NORM WG (NWG) – TRANSSSC Technical Expert Group on Transport Operational Matters

1.0 PARTICIPANTS

1.1 List of Participants

<table>
<thead>
<tr>
<th>Country/Organization</th>
<th>Expert</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>Mathieu Ter Morshuizen</td>
<td></td>
</tr>
<tr>
<td>South Africa</td>
<td>Paul Hinrichsen</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>Lars Holländer</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>Antti Takkinen</td>
<td></td>
</tr>
<tr>
<td>IMO</td>
<td>Bingbing Song</td>
<td></td>
</tr>
<tr>
<td>IAEA TSU</td>
<td>Eric Reber</td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>Daniel Daigle</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>Kazushige Kuriyama</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>Leonardo Katos</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>Maurinao Neme</td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>Baptiste Louis</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>Christian Cymorek</td>
<td></td>
</tr>
<tr>
<td>TIC</td>
<td>Roland Chavasse</td>
<td></td>
</tr>
<tr>
<td>Salus Mineralis</td>
<td>Ulric Schwela</td>
<td></td>
</tr>
<tr>
<td>WNTI</td>
<td>Scott Edwards</td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>Keith Dessent</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>Ingo Reiche</td>
<td></td>
</tr>
</tbody>
</table>

1.2 Apologies:

Mr John Templeton (Australia)

2.0 INTRODUCTION

The Working Group (WG) was tasked with the review of the Proposal;

AMENDMENTS TO THE IMDG CODE AND SUPPLEMENTS
Transport of naturally occurring radioactive material (NORM)

Submitted by Germany

This Proposal was originally submitted to the IMO CCC6 Meeting scheduled in September 2019. The IMO saw it as an IAEA/TRANSSSC matter and deferred it to TRANSSSC for consideration.
3.0 THE PROPOSAL

The full Proposal is attached for information.

The critical Points in the Proposal is as follows;

“The provisions of this Code do not apply to natural material and ores containing naturally occurring Th-232 and U-238 in secular equilibrium, provided that:

1. The combined specific activity for the radionuclides does not exceed 30 Bq/g;
2. The material is individually packed in industrial packages conforming to the requirements of 6.4.5.1;
3. The packages are loaded in freight containers under exclusive use;
4. The mean radiation level on the external surface of the container does not exceed 5 μSv/h; and
5. The radiation level in 1 m distance from the container does not exceed 5 μSv/h at any point.”

4.0 JUSTIFICATION

The Justification for the Proposal is based upon the document;

“Radiological Risk Assessment of the Transport of Tantalum Raw Materials
Prepared for the;
Tantalum-Niobium International Study Center
Prepared by SENES Consultants Ltd (April 2007)”
5.0 DISCUSSION

Without drawing any conclusions on the correctness of the report methodology and calculations the WG raised the following Points;

Point 1:

The SENES Report addresses only the transport of Tantalum raw materials. Yet the Proposal calls for the application of the factor x30 to all NORM which is considered to be in secular equilibrium.

Response:

TRANSSC would be more accommodating to a Proposal, aimed at all NORM, which is backed by similar studies on a range of NORM materials. The Scope of the study should be broadened to cover other NORM, which is considered to be in secular equilibrium. This would provide a stronger basis for the Proposal.

Point 2:

The Proposed Exemption applies only to transport by sea.

Response:

It would not be advisable to approve an exemption, based upon any value (x30), which applies only to a single transport Mode. For a better chance of acceptance, the scope of the Proposal should be broadened to all modes of transport.

Point 3:

Reading Points 2 to 5 of the Proposal;

2 The material is individually packed in industrial packages conforming to the requirements of 6.4.5.1;

3 The packages are loaded in freight containers under exclusive use;

4 The mean radiation level on the external surface of the container does not exceed 5 μSv/h; and

5 The radiation level in 1 m distance from the container does not exceed 5 μSv/h at any point."

What is being requested here would seem to be “Conditional Exemption”. In other words the material would be exempt provided it is packaged according to certain specifications and meets certain radiation dose values at the surface and at 1m.
Response:

An input from Mr Bingbing Song, of the IMO, was that the exemption, as proposed, could require persons at the port to carry radiation instruments so as to check any shipment against the conditions of the exemption. This was not considered a good idea as it could possibly result in ports refusing to accept such shipments due to the onerous task of confirming compliance against the exemption requirement.

6.0 CONCLUSIONS:

6.1 Possible Approval Mechanisms for the Proposal

There would appear to be two options:

- If the Proposal was accepted, as is, into SSR-6, transport through multiple Member States would be simple.
- Alternately, the shipment would need multilateral approval, during transport across many member states. This would only be possible if there was some kind of instrument within SSR-6, allowing for such exemption (extending paragraph 403 (b) to materials as well as articles).

403. for individual radionuclides:

(b) In instruments or articles in which the radioactive material is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(c), alternative basic radionuclide values to those in Table 2 for the activity limit for an exempt consignment are permitted and shall require multilateral approval. Such alternative activity limits for an exempt consignment shall be calculated in accordance with the principles set out in the BSS [2].

6.2 Working Group Conclusions

Conclusion 1: Current SSR-6 Radiation Protection Standards

It was concluded that, under current SSR-6 RP standards, it was very unlikely that TRANSSC would give favourable consideration to the proposed exemption based upon the following:

- The exemption, as proposed, is a blanket exemption, for all NORM, considered to be in secular equilibrium. Yet the study, upon which the Proposal is based, is restricted only to tantalum raw materials transport.
- The exemption, as proposed, is limited to the sea mode and needs to be extended to all transport modes.
- The exemption, as proposed, is “conditional”. This may lead to unacceptable burdens at the port. Conditional exemption will also need to be approved by all competent authorities along the route of shipment.
- The exemption, as proposed, would require multilateral approval.
Conclusion 2: Current Radiation Protection Standards – Exemption

It was brought to the attention of the Meeting that, GSR-Part 3, suggests a value of 1 mSv/a as a dose level for the definition of exemption.

In particular there are a number of paragraphs of GSR Part 3 suggesting this;

GSR-Part 3

Considering Paragraph 5.22;

5.22. The regulatory body or other relevant authority shall establish specific reference levels for exposure due to radionuclides in commodities such as construction materials, food and feed, and in drinking water, each of which shall typically be expressed as, or be based on, an annual effective dose to the representative person that generally does not exceed a value of about 1 mSv.

Considering Schedule 1;

Schedule I
EXEMPTION AND CLEARANCE
CRITERIA FOR EXEMPTION

I.2. A practice or a source within a practice may be exempted without further consideration from some or all of the requirements of these Standards under the terms of para. I.1(a) provided that under all reasonably foreseeable circumstances the effective dose expected to be incurred by any individual (normally evaluated on the basis of a safety assessment) owing to the exempt practice or the exempt source within the practice is of the order of 10 μSv or less in a year. To take into account low probability scenarios, a different criterion could be used, namely that the effective dose expected to be incurred by any individual for such low probability scenarios does not exceed 1 mSv in a year.

Considering Schedule 1 Paragraph I 4

I.4. For radionuclides of natural origin, exemption of bulk amounts of material is necessarily considered on a case by case basis by using a dose criterion of the order of 1 mSv in a year, commensurate with typical doses due to natural background levels of radiation.

footnote 60 –

60 Material containing radionuclides of natural origin at an activity concentration of less than 1 Bq/g for any radionuclide in the uranium decay chain or the thorium decay chain and of less than 10 Bq/g for 40K is not subject to the requirements in Section 3 for planned exposure situations (para. 3.4(a)); hence, the concept of exemption from the requirements of these Standards does not apply for such material.
Considering paragraph 3.4, page 130;

3.4 Exposure due to natural sources is, in general, considered an existing exposure situation and is subject to the requirements in Section 5. However, the relevant requirements in Section 3 for planned exposure situations apply to:

(a) Exposure due to material in any practice specified in para. 3.1 where the activity concentration in the material of any radionuclide in the uranium decay chain or the thorium decay chain is greater than 1 Bq/g or the activity concentration of 40K is greater than 10 Bq/g;

Considering Schedule 1 Paragraph I 5

I.5. The IAEA Regulations for the Safe Transport of Radioactive Material [12] (the IAEA Transport Regulations) do not apply to exempt material or exempt consignments; that is, they do not apply to material in transport for which the activity concentration of the material (for exempt material) or the total activity of radionuclides in the consignment (for an exempt consignment) does not exceed the relevant ‘basic radionuclide value’ given in the IAEA Transport Regulations for exemption from the requirements of the IAEA Transport.

Question:

Is GSR Part 3 paragraph 1.4 the “NEW” way of defining “Exemption” against a dose criteria of 1 mSv/a?

GSR Part 3 Paragraph 1.5 seems to speak directly to SSR-6 current Exemption criteria which may be based upon a dose criteria, for exemption, of 10 µSv/a and therefore might be out of line with paragraph 1.4.

7.0 RECOMMENDATION:

7.1 Recommendations to the Proposal:

The authors of the Proposal should consider broadening the scope of the Proposal to cover other NORM which is considered to be in secular equilibrium.

The authors should consider broadening the scope of the Proposal to cover all relevant modes of transport.

7.2 Recommendations to the TTEG-OM:

The issues should be passed to the RP TTEG for their expert consideration.

They should look at the following:

Consider the potential consequences of the Proposal, as is, without any consideration of any “new” concepts around the definition of Exemption.

Consider the current SSR-6 definition of Exemption, against GSR-Part 3.
Any consideration which may suggest a change to the SSR-6 exemption values, based upon a dose criteria of 1 mSv/a will necessarily need to be put to the RASSC for ratification.