[7590-01-P]

NUCLEAR REGULATORY COMMISSION

10 CFR Part 20

RIN 3150-AH18

Radiological Criteria for Controlling the Disposition of Solid Materials

AGENCY: Nuclear Regulatory Commission.

ACTION: Proposed rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to provide radiological criteria for controlling the disposition of solid materials that originate in restricted or impacted areas of NRC-licensed facilities but which have no, or very small amounts of, residual radioactivity resulting from licensed operations. The proposed amendment would result in more efficient and consistent licensing actions related to the routine handling of solid materials at licensed facilities by providing a clear and consistent regulatory framework for their disposition. The proposed requirements for the disposition of solid materials include a set of allowed limited paths for disposition, a dose criterion, tables of radionuclide concentrations for implementing the dose criterion, and recordkeeping provisions. The NRC has also prepared a Draft Generic Environmental Impact Statement (DGEIS) for the proposed rule.

DATE: Submit comments on the rule by (insert date 75 days after publication in the Federal Register). Submit comments specific to the information collection aspects of this rule by (insert date 30 days after publication in the Federal Register). Comments received after the above

dates will be considered if it is practicable to do so, but assurance of consideration cannot be given to comments received after these dates.

ADDRESSES: You may submit comments by any one of the following methods. Please include the number RIN 3150-AH18 in the subject line of your comments. Comments on rulemakings submitted in writing or in electronic form will be made available for public inspection. Because your comments will not be edited to removed any identifying or contact information, the NRC cautions you against including personal information such as social security numbers and birth dates in your submission.

Mail comments to: Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.

E-mail comments to: SECY@nrc.gov. If you do not receive a reply e-mail confirming that we have received your comments, contact us directly at (301) 415-1966. You may also submit comments via the NRC's rulemaking website at http://ruleforum.llnl.gov. Address questions about our rulemaking website to Carol Gallagher at (301) 415-5905; email cag@nrc.gov. Comments can also be submitted via the Federal eRulemaking Portal at http://www.regulations.gov.

Hand deliver comments to: 11555 Rockville Pike, Rockville, Maryland 20852, between 7:30 am and 4:15 pm Federal workdays. (Telephone (301) 415-1966).

Fax comments to: Secretary, U.S. Nuclear Regulatory Commission at (301) 415-1101.

Publicly available documents related to this rulemaking may be viewed electronically on the public computers located at the NRC's Public Document Room (PDR), Room O1 F21, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The PDR reproduction contractor will copy documents for a fee. Selected documents, including comments, may be viewed and downloaded electronically via the NRC rulemaking website at http://ruleforum.llnl.gov.

Publicly available documents created or received at the NRC after November 1, 1999, are available electronically at the NRC's Electronic Reading Room at http://www.nrc.gov/reading-rm/adams.html. From this site, the public can gain entry into the NRC's Agencywide Document Access and Management System (ADAMS), which provides text and image files of the NRC's public documents. If you do not have access to ADAMS or if there are problems in accessing the documents located in ADAMS, contact the NRC Public Document Room (PDR) Reference staff at 1-800-397-4209, 301-415-4737 or by email to pdr@nrc.gov.

Note: Public access to documents, including access via ADAMS and the PDR, has been temporarily suspended so that security reviews of publicly available documents may be performed and potentially sensitive information removed. However, access to the documents identified in this rule continue to be available through the rulemaking web site at http://ruleforum.llnl.gov, which was not affected by the ADAMS shutdown. Please check with the listed NRC contact concerning any issues related to document availability.

FOR FURTHER INFORMATION CONTACT: Frank Cardile, telephone: (301) 415-6185; e-mail: fpc@nrc.gov; USNRC, Office of Nuclear Material Safety and Safeguards, Mail Stop T8F3, Washington, DC 20555-0001. For information on the DGEIS, you can contact Phyllis Sobel; telephone: (301) 415-6714; e-mail pas@nrc.gov; USNRC, Office of Nuclear Material Safety and Safeguards, Mail Stop T7J8, Washington, DC 20555-0001.

SUPPLEMENTARY INFORMATION:

I. Introduction

The Nuclear Regulatory Commission (NRC) is proposing to amend its regulations to provide criteria for controlling the disposition of solid materials that have no, or very small amounts of, residual radioactivity resulting from licensed operations and which originate in restricted or impacted areas[1] of NRC-licensed facilities. Background information regarding this

[1] A "restricted area" is defined in the NRC's regulations in 10 CFR 20.1003. An "impacted area" is defined in the NRC regulations in 10 CFR 50.2 (that definition is being added in these amendments to 10 CFR 20.1003).

effort (including why the NRC is conducting a rulemaking; the scope of the rulemaking; and the process for decision-making, including alternatives considered) is contained in Section II. A discussion of the NRC's decision regarding its proposed approach, including the rationale for the decision, is contained in Section III. A request for specific comments on certain topics is contained in Section IV. Additional matters regarding this effort are discussed in Section V. A section-by-section analysis of the rule text implementing the proposed approach is contained in Section VI.

As part of this rulemaking effort, the NRC is maintaining a website on its activities regarding the disposition of solid materials at www.nrc.gov/materials.html. The website has information about current activities, relevant documents, opportunities for public comment, and summaries of public comments received to date.

II. Background

A. Why the NRC is Conducting Rulemaking on Disposition of Solid Materials

Currently, the NRC's existing regulations contain a framework of radiation standards to ensure protection of public health and safety from the routine use of materials at licensed facilities. These standards include a public dose limit in 10 CFR Part 20 and criteria on certain types of media released from licensed facilities, such as airborne and liquid effluent releases.

The NRC's existing regulations also permit the release of solid material from licensed facilities. Radiation surveys are conducted on solid material before it leaves restricted or impacted areas of a site. However, 10 CFR Part 20 does not contain a specific dose criterion to be used to verify that the solid material has no or very small amounts of residual radioactivity. Instead, the NRC's current approach is to make decisions on the disposition of solid material on a case-by-case basis by using a set of existing guidelines that are based primarily on survey instrument capabilities. These existing guidelines are summarized in Appendix B of the DGEIS, NUREG-1812, prepared as part of this rulemaking. These guidelines include NRC Regulatory Guide 1.86, "Termination of Operating Licenses for Nuclear Reactors," (January 1974) and other NRC documents.

A report by the National Academies ("The Disposition Dilemma; Controlling the Release of Solid Materials from Nuclear Regulatory Commission-Licensed Facilities," 2002) notes that the current NRC approach for the disposition of solid materials "is sufficiently protective of public health that it does not need immediate revamping." However, because NRC decisions on disposition of solid materials do not derive from a specific regulation, they are inefficient in that they lack an overall risk basis, consistency, and regulatory finality. Therefore, the NRC is conducting this rulemaking to improve the regulatory process by incorporating risk-informed criteria for disposition of solid materials in the regulations.

B. The NRC's Main Focus in this Rulemaking

As noted, the principal reason for this rulemaking is to improve the efficiency and effectiveness of the NRC regulatory process by establishing criteria for the disposition of solid

materials in the regulations. In conducting this rulemaking, the NRC is guided by the goals in its Strategic Plan[2] of which the primary goal is ensuring the protection of public health and safety and the environment. In addition, as described in the Strategic Plan, the NRC is conducting the rulemaking process in an open manner that informs stakeholders about the process and provides them with a reasonable opportunity to participate meaningfully in the NRC's regulatory process.

C. Solid Materials Considered in this Rulemaking

Various solid materials originating from restricted or impacted areas of NRC-licensed facilities are no longer needed or useful at the facilities, or otherwise need to be taken out of the restricted or impacted areas. Much of this material has no residual radioactivity resulting from licensed operations; some of these materials may have very small amounts of radioactivity but at levels so low that potential radiation exposure from them to the public would be a very small fraction of natural background radiation levels and of negligible health impact. These solid materials can include office furniture; metal components; equipment and tools; pipes; ventilation ducts; laboratory materials (gloves, beakers, etc.); routine trash (plastics, paper, glass); and concrete. Soil, soil-like materials and other similar process materials can also be present in restricted or impacted areas and need disposition.

This rulemaking covers all NRC licensees, including: (a) academic -- university laboratories and small reactors that use or produce radioactive materials for research and

[2] NUREG-1614, Volume 3, "Strategic Plan, FY2004-2009," (August 2004)

teaching purposes; (b) medical -- hospitals and clinics that use radioactive materials for diagnostic and therapeutic medical purposes; (c) manufacturing -- facilities and laboratories that manufacture products that contain and/or incorporate radioactive materials as part of their functional design (e.g., smoke detectors, certain types of gauges); and (d) power production -- reactor and fuel cycle facilities that produce and handle radioactive fuel and materials as part of the generation of electricity.

There are other solid materials at licensed facilities that contain larger amounts of radioactivity. These materials are kept separate from the solid materials with no or very small amounts of radioactivity and requirements already exist in the NRC's regulations at 10 CFR Part 61 for their disposal at licensed low-level waste (LLW) disposal facilities. Solid materials that contain larger amounts of radioactivity are not the subject of this rulemaking. Examples of such material not considered in this rulemaking are components of the reactor system and sealed sources.

Additional discussion about the scope of the rulemaking is contained in Section III.C of this document.

D. Information Gathering as Part of the Decision-Making Process for this Rulemaking

The NRC has been engaged in several information gathering activities as part of its decision-making for this rulemaking, particularly with regard to alternate approaches for

disposition of solid materials. Three broad alternate approaches for disposition of solid materials that the NRC has sought information about have included:

(1) Unrestricted release: In this approach, if a radiation survey of the material confirms that a release criterion[3] has been met, solid material is allowed to be released and go to any or all of the non-licensed paths shown in Figure 1 (Paths G, S, and/or L). This approach has been referred to as "clearance";

(2) Limited disposition: In this approach, disposition of solid material is limited to one or more of the non-licensed paths shown in Figure 1 (e.g., Paths S and/or L) if it meets a dose-based release criterion[4]. This approach has been referred to as "conditional release" or "restricted release." Under this limited disposition path approach, the release of material from licensed facilities would not be allowed into the general stream of consumer goods (Path G); and

(3) LLW disposal only: In this approach, all solid material from restricted or impacted areas would be required to be disposed of in a licensed LLW disposal site (Path D of Figure 1).[4] This has been referred to as "prohibition".

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[3] Under approach 1, a criterion could either continue to be based on the current approach which uses instrument detection capability as its basis, or it could be dose-based which would require amending the NRC's regulations to include a dose-based criterion.

[4] Both approaches 2 and 3 would require amending the NRC's regulations because they would involve changes to the current approach.

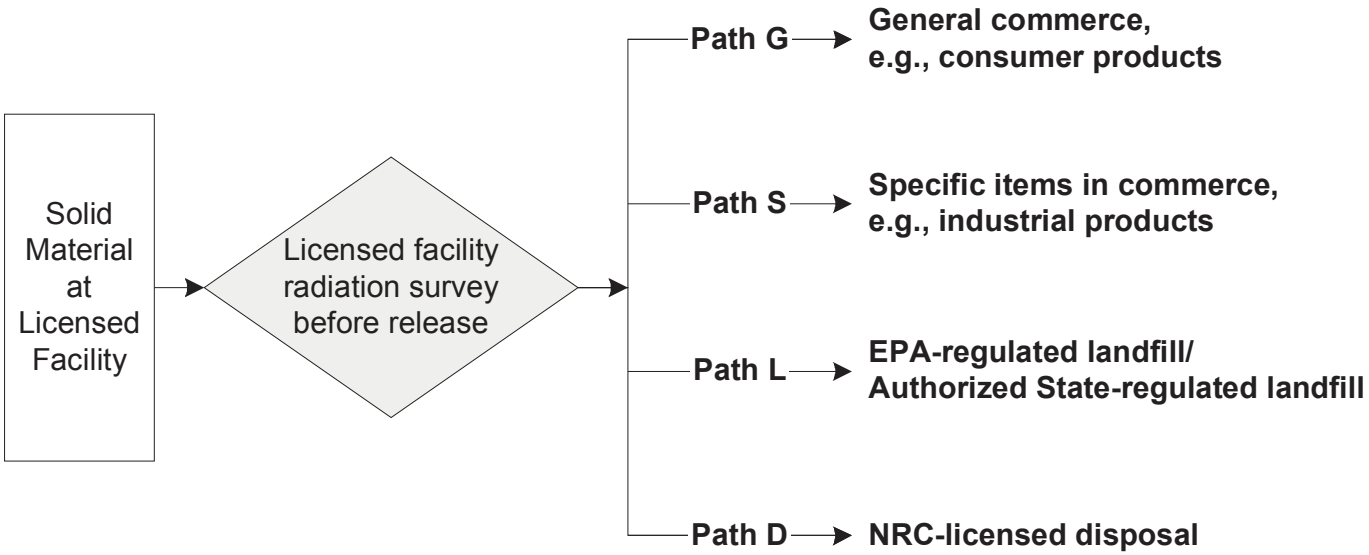

Figure I

The NRC has actively sought stakeholder participation and input on these alternate disposition approaches. This effort has included conducting a scoping process related to the alternate approaches and their associated environmental impacts. Activities to solicit stakeholder input have included requesting public comment on alternate approaches for disposition of solid materials in the Federal Register on June 30,1999 (64 FR 35090) (hereafter referred to as the "June 1999 Issues Paper") and on February 28, 2003 (68 FR 9595). In response, the NRC received nearly 3,500 letters and e-mails from a range of different stakeholder groups that presented a diverse set of views. In addition, the NRC held nine public meetings to solicit stakeholder views between September 1999 and February 2005. The NRC also supported a study by the National Academies to obtain an independent review of the issues and alternatives. The National Academies held three meetings with stakeholder groups between January and June 2001; in March 2002, the National Academies provided a report

(hereafter referred to as the “National Academies Report”), referred to in Section II.A of this document, containing nine recommendations to the Commission.

Input from stakeholders was considered in NRC decision-making on the disposition of solid materials and is discussed further in Section III in the context of the discussion of this proposed amendment, and also in Section V. Generally, stakeholder views to date are centered on potential health impacts of the alternates and issues with implementing the alternates, including potential economic impacts on stakeholders. A detailed summary of stakeholder input on the alternates can be found in Appendix A of the DGEIS. A summary of stakeholder input can also be found in NUREG/CR-6682 and NUREG/CR-6682, Supplement 1.

The NRC also has considered other relevant Federal and international standards in this area. There is a range of Federal health protection standards covering both radiation and chemical materials. The NRC has responsibility, under the Atomic Energy Act of 1954, as amended, for setting standards to ensure that the nation’s civilian use of radioactive material is carried out in a manner which protects public health and safety and the environment. The Environmental Protection Agency (EPA) sets chemical standards, standards for radiation protection in the general environment, and standards for managing material at landfills under the Resource Conservation and Recovery Act (RCRA) which is one of the alternate approaches being considered by this rulemaking. International agencies (such as the International Atomic Energy Agency (IAEA) and the European Commission (EC)) as well as individual nations, are developing standards for controlling the disposition of solid materials.

In addition, the NRC conducted reviews of various related reports prepared by recognized national and international standards organizations, including the National Academies, the National Council on Radiation Protection and Measurements (NCRP), the American National Standards Institute (ANSI), and the IAEA. Each of these organizations has issued findings about possible criteria for controlling the disposition of solid materials. The NRC also has considered other reports suggested by stakeholders.

Finally, the NRC has completed several technical studies to evaluate alternatives for controlling the disposition of solid materials. The results of these studies have been incorporated into the DGEIS[5]. The DGEIS provides a detailed analysis of each of the alternate approaches, including their potential impacts on human health and the environment. The NRC also has conducted studies on the ability of radiation survey methods and instrumentation to verify radioactivity levels on solid materials so that a licensee can verify compliance with an alternate approach. The DGEIS and the technical studies which form its basis are available on the NRC's website at www.nrc.gov/materials.html.

III. Proposed Approach: Revisions to NRC Regulations in 10 CFR Part 20 on Disposition of Solid Materials

The NRC's proposed approach for disposition of solid materials is described in Section III.A of this document. Section III.B discusses the rationale and technical basis supporting the

[5] Comments on the DGEIS may be submitted as specified in the ADDRESSES section of this document.

proposed approach. Section III.C provides additional information on the scope of this proposed approach. Section III.D provides consideration of other alternate approaches for disposition of solid materials.

A. The NRC's Proposed Approach

The NRC has decided upon a proposed approach that is a balanced consideration of technical issues and overall stakeholder concerns and needs. Specifically, the NRC is proposing to amend its regulations for the disposition of solid materials to establish requirements that have the following elements.

(1) Limited allowed disposition paths: Solid material may be released from licensed control if it meets the dose criterion indicated in #2, below, and follows one of these limited disposition paths: (a) disposal in EPA/State-regulated landfills; (b) re-use in a pre-defined set of uses specified in the regulations; and (c) case-specific analysis and approval of proposed procedures for other disposition paths. The rationale for this element is described in Section III.B.1;

(2) A dose criterion set at 1 mrem/yr (0.01 mSv/yr)[6]: This dose criterion is based on scientific analysis and regulatory considerations and is a generic dose constraint set well

[6] Other documents, including various international documents, use the convention of 10 uSv/yr when converting from English to SI units. This document uses the convention of 0.01 mSv/yr to be consistent with the units in other parts of the NRC's regulations in 10 CFR Part 20.

below levels established to ensure adequate protection of public health and safety. Solid material can be released from licensed control if it meets this dose criterion and if it goes to one of the limited disposition paths discussed in detail in Section III.B.1. The rationale for this element is described in Section III.B.2;

(3) Tables of volumetric and surface radionuclide concentration levels associated with the 1 mrem/yr (0.01 mSv/yr) dose criterion: Solid material would be considered acceptable for release if its volumetric and surface radionuclide concentration levels did not exceed the levels in Table 1 and Table 2, as applicable, of Appendix E of 10 CFR Part 20. The rationale for this element is described in Section III.B.3;

(4) A recordkeeping system. Maintenance of records provides reasonable assurance that the dose criterion has been met and that disposition of the solid material has been conducted in accordance with provisions of this amendment. The rationale for this element is described in Section III.B.4.

A section-by-section analysis of amended rule text implementing the proposed approach is provided in Section VI.

B. Rationale Supporting the NRC's Proposed Approach

B.1 The Set of Allowed Limited Disposition Paths

A discussion of the NRC's basis for choosing the limited disposition path approach is contained in Section III.B.1.1. A discussion of specific details related to the limited disposition path approach is contained in Section III.B.1.2.

B.1.1 Basis for Selecting Limited Disposition Path Approach

The NRC discussed with stakeholders and gathered information about a range of alternate approaches for the disposition of solid material, discussed in Section II.D, i.e., unrestricted release of solid material (either by continuing the current approach or issuing a proposed rule), limited disposition paths, and disposal of all material at licensed LLW disposal facilities.

The NRC believes that establishing requirements for unrestricted release of solid material at a 1 mrem/yr (0.01 mSv/yr) dose criterion would satisfy the NRC's strategic goal of ensuring protection of public health and safety. Material released at this level would be a very small fraction of the NRC's public dose limit in 10 CFR Part 20 and reports prepared by the NCRP and other scientific organizations indicate that 1 mrem/yr (0.01 mSv/yr) represents a negligible individual dose (See Section III.B.2). A number of stakeholders supported use of this alternative. In addition, the IAEA recently issued guidelines in RS-G-1.7 ("Application of the

Concepts of Exclusion, Exemption, and Clearance") to assist countries in setting standards for disposition of solid material that would include unrestricted release (clearance) at a dose level of 1 mrem/yr (0.01 mSv/yr).

However, there have been concerns expressed by metals and concrete industry stakeholders about the unrestricted release alternative because they believe their businesses would be negatively impacted by public reaction to the introduction of solid material from licensed facilities in their products. In addition, citizen and environmental groups expressed concerns about unrestricted release of solid material from licensed facilities into general commerce. In reflecting on these same issues, the NCRP, in Report No. 141, notes that, despite the relative safety of a 1 mrem/yr (0.01 mSv/yr) clearance level, "there are significant concerns from the recycling industry and the public over unrestricted release of scrap metal into the public domain," and that rulemaking in this area should consider avoiding placing material in consumer products. In addition, our review of stakeholder comments indicates that there is little stakeholder support for proceeding with the unrestricted release alternative, even among nuclear industry representatives.

At the same time, the NRC does not believe that a complete prohibition on all releases of material with very low amounts of, or no, residual radioactivity from restricted or impacted areas is appropriate. First, as noted above, the potential risks associated with allowing release of material meeting a 1 mrem/yr (0.01 mSv/yr) dose criterion are negligible. Secondly, as discussed below, results from the DGEIS indicate that a prohibition alternative is much more expensive than the other alternates. This is in concert with findings in NCRP Report No. 141 which states that an approach for disposition of solid material (having no or very small amounts

of residual radioactivity) that allows some form of release from licensed control (either for unrestricted release or in a limited manner) should be a priority. NCRP Report No. 141 notes that this is because the potential radiological hazards of these materials are so low that their exemption from continued regulation is deemed warranted and because funds unnecessarily spent on controlling trivial risks in one sector are not available for application to the control of "real" risks elsewhere. NCRP Report No. 141 states that disposal of these materials as LLW is an alternative that should be exercised only as a last resort. The National Academies Report noted that certain risks, e.g., those associated with transportation of solid materials, could be lower for other alternatives, like the landfill alternative, than the prohibition alternative.

To provide further consideration of the alternatives discussed in Section II.D, the NRC completed a cost-benefit analysis in the DGEIS based on potential environmental and public health impacts and economic considerations. The analysis includes impacts and costs of: radiation surveys of solid materials before they are released to ensure that the levels are below release criteria; transport of solid materials to EPA-regulated landfills, for use in a road-bed, or to NRC-licensed LLW facilities; and disposal of solid materials in EPA-regulated landfills or NRC-licensed LLW facilities. The DGEIS indicates that, compared to a No-Action alternative of retaining the current approach, the costs and benefits of the alternatives for disposition of solid materials are: the unrestricted release alternative has a net positive incremental cost-benefit at a 1 mrem/yr (0.01 mSv/yr) dose criterion; an alternative of limited disposition also has net positive incremental cost-benefit at a 1 mrem/yr (0.01 mSv/yr) dose criterion, although slightly larger than the unrestricted release alternative; and the prohibition alternative has a substantial net negative cost-benefit.

The difference in the DGEIS analysis of costs and benefits between the unrestricted release and limited disposition alternatives is not considered significant for regulatory decision-making. However, the prohibition alternative is significantly less cost-effective. This analysis is in line with the National Academies Report which concluded that the landfill disposal alternative could be significantly less costly than prohibition, and with the NCRP Report No. 141 which indicated that the "prohibition" approach is a costly alternative due to the high prevailing costs of disposal at licensed LLW disposal facilities, the costs of transportation to LLW disposal facilities, and issues of access to the limited number of LLW disposal facilities.

With regard to issues of disposal capacity, the DGEIS indicates that for the prohibition alternative the amount of solid material under the scope of this rulemaking needing disposition would exceed the available disposal capacity at LLW disposal facilities. With regard to the limited path alternative (which includes disposal at landfills as an allowed path), the DGEIS found that, given the current and projected disposal capacity at EPA/State-regulated landfills, there is sufficient capacity to accommodate even an alternative in which all solid material is sent to landfills.

Based on the above, the NRC is proposing an approach that it believes is a balanced consideration of technical issues and overall stakeholder concerns and needs. The proposed approach would limit the release of solid material, meeting a 1 mrem/yr (0.01 mSv/yr) dose criterion, from licensed control to the following disposition paths: disposal in EPA/State-regulated landfills; re-use in a limited pre-defined set of uses (specifically concrete in road bed construction and re-use of tools and equipment); and case-specific analysis and approval of proposed procedures for other disposition paths and approaches. The disposition paths

considered in this proposed approach are consistent with NCRP Report No. 141, which suggests an approach that would initially prohibit recycling into certain consumer products, including products used by children, in food preparation, personal items, or household items. NCRP Report No. 141 also notes that it is possible to designate certain acceptable restricted industrial uses where direct contact of solid material with the general public can be minimized and/or avoided. Similarly, the National Academies Report notes the merits of an approach focusing on restricted uses and/or landfill disposal. This approach is consistent with the diverse range of stakeholder comments which sought uniform standards for release, but which were either concerned about unrestricted release or did not specifically support an unrestricted release approach.

The NRC's proposed approach represents an improvement over its current approach because it provides a clear, risk-informed dose criterion and associated radionuclide concentrations for the disposition of solid materials. Even for the case-specific element, a risk-informed dose criterion is proposed to form the basis for decisions rather than the measurement-based guidelines used now. Thus, the proposed amendment enhances consistency and regulatory finality in decisions made regarding the disposition of solid materials. With regard to the disposition paths, as noted in Section III.C, for much of the materials covered by this amendment (e.g., trash, equipment and tools, concrete), the allowed disposition paths are fairly broad and similar to what licensees currently do with the materials. For some materials (e.g., bulk metals), the paths are more limited, however the case-specific provision is available for requesting alternate disposition.

B.1.2 Specific Details on Limited Disposition Approach

Some stakeholders saw the limited disposition path approach, particularly with regard to landfills, as a means to provide additional protection of public health and safety citing EPA requirements on storage, treatment, and other controls at landfills. Others expressed concern about the feasibility and potential regulatory burdens of the proposed disposition paths and the ability of the proposed disposition paths to limit where material goes and protect public health and safety. Theses areas are discussed in Sections III.B.1.2.1 and III.1.2.2.

Although the proposed amendment would authorize disposal of solid material from NRC-licensed facilities in an appropriate EPA/State-regulated landfill facility, it is the operator and/or regulator of each landfill facility who will determine if a transfer to a specific facility will be allowed. Similarly, for intended end uses, a particular recipient is not required to take the material and can decide whether or not to accept the material. Thus, in addition to complying with the requirements of this proposed amendment, licensees will have to be aware of monitoring practices for incoming shipments to landfills or other destinations as part of their business practices.

B.1.2.1 Feasibility of Limited Disposition Paths

With regard to disposition of solid materials in EPA/State-regulated landfills, a number of stakeholders stated that it is not clear if the landfills would accept material from licensed facilities released under the dose criterion of this proposed amendment. These stakeholders

noted that many States have bans against release of radioactivity into landfills. Also, some stakeholders noted that difficulties in siting landfills could be more acute if concerns over radioactivity increased, even if the radioactivity was present at very low levels.

The NRC considered the provisions of the RCRA in making a decision on an approach in this area. RCRA was enacted by Congress in 1976 to ensure that solid wastes from human activities are managed and disposed of in a manner that assures protection of public health and safety and the environment. One of the principal programs for managing solid wastes under RCRA is Subtitle D which includes minimum federal standards, as well as guidelines for State plans, for non-chemically-hazardous solid wastes. Specifically, Subtitle D sets criteria for disposal facilities for these solid wastes, encourages States to develop plans to manage these solid wastes, and prohibits open dumping of solid waste. Under Subtitle D, the EPA provides information, guidance, policy, and regulations to deal with solid waste issues. States and local governments are the primary planning, regulating, and implementing agencies for the management of solid wastes under Subtitle D. Three broad types of landfills covered under RCRA Subtitle D are municipal solid waste landfills (MSWLF), construction and demolition landfills, and industrial landfills. MSWLFs typically receive household wastes (e.g., appliances, newspapers, containers, food wastes, and miscellaneous organic waste). MSWLFs also may receive commercial and industrial solid wastes, although they are less likely to take large bulk industrial items like water tanks, large concrete slabs, etc. Construction and demolition landfills typically take road material, excavated material, and demolition/construction/renovation wastes. Industrial wastes are non-hazardous solid wastes from manufacturing or industrial processes. Industrial landfills can be located on industrial/manufacturing facility sites and receive wastes only from those facilities.

The NRC believes that disposal in a landfill regulated under Subtitle D of RCRA is a feasible option for the disposition of solid material. The 1 mrem/yr (0.01 mSv/yr) dose criterion of this proposed amendment is a constraint set at a very small fraction (1/100) of the NRC's public dose limit established to ensure adequate protection of public health and safety and represents a negligible individual dose level (see Section III.B.2). Material below this level would not require any further regulatory control by the NRC. This material could then be kept out of general commerce if disposed of under the regulatory scheme of the RCRA.

The NRC's decision to authorize disposition of solid material in RCRA Subtitle D landfills is similar to a suggested approach in a June 26, 2003, comment letter from the Association of State and Territorial Solid Waste Management Officials (ASTSWMO). In its letter, ASTSWMO suggested an approach which uses a 1 mrem/yr (0.01 mSv/yr) clearance-type level and which would not result in a change to landfill operations or need for any additional engineered features, nor subject an EPA/State-regulated landfill to any extra controls, or special monitoring or treatment of leachate, groundwater, or landfill gases. The levels in the solid material released under this proposed amendment would be at levels noted in the ASTSWMO letter, and no change in landfill operations should be needed. In addition, the EPA has noted (68 FR 65120; November 18, 2003) that some States have determined that RCRA Subtitle D facilities may offer sufficient protection for certain types of radioactive material. For example, the State of Michigan, in conjunction with the NRC, concluded in 2001 that certain very low-activity wastes (such as concrete rubble) from the decommissioning of the Big Rock Point nuclear facility could be sent to a RCRA Subtitle D landfill (66 FR 63567; December 7, 2001).

Based on the above (as well as the discussions in Section III.B.1.2.2), the NRC is including disposal in a RCRA Subtitle D landfill as one of the acceptable disposition paths under this proposed rule. The NRC does not want to prejudge eventual EPA decisions regarding RCRA Subtitle C[7] landfills; a licensee request to dispose of solid material in a RCRA Subtitle C landfill could be addressed under existing provisions in 10 CFR 20.2002 (see Section III.C.2(5) of this document).

Finally, as noted above, there is no requirement that a landfill operator take the material. Factors such as market forces, agreements between generator and operator, and landfill monitor setpoints will determine if material released under the NRC's standards are accepted at the landfill.

With regard to the limited disposition alternative that would restrict material to certain end uses, a fairly uniform concern expressed by a range of stakeholders (including the metals industry, licensees, and States) was whether it is feasible or practical to establish a generic

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[7] The EPA has initiated an effort to consider modifying its Subtitle C regulations and published an Advanced Notice of Proposed Rulemaking (68 FR 65119; November 18, 2003) soliciting stakeholder input on a potential regulatory framework for disposal of low-activity waste in RCRA Subtitle C facilities. Subtitle C establishes a system for controlling chemically-hazardous solid waste from the time it is generated until its ultimate disposal. There are RCRA Subtitle C regulations (40 CFR Parts 260-264) for the generation, transport, treatment, storage, and disposal of chemically-hazardous wastes. EPA's ANPR indicated that it is considering a range of allowable dose limits for disposal in Subtitle C facilities different from the criteria being considered in this NRC proposed rulemaking. In a January 14, 2004, letter, the Commission stated that it believed that the approach described in the ANPR has the potential to provide a safe and economical alternative for the disposition of low activity radioactive waste. The EPA is coordinating with the NRC on the ANPR effort. If the EPA decides to move forward with a rulemaking for Subtitle C facilities, the NRC would need to take conforming regulatory action in a separate rulemaking. As discussed above, this NRC rulemaking effort is proposing requirements for disposition of materials below a dose criterion of 1 mrem/yr (0.01 mSv/yr) which is a risk level well below the chemical hazard considered at Subtitle C facilities.

approach for restricted use. These stakeholders noted that developing a rule with generic standards for defined restricted uses would be difficult because of regulatory burden and other problems in enforcing controls to limit disposition paths for entities not covered by NRC regulations and because it is not likely to be economically practical for a steel mill to routinely process the limited quantities of material from licensed facilities for a specific set of limited end uses.

Some stakeholders suggested that the NRC should proceed with a rulemaking that would not include a generic approach for limited disposition, but instead provide a regulatory framework and process, similar to the current 10 CFR 20.2002 disposal approval process, so that licensee plans involving limited disposition could be characterized and dealt with on a case-specific basis rather than in a generic standard. This would allow the NRC and the public to review specific details of a particular limited disposition. The NRC agrees in part with these comments; therefore, the case-specific approach is one of the elements of its limited disposition approach. Examples of materials that would be considered as part of a case-specific approach are:

(1) Metal recycle. Developing scenarios for recycling of metals is difficult and stakeholders have not provided any clear process as to how metal could be generically directed for recycle into a non-licensed industrial or construction related end uses (e.g., bridges, etc.). Thus, the NRC has decided that any consideration of restricted recycling of metal could only be proposed by a licensee under the case-specific element of this proposed rule;

(2) Soil and soil-like materials. Results of the DGEIS analyses considering potential uses of released soil under varying scenarios indicate that under some conditions, soils initially intended for burial in a landfill could be diverted, at a point beyond the licensee's control, and used in other purposes given that there is a demand for “clean fill” for use as backfill. Discussion in the DGEIS indicates that, at this time, there is not enough information to characterize how soils might be used locally and that the engineering properties of soils are expected to dictate where and under what conditions soils might be reused. These considerations could not be fully addressed in the DGEIS because of the lack of supporting information. Thus, the NRC decided to address the disposition of soils on a case-specific basis. As discussed in Section III.B.1.1 of this document, this case-specific approach represents an improvement over NRC’s current approach, in particular because the risk-informed dose criterion in the proposed amendment would be used in making decisions regarding a specific request. This case-specific approach is not anticipated to result in significant additional burden for licensees or regulators because information referenced in the DGEIS on experience with soil disposition over the past 20 years indicates that licensee requests for offsite disposal have been infrequent. To aid in minimizing burden, the NRC is including in draft NUREG-1813, information that can be used by licensees in providing case-specific requests for off-site disposition of soil (e.g., potentially acceptable radionuclide concentrations). Similarly, information, e.g., model elements and model assumptions, contained in NUREG-1640 may be used in preparing case-specific requests.

However, the NRC’s review of its technical information bases has indicated that it is also feasible for this proposed amendment to contain a generic approach for certain materials and end uses. Therefore, the NRC is including in this proposed amendment a set of pre-defined

limited end uses (Section III.B.1.2.2 discusses the ability of these end uses to limit where solid materials would go):

(1) Concrete in road-bed construction. NUREG-1640 (see Section III.B.3.1 of this document) reviewed various concrete re-use scenarios and notes that recycle and re-use of reclaimed concrete from licensed facilities in uses such as road-bed construction is its most likely destination because of the physical nature of reclaimed concrete. Other uses of reclaimed concrete are less likely and result in much lower exposure compared to use in road beds made with reclaimed concrete;

(2) Re-use of solid materials, equipment, and tools in their original form, in industrial or construction settings, for their original intended purpose and function. For most large and/or stationary components at a licensed facility (e.g., scaffolds, cranes, trucks, office furniture, etc.), the NRC considers this a feasible approach for limiting where these items go and restricting them from general consumer use. Discussion of how this approach would work to limit where solid materials go is discussed in Sections III.B.1.2.2 and III.B.4, including maintenance of records of the type and amount of material released, the destination of the material, and indication that the radionuclides released were in compliance with the proposed amendment.

There is a class of smaller pieces of equipment and tools used by workers which may be transported by an individual in and out of restricted/impacted areas as part of the routine conduct of work in those areas (e.g., hand tools, testing equipment). The NRC considered

restricting further use of these items to only industrial/construction settings and requiring records of the end destination of these items. However, given the very low dose criterion and low allowable radionuclide concentrations in these proposed amendments, the NRC has determined that trying to direct each small tool to an industrial/construction use, and maintaining records of such transfers, would be unduly burdensome, given the very low risk involved. Instead, the NRC has decided that the proposed amendments should direct that these items be limited to re-use in their original form for their original intended purpose and function, and that required records can be limited to specifying the specific tool or equipment removed from the restricted/impacted area and indication that the radionuclides released were in compliance with the proposed amendment (See Section III.B.4). This approach is similar to the method for handling such items under the NRC's current approach which the National Academies Report found to be protective of public health. However, the proposed approach represents an improvement because it enhances the current approach for these materials by placing them under the proposed requirement of the 1 mrem/yr (0.01 mSv/yr) dose criterion (including its associated radionuclide concentrations) and the limited disposition paths and recordkeeping requirements of this proposed amendment.

B.1.2.2 Ability of Disposition Paths to Limit Where Solid Materials Go and Maintain Exposures Below the Dose Criterion

The limited disposition approach is intended to restrict disposition of material to certain authorized uses and/or to landfills to minimize the likelihood of release of material from licensed facilities into the general stream of commerce, in particular consumer goods, and to maintain doses below the 1 mrem/yr (0.01 mSv/yr) dose criterion discussed in Section III.B.2. An issue

raised by stakeholders regarding limited disposition is how it will be assured that restrictions function to limit where material can go and to limit the dose, while not being a burden on regulators and the public. The NRC believes that the provisions in the proposed amendment, discussed in this section and in Section III.B.2 (regarding the dose criterion) and Section III.B.4 (regarding recordkeeping), provide reasonable assurance that doses will be maintained well below levels established to adequately protect public health and safety while minimizing unnecessary burden.

(1) Considerations related to directing and limiting material to landfills or to the defined end use. The proposed amendment contains specific requirements which direct licensees as to allowed destinations for solid material. Therefore, licensees would have to provide reasonable assurance under the proposed amendments in 10 CFR 20.2008, 20.2009, and 20.2108 that solid material is being disposed of under the regulatory scheme of RCRA, specifically 40 CFR Parts 257 and 258, and/or actually placed into an approved use.

As discussed above, the NRC believes that RCRA controls associated with landfill operations and closure provide for a reasonable level of isolation from the public, especially given that the dose criterion of 1 mrem/yr (0.01 mSv/yr) being proposed in this amendment is well below levels established to ensure adequate protection of public health and safety. Under RCRA, the EPA has developed Federal criteria in 40 CFR Part 257, for proper design and operation applicable to all RCRA Subtitle D landfills, and in 40 CFR Part 258 specifically for MSWLFs. Provisions to ensure that wastes in solid waste disposal units do not threaten surface water, ground water, biota, and flood plains, and precautions to restrict public access to the facility are contained in 40 CFR Part 257. The criteria in 40 CFR Part 258 address location,

operation, design, ground water monitoring, corrective action, closure and post-closure care, and financial responsibility for MSWLFs. The EPA has noted (68 FR 65120; November 18, 2003) that recent standards for RCRA Subtitle D facilities in 40 CFR Part 258 require them to have engineered features that are similar to RCRA Subtitle C facilities. Many States have adopted the criteria in 40 CFR Parts 257 and 258 into their solid waste programs although the extent of adoption varies; thus, there can be a range in standards for landfill operation and design among the fifty States for RCRA Subtitle D landfills within the requirements of 40 CFR Parts 257 and 258. A review of certain State standards indicates that some impose engineered features beyond those required by 40 CFR Part 257. A dose criterion of 1 mrem/yr (0.01 mSv/yr) would limit potential doses to levels substantially lower than, and well within the variation in, background radiation levels received from the surrounding geologic material and other materials present in the landfills.

The NRC believes that the approach outlined in this section will result in doses well below that established to provide adequate protection of public health and safety. For much of the solid materials considered here (e.g., routine trash) there is little recycle value and thus it is likely that the material will be disposed of by burial at the landfill. However, for certain materials such as bulk metals, the NRC is aware that there may be some economic impetus for a landfill to recycle the material. The provisions of the proposed amendment requiring disposal by burial under the regulatory scheme of RCRA attempt to minimize the potential for this to occur. In addition, most major bulk shipments of metal would be made at the time of decommissioning or other large facility outage and/or could be to industrial or construction and demolition landfills (rather than MSLWFs), both of which lend themselves to better direction by the licensee regarding the need for disposal (and not recycle) of the metal by the landfill. Nevertheless, the

NRC is specifically interested in stakeholder input as to practices at the various types of RCRA Subtitle D landfills with regard to recycle of material sent for disposal and how the potential for recycle of solid materials from those facilities can be minimized. A specific question regarding this matter is contained in Section IV.A of this document.

Similarly, it is likely that solid materials, such as rubbled concrete or specific components, will remain in their pre-defined allowed end uses (e.g., road bed construction or re-use of a scaffold). The NRC believes that establishing the 1 mrem/yr (0.01 mSv/yr) dose criterion as part of this proposed amendment would make it unlikely that any future uses of the material would result in reconcentrating residual levels of radioactivity to levels that could impact public health and safety.

(2) Placing bounds on radionuclide concentrations that can be released so as to limit potential exposures. The NRC recognizes that it is difficult to provide absolute assurance that solid material goes to and remains at a landfill, despite the relative protectiveness of the RCRA regulatory structure, or to another designated end use. Some stakeholders expressed concern that there would be a significant regulatory burden in dealing with this material after it reached potential recipients.

Because of the very low level of risk posed by the material released, a reasonable approach that both provides assurance of adequate protection and should not be burdensome, is to use unrestricted release path radionuclide concentration tables (see Section III.B.3.1) for material released to the limited disposition paths of this proposed rule. This is a reasonably

conservative approach because, for the same 1 mrem/yr (0.01 mSv/yr) dose criterion, an unrestricted release is generally associated with lower (more restrictive) radionuclide concentrations than a limited path release, for which persons are exposed in a more limited manner. Thus, there is reasonable assurance that even if all materials released in a year from a licensee were inadvertently diverted for unrestricted release, a 1 mrem/yr (0.01 mSv/yr) dose would not be exceeded. It could also be assured that an isolated unrestricted release would result in doses well below 1 mrem/yr (0.01 mSv/yr). Because the 1 mrem/yr (0.01 mSv/yr) dose criterion is well below the NRC's public dose limit established to ensure adequate protection of public health and safety and is also considered a negligible individual dose by national and international scientific organizations, this approach and this level of assurance is considered appropriate.

This proposed approach of requiring use of the unrestricted release radionuclide concentrations would allow the use of limited disposition paths without imposing the regulatory burden of trying to enforce additional controls on released materials in the public sector. Use of the unrestricted release concentrations is not expected to result in significant additional burden because the NRC's review of the various dose modeling analyses and results (see Section III.B.3.1) indicates that the limiting radionuclide concentrations for both unrestricted and limited path scenarios are within a reasonable range of each other. Also, the lower unrestricted release radionuclide concentrations are not dissimilar from levels which licensees currently measure when using the NRC's current approach.

(3) Inspections. Periodic inspections can provide continuing confirmation or verification that the regulations are being followed. The inspections would look at how licensees identify

and survey materials for release and address the end use of such materials by checking shipment records to recipients.

B.2 The 1 mrem/yr (0.01 mSv/yr) Dose Criterion

A discussion of the NRC's basis for choosing the 1 mem/yr (0.01 mSv/yr) dose criterion is contained in this section. Specific discussion of the relationship of the dose criterion to other NRC/EPA standards, to recommendations from national and international scientific bodies, to background radiation, and to considerations of effects of exposures from multiple sources, are contained in Sections III.B.2.1 to III.B.2.4. Those sections are briefly summarized here.

A 1 mrem/yr (0.01 mSv/yr) dose criterion is a generic dose constraint set at a small fraction (1/100) of the public dose limit of 100 mrem/yr (1 mSv/yr) in 10 CFR Part 20. Both the NCRP and the International Commission on Radiation Protection (ICRP) have indicated that the public dose limit provides adequate protection of public health and safety, although they also indicate that the amount a person would receive from a single source should be a fraction of the limit. The proposed 1 mrem/yr (0.01 mSv/yr) criterion is also in the range of, but less than, other Federal agency standards and allowable risk ranges for other media such as gaseous and liquid effluents. A 1 mrem/yr (0.01 mSv/yr) dose criterion also comports with technical findings in reports prepared by various recognized scientific organizations with regard to its very small potential risk. In particular, NCRP Report No. 141, "Managing Potentially Radioactive Scrap Metal," notes that a dose below 1 mrem/yr (0.01 mSv/yr) can be defined as a "negligible individual dose" and that doses that fall into this range have an associated average annual

excess risk below which “efforts to reduce radiation exposure to the individual is unwarranted.” NCRP Report No. 141 also cites several health effects studies and notes that this dose is in a risk range (10^{-7} to 10^{-6} per year) that is generally regarded as “trivial.” A dose criterion of 1 mrem/yr (0.01 mSv/yr) represents a minute fraction (1/300) of natural background and is also a small fraction of the variability in natural background across the U.S. that members of the public are exposed to without health impact. The NRC is cognizant of studies and reports on radiation health effects cited by citizen and environmental groups that are different from the current scientific consensus views, however, the NRC is confident in the information it does have to determine that the proposed standard of 1 mrem/yr (0.01 mSv/yr) is well below levels established to ensure adequate protection of public health and safety for disposition of solid material from any further licensed control.

The 1 mrem/yr (0.01 mSv/yr) dose criterion is expressed here in terms of effective doses because the basis of RS-G-1.7 is the ICRP 60 dose concept and methodology. In 10 CFR Part 20, dose limits are based on ICRP 26 methodology with dose concepts referring to "deep dose equivalent" doses for external exposures and "effective dose equivalent" doses for internal exposures, expressed as "TEDE" in dose summations. For the purpose of this amendment, equivalence is assumed between effective dose and total effective dose equivalent. Accordingly, the 1 mrem/yr (0.01 mSv/yr) dose criterion is considered to be an “total effective dose equivalent (TEDE)” dose in the proposed amendment.

In addition to the discussions in Sections III.B.2.1 to III.B.2.4, considerations of how the dose criterion would be implemented through use of measurable radionuclide concentrations and appropriate recordkeeping are discussed in Sections III.B.3 and III.B.4, respectively.

B.2.1 Consistency with other NRC/EPA Standards

The NRC utilizes recommendations of other scientific organizations in setting radiation protection standards. For example, the NCRP in its publication No. 116 (Chapter 15) recommends that, for continuous exposure, the effective dose to members of the public not exceed 100 mrem/yr (1 mSv/yr) from all man-made sources, excluding medical and natural background sources. Similarly, the ICRP, in Table 6 of Publication 60, recommends a limit of 100 mrem/yr (1 mSv/yr) as the dose limit for the public. Consistent with these bodies, the NRC's regulations in 10 CFR Part 20, Subpart D, establish a public dose limit of 100 mrem/yr (1 mSv/yr). The NCRP and ICRP also agree that, although the limit for the public dose should be 100 mrem/yr (1 mSv/yr) from all man-made sources combined, the amount that a person would receive from a single source should be further reduced to a fraction of the limit. This would account for the possibility that an individual may be exposed to more than one source of man-made radioactivity and limit the potential that an individual would receive a dose at the public dose limit.

The proposed 1 mrem/yr (0.01 mSv/yr) dose criterion for solid material is well below and a very small fraction (1/100) of the public dose limit of 100 mrem/yr (1 mSv/yr) in 10 CFR Part 20, Subpart D; it is also well below the dose criterion in 10 CFR Part 20, Subpart E for license termination of facilities at 25 mrem/yr (0.25 mSv/yr) which is a "sufficient and ample" margin below the public dose limit for that application (62 FR 39058; July 21, 1997).

The 1 mrem/yr (0.01 mSv/yr) dose criterion for solid materials is comparable to, and smaller than, standards and design objectives set by both the NRC and EPA for other specific media being released from licensed facilities. The NRC sets design objectives in 10 CFR 50, Appendix I, limiting gaseous and liquid effluents from power reactors to less than 5 mrem/yr (0.05 mSv/yr) and 3 mrem/yr (0.03 mSv/yr). The EPA has responsibility for setting generally applicable radiation protection standards in the environment. Currently, the EPA has a drinking water standard of 4 mrem/yr (0.04 mSv/yr), which has been implemented under the Safe Drinking Water Act (1974) in 40 CFR Part 141 and a national emissions standard for air pollutants at 10 mrem/yr (0.1 mSv/yr), which has been implemented under the Clean Air Act, in 40 CFR Part 61. Finally, as noted in the National Academies Report, the risk associated with the 1 mrem/yr (0.01 mSv/yr) dose criterion is below the range of acceptable lifetime risks of 10^{-6} to 10^{-4} that the EPA has used in developing health-based dose standards for exposure to radiation.

B.2.2 Relationship of Dose Criterion to Recommendations from National and International Scientific Bodies Regarding Health Impacts

There are differing views from stakeholders on studies that have been conducted on health impacts. Some commenters cited studies by various national and international scientific organizations that state that there are negligible health impacts from radioactivity at levels near 1 mrem/yr (0.01 mSv/yr). Other stakeholders stated that health effects of low dose radiation are greater than predicted for current radiation limits and cited other studies indicating concerns about impacts at low radiation doses.

In considering these comments, the NRC notes that in developing its overall radiation protection standards, a number of reports and studies by recognized scientific organizations are reviewed. For this proposed amendment, the NRC considered how these organizations address this specific issue, particularly the use of a dose criterion of 1 mrem/yr (0.01 mSv/yr). The organizations include the NCRP, ICRP, National Academies, IAEA, and ANSI. To supplement this review, the NRC also reviewed information from other studies cited by commenters.

In establishing its basic protection standards, the NRC relies on national and international scientific authorities. The NRC believes that reports by the NCRP and ICRP provide a widely held consensus view by national and international scientific authorities on radiation dose responses and accepts their principal conclusions and recommendations on the matter of health impacts.

The NCRP is a nonprofit corporation chartered by Congress to develop and disseminate information and recommendations about protection against radiation, and to cooperate with the ICRP and other national and international organizations with regard to these recommendations. NCRP publications are developed by recognized experts in the fields of radiation protection and health effects. In NCRP Report No. 116, “Limitation of Exposure to Ionizing Radiation”, 1 mrem/yr (0.01 mSv/yr) is referred to as a “Negligible Individual Risk Level” which is defined as a level of average annual excess risk below which “efforts to reduce radiation exposure to the individual is unwarranted.” NCRP Report No. 141, “Managing Potentially Radioactive Scrap Metal”, notes the growing consensus among national and international communities to choose a criterion of 1 mrem/yr (0.01 mSv/yr), in part, because a dose at this level can be considered

"trivial." The NCRP notes the ICRP's recommendation that 1 mrem/yr (0.01 mSv/yr) is appropriate for cessation of regulatory control and that the risk associated with 1 mrem/yr (0.01 mSv/yr) is within a range that is almost universally regarded as trivial. NCRP No. 141 further notes that, in NCRP No. 95, "Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources", levels near or above 1 mrem/yr (0.01 mSv/yr) in consumer products and other miscellaneous sources have not resulted in actions to avoid or mitigate potential exposures. For these reasons, NCRP Report No. 141 states that it is the NCRP's position that a "few" mrem/yr (hundredths of mSv/yr) would be an appropriate dose criterion for a clearance standard.

The ICRP was established in 1928 as a Commission linked to the International Congresses of Radiology and is supported by a number of international organizations and by many governments. The ICRP issues recommendations on the fundamental principles and quantitative bases upon which appropriate radiation protection measures can be established. The ICRP's "Recommendations of the International Commission on Radiological Protection" (ICRP 60, 1990) recommends that the grounds for exempting material from regulation are that a source gives rise to small individual doses, of the order of 1 mrem/yr (0.01 mSv/yr) or less, and the protection is optimized.

During 2002, the National Academies/National Research Council prepared the National Academies Report for the NRC on disposition alternatives for solid material. The National Academies is a society of scientists and engineers, operating under the authority of a charter granted by Congress in 1863, that provides advice to the Federal government on scientific and technical matters. The National Research Council is the principal operating agency of the

National Academies in providing services to the government, the public, and the scientific and engineering communities. As noted in the National Academies Report, the members of the committee responsible for the 2002 National Academies Report were chosen by the National Academies for their special competencies and with regard for appropriate balance.

One of the findings of the National Academies Report was that the NRC's current approach for disposition of solid materials is sufficiently protective of public health that it does not need immediate revamping. However, the report also noted that, for the sake of efficiency of regulation, the NRC should move ahead with a process for evaluating alternatives.

In discussing a 1 mrem/yr (0.01 mSv/yr) dose criterion, Recommendation #5 of the National Academies Report noted that 1 mrem/yr (0.01 mSv/yr) is: a small fraction of the dose received per year from natural background sources; significantly less than the dose we receive from our own bodies due to radioactive potassium and other elements, and due to routine medical procedures; within the range of acceptable lifetime risks of 10^{-4} to 10^{-6} used by the EPA in developing health-based standards for exposure to radiation; able to be measured with radiation measurement technologies available at reasonable cost; and widely accepted by recognized national and international organizations.

The IAEA operates as an organization within the United Nations and works with member nations worldwide with a mission of safety and security; science and technology; and safeguards and verification. The IAEA's standards reflect the recommendations of the ICRP and have been adopted by many of its member nations. IAEA's "Safety Series No. 89, Principles for the Exemption of Radiation Sources and Practices from Regulatory Control",

recognized that there was “no internationally unified policy for excluding or exempting (e.g., clearing) sources from regulatory control.” The first criterion of dealing with this issue was setting a level of trivial dose. The publication noted that most authors proposing values of trivial individual dose have set the level of annual risk which is held to be of no concern to the individual at 10^{-7} to 10^{-6}. Based on this risk, the IAEA concluded that the level of trivial individual effective dose equivalent would be in the range of 1 to 10 mrem/yr (0.01 to 0.1 mSv/yr). Because an individual could be exposed to radiation doses from multiple cleared sources or practices, the IAEA concluded that doses on the order of 1 mrem/yr (0.01 mSv/yr) per practice would be reasonable.

In addition, the NRC reviewed the ANSI national standard (ANSI/HPS N13.12-1999) which contains criteria for unrestricted release of solid materials and includes a dose limit of 1 mrem/yr (0.01 mSv/yr). This standard, which was jointly issued by the ANSI and the Health Physics Society (HPS), contains guidance on the clearance of solid materials based on 1 mrem/yr (0.01 mSv/yr), or higher dose levels when justified on a case-by-case basis, taking into account exposures to multiple sources. The standard recommends maintaining the as low as reasonably achievable (ALARA) principle because it provides an adequate margin of safety below the public dose limit of 100 mrem/yr (1 mSv/yr).

Some stakeholders agreed with the recommendations of the organizations noted above. For example, in an August 2004 position statement, the HPS noted that risks of health effects from exposures below 5000 to 10,000 mrem/yr (50 to 100 mSv/yr) are either too small to be observed or are nonexistent; the 1 mrem/yr (0.01 mSv/yr) dose criterion in this proposed amendment is 5000 to 10,000 times lower than the health effect levels cited by the HPS in their position statement.

Other stakeholders cited studies and reports on radiation health effects that are different from the current scientific consensus views. The NRC collected and reviewed a number of the reports, books, and studies that were cited in the public comment letters (and noted in the DGEIS, Appendix A). One of the publications cited by stakeholders was prepared by Green Audit, an environmental consultancy, who published, on behalf of the European Committee on Radiation Risk (ECRR), a review and analysis entitled, *Health Effects of Ionizing Radiation Exposure at Low Doses for Radiation Protection Purposes* (2003). The authors of the report believe that the health risks associated with inhalation or ingestion of radioactive material are grossly underestimated by the ICRP. A new methodology for estimating radiation exposure was proposed in the ECRR document. Specifically, the new methodology retains the ICRP's system of radiation weighting factors and tissue weighting factors, but includes two additional factors: a biophysical factor and a biochemical enhancement factor, for enhanced hazard weighting for certain kinds of internal exposure to radioactive material. The result of this alternate methodology would be a very substantial increase in effective dose.

The ECRR report was reviewed in detail by the National Radiological Protection Board (NRPB) in the United Kingdom. NRPB staff observed that the methodology proposed by Green Audit for estimating radiation risk from internal emitters did not have a sound scientific basis and that weighting factors proposed by Green Audit appear to have little or no supporting scientific evidence. Similarly, Green Audit criticized the ICRP's value of a risk factor used to convert radiation dose to health risk and proposed its own value, but also failed to provide a scientific basis for its own selection. The NPRB report, in noting that ICRP radiation protection recommendations and radiation dosimetry methodologies are based on extensive knowledge of health effects of ionizing radiation, concluded that the "recommendations of the ICRP provide a

sound technical basis for radiological protection standards. In particular, risks from internal emitters are acceptably well understood and may, in some cases, be overestimated by ICRP."

B.2.3 Comparability to Background Radiation

In considering health impacts of very low doses of radiation, it is noted that humans have evolved in a world constantly exposed to low doses from everyday sources of radiation (such as solar and cosmic radiation, radon, certain foods, etc.) which expose people to background radiation and to wide variations in background each day from place to place with no discernible effect on health (see www.nrc.gov/reading-rm/doc-collections/fact-sheets/bio-effects-radiation.html). The average radiation exposure in the U.S. from all such natural sources is approximately 300 mrem/yr (3 mSv/yr). The proposed dose criterion of 1 mrem/yr (0.01 mSv/yr) is a minute fraction (less than 1/300) of these background levels of radiation received in routine activities and is also a small fraction of background variations which are, themselves, well below the levels where health effects are expected to occur, as discussed in Section III.B.2.2. In addition, man-made sources of radiation from medical, commercial, and industrial activities contribute another 60 mrem/yr (0.6 mSv/yr) to our radiation exposure. Of this, diagnostic medical procedures account for about 40 mrem/yr (0.4 mSv/yr) and can range up to between 500 to 1,000 mrem (5 to 10 mSv) without any documented adverse effects. In addition, some consumer products such as tobacco, fertilizer, welding rods, gas mantles, luminous watch dials, and smoke detectors can contribute another 10 mrem (0.1 mSv) to our annual radiation exposure.

B.2.4 Effect of Exposures from Multiple Sources of Cleared Materials Meeting the Dose Criterion

Concerns were raised by stakeholders that there could be exposures to multiple products or scenarios as a result of solid material released from licensed facilities, even if individual releases met the NRC's dose criterion.

This issue of "multiple exposures" is discussed in detail in Appendix E of the DGEIS. The DGEIS notes that the possibility of multiple exposures concurrently applying to an individual implies that the individual would be exposed to very low amounts of radioactivity as a result of more than one potential situation due to material released from licensed facilities (e.g., from products made from solid materials, disposal in landfills, material present in a road bed, etc.). In considering this, the DGEIS notes that the potential for the same individual to be involved in concurrent scenarios is physically constrained by the relatively limited amount of materials that could be released from licensed facilities, geographical distances between licensees, and the different locations where scenarios could occur. In addition, the limited disposition paths required by this proposed amendment minimizes the number of potential exposure scenarios to the public, in particular with regard to recycle into general commerce. Furthermore, realistically conservative models are used to estimate potential dose to a "critical group" which are likely to overestimate the dose to any specific individual. Based on these varied considerations, and the 1 mrem/yr (0.01 mSv/yr) individual dose criterion, the DGEIS notes that the likelihood of multiple exposure scenarios gets small as the number of potential concurrent scenarios increases and that any combined exposures from multiple exposures would still be a very small fraction of the NRC's public dose limit of 100 mrem/yr (1 mSv/yr).

B.3 Tables of Radionuclide Concentrations Associated with the Dose Criterion

B.3.1 Tables of Radionuclide Concentrations

The proposed amendment is supplementing the dose criterion of 1 mrem/yr (0.01 mSv/yr) with tables of measurable radionuclide concentrations to facilitate confirmation that the dose criterion has been met (i.e., if a licensee can demonstrate for a solid material being considered for release that the radionuclide concentrations are less than levels in the tables, this will provide assurance that the 1 mrem/yr (0.01 mSv/yr) dose criterion has been met). Based on the studies and activities noted in Sections III.B.3.1.1 and III.B.3.2, the NRC has concluded that the dose criterion of 1 mrem/yr (0.01 mSv/yr) can be effectively modeled, measured, and monitored for compliance so that there is reasonable assurance that the dose criterion will not be exceeded.

B.3.1.1 Basis for Radionuclide Concentrations

Because doses in the environment cannot be easily measured, "dose models" are used to model the behavior of nuclides in the environment to translate the residual radionuclide concentrations on, or in, a solid material to a potential dose to an individual. There were comments received from some stakeholders about the ability of dose models to accurately model potential doses. A discussion of technical studies performed to provide reasonable models for estimating potential doses and efforts to establish the accuracy of these models follows.

Several organizations, including the NRC, IAEA, EC, and ANSI have developed reports containing tables that relate measurable radionuclide concentrations to a dose of 1 mrem/yr (0.01 mSv/yr). Each of these reports evaluate various exposure scenarios and pathways by which potential population groups might be exposed, based on the potential release of a range of materials with various radionuclide concentrations. These reports also provide a method for converting the actual measured concentrations when the materials are released to the potential dose received by the various receptors.

The NRC's report (NUREG-1640, "Radiological Assessments for Clearance of Materials from Nuclear Facilities") contains analyses of various potential uses of materials (steel, aluminum, copper, concrete, and reused tools and equipment) and resultant potential exposures as a result of different dispositions of solid materials. The appropriateness of the models in NUREG-1640 to evaluate the relationship between material released and a dose criterion of 1 mrem/yr (0.01 mSv/yr) was reviewed by the National Academies and peer reviewed as part of NUREG-1640's preparation. In particular, the National Academies Report noted the technical soundness of NUREG-1640 and recommended that for any dose-based approach for disposition of solid materials, the NRC should use the conceptual framework of NUREG-1640 to assess dose implications.

The IAEA developed RS-G-1.7 to assist countries in setting standards for exemption, exclusion, and clearance from regulatory control. Radionuclide concentration tables in RS-G-1.7 are based on a consideration of various exposure pathways, scenarios, and potential receptors of released materials developed to encompass typical exposure situations for all material types. The NRC has reviewed the tables of radionuclide concentrations in RS-G-1.7 and, as discussed in the DGEIS, found these concentrations reasonably consistent with

NUREG-1640. An advantage in the use of a table of internationally-accepted radionuclide concentrations in RS-G-1.7 is that their use in this proposed amendment would promote consistency among nations in setting numeric standards for release of solid materials from regulatory control.

The NRC has decided to use the radionuclide concentrations in RS-G-1.7 in this proposed regulation (specifically in a proposed Appendix E to Part 20) because of consistency in international numeric standards, and because the NRC's review of RS-G-1.7 and NUREG-1640 indicates that the use of either document can provide reasonable assurance that the radionuclide concentrations used result in potential doses that meet the 1 mrem/yr (0.01 mSv/yr) dose criterion in this proposed amendment. As discussed below, for certain situations, the NRC is supplementing the radionuclide concentration information from RS-G-1.7 with data from NUREG-1640.

As noted above, the radionuclide concentration tables in RS-G-1.7 and NUREG-1640 have been developed for a range of scenarios and pathways. As discussed in Section III.B.1.2.2, the radionuclide tables taken from these documents, and proposed as an element of this proposed amendment, are based on the limiting scenario of unrestricted release even though the proposed amendment would only authorize limited disposition pathways. Section III.B.1.2.2, further discusses the rationale for this approach.

B.3.1.2 Specific Considerations in Use of the Radionuclide Tables

Table 2 of RS-G-1.7 contains a list of concentrations of radionuclides of artificial origin derived independently from this NRC rulemaking. These concentrations are based on the concepts of exempting and/or clearing these radionuclides from regulation. Because the concentrations in Table 2 of RS-G-1.7 are based on the same 1 mrem/yr (0.01 mSv/yr) value as the dose criterion contained in this proposed amendment, the concentration levels in Table 2 of RS-G-1.7 have been directly transferred into this proposed amendment as Table 1 of Appendix E of 10 CFR Part 20. For radionuclides not included in Table 2 of RS-G-1.7, the NRC has decided to use radionuclide levels taken from NUREG-1640 normalized to the same 1 mrem/yr (0.01 mSv/yr) dose criterion as other facilities covered by this proposed amendment. Primarily, this includes licensees authorized to possess source material (e.g., depleted-U, U-238 and Th-232, and their decay products) for facilities licensed under Part 40, and special nuclear material (e.g., U-238, U-234, and U-235) for facilities licensed under Parts 50, 70, and 72.

Another consideration is that the radionuclide tables in RS-G-1.7 are expressed in terms of the quantity of the radionuclides contained within the volume of the solid material. However, in many situations, surface concentrations will be more readily measurable (indeed, the NRC's current approach for considering release of solid materials in Regulatory Guide 1.86 includes a table of acceptable surface concentration levels). Therefore, there should continue to be guidelines based on surface concentration levels.

Because the IAEA has not yet developed such information on surface concentrations, the NRC has had to develop a table of acceptable surface concentrations as part of this rulemaking. The NRC notes that solid materials released from further license control by the NRC under this proposed amendment would likely be transported in a variety of manners and that consistency between NRC requirements and Department of Transportation (DOT) regulations in 49 CFR Part 173 for transport of material is important. The NRC decided to base its surface concentrations on the definition in 49 CFR 173.403 for surface concentrations not requiring DOT regulation to provide consistency between these two Federal agencies regarding material needing no further regulation. Although the DOT values are not a direct derivation from a 1 mrem/yr (0.01 mSv/yr) dose level (and instead reflect historical practices), they result in doses of less than 1 mrem/yr (0.01 mSv/yr) and are reasonably consistent with the existing values in Regulatory Guide 1.86. In considering how to proceed in this area, the NRC also derived estimates of surface concentrations directly from the volume concentrations of RS-G-1.7 using information in Appendix D of the DGEIS for ratios of the mass of various solid materials to their surface areas (i.e., “mass-to-surface” ratios). The DOT values are reasonably consistent with these derived surface concentrations for certain radionuclides, such as Co-60 and Cs-137, and for multiple radionuclides taking into account their relative mix for specific types of materials, although for some radionuclides the DOT values may introduce additional conservatism, i.e., resulting in more restrictive concentration levels.

Based on the considerations of the previous paragraph, the NRC has included a set of surface concentrations in Table 2 of Appendix E of 10 CFR Part 20. Table 2 groups nuclides in a manner similar to the existing table in Regulatory Guide 1.86 which has been in use for several years. Licensees would have the option of applying to the Commission for case-specific approval to release material at radionuclide concentration levels higher than those in

Table 2 of the proposed amendments; however licensees would have to comply with DOT regulations regarding shipment of material for those cases.

The NRC is specifically interested in stakeholder input on the proposed approach of using DOT values from 49 CFR 173.403 for the surface concentrations in Table 2 of Appendix E of this proposed amendment as opposed to developing concentration levels that take into account representative mass-to-surface ratios. Specific questions regarding this matter are contained in Section IV.B of this document.

As noted in Section III.A, this proposed amendment contains a dose criterion of 1 mrem/yr (0.01 mSv/yr). The radionuclide concentrations developed based on dose modeling and other regulatory considerations, noted above, provide an acceptable means to comply with this dose criterion in an effective and efficent manner by eliminating the need to calculate a set of radionuclide concentrations for each case. If a licensee decides to use radionuclide concentrations other than those in the proposed Appendix E of 10 CFR Part 20 for meeting the dose criterion, it will have to provide a case-specific analysis with the basis for the radionuclide concentrations used under the case-specific element of this proposed amendment.

B.3.2 Ability to Accurately Measure the Radionuclide Concentrations

After a set of radionuclide concentrations corresponding to a dose criterion is established, there must be reasonable assurance that these radionuclide concentrations can be accurately measured. Some stakeholders expressed concerns about the ability to measure the radionuclide releases accurately. An approach to demonstrate that radionuclides at these low

levels can be accurately measured is discussed in draft NUREG-1761, “Radiological Surveys for Controlling Release of Solid Materials,” June 2004. This report was submitted for public comment and modified in response to the comments. NUREG-1761 indicates that radionuclide concentrations at levels corresponding to 1 mrem/yr (0.01 mSv/yr) for any of the alternate disposition paths can be measured accurately with existing survey and detection instruments.

In addition, an interagency working group from the EPA, DOD, DOE, and NRC has incorporated a series of planning steps for survey design (Data Quality Objectives developed by the EPA) and QA/QC principles into a Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575, for surveying lands and structures. The MARSSIM methodology was adopted by the NRC in NUREG-1757. A follow-on interagency working group is developing methods for improving the conduct of radiation surveys for solid materials at very low radiation levels. This group intends to issue guidance as a supplement to MARSSIM in a document entitled “Multi-Agency Radiation Survey and Assessment of Materials and Equipment” (MARSAME).

To assure that the actual measurements are made and documented accurately, the NRC is issuing a draft regulatory guidance document (draft NUREG-1813) for licensees to follow in implementing the requirements of this proposed rule. NUREG-1813 provides information on procedures for designing a survey and for the quality assurance (QA) and quality control (QC) of the measurement process. NUREG-1813 is based on the concepts of NUREG-1761 and MARSSIM and provides specific information on implementing the requirements of the proposed amendment, including information about design, performance, and documentation of radiological surveys of materials to ensure radionuclide concentrations are accurately measured.

B.4 Recordkeeping

The NRC is proposing to require licensees to maintain records in 10 CFR 20.2108 indicating the nature of the material released (e.g., type and quantity of solid material, and radionuclides present and information on their concentrations) and its destination (e.g., the landfill or specific end use). An exception, as noted in Section III.B.1.2.1, is for tools and equipment carried from restricted/impacted areas by an individual as part of routine conduct of business; for these materials, licensees would only be required to maintain records regarding the specific tool or equipment removed from the restricted/impacted area and an indication that radionuclides released were in compliance with the proposed amendment. The records required by the proposed amendment will provide verification that the dose criterion has been met and provide reasonable assurance that the material was delivered to an authorized destination. The records required are considered an appropriate level of control for a material that the NRC considers to be of negligible health consequence.

Some commenters expressed concern that they would not know what doses would result from products made from recycled materials and that materials should be tagged before release. Because the limited disposition path approach in this proposed amendment would limit the potential for exposure to products made from recycled materials and because the dose criterion would be set at a negligible individual dose level of 1 mrem/yr (0.01 mSv/yr), there are no requirements included in the proposed amendment for tagging or marking released materials because this would add regulatory burden without a commensurate health and safety benefit. Also, in conjunction with a dose criterion of 1 mrem/yr (0.01 mSv/yr), it is unlikely that any future uses would reconcentrate residual radioactivity to levels that could impact public health and safety.

C. Other Considerations, Including Scope and Interfaces

To provide additional clarification in considering the implementation of this proposed amendment, this section discusses the scope of this proposed amendment and interfaces with other NRC requirements.

C.1 Materials within the scope of this rule

As noted in Section II.C, materials present in restricted or impacted areas that need disposition would be subject to the provisions of proposed 10 CFR 20.2008, 20.2009, and 20.2108. The materials include metals (tanks, pipes, ventilation ducts, etc); equipment and tools; routine trash (plastics, paper, glass); office furniture, laboratory materials (gloves, beakers, etc.); concrete; and soil, soil-like materials, and other process materials. This material would need to be evaluated and surveyed for radioactivity (either by use of process knowledge or direct measurement) and sent to one of the disposition paths required by 10 CFR 20.2008 or 20.2009. For much of the material covered by the proposed amendment (equipment and tools, routine trash, concrete, etc), the allowed disposition paths are fairly broad and similar to how licensees currently disposition such materials. If a licensee wishes to use a disposition path not listed in 10 CFR 20.2008 for these materials, or for other types of material like metal components, the licensee can apply to the NRC for case-specific approval of disposition procedures under 10 CFR 20.2009.

As noted above, materials within restricted and impacted areas would be subject to the requirements of proposed 10 CFR 20.2008, 20.2009, and 20.2108. However, basing decisions

on disposition of solid materials from a “restricted area” may not be appropriate because the definition of restricted area in 10 CFR Part 20 is based on limiting access for the purpose of protecting an individual against undue risks from exposure to radiation. Some licensees create restricted areas to protect individuals from exposure to ambient external radiation fields, and not necessarily based on the residual radioactivity in or on solid material. Thus, a more appropriate scope to define what material is covered by this amendment may be the term “impacted area” which is currently defined in 10 CFR Part 50 as “areas with some reasonable potential for residual radioactivity in excess of natural background.” (The term “non-impacted area” is also defined in 10 CFR Part 50 as an area with “no reasonable potential for residual radioactivity in excess of natural background”). This same definition of impacted area is included in § 20.1003 of this proposed amendment.

In MARSSIM (NUREG-1575) these same terms, “impacted areas” and “non-impacted areas”, are used to signify the extent of surveys needed to release the areas from licensed control. NUREG-1575, in Figure 2.4, states that for non-impacted areas no survey is required to release the area from licensed control. For impacted areas, NUREG-1575 indicates a range of survey requirements, even for those areas that are not expected to contain any residual radioactivity or expected to contain very small amounts of radioactivity. Because a similar logic can be drawn for those solid materials present in impacted versus non-impacted areas, it would seem reasonable that this proposed amendment on disposition of solid materials should only apply to materials from impacted areas. Thus, it may be appropriate to use only the term “solid materials originating in impacted areas” when indicating the scope of materials covered by this rule. This would mean that for licensees like medical facilities or research laboratories, who may define restricted areas broadly based on facility design, the NRC could better focus its disposition and recordkeeping requirements on solid materials from those areas where a

reasonable potential for the presence of residual radioactivity exists. Licensees could either designate the entire restricted area as an impacted area or could focus more on those areas they were designating as impacted areas, whichever was more cost-effective.

The NRC is interested in stakeholder input with regard to considering material in restricted and/or impacted areas within the scope of this proposed amendment and specifically requests comment on this matter (see Section IV.C).

C.2 Materials not within the scope of this rule

(1) Materials outside the restricted or impacted areas. Solid materials not located in or originating in restricted or impacted areas and considered to be free of radioactivity resulting from licensed operations, are not currently required to be part of a disposition radiological survey program (e.g., material from administrative buildings or office areas). This amendment would not alter this approach; therefore, materials in these areas are not covered by the provisions of this proposed amendment.

(2) Materials with larger amounts of radioactivity. There are other solid materials at licensed facilities that contain larger amounts of radioactivity (e.g., reactor system components, sealed sources, etc.) that are routinely kept separate from solid materials with no, or very small amounts of, radioactivity. Because requirements in 10 CFR Part 61 already cover the disposal of materials with larger amounts of radioactivity at licensed low-level waste (LLW) disposal sites, these materials are outside the scope of this rulemaking.

(3) Treated process materials. Treated process materials (materials whose properties have been modified or are unique to the process from which they originate), such as spent ion-exchange resins; sludge from spent ion-exchange process systems; microspheres; oily sludge and sediments; spent filters and filter sludge; spent charcoal beds; incinerator ashes; and materials that have been solidified or stabilized, contain chelating agents, pathogenic or infectious biotic agents, and pyrophoric or explosive chemicals, are not within the scope of this rulemaking. These materials are not part of the scope of this rulemaking and were not analyzed in the supporting technical basis or in the DGEIS. As noted in item 5, below, licensees may continue to apply to the NRC under the provisions of 10 CFR 20.2002 for their disposal on a case-by-case basis.

(4) Liquids and gases. These materials currently have requirements related to their release in 10 CFR Parts 20 and 50 and are outside the scope of this rulemaking.

(5) Materials covered under existing 10 CFR 20.2002. Currently, licensees can apply to the Commission for approval of proposed procedures, not otherwise authorized in the regulations, to dispose of licensed material under the provisions of existing 10 CFR 20.2002. A licensee can continue to request disposal of treated process materials (discussed in #3, above) under the provisions of 10 CFR 20.2002. Licensees also can continue to use the existing provisions of 10 CFR 20.2002 to request consideration of alternate dose criteria for solid materials, soils, soil-like materials, and process materials covered by this proposed amendment.

(6) Materials associated with persons leaving restricted or impacted areas. Licensees are required to monitor workers for radiation dose as they come and go from restricted areas. It is

industry practice for workers to pass through a personnel frisker before they leave the restricted area under the existing requirements of 10 CFR Part 20. This proposed amendment would not apply to those persons or their personal items such as jewelry, watches, etc.

(7) Material intentionally made radioactive as part of manufacturing or research process at a licensed facility. Some facilities are licensed by the NRC to introduce radioactive material into products or to conduct research using radioactive materials. Handling of these materials is subject to other NRC regulatory requirements and would not be subject to the provisions of this proposed rule.

(8) Materials associated with Radiological Disperson Device (RDDs) incidents. The scope of this proposed amendment would only include release of solid materials from licensed control at facilities licensed by the NRC and/or Agreement States. The proposed amendment would not be applicable to emergency provisions associated with handling or setting criteria for cleanup of RDD events.

C.3 Other transfers of solid material

C.3.1 Transfers from one licensee to another for use in a restricted or impacted area

Nothing in this proposed amendment would preclude a licensee from transferring material and equipment to another NRC or Agreement State licensee for re-use in a regulated environment because other requirements already exist for such transfers and this proposed amendment does not alter that.

C.3.2 Transfers of unimportant quantities of source material exempt under 10 CFR 40.13(a)

As indicated in the June 1999 Issues Paper, 10 CFR 40.13 and 40.51, which contain unimportant quantities or transfer provisions, respectively, are the subject of a separate Commission initiative and are outside the scope of this rulemaking. Hence, nothing in this proposed amendment would affect the definition of unimportant quantities in 10 CFR 40.13(a) nor their transfer under 10 CFR 40.51.

C.4 Relationship to the Requirements of 10 CFR Part 20, Subpart E

Subpart E to 10 CFR Part 20 contains radiological criteria for license termination. Section 20.1402 of Subpart E contains radiological criteria for unrestricted use of a site based on a dose criterion of 25 mrem/yr (0.25 mSv/yr) and, in addition, provisions that the residual radioactivity has been reduced to levels that are ALARA. These criteria for license termination were based on considerations (62 FR 39058; July 21, 1997) related to providing a sufficient and ample margin of safety below the NRC's public dose limit of 100 mrem/yr (1 mSv/yr) and cost-benefit considerations of further reducing the dose below 25 mrem/yr (0.25 mSv/yr) for lands and structures.

The June 1999 Issues Paper, released to solicit early comment on this rulemaking on disposition of solid materials, addressed the different circumstances and issues between Subpart E and the disposition of solid material. Specifically, it was noted that the Subpart E dose limit of 25 mrem/yr (0.25 mSv/yr) is intended to apply to termination of a license, at a specific point in time, and disposition of structures and land whereas, in contrast, release of

solid materials could involve periodic releases over the lifetime of the facility. In developing the dose criterion for this rulemaking, as discussed in Section III.B.2, the NRC considered factors such as: more limiting fractions of the public dose limit to account for the potential for multiple releases and exposures; similarity to the range of requirements in 10 CFR Part 50, Appendix I, for other media such as air and liquid effluents; and consideration of NCRP Report Nos. 116 and 141 regarding the negligible risk associated with a 1 mrem/yr (0.01 mSv/yr) standard.

Solid material released from the site during facility operations and during the active decommissioning period would be covered by the provisions of this amendment. As indicated in 10 CFR 20.1401 and 20.1402, facilities and sites released from a license are covered by the provisions of 10 CFR Part 20, Subpart E and their disposition after license termination would not be subject to the elements of this proposed amendment (i.e., the dose criterion, allowed disposition path, radionuclide concentration, or recordkeeping provisions) because the site would no longer be licensed.

D. Implementation Schedules

Licensees will need adequate time to implement changes in their radiation protection programs as a result of this proposed amendment when it becomes final. Such changes would include changes in survey methodology, including the setpoint for radionuclide concentrations allowed for release, and recordkeeping provisions. Additionally, some licensees (primarily those holding Part 30 licenses) may have existing license conditions that specify radionuclide concentration release levels based on the existing guidelines noted in Section II.A of this document. If the existing license conditions are less restrictive than the Commission

regulations, then licensees will be required to comply with the proposed provisions of this rulemaking when they become final by seeking amendments to their licenses. At this time, the NRC is not proposing an implementation schedule for when licensee would need to comply with the rule when it becomes final. However, as noted in Section IV.D of this document, the NRC is inviting comments on the time period for implementing these changes, including specific information on timing and economic considerations.

E. Consideration of Other Alternate Approaches for Disposition of Solid Materials

The National Technology Transfer and Advancement Act of 1995 (NTTAA), Pub. L. 104-113, requires all Federal agencies and departments, in carrying out policy objectives or activities, to use technical standards developed or adopted by voluntary consensus standards bodies, except when utilization of such standards "is inconsistent with applicable law or otherwise impractical." Therefore, the NRC considered the use of ANSI N13.12 which is a technical standard, issued by the ANSI, presenting screening clearance criteria for unrestricted release of solid materials based on an annual dose limit of 1 mrem (0.01 mSv/yr). However, for the reasons discussed in Sections III.A and III.B of this document, the NRC is proposing an amendment to limit disposition of solid materials, based on a 1 mrem/yr (0.01 mSv/yr) dose criterion (similar to ANSI N13.12) and an associated set of radionuclide concentrations based on RS-G-1.7. The NRC's approach incorporates elements of ANSI N13.12, but does not use it in its entirety. The NRC regards this approach as appropriate given the range of considerations discussed above. Other reasons for why the ANSI N13.12 was not used in its entirety are discussed in the DGEIS; the NRC believes that use of this ANSI standard is impractical for the reasons noted in the DGEIS.

Another alternate discussed by some stakeholders, and referred to in the National Academies Report, was recapture of solid material already released from licensed facilities. As noted in Section I, The NRC's current approach allows release of solid material if it is below a measurement-based guideline. Some stakeholders requested that the NRC include, as one of its alternatives, review of previous releases and their recapture. However, the NRC is not proceeding with this approach as part of this rulemaking for two reasons. First, as noted in the National Academies Report, the NRC's current practice protects public health; therefore, attempting to find and retrieve materials released under the current approach would be unduly burdensome given the National Academies' finding. Second, because this proposed amendment would specify criteria for disposition of material currently at licensed facilities and available for release, the recapture approach is not within the scope of this rulemaking.

IV. Request for Specific Comments

The NRC is requesting comment on all issues related to this proposed rulemaking and comments can be sent to the ADDRESSES section of this document. In addition, the NRC is specifically requesting comments on the following items.

A. Landfill Disposal

As noted in Section III.B.1.2.2, the NRC is interested in stakeholder input regarding landfill disposal practices. Input on the following questions related to this issue is requested.

1) What are practices at the various types of RCRA Subtitle D landfills (MSWLFs, industrial, construction and demolition) with regard to recycle of material sent for burial at the landfill, i.e., is it likely that material sent to the different types of RCRA Subtitle D landfills for burial would be removed from the landfill and sold or sent for other uses or recycle?

2) How can the potential for recycle of solid materials from the RCRA Subtitle D landfills be minimized?

B. Surface Radionuclide Concentration Levels

Section III.B.3.1.2 indicates that the NRC has based the surface radionuclide concentration levels in Table 2 of proposed Appendix E to 10 CFR Part 20 on the definition in DOT's 49 CFR 173.403 for surface concentrations not requiring DOT regulation. Using the DOT values provides consistency between these two Federal agencies regarding material needing no further regulation, although it is noted there that this approach may introduce additional conservatism for certain radionuclides. Input on the following questions related to this issue is requested:

1) Should the NRC, instead of using the DOT values, base its surface concentrations on levels derived directly from the volume concentrations in IAEA's RS-G-1.7 using mass-to-surface-ratios? If so, and given the wide range of components and materials, as well as the diverse range of NRC licensees, covered by this rule, what would be a reasonable approach for deriving surface concentrations, keeping in mind the need for a relatively simple screening table of release values to be used in Appendix E to 10 CFR Part 20?

2) NRC's preliminary estimates for surface concentrations, derived directly from the RS-G-1.7 volume concentrations, indicates that the surface concentration for some radionuclides corresponding to 1 mrem/yr (0.01 mSv/yr) may be in excess of the DOT definition for material requiring regulation in transport. Releases of such material may require placarding, labeling, or recordkeeping under the DOT regulations. What would be the implications to stakeholders in releasing materials if the NRC's table of surface release concentrations contained levels in excess of the DOT values?

C. Scope of the rule.

Section III.C.1 indicates that the scope of the proposed amendment includes materials in restricted and impacted areas of a licensed facility. Section III.C.1 also indicates that the NRC is considering whether it is more appropriate for the scope to include only impacted areas. Input on the following questions related to this issue is requested:

1) How does the burden on licensees, for an amendment requiring both restricted and impacted areas be part of its scope, compare to an amendment requiring just impacted areas? Provide specific information on how an amendment that limited its scope to material in impacted areas would be beneficial in licensed operations.

2) How would a licensee provide assurance that material from non-impacted areas did not have residual radioactivity resulting from licensed operations? How would a licensee provide assurance that non-impacted areas did not become impacted?

D. Implementation schedules

As noted in Section III.D, the NRC is interested in stakeholder input regarding the schedule for implementation of the requirements of this proposed amendment at such time as it becomes final. Input on the following questions related to this issue is requested.

1) What would be an appropriate time period for the effective date of implementation of this proposed amendment at such time as it becomes final? In your response provide specific rationale related to time and economic considerations.

2) What would be an appropriate time period for amending license conditions containing requirements for release of solid materials to make them comply with the provisions of this proposed amendment at such time as it becomes final? In your response provide specific rationale related to time and economic considerations.

V. Discussion of Stakeholder Input on Other Issues

In addition to the discussion of alternatives for disposition of solid materials, stakeholders also provided comments on other issues associated with this rulemaking, including: stakeholder involvement in the rulemaking process, development of NRC's technical basis, the relationship to the Below Regulatory Concern (BRC) Policy, and State, other Federal agency, and international related issues. Stakeholder comments are summarized in the DGEIS, Appendix A; a discussion of considerations related to those concerns follows.

A. Stakeholder Involvement in the Rulemaking Process:

As discussed briefly in Section II.D, the NRC has had a continuing effort, both early in the process and during its decision-making, to seek stakeholder input on major issues associated with this effort. This has included release of several documents, including an NRC Issues Paper issued in June 1999, a scoping Federal Register document (68 FR 9595; February 28, 2003), and a web-based Information Packet issued in February 2003. These documents invited written and/or electronic comment from stakeholders on the issues. Also, 12 public meetings were conducted between September 1999 and February 2005 with stakeholders, including three meetings convened by the National Academies as part of their study on this subject. The NRC has considered a range of viewpoints presented at the meetings from a diversity of stakeholders on alternatives and possible impacts. Stakeholders included representatives from metals and cement industries; citizen and environmental groups; licensees and licensee organizations; State and Federal agencies; Tribal organizations; and organizations such as the HPS. Summaries of stakeholder input received through these forums are presented in various documents, including Appendix A of the DGEIS, in the background section of the NRC's website at www.nrc.gov/materials.html, and in NUREG/CR-6682.

The NRC Issues Paper stated that the NRC was seeking public comment and participation at a series of meetings before the start of any formal rulemaking to solicit early and active public participation on major issues associated with disposition of solid materials. The objectives of these meetings were to identify relevant issues, exchange information on these issues, and identify concerns and areas of disagreement and approaches for resolution.

Despite a boycott by citizens groups of the first two meetings in Fall 1999, the NRC held two additional meetings that were attended by several citizens groups. In addition, the meetings during 1999 were attended by representatives of metals industries and cement industries, both of whom expressed concern about aspects of certain alternatives. The meetings were also attended by State and landfill groups who provided information on issues related to landfill disposal. Also, various licensee groups (including representatives from university laboratories and hospitals) provided input on unique issues associated with disposition of solid material at their facilities. In addition to the four public meetings held in 1999, the NRC also received over 900 written comment letters and emails on the June 1999 Issues Paper from a range of stakeholder groups, including citizens groups and individuals. The NRC held follow-up meetings in January 2000 to specifically hear from representatives of the metals industry about their concerns related to clearance and in May 2000, at which time the NRC invited 14 different stakeholder groups (including several citizens groups, the metals industry, States, and licensees) to a Commission meeting to provide representatives of those groups the opportunity to present their views directly to the Commissioners.

The Commission sought further information on this subject in May 2000 by requesting the National Academies to provide an independent analysis of alternatives for disposition of solid materials. As discussed in Section II.D of this document, the National Academies held three meetings with a range of stakeholder groups in 2001 and provided the Commission with a report on its findings, including nine recommendations, in March 2002. Subsequently, the NRC sought additional public comment on alternatives for disposition of solid materials in a FRN issued February 28, 2003 (68 FR 9595). Stakeholders also were invited to comment via an "Information Packet" placed on the NRC's website in February 2003. The NRC held a workshop in May 2003 at which 30 invited stakeholder groups provided their additional views on

alternatives. Also, the NRC held an additional meeting open to the public, at which the Nuclear Energy Institute, representing utility licensees, at their request, was afforded the opportunity to provide additional information about their views on disposition of solid materials. The NRC also received over 2600 written comment letters and e-mails in response to the February 28, 2003, FRN from a range of stakeholder groups.

Thus, the NRC has participated in 11 meetings with a range of stakeholder groups and has received over 3500 comment letters and emails representing viewpoints from a wide range of stakeholders. Information gathered in this effort has included: identification of economic concerns by the metals and cement industries; public concern over the potential presence of radioactivity in solid materials, even in very low amounts, from licensed facilities in general commerce and consumer products; reference to various health studies regarding low doses of radioactivity; identification of practical issues of how solid materials are handled at the range of facilities that the NRC licenses, including small licensees like university laboratories and hospitals and larger ones like manufacturers and power reactors; issues of feasibility related to limiting solid materials to only a selected set of defined uses; and viewpoints on both sides of the issue associated with disposal of solid materials in RCRA landfills at radioactivity levels near 1 mrem/yr (0.01 mSv/yr). The NRC has benefitted from this process in the knowledge that it has now regarding issues and stakeholder viewpoints related to disposition of solid materials and appreciates greatly those who took the time to participate in this process.

The NRC is now issuing this proposed amendment which it believes represents a reasonable position based on the information gathering process it has conducted. The information used in the NRC's decision-making has included input from stakeholders, review of reports by other organizations in this area, review and comparison with other related health

standards, development of technical bases (including dose analysis and survey procedures), and NEPA analysis on disposition of solid materials. The NRC is issuing this proposed amendment and the DGEIS for public comment and also plans to discuss this issue further with stakeholders to solicit additional input on these documents.

B. Development of Technical Basis and DGEIS.

The NRC has expended substantial effort to review and develop technical information to be able to provide a complete analysis of all reasonable alternatives for disposition of solid materials. Principal factors affecting decisions on alternatives could include impacts on human health and the environment, cost-benefit considerations, impacts on other industries, and the capability to survey the material for the various alternatives. To support decision-making on all alternatives, technical information has been developed which includes inventories of solid material potentially available for release; assessment of individual and collective radiation doses which could occur depending on the alternative selected, including the potential for exposure to multiple sources; and costs associated with handling, surveying, transport, disposal, and possible uses of these materials. The NRC also developed information on methods that could be used for performing radiation surveys of solid material available for release. Solid materials analyzed as part of this effort have included metals, concrete, soil, and ordinary trash.

A principal support document prepared by the NRC as part of the technical basis for the proposed amendment is NUREG-1640 (Volumes 1 and 3, published September 2003; Volume 2, published October 2004; Volume 4, published May 2004). NUREG-1640 includes an assessment of inventory of solid materials at licensed facilities covered by this rulemaking and

those solid materials potentially available to be released or sent to a LLW disposal site under a prohibition alternative. NUREG-1640 also assesses pathways by which an individual could be exposed as a result of release of solid materials, either for general or limited recycle, reuse, or disposal in a landfill. As discussed in Section III.B.3.1, in an effort separate from the development of NUREG-1640, the IAEA developed RS-G-1.7 to assist countries in setting standards for exemption, exclusion, and clearance from regulatory control. RS-G-1.7 is based on a consideration of various exposure pathways, scenarios, and potential receptors of released materials developed to encompass typical exposure situations for all material types. The NRC has reviewed IAEA's RS-G-1.7 concentrations and, as discussed in the DGEIS, found these concentrations reasonably consistent with NUREG-1640. Dose pathways from released material for individuals for the prohibition alternative are not explicitly analyzed in NUREG-1640 or RS-G-1.7 because there would not be release pathways; pathways related to prohibition were analyzed in the Final Environmental Impact Statement on 10 CFR Part 61 "Licensing Requirements for Land Disposal of Radioactive Waste" (NUREG-0945, November 1982).

Draft report NUREG-1640, Supplement 1, extends the information already contained in NUREG-1640 to include other materials (trash and soil) and dispositions (re-use of materials). Additionally, draft report NUREG-1761 provides technical information on survey approaches for the control of solid material, including considerations for different types of material and the presence of multiple radionuclides. NUREG-1761 supplements the information presented in NUREG-1813. Comments on both of these draft reports may be submitted as specified in the ADDRESSES section of this document.

The DGEIS being issued with this proposed rule, includes an analysis of the impacts (including collective doses) and costs associated with all of the alternatives for disposition of

solid materials. The analyses and results are available for public review and comment. Also, based on the analyses conducted, the NRC has issued a regulatory guidance document (NUREG-1813) for assuring that radiation surveys are conducted in a manner that will confirm that the licensee has met the criteria of this proposed amendment. NUREG-1813 is also available for public review and comment. With the issuance of these documents for review and comment, the NRC believes that an appropriate basis exists to make a decision regarding criteria for disposition of solid materials and can proceed with this proposed rule.

NUREG-1640 and NUREG-1761, and the DGEIS (NUREG-1812) and regulatory guidance (NUREG-1813), are available on the NRC website at www.nrc.gov/materials.html.

Some stakeholders stated that NUREG-1640 should not be used in any further analysis or decision-making because the initial contractor in its preparation, SAIC, was found to have an organizational conflict of interest (COI). However, the NRC has peer reviewed and verified the scientific accuracy of NUREG-1640. Based on this review, the NRC believes that the final NUREG-1640 provides an appropriate basis for analysis of potential exposures and for decision-making on alternatives. The NRC's peer review included an independent technical review of draft NUREG-1640 by the Center for Nuclear Waste Regulatory Analyses (CNWRA) which found that SAIC performed a quality analysis in draft NUREG-1640. In addition, the National Academies reviewed NUREG-1640 along with other technical documents and stated in its report that draft NUREG-1640 provides a "conceptual framework that best represents the current state of the art in risk assessment, particularly with regard to its incorporation of formal uncertainty," as judged by recommendations of the National Academies study committee and other committees of the National Research Council. The National Academies Report also noted the questions of contractor organizational COI associated with development of the draft

NUREG-1640; however, the report also noted that the mathematics and completeness of scenarios considered in draft NUREG-1640 had been verified through an audit carried out by another NRC contractor. The National Academies also conducted its own review that confirmed the reasonableness of several dose factor analyses although its report did note certain improvements that were needed to the draft NUREG-1640, including a thorough review of certain parameters, scenarios, and assumptions to complete the reassessment of draft NUREG-1640. Partly in response to the CNWRA and National Academies reviews, the NRC had its new contractor, SC&A, review and revise various parameters, scenarios, and assumptions, and following an additional peer review the final NUREG-1640 was issued, in four volumes from June 2003 to October 2004. Based on these various independent reviews, the NRC considers NUREG-1640 appropriate for use in its further analyses and rulemaking. As discussed in Section III.B.3.1 of this document, the NRC has used NUREG-1640 both to review the content of IAEA's RS-G-1.7 and to supplement its radionuclide concentration tables. The methods of NUREG-1640 could also be used as part of a licensee's submittal under the case-specific provisions of this proposed rule.

C. Relationship of This Rulemaking to the NRC's Below Regulatory Concern (BRC) Policy

Some stakeholders stated that this effort is similar to the NRC's previous efforts to establish a BRC policy[8] in the early 1990s. These stakeholders also stated that the public had

[8] The BRC policy was an effort by the NRC to develop a general statement of policy (55 FR 27522; July 3, 1990) that would provide a broad framework for making decisions on exempting certain practices involving small quantities of radioactive material from regulatory control, including recycle of solid materials. There was extensive public comment from licensees, the States, and citizens groups when the BRC policy was issued. The Commission decided that a more extensive public involvement process in establishing such a decision framework would be beneficial and instituted a moratorium on the BRC Policy in July 1991. In October 1992, Congress enacted the Energy Policy Act of 1992 which revoked the BRC Policy Statement.

opposed the BRC policy, which helped result in promulgation of the Energy Policy Act in 1992 that revoked the BRC policy.

Although the general subject matter of this rulemaking is similar to that of the BRC policy (e.g., to provide a clear, consistent, regulatory framework for regulating the disposition of solid materials in a manner that ensures protection of public health and safety), the NRC's current use of a rulemaking process to establish a regulatory basis is unlike the broad policy-setting approach of the BRC policy, which initially sought to establish a policy on releases prior to a full Administrative Procedure Act (APA) process. The NRC's current rulemaking process (as discussed in Section VI.A of this document) has had, and continues to include, stakeholder participation in consideration of alternatives under the APA and under NEPA. This rulemaking also has included enhanced public participation in the form of several public meetings and review by the National Academies.

D. Other Federal Agency, State, and International Interfaces

As a means of including views from other agencies in this process, DOE, EPA, and State agencies have been represented at the stakeholder meetings. The DOE has a separate effort to disposition scrap metal from DOE facilities. The NRC's effort is for solid materials being considered for disposition from NRC/Agreement State licensed facilities. Materials from DOE facilities that are also NRC licensees were included in the NRC's analysis in the DGEIS. The

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Subsequently, the NRC envisioned conducting rulemakings to implement some of the approaches of the BRC policy through the Administrative Procedure Act process. The license termination rulemaking completed in 1997 was an example of such a rulemaking (62 FR 39058; July 21, 1997).

NRC has worked with the EPA to develop technical bases on estimating exposures from various scenarios and pathways that could result from release of solid materials. In addition, the NRC has reviewed various EPA and State regulations and documents regarding landfill requirements, and has met with the EPA to discuss requirements in this area,

Input from these agencies have been used in the development of various parts of this rulemaking including the proposed amendment and draft NUREG-1813. In addition, DOE, EPA, and the State of Massachusetts (identified as a State representative by the Conference of Radiation Control Program Directors and the Organization of Agreement States) have been cooperating agencies in the development of the DGEIS.

The NRC has included volumetric radionuclide concentrations taken from IAEA's RS-G-1.7 in this proposed amendment to provide for levels that result in doses that meet the 1 mrem/yr (0.01 mSv/yr) dose criterion. There also could be potential issues relating to export-import of materials; however, the NRC's regulations in 10 CFR Part 110 already contain requirements for export and import of material. Today's proposed amendments do not change those requirements or the procedures associated with them.

An additional area where the NRC considered Federal agency interface is related to potential issues with transport regulations issued by the DOT. Solid materials released from further licensed control by the NRC under this proposed amendment will likely be transported in a variety of manners, and there needs to be consistency between NRC's requirements and the DOT's requirements in 49 CFR Part 173 for transport of material. Section III.B.3.1.2 of this document provides further discussion of these interfaces.

VI Section-by-Section Analysis of Proposed Rule

Section 20.1003 Definitions.

This section would be amended to add definitions of the terms “impacted area,” “process materials,“ reuse,” “soil,” “soil-like materials,” and “solid materials.”

The term “impacted area” would be added to 10 CFR Part 20 to reflect the origin of the solid materials that are the subject of this rule. This definition is consistent with the definition of “impacted area” in 10 CFR Part 50.

The term “reuse” would be added to reflect the NRC proposed disposition path of limited disposition alternative. Certain solid materials may be released in their original form for their original intended purpose as indicated in the proposed amendment (*e.g.*, scaffolds, cranes, forklifts, hand tools, testing equipment, etc.).

The terms “soils,” “soil-like materials,” and “process materials” would be added to describe the types of materials that would be dispositioned under proposed 10 CFR 20.2009. Proposed § 20.2009 would ensure that these materials could be dispositioned on a case-by-case basis with the same dose limit as solid material. Even though these types of materials are considered solid in form, they were not analyzed in the DGEIS and would not be considered as material that can be dispositioned under 10 CFR 20.2008.

The term “solid materials” would be added to distinguish such solid material that would be regulated under this action based on the analysis made in the DGEIS and supporting technical basis.

Section 20.2001 General requirements.

This section would be amended to reflect additional disposition options under § 20.2008 for solid material, § 20.2009 for soils, soil-like materials, and process materials, and for case-specific review requirements for disposition of these various materials. Sections 20.2008 and 20.2009 would be included in the list of referenced sections in § 20.2001(a)(4).

Section 20.2008 Limited disposition of solid material.

Section 20.2008 includes requirements for the limited disposition of solid material. The effect of this requirement is to exempt material released under § 20.2008 from further NRC licensing and regulatory requirements. Licensees meeting the requirements set forth in §§ 20.2008(b) and 20.2008(c) can release solid material without further Commission approval.

Section 20.2008(a).

This paragraph would be added to indicate a dose criterion of 1 mrem/yr (0.01 mSv/yr), total effective dose equivalent, for limited disposition that is well below levels established in 10 CFR Part 20 to ensure adequate protection of public health and safety for disposition of solid

material. This dose is consistent with other radiation and chemical protection standards and can be modeled and verified by measurement. The discussion regarding the proposed dose criterion can be found in Section III.B.2.

Section 20.2008(b).

This paragraph introduces the various solid material disposition paths permitted under the proposed rule. New §§ 20.2008(b)(1), 20.2008(b)(2), 20.2008(b)(3), and 20.2008(b)(4) provide the acceptable disposition paths for release of solid materials. Section 20.2008(b)(1) would allow for disposition of solid materials by burial in an EPA or State authorized RCRA landfill. Proposed §§ 20.2008(b)(2), 20.2008(b)(3), and 20.2008(b)(4) allow for disposition in a set of defined non-licensed end uses. Section 20.2008(b)(2) would allow the release of concrete for use in road bed construction. Section 20.2008(b)(3) would allow the reuse of solid materials, equipment, and tools in their original form in industrial or construction settings for their original intended design purpose and function. It is intended that these particular materials would only be reused in industrial and construction settings.

Section 20.2008(b)(4) would be added to the regulations to differentiate between the larger, more stationary pieces of material that would be reused in § 20.2008(b)(3) and the equipment and tools that would be removed from the restricted and/or impacted areas by an individual as part of the routine conduct of work. It is intended that these materials would be reused in their original form for their original intended design purpose and function. These equipment and tools that would be the subject of § 20.2008(b)(4) would not be required to have as detailed recordkeeping requirements as the material described in § 20.2008(b)(3). This

difference in requirements accounts for the difficulty in trying to direct the equipment and tools under § 20.2008(b)(4) to an industrial/construction use; further, maintaining records of such transfers would be unduly burdensome due to the very low risk involved.

Section 20.2008(c).

New § 20.2008(c) would reference tables of volumetric and surface radionuclide concentration levels for solid materials. Solid material would be considered acceptable for release if its radionuclide concentrations do not exceed the levels in Table 1 or Table 2 of Appendix E to 10 CFR Part 20, as applicable. Discussion regarding the use of the radionuclide concentrations can be found in Section III.B.3. The volumetric concentration level in Table 1 were taken from IAEA's RS-G-1.7. The surface concentration level in Table 2 are consistent with DOT regulations. When using Table 1, if more than one radionuclide is released, the licensee shall determine the fraction of the limit in Table 1 represented by the concentration of each radionuclide; the sum of the fractions for each radionuclide must not exceed unity.

Section 20.2009.

This new section would be added to 10 CFR Part 20 to include provisions how a licensee would apply to the NRC for a case-specific approval for disposition of solid materials, soil, soil-like materials, and process materials, and would outline the requirements for a case-specific analysis. The effect of this requirement is to exempt material released under § 20.2009 from further NRC licensing and regulatory requirements.

Section 20.2009(a).

This paragraph would stipulate how and at what dose level soils, soil-like material, and process material could be dispositioned. Because an analysis of this type of material was not included in the DGEIS, a case-specific review and approval would be required. Each application for case-specific approval must include the information in § 20.2009(d).

Section 20.2009(a)(1).

New § 20.2009(a)(1) would include a dose criterion of 1 mrem/yr (0.01 mSv/yr), total effective dose equivalent, for disposition of soils, soil-like material, and process material, consistent with other radiation and chemical protection standards, and can be modeled and readily verified by measurement. Discussion regarding the proposed dose criteria can be found in Section III.B.2.

Section 20.2009(a)(2).

This paragraph would allow for disposition of soils, soil-like material, and process material only in an EPA or State authorized RCRA landfill. Licensees that want to disposition soils, soil-like material, and process material under this provision would have to meet the requirement in § 20.2009(d).

Section 20.2009(b).

This paragraph would stipulate that licensees who disposition soils, soil-like material, and process material into disposition paths other than the path indicated in § 20.2009(a)(2) (i.e., to landfills) would need a case-specific review because analysis of other pathways for these types of material were not included in the DGEIS. The dose criterion of 1 mrem/yr (0.01 mSv/yr) would have to be met to disposition soil, soil-like materials, and process materials under provisions of § 20.2009(b). Licensees who disposition these materials must also meet the requirements of § 20.2009(d).

Section 20.2009(c).

This paragraph would address case-specific approval for procedures not otherwise authorized in §§ 20.2008(b) or §§ 20.2008(c). A licensee may propose an alternative disposition path than in § 20.2008(b) for solid materials and/or a different radionuclide concentration level from that listed in Table 1 or Table 2 of Appendix E to 10 CFR Part 20, as applicable, as long as the 1 mrem/yr (0.01 mSv/yr) dose criterion is met. Licensees who use an alternative path would also have to meet the requirements of § 20.2009(d).

Section 20.2009(d).

This new paragraph would describe the requirements needed for a case-specific application for proposals made under §§ 20.2009(a), 20.2009(b), and 20.2009(c). These requirements are modeled after existing language in § 20.2002.

Section 20.2009(d)(1).

This new paragraph would ensure that a description of the material (including physical, chemical, and radiological properties), the way the material would be dispositioned, and a description of the nature of controls or restrictions to prevent the material from an unrestricted release would be included in an application. Similar text is found in § 20.2002(a).

Section 20.2009(d)(2).

This paragraph would require an analysis and evaluation of pertinent information on the nature of the environment. Similar text is found in § 20.2002(b).

Section 20.2009(d)(3).

This paragraph would be added to ensure that the nature and location of other potentially affected licensed and unlicensed facilities would be described in the application. Similar text is found in the current disposal requirements in § 20.2002(c).

Section 20.2009(d)(4).

This paragraph would be added to require doses to be maintained within the dose limit in § 20.2008(a) for solid materials or in § 20.2009(a)(1) for soils, soil-like material, and process

material. The regulation would restrict licensees to the 1 mrem/yr (0.01 mSv/yr) dose/yr criteria for limited disposition of these materials.

Section 20.2108(a) Records of waste disposal and material disposition.

The title of this section would be revised to indicate that records need to be maintained for material that is dispositioned as well as disposed. This section would be revised to include §§ 20.2108(a)(1), (2), and (3). Section 20.2108(a)(1) would include the requirements that were in the previous § 20.2108(a), which requires licensees to maintain records of disposal of licensed materials made under §§ 20.2002, 20.2003, 20.2004, 20.2005, 10 CFR Part 61 and disposal by burial in soil, including burials authorized before January 28, 1981.[6]

A new § 20.2108(a)(2) would include recordkeeping requirements for materials dispositioned under §§ 20.2008(b)(1), 20.2008(b)(2), 20.2008(b)(3), and 20.2009. Licensees would be required to maintain records of the types and amounts of material shipped, the destination of the material, the date it was delivered to its destination, and the radionuclides in the material released, in a format indicating that the released residual radioactivity was in compliance with the volumetric concentration levels specified in Table 1 of Appendix E to Part 20 or the surface concentration levels specified in Table 2 of Appendix E to Part 20, as applicable. These records would aid in providing reasonable assurance that the material would be delivered to one of the authorized destinations noted in §§ 20.2008(b)(1), 20.2008(b)(2), 20.2008(b)(3), and 20.2009.

[6]A previous § 20.304 permitted burial of small quantities of licensed materials in soil before January 28, 1981, without specific Commission authorization.

A new § 20.2108(a)(3) would add recordkeeping requirements for materials regulated under § 20.2008(b)(4). Licensees would be required to maintain records of tools and equipment that are removed on a routine basis by an individual from the restricted and/or impacted areas. Those records would include a listing of the radionuclides released in a format indicating that residual radioactivity was in compliance with the volumetric or surface concentration levels specified in Tables 1 or 2, as applicable, of Appendix E to Part 20. These records are deemed appropriate for these equipment and tools given the very low risk involved, as noted in Section III.B.1.2.1.

Section 20.2108(b) would be revised to require licensees to retain records for the materials regulated under §§ 20.2108(a)(1) and 20.2108(a)(2) until the Commission terminates the license. Requirements for disposition of these records prior to license termination remain unchanged. A new sentence would be added to indicate that the retention for records material regulated under § 20.2108(a)(3) would only be for three years after the record is made. This retention period was determined to be adequate because it is similar to the timeframe set for retaining records of surveys under § 20.2103(a).

APPENDIX E TO PART 20 - SOLID MATERIAL RELEASE CONCENTRATION LEVELS

A new appendix, Appendix E, would be added to 10 CFR Part 20 to include concentration levels for solid material release. Appendix E would contain Table 1 and Table 2 which are tables of volumetric and surface concentration levels, respectively.

TABLE 1 “VOLUMETRIC CONCENTRATION LEVELS”

A new section would be added to introduce Table 1 which includes measurable volumetric radionuclide concentration release levels for solid material applicable to the limited disposition of solid materials under § 20.2008. Solid material would be considered acceptable for release if its radionuclide concentrations do not exceed the levels in Table 1. The levels in Table 1 for man-made radionuclides are taken from the International Atomic Energy Agency’s report RS-G-1.7, “Application of the Concepts of Exclusion, Exemption, and Clearance.” The levels in Table 1 for source material and special nuclear material are based on NUREG-1640, “Radiological Assessments for Clearance of Materials from Nuclear Facilities.”

TABLE 2 “SURFACE CONCENTRATION LEVELS”

A new section would be added to introduce Table 2 which includes measurable surface radionuclide concentration release levels for solid material applicable to the limited disposition of solid materials under § 20.2008. Solid material would be considered acceptable for release if its radionuclide concentrations do not exceed the levels in Table 2. The levels in Table 2 are based on the definition in 49 CFR 173.403 for surface concentrations not requiring DOT regulation to provide consistency between these two Federal agencies regarding material needing no further regulation.

NOTATION

This section would be added to state that the levels in Tables 1 and 2 are presented in the computer “E” notation. This is the same notation as used for Tables 1, 2, and 3 in Appendix B to 10 CFR Part 20.

VII. Plain Language

The Presidential memorandum entitled "Plain Language in Government Writing" (63 FR 31883; June 10, 1998), directed that the Government's writing be in plain language. The NRC requests comments on the proposed rule specifically with respect to the clarity and effectiveness of the language used. Comments should be sent using one of the methods detailed under the ADDRESSES heading of the preamble to this proposed rule.

VIII. Availability of Documents

The NRC is making the documents identified below available to interested persons through one or more of the following:

Public Document Room (PDR). The NRC’s Public Document Room is located at 11555 Rockville Pike, Public File Area O-1 F21, Rockville, MD 20082. Copies of publicly available documents related to this rulemaking can be viewed electronically on public computers in the PDR. The PDR reproduction contractor will make copies of documents for a fee.

Rulemaking Website (Web). The NRC's interactive rulemaking Website is located at http://ruleforum.llnl.gov. Selected documents may be viewed and downloaded electronically via this Website.

Public Electronic Reading Room (ADAMS). The NRC's public Electronic Reading Room is located at http://www.nrc.gov/reading-rm/adams.html. Through this site, the public can gain access to ADAMS, which provides text and image files of the NRC's public documents.

Document	PDR	Web	ADAMS
Proposed Rule[7]	x	x	ML # - TBD
Draft GEIS, NUREG-1812[8]	x	x	ML# - TBD
Draft Regulatory Guidance, NUREG-1813[8]	x	x	ML# - TBD
Draft Regulatory Analysis[8]	x	x	ML# -TBD
NUREG-1640, Volumes 1-4	x	x	ML# - TBD
Draft NUREG-1640, Supplement 1[8]	x	x	ML# - TBD
Draft NUREG-1761[8]	x	x	ML# - TBD
IAEA RS-G-1.7	x	x	ML# - TBD

[7] Comments on this proposed rule may be submitted as specified in the ADDRESSES section of this document.

[8] Comments on this draft report may be submitted as specified in the ADDRESSES section of this document.

IX. Agreement State Compatibility

Under the "Policy Statement on Adequacy and Compatibility of Agreement State Programs" which became effective on September 3,1997 (62 FR 46517), NRC program elements (including regulations) are placed into four compatibility categories. In addition, NRC program elements also are identified as having particular health and safety significance or as being reserved solely to the NRC. Compatibility Category A are those program elements that are basic radiation protection standards and scientific terms and definitions that are necessary to understand radiation protection concepts. An Agreement State should adopt Category A program elements in an essentially identical manner to provide uniformity in the regulation of solid material on a nationwide basis. Compatibility Category B are those program elements that apply to activities that have direct and significant effects in multiple jurisdictions. An Agreement State should adopt Category B program elements in an essentially identical manner. Compatibility Category C are those program elements that do not meet the criteria of Category A or B, but the essential objectives of which an Agreement State should adopt to avoid conflict, duplication, gaps, or other conditions that would jeopardize an orderly pattern in the regulation of solid material on a nationwide basis. An Agreement State should adopt the essential objectives of the Category C program elements. Compatibility Category D are those program elements that do not meet any of the criteria of Category A, B, or C, and thus, do not need to be adopted by Agreement States for purpose of compatibility.

The compatibility characterization of the existing sections in Part 20 that were proposed to be amended based on the implementation of this rule, remain the same. Section 20.2001, General Requirements, was categorized as a Category C prior to the proposed amendments and

remains a Category C based on the result from implementation of the procedure in Management Directive 5.9, “Adequacy and Compatibility of Agreement States”. A Category C compatibility ensures that Agreement States adopt the essential objectives of the provision in order to eliminate confusion regarding the disposition of solid material on a nationwide basis. All of the new definitions included in 10 CFR 20.1003, Definitions, have been designated as Category A compatibilities. According to Management Directive 5.9, these are scientific definitions that are necessary to understand radiation protection concepts and are needed to ensure uniformity in the implementation and understanding of these key concepts on a nationwide basis.

The new sections that have been added to 10 CFR 20.2008, Dose Limits and Compliance for Release of Solid Materials, and 10 CFR 20.2009, Case-specific Review Requirements for Disposition, have been designated Category B based on the results from following the procedure in Management Directive 5.9. These new sections, 10 CFR 20.2008 and 20.2009, could have transboundary impacts with respect to transporting or distributing of such material, if not designated as Category B. Similarly, the new Appendix E, referred to by 10 CFR 20.2008, has been designated as Category B; 10 CFR 20.2008 indicates that solid material would be considered acceptable for release if its volumetric and surface radionuclide concentrations do not exceed the levels in Tables 1 and Table 2, as applicable, of Appendix E. The recordkeeping requirements in 10 CFR 20.2108(a) are categorized as Category C to ensure that licensees in Agreement States keep a minimum set of records important to keeping track of where the material goes.

X. Draft Generic Environmental Impact Statement: Availability

As required by the National Environmental Policy Act of 1969, as amended, and the NRC's regulations in 10 CFR 51.20, the NRC has prepared a DGEIS (NUREG-1812) for this proposed rule. The DGEIS is available for inspection in the NRC Public Document Room at NRC headquarters in Rockville, Maryland. Single copies of the DGEIS may be obtained by written request or telefax (301-415-2289) from: Office of Information Services, Attention: Reproduction Distribution Services Section, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail at distribution@nrc.gov. The DGEIS is also available on the NRC website at www.nrc.gov/materials.html. The NRC requests public comment on the DGEIS.

XI. Paperwork Reduction Act Statement

This proposed rule contains amended information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq). This rule has been submitted to the Office of Management and Budget for review and approval of the information collection requirements.

Type of Submission: Revised

Title: 10 CFR Part 20, Radiological Criteria for Controlling the Disposition of Solid Materials, Proposed Rule

Form Number: N/A

How often the information is required: On occasion

Who will be required or asked to report: NRC-licensed Facilities

An estimate of the number of annual responses: 240

The estimated number of annual respondents: 240

An estimate of the total number of hours needed annually to complete the requirement or request: 46,280 (192.8 hours per respondent)

Abstract: The NRC is proposing to amend its standards for protection against radiation in 10 CFR Part 20 to establish criteria for determining if solid materials, soils, soil-like material, and process materials originating in restricted and/or impacted areas of a facility will be considered acceptable for release. The proposed rule would establish requirements for records of disposition of solid materials and soils, soil-like materials, and process materials, to be prepared and retained by licensees, and would establish retention periods for such records.

The U.S. Nuclear Regulatory Commission is seeking public comment on the potential impact of the information collections contained in this proposed rule an on the following issues:

1. Is the proposed information collection necessary for the proper performance of the functions of the NRC, including whether the information will have practical utility?

2. Is the estimate of burden accurate?

3. Is there a way to enhance the quality, utility, and clarity of the information to be collected?

4. How can the burden of the information collection be minimized, including the use of automated collection techniques?

A copy of the OMB clearance package may be viewed free of charge at the NRC Public Document Room, One White Flint North, 11555 Rockville Pike, Room O-1 F21, Rockville, MD 20852. The OMB clearance package and rule are available at the NRC worldwide Web site: http://www.nrc.gov/public-involve/doc-comment/omb/index.html for 60 days after the signature date of this notice and are also available at the rule forum site, http://ruleforum.llnl.gov.

Send comments on any aspect of these proposed information collections, including suggestions for reducing the burden and on the above issues, by (INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER) to the Records and FOIA/Privacy Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by Internet electronic mail to INFOCOLLECTS@NRC.GOV and to the Desk Officer, John A. Asalone, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0014), Office of

Management and Budget, Washington, DC 20503. Comments received after this date will be considered if it is practical to do so, but assurance of consideration cannot be given to comments received after this date. You may also e-mail comments to John_A._Asalone@omb.eop.gov or comment by telephone at (202) 395-4650.

Public Protection Notification

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

XII. Regulatory Analysis

The Commission has prepared a regulatory analysis on this proposed amendment. The analysis examines the costs and benefits of the alternatives considered by the Commission. The analysis is available for inspection in the NRC Public Document Room at NRC headquarters in Rockville, Maryland. Single copies of the regulatory analysis may be obtained by written request from the Regulations and Guidance Branch, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555. The regulatory analysis can also be viewed at the NRC's website at www.nrc.gov/materials.html. Comments on the draft regulatory analysis may be submitted as specified in the ADDRESSES section of this document.

XIII. Regulatory Flexibility Analysis

The NRC has prepared an initial regulatory analysis of the impact of this proposed rule on small entities (see Section XII of this document). As discussed in Section V of this document, the NRC has had a continuing effort to obtain stakeholder input on major issues associated with this rulemaking and has interacted with a diversity of stakeholders (including representatives from university laboratories, hospitals, manufacturers, etc.) on alternatives and possible impacts. Based on this input, the NRC has developed this proposed rule which would establish requirements that to a large extent formalize existing practices regarding decisions on disposition of solid material. As part of the rulemaking, the NRC is considering ways to minimize unnecessary impacts; for example, Section IV.B of this document specifically requests comment on the scope of material that should be covered by this proposed rule. In addition, because many small entities would have only sealed sources or devices containing sealed sources, there would not be significant effort involved in disposition of solid materials. Therefore, the NRC believes that this proposed rule would not have a significant impact on small entities.

However, most of the data available for the regulatory analysis of this proposed rule is for large entities, which account for the vast majority of materials covered by the proposed rule. Limited data has been available for analysis of small entities. Therefore, the NRC is seeking public comment on the potential impact of the proposed rule on small entities. The NRC particularly desires comment from small entities (small businesses, small organizations, and small jurisdictions under the Regulatory Flexibility Act) as to how the regulations will affect them. In addition to providing comment in response to the request in Section IV.B, these small entities

should specifically discuss information regarding how they currently release materials under NRC's existing guidelines, including–

(a) The NRC license classification of such entities;

(b) The types of materials released under existing NRC guidelines and license conditions;

(c) The frequency and amounts of such releases;

(d) The radionuclides and range of concentration levels; and

(e) The destination, end-use, or disposition of the materials.

Comments may be submitted as specified in the ADDRESSES section of this document.

XIV. Backfit Analysis

The NRC has determined that the backfit rule does not apply to this proposed rule; therefore, a backfit analysis is not required for this proposed amendment because it does not involve any provisions that would impose backfits as defined in 10 CFR 50.109, 70.76, 72.62, and 76.76. The existing regulations in 10 CFR Part 20 provide a framework of radiation standards to ensure the protection of public health and safety from the routine use of materials at

licensed facilities. These standards include a public dose limit and specific dose criteria on certain types of media released from licensed facilities such as liquid effluent releases. Under current regulations, every disposition of solid material requires NRC review and approval. This proposed amendment would establish specific criteria for controlling the disposition of solid materials including a dose limit and radionuclide concentration levels. Solid materials meeting the requirements of the proposed amendment could be dispositioned under the amendment without seeking prior NRC approval. Licensees seeking to disposition solid material not meeting the criteria of the amendment would continue to be required to seek case-specific approval from the NRC. The proposed amendment also includes changes to the information collection and reporting requirements in 10 CFR 20.2108 which are not subject to the provisions of the backfit rule. Accordingly, the proposed rule's provisions do not constitute a backfit and a backfit analysis need not be performed.

List of Subjects

10 CFR Part 20

Byproduct material, Criminal penalties, Licensed material, Nuclear materials, Nuclear power plants and reactors, Occupational safety and health, Packaging and containers, Radiation protection, Reporting and recordkeeping requirements, Source material, Special nuclear material, Waste treatment and disposal.

For the reasons set out in the preamble and under the authority of the Atomic Energy Act of 1954, as amended; the Energy Reorganization Act of 1974, as amended; and 5 U.S.C. 553; the NRC is proposing to adopt the following amendment to 10 CFR Part 20.

PART 20 - STANDARDS FOR PROTECTION AGAINST RADIATION

1. The authority citation for Part 20 continues to read as follows:

AUTHORITY: Secs. 53, 63, 65, 81, 103, 104, 161, 182, 186, 68 stat. 930, 933, 935, 936, 937, 948, 953, 955, as amended (2 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201, 2232, 2236), secs. 201, as amended, 202, 206, 88 stat. 1242, as amended, 1244, 1246, (42 U.S.C. 5841, 5842, 5846); Sec. 1704, 112 Stat.2750 (44 U.S.C. 3504 note).

2. In § 20.1003, new definitions Impacted area, Process materials, Reuse, Soil, Soil-like materials, and Solid materials and are added in alphabetical order to read as follows:

§ 20.1003 Definitions.

* * * * *

Impacted area means an area with some reasonable potential for residual radioactivity in excess of natural background or fallout levels.

* * * * *

Process materials means material such as material with soil-like or cementitious properties, including sediments, sands, filter cake, sludge, and crushed slag, among others.

* * * * *

Reuse means to release solid material in its original form for its intended original use.

* * * * *

Soil means unconsolidated earthy material with no specific distinction as to its composition, nor its initial origin from either onsite or offsite locations.

* * * * *

Soil-like materials means material such as backfill consisting of a mixture of soil with rocks, gravel, or sand, with no distinctions made as to the material's initial origins or proportions of constituents.

* * * * *

Solid materials means material such as concrete, asphalt, metal, trash, equipment, supplies, and tools used by licensees in restricted and/or impacted areas of a facility. Soils, soil-like materials, process materials, and treated process materials are excluded from this definition.

* * * * *

3. In § 20.1009, paragraph (b) is revised to read as follows:

§ 20.1009 Information collection requirements: OMB approval.

* * * * *

(b) The approved information collection requirements contained in this part appear in §§ 20.1003, 20.1101, 20.1202, 20.1203, 20.1204, 20.1206, 20.1208, 20.1301, 20.1302, 20.1403, 20.1404, 20.1406, 20.1501, 20.1601, 20.1703, 20.1901, 20.1902, 20.1904, 20,1905, 20.1906, 20.2002, 20.2004, 20.2006, 20.2102, 20.2103, 20.2104, 20.2105, 20.2106, 20.2107, 20.2108, 20.2110, 20.2201, 20.2202, 20.2203, 20.2204, 20.2205, 20.2206, 20.2301, and Appendices F and G to 10 CFR Part 20.

* * * * *

4. In § 20.2001, paragraph (a)(4) is revised to read as follows:

§ 20.2001 General requirements.

(a) * * *

(4) As authorized under §§ 20.2002, 20.2003, 20.2004, 20.2005, 20.2008, or 20.2009.

* * * * *

5. Section 20.2008 is added under Subpart K to read as follows:

§ 20.2008 Limited disposition of solid material.

Solid materials, originating in restricted and/or impacted areas of a facility will be considered acceptable for release if:

(a) The residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent to an average member of the critical group, that does not exceed 1 mrem (0.01 mSv) per year ;

(b) The solid material is released for only certain limited disposition paths, as follows:

(1) Disposal of solid material by burial in an EPA RCRA landfill regulated under 40 CFR Parts 257 and 258, or in a State landfill as authorized by the EPA under 40 CFR Part 271;

(2) Use of concrete in road bed construction;

(3) Reuse of solid materials, equipment, and tools in their original form, in industrial or construction settings for their original intended design purpose and function (*e.g.,* scaffolds, cranes, forklifts);

(4) Reuse of equipment and tools in their original form for their original intended design purpose and function, that are removed by an individual from the restricted and/or impacted areas on a routine basis (*e.g.,* hand tools, testing equipment); and

(c) The radionuclide volumetric concentrations do not exceed the levels specified in Table 1 of Appendix E to 10 CFR Part 20 or the radionuclide surface concentrations do not exceed the levels specified in Table 2 of Appendix E to 10 CFR Part 20. For Table 1, if more than one radionuclide is released, the licensee shall determine the fraction of the limit in Table 1 of Appendix E to Part 20 represented by the concentration of each radionuclide; the sum of the fractions for each radionuclide must not exceed unity.

6. Section 20.2009 is added under Subpart K to read as follows:

§ 20.2009 Case-specific review requirements for disposition.

(a) A licensee may apply to the Commission for approval of proposed procedures to disposition soils, soil-like material, and process material, originating in restricted and/or impacted areas of a facility. Each application shall include the information described in paragraph (d) of this section and demonstrate that:

(1) The residual radioactivity that is distinguishable from background radiation results in a total effective dose equivalent, to an average member of the critical group, that does not exceed 1 mrem (0.01 mSv) per year; and

(2) The material is disposed by burial in an EPA RCRA landfill regulated under 40 CFR Parts 257 and 258, or in a State landfill as authorized by the EPA under 40 CFR Part 271.

(b) For soils, soil-like material, and process material, a licensee may apply to the Commission for case-specific approval of proposed procedures, not otherwise authorized in § 20.2009(a)(2), if a case-specific analysis is submitted under paragraph (d) of this section.

(c) For solid material, a licensee may apply to the Commission for case-specific approval of proposed procedures, not otherwise authorized in § 20.2008(b) or § 20.2008(c), if a case-specific analysis is submitted under paragraph (d) of this section.

(d) Each application for case specific approval of proposed procedures under paragraphs (a), (b), and (c) of this section must include:

(1) A description of the material to be released, including the physical, chemical, and radiological properties important to risk evaluation, and the proposed manner and conditions of the disposition of this material, including a description of the nature of the controls or restrictions that would keep the material from going to an unrestricted use; and

(2) An analysis and evaluation of pertinent information on the nature of the environment; and

(3) The nature and location of other potentially affected licensed and unlicensed facilities; and

(4) Analyses and procedures to ensure that doses are maintained within the dose limit in § 20.2008(a) for solid materials or within the dose limit in paragraph (a)(1) of this section for soils, soil-like material, and process material.

7. § 20.2108, should be revised to read as follows:

§ 20.2108 Records of waste disposal and material disposition.

(a) Each licensee shall maintain the following:

(1) Records of disposal of licensed materials made under §§ 20.2002, 20.2003, 20.2004, 20.2005, 10 CFR Part 61 and disposal by burial in soil, including burials authorized before January 28, 1981.[6]

(2) Records of disposition of solid materials, equipment, and tools and soils, soil-like materials, and process materials made under §§ 20.2008(b)(1), 20.2008(b)(2), 20.2008(b)(3), and 20.2009 including - -

(i) The types and amounts of material shipped;

(ii) The destination of the material;

(iii) The date it was delivered to its destination; and

(iv) The radionuclides released in a format indicating that the residual radioactivity levels were in compliance with the volumetric concentration levels specified in Table 1 of Appendix E to Part 20 or the surface concentration levels specified in Table 2 of Appendix E to Part 20, as applicable.

(3) Records of disposition of solid materials made under § 20.2008(b)(4), including - -

[6]A previous § 20.304 permitted burial of small quantities of licensed materials in soil before January 28, 1981, without specific Commission authorization.

(i) The tools and equipment that are removed from the restricted and/or impacted areas on a routine basis; and

(ii) the radionuclides released in a format indicating that the residual radioactivity levels were in compliance with the volumetric concentration levels specified in Table 1 of Appendix E to Part 20 or the surface concentration levels specified in Table 2 of Appendix E to Part 20, as applicable

(b) The licensee shall retain the records required by paragraph (a)(1) and (a)(2) of this section until the Commission terminates each pertinent license requiring the record. Requirements for disposition of these records, prior to license termination, are located in §§ 30.51, 40.61, 70.51, and 72.80 for activities licensed under these parts. The licensee shall retain the records required by paragraph (a)(3) of this section for 3 years after the record is made.

* * * * *

8. Appendix E to 10 CFR Part 20 is added to read as follows:

APPENDIX E TO PART 20 - SOLID MATERIAL RELEASE CONCENTRATION LEVELS

TABLE 1 “VOLUMETRIC CONCENTRATION LEVELS”

Table 1 contains measurable volumetric radionuclide concentrations applicable to the limited disposition of solid materials under § 20.2008. Solid material would be considered acceptable for release if its radionuclide concentrations do not exceed the levels in Table 1. The levels in Table 1 for man-made radionuclides are taken from the International Atomic Energy Agency’s report RS-G-1.7, “Application of the Concepts of Exclusion, Exemption, and Clearance.” The levels in Table 1 for source material and special nuclear material are based on NUREG-1640, “Radiological Assessments for Clearance of Materials from Nuclear Facilities.”

TABLE 2 “SURFACE CONCENTRATION LEVELS”

Table 2 contains measurable surface radionuclide concentrations applicable to the limited disposition of solid materials under § 20.2008. Solid material would be considered acceptable for release if its radionuclide concentrations do not exceed the levels in Table 2. The levels in Table 2 are based on the definition in 49 CFR 173.403 for surface concentrations not requiring DOT regulation to provide consistency between these two Federal agencies regarding material needing no further regulation.

NOTATION

The levels in Tables 1 and 2 are presented in the computer “E” notation. For example, in this notation, a value of 2.7E+01 represents a value of $2.7x10^{+1}$ or 27.

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
1	Hydrogen-3	2.7E+03
4	Beryllium-7	2.7E+02
6	Carbon-14	2.7E+01
9	Fluorine-18*	2.7E+02
11	Sodium-22	2.7E+00
11	Sodium-24*	2.7E+01
14	Silicon-31*	2.7E+04
15	Phosphorus-32	2.7E+04
15	Phosphorus-33	2.7E+04
16	Sulfur-35	2.7E+03
17	Chlorine-36	2.7E+01
17	Chlorine-38*	2.7E+02
19	Potassium-40**	2.7E+01
19	Potassium-42	2.7E+03
19	Potassium-43*	2.7E+02
20	Calcium-45	2.7E+03
20	Calcium-47	2.7E+02
21	Scandium-46	2.7E+00
21	Scandium-47	2.7E+03
21	Scandium-48	2.7E+01
23	Vanadium-48	2.7E+01
24	Chromium-51	2.7E+03
25	Manganese-51*	2.7E+02
25	Manganese-52	2.7E+01
25	Manganese-52m*	2.7E+02
25	Manganese-53	2.7E+03
25	Manganese-54	2.7E+00
25	Manganese-56*	2.7E+02

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
26	Iron-52	2.7E+02
26	Iron-55	2.7E+04
26	Iron-59	2.7E+01
27	Cobalt-55*	2.7E+02
27	Cobalt-56	2.7E+00
27	Cobalt-57	2.7E+01
27	Cobalt-58	2.7E+01
27	Cobalt-58m*	2.7E+05
27	Cobalt-60	2.7E+00
27	Cobalt-60m*	2.7E+04
27	Cobalt-61*	2.7E+03
27	Cobalt-62m*	2.7E+02
28	Nickel-59	2.7E+03
28	Nickel-63	2.7E+03
28	Nickel-65*	2.7E+02
29	Copper-64*	2.7E+03
30	Zinc-65	2.7E+00
30	Zinc-69*	2.7E+04
30	Zinc-69m*	2.7E+02
31	Gallium-72*	2.7E+02
32	Germanium-71	2.7E+05
33	Arsenic-73	2.7E+04
33	Arsenic-74*	2.7E+02
33	Arsenic-76*	2.7E+02
33	Arsenic-77	2.7E+04
34	Selenium-75	2.7E+01
35	Bromine-82	2.7E+01
37	Rubidium-86	2.7E+03

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
38	Strontium-85	2.7E+01
38	Strontium-85m*	2.7E+03
38	Strontium-87m*	2.7E+03
38	Strontium-89	2.7E+04
38	Strontium-90	2.7E+01
38	Strontium-91*	2.7E+02
38	Strontium-92*	2.7E+02
39	Yttrium-90	2.7E+04
39	Yttrium-91	2.7E+03
39	Yttrium-91m*	2.7E+03
39	Yttrium-92*	2.7E+03
39	Yttrium-93*	2.7E+03
40	Zirconium-93*	2.7E+02
40	Zirconium-95	2.7E+01
40	Zirconium-97*	2.7E+02
41	Niobium-93m	2.7E+02
41	Niobium-94	2.7E+00
41	Niobium-95	2.7E+01
41	Niobium-97*	2.7E+02
41	Niobium-98*	2.7E+02
42	Molybdenum-90*	2.7E+02
42	Molybdenum-93	2.7E+02
42	Molybdenum-99	2.7E+02
42	Molybdenum-101*	2.7E+02
43	Technetium-96	2.7E+01
43	Technetium-96m*	2.7E+04
43	Technetium-97	2.7E+02
43	Technetium-97m	2.7E+03

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
43	Technetium-99	2.7E+01
43	Technetium-99m*	2.7E+03
44	Ruthenium-97	2.7E+02
44	Ruthenium-103	2.7E+01
44	Ruthenium-105*	2.7E+02
44	Ruthenium-106	2.7E+00
45	Rhodium-103m*	2.7E+05
45	Rhodium-105	2.7E+03
46	Palladium103	2.7E+04
46	Palladium109	2.7E+03
47	Silver-105	2.7E+01
47	Silver-110m	2.7E+00
47	Silver-111	2.7E+03
48	Cadmium-109	2.7E+01
48	Cadmium-115	2.7E+02
48	Cadmium-115m	2.7E+03
49	Indium-111	2.7E+02
49	Indium-113m*	2.7E+03
49	Indium-114m	2.7E+02
49	Indium-115m*	2.7E+03
50	Tin-113	2.7E+01
50	Tin-125	2.7E+02
51	Antimony-122	2.7E+02
51	Antimony-124	2.7E+01
51	Antimony-125	2.7E+00
52	Tellurium-123m	2.7E+01
52	Tellurium-125m	2.7E+04
52	Tellurium-127	2.7E+04

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
52	Tellurium-127m	2.7E+02
52	Tellurium-129*	2.7E+03
52	Tellurium-129m	2.7E+02
52	Tellurium-131*	2.7E+03
52	Tellurium-131m	2.7E+02
52	Tellurium-132	2.7E+01
52	Tellurium-133*	2.7E+02
52	Tellurium-133m*	2.7E+02
52	Tellurium-134*	2.7E+02
53	Iodine-123	2.7E+03
53	Iodine-125	2.7E+03
53	Iodine-126	2.7E+02
53	Iodine-129	2.7E-01
53	Iodine-130*	2.7E+02
53	Iodine-131	2.7E+02
53	Iodine-132*	2.7E+02
53	Iodine-133*	2.7E+02
53	Iodine-134*	2.7E+02
53	Iodine-135*	2.7E+02
55	Cesium-129	2.7E+02
55	Cesium-131	2.7E+04
55	Cesium-132	2.7E+02
55	Cesium-134	2.7E+00
55	Cesium-134m*	2.7E+04
55	Cesium-135	2.7E+03
55	Cesium-136	2.7E+01
55	Cesium-137	2.7E+00
55	Cesium-138*	2.7E+02

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
56	Barium-131	2.7E+02
56	Barium-140	2.7E+01
57	Lanthanum-140	2.7E+01
58	Cerium-139	2.7E+01
58	Cerium-141	2.7E+03
58	Cerium-143	2.7E+02
58	Cerium-144	2.7E+02
59	Praseodymium-142*	2.7E+03
59	Praseodymium-143	2.7E+04
60	Neodymium-147	2.7E+03
60	Neodymium-149*	2.7E+03
61	Promethium-147	2.7E+03
61	Promethium-149	2.7E+04
62	Samarium-151	2.7E+04
62	Samarium-153	2.7E+03
63	Europium-152	2.7E+00
63	Europium-152m*	2.7E+03
63	Europium-154	2.7E+00
63	Europium-155	2.7E+01
64	Gadolinium-153	2.7E+02
64	Gadolinium-159*	2.7E+03
65	Terbium-160	2.7E+01
66	Dysprosium-165*	2.7E+04
66	Dysprosium-166	2.7E+03
67	Holmium-166	2.7E+03
68	Erbium-169	2.7E+04
68	Erbium-171*	2.7E+03
69	Thulium170	2.7E+03

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
69	Thulium171	2.7E+04
70	Ytterbium-175	2.7E+03
71	Lutetium-177	2.7E+03
72	Hafnium-181	2.7E+01
73	Tantalum-182	2.7E+00
74	Tungsten-181	2.7E+02
74	Tungsten-185	2.7E+04
74	Tungsten-187	2.7E+02
75	Rhenium-186	2.7E+04
75	Rhenium-188*	2.7E+03
76	Osmium-185	2.7E+01
76	Osmium-191	2.7E+03
76	Osmium-191m*	2.7E+04
76	Osmium-193	2.7E+03
77	Iridium-190	2.7E+01
77	Iridium-192	2.7E+01
77	Iridium-194*	2.7E+03
78	Platinum-191	2.7E+02
78	Platinum-193m	2.7E+04
78	Platinum-197*	2.7E+04
78	Platinum-197m*	2.7E+03
79	Gold-198	2.7E+02
79	Gold-199	2.7E+03
80	Mercury-197	2.7E+03
80	Mercury-197m	2.7E+03
80	Mercury-203	2.7E+02
81	Thallium-200	2.7E+02
81	Thallium-201	2.7E+03

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
81	Thallium-202	2.7E+02
81	Thallium-204	2.7E+01
82	Lead-203	2.7E+02
82	Lead-210**	2.7E+01
83	Bismuth-206	2.7E+01
83	Bismuth-207	2.7E+00
84	Polonium-203*	2.7E+02
84	Polonium-205*	2.7E+02
84	Polonium-207*	2.7E+02
84	Polonium-210**	2.7E+01
85	Astatine-211	2.7E+04
88	Radium-225	2.7E+02
88	Radium-226**	2.7E+00
88	Radium-227	2.7E+03
88	Radium-228**	2.7E+00
89	Actinium-227**	2.7E+00
90	Thorium-226	2.7E+04
90	Thorium-228**	2.7E+00
90	Thorium-229	2.7E+00
90	Thorium-230**	2.7E+01
90	Thorium-232**	2.7E+00
91	Protactinium-230	2.7E+02
91	Protactinium-231**	2.7E+00
91	Protactinium-233	2.7E+02
92	Uranium-230	2.7E+02
92	Uranium-231	2.7E+03
92	Uranium-232	2.7E+00
92	Uranium-233	2.7E+01

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
92	Uranium-234**	2.7E+01
92	Uranium-235**	2.7E+00
92	Uranium-236	2.7E+02
92	Uranium-237	2.7E+03
92	Uranium-238**	2.7E+01
92	Uranium-239*	2.7E+03
92	Uranium-240*	2.7E+03
93	Neptunium-237	2.7E+01
93	Neptunium-239	2.7E+03
93	Neptunium-240*	2.7E+02
94	Plutonium-234*	2.7E+03
94	Plutonium-235*	2.7E+03
94	Plutonium-236	2.7E+01
94	Plutonium-237	2.7E+03
94	Plutonium-238	2.7E+00
94	Plutonium-239	2.7E+00
94	Plutonium-240	2.7E+00
94	Plutonium-241	2.7E+02
94	Plutonium-242	2.7E+00
94	Plutonium-243*	2.7E+04
94	Plutonium-244	2.7E+00
95	Americium-241	2.7E+00
95	Americium-242*	2.7E+04
95	Americium-242m	2.7E+00
95	Americium-243	2.7E+00
96	Curium-242	2.7E+02
96	Curium-243	2.7E+01
96	Curium-244	2.7E+01

Table 1

Volumetric Concentration Levels

Atomic No.	Nuclide	Volume pCi/g
96	Curium-245	2.7E+00
96	Curium-246	2.7E+00
96	Curium-247	2.7E+00
96	Curium-248	2.7E+00
97	Berkelium-249	2.7E+03
98	Californium-246	2.7E+04
98	Californium-248	2.7E+01
98	Californium-249	2.7E+00
98	Californium-250	2.7E+01
98	Californium-251	2.7E+00
98	Californium-252	2.7E+01
98	Californium-253	2.7E+03
98	Californium-254	2.7E+01
99	Einsteinium-253	2.7E+03
99	Einsteinium-254	2.7E+00
99	Einsteinium-254m	2.7E+02
100	Fermium-254*	2.7E+05
100	Fermium-255*	2.7E+03

** = naturally occurring

* = half life less than 1 day

Atomic No.	Nuclide Category	Volume (pCi/g)
---	Any nuclides not listed above with beta-gamma decay modes other than alpha emissions and without regard to half-lives	2.7E+00
---	Any nuclides not listed above with alpha or spontaneous fission decay modes and with half-lives less than 10 days	2.7E+00
---	Any nuclides not listed above with alpha or spontaneous fission decay modes and with half-lives equal to or greater than 10 days	2.7E-01

Table 2 Surface Concentration Levels

Radionuclide Groupings	Release Level – Total Surface Activity	
	pCi/cm^2	$dpm/100\ cm^2$
Beta-gamma emitters (nuclides with decay modes other than alpha emission and without regard to half-lives)	11	2400
U-natural, Th-natural, U-235, U-238, Th-232, Th-228, Th-230, U-depleted, and associated decay products; and alpha emitters with half-lives of less than 10 days	11	2400
Radionuclides with alpha or spontaneous fission decay modes and with half-lives equal to or greater than 10 days	1.1	240

Dated at Rockville, Maryland, this ____ day of _____ 2005.

For the Nuclear Regulatory Commission

_____

Annette Vietti-Cook,
Secretary of the Commission.