

POLICY ISSUE NOTATION VOTE

May 1, 2003

SECY-03-0068

FOR: The Commissioners

FROM: William D. Travers
Executive Director for Operations

SUBJECT: INTERAGENCY JURISDICTIONAL WORKING GROUP EVALUATING THE
REGULATION OF LOW-LEVEL SOURCE MATERIAL OR MATERIALS
CONTAINING LESS THAN 0.05 PERCENT BY WEIGHT CONCENTRATION
URANIUM AND/OR THORIUM

PURPOSE:

To inform the Commission of the activities of the Interagency Jurisdictional Working Group (JWG) and the resulting general consensus regarding the best approach to delineate the responsibilities of the U.S. Nuclear Regulatory Commission (NRC) and other Federal agencies and the States, with regard to low-level source material or materials containing less than 0.05 percent by weight concentration uranium and/or thorium. The staff is also requesting Commission approval of: (1) the staff's recommended approach to decrease NRC responsibility by limiting NRC authority to uranium and thorium that are extracted/purposely concentrated for the use of uranium or thorium; and (2) the staff's recommendation to formally solicit comments on the recommended approach from impacted Federal agencies at a high level [i.e., U.S. Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and U.S. Department of Energy (DOE)] and individual States and coordinate with the State Department regarding impacts on international Agreements of Cooperation.

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SUMMARY:

This paper provides the Commission with information about the activities of the JWG and recommendations for the best approach to delineate the responsibilities of NRC and other Federal agencies and the States with regard to low-level source material or materials containing less than 0.05 percent by weight concentration uranium and/or thorium. There were several public meetings of the JWG, during which it obtained additional information and insights related to the regulation of low-level source material. The JWG reviewed the options in SECY-99-259, "Exemption in 10 CFR Part 40 for Materials Less Than 0.05 Percent Source Material—Options and Other Issues Concerning the Control of Source Material"; technical information, including NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials"; and the relationship of other ongoing activities to 10 CFR Part 40 (Part 40) jurisdictional issues. In evaluating the options in SECY-99-259, the JWG divided the options into three outcomes: (1) no change, (2) increase NRC regulation, and (3) decrease NRC authority. The pros and cons for each were evaluated. The general consensus of the JWG is that the best approach for regulating low-level source material is to limit NRC authority to uranium and thorium that have been extracted or purposely concentrated for the use of the uranium or thorium. All other uranium and thorium incidental to the processing of other materials would be considered NORM /TENORM¹, and would be regulated by existing standards/regulations for this material. Additionally, a material's concentration, i.e., greater or lesser than 0.05 percent by weight uranium or thorium, would no longer be used to determine if a material is licensable source material. This approach would clarify jurisdictional authorities; limit what could be described as *de-facto* dual regulation (i.e., the regulation of various components within the same material by various agencies); and provide more consistency within NRC regulations. The staff recommendations in this paper are based largely on the deliberations of the JWG.

BACKGROUND:

SECY-99-259, "Exemption in 10 CFR Part 40 for Materials Less Than 0.05 Percent Source Material—Options and Other Issues Concerning the Control of Source Material," addressed many issues concerning Part 40, including the exemption in § 40.13(a). Section 40.13(a) exempts any person who receives, possesses, uses, transfers, or delivers source material in any chemical mixture, compound, solution, or alloy, in which the source material is by weight less than 0.05 percent of the mixture, compound, solution, or alloy, from the regulations in Part 40 and from the requirements for a license set forth in section 62 of the AEA of 1954.

In SECY-99-259, the staff discussed the complex issues related to the history of Part 40, including the origin of the definition of source material in the AEA as it relates to its significance as a source for the production of special nuclear material. The original definition of source material in Part 40 (1947) excluded all forms of uranium and thorium below the concentration

¹For purposes of this paper, NORM is naturally occurring radioactive material, excluding AEA of 1954 material; TENORM is technologically enhanced naturally occurring radioactive material, excluding AEA material. Although NORM stands for the words "naturally occurring radioactive material," some uranium and thorium, though naturally occurring, have a unique legal standing under the AEA, and are regulated separately from other naturally occurring radioactive material. When "naturally occurring radioactive material" is used in this paper, it is meant to more broadly include uranium and thorium present with NORM/TENORM.

limit of 0.05 percent by weight. In 1961, the definition in Part 40 was revised to its present form, to be consistent with the definition of source material in the AEA of 1954. Since that time, only ore below the 0.05 percent by weight concentration has been excluded from the definition of source material. Other forms, "chemical mixtures, compounds, solutions, or alloys," in which the uranium or thorium is by weight less than 0.05 percent of the mixture, became an "unimportant quantity," covered by the exemption in § 40.13(a), which was also added to Part 40 in 1961. The concentration appears to have been chosen on the basis of the concentrations of source material necessary to be a useful source of fissionable material.

There is no consistent definition of "ore" underlying the regulatory decisions made by the Commission. The word "ore" is not defined in Part 40 or in the AEA of 1954, as amended. Under the present regulatory scheme, and depending on the interpretation of the word "ore," materials with low concentrations of uranium and thorium could be considered AEA material exempt from regulation or might not be considered AEA material at all. The only formal Agency definition of "ore" is in guidance for use only with respect to alternate feed material. This guidance defines "ore" in terms of its use for processing for its uranium or thorium content at a uranium recovery facility. This lack of a consistent definition of ore contributes to problems with the interpretation of the definition of source material, which have resulted in numerous regulatory and legal deliberations and inconsistencies in the regulation of source material.

In SECY-99-259, the staff noted that a legislative change could resolve the issues related to the exemption in § 40.13(a) and the confusion concerning the definition of source material. The staff recommended that before requesting a legislative change, negotiations with the other agencies that could assume some responsibilities now held by NRC would be necessary. The staff sought Commission approval to interact with EPA, OSHA, and the States, to explore the best approach to delineate the responsibilities of NRC and those agencies, with regard to the regulation of low-level uranium and thorium.

The Commission issued a Staff Requirements Memorandum (SRM) dated March 9, 2000 (Attachment 1), in response to SECY-99-259. In this SRM, in Item 1, the Commission approved the staff recommendation to initiate interactions and work with EPA, OSHA, and the States, to explore the best approach to delineate the responsibilities of NRC and these agencies with regard to low-level source material or materials containing less than 0.05 percent uranium and/or thorium. The Commission indicated that the following agencies should also be involved: DOE; the U.S. Army Corps of Engineers (ACE); the U.S. Department of Interior (DOI); and the U.S. Department of Transportation (DOT). The Commission directed the staff to undertake this activity as part of the overall effort to rationally address the risks from NORM, TENORM, low-level source material, and, specifically, materials containing less than 0.05 percent uranium and/or thorium, while ensuring adequate protection of public health and safety. The staff was also directed to ". . . work with other Federal agencies and the States to evaluate existing and planned regulation of such materials and assess the willingness of these agencies to assume responsibilities for certain levels of source material and other material."

In response to the SRM, the JWG was established. As directed by the Commission, the JWG included a representative from the States [representing the Organization of Agreement States (OAS) and the Conference of Radiation Control Program Directors (CRCPD)], and representatives from EPA and OSHA. Other Federal agencies with responsibilities for similar materials are also members of the JWG, and include DOE; ACE; DOI, Bureau of Land

Management; and DOT. These representatives did not make official decisions on behalf of their respective organizations. The JWG held seven meetings, from September 2000 through March 2002, which were open to the public, at NRC Headquarters. During these meetings, the JWG discussed and evaluated the jurisdictional issues and available technical information related to the regulation of low concentrations of uranium and thorium and their decay products. Some of the specific work of the JWG is discussed in the following sections. As a result of these discussions, the JWG reached a general consensus on the best approach for regulating low-level source material, as discussed in more detail later in this paper.

A representative from the Mine Safety and Health Administration (MSHA) also attended several of the public meetings of the JWG. Additionally, there was public participation at these meetings. A representative from the Nuclear Energy Institute and representatives from different industries, such as the zirconium, ceramics, oil and gas, and waste disposal industries, etc., attended the meetings. Several of these representatives submitted comments to the JWG, which were considered by the JWG during its meetings.

The staff submitted SECY-01-0051, "Status Report on Interagency Jurisdictional Working Group Evaluating the Regulation of Low Concentrations of Uranium and Thorium," to the Commission, in March 2001, providing a status report of the JWG's activities. The staff discussed the JWG's activities at that time and provided a schedule for completing its work. On August 13, 2002, the staff provided an additional status report to the Commission, which set out some of the remaining work that needed to be completed before the staff could provide final recommendations to the Commission. As identified in this memorandum, some of the remaining work to be completed before formal Commission consideration included issues related to: (1) the definition and regulation of ore, (2) impact on some sites currently under AEA authority, such as sites on the on the Site Decommissioning Management Plan (SDMP)/complex sites list, (3) impact to international Agreements of Cooperation and coordination with the U.S. Department of State, and (4) ongoing security issues.

DISCUSSION:

To determine the best approach to delineate the NRC's and other agencies' responsibilities regarding low-level source material, the JWG began by assessing the current jurisdictional responsibilities of each agency. It analyzed available technical data, to help it evaluate worker and public health and safety. The JWG discussed three possible general outcomes: (1) making no changes, (2) increasing NRC regulation, or (3) decreasing NRC authority. Numerous ongoing NRC activities were also identified, as well as activities of other organizations, related to the regulation of NORM and source material.

Jurisdictional Issues/Planned Regulations

The Commission asked the staff to evaluate existing and planned regulation of NORM, TENORM, low-level source material, and materials containing less than 0.05 percent by weight uranium and/or thorium (SRM in response to SECY-99-259) dated March 9, 2000). To assist in this evaluation, each JWG member representing an agency that has statutory authority over the use of radioactive material prepared an informal "citation of authority" (Attachment 2). These citations of authorities were developed for the purpose of discussion and support of the JWG activities and do not represent Agency-endorsed positions or statements. The JWG used the

citations of authorities in its evaluation of existing and planned regulation, as well as in its evaluation of jurisdictional issues.

Currently, no Federal agencies have immediate plans to revise their regulations for these materials. EPA is evaluating the use of TENORM, on an industry-by-industry basis, to determine whether there is a need for education or guidance regarding the use or waste disposal of the materials, or for issues related to products resulting from these industry activities. EPA is also evaluating the need for regulation, instead of education and guidance, for each industry. Currently, about 13 States have regulations that specifically address the regulation of NORM/TENORM. Other States that have active radiation control programs, and regulate this material, do so in accordance with their general radiation protection standards.

The JWG determined that most of the materials/processes are regulated by one or more Federal and State regulatory agency(ies), based on different statutes/missions. EPA's authority focuses on general population exposure and environmental issues; OSHA's mission is to ensure worker safety, with the exception of mining, where MSHA has regulatory authority for mine worker safety. States that regulate NORM/TENORM do so for general radiation protection. The ACE authority relates to environmental restoration and compliance activities for the Department of the Army, Department of Defense, EPA, DOE, and other Federal agencies. By statute, radiological working conditions resulting from AEA materials at NRC licensed or Agreement State licensed facilities are not subject to OSHA (29 USC 653(b)) and, by regulation, are deemed to be in compliance with the radiation protection provisions of OSHA regulations [29 CFR Ch. XVII, § 1910.1096(p)]. In addition, the OSHA representative also indicated that if a facility is exempt from NRC regulations, OSHA would also consider the facility to be in compliance with its radiation protection regulations, with respect to the material covered by the exemption. Note that OSHA and NRC entered into a Memorandum of Understanding (MOU) in order to delineate the responsibilities between the two agencies to avoid duplication of effort.

Finally, the JWG determined that other Federal agencies and States have the authority to regulate most of the materials/processes, evaluated by the JWG, through their authority to regulate the radium content or other naturally occurring radioactive material contained in the materials. Most of the JWG members have indicated that regulations specifically addressing the radium content in materials will essentially address the uranium or thorium in the material, as well. This occurs either because the doses from uranium and thorium are included in the dose calculations for radium, or simply because of an inadvertent result of controlling doses from NORM. Additionally, many members of the JWG and several members of the public commented that when facilities adhere to OSHA requirements for other toxic materials and for dust control, the doses from the uranium and thorium in those materials are also greatly minimized.

Technical Information

The JWG reviewed relevant sections of NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials," published in June 2001, as part of its review of technical data, to evaluate worker and public health and safety. The staff's evaluation of relevant sections of NUREG-1717 is provided in Attachment 3. After evaluating the assumptions and parameters used in the calculations in NUREG-1717, the staff and the JWG have concluded that

workers are probably not receiving doses in the range of a few tens of mSv/year (a few rem/year) as estimated in NUREG-1717, and believe that the actual doses are around 1 mSv/year (100 mrem/year). However, NUREG-1717 does not include an analysis of all industries that use material that could contain uranium or thorium. There may be other scenarios, related to other industries, that were not evaluated, which could result in exposures to workers and members of the public, of which NRC is not aware. Additionally, there is limited information on doses to members of the public.

The JWG has also evaluated information that was provided to a working group within the CRCPD revising the Suggested State Regulations on Part N–TENORM. The JWG included and focused on Part N because the Part N working group had proposed an exemption from the Part N–TENORM regulations for the zirconium industry. As of this writing, the proposed exemptions are more limited in that they apply only to phosphate and potash fertilizer, zircon, zirconia, and zircon products for distribution, including custom-blending, possession, and use and disposal of the materials. The manufacturing or processing (i.e., mining or extraction of zirconium metal) of these materials is explicitly not exempted. The Part N working group worked with a consultant to evaluate information from the zircon industry and found that, in general, when (1) actual measurements and data from the industry are used; (2) newer dose methodologies (i.e., International Commission on Radiological Protection (ICRP) 66 and 68 are applied; and (3) other regulatory controls already in place, such as OSHA dust control regulations, are factored into the calculations, the doses are much lower than those estimated in NUREG-1717. The Part N group concluded that the doses should be below 1 mSv/year (100 mrem/year) in most situations. The consultant to the Part N working group indicated that the one exception would be for ultra-fine zircon milling and mining, with doses potentially in the range of 3-7 mSv/year (300-700 mrem/year). As of this writing, the CRCPD Executive Board was still reviewing the draft proposed revision to Part N–TENORM.

Although the general consensus of the JWG is that there is not a significant health and safety problem that warrants urgent regulatory action, it could not conclude that the exemption in § 40.13(a) provides a level of protection consistent with other NRC regulations. For example, workers in industries that are exempt from the regulations in Part 40 and from the requirements for a license are not necessarily receiving any radiation safety training or monitoring of their radiation exposures. The JWG believes that some oversight of the material covered by this exemption may be needed. Because individuals can receive doses in excess of 1 mSv/year (100 mrem/year) as a result of their jobs, a formal radiation protection program, including monitoring and training, consistent with the requirements in 10 CFR Part 19 and Part 20, for NRC-licensed facilities, may be warranted. The JWG believes that agencies other than NRC can provide this oversight.

Relationship to Other Ongoing Activities and Other Issues Related to § 40.13(a) and Regulation of NORM

The JWG was informed of other ongoing activities and other issues related to § 40.13(a) and the regulation of NORM/TENORM that it believed should be brought to the Commission's attention. Two committees are working on NORM/TENORM issues: (1) American National Standards Institute/Health Physics Society Committee on TENORM standards; and (2) Interagency Steering Committee on Radiation Standards subcommittee on NORM/TENORM. Additionally, a National Academy of Sciences study, regarding "Improving Practices for Regulating and

Managing Low-Activity Radioactive Waste," is now underway. The objective of this study is to evaluate options for improving practices for regulating and managing low-activity radioactive waste in the United States. Also, subsequent to the meetings of the JWG, the staff began working with EPA, who is considering a rulemaking that could permit disposal of certain radioactive material, such as source material and NORM, in a Resource Conservation and Recovery Act permitted facility. The staff recognizes that the Commission has submitted a legislative request to obtain jurisdiction over additional radioactive material extracted, or converted after extraction, for use in commercial or research activities. A description of some of the other ongoing activities, along with some related NRC activities identified by staff, is provided in Attachment 4. Where applicable, the impact of the interrelated activity, as compared to the recommended approach (i.e., decrease NRC authority to uranium or thorium that are purposely extracted/concentrated), is discussed.

Additionally, as part of this project, the JWG and staff identified numerous issues related to the activities of the JWG. These issues are discussed in Attachment 5, including such issues as State perspective; inconsistencies between the exemption in § 40.13(a) and other NRC regulations; the difficulty with the definition of source material and the exemption in § 40.13(a) pose when determining regulatory jurisdiction; impact on international Agreements of Cooperation; and the impact on sites where the uranium and thorium are incidental to the material of interest and contain greater than 0.05 percent by weight uranium and/or thorium and, therefore, require an NRC license.

JWG's Review of Options

The JWG's review began with evaluating the options discussed in SECY-99-259. Subsequently, the options were divided into three outcome categories: (1) no change, (2) increase NRC regulation, and (3) decrease NRC authority. The outcome categories focus on the basic outcomes that could result from the various options in SECY-99-259. After deciding on the basic outcome of "decrease NRC authority," the group focused on two options within this category: to limit NRC authority to (1) the uranium or thorium that are purposely extracted for the use of the material; or (2) uranium and thorium in materials above 0.05 percent by weight concentration. An options analysis based largely on the deliberations of the JWG is provided in Attachment 6. This analysis includes information regarding considerations used to evaluate the options in SECY-99-259, the outcome categories into which the options in SECY-99-259 were divided, and the pros and cons for the different outcome categories. Attachment 6, Table 3, compares the two options on which the JWG focused, as well as the option for "no change," with respect to the various considerations used by the staff and the JWG in evaluating the options in SECY-99-259.

In addition to the options in SECY-99-259, the JWG considered two additional options. One option discussed by the JWG was a tiered approach, using specified dose levels to determine when a person would be exempt from NRC licensing, require a general license, or require a specific license. Discussions focused on the difficulty of implementing this approach, because, based on the assumptions used, results of dose calculations for similar situations can be different. This could result in similar material being regulated differently (e.g., under an exemption, a general license, or a specific license). Additionally, this approach would place the burden on the person possessing the material to determine when the radioactive material requires a license, and if so, what type of license.

The other option, suggested by a member of the public, was that NRC make no changes to its current regulatory approach; instead, the individual recommended that OSHA revise its regulations for the use of radioactive materials to update training requirements, specifically requiring training for workers who could receive a dose greater than 1 mSv/year (100 mrem/year). Alternatively, the suggestion was made to establish an OSHA-approved voluntary workplace training program, consistent with the requirements in 10 CFR 19.12, for the use of material under the exemption in § 40.13(a). In the aforementioned individual's view, this approach would alleviate the concern that workers are receiving radiation exposures as a result of their occupation, without receiving radiation safety training to inform them of the risks of such exposures, and ways to minimize their exposures. Although this approach could be useful, there is no indication at this time that OSHA is willing to modify its regulations.² Additionally, this training would not solve the problems with the definition of source material, discussed above, and the concentration level in § 40.13(a), nor the legal impediments the States and other Federal agencies have in regulating uranium and thorium covered under the exemption in § 40.13(a) and considered AEA material. This is discussed further in Attachment 5. Also, it would be the responsibility of an individual facility/industry organization to propose to OSHA the possibility of having OSHA-approved voluntary workplace training.

The JWG eliminated the option in SECY-99-259 for an MOU between NRC and another agency or agencies, primarily because MOUs are not legally binding. In addition, the agencies involved with an MOU must have statutory authority over the materials in question.

General Consensus of the JWG for the Best Approach for Regulating Low-Level Source Material

Based on its evaluations, the general consensus of the JWG is that the best approach for regulating low-level source material is to limit NRC authority to uranium and thorium that are extracted (i.e., purposely concentrated for the use of the uranium or thorium). Once extracted/purposely concentrated, the uranium and thorium would continue to be considered source material subject to NRC regulations. All other incidental uranium and thorium that are not extracted or purposely concentrated would be considered NORM/TENORM, and would be regulated by current standards/regulations for this material, under the regulatory programs of other agencies, such as EPA, OSHA, and the States, to the extent that these organizations choose to regulate this material. The input obtained from the various agency representatives and the CRCPD/OAS representative was generally supportive of this approach. They believe that the responsibilities for this material could fall into current regulatory programs without a great burden on agency resources. To summarize, this approach would: (1) maintain safety; (2) limit *de-facto* dual regulation; (3) provide a clearer delineation of jurisdictional authority, which will be easier for agencies, industry, and the public to understand; (4) provide for more

²Note that OSHA regulations are taken from an older version of 10 CFR Part 20 (based on ICRP 2) and do not include training requirements comparable to those in the current 10 CFR Part 19.

consistent overall regulation of naturally occurring uranium and thorium within a regulatory authority; and (5) reduce inconsistencies within NRC's regulatory program.³

Additionally, the programs of other regulatory authorities will then be able to operate in an unimpeded manner while still providing protection of worker and public health and safety, because the jurisdictional authority will be clearer, and the States and EPA could have a comprehensive program to regulate all NORM, instead of just the radium and radon component of the material, if they choose to regulate this material. However, this approach would require expenditure of NRC resources in the near term, to coordinate the proposed NRC action with affected Federal agencies and States, as well as resources associated with preparing a legislative package and associated rulemaking.

Performance Goals

As the JWG progressed in this effort, the staff considered how the options and recommendations address NRC's performance goals of: (1) maintaining safety, protection of the environment, and common defense and security; (2) increasing public confidence; (3) making NRC activities and decisions more effective, efficient, and realistic; and (4) reducing unnecessary regulatory burden. Each performance goal, as it relates to the JWG's recommended outcome and approach, is addressed as follows:

Maintain Safety, Protection of the Environment, and the Common Defense and Security

Limiting NRC authority to uranium and thorium that are extracted or purposely concentrated for that material would continue to meet the performance goal of maintaining safety, protection of the environment, and the common defense and security, for material less than 0.05 percent by weight. The staff expects that States will regulate material that is greater than 0.05 percent by weight. As discussed elsewhere in this paper, the staff will further evaluate State regulation of this material when the staff formally solicits comments on the recommendation. This limitation to the purposeful use of uranium and thorium should not adversely impact the common defense and security (see Attachment 6 for further discussion related to safeguards issues). Uranium and thorium that are incidental to a process would then be defined as NORM and would fall into the regulatory programs of other agencies (if they choose to regulate NORM), such as EPA, OSHA, and the States. Safety could be

³NOTE: The Commission directed the staff to evaluate the appropriate relationship between the LTR release limits and the unimportant quantities limit in § 40.13(a), in an SRM dated June 18, 2002. This SRM relates to SECY-01-0194, "AAR Manufacturing Group, Inc., and Proposed Use of Unimportant Quantities of Source Material in 10 CFR 40.13(a) as Decommissioning Criteria." The staff has been evaluating the potential inconsistencies between the dose allowed for unrestricted release by the LTR in 10 CFR 20.1402, and the dose if § 40.13(a) were used as a decommissioning criterion. Since the Commission direction in the SRM to SECY-01-0194 focused on an overall evaluation of the LTR, the staff is mainly addressing this inconsistency in the LTR Analysis paper, and the Commission should refer to that paper regarding the staff's analysis and recommendations on that issue. However, it is noted here that the implementation of the recommended approach may include eliminating the exemption in § 40.13(a), thus removing the inconsistency between the LTR and § 40.13(a).

increased, if these organizations choose to regulate these materials, because the States and EPA would then have comprehensive control over all aspects of naturally occurring radioactive material and not just the radium and radon components of the material.

However, even with State or EPA regulatory control, under their programs for regulating NORM/TENORM, there is the possibility that the States and EPA may have different standards for regulating NORM and TENORM. These standards may not be equivalent to NRC's regulations. Also, some States may not have any standards for regulating this material. Part of the next phase in implementing the recommended approach would be to formally survey the individual States, which would include an evaluation of the standards that would be used, to determine if the health and safety of the public would be adequately protected.

Increase Public Confidence

It is not clear how the public would react if the recommended approach were implemented. Public confidence might increase, because material that is currently covered by the exemption in § 40.13(a) could now be regulated by EPA and/or the States, within their regulatory programs for NORM/TENORM. NRC will continue to regulate the purposeful use of uranium and thorium; therefore, there should not be any significant change to NRC authority to control uranium and thorium from a strategic standpoint. All other uranium and thorium that are incidental to a process would be considered NORM and fall into the regulatory programs of other agencies, such as EPA and OSHA, and the States. These organizations would then have control over all aspects of activity involving naturally occurring radioactive material. However, it is also possible that the public would see this shift in authority as a decrease in NRC's commitment to public protection.

Make NRC Activities and Decisions More Effective and Efficient

Limiting NRC authority to the regulation of extracted uranium and thorium would make NRC activities more effective and efficient. Based on the mission of NRC, under the AEA, it could be argued that NRC authority should be limited to activities related to the recovery of uranium and thorium (primarily in support of the nuclear fuel cycle). If NRC retains authority for all materials produced once ore is processed for its uranium and thorium content, even though some of these materials may not enter the fuel cycle (e.g., materials used to make products using uranium and thorium), it would resolve the essential question of whether NRC should, or was ever intended to, regulate all uranium and thorium, given that it is ubiquitous in nature. Under the recommended approach, the uranium and thorium would not be regulated by NRC when it is an incidental component of material being processed for other reasons, such as zircon sands. This approach would be a more efficient use of NRC resources, by allowing NRC to concentrate its resources on the regulation of the purposeful use of uranium and thorium. Also, NRC's statutory approach to regulating through licensing is not the most efficient approach for regulating many of the materials that constitute NORM/TENORM. This material is ubiquitous in nature and there are many different types of processes that use this material. Applying a standard licensing approach (such as that used for other industries, like industrial radiography and well logging) to many different types of processes using the same material is often difficult to do consistently. The recommended approach would allow NORM

to be regulated as a whole by the States and EPA, instead of regulating only the radium and radon components of the material, which is also more efficient and effective.

Reduce Unnecessary Regulatory Burden

Under the recommended approach, a single regulatory authority would be in a better position to evaluate the potential hazards of uranium and thorium, which would be considered NORM, with the potential hazards of the other materials with which they are associated, such as radium and hazardous chemicals. The EPA and the States would be able to have a comprehensive program over all naturally occurring radioactive materials, and would not be limited to the regulation of radium and radon. This would reduce *de-facto* dual regulation of the material by reducing the number of agencies involved, and thereby could reduce burden on industries dealing with NORM/TENORM. However, it is recognized that individual programs of States may have different regulations/standards, procedures, scope, etc.

Staff Analysis

After the JWG meetings, the staff continued its analysis of the recommended approach, as discussed in the Commission Memorandum dated August 13, 2002. The staff further analyzed the: (1) results of ongoing security issues; (2) best method of implementing the recommended approach (i.e., by rulemaking or through a legislative change); (3) impacts of the JWG recommended approach on sites currently regulated under AEA authority, including sites on the SDMP/complex sites list; (4) impact on international Agreements of Cooperation; and (5) resources that might be saved as a result of the recommended change. These analyses are discussed below.

Security Initiatives

The staff has evaluated the ongoing work of security initiatives for any impacts that the recommended approach might have on these. At this time, it appears that the materials under consideration are well below the thresholds of material of potential security concerns. Natural uranium outside the fuel cycle and natural thorium have not been identified as material of potential concern.

Best Method of Implementation

The staff evaluated the best method of implementing the recommended approach. At this time, the staff believes that a legislative change to the AEA will be required to fully implement this approach. Agreement between the affected agencies and the States may minimize potential uncertainties with obtaining a legislative change. Also, DOE can now establish a different concentration limit for purposes of defining source material under 11z.(2) of the AEA. A legislative change to the AEA will minimize the potential for inconsistencies in the definition of source material between DOE and NRC. Before NRC requests a legislative change, the staff recommends formally contacting both the impacted Federal agencies at a high level (e.g., EPA, OSHA, and DOE), and the individual States, for their formal input and comments on this approach.

Impact on Sites Currently regulated under AEA Authority and Impact on Formerly Utilized Site Remedial Action Program (FUSRAP) Sites

The staff has evaluated the impact of its recommended approach on sites that are not purposely using uranium and thorium that would no longer be under NRC jurisdiction. Such sites include those that are on the SDMP/complex sites list and one active licensee. There are also some Agreement State licensees that would be affected; however, under the staff's recommended approach, these would remain under State jurisdiction but under different statutes and, in some cases, different regulatory programs.

If the Commission approves the staff's recommendation, the staff plans to formally survey the individual States regarding potential impacts/resource burdens on their regulatory programs. In this survey, the staff plans to specifically address jurisdiction of the SDMP/complex sites and the one active licensee, with those States where these sites are located, including possible transition of these sites, and consider issues such as funding and any liability concerns. Some States may not be willing to accept existing sites on the SDMP/complex sites list for financial and liability reasons. As noted in Option 1, the legislative change might be drafted so that NRC retains jurisdiction over those sites currently on the SDMP/complex sites list that would be impacted by the staff's recommended approach, so that the decommissioning of these sites can be completed without a change in the regulatory program. This could minimize an interruption to, or increased burden on, the decommissioning process already in place.

The processing of ore for its uranium or thorium content will continue to be subject to regulation under the AEA. The treatment of mill tailings not subject to Title II of the Uranium Mill Tailings Radiation Control Act has not yet been resolved. During the comment period with the States and other Federal agencies, particularly with DOE and ACE, this issue will need to be addressed.

Furthermore, the staff appreciates the need to avoid adverse impact on the FUSRAP program and DOE activities. The staff will coordinate the drafting of the legislative language with ACE and DOE in the interest of minimizing the impact on FUSRAP and DOE activities.

Impact on International Agreements of Cooperation

A discussion of the impacts on international Agreements of Cooperation is provided in Attachment 5. At this time, it does not appear that there will be a major impact on Agreements of Cooperation. The staff will research possible proliferation concerns and the ability for the U.S. to fully meet reporting requirements under current Agreements of Cooperation for export of material, as well as coordinate this issue with the State Department.

Resources Saved by Implementing the Staff's Recommended Approach

Implementing the staff's recommended approach should save some Agency resources in the long run, without greatly increasing costs to other Federal agencies and the States. As discussed in Attachment 5, Item 6, there are several sites, including some sites on the

SDMP/complex sites list, licensed under AEA authority, at which the material would no longer be under the AEA. The staff does not believe that NRC will gain new licensees with the recommended approach; it is not likely that anyone having a concentration of less than 0.05 percent by weight is purposely using the uranium or thorium.

The staff estimates that at least 1 FTE per year would be saved solely from eliminating the need to continue to resolve issues related to inconsistencies and jurisdictional questions. Additionally, the States would save some resources, because they deal with these same issues.

For fiscal year (FY) 2003, 5 FTEs are currently budgeted for the nine sites on the SDMP/complex sites list; a future budget associated with these sites may be reduced. Three of these nine sites are currently scheduled to complete decommissioning by the end of 2005. Some States may not be willing to accept existing sites on the SDMP/complex sites list, for financial and liability reasons, so there may not be any associated resource savings, if we request a legislative change that would retain NRC authority over these sites. Additionally, there is one active NRC licensee that would no longer be under NRC jurisdiction with the recommended approach; the staff estimates a savings of about 0.5 FTE a year, if this site were transferred to the State in which it is located.

Staff Recommendations

Based on these evaluations and the work of the JWG, the staff evaluated two options for going forward: (1) pursue the recommended approach to limit NRC authority to uranium and thorium that are extracted or purposely concentrated for the use of that material; and (2) no change. A detailed discussion of these two options and the pros and cons are provided in Attachment 6. Key pros and cons are listed below.

Option (1) - Limit NRC authority through a legislative change to uranium and thorium that are extracted or purposely concentrated for the use of that material

In considering this legislative change, it is appropriate to consider retaining authority over complex decommissioning sites where incidental uranium and thorium is on site [materials were processed for other than the uranium and thorium in the materials]. This would include the nine sites currently on the SDMP/complex sites list. In the consultation process with the States, States may propose for Commission consideration, additional sites currently under license that, at the time of decommissioning, may present complex decommissioning and decommissioning funding issues for consideration. Any sites for which NRC would retain authority would to be added to the list for inclusion in the legislation.⁴

⁴More detailed information related to the pros and cons of keeping or transferring sites currently under AEA jurisdiction will be developed after the staff has surveyed the individual States, if the Commission directs the staff to pursue the recommended approach.

Pros:

- a. Reduces inconsistencies within NRC regulations, which have raised numerous jurisdictional and regulatory questions, at significant resource costs to the Agency.
- b. Focuses NRC resources on activities directly related to uranium recovery and subsequent use of the recovered materials.
- c. Provides a clearer delineation of jurisdictional authority that will be easier for agencies, States, industry, and the public to understand.
- d. Reduces *de-facto* dual regulation.
- e. Allows EPA, OSHA, and the States to have a comprehensive control program over all aspects of naturally occurring radioactive material, rather than just the radium and radon components of the material, resulting in more consistent regulation of naturally occurring radioactive material within a State.

Cons:

- a. Costs to gather additional information, prepare a legislative package, and prepare associated rulemaking.
- b. A possibility that some industries might use higher concentrations without a concentration limit in place, resulting in a possible increase in exposures.
- c. Some costs to States and other Federal agencies to modify existing radiation control programs or to develop standards to implement this change.
- d. Potential for inconsistent regulation between different States.

*Option (2) - No Change*Pros:

- a. No NRC resources needed to gather additional information, prepare a legislative proposal, and prepare associated rulemaking.
- b. Continued licensing of uranium or thorium greater than 0.05 percent by weight concentration; persons less likely to use higher concentrations; helps ensure worker and public health and safety.

Cons:

- a. Need to further evaluate the exemptions in §§ 40.13(a), 40.13(b), and 40.13(c)(1)(vi), to determine any necessary regulatory options for addressing potential health and safety concerns.
- b. Continues inconsistencies within NRC regulations, which have raised numerous jurisdictional and regulatory questions at significant resource costs to the Agency.
- c. Delineation of jurisdictional authority is not as clear.
- d. *De-facto* dual regulation continues.
- e. EPA, OSHA, and the States continue to regulate only the radium and radon components of the material.

After further consideration of the JWG deliberations and staff analysis, the staff's recommendation for the best approach for regulating low-level source material is to limit NRC

authority through legislation to uranium and thorium that are extracted (i.e., purposely concentrated for the use of the uranium or thorium). All other uranium and thorium that are incidental to a process would be considered NORM and fall into the regulatory programs of other agencies, such as EPA and OSHA, and the States. The agency representatives and the CRCPD/OAS representative for the JWG appear amenable to this approach, and believe that responsibilities for this material could fall into current regulatory programs, without a great increase in burden on agency resources. The staff subsequently recognized that if the sites on the current SDMP/complex sites list transfer to the States, there will be more of a resource burden on the States. If more sites are identified during this process, staff will reevaluate resource burden on the States.

As noted above, there are still steps that the staff plans to take before implementing the recommended approach. Primarily, the staff recommends that contact be made at a high level with both the impacted Federal agencies (i.e., EPA, OSHA, and DOE), and the individual States, for their formal input and comments on this approach. The staff has not yet initiated such high level interactions with these organizations in the belief that these interactions should take place only after the Commission has reviewed the recommended approach and provided direction to the staff. Also, the staff did not believe it should expend additional resources of NRC staff and the other Federal agencies and individual States until the Commission has reviewed the recommended approach. This is an interim decision for the Commission; if the Commission directs the staff to continue pursuing the recommendations, the staff will provide additional information to the Commission after the next steps are completed.

RESOURCES:

The staff estimates that it will require the following resources to fully implement this approach.

1. 1.5 FTEs, over the next 1-1.5 years, to continue to pursue the recommended approach.
2. 3 FTEs total, to prepare a legislative package and, if approved by Congress, implement associated rulemaking, beyond the resources in 1. above.

All resources required in FY 2003-2004 are currently budgeted. Resources that may be required in FY 2005 and beyond will be incorporated into the budget using planning and prioritization tools of the planning, budgeting, and performance management process.

RECOMMENDATIONS:

- 1) Approve the staff's recommended approach [Option (1)] to decrease NRC authority by limiting NRC authority to uranium and thorium that are extracted/purposely concentrated for the use of uranium or thorium; and

- 2) Approve the staff's plan to formally solicit comments on the recommended approach from other impacted Federal agencies and individual States, including specifically obtaining input from the States where the sites currently regulated under AEA authority that would be affected by the recommended approach are currently located, and coordinate with the State Department regarding impacts on international Agreements of Cooperation.

/RA/

William D. Travers
Executive Director
for Operations

Attachments:

1. SRM dtd. 3/9/00
2. Citations of Authority
3. Staff Analysis of Dose Estimates in NUREG-1717
4. Relationship to Other Ongoing Activities
5. Other Issues Related to § 40.13(a) and Regulation of NORM
6. Options Analysis Based on Deliberations of the JWG

ATTACHMENT 1

STAFF REQUIREMENTS MEMORANDUM

SECY-99-259 - EXEMPTION IN 10 CFR PART 40
FOR MATERIALS LESS THAN 0.05 PERCENT
SOURCE MATERIAL - OPTIONS AND OTHER ISSUES
CONCERNING THE CONTROL OF SOURCE MATERIAL

March 9, 2000

MEMORANDUM TO: William D. Travers
Executive Director for Operations

Jesse L. Funches
Chief Financial Officer

FROM: Annette L. Vietti-Cook, Secretary /s/

SUBJECT: STAFF REQUIREMENTS - SECY-99-259 - EXEMPTION IN 10
CFR PART 40 FOR MATERIALS LESS THAN 0.05 PERCENT
SOURCE MATERIAL - OPTIONS AND OTHER ISSUES
CONCERNING THE CONTROL OF SOURCE MATERIAL

The Commission has approved the staff's recommendations to:

- 1) Initiate interaction with EPA, OSHA, and the States to explore the best approach to delineate the responsibilities of the NRC and those agencies with regard to low-level source material (as defined in 10 CFR Part 40) or materials containing less than 0.05% uranium and/or thorium. The Department of Energy should be included in such discussions because of the potential implications for its self-regulated activities. The Army Corps of Engineers (because of its responsibilities for DOE FUSRAP sites), the Department of Interior (because of its involvement in mineral mining), and the Department of Transportation (because of its involvement in the regulation of transport of materials) also should be consulted. As both part of the interactions discussed above and as part of the overall effort to rationally address the risks from NORM, TENORM, low-level source material, and materials containing less than 0.05% uranium and/or thorium, while ensuring adequate protection of public health and safety, the staff should work with other Federal agencies and the States to evaluate existing and planned regulation of such materials and assess the willingness of these agencies to assume responsibilities for certain levels of source material and other material. The staff should provide, within 12 months of the date of the SRM, or before if possible, a status report of its activities and a plan, including important milestones, for how to proceed.
(EDO) (SECY Suspense: 3/9/01)
- 2) Initiate the development of a proposed rule to amend 40.51(b)(3) and (4) to require prior Commission approval for transfers to persons exempt under 40.13(a). The staff should use the meetings with other Federal agencies and the States to get a sense of the possible number and type of material transfers for similar material that would remain outside NRC purview and see if the other potential regulators see merit in NRC's approach. The staff should be free to discuss its proposed rule in these interagency interactions. Regarding transfers of unimportant quantities of source material to exempt persons, the statement of considerations accompanying the draft proposed rule should

state that the staff would: 1) expect to approve transfers under this provision if the individual radiation dose is not expected to exceed 1 mSv/yr (100 mrem/yr); and 2) inform the Commission in cases where the individual dose is expected to exceed 0.25 mSv/yr (25 mrem/yr). The interested and affected parties should be made aware of NRC's current practice with regard to such transfers. Regarding transfers of unimportant quantities of source material for permanent disposal, the statement of considerations for the draft proposed rule should state that the staff would expect to approve transfers for disposal if the proposals meet the guidance contained in the December 17, 1998, SRM on COMSECY-98-022. The staff should identify the pros and cons of revising 10 CFR 40.13(a) to explicitly allow for the transfer of unimportant quantities of source material to exempt persons for the purpose of permanent disposal. This discussion could be included in the staff paper transmitting the proposed draft rule. The staff should also propose draft language to modify 10 CFR 40.13(a) in the paper if the staff determines that rulemaking is indicated.

(EDO)

(SECY Suspense:

9/8/00)

- 3) Develop a rulemaking plan to improve the control of distribution of source material to exempt persons and to general licensees, and the incorporation of the resolution of PRM-40-27 in order to make Part 40 more risk-informed. The staff should provide adequate justification for additional reporting requirements for distributors, exempt persons, and general licensees. If the staff believes it needs additional information about products and amounts of material distributed and used by persons exempt and general licensees, the staff should use the information developed as part of the reassessment of exemptions, including comments that will be provided on the draft report, obtain additional information as part of its interactions with EPA, OSHA, other Federal agencies, and the States, and consider the use of a contractor or survey of users to obtain the information.

When providing the rulemaking plan to the Agreement States, the staff should specifically solicit input from the Agreement States on whether the resolution of PRM-40-27 submitted by the State of Colorado and the Organization of Agreement States should be handled separately from the rulemaking effort.

(EDO)

(SECY Suspense:

3/9/01)

As this work benefits multiple classes of licensees and several surcharge categories -- such as regulatory support to Agreement States, small entities, nonprofit educational institutions, and other Federal agencies -- the costs associated with this effort should be allocated accordingly as fees are developed.

cc: Chairman Meserve
Commissioner Dicus
Commissioner Diaz
Commissioner McGaffigan
Commissioner Merrifield
OGC
CIO
OCA
OIG
OPA
Office Directors, Regions, ACRS, ACNW, ASLBP (via E-Mail)
PDR
DCS

ATTACHMENT 2

CITATIONS OF AUTHORITIES

Prepared by the Individual Agency Representatives
for the Purpose of Discussion and Support of the
Part 40 Jurisdictional Working Group¹

¹The Citations of Authority do not represent Agency-endorsed positions or statements.

CITATION OF AUTHORITY - DEPARTMENT OF TRANSPORTATION

DOT's regulatory authority is derived from the Transportation Safety Act of 1974 and subsequent amendments and re-authorizations. The most recent re-authorization was the Hazardous Materials Transportation Authorization Act of 1994 (Public Law 103-311, August 26, 1994), as Amended by Sections 6 and 7 of Public Law 103-429 of October 31, 1994, and as codified in Chapter 51 of Title 49 of the U. S. Code, Sections 5101 through 5127. Some additional provisions of the former (Public Law 103-311) contain instructions from Congress to the Secretary for certain actions to be carried out in conjunction with the regulation of hazardous materials transport.

In Section 5103, "General regulatory authority," 5103(a) states that "The Secretary of Transportation shall designate material (including an explosive, radioactive material, or a group or class of material as hazardous when the Secretary decides that transporting the material in commerce in a particular amount and form may pose an unreasonable risk to health and safety or property."

5103(b)(1) reads: "The Secretary shall prescribe regulations for the safe transportation of hazardous material in intrastate, interstate, and foreign commerce. The regulations --

- (A) apply to a person --
 - (i) transporting hazardous material in commerce;
 - (ii) causing hazardous material to be transported in commerce; or
 - (iii) manufacturing, fabricating, marking, maintaining, reconditioning, repairing, or testing a packaging or container that is represented, marked, certified, or sold by that person as qualified for use in transporting hazardous material in commerce; and
- (B) shall govern safety aspects of the transportation of hazardous material the Secretary considers appropriate."

Radioactive material is addressed explicitly in several other sections of Chapter 51, including Sections 5105, "Transporting certain highly radioactive material" and 5114, "Air transportation of ionizing radiation material." However, since radioactive material forms one of the nine classes of hazardous materials, for the most part any requirements or restrictions on the transport of hazardous materials found in the remaining sections of Chapter 51 also apply to the transport of radioactive materials.

CITATION OF AUTHORITY
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

The Occupational Safety and Health Administration (OSHA) in the U. S. Department of Labor was created by the U. S. Congress under the Occupational Safety and Health Act of 1970. Its purpose is “to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources.” To achieve these objectives, OSHA uses: strong enforcement to target workplaces with the highest injury and illness rates; creative partnership to develop new ways of working with employers, employees, and other stakeholders; improved rulemaking to meet the challenges of the 21st century; and expanded outreach and training to create safe and healthful working environments. OSHA’s standard to protect employees from exposure to ionizing radiation is 29 CFR § 1910.1096. It has provisions on: the exposure levels; definitions of terms; precautionary procedures and personal monitoring: caution signs, labels, and signals; immediate evacuation warning signal; exceptions from posting requirements; exemptions for radioactive materials packaged for shipment; instruction of personnel, posting; storage of radioactive materials; waste disposal; notification of incidents; reports of overexposure and excessive levels and concentrations; and records. The Occupational Safety and Health Act (OSH Act) of 1970 removes from OSHA's coverage those working conditions for which another Federal agency (or a State agency acting under the Atomic Energy Act of 1954) has prescribed or enforced occupational safety and health regulations. The Federal Agencies responsible for implementing the Atomic Energy Act of 1954, regarding occupational exposures, are Nuclear Regulatory Commission and Department of Energy.

CITATION OF AUTHORITY - ENVIRONMENTAL PROTECTION AGENCY

EPA Legislation and Regulations Providing Radiation Protection Authorities Subject to Revision by EPA General Counsel Review

More than a dozen major statutes or laws form the legal basis for the programs of the Environmental Protection Agency. EPA authority to develop radiation protection standards and to regulate radioactive materials, including TENORM, is derived from a number of those Federal laws, plus Executive Orders.

The authority to develop Federal guidance for radiation protection was originally given to the Federal Radiation Council (FRC) by Executive Order in 1959 as an offshoot of authorities of the Atomic Energy Act (42 U.S.C. 2011 et seq.)(1954). Over the next decade, the FRC developed Federal guidance ranging from guidance for exposure of the general public to estimates of fallout from nuclear weapons testing. Federal guidance developed by the FRC provided the basis for most regulation of radiation exposure by Federal and State agencies, prior to the establishment of the EPA.

In 1970, the responsibility for developing Federal guidance for radiation protection was transferred from the FRC to the newly formed EPA under Executive Order 10831 and Reorganization Plan No. 3. Federal Guidance Documents are signed by the President and issued by EPA. By signing these, the President provides a framework for Federal and State agencies to develop regulations that ensure the public is protected from the harmful effects of ionizing radiation. Federal Guidance is also an opportunity for the President to promote national consistency in radiation protection regulations. For example, the guidance document Radiation Protection Guidance to Federal Agencies for Occupational Exposure, issued by EPA in 52 CFR 2822 January 27, 1987, established general principles, and specifies the numerical primary guides for limiting worker exposure to radiation.

EPA regulates radon and radioisotope emissions through its authority under the Clean Air Act (42 USC 7401 et seq.) (1970). Regulations promulgated by the Agency which control radioactive facilities and sites include 40 CFR 61:

- Subpart B, Underground Uranium Mines
- Subpart H, Department of Energy Facilities
- Subpart I, Certain non-DOE Facilities
- Subpart K, Elemental Phosphorous Plants
- Subpart Q, DOE Facilities Radon Emissions
- Subpart R, Radon from Phosphogypsum Stacks

Under the Radon Gas and Indoor Air Quality Research Act (USC 42 et seq.)(1986) and Indoor Radon Abatement Act (1988), as well as authorities of the CAA, EPA has developed guidance for control of radon in buildings and schools.

The Clean Water Act's (33 USC 121 et seq.) (1977) primary objective is to restore and maintain the integrity of the nation's waters. This objective translates into two fundamental national goals: eliminate the discharge of pollutants into the nation's waters, and achieve water quality levels that are fishable and swimmable. Under this law, EPA is given the authority to establish water quality standards and regulate the discharge of pollutants into waters of the United

States. Section 502(6) of the CWA includes “radioactive materials” in the definition of pollutants. EPA’s implementing regulations at 40 CFR 122.2, which defines the term “pollutant” includes radioactive materials except those regulated under the Atomic Energy Act. Thus EPA currently regulates radionuclides and radiation in discharges and establishes water quality standards. This includes TENORM radionuclides with the exception of uranium and thorium.

The Safe Drinking Water Act (SDWA)(42 USC 300f et seq.)(1974), is the main federal law that ensures the quality of Americans' drinking water. Under SDWA, EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. Implementing regulations for 40 CFR 141 include the establishment of national primary drinking water standards which currently include maximum contaminant limit goals and maximum contaminant limits for radiation and radionuclides; current standards include Radium-226 and Radium-228, Uranium, combined alpha, beta and photon emitters. Draft proposed MCL's are in preparation for Radon.

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) (42 USC 9601 et seq.)(1980) and the Superfund Amendments and Reauthorization Act (SARA) (42 USC 9601 et seq.)(1986) created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment. CERCLA established prohibitions and requirements concerning closed and abandoned hazardous waste sites; provided for liability of persons responsible for releases of hazardous waste at these sites; and established a trust fund to provide for cleanup when no responsible party could be identified. EPA has determined that radiation is a carcinogen and thus a hazardous substance. Under the National Oil and Hazardous Substances Contingency Plan, EPA has issued guidance on removals and clean up of radioactively contaminated sites. Implementing regulations for the NCP are found at 40 CFR 300.

The Toxic Substances Control Act (TSCA) (15 USC 2601 et seq.)(1976) was enacted by Congress to give EPA the ability to track the 75,000 industrial chemicals currently produced or imported into the United States. EPA repeatedly screens these chemicals and can require reporting or testing of those that may pose an environmental or human-health hazard. EPA can ban the manufacture and import of those chemicals that pose an unreasonable risk. While radionuclides are considered toxic substances under the act, source material, special nuclear material, or byproduct material (as such terms are defined in the Atomic Energy Act of 1954 (42 USC. 2011 et seq.) and regulations issued under such Act) are excluded from coverage. Consequently, TENORM radionuclides may be subject to this law.

The Resource Conservation and Recovery Act (RCRA) (42 USC 321 et seq.) (1976) gave EPA the authority to control hazardous waste. This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes. The 1986 amendments to RCRA enabled EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances. RCRA focuses only on active and future facilities and does not address abandoned or historical sites (see CERCLA). HSWA —The Federal Hazardous and Solid Waste Amendments are the 1984 amendments to RCRA that required phasing out land disposal of hazardous waste. Some of the other mandates of this strict law include

increased enforcement authority for EPA, more stringent hazardous waste management standards, and a comprehensive underground storage tank program. EPA's implementing regulations for RCRA do not allow for disposal of radioactively contaminated substances in landfills, however Nuclear Accelerator wastes—a form of waste previously classified as part of the TENORM waste class, can be disposed of in such facilities.

Additional radiation protection authorities provided to the EPA by Congress include responsibilities for setting protective standards for radioactive waste disposal. Under the Waste Isolation Pilot Plant Land (WIPP) Withdrawal Act, as amended (P.L. 102-579, 106 Stat. 4777), Congress gave EPA the authority to regulate many of the Department of Energy's activities concerning this radioactive waste disposal site in New Mexico. EPA was required to finalize regulations which apply to all sites -- except Yucca Mountain -- for the disposal of spent nuclear fuel, transuranic and high level radioactive waste. In 2000, EPA granted a certification of compliance indicating that the WIPP complied with EPA's radioactive waste disposal regulations and could open to receive these materials. The compliance criteria regulations were established by EPA in 40 CFR 194 and the disposal regulations set by EPA in 40 CFR 191.

The Energy Policy Act of 1992 (42 USC 10141 n.), Section 801, required the EPA, based upon and consistent with the findings and recommendations of the National Academy of Sciences, to develop regulations on health and safety standards for protection of the public from releases from radioactive materials stored or disposed of in the proposed Yucca Mountain radioactive waste disposal site. The standards to be developed were required to prescribe the maximum annual effective dose equivalent to individual members of the public from releases to the accessible environment from radioactive materials stored or disposed of in the repository. In 1999, EPA proposed draft standards and held public hearings; final regulations were published in 2001 for use by the Nuclear Regulatory Commission and Department of Energy.

Current regulations applicable to remediation of both inactive uranium mill tailings sites, including vicinity properties, and active uranium and thorium mills have been issued by the EPA under the Uranium Mill Tailings Radiation Control Act (UMTRCA) (42 USC 2022 et seq.) of 1978, as amended. EPA's regulations in 40 CFR 192 apply to remediation of such properties and address emissions of radon, as well as radionuclides, metals, and other contaminants into surface and groundwater.

CITATION OF AUTHORITY - STATE AUTHORITY AND RESPONSIBILITY

State authority to regulate radioactive materials is based on the Constitutional law tenet that any authority or responsibility not specifically assigned to the federal government may be exercised by the States.

Many states actively regulate radioactive material through radiation control and other state programs. Control under state law includes naturally occurring and accelerator-produced radioactive materials and other sources of ionizing radiation. Thirty-two states have entered into agreements with the U.S. Nuclear Regulatory Commission, under which the Commission has relinquished regulatory authority over most radioactive materials used in non-Federal facilities. Most states also control radioactivity through programs implementing the federal clean air, clean water and other environmental laws authorized by the U.S. Environmental Protection Agency.

A model state radiation control statute, last amended in 1983, has been developed by the Council of State Governments. A comprehensive model state code for all types of radioactivity-containing material and radiation-producing machines has been developed by the Conference of Radiation Control Program Directors (CRCPD). For example, Part N of the Suggested State Regulations for Control of Radiation (SSRCR) is specific to technologically-enhanced naturally occurring radioactive material (TENORM).

As an example from one of the 32 members of the Organization of Agreement States, the Colorado Radiation Control Act designates a state radiation control agency and grants broad authority to evaluate and control *...hazards associated with the use of any and all radioactive materials and other sources of ionizing radiation*. In the Colorado Act radioactive material means *any material, solid, liquid or gas, which emits ionizing radiation spontaneously*. Ionizing radiation means *gamma rays and x-ray and alpha particles, beta particles, high-speed electrons, neutrons, protons, and other high-speed nuclear particles*. The Colorado Act requires the Colorado Board of Health to promulgate regulations (for licenses and for exemption from licensing), which are modeled after those proposed by the Conference of Radiation Control Program Directors.

Whether or not an individual state has assumed regulatory authority from the NRC under an Agreement, each state has explicit statutory authority for regulating sources of ionizing radiation not otherwise regulated by the federal government. Several non-agreement states (for example, Michigan and New Jersey) have asserted specific authority over TENORM, especially cleanup approaches and disposal. Ten have developed regulations specifically for TENORM. Most states regulate TENORM under general rules for radiation protection.

State laws and the exercise of State authorities are reasonably consistent nationwide, but do vary in some respects. For example, Colorado's statute requires Colorado's rules to be neither more nor less stringent than the CRCPD SSRCR and also authorizes TENORM rules only after their promulgation by the U.S. Environmental Protection Agency. The Illinois Department of Nuclear Safety has no such constraints. Agreement State regulation of Atomic Energy Act materials is to be uniform, consistent, and compatible with that of the U.S. Nuclear Regulatory Commission.

CITATION OF AUTHORITY - DEPARTMENT OF DEFENSE, ARMY CORPS OF ENGINEERS

The U.S. Army Corps of Engineers performs environmental restoration and compliance activities for the Department of Army, Department of Defense, U.S. Environmental Protection Agency, Department of Energy and other Federal Agencies. The Army Corps of Engineers conducts environmental restoration activities under the authority of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and the implementing regulations, known as the National Contingency Plan (NCP), found in 40 Code of Federal Regulations (CFR) 300. The Army Corps of Engineers also follows the CERCLA framework when executing two specifically authorized programs. The statute creating the Defense Environmental Restoration Program, Section 10 U.S.C. 2701, authorized the Department of Defense (DOD) to administer and execute the Formerly Used Defense Sites (FUDS) Program, and DOD delegated the program to the Army for execution by the Corps of Engineers. In October 1997, Congress transferred responsibility for the administration and execution of Formerly Utilized Sites Remedial Action Program (FUSRAP) to the Army Corps of Engineers with the Energy and Water Development Appropriations Act for fiscal year 1998 (P.L. 105-62).

The Army Corps of Engineers is responsible for ensuring compliance with all safety and environmental requirements for the Army's deactivated nuclear reactors. The Army Reactor Program, as outlined in Army Regulation 50-7, is authorized under the Atomic Energy Act, Section 42 U.S.C. 2121(b), enacted as Section 91b of the Atomic Energy Act of 1954.

The U.S. Army, under its Executive Branch authority, issues Army radiation authorizations (ARA) to control specific Army ionizing radiation sources that the Nuclear Regulatory Commission does not license. U.S. Army radiation safety policies and procedures are established in Army Regulation 11-9, The Army Radiation Safety Program.

CITATION OF AUTHORITY - U.S. NUCLEAR REGULATORY COMMISSION

The mission of the U.S. Nuclear Regulatory Commission (NRC) is to ensure adequate protection of the public health and safety, the common defense and security, and the environment in the use of nuclear materials in the United States. The NRC's scope of responsibility includes regulation of commercial nuclear power reactors; non-power research, test, and training reactors; fuel cycle facilities; medical, academic, and industrial uses of nuclear materials; and the transport, storage, and disposal of nuclear materials and waste.

The NRC was created as an independent agency by the Energy Reorganization Act of 1974, which abolished the Atomic Energy Commission (AEC) and moved the AEC's regulatory function to NRC. This act, along with the Atomic Energy Act of 1954, as amended, provides the foundation for regulation of the nation's commercial nuclear industry.

NRC regulations are issued under the United States Code of Federal Regulations (CFR) Title 10, Chapter 1. Principal statutory authorities that govern NRC's work are:

- Atomic Energy Act of 1954, as amended
- Energy Reorganization Act of 1974, as amended
- Uranium Mill Tailings Radiation Control Act of 1978, as amended
- Nuclear Non-Proliferation Act of 1978
- Low-Level Radioactive Waste Policy Act of 1980
- West Valley Demonstration Project Act of 1980
- Nuclear Waste Policy Act of 1982
- Low-Level Radioactive Waste Policy Amendments Act of 1985
- Diplomatic Security and Anti-Terrorism Act of 1986
- Nuclear Waste Policy Amendments Act of 1987
- Solar, Wind, Waste and Geothermal Power Production Incentives Act of 1990
- Energy Policy Act of 1992

The NRC and its licensees share a common responsibility to protect the public health and safety. Federal regulations and the NRC regulatory program are important elements in the protection of the public. NRC licensees, however, have the primary responsibility for the safe use of nuclear materials.

The NRC fulfills its responsibilities through a system of licensing and regulatory activities that include:

- 1) Licensing the construction and operation of nuclear reactors and other nuclear facilities, such as nuclear fuel cycle facilities and non-power test and research reactors, and overseeing their decommissioning;
- 2) Licensing the possession, use, processing, handling, and export of nuclear material;
- 3) Licensing the siting, design, construction, operation, and closure of low-level radioactive waste disposal sites under NRC jurisdiction and the construction, operation, and closure of the geologic repository for high-level radioactive waste;
- 4) Licensing the operators of nuclear power and non-power test and research reactors
Inspecting licensed facilities and activities;

- 5) Conducting research to provide independent expertise and information for making timely regulatory judgments and for anticipating problems of potential safety significance;
- 6) Developing and implementing rules and regulations that govern licensed nuclear activities;
- 7) Investigating nuclear incidents and allegations concerning any matter regulated by the NRC;
- 8) Enforcing NRC regulations and the conditions of NRC licenses;
- 9) Conducting public hearings on matters of nuclear and radiological safety, environmental concern, common defense and security, and antitrust matters;
- 10) Developing effective working relationships with the States regarding reactor operations and the regulation of nuclear material;
- 11) Maintaining the NRC Incident Response Program, including the NRC Operations Center;
and
- 12) Collecting, analyzing, and disseminating information about the operational safety of commercial nuclear power reactors and certain non-reactor activities.

CITATION OF AUTHORITY
DEPARTMENT OF ENERGY FOR CONTROLLING RADIOACTIVE MATERIALS

The Department of Energy (DOE or the Department) has the responsibility to protect health and safety from the hazards of radiation and radioactive materials associated with its research, development and production activities. The authorities of the Department of Energy come from the Atomic Energy Act of 1954, as amended²; the Energy Reorganization Act of 1974, as amended³; and the Department of Energy Organization Act of 1977⁴. The Atomic Energy Act (AEA) is the source of most, but not all, of DOE's authorities for protection of health, safety, and the environment.

The Department's authorities for control of source, byproduct and special nuclear materials and for the operation of production and utilization facilities are derived primarily from the Atomic Energy Act of 1954, as amended, and are similar to the responsibilities that the Nuclear Regulation Commission also inherited from the Atomic Energy Commission. DOE also has responsibility for the control of NARM (Naturally-occurring and Accelerator-produced Radioactive Materials) derived from broad interpretations of the requirements to protect public health and the environment.

The following excerpts from these statutes provide examples of DOE authorities:

Atomic Energy Act of 1954, as amended

Section 31 of Title IV of the AEA authorizes and directs the Commission (DOE) to conduct research and development activities related to: "... (5) the protection of health and the promotion of safety during research and productive activities..."

Section 31(d) states that arrangements for the conduct of these activities:

"...shall contain such provisions (1) to protect health, (2) to minimize danger to life or property, and (3) to require the reporting and to permit the inspection of work performed there under [*the contracts for conducting these research activities*], as the Commission may determine. ..."

Section 91(3) authorizes the Commission (Department) to:

(3) provide for safe storage, processing, transportation, and disposal of hazardous waste (including radioactive waste) resulting from nuclear materials production, weapons production and surveillance programs, and nuclear propulsion programs;

Section 161(b) authorizes the Commission (Department) to:

² Public Law 83-703, 68 Stat. 919, 42 U.S.C. Chapter 23

³ Public Law 93-438, 88 Stat. 1233, 42 U.S.C. 5801 *et seq.*

⁴ Public Law 95-91, 91 Stat. 565, 42 U.S. C. 7101 *et seq.*

(b) Standards and instructions. establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material and byproduct material as the Commission [Department] may deem necessary or desirable to

Citation of Authority - DOE (continued)

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promote the common defense and security or to protect health or to minimize danger to life or property; in addition, the Commission [Department] shall prescribe such regulations or orders as may be necessary or desirable to promote the Nation's common defense and security with regard to control, ownership, or possession of any equipment or device, or important component part especially designed for such equipment or device, capable of separating the isotopes of uranium or enriching uranium in the isotope 235;

Section 274(a)(5) provides for : "... the coordination of the development of radiation standards for the guidance of Federal agencies and cooperation with the States;"

Energy Reorganization Act of 1974

Section 105(a) of the Energy Reorganization Act of 1974 specified the authority of the Administrator of the former Energy Research and Development Administration, a DOE predecessor:

Rules and regulations. The Administrator is authorized to prescribe such policies, standards, criteria, procedures, rules, and regulations as he may deem necessary to promote the efficient and coordinated administration of the Administration and properly assess progress toward the achievement of its missions.

Department of Energy Organization Act of 1977

The Department of Energy Organization Act of 1977 (P.L. 95-91) sets forth one of the purposes of the Department of Energy as being (Sec. 102 (13) "...to advance the goals of restoring, protecting and enhancing environmental quality, and assuring public health and safety."

Conclusion

These excerpts and other portions of these statutes provide the Department the authority to issue orders and rules to ensure the safe conduct of its research, development and production activities. To the extent that there are hazards resulting from NARM associated with these activities, DOE has the responsibility and authority to control these hazards.

CITATION OF AUTHORITY
MINE SAFETY AND HEALTH ADMINISTRATION

The Mine Safety and Health Administration (MSHA) in the U.S. Department of Labor was created by the U.S. Congress under the Federal Mine Safety and Health Act of 1977 (Mine Act). Our mission is to administer the provisions of the Mine Act and to enforce compliance with mandatory safety and health standards as a means to eliminate fatal accidents; to reduce the frequency and severity of nonfatal accidents; to minimize health hazards; and to promote improved safety and health conditions in the Nation's mines. We carry out the mandates of the Mine Act at all mining and mineral milling and preparation operations in the United States, regardless of size, number of employees, commodity mined, or method of extraction. The Mine Act provides that our inspectors will inspect each surface mine at least two times a year and each underground mine at least four times a year (seasonal or intermittent operations are inspected less frequently) to determine whether an imminent danger exists and whether there is compliance with health and safety standards or with any citation, order, or decision issued under the Mine Act. We perform other mandatory activities under the Mine Act. These include, but are not limited to: investigating mine accidents, complaints of retaliatory discrimination filed by miners, hazardous condition complaints, knowing or willful (criminal) violations committed by agents of mine operators; developing improved mandatory safety and health standards; approving petitions for modification of mandatory safety standards; assessing and collecting civil monetary penalties for violations of mine safety and health standards; and reviewing for approval mine operators' mining plans and education and training programs. Our inspection presence does not, by itself, result in violation-free mines. We therefore encourage voluntary compliance with the Mine Act through training, technical assistance, and other non-enforcement activities.

Our standards to protect underground metal/nonmetal miners from exposure to ionizing radiation are covered in 30 CFR §§ 57.5037 through 57.5047. These sections contain provisions on radon daughter exposure monitoring; annual exposure limits; maximum permissible concentrations; exposure records; a smoking prohibition; revised exposure levels; the use of respirators; posting of inactive workings; protection against radon gas; and gamma radiation surveys.

ATTACHMENT 3

Staff Analysis of the Dose Estimates
In NUREG-1717 Related to Activities
of the Interagency Jurisdictional Working Group

STAFF ANALYSIS OF THE DOSE ESTIMATES IN NUREG-1717 RELATED TO ACTIVITIES OF THE INTERAGENCY JURISDICTIONAL WORKING GROUP

Introduction

The staff reviewed the source material exemptions discussed in NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials." For those exemptions potentially impacted by the activities of the Jurisdictional Working Group (JWG) and for scenarios where the potential dose could exceed 100 mrem (1 mSv) per year, additional evaluations were conducted. Each evaluation is presented below. The analysis in NUREG-1717 was often based on conservative assumptions, as recognized in the report, because of uncertainties resulting from the lack of information about the subject industries. The NUREG analysis was based on the dose calculation methodology in International Commission on Radiological Protection Publications (ICRP) 26 and 30, which presents the dose methodology on which Part 20 is based. More specifically, the dose conversion factors in Federal Guidance Report 11 system, (FGR 11) were used. Additionally, the staff evaluated the doses for the impacted exemptions, if the use of ICRP 68+ dosimetry were to be applied instead of the dose conversion factors in FGR 11.

Background

NUREG-1717 presents a systematic assessment of potential individual and collective radiation doses associated with the current exemptions from licensing. The results of NUREG-1717 are intended to provide an assessment upon which the NRC can review and examine the radiological impact of current exemptions and determine if regulatory actions may be needed for ensuring public health and safety.

The staff review of NUREG-1717 identified three exemptions that could be impacted by the recommendations of the JWG. The sections from NUREG-1717 that cover the impacted exemptions are: Section 3.2, "Chemical Mixture, Compound, Solution, Alloy Containing <0.05 Percent by Weight of Source Material"; Section 3.3, "Unrefined and Unprocessed Ore Containing Source Material"; and Section 3.9, "Rare Earth Products Containing Less than 0.25 percent by Weight of Source Material." The specific exemptions are:

1. 10 CFR 40.13(a) [Section 3.2 of NUREG-1717], Source material in concentrations less than 0.05 weight-percent in any chemical mixture, compound, solution, or alloy: Zircon used in industry may cause doses estimated up to 4,000 mrem (40 mSv) per year. Use of Zircon sands in sandblasting may also cause a dose up to 300 mrem (3 mSv) per year. Use of slag materials in construction may cause dose up to 200 mrem (2 mSv) per year.
2. 10 CFR 40.13(b) [Section 3.3 of NUREG-1717], Source material in unrefined and unprocessed ores: The dose to a truck driver is up to 300 mrem (3 mSv) per year.
3. 10 CFR 40.13(c)(1)(vi) [Section 3.9 of NUREG-1717], Rare earth compounds containing less than 0.25 weight-percent source material. Doses up to 3,000 mrem (30 mSv) per year at a major processing facility.

The entries for these scenarios in Executive Summary Table from NUREG-1717 were expanded to include a breakout of the pathway contribution to the total dose, Table 1. These three

Staff Analysis of Dose Estimates in NUREG-1717

exemptions were evaluated for the conservatism used in the NUREG-1717 analysis and the effect of the application of International Commission on Radiological Protection (ICRP)-68 dosimetry (which includes changes through ICRP-72) to the dose calculations.

Discussion:

The staff analyzed each of the scenarios for these exemptions evaluated in NUREG-1717 that had dose estimates in excess of 100 mrem (1 mSv) per year and that would be impacted by the recommendations resulting from the deliberations of the JWG. The analysis included review of the NUREG-1717 sections, identification of the dose pathways (ingestion, inhalation, or external dose), and a comparison of the doses in NUREG-1717 to the doses calculated using the ICRP 68 dosimetry system. The comparison to ICRP 68 was initiated to evaluate doses potentially received from source material, because ICRP 68 more accurately represents the actual dose. The zircon industry is currently using the ICRP 68 dosimetry system for evaluation of the doses from the materials currently covered under the exemption in § 40.13(a) and the development of their controls as recommended in their Materials Safety Data Sheet (MSDS) sheets.

1. **10 CFR 40.13(a)**, source material in concentrations less than 0.05 weight-percent in any chemical mixture, compound, solution, or alloy:
 - a. **Zircon Flour Use:** Exposure pathways: NUREG-1717 identified two significant exposure pathways, the external dose [40 mrem (0.4 mSv) per year], and inhalation [4,000 mrem (40 mSv) per year].

External dose: The external annual dose of 40 mrem (0.4 mSv) was calculated based on a 2000 hour per year worker exposure time. The calculated exposure rate using MicroShield and resulting dose to a worker was 40 mrem (0.4 mSv) per year. This assumes natural uranium in equilibrium with its short-lived progeny and Th-232 in equilibrium with its progeny. Higher measured exposure rates were reported in references noted in NUREG-1717, possibly from variations in actual uranium and thorium concentrations in the zircon product and contribution of uranium long-lived decay products. The assumption of full occupancy at 1 meter from bags of the zircon flour is considered conservative. The typical annual external dose will likely be lower than calculated. The contribution from external doses becomes of greater significance when the more realistic evaluations of inhalation doses under ICRP 68 methodology is used.

Inhalation Dose: The rounded inhalation annual dose of 4,000 mrem (40 mSv) was calculated using an air concentration from personnel sampler data for a bagger operator, assuming 2000 hours of exposure, and the dose factors from FGR 11. Other dose calculations were cited which ranged from 200 mrem (2 mSv) to 3500 mrem (35 mSv) per year based on various air concentrations and particle sizes, all assuming a 2000 hour working year.

The staff performed several dose calculations to bound the potential impacts of use of this material. The staff assumptions used were: (1) the Threshold Limit Value (TLV) dust concentration limit (10 mg/m³) should bound the dust concentration, (2) the dust was assumed to contain uranium or thorium at the 0.05 weight-percent concentration level and in equilibrium with their progeny, (3) the FGR 11 dose factors were used,

Staff Analysis of Dose Estimates in NUREG-1717

(4) the worker breathing rate of 1.2 m³/hr was assumed, and (5) the duration of exposure was 2000 hours per year. For the uranium decay chains, the calculated dose is 2,610 mrem (26 mSv) per year, assuming 1 μm particle size. For the thorium decay chain, the dose is 1,965 mrem (20 mSv) per year. Information provided by the zirconium industry indicates that they maintain the dust levels below the TLV levels to ensure compliance with the Occupational Safety and Health Administration (OSHA) dust requirements. The staff is reporting the dust levels with caution since the measurements were conducted with techniques that may not be consistent with NRC sampling protocols. The dust concentrations used are total dust value which is the closest to the NRC dust value. The staff recognizes that the total dust values are conservative and will give dose values in excess of the actual doses received by the workers. The staff acknowledges that this calculation is conservative because the particle size of the dust in the zirconium industry is significantly larger than the assumed 1 μm particle size used in the calculation. Adjustments for the larger particle size would decrease the inhalation dose by up to a factor of 3 for 10 μm particle size.

Impact of ICRP-68: The staff conducted similar calculations using the ICRP-68 dosimetry. The staff calculations included use of 1, 5, and 10 μm particle sizes as well as the newer dosimetry. ICRP 68 recommends the use of the 5 μm particle size for occupational dose calculations. The other assumptions listed above were not changed. The resulting doses in mrem per year (for mSv divide by 100) were:

	Part 20 1 μm	ICRP 68 1 μm	ICRP 68 5 μm	ICRP 68 10 μm
Uranium @ 0.05 wt% and 10 mg/m ³	2,610	620	435	275
Uranium @ 0.05 wt% and 5 mg/m ³	1,305	310	220	160
Thorium @ 0.05 wt% and 10 mg/m ³	1,965	320	200	140
Thorium @ 0.05 wt% and 5 mg/m ³	985	160	100	70
U&Th @ 250 & 150 ppm @10 mg/m ³	1,900	410	280	180
U&Th @ 250 & 150 ppm @5 mg/m ³	950	205	140	90
U&Th @ 250 & 150 ppm @3 mg/m ³	645	125	85	55
U&Th @ 250 & 150 ppm @0.8 mg/m ³	155	35	25	15

The ratio of uranium to thorium in the latter entries is representative of the zirconium sands used in the U.S. industry and totals 0.04%, which is also representative of the U.S. zircon industry. The 0.8 mg/m³ value was used as an example of the total dust level at a U.S. zircon sand plant. The respirable fraction at this plant was 0.22 mg/m³. The ratio of total dust to respirable dust shows the large fraction of the total dust that is at, or greater than, the 10 μm particle size (the cutoff level for the respirable dust measurement technique). The larger actual particle size makes calculations based on total dust concentrations or dosimetry using smaller particle sizes conservative.

Staff Analysis of Dose Estimates in NUREG-1717

The dose calculations assumed no respiratory protective devices were worn by the workers. Several of the references in NUREG-1717 indicated that, in the dustier environments, respiratory protective equipment is provided and worn. Such equipment provides a protection factor of from 2 to 10 depending on the equipment used, which could further reduce inhalation doses.

Conclusion: For the zircon flour or sand industry, the doses from the nuisance radioactivity in the zircon flour and sand may cause doses in excess of 100 mrem (1 mSv) per year using the dosimetry on which 10 CFR Part 20 is based. However, if the NRC considers application of the ICRP-68 dosimetry, the particle size correction, or the lower actual occupancy times, the actual dose received by a worker could be, and most likely is, below 100 mrem (1 mSv) per year. These workers are covered under OSHA occupational exposure regulations since they are receiving an occupational dose. The OSHA occupational limit is 5 rem (50 mSv) per year.

b. **Use of Zircon sands in sandblasting may also cause a dose up to 300 mrem (3 mSv) per year.**

External dose: There was no significant external annual dose described in NUREG-1717.

Inhalation Dose: The inhalation annual dose of 300 mrem (3 mSv) was reported in NUREG-1717 (Section 3.2.4.2.2.1). The value was based on 2.5 pCi/g uranium-238, 5.5 pCi/g thorium-232, 10.4 mg/m³ respirable air concentration, which was greater than the TLV, assuming 2000 hours of exposure, and the dose conversion factors from FGR 11. The staff ran the same input data and calculated a value of about 240 mrem (2.4 mSv) per year. The doses using the ICRP-68 dosimetry are 45, 30, and 20 mrem (0.45, 0.3, and 0.2 mSv) per year for 1, 5, and 10 µm particle sizes, respectively. NUREG-1717 stated that the doses could be lower by a factor of 5-10 if respiratory protective devices were worn.

Conclusion: The staff believes the doses will be more in the range of 20 to 50 mrem (0.2 to 0.5 mSv) per year, if respiratory protection is worn and more realistic assumptions are used in the dose assessment.

c. **Use of slag materials in construction may cause a dose up to 200 mrem (2 mSv) per year.**

External dose: The external dose pathway contributed the most to the total dose from slag materials (Section 3.2.3.4.2.1). The maximum doses from use in construction of streets and housing foundations are about 150 to 200 mrem (1.5 to 2 mSv) per year. The direct dose from storage and disposal of slags from minerals other than phosphate contributed 200 mrem (2 mSv) per year, and slags from phosphate contributed 100 mrem (1 mSv) per year to workers. NUREG-1717 also presented doses to on-site and off-site members of the public with annual doses up to 400 mrem (4 mSv) and 100 mrem (1 mSv), respectively. These numbers were taken from EPA report RAE-9232/1-2. The staff did not re-evaluate this assessment.

Staff Analysis of Dose Estimates in NUREG-1717

Inhalation Dose: The inhalation annual dose of 3 mrem (0.03 mSv) was reported in NUREG-1717. The staff did not evaluate this pathway any further.

Conclusion: As discussed in NUREG-1717, several States with phosphate industry have banned the use of phosphate slag as a building material. EPA is considering additional guidance and/or controls on the phosphate industry.

2. **10 CFR 40.13(b)**, source material in unrefined and unprocessed ores:

External dose: The external dose pathway contributed the most to the total dose from uranium ore transport (Section 3.3.4.1.1). The NUREG-1717 assessment estimated an annual dose of 200 mrem (2 mSv) from the transport of uranium ores. This assessment used 0.3 cm for the thickness of steel between the ore and the driver of the haul truck. This thickness for the bed and cab of a large haul truck appears to be thin for this type of truck. A value of 0.9 cm for the thickness of the steel would appear to be a more realistic value to be applied. The 1000 hour exposure time is conservative since it does not allow for loading time and other down time for the trucks, where the driver of the truck would not be present and exposed to the uranium ores. The staff did not re-calculate the dose with less conservative assumptions. However, the staff believes that the actual external dose would be significantly lower.

Inhalation Dose: The inhalation annual dose of 60 mrem (0.6 mSv) was reported in NUREG-1717 for uranium ore transport. The inhalation dose would be reduced significantly if less conservative assumptions and/or the ICRP-68 dosimetry (a factor of between 4 to 9) would be applied to the assessment.

Conclusion: The staff believes that the actual total dose to uranium ore haul drivers is less than 100 mrem (1 mSv) per year.

3. **10 CFR 40.13(c)(1)(vi)**, Rare earth compounds containing less than 0.25 weight-percent source material.

External dose: The external dose pathway contributes 40 mrem (0.4 mSv) per year and 80 mrem (0.8 mSv) per year for bastnasite and cerium bagging areas, respectively.

Inhalation Dose: The inhalation annual dose for bastnasite and cerium concentrate were 1,000 mrem (10 mSv) and 3,000 mrem (30 mSv), respectively, in NUREG-1717. The staff calculated, using ICRP 68 dose system, annual inhalation doses of 170 mrem (1.7 mSv) and 500 mrem (5 mSv) for 1 μ m particles, 100 mrem (1 mSv) and 300 mrem (3 mSv) for 5 μ m particles, and 75 mrem (0.75 mSv) and 225 mrem (2.3 mSv) for 10 μ m particles for bastnasite and cerium, respectively. NUREG-1717 identified that, if respiratory protection were worn in this dusty environment, the annual doses could be reduced by a factor of up to 10. The time of exposure was conservative for these calculations.

Conclusion: The staff believes that the annual doses from this exemption are not actually in the 1,000 to 3,000 mrem (10 to 30 mSv) range based on: (1) the conservative nature of the assessment, (2) the reduced doses using the ICRP 68 dose system, and (3) the use of respiratory protective equipment in the dusty environment. Note also: the JWG indicated that

Staff Analysis of Dose Estimates in NUREG-1717

there are very few remaining rare earth major processing facilities in the United States, and that most of the materials are imported.

Overall Summary and Conclusion

The staff reviewed the NUREG-1717 assessments for the industries that could be impacted by the recommendations resulting from the deliberations of the JWG. The staff found them to be conservative assessments and evaluated the impact of certain changes to those assessments. The significant changes considered were:

For External Dose:

1. The occupancy times were conservative, therefore, the doses were on the high side.
2. The thickness of material between the radioactivity and the exposed individual in one case was not appropriate for that assessment (0.3 cm vs 0.9 cm).

For Inhalation Dose:

1. The inhalation assessment was not always limited by the TLV's for a given material or the general limit for non-specified dust.
2. The occupancy time was conservative for the assessments.
3. The use of the 1 μm particle size was conservative and the actual doses could vary up to a factor of 3, if a larger particle size were to be used.
4. The use of the newer ICRP 68 dosimetry system would reduce the calculated doses in all of these cases. The NRC staff has approved the use of ICRP 68 in several cases for uranium licensees. The staff thought it was important to evaluate the change the ICRP 68 system would have on the doses from the uranium and thorium. The staff believes that the ICRP 68 dosimetry system more accurately represents the actual dose received from inhalation of uranium and thorium and their progeny.
5. The use of respiratory protection was not considered in the assessments even when NUREG-1717 specifically stated that respiratory protection was used by the workers in some cases.

The use of actual occupancy times, working conditions, and new dosimetry system would appear to bring the actual doses to near or below the 100 mrem (1 mSv) annual dose level. The areas that had the highest doses in NUREG-1717 were industrial workers that are also under the OSHA radiation protection standards. These workers would be within the OSHA limits for occupational radiation exposure, as originally evaluated. The OSHA occupational limit is 5 rem (50 mSv) per year.

Staff Analysis of Dose Estimates in NUREG-1717

Table 1. NUREG-1717 EXECUTIVE SUMMARY TABLE WITH DOSE PATHWAY BREAKOUT FOR EXEMPTIONS WITH THE HIGHEST DOSES^a

Report Section	Source Material Exemption	Effective Dose Equivalent	Inhalation Dose	Ingestion Dose	External Dose
3.20	Chemical Mixture, Compound, Solution, or Alloy				
	Zircon Flour Use	4,000	4,000	0	140
	Zircon Sandblasting Construction (Slag)	300	300	0	0
		200			200
3.30	Unrefined & Unprocessed Ore	300	60	0	200
3.90	Rare Earth Metals & Compounds, Mixtures, & Products	3,000	3,000	0	80

^a The exemptions evaluated were selected based on their doses and whether they could be impacted by the recommendations of the JWG.

ATTACHMENT 4

Relationship to Other Ongoing Activities

Relationship to Other Ongoing Activities

Below is a description of other activities and information related to the regulation of source material. These activities are interrelated with the activities of the Interagency Jurisdictional Working Group (JWG). Where applicable, the impact of the interrelated activity, as compared to the recommended approach discussed in the Commission paper (i.e., decrease NRC authority to uranium or thorium that are purposely extracted/concentrated), is discussed.

1. Proposed Rule Changes to 10 CFR 40.51, "Transfer of source or byproduct material"

In the SRM to SECY-99-259, the Commission directed the staff to develop and issue a proposed rule to require licensees to request NRC approval prior to transferring source material to persons who were exempt under § 40.13(a) (i.e., receiving formerly-licensed uranium and thorium at concentrations under 0.05 percent by weight of source material). Additionally, the proposed rule would add "disposal" to the list of exempted activities under § 40.13(a). The staff issued the proposed rule for comment on August 28, 2002 and the comment period ended on November 12, 2002. The staff is evaluating the comments and developing the final rule and expects it to be ready for Commission review during the summer of 2003. The recommended approach could eventually remove the need for this rule because it is expected that, under implementation of the recommendation, 10 CFR 40.13(a) would likely be deleted from the regulations. As a result, the staff would likely use any regulations related to solid material release for further transfers.

2. Proposed Rulemaking Related to Distribution of Source Material and to Changes to 10 CFR 40.22, "Small quantities of source material"

In the SRM to SECY-99-259, the Commission directed the staff to develop a rulemaking plan to improve the control of distribution of source material to exempt persons and to general licensees, and the incorporation of the resolution of PRM-40-27 in order to make Part 40 more risk-informed. The staff provided a rulemaking plan as part of SECY-01-0072 to the Commission on April 25, 2001. The staff's recommendation in the rulemaking plan calls for new requirements to require reporting from distributors of source material to exempt persons and to general licensees, so that NRC can better understand how much and what hazards this distribution presents to the public and the environment. Additionally, the rulemaking plan suggests that 10 CFR 40.22 be modified to remove, to some extent, the current exemptions from 10 CFR Parts 19, 20, and 21 or change the limits for general licensees, resulting in more specific source material licensees. Although the recommended approach might remove some exemptions (e.g., rare earth), it is expected that it will not result in any significant changes to the need or purpose of the current rulemaking.

Relationship to Other Ongoing Activities

3. Control of Disposition of Solid Material

The staff is conducting a rulemaking on its approach for control of disposition of solid materials. Doses from uranium or thorium at concentrations below 0.05 percent by weight concentration could exceed those included for consideration in the June 30, 1999, Issues Paper on release of solid materials at licensed facilities (64 FR 35090). Under the recommendations in this SECY paper on the JWG activities, uranium and thorium occurring or apt to occur as an incidental component of the material would not be subject to NRC jurisdiction and would then be considered NORM. Therefore, this material would not be impacted by NRC's current approach for control of disposition of solid materials or by any future proposed regulations related to the control of disposition of solid materials, which apply, or will apply, to licensed material. EPA and the States would then have the legal authority to regulate the uranium and thorium as NORM. By adopting the recommendations in this SECY paper to limit NRC authority to uranium and thorium that are purposely used or extracted, the exemption in § 40.13(a) may no longer be needed, and, thus, potential conflict with the approach to the control of disposition solid materials will likely be eliminated.

4. Systematic Assessment of Exemptions

SECY-99-259 was, in part, an outgrowth of the Systematic Assessment of Exemptions (NUREG-1717, "Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials"), in which § 40.13(a) was identified as being related to questions of jurisdiction. Preliminary conclusions of the staff with respect to the source material exemptions included that options beyond rulemaking should be evaluated with respect to the exemption in § 40.13(a) and that some of these options could also impact the exemptions in §§ 40.13(b) and 40.13(c)(1)(vi). Staff recommendations concerning the other exemptions from licensing were provided to the Commission in SECY-02-0196, "Recommendations Stemming from the Systematic Assessment of Exemptions from Licensing in 10 CFR Parts 30 and 40; and a Rulemaking Plan for Risk-informing 10 CFR Parts 30, 31, and 32," November 1, 2002. That paper did not address the exemptions in §§ 40.13(a), 40.13(b), and 40.13(c)(1)(vi), because of the concurrent work of the JWG. If the Commission does not pursue the recommendation to decrease NRC's authority for uranium and thorium, the staff would need to further evaluate the results of NUREG-1717, other information with respect to these three exemptions, and regulatory options for addressing health and safety concerns.

5. IAEA Draft Proposed Specification of Radionuclide Content Not Requiring Regulation for Purposes of Radiation Protection (DS-161)

The IAEA draft safety guide uses different approaches to set limits for "artificial radionuclides" (i.e., produced by reactor or accelerator) versus naturally occurring radionuclides. The IAEA draft safety guide could also be considered for the control of disposition of solid materials for purposes of trade. The recommended approach is similar to the IAEA proposal to the extent that it treats diffuse NORM differently from "artificial radionuclides"; however, the recommended approach would lead to NRC continuing to

Relationship to Other Ongoing Activities

regulate the purposeful use of uranium and thorium to the same standards used in the regulation of byproduct material. Additionally, the recommended approach would rely on agencies, other than NRC, to set limits for uranium and thorium, in NORM/TENORM, such that one single standard may not apply to diffuse uranium and thorium.

6. EPA/States NORM/TENORM Regulations

The EPA is developing guidance and education programs on an industry-by-industry basis for TENORM materials. Implementation of EPA guidance generally considers the impact of source material. EPA implementation would be consistent with its current programs for NORM. Under the recommended approach, the EPA could more broadly regulate uranium or thorium, which would no longer be considered AEA material. Therefore, the recommended approach would provide greater consistency with the regulation of NORM/TENORM.

7. National Materials Program Working Group Report

The National Materials Program Working Group Report (submitted to the Commission by SECY-01-0112, June 22, 2001) recommended that the Commission adopt a cooperative, consensus option for a national program and obtain legislative authority to regulate discrete sources of Naturally Occurring or Accelerator-Produced Radioactive Material. This authority would not include regulation of diffuse naturally-occurring radioactive material.

The recommended approach takes a similar approach in that when uranium or thorium are purposefully concentrated/extracted, the concentrated/extracted material would be regulated as source material under the AEA by NRC and the Agreement States, while diffuse uranium and thorium (not purposefully concentrated/extracted) would be considered NORM and not subject to NRC regulation under the AEA. Ores that are processed at uranium mills would also be regulated as source material under the AEA regardless of the uranium or thorium concentration of the ore.

8. SECY-01-0224, "Expansion of NRC Statutory Authority Over Medical Use of Naturally Occurring and Accelerator-Produced Radioactive Material (NARM)"

SECY-01-0224 focuses primarily on accelerator-produced material and proposes a legislative change to have NRC regulate "any material that has been made radioactive by use of a particle accelerator and is extracted, or converted after extraction, for use in commercial or research activities" The Commission approved this approach in an SRM dated May 21, 2002. Subsequently, the Commission directed the staff to expand the proposal in SECY-01-0224 to include all discrete sources of naturally occurring radioactive material, other than source material, that are extracted or converted after extraction for use in commercial, medical, or research activities.

The recommended approach is consistent with the proposal in SECY-01-0224 and related SRM because both proposals limit NRC jurisdiction to radioactive materials that are

Relationship to Other Ongoing Activities

purposely extracted and used and do not include regulation of the diffuse radioactive material by the NRC.

9. National Academy of Sciences Report, "Evaluation of Guidelines for Exposures to TENORM" and EPA's Response to Congress (1999)

The National Academy of Science (NAS) was tasked with determining whether the differences in the guidelines for TENORM developed by the EPA and other organizations are based upon scientific and technical information or on policy decisions related to risk management. If the guidelines developed by the EPA and other organizations differ in their scientific and technical bases, the NAS was asked to examine the relative merits of the underlying assumptions for these guidelines and also to determine whether there is relevant and appropriate scientific information that has not been used in the development of the guidelines. The NAS determined that the differences are due essentially to differences in policy judgments for risk management, rather than differences in the application of scientific and technical information. The NAS, in this document, acknowledges that inconsistencies exist across agencies in how they regulate similar material. In comparing guidelines, NAS pointed out that it is important to understand the reasons why such a consistency should not be expected, one of which is that each agency/organization has different statutory and judicial mandates.

The recommended approach will allow greater consistency within NRC's regulations, as well as remove the current legal impediments for the States and EPA to regulate uranium and thorium. The States and EPA will then be able to regulate NORM as a whole, and not just the radium and radon components of the material.

10. IAEA Technical Document on NORM, "The Extent of Environmental Contamination by Naturally Occurring Radioactive Material (NORM) and Technological Options for Mitigation."

IAEA is preparing a technical document on NORM, "The Extent of Environmental Contamination by Naturally Occurring Radioactive Material (NORM) and Technological Options for Mitigation." The document should be available sometime in 2003. The document is intended to be a brief compilation of information on the occurrence of NORM/TENORM in major industry sectors, including means of reducing the radiation levels or volumes of wastes. The purpose of the document is to advise IAEA member nations that they may have TENORM problems and what some countries are doing about such problems.

ATTACHMENT 5

Other Issues Related to § 40.13(a)
and Regulation of NORM

Other Issues Related to § 40.13(a) and Regulation of NORM

As part of this project, the Part 40 Jurisdictional Working Group (JWG) identified numerous issues related to its activities. These issues include the State perspective and problems with inconsistency involving NRC regulations and the regulation of NORM in general. The JWG believed these issues should be brought to the Commission's attention and are listed below.

1. State Perspectives

The State (CRCPD/OAS) representative believes that the States prefer a consistent national framework. However, the State representative indicated that the States have three priorities: (1) adequate protection of public health and safety; (2) emphasis on a consistent Federal framework across the spectrum of issues dealing with radioactive material; and (3) enhancing, not interfering with, State regulatory programs. The States do not want NRC to institute a program that will impede States from doing what they are already doing, or think they should do, to protect public health and safety. With the recommended approach, the States will no longer have a legal impediment to regulate uranium and thorium and can more effectively regulate NORM as a whole. This will allow the States to protect public health and safety and not interfere with current State regulatory programs. The recommended approach will help clarify jurisdictional authorities.

2. Inconsistencies in Regulations Involving NRC Regulations and the Regulation of Naturally Occurring Radioactive Material in General

There are problems with inconsistency, both involving NRC regulations and the regulation of naturally occurring radioactive material in general. Numerous questions and issues have been raised related to: (1) the relationship between § 40.13(a) and the License Termination Rule (LTR), (2) regulatory jurisdiction, and (3) transfer of material containing concentrations less than 0.05 percent by weight uranium and thorium.

It should be noted; however, that, in accordance with 10 CFR 40.13(a), if an unlicensed person possesses less than 0.05 percent by weight source material, that person is exempt from regulation or licensing by NRC. At this exemption limit, some calculated scenarios have shown that doses could potentially exceed the unrestricted release criterion in § 20.1402. As a result, this exemption allows a person to possess materials containing concentrations of uranium and thorium under this exemption limit without a license and freely dispose of the material at a concentration level higher than a licensee would be permitted to keep onsite for an unrestricted release under § 20.1402. This results in the inconsistency that a licensee may have to clean up to lower levels than a non-licensee, for what is essentially the same material.

The recommended approach, that only the purposeful use of uranium and thorium will be under NRC jurisdiction, should minimize current inconsistencies within NRC regulations, as well as help clarify jurisdictional authorities. It will be clearer as to when uranium and thorium is licensable by NRC, or whether the uranium and thorium are considered NORM. Section 40.13(a) will likely be eliminated if the recommended approach is implemented; this will make it clearer that current NRC regulations, including the LTR, will continue to apply to licensed uses of uranium and thorium. Issues associated with the statutory provisions of

Other Issues Related to § 40.13(a) and Regulation of NORM

"unimportant quantities" of source material under Section 62 of the AEA may need to be treated under other NRC regulatory requirements.

3. No single definition of the word "ore"

The staff routinely receives questions related to the definition of source material because of the inconsistent use of the word "ore" and/or § 40.13(a). Implementing the recommended approach should save NRC resources resolving these questions. Under the present regulatory scheme, materials with low concentrations of uranium and thorium may be exempt source material or not AEA material, depending on the interpretation of the word "ore." Different interpretations have been used in different contexts; thus, attempting to clarify some of the issues by adopting a specific definition of "ore" in the regulations may have significant impacts on the regulatory program. By regulating only the purposeful use of uranium and thorium, questions related to the definition of source material and ore should be minimized.

4. Impediments to other agencies for regulation of the uranium and thorium present with NORM/TENORM

Currently, the States and EPA (two statutes for EPA specifically exclude authority over AEA materials) have limited authority to regulate uranium and thorium that are defined as source material in the AEA. Material that is less than 0.05 percent by weight concentration uranium and thorium and covered under the exemption in § 40.13(a) is still considered AEA material although it is exempt from NRC regulation. However, the States and EPA staff often include doses from these radionuclides when performing dose calculations or when considering regulatory actions for NORM (e.g., radium). Additionally, the States' and EPA's regulation of radium also protects individuals from potential doses from uranium and thorium. The recommended approach will remove the legal impediments the States and EPA now have in regulating uranium and thorium, which should increase public health and safety because the jurisdictional authority will be clearer. The States and EPA could regulate all NORM, instead of just the radium and radon component of the material, if they choose to regulate the material.

5. International Agreements of Cooperation

Revising the definition of source material or changing the concentration limit in § 40.13(a) may have an impact on international Agreements of Cooperation that exist or are in the process of being developed or ratified. There are approximately 24 Agreements for Cooperation that the United States has in place at this time. Six of these Agreements currently require the United States to track and report source material subject to these

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Agreements¹. The definitions of source material found in these agreements generally, but not completely, follow the definition in the Atomic Energy Act and reference "such concentration as may be agreed to by..." in essence by both parties of the Agreement.

The U.S. can, and usually does, accept imports of source material under the Agreements for Cooperation if the source material is for nuclear end use. If the import is for a non-nuclear end use, the U.S. can decline the import under the Agreement. However, import for non-nuclear end use is allowed, but is not routinely imported under the specific terms of the Agreement.

Additionally, an Additional Protocol to the U.S.-International Atomic Energy Agency Safeguards Agreement was submitted by the President to the Senate on May 9, 2002, for review and approval. This new treaty, when approved, would require information to be submitted by the U.S. Government to the IAEA regarding source material that has not reached the composition and purity suitable for fuel fabrication or for being isotopically enriched. This protocol would require additional reporting of information on such things as production levels and stockpiles at uranium/thorium mines and concentration plants (such as mills). These types of facilities would not be impacted by the proposed approach; however, the proposed approach could affect the reporting requirements under the proposed protocol if the proposed definition excludes source material covered under the definition of source material in the U.S. - IAEA Safeguards Agreement and Additional Protocol.

Regulating source material based on use (i.e. purposely extracted for the property of the uranium or thorium vs. the uranium or thorium being incidental to the processing of other material of interest), raises the possibility that individuals could possess source material not purposely extracted, but concentrated to greater than 0.05 percent. This could be a proliferation concern. If the individuals were not under NRC jurisdiction, NRC would not be aware of this material and the U.S. would not be able to fully meet reporting requirements under current Agreements of Cooperation for export of material. Note, this is an area where NRC knowledge is already limited.

There are existing requirements under Part 110, § 40.64, and § 150.17 which require reporting on imports or exports of source material if it is 5.0% or more by weight. This requirement would not be affected by the recommended approach. There is another reporting requirement in Part 110, which would need a conforming amendment for consistency with Part 40, if § 40.13(a) is changed.

The proposed new definition of source material would remove rare earth facilities, and other mineral processors, from current reporting requirements, because the uranium and thorium in these materials would no longer be defined as source material. These facilities are

¹These six Agreements are between the United States and each of the following:
1) Australia, 2) Canada, 3) Euratom, 4) People's Republic of China, 5) Japan, and 6) Czech Republic.

Other Issues Related to § 40.13(a) and Regulation of NORM

currently not required to have a NRC license unless the concentration of any uranium and thorium is greater than 0.05% by weight concentration. Under the recommended approach, these facilities would not require a license since the uranium and thorium are not being extracted purposely for the uranium and thorium content even if the source material were greater than 0.05 percent by weight concentration.

If this waste material was transferred to a facility in another country for source material separation, the U.S. could potentially be in violation of one or more Agreements for Cooperation. The potential for violation would have to be evaluated on a case-by-case basis. However, if the revised definition of source material was adopted, the NRC would no longer have jurisdiction for export licensing of uranium and thorium that is not extracted purposely. Thus, the NRC would be unable to assure that the tracking and reporting of this source material complies with the various Agreements for Cooperation.

There is also a potential proliferation concern if quantities of uranium and thorium are concentrated for purposes other than recovering the source material (e.g., in waste streams), and shipped out of the U.S. The uranium or thorium content in this waste could be recovered and used for undeclared nuclear purposes. We note that the current trend in IAEA safeguards and nonproliferation is to place greater attention on uranium- and thorium-bearing materials that could be used as feed for undeclared nuclear operations.

Revising the definition of source material or § 40.13(a) will need to be coordinated with the State Department, to evaluate any impacts on international Agreements of Cooperation and the proposed model protocol discussed above, if ratified. The recommended approach will involve further coordination with the State Department and possibly the countries holding Agreements of Cooperation that will be impacted by the JWG's recommended approach.

6. Impact on sites currently regulated under the AEA

Revising the definition of source material will have an impact on some sites that are currently regulated by the NRC and the Agreement States. There are nine sites on the Site Decommissioning Management Plan (SDMP)/complex sites list, located in the States of PA, OK, MO, and NJ, and one currently operating NRC-licensed facility located in PA, that did not purposely extract uranium and thorium or use extracted uranium and thorium. The facilities were processing ores and slags to extract certain minerals and were regulated by NRC: (1) if the original material processed contained uranium and thorium in concentrations above 0.05 percent by weight, or (2) if, during processing, the uranium and thorium was concentrated in waste streams to concentrations above 0.05 percent by weight. Three of these nine sites on the SDMP/complex sites list are currently expected to complete decommissioning in the next few years, before implementation of any change would be completed.

If the recommended approach is implemented, these sites would no longer be subject to NRC jurisdiction, since NRC authority will be limited to uranium and thorium that is extracted/purposely concentrated for the use of uranium and thorium. It is not clear how the

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States, EPA, and other stakeholders (the general public and the affected sites) would react if this recommendation is implemented. Therefore, as part of the staff recommendation, the staff plans to consult with the individual States and EPA to determine their position on this issue, including the possibility of drafting the requested legislative change such that NRC retains jurisdiction over these nine sites on the SDMP/complex sites list. In this consultation process, we could also consider whether the one currently operating NRC-licensed facility should also be retained by NRC, if, at the time of decommissioning, it presents complex decommissioning or decommissioning funding issues.

There are a few additional mineral processors licensed by Agreement States under the AEA. The impact on each of these sites and the regulating States, if any, would depend on whether the State is currently regulating NORM consistently with AEA material under a single radiation program.

7. Alternate feed

NRC has a policy on Uranium Recovery facilities. This policy is discussed in NRC Regulatory Issue Summary 2000-23, "Recent Changes to Uranium Recovery Policy." This policy was also noticed in the Federal Register, 60 FR 49296, on September 22, 1995. In reaching its recommendations, the JWG and staff recognizes this policy and does not want to recommend any changes that would jeopardize the current policy. It does not appear that the recommended approach will affect this policy. One of the criteria in the Final Position and Guidance on the Use of Uranium Mill Feed Material Other than Natural Ores states, "Determination of Whether the Ore Is Being Processed Primarily for its Source Material Content." In this criterion, it states that "for the tailings and waste from the proposed processing to qualify as 11e.(2) byproduct material, the ore must be processed primarily for its source material content." The recommendation should not impact this policy since the recommended approach is to limit NRC jurisdiction to the purposeful use or extraction of uranium and thorium.

8. FUSRAP sites

Currently, there is some ongoing cleanup work with the U.S. Army Corps of Engineers (ACE) at Formally Utilized Site Remediation Action Plan (FUSRAP) sites. The staff position is that the contaminated tailings material at those sites is "pre-UMTRCA tailings" and not 11e.(2) byproduct material. The ACE has been sending some of this material to disposal sites not licensed by NRC if the uranium and thorium concentration is less than 0.05% by weight. If it is greater than 0.05% by weight, the material is considered source material and the ACE sends the material to a disposal site that authorizes disposal of source material.

The recommended approach may affect FUSRAP sites. If the Commission approves the staff recommendation, to ensure that there will be no impact on the current FUSRAP program, the legislative language will be coordinated with ACE.

ATTACHMENT 6

Options Analysis Based on Deliberations of the
JWG

OPTIONS ANALYSIS BASED ON DELIBERATIONS OF THE JWG

INTRODUCTION

In the staff requirements memorandum (SRM) for SECY-99-259, dated March 9, 2000, the staff was tasked to initiate interaction with the U.S. Environmental Protection Agency (EPA), the U.S. Occupational Safety and Health Administration (OSHA), the States, and other organizations to explore the best approach to delineate the responsibilities of the NRC and those agencies with regard to low-level source material or materials containing less than 0.05 percent by weight uranium and/or thorium. As part of this task, representatives from the participating organizations evaluated existing jurisdictional authority, regulations, practices, and data to determine what, if any, changes should be made to the regulatory jurisdiction of uranium and thorium to ensure protection of the public with the greatest efficiency across government agencies. The purpose of this attachment is to describe and evaluate the options, based largely on the deliberations of the Jurisdictional Working Group (JWG), for the best approach for regulating low-levels of uranium and thorium.

BACKGROUND

Original Definition of Source Material

The Atomic Energy Act (AEA) of 1946 defined source material as follows: "The term 'source material' means uranium, thorium, or any other material which is determined by the Commission, with the approval of the President, to be peculiarly essential to the production of fissionable materials; but includes ores only if they contain one or more of the foregoing materials in such concentration as the Commission may by regulation determine from time to time." Also, the 1946 Act, in Section 5(b)(2), stated that "...licenses shall not be required for quantities of source material which, in the opinion of the Commission, are unimportant." In implementing the 1946 Act, the Commission established in 10 CFR Part 40, § 40.2(a), the following definition of source material: "the term 'source material' means any material, except fissionable material, which contains by weight one-twentieth of one percent (0.05%) or more of (1) uranium, (2) thorium, or (3) any combination thereof." No distinction was made with respect to ores containing uranium or thorium. It appears that the Commission selected the 0.05% value primarily on the basis of that concentration of source material that was considered strategically important for the production of special nuclear material. It also appears that concentrations of natural uranium and thorium less than 0.05% were considered "unimportant." The legislative history of the Act indicates that Congress believed that uranium and thorium, as they exist in nature, were not a concern unless they were considered important to the production of special nuclear material. It should be noted, however, that the AEA of 1954, as amended, makes it clear in several places that the Commission is to regulate source material, to, among other things, protect the health and safety of the public (see, for example, Section 2 d. and e., Section 63 b., Section 69 and Section 161 b.).

Subsequent Definition Changes

The AEA of 1954 changed the definition of source material to read as follows: "The term 'source material' means (1) uranium, thorium, or any other material which is determined by the Commission pursuant to the provisions of Section 61 to be source material; or (2) ores

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containing one or more of the foregoing materials, in such concentration as the Commission may by regulation determine from time to time.” There appears to be no explanation why the phrase "but includes ores only" was changed. The primary difference from the 1946 Act is the deletion of the phrase: “peculiarly essential to the production of fissionable material,” although the concept was embodied in Section 61 of the 1954 Act. Section 62 of the 1954 Act states, as did the 1946 Act, that “...licenses shall not be required for quantities of source material which, in the opinion of the Commission, are unimportant.” To conform with the 1954 Act, the Commission revised the definition of source material in 10 CFR Part 40 (§ 40.4) to read as follows: "Source Material means: (1) Uranium or thorium, or any combination thereof, in any physical or chemical form or (2) ores which contain by weight one-twentieth of one percent (0.05%) or more of: (i) Uranium, (ii) thorium or (iii) any combination thereof. Source material does not include special nuclear material" (26 FR 284, January 14, 1961). The change in the source material definition also added the phrase “any physical or chemical form” to the first part of the definition. As noted above, the Commission also provided in Part 40 an exemption from licensing for any chemical mixture, compound, solution, or alloy in which the source material content by weight is less than 0.05% (§ 40.13 (a)). Thus, the Commission carried forward the 0.05% value that was established earlier. The Commission noted in its Notice of Proposed Rulemaking on amending Part 40 (25 FR 8619, September 7, 1960) that as a result of this exemption, the change in the definition of source material was not expected to have any effect on the licensing program. An exemption from licensing was also provided for unrefined and unprocessed ore (§ 40.13(b)) without regard to source material concentration (note that ores containing less than the 0.05% concentration are not source material by definition). A definition for the word ore was not provided in the AEA of 1946, the AEA of 1954, as amended, or in 10 CFR Part 40. The above cited Notice of Proposed Rulemaking indicates that this exemption would eliminate the need for miners to have a license to transfer source material, as was required by existing regulations at that time. The Notice also states that the Act does not require a license for the mining of source material, nor do the implementing regulations. Finally, although NRC did include these exemptions, historically most uranium and thorium is considered to still be under the jurisdiction of AEA. As a result, any agency whose authorizing legislation specifically excludes AEA material cannot regulate AEA material under those authorizing statutes. In the case of EPA, certain statutes specifically exclude AEA material, while others do not.

DISCUSSION

The JWG generally used the following process as it began its evaluation: (1) determine Agency responsibilities, (2) evaluate health and safety data and other applicable information, (3) determine if NRC responsibility should remain the same, increase, or decrease, and (4) determine best method to implement chosen outcome (results in approach). Throughout the process, the JWG evaluated available options against the considerations listed below:

- a. Impact to health and safety
- b. Consistency within NRC regulations
- c. Consistency in regulation of NORM
- d. Impact to existing treaties
- e. Impact on NRC resources

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- f. Impact on resources of States and other Federal agencies
- g. Impact on licensees and non-licensees
- h. Impact on public confidence

After assessing the current jurisdictional responsibilities of each agency, the JWG grouped the available options from SECY-99-259 on the basis of their basic outcomes. The general outcomes evaluated included (1) making no changes, (2) increasing NRC regulatory requirements, or (3) decreasing NRC regulatory jurisdiction. Based on the health and safety data and other available information, the JWG determined which outcome was preferable. The JWG then evaluated approaches within the outcome category to determine which would result in the most effective regulation of uranium and thorium.

Determination of Preferred Outcome

Through evaluation of the Options Paper attached to SECY-99-259, the JWG divided the options discussed in that paper into three general categories, as shown in Table 1. These categories became the basic outcomes that the JWG initially evaluated.

Table 1. Options to Change NRC Responsibility

No Change	Increase NRC Regulation	Decrease NRC Authority
Legislation, its interpretation, and regulations remain as is	Eliminate the exemption	Regulate uranium or thorium that is extracted for use of the uranium or thorium
	Lower the concentration level	Regulate uranium or thorium that is extracted for the use of the uranium or thorium and rare earth processing
	Keep the exemption, but specify the activities that can or cannot be conducted under the exemption - based on health and safety concern(s) or dose	Establish a concentration level below which NRC would not have jurisdiction, i.e., 0.05 percent or some other determined concentration
	Combination of revising concentration level and specifying which activities can or cannot be done under the exemption	

Tables 2(a) to 2(c) illustrate the pros and cons for each general outcome that the JWG discussed while determining its preferred approach. The pros and cons are meant to address the general outcome and not be specific to individual approaches for implementation of the outcome.

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Table 2(a). Pros and Cons for Making no Change to NRC Regulatory Oversight

No Change	
Pros	Cons
<p>S Save resources (States and Federal) in the near term; no further work related to coordination.</p>	<p>S Overall regulation is inconsistent since NRC may not be aware of all non-fuel-cycle activities that may inadvertently concentrate source material to levels greater than the concentration limit. Considerable additional NRC resources would be needed to find such situations, if the Agency decided it was necessary.</p> <p>S Inconsistent with how other agencies handle most other NORM.</p> <p>S Existing regulatory scheme may hinder the ability of States and EPA to regulate uranium and thorium covered under the exemption in § 40.13(a).</p> <p>S NRC may not be fully carrying out its responsibility to protect public health and safety.</p> <p>S Recurring issues related to definition of source material and § 40.13(a) and extensive resources expended to resolve.</p>

Options Analysis

Table 2(b). Pros and Cons for Increasing NRC Regulation

Increase NRC Regulation	
Pros	Cons
<p>S Provides justifiable basis for the regulations based on current radiation standards.</p> <p>S Provides more uniform regulation of uranium and thorium.</p>	<p>S Increases the regulatory workload of NRC.</p> <p>S May increase the impact, including fees, on those subject to regulation by requiring licenses for a wide variety of activities that were previously exempt from licensing.</p> <p>S Could cause NRC to regulate operations in the non-nuclear mineral extraction and other industries where hazards from materials other than uranium and thorium usually predominate, possibly resulting in Congressional reaction and/or additional tort liability concerns for newly regulated businesses.</p> <p>S Could cause interface problems between NRC and EPA (and possibly the States), since EPA is in the process of developing guidance for controlling diffuse sources of naturally occurring radioactive material.</p> <p>S Potential impact on FUSRAP sites.</p> <p>S Potential impact to waste sites as more material would be classified as low-level waste. This would result in increased costs and other burdens to holders of the material and possible capacity issues.</p> <p>S Could impact existing international treaties.</p>

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Table 2(c). Pros and Cons for Decreasing NRC Authority

Decrease NRC Authority	
Pros	Cons
<p>S Would allow the NRC to concentrate its resources on the regulation of processing activities directly related to uranium recovery and subsequent utilization of the recovered materials.</p>	<p>S Would require expenditure of NRC resources in the near term to coordinate the proposed NRC action with EPA, OSHA, and the States.</p>
<p>S Would not change NRC authority to control uranium and thorium from a strategic standpoint.</p>	<p>S Could impact existing international treaties.</p>
<p>S Would potentially remove inconsistencies within NRC regulations.</p>	<p>S If States and EPA choose to regulate this material, may need to modify existing regulations/standards or develop radiation protection standards if none are in place.</p>
<p>S Under the recommended approach, a single regulatory authority would be in a better position to evaluate the potential hazards of uranium and thorium, which would be considered NORM, with the potential hazards of the other materials with which they are associated, such as radium and hazardous chemicals.</p>	<p>S While the regulatory program within a State may be more consistent, there may be inconsistencies among the different States in how each regulates.</p>
<p>S Would allow EPA, OSHA, and the States to have a comprehensive control program over all aspects of activities involving low concentrations of naturally occurring radioactive material.</p>	
<p>S Reduces the number of agencies involved in regulating many materials containing low concentrations of uranium and thorium.</p>	
<p>S Conserves NRC resources in the long term.</p>	

Initially, the JWG's review of NUREG-1717 led to some concern for the potentially significant doses in certain areas. As a result, the JWG initially considered whether NRC should be increasing its regulatory oversight of low-level source material.

A more thorough review of the data supporting NUREG-1717, as well as input from industry representatives, led the JWG to conclude that most of these dose estimates were conservative and would be significantly lower when calculated using newer dose calculation methodology. The JWG found that using more realistic calculations resulted in calculated annual exposures significantly lower than those calculated in NUREG-1717, especially for evaluations for inhalation exposures. These more realistic calculations appeared to be more consistent with the CRCPD/OAS representative's informal conversations with state regulators from Florida who identified no significant occupational exposure concerns for zirconium processors within Florida.

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As a result, the JWG concluded that, while the exemption in § 40.13(a) does not provide the level of protection of many other exemptions and release criteria in the Commission's regulations, there does not appear to be a significant health and safety concern such that urgent action is necessary. The JWG believed that it would seem appropriate for these materials to be handled by EPA, OSHA, and States under regulations governing NORM and TENORM. However, it should also be noted that the JWG has not evaluated all possible exposure scenarios and is basing its conclusion on the data available.

Additionally, the JWG discussed whether there were other concerns related to the current regulatory scheme for regulating materials containing low-levels of uranium and thorium. One of the concerns identified by the JWG was that the current exemption may not always grant enough flexibility for other agencies to regulate all constituents of the material due to their status as AEA material, other than through indirect means. Additionally, the JWG indicated that uranium and thorium that is incidental to a process should be treated similarly to NORM since they are similar in origin and proximity to NORM.

Based on the data available, the JWG concluded that the preferred outcome would be to decrease NRC regulatory authority for uranium and thorium. The programs of other agencies, which may already deal with material that is NORM (also containing uranium and thorium), will then be able to operate in an unimpeded manner while still providing appropriate levels of protection of health and safety for uranium and thorium incidentally present with NORM. This approach would clarify jurisdictional authorities, limit *de-facto* dual regulation, and provide for more consistent regulation of low-level uranium and thorium.

Determination of Preferred Approach

After a general agreement that the JWG's preferred outcome was to decrease NRC's authority for uranium and thorium, the JWG focused on two primary approaches to reach the desired outcome:

- 5) Limited-to-Extraction Approach: To limit NRC authority to uranium and thorium that is purposely extracted for the use of the uranium or thorium. To limit impacts to programs, ore would be defined as material which is planned to be processed primarily for its content of uranium or thorium.
- 6) Concentration Approach: To limit NRC authority to uranium and thorium at concentrations above 0.05 percent. NRC would retain authority over uranium and thorium below this threshold only if it resulted from an NRC-licensed process.

Table 3 shows a comparison between the two primary approaches considered by the JWG as feasible solutions. These two approaches are evaluated against a no change approach using the list of considerations discussed above.

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Table 3. Comparison of Approaches for Decreasing NRC Regulation versus No Change

Consideration	Only regulate extracted	Only regulate >0.05% by weight	No Change Option
<p>1. Consistency within NRC regulations</p>	<p>By removing § 40.13(a), many of the potential conflicts within Part 40 versus other agency regulations are removed. Allows regulation of uranium and thorium to be more consistent with overall theme of AEA to regulate the discrete, beneficial use of radioactive material.</p>	<p>Maintains concentration based regulation versus health and safety based. Uranium and thorium continues to be the only naturally occurring radioactive materials that are regulated by NRC as a diffuse source.</p>	<p>Potential for inconsistency of handling source material vs. other AEA material continues or requires alternative resolution.</p>
<p>2. Consistency in regulation of NORM</p>	<p>Under the recommended approach, a single regulatory authority would be in a better position to evaluate the potential hazards of uranium and thorium, which would be considered NORM, with the potential hazards of the other materials with which they are associated, such as radium and hazardous chemicals, if they choose to regulate the material. Allows regulatory oversight to be more consistent with other ubiquitous NORM.</p>	<p>Under the recommended approach, a single regulatory authority would be in a better position to evaluate the potential hazards of uranium and thorium, which would be considered NORM, with the potential hazards of the other materials with which they are associated, such as radium and hazardous chemicals, if they choose to regulate the material. Allows regulatory oversight of concentrations under 0.05 percent to be more consistent with other ubiquitous NORM.</p>	<p>Inconsistency with handling of most other NORM remains. Potential jurisdictional questions could limit other agencies from regulating other hazards associated with materials containing source material.</p>

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Consideration	Only regulate extracted	Only regulate >0.05% by weight	No Change Option
3. Impact to Health and Safety	<p>Would allow States/EPA to better regulate all hazards from materials that currently may have mixed jurisdiction over radioactive material, thus potentially reducing hazards. However, there is a possibility of increased exposures in certain situations if lesser standards are used by other agencies. Also, risk of increased exposures from more industries using higher concentration material because possible NRC-licensing is no longer a deterrent. On the other hand, industry should have a motivation to control exposures because of potential liability.</p>	<p>Would allow States/EPA to better regulate all hazards from materials <0.05 percent that currently may have mixed jurisdiction over radioactive material, thus potentially increasing public and worker health and safety. NRC will still have difficulty in identifying situations where concentrations in non-nuclear industries exceed 0.05 percent by weight of uranium or thorium.</p>	<p>Difficult for States/EPA to regulate § 40.13(a) exempted material if they see a need. Concern that presence of uranium and thorium may be used as an excuse to prohibit the State or EPA from regulating greater hazards combined in material, if material overall were defined as source material.</p>
4. NRC Resource Usage	<p>Reduced long-term costs from fewer specific licensees and fewer recurring questions related to inconsistencies. If sites on the SDMP/complex sites list remain under NRC jurisdiction, there would be less cost savings. Easier to make determination if license is needed or not.</p>	<p>May be easier to implement because the changes are not as broad and the 0.05 percent concentration value remains as a limit. Does not reduce any long-term costs, as number of licensees would not change and it would likely not reduce number of recurring questions.</p>	<p>No extra initial costs. Continued costs of licensing certain entities and resolving potential conflicts resulting from § 40.13(a), determinations of what is source material, inconsistent use of the term “ore”, and other associated regulations/policies.</p>

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Consideration	Only regulate extracted	Only regulate >0.05% by weight	No Change Option
5. Expected Costs to States and other Federal Agencies	No legislative costs. Removal from AEA would allow most agencies/States to regulate. Some incremental costs setting up standards within existing frameworks. May be costs to develop radiation protection program, if a State does not have existing framework and chooses to regulate this material. Potential impacts on DOE have to be considered with any change in the AEA.	No legislative costs. Removal from AEA would allow most agencies/States to regulate. Some costs setting up standards within existing frameworks (likely no reduction from option to regulate all non-extracted uranium and thorium). There would be continued costs from dual regulation of material >0.05 percent by weight. Potential impacts on DOE have to be considered with any change in the AEA.	No additional costs. Continued costs related to difficult interpretations similar to NRC.
6. Costs to Licensees	No continued costs related to NRC requirements for current specific licensees that would no longer be required to have an NRC license. Costs will continue as subject to State regulations and the potential for inconsistent State regulation.	Continued costs to licensees that possess uranium or thorium incidental to the material.	Continued costs to licensees that possess uranium or thorium incidental to the material
7. Costs to non-licensees	Easier for non-licensees to determine if they require licensing. Could decrease revenue at disposal sites that accept exempt source material, but increase revenue at other disposal facilities. Increased costs if other agencies decide to regulate uranium and thorium that is now exempted by NRC.	Increased costs if other agencies decide to regulate uranium and thorium that is now exempted by NRC. Continued costs to determine what weight percentage is.	Continued costs to determine what weight percentage is.

Options Analysis

Consideration	Only regulate extracted	Only regulate >0.05% by weight	No Change Option
<p>8. Public Confidence</p>	<p>Potential concern that general public may view NRC as abdicating its duty to protect public health and safety. Also, the expectation is that other Federal agencies/States already have or would implement programs to adequately protect the health and safety of the public and workers before transition. Segregation of regulated material versus non-regulated would be more clear. Greater consistency of treatment of all NORM might increase confidence.</p>	<p>Greater consistency of treatment of all NORM with uranium and thorium below 0.05 percent might increase confidence. May even increase confidence that other Federal agencies/States are looking at material that NRC currently exempts, if the other agencies/States choose to regulate the material.</p>	<p>No change. Confusion could continue as to when licenses are required and as to why we regulate uranium and thorium differently at similar risk levels and why it is treated differently than other NORM.</p>
<p>9. Other Considerations</p>	<p>May impact some international treaties.</p>	<p>None.</p>	<p>None.</p>

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Based upon the information compiled in Table 3, the JWG primarily focused on the approach limiting NRC jurisdiction to extracted material. As a result, a number of issues were identified for further evaluation including the amenability of the other agencies to take over this material, potential industry behavioral changes, viability of methods of implementing approaches, resource costs and savings, impacts to treaties, and impacts to domestic safeguards and security. These issues are discussed in the following paragraphs.

Initially, discussion of the amenability of the other agencies for taking over jurisdictional authority of these approaches was addressed. EPA representatives believed that their agency would be amenable to pursuing either approach, while the OSHA representative stated his agreement that the approach was reasonable. The CRCPD/OAS representative presented three priorities that were of concern to the States: (1) adequate protection of public health and safety, (2) emphasis on a consistent Federal framework across the spectrum of radioactive issues, and (3) enhancing, not interfering with the States regulatory programs – the States do not want NRC to institute a program that will keep the States from doing what they are already doing or feel they should do to protect public health and safety. As both of the proposed approaches reduce NRC authority, there would not appear to be a conflict with these State priorities.

The JWG also evaluated potential industry behavioral changes resulting from decreased NRC authority. For the approach limiting NRC authority to only extracted uranium and thorium, the JWG believed that concern is warranted that some industries may attempt to either import or process bulk ores containing higher concentrations of uranium and thorium than they now use in order to avoid NRC licensing; this could lead to higher exposures to workers. There is; however, some motivation on the part of industry to minimize exposures to the workers because of potential liability concerns. The JWG concluded that the existing regulatory schemes at other agencies can limit the amount of imported material (to restrict the use, as necessary, of ores containing high concentrations of uranium and thorium) and limit the exposures to workers and others, similar to how they would handle higher concentrations of other NORM (such as radium-bearing materials). Further, there is an expectation that these types of materials would only be used if they provided other economic benefits (e.g., higher concentrations of the minerals to be extracted). Disposals of associated wastes would be completed under existing frameworks of the States and EPA. The approach which limits NRC authority to only over 0.05 percent by weight would likely not change industry behavior.

Current NRC resource expenditures would be expected to be reduced only under the approach based on regulating extracted uranium and thorium, regardless of the concentration level. There would be expected to be minimal direct-cost savings from this approach because only a handful of licensees may be removed from NRC jurisdiction. If the sites on the SDMP/complex sites list remain in NRC jurisdiction, there would be less cost savings. There should be; however, cost savings resulting from the clarification of Part 40 regulations and the reduction of staff resources used to repetitively address the applicability of § 40.13(a) to licensees and questions related to jurisdiction. There would be some similar benefit to the Agreement States with regard to this aspect. If the sites on the SDMP/complex sites list are transferred to the States, there will be an increase in cost to those States in which the sites are located. As no further legislative or interpretive changes would be necessary to allow other agencies to regulate these materials, it is expected that the costs would be relatively small for them to incorporate uranium and thorium

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into existing regulatory programs, standards, and/or guidance. For States that do not have radiation control programs in place, and decide to regulate this material, there will be some costs to those States to develop regulations or standards. With the approach based on concentration limits, these cost savings would not exist because § 40.13(a) would still remain in some form and there would not be a change in the number of licensees.

Revising the definition of source material or changing the concentration limit in § 40.13(a) may have an impact on international treaties or Agreements of Cooperation that exist or are in the process of being developed or ratified. This is discussed further in Attachment 5. There might be proliferation concerns if the recommended approach is implemented. Also, the staff will have to discuss any impacts on international treaties with the State Department. Further evaluation of this issue is not being pursued until the Commission directs the staff to pursue the recommended approach to limit NRC authority to extracted uranium and thorium.

The JWG also discussed concerns related to safeguards. These concerns included ensuring an adequate supply of uranium and thorium for domestic use, as well as preventing proliferation. The staff belief is that the original purpose for inclusion of uranium and thorium in the AEA was to ensure an adequate supply of this material at the time the AEA was implemented. Since that time, there has been found to be an abundant supply of source material for domestic security. As to proliferation, there is already a large supply of extracted uranium and thorium (which would continue to be regulated under either approach), which would be easier for persons to obtain for illicit uses than by attempting to extract uranium and thorium from the materials containing uranium and thorium that are proposed to be released from NRC authority. Therefore, it is expected that decreasing NRC authority, to include only extracted uranium and thorium, would not result in any significant safeguards issues.

As a result of these discussions, overall, the JWG believes that the consistency, safety, and economic benefits to industry and the public sufficiently offset these other concerns to favor limiting NRC's authority to only regulating extracted uranium and thorium.

CONCLUSION

After reviewing the information in Table 3, the general consensus of the JWG was that limiting NRC authority to only extracted (or purposely concentrated) uranium and thorium was the preferred approach. Although the JWG put a primary emphasis on ensuring public and worker health and safety, it also considered many other factors. Based upon the review of the data supporting NUREG-1717 and data submitted by industry, the JWG believed that agencies other than NRC (i.e., OSHA, many States, and EPA) generally already have methods of regulation in place to either regulate NORM or other properties of the material (e.g., respiratory particle size requirements, etc.) or processes to ensure such safety. By allowing these agencies to have full jurisdiction over the uranium and thorium in these situations, the JWG believes that regulatory burden and duplication would be reduced. The staff shares these views.