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November 12, 2002

**Subject: Transfers of Certain Source Materials by Specific Licensees;
NRC 10 CFR 40 Proposed Rule; 67 FR 55175; August 28, 2002**

On behalf of the DuPont Titanium Technologies business and the zircon / mineral sands industry, I appreciate the opportunity to provide comment on the Nuclear Regulatory Commission's (NRC) 10 CFR 40 proposed rule regarding "Transfers of Certain Source Materials by Specific Licensees". The industry fully supports appropriate source material related regulation that provides sufficient radiation protection to public health. However, it is my firm belief that, except for the provision that adds disposal to exempt activities in 40.13(a), the proposed rule requiring NRC approval for transfer of "unimportant quantities" (less than 0.05 percent by weight) of source material from specific licensees to exempt persons is flawed, and should be withdrawn. The proposed rule is premature to conclusion of related NRC activities, is not based on an accurate determination that it is necessary to protect public health, and has not sufficiently demonstrated that costs to affected entities, both agreement state and industry, won't be unduly burdensome.

Summary

The rationales for withdrawal of the proposed rule are briefly listed below for summary purposes, followed by further explanation in a text section:

- **Scope:** Much larger, both currently and for future precedent, than NRC has erroneously considered, with respect to agreement states, source material exemption, disposal, and precedent for other agencies.

Transfers of Certain Source Materials by Specific Licensees; 10 CFR 40 Proposed Rule

Template = SECY-067

SECY-02

- **Transfer**: Ambiguities in what NRC considers to be a “transfer” could result in the need for manufacturers to require approval for a wide variety of product distribution as well as originally intended decommissioning and disposal activities.
- **Derived from**: An overly broad use of the term “derived from”, which appears to include any physical mixtures that may have at one point in a process exceeded the exempt limit, could result in the inclusion of a wide variety of mineral products requiring transfer approval.
- **Timing**: The proposed rule is “ahead of the curve” with respect to the deliberations of the NRC led Part 40 working group regarding the unimportant quantity source material exemption in 10 CFR 40.13 (a).
- **NUREG 1717**: The proposed rule relies, for consideration of dose and need for the rule, completely upon a document that NRC has determined is technically flawed, over-conservative, and uses outmoded dosimetry.
- **Voting Record**: Those commissioners approving the proposed rule voted their approval before the flaws in NUREG-1717 were identified and confirmed. However, NRC proceeded to publish the proposed rule despite recognition of these significant flaws that occurred in the interim between commissioner voting and publication.
- **Dose**: Both potential occupational and public doses are considered for the proposed transfer rule; which adds an unnecessary layer of complexity to existing occupational dose regulations.
- **Dilution**: NRC seeks to more clearly codify a prohibition on “intentional dilution”, yet consideration of situations wherein dilution is a normal part of an existing manufacturing process is lacking.
- **Miscellaneous**: Conversion to pCi/g basis for natural Th and U can be misleading as opposed to parent isotopes used to determine daughter concentrations and modeled doses, natural background is not defined, and NRC has not clarified whether 40.13(a) source material can indeed be disposed of in mill tailing impoundments.

NRC’s proposal to add the word “disposes” to the list of exempted activities in 40.13(a) would serve to eliminate some of the confusion and potential for misinterpretation that exists regarding the ultimate fate of unimportant quantities of source material. Otherwise, both licensed and exempt entities must refer to both 10 CFR 20 and 10 CFR 40 to evaluate whether or not NRC regulates disposal of their material, which can lead to confusion. As such, it is recommended that NRC implement only this provision of the proposed rule.

The DuPont Titanium Technologies business also supports the comments provided by Mr. Charles T. Simmons of Kilpatrick Stockton, LLP, on behalf of the Zirconium Environmental Committee.

Text

Scope: NRC erroneously believes that the scope of this proposed rule is quite limited, since the commission has not adequately considered the impact beyond a limited set of specific licensees. Page 67 FR 55178 includes a total of 114 licensees under Part 40, with a NRC estimate that approximately three to six licensees per year would apply for approval for transfers of unimportant quantities of source material. Although the definition of transfer is not explicitly

limited to waste or waste-like materials in a decommissioning or disposal context, it is assumed that such limitations were used by the NRC in determining the low estimate of licensees applying for approval.

However, the potential economic and time burden impact on Agreement States that must also implement this rule has not been appropriately considered, and represents an unfunded mandate. There are presently 32 Agreement States that will be required to implement the same criteria in state regulations, and NRC has estimated that the bulk of materials licensees are regulated by Agreement States. As such, both the total number of licensees, as well as the total number of transfer requests per year, may be grossly underestimated.

There is a significant potential burden on licensees who must demonstrate a low dose, less than 100 mrem at a minimum. NRC estimates a one-time application cost of about \$3600 to \$5300 per licensee (67 FR 55178), which most certainly will be an underestimate for any application that includes a dose estimate. At these low dose levels, it is anticipated that nearly every application will include either the results of pathway assessment modeling, or personnel or environmental monitoring studies to demonstrate a low dose. Modeling and monitoring studies, performed by either in-house personnel or consultants, represents a higher cost burden than estimated by NRC.

The number of applications for transfer approval, as well as the associated costs, are exacerbated by ambiguities in what NRC may consider to be “transfers” and “derived from” licensed source material. If both terms are broadly applied, then implementation of the proposed rule by NRC and Agreement States may require approval for a wide variety of normal product distribution, as well as disposal activities (see following sections).

NRC (low-level waste), and EPA (RCRA C) disposal facilities may not be equipped to handle the potentially enormous additional volume burden of low level source material that may not be approved for alternate disposal options. The Environmental Protection Agency’s (EPA) draft report “Diffuse NORM Waste Characterization and Preliminary Assessment”, dated 1993, cites enormous volumes of NORM material that either contain or are derived from material at concentrations below the current exempt level.

In fact, the Generic Environmental Impact Statement (GEIS) supporting NUREG-1496 as covered in 1994, when NRC proposed the “Radiological Criteria for Decommissioning” rule, can serve to dramatically point out this concern. The GEIS (table 5-13) estimated that a total planned capacity at low-level compacts of 85.5 million ft³ (assuming that all the compact sites are actually constructed) would be sufficient for decommissioning waste volumes. However, the estimates did not consider the impact of the high volume of NORM waste (estimated in the EPA diffuse NORM document at 1 billion tons annually, with 60 billion tons in inventory) that might only be approved for low-level waste disposal.

In addition, the precedent setting nature of this proposed rule cannot be ignored. Examples, such as CRCPD utilizing both 1) NRC’s 10 CFR 32 gas and aerosol detector dose limits for use for all consumer products, and 2) EPA’s 40 CFR 192 Ra concentration limit for all TENORM

under the part N suggested TENORM rule, indicate that proposals requiring approval for otherwise exempt material can be borrowed for use in other regulatory settings.

While it is recommended that NRC withdraw this proposed rule, it is also recommended that NRC re-evaluate the economic impact and scope in future consideration of this rule on a more realistic basis to more appropriately determine the true burden to NRC, the states, and industry.

Transfer: Ambiguities in what NRC considers to be a “transfer” could result in the need for manufacturers to require approval for a wide variety of commercial product distribution as well as originally intended decommissioning and disposal activities. There are a vast number of natural ores and mineral-based products that contain unimportant quantities of source material that are exempt under 40.13(a). Many of these products are only used in industrial applications, and are not used in consumer or retail settings by members of the public. However, NRC indicates that both occupational as well as general public doses will be considered for use and disposition of less than 0.05 percent source material. If the term “transfer” is broadly applied to product transfer, then a specific licensee may be subject to application and approval requirements each and every day that unimportant quantity product is shipped out the door! This represents a tremendous competitive and economic disadvantage for specific licensees as opposed to general licensees or exempt entities, who may also ship materials at the same concentration of source material on an everyday basis.

The CRCPD, in drafting “Part N” suggested state rules for the licensing and regulation of TENORM, has recognized the important distinction between products used in industrial applications and consumer/retail products. Industrial products are intended to be regulated under the general license provisions of Part N, while specific licensing is included for manufacture of TENORM containing consumer/retail products. Dose constraints to workers are more consistent with 10 CFR 20 type levels, and differ from constraints for members of the public for consumer/retail products. In addition, standard industrial hygiene practices aimed at worker education, dust and contamination control (see NUREG and dose sections below) will provide a sufficient level of mandated protection against excessive dose incursions to workers, so that the requirements for approval for transfer in occupational settings is unnecessarily duplicative.

As such, the only scenarios which present a credible potential for public exposure are unrestricted doses arising from waste-related disposal or re-use in a public setting, as well as from consumer products. Therefore, while it is recommended that NRC withdraw this proposed rule, it is also recommended that NRC limit the definition of transfer in future consideration of this rule solely to transfer of material to non-occupational, unrestricted public applications.

Derived from: An overly broad use of the term “derived from”, which appears to include any physical mixture that may have at one point in a process exceeded the exempt limit, could result in the inclusion of a wide variety of mineral products requiring transfer approval. It is arbitrary to consider a mineral product, that at one point in a processing circuit was temporarily mixed with licensed source material, yet by the final product stage contains an unimportant quantity of source material, to be a material “derived from licensed material” that requires application and approval for transfer as a product.

Mineral sands that have been produced via physical separation are typically products that are extremely resistant to weathering and environmental chemical attack, which is the reason they are congregated along ancient shorelines and are available for mining and physical separation into beneficial ores and mineral products. As such, the source material content in these materials, such as zircon, is not environmentally mobile. This lies in stark contrast to materials that have been chemically processed expressly for their source material content. Unimportant quantities of these chemically processed source materials, such as tailings or other waste from U ore processing, may have potential for greater environmental mobility.

It appears that NRC's prime intent for this proposed rule is increased oversight of waste and waste-like materials derived from specifically licensed source materials that would be transferred to exempt persons for the purposes of disposal, recycle, or indirect disposal. If this is indeed true, then it is apparent that a one-time physical mixture of unreactive mineral components should lie outside the context of this proposed rule, as opposed to material that has undergone extensive processing aimed at its source material content.

Therefore, while it is recommended that NRC withdraw this proposed rule, it is also recommended that NRC limit the definition of "derived from" in future consideration of this rule solely to materials that are chemically derived from or directly result from source material that has been processed for its source material content.

Timing: The proposed rule is "ahead of the curve" with respect to the deliberations of the NRC led Part 40 working group regarding the unimportant quantity source material exemption in 10 CFR 40.13(a). Any Part 40 working group decision regarding the exemption can significantly alter what is already a potentially extensive scope of this proposed transfer rule, which NRC erroneously believes is very limited in scope. As such, consideration of the proposed transfer rule at this point in time is ill advised.

As discussed by the working group, the three main options for re-examining the "unimportant quantity" source material exemption in 10 CFR 40.13(a) are 1) no change to the exemption, wherein NRC authority is limited to U and Th at concentrations >0.05% (or below only if resulting from a NRC-licensed process), 2) limit NRC authority to only U and Th that is purposely extracted for its source material content, and 3) increase NRC authority to materials that are currently exempt, potentially via a tiered approach linked to concentration and/or dose. [Comments to the NRC to maintain the no change option, with options to strengthen this option, have already been submitted to the NRC (dated 4/29/2002 to Torre Taylor, NRC)]. Selection of option three would result in an increase in NRC and Agreement State specific licensees, and as such, would serve to widen the scope of this proposed rule.

While it is recommended that NRC withdraw this proposed rule, it is also recommended that NRC delay any future consideration of this proposed rule until after the Part 40 working group has reached its final conclusions, and that any recommended regulatory action on the 40.13(a) exemption has been enacted.

NUREG 1717: The object of this proposed rule is to ensure that regulations regarding the transfer of materials containing low concentrations of source material are adequate to protect public health and safety. As such, the basic underpinning for this proposed rule as noted in 67 FR 55176 is NRC's NUREG-1717 report ("Systematic Radiological Assessment of Exemptions for Source and Byproduct Materials"), which concludes that, in certain situations, individual doses greater than 100 mrem/yr could be obtained from source material below the 0.05 percent limit.

However, it has been shown (Part 40 working group meeting summary, 3/6-7/2002; and Commissioner comment at NRC/OAS/CRCPD meeting, 8/21/2002) that NRC staff has concluded that uncertainties regarding particle size, over-conservatism in calculations that are not realistic, and errors in the original cited reference have caused NUREG-1717 to dramatically overstate occupational doses for zircon. As such, NUREG-1717 is a technically flawed document.

In addition, the use of updated dosimetry based upon a more accurate lung model, as prescribed in ICRP 68 (and subsequent Ra correction) for Th, U and their progeny will also render NUREG-1717 over-conservative for other source containing materials as well, and not just for zircon. NRC has already approved the use of ICRP 68 dosimetry on a case-by-case basis in SECY 99-077 (4/21/1999). In the interest of technical accuracy for low dose determinations, NRC should use ICRP 68 in current and future rule-making efforts, and should not rely on outmoded 10 CFR 20 (or equivalent FGR11) dose/activity conversion factors.

Indeed, the revised ICRP 68 dosimetry, combined with ICRP acknowledgement that 5 um Effective Aerodynamic Diameter (EAD) particulates more accurately represents industrial processes than do those with 1 um EAD, represents a significant reduction in inhalation related dose (~6X less for U238 series, ~10X less each for the Th232 and U235 series). As such, standard industrial hygiene practices aimed at dust control, which are consistent with OSHA regulations (PEL) and ACGIH guidelines (TLV), will result in low occupational doses.

Therefore, while it is recommended that NRC withdraw this proposed rule, it is also recommended that NRC correct the inaccuracies in NUREG-1717, update dose estimates using updated ICRP 68 dosimetry, and then re-evaluate whether there is a sufficient public health and safety need to warrant consideration of an unimportant quantity transfer rule.

Voting Record: Examination of the voting record for this proposed rule (Commission Voting Record for SECY 00-0201, 3/29/2002) indicates that those commissioners voting in favor of the proposed rule cast their votes between 10/5/00 and 3/23/2001. As such, these votes were cast prior to discussion of both the flaws inherent in NUREG-1717 and the use of outmoded dosimetry to NRC at Part 40 working group meetings in fall/winter 2001, with subsequent confirmation by NRC staff (Part 40 working group meeting summary, 3/6-7/2002). However, NRC proceeded to publish the proposed rule on 8/28/2002, despite recognition of the significant flaws in NUREG-1717 by spring of the same year.

Since consideration of potential dose was a prime rationale in commissioner acceptance of this proposed rule, and it became apparent that the technical basis for the dose estimates was

flawed, it is recommended that the NRC commissioners reconsider their vote on this proposed rule utilizing realistic and updated dosimetry.

Dose: Both potential occupational and public doses are considered for the proposed transfer rule; which adds an unnecessary layer of complexity to existing occupational regulations for consideration of doses to workers in activities including transfer of unimportant quantities of source material. As alluded to in the sections on transfer and NUREG-1717, standard industrial hygiene practices aimed at worker education, dust and contamination control will provide a sufficient level of mandated protection against excessive dose incursions to workers.

OSHA regulations provide dust control limits (PEL) in 29 CFR 1910.1000 for a host of contaminants that either address minerals specifically, or include them in the catchall “particulates not otherwise classified” category. OSHA also regulates occupational radiation dose to non-NRC licensed employees in 29 CFR 1910.1096. In addition, more up-to-date ACGIH guidance also provide dust control limits (TLV) either at or below OSHA mandated levels, and the typical methodology for industrial hygienists charged with employee health and safety is to apply the lower of the PEL or TLV limits.

Comments sent to the Part 40 working group (4/29/2002), pertaining to options to strengthen worker protection within the context maintaining the current 40.13(a) exemption at 0.05 percent, could also serve to alleviate concerns with respect to worker protection without the need to include occupational dose in the proposed transfer rule. With the 0.05 percent source material exemption in place, control over potential occupational doses can be accomplished via a worker training requirement for likely doses over 100 mrem, either within 10 CFR 40.13(a), a voluntary training program approved by the Occupational Safety and Health Administration (OSHA), or within the context of OSHA’s 29 CFR 1910.1096 standard for ionizing radiation.

One advantage to this approach is that it may clarify the role of occupational worker as opposed to member of the public. It is my belief that publication of specific language for definitions for “occupational dose”, “member of the public”, and “public dose” in 60 FR 36038 (7/13/1995) served to clarify the point that occupational dose covers employment-related exposure to both licensed and unlicensed sources of radiation, and that public dose, as received by a member of the public, does not include occupational dose. Hence, the separation of employees into radiation workers and members of the public (consistent with the pre-1991 version of 10 CFR 20) can be viewed as outmoded, when compared to NRC’s amended definitions. The addition of training requirements for the use of 40.13(a) exempt material helps solidify the distinction between a single class of worker, and non-employment related member of the public.

Therefore, while it is recommended that NRC withdraw this proposed rule, it is also recommended that NRC limit inclusion of dose in future consideration of this rule solely to non-occupational, unrestricted public dose.

NRC indicates (67 FR 55716) that in cases of transfers of material for other purposes such as recycle or indirect disposal, that “lower dose limits may need to be considered”. Given that the dose limits discussed for this rule are in the 25-100 mrem/yr range, it is unclear whether NRC

considers this dose range insufficient for public protection. The unrestricted dose limit to the public from decommissioning of NRC facilities is 25 mrem/yr. As such, it is difficult to imagine that this low dose is not considered protective for the purposes of this proposed rule.

Dilution: NRC seeks comment regarding whether 40.41(c) should be clarified to more clearly codify a prohibition on “intentional dilution” (without first obtaining specific approval) for the purpose of reducing source material concentration below 0.05 percent, yet consideration of situations wherein dilution is a normal part of an existing manufacturing process is lacking. On the other hand, CRCPD has expressly indicated, in its part N TENORM suggested state draft regulation, that dilution resulting from normal product processing is not considered purposeful dilution.

For example, zircon used at very low levels in ceramic-ware as an opacifying additive results in a product wherein the zircon content is greatly diluted (i.e., “at background levels”). However, this dilution occurs as a natural function of the process, and is not performed purposefully to avoid regulation. The same can be said for a host of products that contain mineral-based components, as well as for the processes used to mine and separate feedstocks into valuable commercial mineral products. If such operations are specifically licensed due to temporary mixing of licensed source material with unimportant quantities of source material, then the existing provision of 40.14(c) requiring licensees to confine possession and use of source material to the locations and purposes authorized in the license is sufficient to protect against uses such as intentional dilution to avoid a regulatory limit. As such, it is recommended that NRC leave the provision of 40.14(c) intact, without modification.

Miscellaneous: On page 67 FR 55176, NRC provides a conversion from the 0.05 percent weight limit of source material to a pCi/g basis for natural U and Th. However, when U and Th specific activity is used to calculate or model dose, each isotope in the decay series, starting with the parent isotopes (U238, with ~5% activity from U235, and Th232) is assigned a specific activity as part of the dose determination. Therefore, both natural U (with U238, U234, and U235) and natural Th (with Th232 and Th228) will each contain approximately twice the activity as would be used for the parent isotopes in determining dose. Since dose is the prime basis for the proposed transfer rule, publication of the natural Th and U based pCi/g conversion can be misleading.

NRC states (67 FR 55176) that the proposed transfer rule is not intended to apply to U or Th essentially at the natural background levels of the surrounding area, but what constitutes “essentially at the natural background levels” is not defined. NRC should define this term, with sufficient allowance for the variation inherent in background levels, to clearly delineate the lower limit for consideration of the proposed transfer rule.

Although NRC states (67 FR 55178) that the possibility of a licensee disposing of its 40.13(a) material in a mill tailings impoundment was evaluated, the NRC has not clarified in the text whether 40.13(a) source material can indeed be disposed of in mill tailing impoundments.

Please do not hesitate to contact me via telephone, e-mail, or fax if there are questions or the need for additional follow-up to these comments. Thank you.