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June 29, 2000

RSPA-99-6283-33

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Via Hand Delivery

U.S. Department of Transportation
Dockets Management System
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Re: Comments on Advanced Notice of Proposed Rulemaking (“ANPR”):
Compatibility With the Regulations of the International Atomic Energy
Agency; RSPA Docket RIN 2137-AD39

Dear Sir/Madam:

These comments are submitted on behalf of the Zirconium Environmental Committee (“ZEC”), a group of companies that engage in the production, research and development, and commercial distribution of zirconium ores and products, including zircon and zirconia. ZEC member companies engage in intra- and interstate commerce within the United States, as well as foreign commerce worldwide. The ZEC is concerned that DOT’s contemplated rulemaking – without appropriate clarifications – could extend Class 7 (radioactive) regulation to ores and natural materials having very low activity levels with resulting increased costs, transportation burdens and liabilities, all without justification. Accordingly, the ZEC offers the following comments on DOT’s contemplated rulemaking.

I. DOT Must Consider IAEA’s Supporting Documentation to Avoid Ambiguity.

The U.S. Department of Transportation (“DOT”), in announcing its contemplated harmonization of United States transportation rules with the 1996 *International Atomic Energy Agency (“IAEA”) Regulations for the Safe Transport of Radioactive Material No. ST-1*, should consider that this action could unintentionally increase the variety of materials in transportation that become regulated as “radioactive.” IAEA became aware of this concern through comments of interested parties¹, and took affirmative steps to limit the scope of ST-1. However, as drafted, the limitations on the scope of ST-1 are ambiguous and

¹ See: *Comments on International Atomic Energy Agency Fourth Draft of Safety Series No. 6* (Feb. 19, 1996) attached hereto as Attachment 1.

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require consideration of IAEA's supporting documentation in order to comprehend the intent of the drafters.

The history of IAEA's adoption of the 1996 ST-1 Regulations confirms that the expert Working Group that drafted Paragraph 107 sought to exclude natural materials and ores from the classes of materials to be regulated as "radioactive" for transportation purposes. Paragraph 107, limiting the scope of ST-1, provides:

107. The Regulations do not apply to:

* * *

(e) natural material and ores containing naturally occurring radionuclides which are not intended to be processed for use of these radionuclides provided the activity concentration of the material does not exceed 10 times the values specified in paras 401-406.

Paragraph 107(e) appropriately emphasizes that natural materials and ores that are not part of the nuclear fuel cycle or otherwise processed for their radionuclide content are outside the scope of the regulation. Because most minerals and natural materials contain detectable concentrations of natural radionuclides, the universe of materials that could be considered to be technically "radioactive" -- and potentially subject to regulation -- is very large. Importantly, IAEA recognized that the scope of regulatory control should be limited by excluding ores and natural materials that are not exploited for their radionuclide content, provided a certain activity level is not exceeded.

Second, Paragraph 107(e) expanded the exemption beyond ores to include ores and *natural materials* containing natural radionuclides. There are many materials of natural mineral origin that could not be strictly construed to be "ores," but rather are products made from ores. Examples include high performance refractories used in extreme temperature applications such as foundries or glass furnaces and zirconia specialty ceramics. Moreover, in today's environmentally conscious market, many spent refractory materials retain their value as recyclable natural materials. That IAEA saw fit not to limit the scope of the exemption to "ores" promotes environmentally sound recycling practices for natural materials that incidentally contain natural radionuclides.

Notwithstanding the plain language of Paragraph 107(e), the practical application of this Paragraph remains ambiguous. Referring to Paragraphs 401-406 of ST-1, the Table I

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exemption values for natural uranium (“U”) is 1 Bq/g², and according to Paragraph 107, mineral ores and natural materials would be excluded from the scope of ST-1 provided the specific activity was below 10 Bq/g U. While the Table I listing for natural U refers to footnote (b), which in turn summarizes the decay progeny for natural radionuclides, it is not entirely clear from the language in Paragraph 107 or Table I footnote (b) whether it is the specific activity of the parent nuclide or the total specific activity of the sum of all nuclides in the U decay sequence that is to be considered in determining whether a material is outside the scope of ST-1. The same is true for natural thorium. Fortunately, the record of ST-1’s development and subsequent documentation from IAEA make this clarification; unfortunately, the availability of these materials has been very limited and Paragraph 107(e) of ST-1, on its face, is ambiguous.

*The Report From the Special Working Group on Exemption*³ clarified that:

The factor 10 was selected taking the following considerations into account:

- the exemption values refer to the activity of the parent radionuclide, if daughter products are involved

Notwithstanding the omission of this important clarification in ST-1, IAEA’s subsequent *DRAFT ADVISORY MATERIAL FOR THE REGULATIONS FOR THE SAFE TRANSPORT OF RADIOACTIVE MATERIAL (1996 Edition) IAEA Safety Standards Series No. ST-2* (Feb. 19, 1999) makes it clear that the exemptions of Para. 107 are determined on the basis of parent 238-U nuclide activity. The *Advisory Material* was published because “it became increasingly evident that, while the provisions of the [IAEA] Regulations might be essentially clear and unambiguous, nevertheless they would often also be highly technical in nature and unavoidably complex.” *Id.* at page 2. The draft ST-2 provided the following important clarifications to ST-1 Section 107, as follows:

107.5. The scope of the Regulations includes those natural materials or ores which form part of the nuclear fuel cycle or which will be processed in order to use their radioactive properties. The Regulations do not apply to other ores which may contain naturally occurring radionuclides, but whose usefulness does not lie in the fissile, fertile or radioactive properties of those nuclides, provided that the activity concentration does not exceed 10 times the exempt activity concentration values.

² The SI unit for specific activity Bq/g is equivalent to 27 picoCuries (“pCi”)/g.

³ Attached hereto as Attachment 2.

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Natural material and ores containing natural occurring radionuclides which are processed are also exempt from the Regulations (up to 10 times the exempt activity concentration values) where the physical and/or chemical processing is not for the purpose of extracting radionuclides, e.g., washed sands, tailings from alumina refining etc.,

Were this not the case, the Regulations would have to be applied to enormous quantities of material that present a very low hazard. However, there are ores in nature where the activity concentration is much higher than the exemption values. The regular transport of these ores may require a consideration of radiation protection measures. Hence, a factor of 10 times the exemption values for activity concentration was chosen as providing an appropriate balance between the radiological protection concerns and the practical inconvenience of regulating large quantities of material with naturally occurring low activity concentration.

ST-2 at page 2 (emphasis supplied). It should further be noted that ST-2 includes the following important clarification:

401.6. It must be emphasized that, in the case of decay chains, the values in Table I columns 4 and 5 of the Regulations relate to the activity or activity concentration of the parent nuclide.

Thus, the ST-2 explanatory materials are relevant in clarifying the limitations on the scope of ST-1 and cannot be ignored for DOT's purposes. IAEA was clearly aware that the ST-1 regulations could be misapplied to broad classes of minerals and natural materials and sought to provide appropriate safeguards against over-regulation of useful minerals and natural products in commerce.

II. DOT Should Consider NRC's Role in Transportation of Radioactive Materials

Even though DOT has signaled an interest in harmonizing its rules governing transportation of radioactive materials with IAEA through its ANPR, the U.S. Nuclear Regulatory Commission ("NRC") has apparently not considered this issue at this time. DOT's web site does not reveal any comments submitted by NRC at the time of this writing.

In addition to its other functions, NRC administers regulations governing the transportation of source, byproduct, and special nuclear material as those materials are

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defined pursuant to the Atomic Energy Act of 1954 ("AEA") (42 U.S.C. Section 2011, *et seq.*) and NRC's regulations at Title 10 of the Code of Federal Regulations. While DOT rules govern the entire universe of radioactive materials that are not otherwise excluded, NRC's rules are limited to those radioactive isotopes within NRC's authority. However, to transporters of radioactive materials, the rules of NRC and DOT are inextricably intertwined, and something that is "radioactive" for DOT purposes is likewise considered "radioactive" for NRCs.⁴ To be workable in practice then, NRC's rules and those of DOT must be harmonious. It has long been the regulatory practice of DOT to coordinate with NRC on past rulemakings governing transportation of radioactive materials. See, e.g., 60 Fed. Reg. 50292 (September 28, 1995); 60 Fed. Reg. 50248 (September 28, 1995); 53 Fed. Reg. 21550 (June 8, 1988); 54 Fed. Reg. 47454 (Nov. 14, 1989). We recommend that DOT engage in consultation with NRC regarding harmonization of existing U.S. transportation rules with IAEA. For DOT to proceed unilaterally on this rulemaking would result in a confusing morass of inconsistent regulation.

III. DOT may wish to consider the underlying bases for ST-1 exemptions.

To the extent that DOT is considering adopting numerical standards for the exemption of materials for U.S. transportation purposes that are different from those already in effect, DOT should note that some members of the IAEA Working Group on Exemption felt that the 10 x Table I exemption was too low.⁵ If IAEA's numerical regulatory thresholds are under consideration by DOT, then the Department may wish to further explore the underlying basis for these numbers. Should DOT reconsider the 70 Bq/g exemption level in favor of dose-based constraints, any revised regulatory thresholds should be derived on the basis of the chemical, physical and radiological properties of materials in transit, as modeled under realistic transportation scenarios.

III. DOT Is Not Required to Adopt Standards Identical to IAEA

The Hazardous Materials Transportation Uniform Safety Act of 1990, Pub. L. 103-272 (108 Stat. 759) provides that harmonizing DOT standards to be identical to IAEA's is not obligatory. Rather, DOT may exercise its discretion in rejecting IAEA standards it deems unnecessary or inappropriate, pursuant to 49 U.S.C. Section 5120:

⁴ Compare: 49 C.F.R. 173.403 and 10 C.F.R. 71.10(a).

⁵ See Attachment 2.

(2) Consultation.--The Secretary may consult with interested agencies to assure that, to the extent practicable, regulations issued by the Secretary pursuant to this section shall be consistent with standards adopted by international bodies applicable to the transportation of hazardous materials. Nothing in this subsection shall require the Secretary to issue a standard identical to a standard adopted by an international body, if the Secretary determines the standard to be unnecessary or unsafe, nor shall the Secretary be prohibited from establishing safety requirements that are more stringent than those included in a standard adopted by an international body, if the Secretary determines that such requirements are necessary in the public interest.

Accordingly, there is no statutory mandate compelling DOT to modify its existing rules governing the transportation of radioactive materials to be identical to IAEA's ST-1.

IV. Conclusion

For all of the foregoing reasons, we recommend that DOT consider the following in conjunction with its contemplated rulemaking:

- Ensure that the scope of materials regulated as "radioactive" for transportation purposes does not extend to ores and natural materials, including products made from those ores and materials, that are outside the nuclear fuel cycle and do not exceed an appropriate regulatory threshold.
- If DOT contemplates departing from the current 70 Bq/g regulatory threshold in favor of IAEA's radionuclide-specific thresholds, DOT may wish to consider whether the technical basis, including models, computer codes, and exposure pathway assumptions underlying IAEA's threshold values would justify increased costs and burdens on transporters of materials that are currently excluded from Class 7 rules.
- Clarify that in determining exemptions, consistent with IAEA's intent, it is the specific activity of the parent nuclide to be considered, where naturally occurring radioactive materials are in issue.

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- Consult with NRC in jointly determining whether U.S. transportation rules for AEA and non-AEA materials should be harmonized with IAEA ST-1, and if so, to what extent.
- Consider abstaining from rulemaking until IAEA has finalized its Draft Advisory Materials ST-2.

Please do not hesitate to contact the undersigned if there are any questions regarding these comments.

Very truly yours,



Charles T. Simmons

For

The Zirconium Environmental Committee

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VIA TELECOPIER

Mr. Richard Boyle
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400 7th Street, S.W.
Washington, D.C. 0590-0001

Re: Comments on International Atomic Energy Agency Fourth Draft of
Safety Series No. 6 (1996)

Dear Mr. Boyle:

This letter is to express the Zirconium Environmental Committee's support for IAEA's proposal to exempt from regulation certain natural materials and mineral ores in the Fourth Draft revisions to the International Atomic Energy Agency (IAEA) Safety Series No. 6 Regulations for the Safe Transport of Radioactive Material. The Committee is a consortium of companies that engage in the production, research and development, and commercialization of products made from zirconium ores, including zircon, zirconia and baddeleyite. Member Companies operate zircon mining facilities worldwide and are therefore affected by international regulations governing the transportation of mineral ores.

We appreciate IAEA's recognition that certain materials containing naturally occurring radionuclides are inappropriate for regulation. However, we believe that language in the Fourth Draft limiting the exemption to ores with "unmodified or decreased concentration" introduces an unworkable ambiguity to the Regulation and should be deleted or modified. We urge the IAEA to adopt the following draft language in its final Regulation:

§108. The Regulations do not apply to:

- (e) **natural material and ores containing naturally occurring radionuclides which are not intended to be processed to use these radionuclides;**

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Our recommendation is made for the following reasons:

1. The phrase "unmodified or decreased concentration" is inherently ambiguous. In assessing whether a mineral has been "modified," the central inquiry is: modified compared to what? Site-specific geological factors influence the radionuclide content of mineral ores, and samples of the same mineral ore will vary in activity from place to place. Moreover, mineral producers are bound by their customer's specifications. Thus, there is no single standard that is universally applicable to discern whether an ore has been "modified."
2. By making a comparison between ore as transported and ore bodies in situ, some readers might conclude that virtually all mineral ores will be "modified" simply by virtue of extraction, cleaning, debris removal, and other basic ore management steps intended to maximize transport efficiency of usable product. While we perceive that IAEA does not intend such an interpretation, we are concerned that regulatory staff in some jurisdictions will apply this overly literal construction to the proposal provision.
3. Because of the aforementioned difficulties in assessing "modification" due to natural geological variability and ore management practices, we suggest that if IAEA believes that mineral ores must be distinguished from ores likely to be of radiological concern, the phrase "in commercial grade" should be substituted for "in unmodified or decreased concentration."

As the IAEA is no doubt aware, a specific activity threshold below 70 Bq/g (as low as 1 Bq/g) would substantially increase the number of "radioactive" materials subject to regulatory control. Absent the above exemption, many commercially important ores and minerals could become classified as "radioactive materials" -- including coal, phosphate rock, rutile, copper ores, bauxite, and zircon to name only a few.

The obvious result of very broad regulation of all "modified" mineral ores is that international commerce in many valuable commodities would be further encumbered by increased handling, insurance, freight and packaging costs, without any commensurate benefits to human health or the environment. Increased transportation costs are a significant barrier to capital investment in mineral extraction, and even marginal transportation cost increases for minerals would disproportionately impact developing countries and economies - - countries whose export markets are least resilient.

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The IAEA recognized that even though some materials are technically "radioactive" (e.g., >70 Bq/g), certain categories of materials have specific activities that "are so low that it is inconceivable that an intake could occur which would give rise to a significant radiation hazard..."¹ Such IAEA-regulated low specific activity ("LSA") materials are nevertheless much higher in activity than most commercially important minerals. We believe that IAEA's observations about LSA apply with even greater force to very low activity mineral ores, whether "modified" or not. In short, unless the exemption is clarified, regulators will be distracted from scrutiny of truly dangerous radiation hazards by the extremely large volume of relatively harmless ores and natural materials which will require special packaging and labeling.

We also support IAEA's approach to distinguishing minerals "intended to be processed" for their radionuclide content from minerals that incidentally contain radionuclides but are used for other purposes. This approach eliminates the ambiguity inherent in a "modified" ore distinction, and if limited to "commercial grade" ores would appropriately distinguish ores that are not reasonably of radiological concern. An intent or use-based test is feasible, and is analogous to the regulatory approach used to distinguish NRC-regulated "byproduct" material from other categories of materials.² Moreover, of the approximately 33 radionuclide-contaminated "Superfund" sites in the U.S.³, the Environmental Protection Agency ("EPA") has confirmed that all of these sites were previously used for the intentional extraction of radionuclides. This observation suggests that a distinction based on intended end use is rationally related to the potential for environmental risk, unlike an unworkable distinction based on whether an ore is "modified."

¹ IAEA Safety Series No. 7, Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, Second Edition (As Amended 1990) at Section AI.5.5.

² For example, one definition of "byproduct material" under The Atomic Energy Act of 1954 (42 U.S.C. 2011, et seq.) is "tailings or wastes produced by the extraction or concentration of uranium or thorium from any ore processed primarily for its source material content" (42 U.S.C. §2014; emphasis supplied). Another example of "intent-based" regulation is found in the Federal Insecticide, Fungicide and Rodenticide Act ("FIFRA"; 7 U.S.C. 136, et seq.): Chemicals are regulated as "pesticides" based on their "intended" use.

³ "Superfund" sites are designated under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"; 42 U.S.C. 9601 et seq.).

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For the foregoing reasons, we appreciate IAEA's efforts to distinguish commercially important mineral ores from materials intended to be regulated as "radioactive" materials. We respectfully request that IAEA adopt the mineral ore exemption without reference to "modification" in the Fourth Draft, and update the Explanatory Materials in Safety Series No. 7 to provide appropriate guidance to Member States in implementing this exemption. Please do not hesitate to contact the undersigned if there are any questions regarding this letter.

Very truly yours,



Charles T. Simmons

for

The Zirconium Environmental Committee

REPORT FROM THE SPECIAL WORKING GROUP ON EXEMPTION

Participants : L. Baekelandt, Chairman

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T. Mountford-Smith
A.M. Xavier
G.B. Johnston
C. Devillers
T. Kitamura
B. Svahn
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C. Haughney

1. The working group reached a broad consensus on the following proposal for amendment of para. 107 :
 - (e) *natural material and ores containing naturally occurring radionuclides which are not intended to be processed for use of these radionuclides, provided the activity concentration does not exceed 10 times the exemption level in terms of activity concentration as specified in paras 401-406*

The factor 10 was selected taking the following considerations into account :

- the exemption values refer to the activity of the parent radionuclide, if daughter products are involved;
- the exemption values that were derived for the transport specific scenarios were almost always lower than the ones that were derived for the BSS.

There were one or two reservations on the factor that was felt to be too low.

2. The working group strongly recommend that Tables I and II be checked carefully for correctness and completeness.
Examples: in table I, footnote (b) does not always appear where it should, e.g. for natural uranium and natural thorium; in table II the first figure in the last column should be 1×10^4 ; the third entry in the first column should read "Only alpha emitters ..."
3. The Working group recommends to add the following sentence to para. 401 :
Where daughter products are involved, these values refer to the activity of the parent nuclide (see footnote (b)).
4. Finally, the working group proposes to add a new sub-category of LSA-I material and to add the following to para. 226 (a):

- (iv) *radioactive material (for which the A_2 value is not unlimited) in which the activity is distributed throughout and the estimated specific activity does not exceed 30 times the exemption level in terms of activity concentration.* (

The factor of 30 has been selected to take account of the rounding procedure used in the derivation of the BSS exemption levels and to give a reasonable assurance that the transport of such materials does not give rise to an unacceptable annual dose.