Proposal for Changes to the IAEA regulation TS-R-1

June 7, 2004

In reference to the Proposal by the U. S. Department of Transportation
Research and Special Program Administration

(Docket No. RSPA-04-16964 (Notice No. 04-3))

Hazardous Materials: Regulations for the Safe Transport of Radioactive Material (TS-R-1); Solicitation of Proposed Changes

This document is hereby submitted for consideration by:
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This document is a request for change to IAEA regulation TS-R-1

1. Objective of the change/regulatory problem:

The members of the Tantalum-Niobium International Study Center hereby request that the U. S. Department of Transportation/IAEA grant relief from the latest proposed changes to the regulations for naturally occurring radioactive materials (NORM) and that the previous limit of 70-Bq per gm for Class 7 shipments be reinstated. The new limit of 10.0-Bq per gm (1.0-Bq per gm x factor of 10), for transportation purposes, will cause significant disruption to the supply chain for this industry, affecting the business of miners, shippers and processors of tantalum bearing ores.

The objection to the new limit is based on the new fact that more than 90% of our shipments will now fall into Class 7 as “dangerous goods”. The T.I.C. understands that even under the old limits, some of the tantalum raw materials fall into Class 7.

At this time the new IAEA limit is being incorporated in transport regulations and implemented by local Competent Authorities. Although the limit is not in effect in all authorities, some shippers have already seen the effects of the new regulations and have been harmed by the denial of shipment by international carriers.

- Some carriers refuse our material because it is Class 7 cargo.
- Other carriers quote significantly higher shipping charges that discourage the possibility of accepting the quotation.
- Other carriers fail to respond to requests for quotation for shipment, effectively refusing to ship without actually stating the denial in writing.
- Some ports are closed entirely to shipments of Class 7 material.
- And some carriers refuse to visit ports if they are only to collect Class 7 material at that port.

Some T.I.C. member companies have submitted reports of instances of denial of shipment to the Competent Authority of their own country and in addition reports of denial have been submitted to the U.S. Department of Transportation.

Transport of raw materials is necessary because the miners are in locations such as Australia, Brazil, China, Africa and Canada, whereas the processors are in the United States, Germany, Japan and China. The established supply chain could be virtually shut down by these cases of denial of shipment in countries where regulations are being followed.

2. Justification for change/maintaining:

Due to the chemical nature of tantalum raw materials, they generally are mined with low levels of radioactivity and then transported in packages inside sea/land containers. For 70-Bq per gm material this method of packaging and shipment limits the radioactive exposure outside the container to acceptable levels.

If this change in regulation is implemented, carriers will deny (and already have denied) shipment which will in turn stop or cause delays in delivery of tantalum raw materials. The problem will not be confined to the tantalum industry, but could have a domino effect on the entire electronic supply chain since nearly 70% of the tantalum finished products are consumed in electronic applications. These applications comprise but are not limited to: high reliability military and aviation electronics, automotive safety and environmental systems such as air bags, ignition control, and automatic braking systems. Capacitors made from tantalum are used in cell phones, telecommunications infrastructure, large and laptop computers and many other applications important to today’s productivity improvements in the U.S. and elsewhere. A significant amount of

tantalum is used in alloys for military and commercial aircraft. In addition, tantalum is used in implantable medical devices.

3. Paragraphs of the current regulations (TS-R-1)

The regulation that is in question is IAEA TS-R-1, *Scope, paragraph 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.*

This combined with:

Paras 401 to 406. Para 404 is Table I. Page 33, lists *Th (nat) with an activity concentration for exempt materials as 1 x 10^0 (b) and the activity limit for an exempt consignment as 1 x 10^3.* For U (nat) the activity concentration for exempt material and the activity limit for an exempt consignment is the same as for Th. Thus the limit will be 1-Bq per gm x 10, or 10-Bq per gm. From the data that have been reported to us by some of our members, measurements are between 0 and 160-Bq per gm. Under the new regulation, nearly all of our members' shipments will fall into the Class 7 handling regulations. Prior to this change in regulation, most of the shipments were not Class 7. The relief is requested for those shipments that fall between the old limit of 70-Bq per gm and the new limit of 10-Bq per gm.

4. Additional guidance material:

The T.I.C. recommends that exemption or relief be granted for the case of tantalum ores (NORM) that are measured to be less than 70-Bq per gm. We recommend that the US. Department of Transportation delays the implementation of the change in regulations until the IAEA has an opportunity to review our request. We believe that it is in the best interest of the miners, shippers, carriers and others that the new regulations not be implemented. We also believe that U.S. DOT/IAEA should evaluate all similar requests and grant the exemption in the way most practicable for the IAEA and still insure that the new regulations provide us with relief.

Attached is the position paper of the T.I.C. submitted to the Competent Authorities of several countries prior to the meeting of the TRANSSC of IAEA in March, 2004.

TANTALUM INDUSTRY

The effect on this industry of the IAEA regulations for the Safe Transport of Radioactive Material

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Tantalum is a rare but very useful metal making our lives safer and more productive. It is very hard and resistant to chemicals, and has an extremely high melting point. In electronics it is used for highly reliable capacitors for computerized car components, such as air bags, automatic braking and engine control systems which reduce pollution, for digital cameras, for mobile phones, enhancing the quality of modern life. In aircraft engines it is used in the hottest section of jet engines, making them safer and more efficient in flight. In the field of health it is used in heart pacemakers and defibrillators, insulin injectors, joint and tissue reconstruction, as it can remain in the human body for many years without rejection. Cutting tools with tantalum work faster and last longer. Tanks and pipes for the chemical industry do not corrode in tough conditions, keeping acids safely under control, if they are made with tantalum.

The Tantalum-Niobium International Study Center is an international association under Belgian law, founded in 1974 to promote knowledge and applications of tantalum and niobium, and whose members are companies involved with mining, processing and fabricating the two metals. It has members in North and South America, Europe, Africa, Australia and Asia. The T.I.C. fully supports the activities of agencies working towards regulations which protect the health and safety of both workers and members of the general public who may be in the vicinity of materials being transported. The T.I.C. expects its members to meet the requirements of all local and international regulations governing the safe handling, use and transport of tantalum and niobium materials. Such regulations need to take into account the packaging and containers used, as well as the means of transport.

Raw materials such as those used for extracting tantalum exhibit a very low level of naturally occurring radioactivity, which we believe poses no danger to the public during their transport.

Sources of tantalum are minerals such as tantalite and columbite. Tantalum raw materials are mined in Australia, South America, Canada, Africa and other remote spots. But the facilities for processing and refining, which require sophisticated technology, are located mainly in the United States, Germany, Japan and China. Therefore the minerals need to be transported from the locations where they are mined to the factories where

they can be processed. Both mining and refining are carried out with great care and attention to the safety of both the workers and the environment, and the transport of the materials merits similar consideration.

The tantalum and niobium ores contain numerous other elements, including small amounts of naturally occurring uranium and thorium. They are naturally-occurring radioactive materials, or NORM, exhibiting a very low level of radioactivity. The percentage of uranium is far too low and the mineralogy too complex for the uranium to be extracted for traditional fuel cycle use. Tantalum/niobium-bearing minerals are being transported from one place to another solely for the purpose of extracting these metals for useful materials, and not for the extraction of the uranium or thorium.

Minerals are physically treated and concentrated in the country of origin, before being packed for transporting. The treatment typically removes sand or quartz minerals to enhance the percentage of tantalum and niobium contained. It upgrades the tantalum and niobium concentrations in the ore up to 1000 times. The natural consequence of this upgrading ratio is that NORM minerals are also concentrated from almost undetectable levels to levels that are still very low but which can, nonetheless, be measured.

The annual production and movement of these minerals is not high, only containing approximately *5*-6000 metric tonnes of tantalum oxide (Ta_2O_5, the industry's measure of the useful part of the mineral). As the mineral concentrates usually contain 15-40% Ta_2O_5, this equates to about 25 000 to 30 000 metric tonnes per annum of concentrates to be transported. They are generally shipped as drums enclosed in sea-land containers, and not as an entire shipload of bulk mineral. A typical consignment may only be one or two closed sea-land containers, each containing 20 tonnes of product.

As implementation of the 10 Bq/g limit for uranium and thorium content, in regulations TS-R-1, is progressively taking effect, the increased rigor in the classification of tantalum raw materials is causing the following problems for the tantalum industry:

1. Shipping is being denied by more and more freight companies, concerned about carrying radioactive materials. There is already anecdotal evidence that many international carriers decline to take IMDG Class 7 materials.

2. Some ports could be closed to Class 7 materials, thus stopping or delaying the transit of consignments.

3. A dilution of impact results if the marking of highly radioactive material – subject to strict control for the sake of public safety – is the same as the marking of raw materials such as those containing tantalum and niobium. Classification of minerals as dangerous goods leads to a major increase in the volume of freight labeled as hazardous, distracting attention.

4. Any confusion between natural minerals of low level of activity and fuel cycle materials needs to be avoided. The latter have an excellent record of safety during transport which should not be compromised. Tantalum raw materials have no record of being dangerous to transport, and should not be mistaken for uranium minerals. Nevertheless, shipments of tantalite with higher radioactivity levels should be labeled and provided with all the necessary documents to respect the regulations. We would call for a responsible attitude on the part of all T.I.C. member companies.

There will be increasing difficulty in maintaining the supply chain of raw materials to this industry if transport is denied, and although it is not a very large industry it is important in this technological modern world of ours.

According to generally agreed safety limits, an exposure to a dose of 1mSv/annum would not pose any risk of harm to a member of the public in the vicinity of radioactive materials. Literature shows that this is a fraction of the dose which just might cause harm.

Initial estimates indicate that the maximum exposure to radiation for a person in proximity to the sea-land containers with tantalite, such as a seaman or a truck driver, would be far below the accepted limits. Thus, we believe that tantalum raw materials would pose no significant risk to any person during transport.

A preliminary survey of some shipments by T.I.C. members, although it is not systematic, has indicated that some 80% of shipments would exhibit radioactivity levels of 40 Bq/g or less. Our goal is to carry out a more comprehensive study with careful measurements in the near future.

Based on the low hazard risk presented by tantalum raw materials, we believe they should be classed as ‘goods posing no danger’ during transport. We believe that classification as Class 7 is inappropriate and disproportionately restrictive, in view of the insignificant danger posed. We therefore urge that the classification be studied and re-considered such that the regulations applicable to transport of low radioactivity materials be more appropriate to the hazard risk.

We strongly support the efforts of TRANSSC in exploring the impact of the transport regulations.

Brussels, March 16th 2004