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NATURAL RESOURCES DEFENSE COUNCIL

June 30, 2003

Via Electronic Mail and U.S Mail

Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attention: Rulemaking and Adjudications Staff

RE: Comments on scope of "Rulemaking on Controlling Disposition of Solid Materials"

Dear Secretary,

The Natural Resources Defense Council, Inc. ("NRDC") has serious concerns with the five options presented by the Nuclear Regulatory Commission's ("NRC") scoping process for the release of radioactively contaminated materials. Release of such material for use in such things as consumer products could expose the public to potentially harmful levels of radiation and expose workers processing contaminated materials at scrap mills to potentially significant levels of radiation.

Despite years spent on previous versions of this "Below Regulatory Concern" concept and the National Academy of Science's 2002 study, NRDC has fundamental and continuing concerns about whether such standards can be implemented safely and about the uncertainties in the estimates of the risks of recycling radioactively contaminated materials to workers and the public. These concerns are heightened by the improper releases of radioactively contaminated materials from DOE's Santa Susana facility in California, and continuing environmental and radiation safety management problems at both private and government facilities generally (*e.g.*, the Davis-Besse commercial nuclear generator in Ohio). For these reasons, NRDC opposes the NRC's alternatives and the NRC's practice of allowing unrestricted releases on a case by case basis until these uncertainties are resolved and the NRC has obtained general public acceptance that radioactively contaminated materials can be recycled safely.

NRDC is a national non-profit membership environmental organization with offices in Washington, D.C., New York City, San Francisco and Los Angeles. NRDC has a nationwide membership of over 500,000 individuals. NRDC's activities include maintaining and enhancing environmental quality and monitoring federal agency actions to ensure that federal statutes enacted to protect human health and the environment are fully and properly implemented. Since its inception in 1970, NRDC has sought to improve the environmental, health, and safety conditions at and surrounding nuclear facilities operated by Department of Energy ("DOE") and commercial nuclear facilities licensed by the NRC and their predecessor agencies.

Many of these comments were submitted to the NRC in prior rulemaking proceedings on this matter and should be effectively addressed by the agency during the course of any rulemaking. For purposes of consistency, those earlier comments are incorporated explicitly and by reference.

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Analysis of Alternatives – NRC's Proposed Rulemaking Raises Numerous Regulatory Uncertainties and Challenges.

Alternative 1 – No Action: Retain Current Approach of Allowing Unrestricted Use Using Measurement Based Guidelines.

Continuation of the current ad hoc process is unacceptable for the reasons noted in response to Alternatives 2 and 3.

Alternative 2 – Dose-Based Regulation on Unrestricted Use
Alternative 3 – Conditional Use

These options are inappropriate for the following reasons:

1. *The Total Quantity of Radioactively Contaminated Materials to be Released for Use in Commercial Products Remains Highly Uncertain.*

Environmental Protection Agency ("EPA") estimates that NRC-licensed facilities contain more than 650,000 metric tonnes of scrap metal that could be recycled (~ 80% carbon steel; ~ 20% stainless steel); EPA's upper bound on this estimate is about twice this value. EPA estimates that DOE facilities currently store bout 171,000 metric tonnes of scrap metal; the upper bound on this estimate is about twice this value. Decommissioning of DOE facilities according to EPA will generate approximately another 925,000 tonnes (~ 85% carbon steel; ~ 15% equally divided between copper, aluminum, and stainless steel); the actual quantity could be several times higher than this value. There are no estimates of the total quantities of other radioactive materials (*e.g.*, concrete, soil, industrial wastes) that could be deregulated.

Because of these uncertainties, it is unclear how NRC can reasonably evaluate the human health impacts of its standard. It is essential that NRC clearly explain how it plans to estimate, in a scientifically sound manner, the total quantity of radioactively contaminated materials that the public could be exposed to, particularly because some radioactive contaminants remain hazardous for many thousands of years. For example, several radionuclides have extremely long half-lives, which adds another layer of complexity to NRC's assessment of the aggregate amount of radioactively contaminated materials that will be in commerce at any given time.

NRC has claimed that the risks from contaminated metals are limited because contaminated scrap metals will make up less than a percent of the scrap metal being processed in any given year, which necessarily reduces their potential risks. However, this estimate does not take into account scrap mills, particularly mini-mills, that may receive a disproportionate amount of radioactively contaminated metal. At these facilities, recycled metal could be released without being mixed with any clean metal. Under these circumstances, any claim of significant dilution is hypothetical. As in the prior EPA study, the risks from contaminated materials must be evaluated assuming no dilution.

In addition, because of public concern about aggregate effects of radiation from contaminated materials, it is essential that in any rulemaking NRC provide information on and estimates of exposures from multiple pathways. Only with this information will the public be able to assess the relative contributions from different sources and pathways, *e.g.*, the impact of technetium-99 contamination in consumer products relative to that of cobalt-60 or what pathways

are most important for each radionuclide. This information should be tabulated and presented in several examples illustrating the affect of different radionuclides in specific circumstances.

2. *Surveying for Radioactive Contamination is Costly, Challenging, Limited by Current Instruments, and Difficult to Monitor and Enforce Effectively.*

Survey measurements for radioactive contamination are difficult and challenging where large, complicated pieces of equipment, such as that found at DOE and NRC facilities, are involved. Problems that can undermine effective surveying include the following:

- Large errors can be introduced into measurements of volumetric contamination if the contaminant concentration is not uniform or if the geometry of the contaminated piece is complicated.
- Complex geometries with difficult to reach surfaces are challenging to measure accurately, and workers will tend to avoid these measurement areas.
- Even where measurements are straightforward, the accuracy of the measurements is limited by the presence of unavoidable background radiation.

Typical measurement uncertainties are likely to be several percent even for the most favorable geometries; more complex geometries will result in greater measurement uncertainty. In its study, EPA acknowledges that current detection instruments may not be sensitive enough to detect contamination reliably under a 1 mrem/y standard. For example Co-60, a major contaminant in materials at NRC-licensed facilities and an important radionuclide in risk assessments, could be difficult to detect under a 1 mrem/y standard. Even if a standard of 1 mrem/y (such as the NAS suggests may be a good "starting point"), NRC must be able to demonstrate that the available detection equipment can reliably survey materials to satisfy its standard.

These technical constraints lead to several basic questions:

- It is unclear whether the detection equipment available can protect the public against improper releases of radioactively contaminated materials if a stringent standard were set.
- No data have been provided estimating the rate of potential false negatives (measurements that incorrectly find that a piece of equipment is not contaminated).
- Despite NUREG 17-61 ("Radiological Survey for Controlling Release for Solid Materials" (July 2002)), NRC has not demonstrated that surveying can be conducted adequately for the large quantities of scrap metal available for recycling at NRC-licensed and DOE facilities.

3. *The Many Risks Posed by Different Radiological Contaminants Could Impede Reliable Implementation of a General Standard.*

Several factors influence the threat posed by a given radioactive element:

(1) whether the radionuclide remains in the recycled material or partitions into a byproduct of the recycling process (e.g., for metals it can partition into the metal product, slag, or baghouse dust);

(2) the type of radiation the radionuclide emits (*i.e.*, alpha, beta, gamma);

(3) the residence time of the radionuclide in an individual once it is ingested; and

(4) the length of the radionuclide's half-life.

For example, some radionuclides like uranium-238, plutonium-239, neptunium-237, and technetium-99 are extremely long lived, some have long residence times like plutonium and neptunium, and some partition almost exclusively into the recycled metal, such as technetium and cobalt.

These different characteristics mean that radionuclides present substantially different risks to workers and the public and present different challenges from a regulatory perspective. For example, radionuclides that partition exclusively into the slag that is generated during recycling are less likely to pose a significant threat to the public through commercial products, but pose potentially significant risks to workers. Establishing an across-the-board rule under these circumstances raises the potential for substantial regulatory problems and could undermine safe implementation of a standard. Factors that differentiate radionuclides from a standard-setting perspective include uncertainties in estimates underlying risk assessments, types of risks, likelihood of improper releases (violations), and level of public concern. For example, more uncertain risks should lead to more conservative standards or rejection of a standard altogether. Similarly, the degree to which future uses are foreseeable should factor into this analysis.

For radionuclides that partition into the recycled material, NRC must be particularly vigilant in ascertaining the potential uses and risks posed by the residual radioactive contaminants. Where these risks cannot be reliably calculated, the scrap materials should not be recycled. NRC bears the burden of demonstrating the safety of its rule under real-world conditions.

In addition, where radionuclides partition into recycling byproduct materials, such as metal slag produced during smelting, NRC must evaluate requiring proper disposal of such materials at regulated facilities under ALARA. This applies particularly to metal slag, which is sold for, among other things, soil conditioning and ice control, because it is of low economic value and certain long-lived radionuclides concentrate in it during the melting process.

4. *The Economics of Radioactive Materials Recycling Will Impede Safe Implementation of a Standard.*

Except in the case of nickel, and to a lesser extent copper, the primary economic gain from recycling scrap metal and other radioactively contaminated materials derives from avoiding disposal costs. This means that from an economic perspective there is little difference between limiting standards to restricted releases, including disposal, versus permitting unrestricted recycling of such materials.

However, the savings from avoiding disposal are often more than offset by the costs of cleaning the materials to meet unrestricted release standards and, to a lesser extent, costs from surveying the materials for radioactive contaminants. Unless there are effective regulatory oversight and significant penalties for regulatory violations, companies engaged in recycling will (1) maximize the amount of material they release without cleaning it; and (2) seek to limit survey costs. The economics of the radioactive recycling therefore strongly favor lax implementation of surveying requirements and compliance with release standards. Given the amount of material potentially available, the economic incentives and the limits of survey equipment, issuing an

NRC standard could result in substantial quantities of material being released in violation of whatever standard is set. Rigorous monitoring and regulatory enforcement will be essential.

As discussed above, NRC must evaluate the potential impacts from such improper releases and ensure that there are regulatory mechanisms to protect the public against them. Further, where the risks – particularly to workers – from improper releases are particularly great, NRC should limit the scope of the permissible types of releases to foreclose the possibility of serious or chronic risks to the public.

NRC is required to ensure that all recycling is in compliance with ALARA and to conduct an analysis in conformance with the ALARA principle as part of any rulemaking. NRC's ALARA analysis will be particularly important in circumstances where the economics either make disposal marginally more expensive (or in some cases cheaper) than unrestricted release or where restricted release is an option. It is therefore essential that NRC include analyses of a variety of circumstances under which recycling could occur to assess fully how ALARA applies. NRC's ALARA analysis should not be limited to a global assessment, but include focused analyses of particular releases under specific conditions.

5. *Public Concern and the Legacy of NRC's and DOE's Management of Radioactive Materials*

The National Academy of Sciences, in its 2002 report, referred to the "legacy of distrust." This latest version of this rulemaking is being developed in the continuing context of decades of mismanagement of radioactive wastes at both DOE and NRC facilities. DOE mismanagement has caused incalculable environmental harm, threatened the health, and in some cases lives, of many DOE workers and public citizens, and created an environmental debacle that will cost billions of dollars to remedy. Unfortunately, these problems are not merely historical artifacts:

- In 1994, the Conference of Radiation Control Program Directors ("CRCPD") found that "[r]adioactive materials has been tracked offsite, into homes, businesses, and elsewhere .... States have surveyed people, homes, businesses, rental cars, and trucks. Significant contamination events continue to occur at the DOE facilities due to lack of adequate health physics for all its operations."

- In 1999, the regulatory deficiencies identified by CRCPD were found at DOE's Paducah, Kentucky, plant, as well as evidence that DOE contractors had illegally disposed of radioactive materials in local sanitary landfills, at random sites in a local state wildlife preserve, and through largely un-monitored on-site recycling operations.

- Over the past several years DOE has engaged in a pattern of attempting to reclassify waste to avoid more stringent cleanup obligations or to relax cleanup standards.

The NRC, unfortunately, has had a consistent record of supporting flawed concepts as well. Despite the absence of accepted standards and any meaningful public involvement with the DOE's effort to commence the first large-scale recycling of scrap metal at the Oak Ridge K-25 Gaseous Diffusion Plant, the NRC supported the Oak Ridge project until that program was halted in 2000.

These problems are a testament to the challenges of managing radioactively contaminated materials, as well as DOE's continuing failure to develop mechanisms to improve its control of them.

NRC's proposed rulemaking will directly and indirectly affect the ability of DOE and its contractors to release radioactively contaminated materials, which DOE has time and again failed to manage safely in a regulated environment. In the absence of demonstrable changes within DOE or, at the very least, independent regulatory mechanisms to ensure that radioactive materials are properly managed, the public has little reason to believe that free releases from DOE facilities, which contain the bulk of the inventory, will occur without serious incidents. It is therefore essential that NRC consider the practical, technical, and administrative limitations of the entities that will be responsible for releasing contaminated materials into United States markets, and that it factor these constraints into its decision on how to proceed.

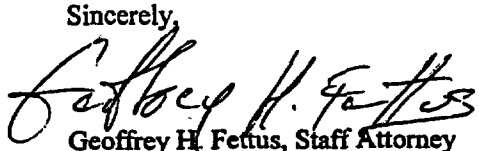
Alternative 4 – Disposal of Solid Materials in EPA-regulated landfills.

The disposal of radioactive materials at hazardous waste facilities is currently prohibited and should remain so. Resource Conservation and Recovery Act Subtitle C hazardous waste facilities are not designed to isolate materials for the thousands of years necessary for radioactive materials. Rather, hazardous waste disposal facilities are designed to last, at best, a period of decades.

Alternative 5 – Disposal of Solid Materials in NRC/LLW Disposal Sites

Despite the dismal technical and regulatory history of low-level radioactive waste disposal sites, this option is currently the only appropriate alternative presented by the NRC in this scoping process. This rulemaking process, at a minimum, should be used to strengthen existing regulations and appropriate control of disposal of radioactive solid material.

Sincerely,



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