materials falling into the "impacted" types. Concur with the statement on p. xiii, lines 287/288, "The MARSSIM and NUREG reports replaced the previous approach for such surveys contained in NUREG/CR-5849."

This draft guidance is essentially "MARSSIM for personal property". The document is generally well written and complete. One potential fault is that because the technical discussions, e.g., Chapter 5, and many concepts presented are modeled after the MARSSIM, the user of this NUREG should possess some previous familiarity with the MARSSIM. Due to several direct references to tables in the MARSSIM, the user would at the least need to have a copy of the MARSSIM to fully utilize this NUREG. As such it is not a "stand-alone" document. The appendices provide very good background, technical information. Appendix B in particular provides an excellent overview of available radiological instrumentation for clearance surveys.

DOE needs to strongly consider adopting this NUREG, modified as necessary, for use in standardizing personal property clearance programs across the complex. This draft NUREG provides a level of detail and clarity currently lacking in DOE guidance on personal property clearance.

The terms "release criterion" and "release criteria" are utilized throughout the document without any discussion of their meaning (or differences). "Release criterion" appears to be used to refer to the allowable dose, e.g., 1 mrem/yr., or risk, e.g., 10E-6, for release of property. "Release criteria" appears to be used when discussing DCGLs, or radionuclide-specific allowable levels of residual radioactivity, which would equate to an allowable dose or risk value. This document should contain a discussion clarifying this difference.

The discussions and examples in this document on allowable residual radioactivity appear to be based on "average", e.g., median, values. This document should provide a discussion of why "average" values are used (preferred?) vs. a different statistical population parameter, e.g., 90th percentile. This document should also address how to proceed in a situation for which a

population parameter other than the "average" is required for as a basis for release criteria.

This draft NUREG assumes that all clearance surveys will be performed to a 95% confidence level. This should be justified as 67% and even 50% are commonly used in the industry for situations where the probability of contamination is low.

It is recommended that definitions for the following be added to the glossary: background (or reference) material, contamination, delta (relative shift), DCGL, DQA, DQO Process, gray area, hypothesis, LBGR, NORM/TENORM, power (statistical), QAPP, residual radioactivity, scanning, SOP, surface contamination, survey. Many of the definitions of these terms may be obtained directly, or modified from, definitions in the MARSSIM.

The reference to MARSSIM, Rev. 1 on line 237 of p. xi is not consistent with the 1997 date on the references shown on lines 3562/3563 (p. 105) and lines 5544/5545 (p. B-47), nor are all three listed the same way; e.g., Multiagency versus Multi-Agency, U.S. Nuclear Regulatory versus NUREG-1575. The ISO main text reference list uses quotation marks while the same reference titles in Appendix A are in italics.

A number of figures, i.e., A-1, A-2, A-3, A-4, A-5, B-2, are either inverted, reversed, or otherwise illegible.

The meaning of the references (?) in the columns labeled "ID#" in Tables B-3a, B-3b, B-4a, and B-4b should be defined.

SPECIFIC COMMENTS

PAGE	LINE	COMMENT
ix	157	space is missing between "Am" and "with"
xvii	354-355	Add "CZT" to list of abbreviations.
2	455-456	Insert space between paragraphs.
6	551	Revise to read: "If the static MDC and the scan MDC..."
9	620	Delete 1st "be", i.e., revise to read: "...should also be addressed."
10	625	The process for determining the value of performing a release survey should include any pollution prevention directives.
10	656	Revise to read: "... has not been exposed to any sources of radioactivity or any beams of radiation which could have caused activation can be classified..."
11	Figure 3.1	The potential for volumetric contamination should be included in the decision tree. It is discussed in the document, but not called out as a specific subsection as it should be.

11	Figure 3.1	Characterization studies should be discussed in the decision tree. Again, mention of it is made in the document, but is so important that it deserves its own subsection. This includes a discussion on hard-to-detect nuclides. This is referred to throughout the document, but needs to be drawn together in a specific subsection for better usability.
13	712	Insert space between Sections and 4.1.
16	814-816	The NUREG states that a statement of no rad added is insufficient. The minimum detectable must be given. For solids like dirt, which may be slightly but unevenly contaminated, it would require that analyses be done for the entire pile to determine what might be self-shielded. For the case of alpha emitters such as plutonium and the other TRU, it would be impossible to state what might have been missed in the center of a pile of dirt, without assaying the entire pile.
18	869	Revise to read: "... only judgmental surveys..."; scanning is a moving survey, and in this case a static survey could also be used, so the generic term "survey" is better suited.
20	935	Draft NUREG-1640 is referenced as a source for dose-driven release criteria. Recommend that ANSI 13.12 also be provided as such a reference.
27	1117-1118	Revise to read: "... exposed to a neutron or particle fluence..."
27	1121	Was the intent to use the word "control" or "controlled"? Within DOE context we would use "controlled" as in "outside of **controlled** areas . . ."
30	1163	Revise to read: "$^{239,240}Pu$
31	1228-1233	The definition of class 1 materials is different here than on page 10. Here, it is assumed that the solid is either surface contaminated or has been activated. It does not consider the normal case at Hanford where the dirt is volumetrically contaminated even though it has not come in contact with radioactivity in the operations of the facility. Therefore, this definition of class 1 is defective in that the vast preponderance of the contamination at sites across the DOE complex is not covered.
32	1241-1249	The definition of class 2 materials gives no recognition to the possibility of the spread of contamination by bio-transport, wind, weather, water, etc. The release criteria are not stated.
32	1251-1256	The same problems exist for class 3 materials as for class 2.
33	1276	Revise DCGL (2^{nd}) to "$DCGL_c$"
33	1291	Delete "with" (2^{nd} word in line).
34	1336-1337	It should be stated that the unity rule is only applicable to concentrations derived from dose limits, not to specific surface activity guidelines, e.g., NUREG 1.86 values.

35	1342	Revise to read: "C = concentration value for each individual radionuclide (1, 2, ... n).
35	1354	Provide definition for $DCGL_{nfer}$
37	1403	A simpler alternative to the MARSSIM process is provided in Durham, J. S. et al, "Contamination Surveys for Release of Material," PNL-9789; May 1994. This alternative approach is conservative and could be used for less complex property clearance scenarios.
38	1453	Revise Cs-134 to ^{134}Cs.
39	1477	Revise to read: "The MDCR will depend on..."
39	Table 4.4 (line 1493)	Provide definitions of e_i and e_s
40	1517	Provide definition of s_i
40	1519	Reference to Table 9.1 should be Table 4.4.
40	1520	Value of 4,600 dpm/100 cm^2 assumes the areal extent of the contamination scanned is 100 cm^2; this is not inherent in the equation for scan MDC and should be explicitly stated.
41	1529	Revise 2p to 2 pi or 2 Π.
41	1552	Reference to Table 9.2 should Table 4.5.
43	1598	Consider adding a third alternative that being "not contaminated via process knowledge." This would be applicable for situations where the material has sealed compartments that would prevent contamination from entering.
43	1614	The word "as" is missing: "such as pumps, motors, and other equipment."
45	1687	Refer to a specific subsection in Section 6 for addition information on the practice of ignoring the background in demonstrating compliance.
47	1759	Revise to read: "... for the radiations known or suspected to be present."
47	1770	Revise to read: "Materials considered for release may require..."
48	1800-1802	Hanford contractors routinely perform scanning surveys for release of property using instruments which do not have the capability to automatically log data. While this is a commendable feature, such a "requirement" would be very costly for DOE to implement at this time.
48	1805-1806	Is there a technical justification for the values of 50-100% scans for Class 2, and 10-50% for Class 3? If so, please provide.
51	1887-1892	The criterion for Scenario B is no contamination; therefore, the median value is irrelevant (see discussion in lines 1918-1921). Need to revise these proposed hypotheses.
51	1896	Reference to Section 9.1 should be to Section 4.6.

53	1978-1984	See comment for lines 1887-1892 above.
59	2203	Revise cesium to ^{137}Cs.
61	2281	Revise "overall ?-emission" to "overall gamma-emission".
62	Table 5.1	The table does not cover alpha contamination of volumetrically contaminated materials such as dirt.
62	Table 5.1	Numerous "*"s throughout table, but no indication of meaning of "*" in footnotes.
64	2368	Extra space between "pallet" and "represents".
67	2488	Change symbol "ε" in denominator to "X" (times symbol).
69	2575	Revise 4p to 4 pi or 4 Π.
71	Table 5.6 (line 2613)	No meaning provided for footnote "1" after "surface barrier detector".
71	2642	Latest edition of EML manual is 28th edition issued in 1997.
72	Table 5.7	The table indicates that for alpha emitters such as plutonium, small samples should be dissolved in acid and precipitated as a thin source. This is not of any assistance when millions of tons of dirt are involved.
76	2762	Include ^{14}C in parenthetical list of hard-to-detect radionuclides.
76	2768	Justification for using Sr-90 values from NUREG 1.86 for Sr-90/Y-90?
77	2785	Surface scans with typical GM detectors will not detect hard-to-detect radionuclides such as ^{3}H, ^{14}C, ^{55}Fe, and ^{63}Ni.
78	2799	Provide explanation for value of "60" in equation for MDCR.
79	2826-2827	Based on Figure 2.1, next step would be to loop back to step k, then on to step o.
80	2843-2844	Should indicate that background values are for 100 cm^2 to be consistent with remainder of example.
83	2932	Revise "o f" to "of".
83	2933	Revise "Co+Cs" to ^{60}Co + ^{137}Cs".
85	2990	QA/G-9 QA00 Update (EPA 2000) not in list of references.
99	Table 6.4	Row # "1" should be deleted; all other row #'s decreased by one, i.e., 2→ 1, 3→2, etc.
99	3451-3452	ALARA considerations should be included in development of DCGLs not at the decision point.
103	3525	Need to capitalize "test" in title of document.
103	3525	The period is missing after the parenthetical statement; compare with the same reference line 5454, p. B-44
104	3532	Using a six year old "interim report for comment" seems inappropriate; either replace or eliminate. The same is true for line 4106, p. A-25
105	3562-3563	MARSSIM updated in 2000; should reflect update in references.

105	3574	Latest edition of EML Procedures Manual issued in 1997; should reflect update in references.
105	3583-3585	EPA QA/G-4 updated in August 2000; should reflect update in references.
106	3597	Using a seven year old "Draft report for comment" seems inappropriate; either replace or eliminate.
106	3606-3607	NUREG-1640 still in draft; should reflect in references.
107	3623-3624	Revise to read: "... surveyor concludes within an established level of confidence that no net activity is present ..."
107	3631	Revise to read: "... locations on any surface of a solid..."
107	3637-3639	Statement that instrument efficiency is a 2-pi value is not true for all instruments. Revise to read: "Instrument efficiency shall only be used in surface..."
108	3649	Revise "anaquantify" to "quantify".
108	3650-3653	Recommend adding equation previously used to definition of MDC.
108	3654-3655	Recommend adding equation previously used to definition of MDCR.
108	3659	Revise to read: "... the location and use history of the materials." Delete reference to "during operations" as this is too limiting. Process knowledge needs to include entire history of material, e.g., while in storage, not just during operations.
108	3660-3661	Definition of real property should reflect that equipment and fixtures removed from building or structure are no longer real property.
108	3664	Revised to read: "... condition reached between the parent..." Equilibrium does not exist initially.
108	3667	Revise to read: "... as opposed to real property, i.e., land and structures, ..."
A-1	3695-3696	Revise to read: "... usually expressed by the type(s) and energy(ies) of the radiation..."
A-8	3817	Revise to read: "... from the nucleus consists of uncharged particles..."
A-8	3820	Revise to read: "... other hand, are typically generated ..."
A-22	Table A-4 (lines 4066 & 4069)	Revise second column to read: "decays to ..."
A-26	4127	The correct title for NCRP Report No. 58 includes an "s" at the end of Measurement; i.e., Measurements Procedures.
B-1	4153	Do not capitalize "zinc sulfide and sodium iodide".
B-1	Table B-1 (line 4163)	Revise to read: "use thin windows (e.g., aluminized Mylar..."
B-3	4185	Do not capitalize zinc sulfide.
B-5	4247	Include a discussion on the reusability of electret ion chambers?

B-7	4306	Spell-out acronym "CZT".
B-13	4559	Format of "Co-60" should be ^{60}Co to be consistent with rest of document.
B-43	5407	The reference format for this ANSI N13.12 is not consistent with that on lines 3501/3502 on p. 103.
B-44	5444	The space after A should be deleted and a space added after the comma before 353; i.e., **A, 353,** pp. . . .
B-47	5536	Physics misspelled; i.e., Health Physics Society, Medical . . .
B-47	5555	The space after A should be deleted and a space added after the comma before 353; i.e., **A, 353,** pp. . . .