Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

TM-44897

MOE Press Briefing Room

IAEA Headquarters, Vienna

8 to 12 April 2013

Meeting Report
1. OPENING

1.1. Director - NSRW Opening
Mr Pil Soo Hahn, Director of the Division of Radiation, Transport and Waste Safety, opened the meeting with remarks that highlighted the importance of the work that was being done at the Technical Meeting (TM). Mr Hahn emphasized that the work being carried out in response to the President’s Findings and the follow-up TM to the 2011 Transport conference is relevant and useful and will continue with further TMs in the next 2 years. A copy of Mr Hahn’s opening remarks is included in Annex 1.

1.2. Chair Opening
Mr William Brach, Chairman of TRANSSC, provided opening remarks in his capacity as Chairman of the TM. He echoed the words of Mr Hahn and acknowledged the attendees that were attending an IAEA TM for the first time. He also acknowledged the participation of regional coordinators from various countries who were attending the TM to focus on Denial of Shipment. While the main focus of the meeting is to explore potential changes to the current transport regulations (SSR-6), Mr Brach noted that there may be specific issues that could be recommended for further consideration or study by the IAEA and that issues in such categories should be noted by the working groups. A copy of Mr Brach’s opening remarks is included in Annex 2.

1.3. Introductions
The members of the TM were given the opportunity for short introductions. A list of meeting attendees is included in Annex 3.

1.4. Administrative Arrangements
Mr Bajwa, the Scientific Secretary for the meeting, provided a brief discussion of administrative procedures and arrangements related to the meeting.

1.5. Agenda
While discussed earlier by the Chair, Mr Brach, following his opening remarks, the Agenda was discussed further, with the addition of a re-convening of plenary on Wednesday (April 10th), to consider two presentations from members of the Dual Purpose Cask Safety Case Working Group that met in Vienna the same week, as well as provide an update on the International Workshop on Transport of Class 7 Dangerous Goods, sponsored by the World Nuclear Association, which took place in Fairmont, Singapore on April 8th and 9th, 2013. Working group chairs would then be given the opportunity to provide brief updates on their progress, bringing any issues and considerations forward that might be pertinent to the other working groups. The Final Agenda is attached in Annex 4.

1.6. Terms of Reference
The Terms of Reference for the meeting were reviewed and accepted. The Terms of Reference are attached in Annex 5.

1.7. Conduct of the Meeting
The conduct of the meeting was briefly discussed. After the plenary the TM would divide into working groups to review the recommendations from the October 2011 International Conference on the Safe and Secure Transport of Radioactive Material (Transport Conference), and the March 2012 follow-up TM, to identify potential changes to the transport safety standards and issues for future study and or review. The TM plenary would consider the output from the working groups.
2. PRESENTATION OF INFORMATION
   2.1. Review of President’s findings and Conclusions of TM 43650
   The Scientific Secretary provided a presentation on the President’s Findings and Conclusions of the March 2012 follow-up TM to the 2011 Transport Conference.

   2.2. Work Plan Development for Working Groups (WGs)
   The Scientific Secretary provided a presentation which provided more precisely focused areas for working group discussions. The areas that were targeted for the working groups were: Technical Basis Document input to regulatory changes (Working Group 1), Denial and Delay of Shipment (Working Group 2), Harmonization (Working Group 3), and Implementation of the Regulations (Working Group 4).

   2.3. Terms of Reference for WGs
   The Terms of Reference for each of the working groups were presented to the meeting participants. The Terms of Reference provided specific questions for consideration of the working groups in each of the areas mentioned above. The Terms of Reference for the four working groups were accepted by the TM plenary and are provided in Annex 6.

3. DISCUSSION/WORKING GROUPS
   3.1. Working Group (WG) Logistics
   With the announcement of the working group chairs, meeting attendees were asked to assign themselves a specific working group.

   3.2. Dismissal from Plenary to Working Groups
   Working groups were then convened to begin their work.

   3.3. Working Group Discussions
   Discussions continued until the afternoon of 10 April, 2013.

   3.4. Reconvene Plenary
   Plenary was reconvened the afternoon of 10 April, 2013.

   3.4.1. Information Presentations

      3.4.1.1. Presentation on Dual Purpose Cask Safety Case Working Group
      Ms Yumiko Kumano provided a presentation on the working group on the development of the Dual Purpose Cask Safety Case (TM-44985). Ms Kumano specifically mentioned recommendations that the working group intended to make to TRANSSC.

      3.4.1.2. Presentation on Inspection of Spent Fuel in Dry Storage at the Fukushima Daiichi Nuclear Power Plant
      Mr Toshiari Saegusa provided a presentation on the inspection of spent fuel in dry storage casks at the Fukushima Daiichi nuclear power plant. The presentation was recently released by Tokyo Electric Power Company (TEPCO) and translated by Central Research Institute of Electric Power Industry (CRIEPI) to provide to the Dual Purpose Cask Working Group TM this week. Mr Saegusa presented a video, also developed by TEPCO, which provided a “virtual tour” of the Fukushima site as of December 2012.

   Copies of both of the presentations and the video described above were posted to the TM-44897 web folder.

   3.4.2. Discussion of the International Workshop on Transport of Class 7 Dangerous Goods
   Ms Nancy Capadona of the IAEA provided a brief update on the International Workshop on Transport of Class 7 Dangerous Goods, sponsored by the World Nuclear Association,
occurring this week in Singapore. Feedback on the issues discussed at the workshop was relevant to the discussions in the current TM on transport and specifically for the area of denials of shipment. A brief letter report on the outcomes of the meeting has been posted to the TM website.

3.4.3. Working Group Updates

Working group chairs provided brief updates on the progress made up to this point from their respective groups and shared issues that might be considered by the other working groups at the TM. In general, while there were issues shared between the working groups there were no new major areas identified.

3.5. Dismiss Plenary - Return to Working Groups

The plenary was dismissed and the working groups reconvened for the balance of the afternoon.

3.6. Reconvene Plenary

Plenary was reconvened on the afternoon of 11 April 2013.

3.7. Working Group Reports

3.7.1. Working Group 1

The Chair of WG 1 presented the results of their discussions on the technical basis document, the benefit of a communication program for transport similar to those in other industries, and the development of information packs on transport. No urgent need for the revision of the transport regulations, SSR-6, were identified by the working group based on their discussions. Specific areas for revisions to SSR-6 were discussed and recommendations were made for consideration of these changes in the on-going review cycle for SSR-6. The details of these recommendations are provided in the working group report in Annex 7.1.

3.7.2. Working Group 2

The Chair of WG 2 presented the results of their discussion on denial of shipment in reviewing draft security requirements documents and their potential impact on denials and delays, reviewed the provisions of the action plan developed by the International Steering Committee on Denial of Shipment (ISC), and reviewed the 11 recommended actions concerning denial of shipment from the March 2012 follow up TM to the 2011 Transport Conference. In addition, country templates related to denial of shipment for the Transport Safety Unit SharePoint site were also addressed. Discussion on the transition of the ISC actions to TRANSSC and the inter-agency group also occurred. No urgent need for the revision of SSR-6 was identified by the working group based on their discussions. The working group developed recommendations, primarily focused on the reduction of delays and denials, especially in the area of education, training, and guidance. The details of these recommendations are provided in the working group report in Annex 7.2.

3.7.3. Working Group 3

The Chair of WG 3 presented the results of their discussion on harmonization of the transport regulations, developing “model” regulations using the basic format of TS-G-1.6, development of an outline for a cost-benefit methodology for regulatory changes, and clarity of the regulatory language. No urgent need for the revision of SSR-6 was identified by the working group based on their discussions. The working group developed recommendations to improve harmonization of transport regulations both between international organizations and between national regulators, use of content from TS-G-1.6 for incorporation into the UN Orange Book and SSR-6, the development of a safety guide on cost-benefit analysis methodologies, and clarity in writing regulations. The details of these recommendations are provided in the working group report in Annex 7.3.
3.7.4. Working Group 4
The Chair of WG 4 presented the results of their discussion on state implementation issues with the transport regulations and examination of lessons learned from non-radioactive incidents or events. No urgent need for the revision of SSR-6 was identified by the working group based on their discussions. The working group developed recommendations involving regulatory implementation radiation protection programs, classification, transport of large objects, radiation monitoring, and clarification of the regulations. Recommendations were also provided for improved guidance in the areas of human factors and safety culture. The details of these recommendations are provided in the working group report in Annex 7.4.

3.7.5. Summary of WG Presentations
In general, while there were no urgent changes to SSR-6 identified by the four working groups, there were many recommendations for potential revisions to SSR-6 to be considered by the Secretariat as part of the on-going review cycle. In addition, a number of recommendations for review of the Transport Regulations of the IAEA, UN Orange Book, and the UN modal organizations to improve harmonization, clarity, simplification and consistency were provided. Recommendations were also provided suggesting revisions to existing Safety Guides and the development of new Safety Guides. Finally, a number of recommendations were suggested for specific Secretariat action. All of the recommendations will be reviewed by the Secretariat and, as appropriate, added to the Transport Safety Work Plan.

3.8. Concluding Discussion
The Chair commended the Working Groups Chairs and participants for their hard work and focus efforts to provide recommendations on changes to the transport safety standards and other areas for which additional study is needed. The Chair offered the opportunity for any concluding remarks or additional discussion to the participants on the TM, and there were no additional comments or remarks.

4. REPORT AND CLOSING
4.1. Plenary – acceptance of meeting report
The draft meeting report was reviewed by the TM plenary. Discussion on the final report resulted in some additions to the report as well as editorial corrections and clarifications. Following these changes and additions the TM accepted the meeting report.

4.2. Closing
The Chair offered his concluding remarks on the TM, stating that the working groups had discussed, analysed and recommended a path forward for Secretariat consideration on a wide range of very complex issues. The recommendations from the Working Groups provide possible changes to the Transport Regulations as well as new and revised safety guidance. The chair noted the similarity of the TM recommendations on denials and delays of shipment with the outcome of the international workshop on the transport of dangerous goods (sponsored by WNA) held in Singapore earlier this week. The TM also identified many candidate topics that could be addressed in future IAEA meetings as identified by Mr Hahn in his opening remarks. The Chair again thanked all participants for their hard work and active engagement in meeting deliberations and wished all a safe trip home.

The Transport Safety Unit Head, Mr Stewart, offered closing remarks on the TM from the IAEA perspective. He thanked all the meeting participants for the work they had done in the working groups to consider the findings of the transport conference and recommendations of the March 2012 TM. He noted that all the working groups concluded that there was no immediate need for changes to SSR-6, and the recommendations to further reduce the incidences of denials and delays
in part with a renewed emphasis on training and education. He also mentioned the recommendations on harmonization, cost-benefit considerations, and implementation of the regulations by Member States specifically with consideration of human factors and safety culture. Finally, he complimented the participants of the TM for providing substantial recommendations on a large number of issues in a very short period of time. Mr Stewart concluded by thanking everyone, once again, for their work and wished them safe travels.

Annexes

1. Opening remarks by Director, NSRW.
2. Opening remarks by TM Chair
3. List of Attendees
4. Final Agenda
5. Terms of Reference for TM
6. Terms of Reference for Working Groups
7. Working Group Reports
   7.1 Working Group 1
   7.2 Working Group 2
   7.3 Working Group 3
   7.4 Working Group 4
Annex 1

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

Opening remarks by Director, NSRW
Good Morning. I would like to welcome all of you to Vienna, and thank each of you for your continued dedication to the safe transport of radioactive material and of your support of the work that the IAEA is doing in this area.

This week you will continue the important work of considering the findings of the International conference on Safe and Secure Transport of Radioactive Material, held here in Vienna in October of 2011, which celebrated the 50th anniversary of the issue of the first Regulations for the Safe Transport of Radioactive materials by the IAEA in 1961. The subtitle of the conference was: “Creating a safe, secure and sustainable network”. If there was no radioactive material to transport, then it would be both safe and secure, but it would fail to meet that important third strand of sustainability. The conference was important to your work, in that it identified the need for harmonisation between UN bodies, member states, between safety and security, and of course, industry, in order to deliver the sustainable framework.

Many of you present today were able to attend that conference and contributed to making it a great success; however, our work on safe transport is far from complete. With the start of the review cycle for the 2012 edition of the transport regulations (SSR 6), your work this week will focus on a review of the findings from the conference and deriving from those findings potential revisions to the transport regulations.

Your working groups will focus on the 8 topical areas that were determined during the conference follow-up Technical Meeting held in March of last year. These areas include: Harmonisation, Denial of Shipments, The basis of the provisions, Safety requirements and security recommendations, National implementation and industry compliance, Emergency Response, Communication, and Regional considerations. From the specific tasks highlighted in these 8 areas, you will be able to recommend potential changes that might be necessary to the current transport regulations, or recommend areas for additional study or research.

Because the findings of the 2011 Transport Conference and the tasks highlighted in the follow-up Technical Meeting continue to be relevant and useful, funding has been authorized to facilitate the work that remains to be done on these findings. This will take the form of Technical Meetings in 2014 and 2015, to specifically address the topical areas previously mentioned and to address areas identified by you that require additional study.

I am particularly pleased to welcome Mr Bill Brach, the Chair of the Transport Safety Standards Committee as the Chair of this meeting, I wish you well over the next four days, and have no doubt that as a result of this meeting, you will provide useful recommendations for revision of the current transport regulations to make them even more practical, useful and accessible. I now turn to Mr. Brach for some opening remarks.
Annex 2

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

Opening remarks by TM Chair
OPENING REMARKS
BY BILL BRACH

TECHNICAL MEETING
TO PRODUCE CONSOLIDATED DRAFTS OF THE IAEA’S NEW TRANSPORT SAFETY STANDARDS TAKING INTO ACCOUNT THE RESULTS OF THE 2011 INTERNATIONAL CONFERENCE ON THE SAFE AND SECURE TRANSPORT OF RADIOACTIVE MATERIAL
(TM44897)


I want to “Thank” the IAEA for asking me to Chair this meeting. It is indeed an honor for me to have this opportunity to work with you in this very important undertaking this week to produce and to provide to the IAEA our collective recommendations on candidate changes to the transport safety standards.

Let me also add my welcome to all our meeting participants and visitors. Many of you here today, as Mr. Hahn noted, were also participants in the October 2011 international transport conference and participants in the follow on Technical Meeting in March 2012. I also note that some of you did not attend the previous meetings and I clearly want to welcome you to this meeting. In addition, I want to welcome the regional coordinators involved in the IAEA’s denial of shipment activities to our meeting. Your participation, your commitment and your engagement are critical to our success in this meeting.

The IAEA General Conference in September 2012 called upon Member States and the Secretariat to take immediate action on the outcomes of the 2011 international transport conference and the March 2012 Technical Meeting. Our charge this week is, in large part, to respond to the direction of the General Conference. Our objective is to produce a set of recommendations for change to the transport safety standards based on and taking into account the President’s Findings from the October 2011 conference and the recommended actions resulting from the March 2012 Technical Meeting. For many of the topics and issues we will be discussing, I anticipate that in lieu of specific recommendations for change to the transport safety standards, we may identify issues or activities for which additional study is needed to determine if a change to the regulations or a change to one of the transport safety standards should be considered. I was very pleased to learn that the IAEA has budgeted and planned for additional meetings in the next two years to address those considerations that require additional study.
Many of you are aware that the IAEA is currently in the middle of a biennial review cycle for the Regulations for the Safe Transport of Radioactive Material, more commonly referred to now as SSR-6. I know to some of you the more commonly understood reference is to the old nomenclature, TS-R-1. My point in mentioning the ongoing review cycle for SSR-6 is that the timing for this Technical Meeting and the timing for our providing recommendations to the IAEA is opportune. At the June 2013 TRANSSC meeting, we will have a preliminary review of identified issues warranting consideration and of recommended changes to SSR-6. A final decision on whether to start a revision cycle for SSR-6 based on the significance of and the justification for the recommended changes will be made by TRANSSC at the October 2013 TRANSSC meeting.

The Secretariat has been very busy preparing for this meeting. To help guide our deliberations the Secretariat has analyzed the October 2011 Conference President’s Findings and the set of recommended actions from the March 2012 Technical Meeting. They have prepared a set of questions and considerations that will focus our review and I believe provide a sound framework for the conduct of this week’s meeting.

Let me now conclude my opening remarks by again welcoming you to our meeting and challenging you to actively engage in our deliberations. Each of you brings a wealth of experience and expertise, and often a different viewpoint to our deliberations that collectively will help us develop sound recommendations to provide to the IAEA.

Thank you.

Now let’s move to agenda item 1.3
Annex 3

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

List of Attendees
NOTIFICATION OF AN AGENCY MEETING

Department of: Nuclear Safety and Security
Division / Section of: NSRW - Regulatory Infrastructure and Transport Safety Section

Title of meeting: Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

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<td>Gewessler, Lynn Ann</td>
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<td>Zdravevska, Elena</td>
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<td>Austria</td>
<td>Mr. Kirchnawy Friedrich&lt;br&gt;<a href="mailto:friedrich.kirchnawy@bmvit.gv.at">friedrich.kirchnawy@bmvit.gv.at</a></td>
<td>Federal Ministry for Transport, Innovation and Technology BMVIT/IV/ST6 Radetzkystrasse 2 A-1030 Vienna Tel: +43 1 711 62 5771 Fax: +43 1 711 62 5725 Email: <a href="mailto:friedrich.kirchnawy@bmvit.gv.at">friedrich.kirchnawy@bmvit.gv.at</a></td>
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<td>Brazil</td>
<td>Mr. Bruno Natanael de Carvalho&lt;br&gt; <a href="mailto:nbruno@cnen.gov.br">nbruno@cnen.gov.br</a></td>
<td>Comissão National de Energia Nuclear (CNEN) Rua Gal Severiano, 90 22294-901 Rio de Janeiro Tel: +55 21 2542 2299 ext.: 2669 Email: <a href="mailto:nbruno@cnen.gov.br">nbruno@cnen.gov.br</a></td>
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<td>Canada</td>
<td>Mr. Ramsay Jeff&lt;br&gt;<a href="mailto:Jeff.Ramsay@cnsc-ccsn.gc.ca">Jeff.Ramsay@cnsc-ccsn.gc.ca</a></td>
<td>Transport Specialist Directorate of Nuclear Substance Regulation Canadian Nuclear Safety Commission 280 Slater Street PO Box 1046, Station B Ottawa K1P 5S9 Ontario Tel: +1 613 991 3179 Fax: +1 613 995 5086 Email: <a href="mailto:Jeff.Ramsay@cnsc-ccsn.gc.ca">Jeff.Ramsay@cnsc-ccsn.gc.ca</a></td>
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<td>China</td>
<td>Mr. Zhengcai Chen&lt;br&gt;<a href="mailto:zhengcaichen@yahoo.com.cn">zhengcaichen@yahoo.com.cn</a></td>
<td>Ministry of Transport Bureau of Waterway Transport No. 11 Jianguo Mennei Street 100736 Beijing Tel: +8610 65292225 Fax: +8610 65292638 Email: <a href="mailto:zhengcaichen@yahoo.com.cn">zhengcaichen@yahoo.com.cn</a></td>
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<td>France</td>
<td>Ms Colette</td>
<td>Deputy Director Transport and Sources</td>
<td>13 rue Louis Lejeune 92260 Fontenay-aux-Roses 92120 Montrouge</td>
<td>2013-04-08</td>
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<td></td>
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<td>Department Autorité de sûreté nucléaire</td>
<td>Tel: +33 1 46 16 4109 Email: <a href="mailto:colette.clemente@asn.fr">colette.clemente@asn.fr</a></td>
<td>2013-04-12</td>
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<tr>
<td>France</td>
<td>Mr Laurent</td>
<td>Permanent Mission of France to the IAEA</td>
<td>Schwarzenbergplatz 16 1010 Vienna</td>
<td>2013-04-08</td>
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<td>Email: <a href="mailto:laurent.kueny@diplomatie.gouv.fr">laurent.kueny@diplomatie.gouv.fr</a></td>
<td>2013-04-12</td>
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<tr>
<td>France</td>
<td>Mr Bernard</td>
<td>Vice President External Relations</td>
<td>1 rue de Hérons 78180 Montigny le Bretonneux</td>
<td>2013-04-09</td>
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<tr>
<td></td>
<td></td>
<td>TN International AREVA Logistics Business Unit</td>
<td>Tel: +33 1 34965332 Fax: +33 1 349 65477 Email: <a href="mailto:bernard.monot@areva.com">bernard.monot@areva.com</a></td>
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<td>France</td>
<td>Mr Vivien</td>
<td>ASN</td>
<td>15-21 rue Louis Lejeune 92120 Montrouge</td>
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<td>Email: <a href="mailto:vivien.tran-thien@asn.fr">vivien.tran-thien@asn.fr</a></td>
<td>2013-04-12</td>
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<tr>
<td>Germany</td>
<td>Mr Christel</td>
<td>Federal Office for Radiation Protection</td>
<td>PO Box 100149 38201 Salzgitter</td>
<td>2013-04-08</td>
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<td>Tel: +49 0 30 18333 1772 Email: <a href="mailto:cfasten@bfs.de">cfasten@bfs.de</a></td>
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<tr>
<td>Hungary</td>
<td>Ms Szepes</td>
<td></td>
<td>Hungarian Atomic Energy Authority (HAEA)</td>
<td>P.O. Box 676, Fenyes Adolf u. 4, 1036 Budapest</td>
<td>Tel: 00361 436 4889, Email: <a href="mailto:szepeszs@haea.gov.hu">szepeszs@haea.gov.hu</a></td>
</tr>
<tr>
<td>India</td>
<td>Mr Meenakaran</td>
<td>General Manager Customer Support</td>
<td>Board of Radiation &amp; Isotope Technology (BRIT)</td>
<td>VN Purav Marg., Anushaktinaga, Mumbai, 400 094</td>
<td>Tel: +91 22 2557 3534; Mobile: +91 986 947 3308 Email: <a href="mailto:dinameena@gmail.com">dinameena@gmail.com</a>, <a href="mailto:dinakaran@britatom.gov.in">dinakaran@britatom.gov.in</a></td>
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<td>Indonesia</td>
<td>Ms Sinaga</td>
<td>Director</td>
<td>Nuclear Energy Regulatory Agency (BAPETEN)</td>
<td>JL. Gajahmada No.8, Jakarta</td>
<td>Tel: +62216302547, Fax: +62216302547 Email: <a href="mailto:d.sinaga@bapeten.go.id">d.sinaga@bapeten.go.id</a></td>
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<td>Italy</td>
<td>Mr Trivelloni</td>
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<td>Institute for Environmental Protection and Research (ISPRA)</td>
<td>Via Vitaliano Brancati, 48 00144 Rome</td>
<td>Tel: +39 0650 072978, Fax: 0039 06 50072941 Email: <a href="mailto:sandro.trivelloni@isprambiente.it">sandro.trivelloni@isprambiente.it</a></td>
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<td>Japan</td>
<td>Ms Konnai Akiko</td>
<td>National Maritime Research Institute</td>
<td><a href="mailto:konnai@nmri.go.jp">konnai@nmri.go.jp</a></td>
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<tr>
<td>Korea, Republic of</td>
<td>Mr Cho Woon-Kap</td>
<td>Korea Institute of Nuclear Safety (KINS)</td>
<td><a href="mailto:k485cwk@kins.re.kr">k485cwk@kins.re.kr</a></td>
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<td>Madagascar</td>
<td>Mr Zafimanjato Joseph Lucien</td>
<td>Institut national des sciences et techniques</td>
<td><a href="mailto:jln@moov.mg">jln@moov.mg</a>; <a href="mailto:jl_zafimanjato@yahoo.fr">jl_zafimanjato@yahoo.fr</a></td>
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<td>Netherlands</td>
<td>Mr Keller Bernd</td>
<td>Ministry of Infrastructure and the Environment</td>
<td><a href="mailto:Bernd.Keller@ilent.nl">Bernd.Keller@ilent.nl</a></td>
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<td>Email: <a href="mailto:Bernd.Keller@ilent.nl">Bernd.Keller@ilent.nl</a></td>
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<td>Peru</td>
<td>Mr Mallaupoma Gutierrez</td>
<td><a href="mailto:mmallaupoma@ipen.gob.pe">mmallaupoma@ipen.gob.pe</a></td>
<td>Instituto Peruano de Energia Nuclear (IPEN) Avenida Canadá 1470 San Borja, Lima 41</td>
<td>+5114885050</td>
<td>+5114885224</td>
</tr>
<tr>
<td>Poland</td>
<td>Mr Grzegzolk</td>
<td><a href="mailto:grzegzolka@zuop.pl">grzegzolka@zuop.pl</a></td>
<td>Radioactive Waste Management Plant 7 Soltana Str. 05-400 Otwock Swierk</td>
<td>0048 22 7180094</td>
<td>0048 22 7180256</td>
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<tr>
<td>Poland</td>
<td>Mr Snopek</td>
<td><a href="mailto:snopek@zuop.pl">snopek@zuop.pl</a></td>
<td>Radioactive Waste Management Plant 7 Soltana Str. 05-400 Otwock Swierk</td>
<td>0048 22 7180108</td>
<td>0048 22 7180257</td>
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<tr>
<td>Russian Federation</td>
<td>Ms Budu</td>
<td><a href="mailto:madalina@msk.sosny.ru">madalina@msk.sosny.ru</a></td>
<td>Research and Development Co. &quot;Sosny&quot; 11 Derbenyevskaya Quay Pollars Business Center, Office B405 117218 Moscow</td>
<td>007 495 913 67 15</td>
<td>007 495 9136716</td>
</tr>
<tr>
<td>South Africa</td>
<td>Ms Mmutle</td>
<td><a href="mailto:nmmutle@nrr.co.za">nmmutle@nrr.co.za</a></td>
<td>National Nuclear Regulator (NNR) P. O. Box 7106, Cnr Embankment and Hendrik Verwoerd Drive 0046 Centurion</td>
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<td>Sweden</td>
<td>Mr. Mennerdahl</td>
<td>E Mennerdahl Systems</td>
<td>Starvaegen 12 SE-183 57 Taby</td>
<td><a href="mailto:dennis.mennerdahl@ems.se">dennis.mennerdahl@ems.se</a></td>
<td>2013-04-08</td>
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<tr>
<td></td>
<td>Dennis,</td>
<td></td>
<td>Tel: +46 8 756 5812 Email: <a href="mailto:dennis.mennerdahl@ems.se">dennis.mennerdahl@ems.se</a></td>
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<tr>
<td>Sweden</td>
<td>Mr. Nilsson</td>
<td>Swedish Radiation Safety Authority</td>
<td>SE-171 16 Stockholm</td>
<td><a href="mailto:thomas.nilsson@ssm.se">thomas.nilsson@ssm.se</a></td>
<td>2013-04-08</td>
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<tr>
<td></td>
<td>Thomas,</td>
<td></td>
<td>Tel: +46 8 799 4380 Email: <a href="mailto:thomas.nilsson@ssm.se">thomas.nilsson@ssm.se</a></td>
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<tr>
<td>Tunisia</td>
<td>Mr. Sboui</td>
<td>Head of Division</td>
<td>Ministere du Transport</td>
<td><a href="mailto:nabila.sboui@mt.gov.tn">nabila.sboui@mt.gov.tn</a></td>
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<td>Nabila,</td>
<td>Legal Department</td>
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<tr>
<td>United Republic of</td>
<td>Mr. Ngaile</td>
<td>Tanzanian Atomic Energy Commission</td>
<td>Njiro Area Block J P.O. Box 743 Arusha</td>
<td><a href="mailto:jngaile@yahoo.com">jngaile@yahoo.com</a></td>
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<tr>
<td>Tanzania</td>
<td>Justin Emmanuel,</td>
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<td>Tel: +255 2725 08554 Fax: +255 2725 09709</td>
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<td>America</td>
<td>E. William,</td>
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<td>Mail Stop: EBB-1-D02M Washington, D.C. 20555-0001 Tel: +1 301 492 3262 Fax: +1 301 492 3360 Email: <a href="mailto:Bill.Brach@nrc.gov">Bill.Brach@nrc.gov</a></td>
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<td>United States of America</td>
<td>Mr. Pope</td>
<td><a href="mailto:Poper787@comcast.net">Poper787@comcast.net</a></td>
<td>11262 Weatherstone Drive 17268 Waynesboro Pennsylvania</td>
<td>2013-04-08</td>
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<td>Ronald Beck</td>
<td></td>
<td>Email: <a href="mailto:Poper787@comcast.net">Poper787@comcast.net</a></td>
<td>2013-04-12</td>
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<tr>
<td>International Source Suppliers and Producers Association (ISSPA)</td>
<td>Mr. Rijpkema</td>
<td><a href="mailto:Juul.Rijpkema@Covidien.com">Juul.Rijpkema@Covidien.com</a></td>
<td>Representative of ISSPA Manager Regulatory Compliance &amp; Transport Security Mallinckrodt Medical B.V., a Pharmaceuticals business of Covidien Petten</td>
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<td>Julius</td>
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<td>Email: <a href="mailto:Juul.Rijpkema@Covidien.com">Juul.Rijpkema@Covidien.com</a></td>
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<td>Nuclear Energy Agency of the Org. for Economic Co-operation and Development</td>
<td>Ms. Kwong</td>
<td><a href="mailto:gloria.kwong@oecd.org">gloria.kwong@oecd.org</a></td>
<td>Radioactive Waste Management Division Tel: +33 1 4524 1049 Email: <a href="mailto:gloria.kwong@oecd.org">gloria.kwong@oecd.org</a></td>
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<td>World Nuclear Transport Institute</td>
<td>Mr. Bonnardel-Azzarelli</td>
<td><a href="mailto:bettyba@wnti.co.uk">bettyba@wnti.co.uk</a></td>
<td>World Nuclear Transport Institute (WNTI) Remo House; 310-312 Regent Street London W1B 3AX Tel: +44 207 580 1144 Fax: +44 207 580 5365 Email: <a href="mailto:bettyba@wnti.co.uk">bettyba@wnti.co.uk</a></td>
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<td>World Nuclear Transport Institute</td>
<td>Mr. Owen</td>
<td><a href="mailto:garry.c.owen@innuserv.com">garry.c.owen@innuserv.com</a></td>
<td>World Nuclear Transport Institute Remo House, 4th Floor 310-312 Regent Street London, W1B 3AX Tel: +44 (0) 1925 832 875 Email: <a href="mailto:garry.c.owen@innuserv.com">garry.c.owen@innuserv.com</a></td>
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Annex 4

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

Final Agenda
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

TM-44897

MOE Press Briefing Room

IAEA Headquarters, Vienna

8 to 12 April 2013

FINAL AGENDA
1. OPENING
   1.1. Director - NSRW Opening
   1.2. Chair Opening
   1.3. Introductions
   1.4. Administrative Arrangements
   1.5. Agenda
   1.6. Terms of Reference
   1.7. Conduct of the Meeting
2. PRESENTATION OF INFORMATION
   2.1. Review of Presidents findings and Conclusions of TM 43650
   2.2. Work Plan Development for Working Groups (WGs)
   2.3. Terms of Reference for WGs
3. DISCUSSION/WORKING GROUPS
   3.1. Working Group (WG) Logistics
   3.2. Dismissal from Plenary to Working Groups
   3.3. Working Group Discussions
   3.4. Reconvene Plenary
        3.4.1. Information Presentations and WG updates
   3.5. Dismiss Plenary - Return to Working Groups
   3.6. Reconvene Plenary
   3.7. Working Group Reports
   3.8. Concluding Discussion
4. REPORT AND CLOSING
   4.1. Plenary – approval of report
   4.2. Closing
        4.2.1. TSU Unit Head
        4.2.2. TM Chair

Meeting Chair: E. Brach
Scientific Secretary: Mr. Chris Bajwa

Schedule*:
Monday 10:00 start
Tuesday: 9:00 start
Wednesday: 9:00 start
Thursday: 9:00 start
Thursday PM: Draft report emailed to participants
Friday 10:00 start, conclude by 12:00

*Schedule is at the Chair's discretion and may be modified.

Breaks: mid-morning and mid-afternoon approx. 20 min
        Lunchtime 60-90 minutes

Reception: Tuesday 17:30
Annex 5

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

Terms of Reference for TM
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking Into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

IAEA Headquarters, Vienna
8 to 12 April 2013

FINAL TERMS OF REFERENCE
Terms of Reference

A. Background:

On the fiftieth anniversary of the issue by the International Atomic Energy Agency (IAEA) in 1961 of its first Regulations for the Safe Transport of Radioactive Materials, the International Conference on the Safe and Secure Transport of Radioactive Material: The Next Fifty Years of Transport — Creating a Safe, Secure and Sustainable Framework (Transport Conference), was held in Vienna in October 2011. The President’s findings from the Transport Conference were considered in a March 2012 Technical Meeting which produced a report of recommended activities to address the President’s findings. The outline of work prepared for the Technical Meeting summarized the President’s findings under eight topical areas including: harmonization, denials of shipment, basis of provisions, Safety Requirements and security recommendations, national implementation and industry compliance, emergency response, communications, and regional considerations. A ninth topic in the Transport Conference President’s findings on liability was not addressed by the Technical Meeting because that topic had been assigned to the International Expert Group on Nuclear Liability (INLEX) for consideration. This Technical Meeting (TM) is to focus on the implications of the President’s findings from that conference as well as the recommendations from the subsequent follow-up TM on the upcoming review cycle for the 2012 version of the Regulations for the Safe Transport of Radioactive Materials (SSR-6).

B. Work to be done

The participants of this Technical Meeting are asked to:

1) Review the President’s findings from the 2011 Transport Conference and the recommendations from the subsequent follow-up TM 43650.

2) Determine which findings and/or recommendations might directly impact the current review cycle for the 2012 version of the Regulations for the Safe Transport of Radioactive Materials (SSR-6).

3) Develop recommendations for revision of the regulations or identified issues that warrant further study based on the documentation reviewed during the TM.

C. Expected Output

The expected output from the Technical Meeting is a list of recommended changes to the Transport Regulations based on consideration of the 2011 Transport Conference President’s findings and the March 2012 TM-43650. In addition, the Technical Meeting may also produce a list of identified issues that warrant further study and review, an activity that may in the future also result in proposed changes to the Transport Regulations.
Annex 6

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

Terms of Reference for Working Groups
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking Into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

IAEA Headquarters, Vienna
8 to 12 April 2013

FINAL TERMS OF REFERENCE
for Working Group #1

For reasons of economy, this document will not be available at the meeting. Participants are kindly asked to bring their copies to meetings and not to request additional copies.
Terms of Reference for Working Group #1

A. Background:

On the fiftieth anniversary of the issue by the International Atomic Energy Agency (IAEA), in 1961, of its first Regulations for the Safe Transport of Radioactive Materials, the International Conference on the Safe and Secure Transport of Radioactive Material: The Next Fifty Years of Transport — Creating a Safe, Secure and Sustainable Framework (Transport Conference), was held in Vienna in October 2011. The President's findings from the Transport Conference were considered in a March 2012 Technical Meeting which produced a report of recommended activities to address the President's findings. The outline of work prepared for the Technical Meeting summarized the President's findings under eight topical areas including: harmonization, denials of shipment, basis of provisions, Safety Requirements and security recommendations, national implementation and industry compliance, emergency response, communications, and regional considerations. This Technical Meeting (TM) is to focus on the implications of the President's findings from the Transport Conference as well as the recommended actions from the subsequent follow-up TM. The Working Groups will focus on specific elements within the eight topical areas to, primarily, determine if recommendations for changes to the regulations should be considered during the current review cycle for the Regulations for the Safe Transport of Radioactive Materials, 2012 Edition (SSR-6); or if additional study is needed to determine if a change to the regulations should be considered.

B. Work to be done

To assist the Working Groups in their deliberations, the Secretariat has developed a set of questions and considerations to help guide and focus the Working Group deliberations on regulatory change. The questions and considerations were developed based on the topical areas and recommendations from the March 2012 Technical Meeting. The participants of this Working Group are asked to consider the following:

1) What considerations from the Technical Basis effort could provide for revisions to the regulations?

2) Would transport benefit from a communication program similar to those established in other industries? (i.e., the chemical responsible care program)
   a. What changes to the regulations would be needed to facilitate establishing a communication program for transport?

3) What general information could be included for “information packs” on transport?

C. Expected Output

A working group report will be drafted and will include details on the work completed in the areas of work highlighted in Section B above.
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking Into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

IAEA Headquarters, Vienna
8 to 12 April 2013

FINAL TERMS OF REFERENCE
for Working Group #2
A. Background:

On the fiftieth anniversary of the issue by the International Atomic Energy Agency (IAEA), in 1961, of its first Regulations for the Safe Transport of Radioactive Materials, the International Conference on the Safe and Secure Transport of Radioactive Material: The Next Fifty Years of Transport — Creating a Safe, Secure and Sustainable Framework (Transport Conference), was held in Vienna in October 2011. The President's findings from the Transport Conference were considered in a March 2012 Technical Meeting which produced a report of recommended activities to address the President's findings. The outline of work prepared for the Technical Meeting summarized the President's findings under eight topical areas including: harmonization, denials of shipment, basis of provisions, Safety Requirements and security recommendations, national implementation and industry compliance, emergency response, communications, and regional considerations. This Technical Meeting (TM) is to focus on the implications of the President’s findings from the Transport Conference as well as the recommended actions from the subsequent follow-up TM. The Working Groups will focus on specific elements within the eight topical areas to, primarily, determine if recommendations for changes to the regulations should be considered during the current review cycle for the Regulations for the Safe Transport of Radioactive Materials, 2012 Edition (SSR-6); or if additional study is needed to determine if a change to the regulations should be considered.

B. Work to be done

To assist the Working Groups in their deliberations, the Secretariat has developed a set of questions and considerations to help guide and focus the Working Group deliberations on regulatory change. The questions and considerations were developed based on the topical areas and recommendations from the March 2012 Technical Meeting. The participants of this Working Group are asked to consider the following:

1) Could changes to the regulations potentially reduce the incidences of denial?

2) Review of Draft Security Requirements Documents
   a. If implemented, could the security requirements in the documents lead to denials?
   b. If so, are there changes in the transport regulations that could preclude this?
   c. If not, the proposed security provisions that could cause difficulties in transport should be highlighted.

3) Provisions of the ISC action plan should be reviewed. Do any of the action plan provisions require changes to the regulations?

C. Expected Output

A working group report will be drafted and will include details on the work completed in the areas of work highlighted in Section B above.
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking Into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

IAEA Headquarters, Vienna
8 to 12 April 2013

FINAL TERMS OF REFERENCE
for Working Group #3
Terms of Reference for Working Group #3

A. Background:
On the fiftieth anniversary of the issue by the International Atomic Energy Agency (IAEA), in 1961, of its first Regulations for the Safe Transport of Radioactive Materials, the International Conference on the Safe and Secure Transport of Radioactive Material: The Next Fifty Years of Transport — Creating a Safe, Secure and Sustainable Framework (Transport Conference), was held in Vienna in October 2011. The President's findings from the Transport Conference were considered in a March 2012 Technical Meeting which produced a report of recommended activities to address the President's findings. The outline of work prepared for the Technical Meeting summarized the President's findings under eight topical areas including: harmonization, denials of shipment, basis of provisions, Safety Requirements and security recommendations, national implementation and industry compliance, emergency response, communications, and regional considerations. This Technical Meeting (TM) is to focus on the implications of the President's findings from the Transport Conference as well as the recommended actions from the subsequent follow-up TM. The Working Groups will focus on specific elements within the eight topical areas to, primarily, determine if recommendations for changes to the regulations should be considered during the current review cycle for the Regulations for the Safe Transport of Radioactive Materials, 2012 Edition (SSR-6); or if additional study is needed to determine if a change to the regulations should be considered.

B. Work to be done
To assist the Working Groups in their deliberations, the Secretariat has developed a set of questions and considerations to help guide and focus the Working Group deliberations on regulatory change. The questions and considerations were developed based on the topical areas and recommendations from the March 2012 Technical Meeting. The participants of this Working Group are asked to consider the following:

1) What revisions might need to be made to SSR-6 or the UN Orange book/ADR/ADN to promote further harmonization?

2) Consider review of TS-G-1.6 in developing simpler “model” regulations for Member States.

3) Develop and outline of a methodology for determining cost of safety/security regulatory changes
   a. What changes would be needed to incorporate such a methodology into the regulations?

4) What changes to the regulations could improve the clarity of regulatory language?

C. Expected Output
A working group report will be drafted and will include details on the work completed in the areas of work highlighted in Section B above.
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking Into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

IAEA Headquarters, Vienna
8 to 12 April 2013

FINAL TERMS OF REFERENCE
for Working Group #4

For reasons of economy, this document will not be available at the meeting. Participants are kindly asked to bring their copies to meetings and not to request additional copies.
Terms of Reference for Working Group #4

A. Background:
On the fiftieth anniversary of the issue by the International Atomic Energy Agency (IAEA), in 1961, of its first Regulations for the Safe Transport of Radioactive Materials, the International Conference on the Safe and Secure Transport of Radioactive Material: The Next Fifty Years of Transport — Creating a Safe, Secure and Sustainable Framework (Transport Conference), was held in Vienna in October 2011. The President's findings from the Transport Conference were considered in a March 2012 Technical Meeting which produced a report of recommended activities to address the President's findings. The outline of work prepared for the Technical Meeting summarized the President's findings under eight topical areas including: harmonization, denials of shipment, basis of provisions, Safety Requirements and security recommendations, national implementation and industry compliance, emergency response, communications, and regional considerations. This Technical Meeting (TM) is to focus on the implications of the President's findings from the Transport Conference as well as the recommended actions from the subsequent follow-up TM. The Working Groups will focus on specific elements within the eight topical areas to, primarily, determine if recommendations for changes to the regulations should be considered during the current review cycle for the Regulations for the Safe Transport of Radioactive Materials, 2012 Edition (SSR-6); or if additional study is needed to determine if a change to the regulations should be considered.

B. Work to be done
To assist the Working Groups in their deliberations, the Secretariat has developed a set of questions and considerations to help guide and focus the Working Group deliberations on regulatory change. The questions and considerations were developed based on the topical areas and recommendations from the March 2012 Technical Meeting. The participants of this Working Group are asked to consider the following:

1) What regulatory issues cause problems to implementation of the regulations by Member States?
   a. What changes or revisions to the regulations could solve these problems?

2) Examine lessons learned from non-radioactive transport or other incidents where the response\(^1\) system did not work as well as expected.
   a. What applications can be made to transport of radioactive material?
   b. Are changes to the regulations warranted given these “lessons learned”?
   c. What is the nature of these regulatory changes?

C. Expected Output
A working group report will be drafted and will include details on the work completed in the areas of work highlighted in Section B above.

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\(^1\) Working group discussions on emergency response should be coordinated with the staff of the IAEA Incident and Emergency Center, Emergency Preparedness Coordinator: Jean-Francois, LaFortune, J.Lafortune@iaea.org ext. 21423

For reasons of economy, this document will not be available at the meeting. Participants are kindly asked to bring their copies to meetings and not to request additional copies.
Annex 7

TM-44897 Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material

Working Group Reports
Annex 7.1  Report for Working Group 1
I. Introduction
The terms of reference ask for the following areas to be considered:

1) What considerations from the Technical Basis effort could provide for revisions to the regulations?

2) Would transport benefit from a communication program similar to those established in other industries? (i.e., the chemical responsible care program)

   a. What changes to the regulations would be needed to facilitate establishing a communication program for transport?

3) What general information could be included for “information packs” on transport?

Working Papers 1-3 were prepared for Working Group #1 before the meeting. They are attached as Annexes 1-3. Presentation material from the Responsible Care initiative of the International Council of Chemical Associations (ICCA) was discussed together with the IAEA chart "One Entry Point: “Transport Web Portal”" (Annex 3 to Working Group 2 report).

II. Contributors
Working Group 1 participants

   Dennis Mennerdahl (Chair)  Thomas Nilsson
   Andrzej Grzegrzolka        Bozydar Ryszard Snopek
   Betty Bonnardel-Azzarelli

Support from IAEA:

   William Brach              Ann-Margret Eriksson
   Jim Stewart                Chris Bajwa

III. The effort to document the Technical Basis for the IAEA Transport Regulations
An IAEA effort to establish and document the Technical Basis for the IAEA Transport Regulations, SSR-6 (2012 Edition) was initiated at a Technical Meeting in October 2010. Significant progress has been demonstrated at the follow-up Technical Meeting in 2011 and at a Consultant Meeting in March 2012. In connection with the March 2012 Meeting, a draft document with basic contents was prepared (June 2012). After that, a major effort has been made to find, compile and evaluate information sources to make the Technical Basis essentially complete. This has required searching for documents from the late 1950’s and later.

The Technical Basis effort clarifies existing requirements but also justifies removal of previous requirements and rejection of proposals for change. The documented justifications for removal and rejection are valuable to reduce repetition of the same requests and introducing rejected provisions while demonstrating the philosophy (safety culture) at the time.

Before a revision of the Regulations is acceptable, it has to be justified. Many considerations need to be made, including cost, improved safety, clarity/transparency, compatibility with other regulations, etc. Security is a concern that needs consideration and may justify revision of the Regulations if the revision is not providing unacceptable side-effects. Any conflict between proposals for change with the currently established Technical Basis for the Regulations needs to be considered and, if the change is implemented, the Technical Basis needs updating.
IV. Considerations from the Technical Basis effort for revisions of the regulations

A request by IAEA for Working Group 1 is to identify potential areas for revision of the Regulations based on the Technical Basis effort.

A major revision of the Regulations (SSR-6) was published only a few months ago and includes substantial changes in some areas, e.g. options for exception of fissile material from competent authority approval and from UN Number assignment as “FISSILE”. Many other changes have been discussed, with some being implemented. It is not expected that major changes to requirements are justified at this time. Some identified problems from the last review process may remain but they would have been accounted for if they had been considered urgent.

The ideas for revision of SSR-6 presented here are primarily related to the purposes of clarification, transparency and simplification of provisions.

Identified concerns that may justify revision of the Regulations

The concerns discussed by the Working Group are not intended to be a complete inventory of potential areas of revision of the Regulations. They include many of the concerns that have been expressed during the Technical Basis effort and some that have been expressed by participants at this Technical Meeting. Table 1 lists the concerns (issues) discussed during the meeting.

The two individuals that are currently in the process of finishing a complete draft of the Technical Basis effort are both present at this Technical meeting. Mr Pope, covering most of the requirements of the Regulations, has been asked if he has observed any paragraphs or requirements in SSR 6 that should be considered for revision. The response was that currently no such observation has been made. Mr Mennerdahl, focusing on criticality safety requirements in the Regulations (finding them essentially hidden in some paragraphs), has observed several paragraphs that should be clarified or even corrected. There are also other concerns expressed by Working Group 1 participants.

Table 1. A summary of concerns (issues) discussed during the meeting

<table>
<thead>
<tr>
<th>Subject</th>
<th>Id.</th>
<th>Issue</th>
<th>Para(s)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td></td>
<td>Energy release</td>
<td>104</td>
<td>Criticality not only radiation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Criticality safety</td>
<td>104</td>
<td>Criticality prevention “how to”</td>
</tr>
<tr>
<td>Scope</td>
<td></td>
<td>Non-transport operations</td>
<td>106</td>
<td>No safety, no authorization</td>
</tr>
<tr>
<td>Dual purpose of activity and</td>
<td></td>
<td>Confinement system def.</td>
<td>209</td>
<td>Original purpose needed</td>
</tr>
<tr>
<td>subcriticality control not clear from</td>
<td></td>
<td>Containment system def.</td>
<td>213</td>
<td>Depends on para, 209 solution</td>
</tr>
<tr>
<td>definitions</td>
<td></td>
<td>LSA-1 Clarification needed</td>
<td>226</td>
<td>Some criticality control built-in</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exempted package</td>
<td>231</td>
<td>Not package type – Criticality</td>
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<td>Radiation prot. programme</td>
<td>234</td>
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<td>Radioactive material</td>
<td>236</td>
<td>Clarify exclusion of criticality</td>
</tr>
<tr>
<td>Simplifications</td>
<td></td>
<td>Section IV classification/UN</td>
<td>Section IV</td>
<td>Can be clarified significantly</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Split FISSILE and exceptions</td>
<td>417</td>
<td>Simplify reference to para. 417</td>
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<tr>
<td></td>
<td></td>
<td>Example of simplification</td>
<td>565</td>
<td>Example provided by TM</td>
</tr>
<tr>
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<td>Incorrect split of paragraph</td>
<td>656</td>
<td>Inconsistent with para. 666</td>
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<td></td>
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<td>Location of uncertainties</td>
<td>676</td>
<td>Consider Section IV</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Individual package</td>
<td>681-682</td>
<td>Purpose not clear – Lost origin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>From allowed to shall</td>
<td>684</td>
<td>Permission intended</td>
</tr>
<tr>
<td>Document form</td>
<td></td>
<td>Format of regulations</td>
<td>SSR-6</td>
<td>Consider format harmonization</td>
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<tr>
<td>Focus on Guide</td>
<td></td>
<td>Simplify Advisory Material</td>
<td>TS-G-1.1</td>
<td>Remove explanatory material</td>
</tr>
</tbody>
</table>
Conclusions on discussions and proposals

There are no proposals for essential changes even if the confinement system issue may eventually lead to some change of current practices (going back to earlier, intended purposes). Even that should only involve documentation with advantages for emergency preparedness, and other operations where the containment system may be handled on its own.

All the proposals are intended to provide clarity and transparency, often with the added purposes of simplification and consistency.

The fact that most proposals are related to criticality safety or combinations of activity and criticality considerations needs some explanation.

Radioactive decay (accounting for subcritical neutron multiplication) and criticality are the two basic hazard sources that need to be accounted for. The IAEA has decided to treat criticality safety as an additional consideration, after activity has been accounted for. Since criticality is only a potential for a very small fraction of the radioactive material transports, the IAEA policy appears to be justified.

When criticality safety consideration has been added to definitions and requirements that appear to be activity-related only, it is essential to clarity, transparency and consistency that the added features or purposes are recognized. This is a safety principle (part of the IAEA safety culture) that needs to be maintained when provisions are modified or moved to different Sections or subsections of the Regulations.

Working Group 3 has already presented some draft information from discussion and conclusions in that group. Chapter 4 of the Working Group 4 draft report, with guidelines for improvements of the text of the Regulations, is closely related to the Working Group 1 discussion of revision to the Regulations. The guidelines appear to be very useful but some care is required not to change the intention when simplification and clarity are intended. Some of the Working Group 1 proposals for revision appear to be caused by mistakes in modifying or rewriting previous paragraphs and requirements with the purpose of clarification.

Priorities for action

There are three areas that should be given high priority:

- Issue 3. Clarification of the scope to remove any uncertainty about what operations are transport and thus assured to provide safety by compliance with the Regulations.
- Issues 4 and 14. Removal of the confinement system term and reinstallation of the intended requirements and properties.
- Issues 5-7. Clarification of the full purposes of LSA-I material, excepted package and the radiation protection programme.

1. Objective – Radiation and energy release

“104. The objective of these Regulations is to establish requirements that must be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the transport of radioactive material.”

Safety intended to be covered by the Regulations is related to two different hazard sources: radioactivity (including subcritical neutron multiplication) and self-sustaining fission chains (criticality). Both hazard sources result in release of radiation and energy in other forms.
Understanding potential consequences of a criticality event is an important part of the Technical Basis for the Regulations and this is evident already from the development of the first edition in 1961.

**WG1 concern:** The fundamental objective of the Regulations was established many years ago. The focus on radiation doses is obvious but it does not appear to provide a complete set of objectives. Energy release in other forms than radiation has been considered as a criticality event consequence. It may be a source for damage to package containment and shielding of radioactive material but also to other harmful effects than radiation.

**WG1 proposal 1:** SSR 6, paras 101-104. Add energy release as an effect (in addition to radiation). The Technical Basis should confirm that a nuclear explosion in transport of radioactive material covered by the Regulations is not credible and capture the improvements in understanding that other potential consequences of a criticality event since the first edition of the Regulations published (1961).

### 2. Objective – Criticality safety is more than prevention

Consideration of criticality as a hazard source is traditionally made through efforts to prevent criticality from occurring. That is a method (how to comply with requirements) rather than a major objective (what to accomplish). Experience from the last 50 years demonstrates that adequate safety can be achieved even when criticality is credible. This is also consistent with established criticality safety standards that allow some relaxation of requirements when a criticality event is not expected to cause any significant harm.

Some of the credible accident scenarios that need to be accounted for in containment of some radioactive material are not required to be subcritical. This has been demonstrated during discussions and implementations of new requirements such as crush test (1985 Edition), deep sea immersion (1985 Edition) and Type C air accident conditions (1996 Edition).

**WG1 concern:** The fact that criticality may be acceptable under credible but extreme accident conditions should be reflected in the discussion on methods of how to meet the objective in para. 104.

**WG1 proposal 2:** SSR 6, para. 104. Consider changing “prevention of criticality” to “preservation of criticality safety” in the para. 104 list of methods to meet the objective. This can subsequently be clarified by the statement that criticality safety primarily relies on prevention of criticality.


Paras 105, 106 and 511. Working Paper 2 provides some background on this issue.

Para. 105 states: “In the transport of radioactive material, the safety of persons and the protection of property and the environment are assured when these Regulations are complied with”.

Para. 106 of SSR-6 contains a complicated collection of operations that are stated to comprise transport and for which the Regulations thus apply.

“511. Packages that are damaged or leaking radioactive contents in excess of allowable limits for normal conditions of transport may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.”
WG1 concern: Most of the operations in para. 106 are not transport of radioactive material and are not authorized by the Regulations (even though they may be required before transport). Safety during those operations is not assured by the Regulations.

Some of the listed operations can be explained in the Advisory Material as operations required before transport is authorized or as operations required after transport has been completed. The Regulations may require measurement of irradiated fuel but that does not imply that such measurements are authorized and certainly not that compliance with the Regulations assures safety (para. 105). There are many examples of requirements that involve operations not covered by the Regulations. Such operations are not within the scope of the Regulations.

WG1 proposal 3: SSR 6, paras 105-106. Restrict the scope to the operations for which the Regulations provide safety as well as are authorized by the Regulations and by competent authorities.

4. Definition – Confinement system and containment system
Paras 209 and 213. Working Paper 1 provides some background on this issue.

WG1 concern: The confinement system has several times been recognized as being an incorrect definition, providing incorrect messages, being interpreted very differently than the original intent, containing requirements in the definition that are not consistent with requirements in other sections (leading to neglect of the requirements while applying the definition as a complex set of requirements), etc. The concern has been recognized as legitimate by criticality specialists at various meetings, e.g. IAEA TM-38941 in January 2010.

WG1 proposal 4: Remove the term “confinement system” from Regulations. Return to previous (before 1996) requirement related to subcriticality of containment system. Clarify full intent of containment system. The U.S. national regulations have preserved the pre-1996 interpretation of this requirement. The U.S. has rejected the adoption of the confinement system concept as defined and applied in the Regulations. The U.S. discussion and experience may be studied for guidance on new text. The requirements in paras 681 and 682 need clarification.

The Advisory Material should express that the containment system is not necessarily required if the containment function is provided by the contents. A common example of interpretation difficulty is the LWR fuel rod cladding which is not a packaging component but often still is defined as a containment system.

5. Clarification of LSA-I – Dual purpose - Also a criticality safety concept
Para 226. Working Paper 3 provides some background on this issue.

WG1 concern: An improvement of the criticality safety requirements for packages that don’t require competent authority approval (previous 15 g limit, now paras 674 and 675) makes it difficult to ship LSA-I materials that have been packaged during many years for shipment to final disposal sites. The consignors also have to increase the formal hazard level from LSA-I to LSA-II to allow shipment of LWR fuel in IP-II packages. This does not appear to be contributing to a good safety culture. In both cases the reason is that there is no UN number for material that is both LSA-I and FISSILE. LSA-I material has been informally defined as covering both activity and criticality hazards together. As shown before the SSR 6 2012 Edition, LSA-I material complying with 15 g fissile exception criteria
were not demonstrated to provide a higher level of criticality safety (rather the opposite since the provision was removed for safety reasons). The Technical Basis for criticality safety requirements have aimed to result in a consistent safety level (extremely high) for all transport of fissile material.

**WG1 proposal 5:** Modify the definition to express the full purpose of LSA, including reasons for excluding some fissile materials and not others from LSA-I. Alternatively, allow LSA-I to be FISSILE, requiring a new UN number.

6. **Clarification of excepted package – Dual purpose - Also a criticality safety concept**

Para 231. Working Paper 3 provides some background on this issue.

**WG1 concern:** The Technical Basis efforts have shown that the “package type” term should be restricted to activity only. This is also clear from the definition of package. Fissile material and uranium hexafluoride require additional considerations. This does not apply to excepted packages since they have requirements both for activity limits and for criticality safety.

**WG1 proposal 6:** Modify the definition of package by removing excepted package from the list of “package types”. Retain a definition of excepted package (but not as a package type) and express its dual purpose. Reasons for excluding some fissile materials and not others should be subsequently documented in the Technical Basis document.

7. **Clarification of Radiation Protection Programme (RPP) – Dual purpose**

Para 234. Working Paper 3 provides some background on this issue.

“234. Radiation protection programme shall mean systematic arrangements that are aimed at providing adequate consideration of radiation protection measures.”

**WG1 concern:** It is not easy to recognize that the RPP also applies to criticality safety measures. This is clear from several documents and paragraphs, in particular para. 576(a) which allows for replacement of CSI with some other control for special use vessels.

**WG1 proposal 7:** Modify the definition to recognize that the RPP accounts for radiation protection and criticality safety measures.

8. **Definition of radioactive material – Dual purpose – Also for criticality safety**

Para 236. Working Paper 3 provides some background on this issue.

**WG1 concern:** If the activity limit for the definition of radioactive material is high enough to allow criticality of material not defined as radioactive material, under accident and human error conditions, then the fissile material definition and criticality safety requirements in the Regulations will not apply. As long as the title and scope of the Regulations only refer to radioactive material, criticality safety for materials that do not meet the radioactive material definition need to be assured. It has not been obvious from the Technical Basis efforts that such verification has been made. Current activity limits appear to provide adequate criticality safety and such a purpose needs to be clear and formally documented.
**WG1 proposal 8**: The definition of radioactive material should refer to a demonstrated “fact” that all fissile materials of potential criticality safety concern are covered.

9. **Section IV – Classification and UN number assignment for materials and packages**

Section IV.

**WG1 concern**: Working Group 1 spent considerable time on discussions on mixed packing of LSA and SCO materials in an IP-II package. The material could also be FISSILE (except for LSA-I). A single IP-II package can contain multiple materials, each requiring different UN numbers.

It has also been evident from the WG1 discussions as well as from the Technical Basis effort that the issue of classification versus UN number assignment is confusing to many people. Are both terms needed in Section IV? Also classification/UN number assignment for materials and for packages can be confusing. Classification is a common term applied to many areas, also for non-radioactive material, and it applies both to materials and to packages. Sometimes it is intended to have a precise meaning (without being defined) and sometimes it is used in a general sense. **WG1 proposal 9**: Consider removing the classification and classify terms from Section IV. UN number assignment should be sufficient. Make the need for separation of UN number assignment for materials and for packages easier to understand. Review this issue with a consideration of the harmonisation of UN Regulations.

10. **Classification and UN number assignment for fissile material**

Para. 417.

**WG1 concern**: This paragraph covers all fissile materials, both those that have to be assigned a UN number as FISSILE and those that are excepted from this requirement. It has been evident during the preparation of SSR 6 that references to the different provisions of para. 417 have often been incomplete. It would be much easier to avoid mistakes if para. 417 exceptions could be split from the main requirement for UN number assignment as FISSILE.

**WG1 proposal 10**: Prepare a clearer split of para. 417 into two main subparagraphs. Even clearer would be to have two separate paragraphs (maybe such a clarification can be made when other changes to para. numbers are made).

11. **Simplification of complicated requirements – Average surface heat flux**

Para. 565.

"565. Provided that its average surface heat flux does not exceed 15 W/m² and that the immediate surrounding cargo is not in sacks or bags, a package or overpack may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the competent authority in an applicable certificate of approval."

**Concern**: Request from outside the Working Group 1. The text was considered to be complicated and perhaps even incorrect. Are there too many negative terms? A short discussion was not conclusive but it was agreed that the text should be simplified.

A general structure of the sentence is: “Provided that both condition 1 and condition 2 apply, then operation A is allowed unconditionally, except when restricted by a certificate.”
It makes no difference if the conditions 1 and 2 are expressed as positive or negative terms (e.g. by replacing “does not exceed 15 $\text{W/m}^2$” with “is less or equal to 15 $\text{W/m}^2$”). The paragraph appears to be correct but complicated.

**WG1 proposal 11:** Consider clarifying the text without changing its meaning.

12. **Multiple requirements for environment temperature for type B(U) packages**

Paras 656 and 666.

“**REQUIREMENTS FOR TYPE B(U) PACKAGES**”

“653. A *package* shall be so designed that, under the ambient conditions specified in paras 656 and 657, heat generated within the *package* by the *radioactive* ...”

“654. A *package* shall be so designed that, under the ambient condition specified in para. 656 ...”

“655. Except ... under the ambient condition specified in para. 656... “

“656. The ambient temperature shall be assumed to be 38°C.”

“666. A *package* shall be designed for an ambient temperature range of –40°C to +38°C.”

**WG1 concern:** Paras 656 and 666 appear to be contradictory. Para. 656 was obtained by splitting a previous multiple requirement paragraph into multiple paragraphs (653-656). Para. 656 is only intended for parts of paras 653-655 and not to the remaining paras with requirements for type B(U) packages. An effort for simplification may have led to this editorial mistake, possibly causing confusion and even unacceptable designs.

**WG1 proposal 12:** Revise the text in paras 653-656 to assure that the correct intent is covered.

13. **Conservative assumptions when specifications are uncertain**

Paras 676.

“676. Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of paras 680–685 shall be performed assuming that each parameter that is not known has the value that gives the maximum neutron multiplication consistent with the known conditions and parameters in these assessments.”

**WG1 concern:** This requirement can be traced back to ancient editions of the Regulations when criticality safety requirements were collected into one Section or subsection. The assessments of package design requirements 680–685 are often completed many years, maybe decades, before the final shipments of radioactive material applying that design are completed. Further, the designer may not be aware of the future uses of the design. This requirement appears more to be guidance for a designer. However, for UN number assignment in Section IV, similar requirements are needed with a general purpose (not only criticality safety).

**WG1 proposal 13:** Consider adding a general requirement in Section IV related to accounting for uncertainties in material, packaging, presence of other materials/packages in the consignment, as well as other specifications. Failure to comply with para. 676 during design does not appear to be a safety concern since it will only limit the type of fissile material that can be shipped in the package
(possibly allowing a larger quantity of other types of fissile material). Consider rewriting para. 676 as guidance for inclusion in the Advisory Material document.

14. Clarifying the individual package requirements for fissile material

Paras 680-683. The criticality safety specialists meeting at the TM-38941 in January 2010 agreed to modify paragraph 682 to assure that at least 20 cm water reflection would be required. The same group also discussed the intent of the confinement system in paras 681 and 682. It was agreed that this intent is not clear and that none of the participants had a clear understanding of the Technical Basis for the confinement system purpose or for the intent of the corresponding requirements in Regulations before 1996. Very recent Technical Basis efforts lead to the conclusion that a containment system, as implemented in the 1950’s and 1960’s, should be subcritical when water-flooded. It has not been confirmed whether the intention was to cover intentional removal of the containment system from the remainder of the packaging. It appears to have been too late in the review cycle to allow further changes to the draft edition of SSR 6. Para. 681 was not applied by most of the competent authorities present at the meeting.

WG1 concern: The intent of paragraphs 681 and 682 related to reflection of the package and possibly of the containment system should be clarified.

WG1 proposal 14: As proposed for para. 209, the confinement system term should be removed from the Regulations. The requirements of paras 681 and 682 should be clarified without reference to a confinement system.

15. A reformatted allowance unintentionally turned into a requirement

Paras 684(a) in SSR 6-2012 and 567 in SS No. 6-1990.

“684. A number \( N \) shall be derived, such that five times \( N \) packages shall be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication consistent with the following:
There shall not be anything between the packages, and the package arrangement shall be reflected on all sides by at least 20 cm of water.

(a) The state of the packages shall be their assessed or demonstrated condition if they had been subjected to the tests specified in paras 719–724.”

“567. An array of packages shall be subcritical. A number ‘\( N \)’ shall be derived assuming that if packages were stacked together in any arrangement with the stack closely reflected on all sides by water 20 cm thick (or its equivalent) both of the following conditions would be satisfied:

(a) Five times ‘\( N \)’ undamaged packages without anything between the packages would be subcritical; and
(b) Two times ‘\( N \)’ damaged packages with hydrogenous moderation between packages to the extent which results in the greatest neutron multiplication would be subcritical.”

Concern: Subpara. 567(a) from 1990 requires subcriticality for undamaged packages under some conditions (5\( N \), stacked in any arrangement, 20 cm water reflection) while allowing some relaxation (no hydrogenous moderation between packages, undamaged packages).

Subpara. 567(b) has a similar requirement for subcriticality of damaged packages with the difference
that the allowances (to neglect water between packages and to neglect any damage to packages) is replaced with requirements (hydrogenous moderation between packages and exact package models of the test results).

Para. 684 from SSR 6 – 2012 corresponds to the 1990 subpara. 567(a). The intended allowances (no hydrogenous moderation and no damage) have been replaced with requirements. The original intention of the requirements and allowances appear to be interpreted correctly by the industry and competent authorities. The safety assessment of 684(a) sometimes builds on accident condition packages and with moderation between the packages (same as for para. 685).

The changed meaning of the text is of demonstration interest.

There could be problems with individuals who interpret the Regulations literally. This has occurred with other test requirements (e.g. exactly 30 minute fire being evaluated even when no fire at all caused more “damage”).

**WG1 proposal 15**: Very low priority for revision at this time. If there are other changes to this requirement, more correct text can be provided.

16. Formats of SSR 6, UN Model and Modal Regulations

**WG1 concern**: There are many different formats of transport regulations. All those documents may be needed for some consignors and designers.

**WG1 proposal 16**: Consider making an effort to reduce the number of different formats.

17. Simplify the Advisory Material for the benefit of transport staff looking for guidance

**WG1 concern**: There is a lot of text in the Advisory Material (currently still TS-G-1.1 from 2008) that is valuable for various purposes but not to the daily needs of transport staff. The Technical Basis effort allows movement of some of the text and references to such a document. This concern is one of the major reasons for the Technical Basis effort.

**WG1 proposal 17**: Simplify the actual guidance (as opposed to explanatory and historical information) to transport staff in the Advisory Material. Preserve other information in a separate document such as a Technical Basis document.

V. Would transport benefit from a communication program similar to those established in other industries? (i.e., the chemical responsible care program)

The Working Group participants discussed communication for radioactive materials transport. It was recognised that radioactive materials transport communication needs to be tailored to a relevant audience. The IAEA is addressing a large variety of stakeholders, which include the Member States, other International Organisations, and the general public. The working group discussed the suggestion from the IAEA Secretary of a “Transport Web Portal” ([http://www-ns.iaea.org/tech-areas/radiation-safety/transport.asp?s=3&l=23](http://www-ns.iaea.org/tech-areas/radiation-safety/transport.asp?s=3&l=23)). It was considered that the concept would be useful, allowing for a large variety of radioactive materials transport related information to be available in one place. It was suggested that a log of changes to the website should be kept and easily accessible. The working group is recommending the development of the Transport Web Portal tool.
In addition, it was considered as a useful complement if the Secretariat produced a regular electronic letter to update the community on the progress of the work carried by the Agency in relation to radioactive materials transport.

Also, the working group studied the chemical responsible care program presentation available to the working group and did find that, as similarly done by the chemical care program, keeping an updated list of national competent authorities was of value especially for international transport. The IAEA Secretariat confirmed that the list is currently updated and maintained by the Agency, but that the aim is eventually to allow Member States to update their own information directly on the Transport Web Portal.

The working group recommends that no change to the regulations was required to facilitate a communications program.

The working group then discussed information regarding SSR-6 available on the IAEA website which could be used by the general public. It was concluded that there would be some benefit for uploading a synthetic presentation, such as the one given by the TRANSSC Chair to the CSS in spring 2012, to the IAEA transport web pages, would provide the framework in which the SSR-6 is developed, and used.

Working Group #1 recommends uploading the TRANSSC presentation to CSS to the transport page of the IAEA website.

VI. What general information could be included for “information packs” on transport?

Finally, the working group discussed “information packs” for transport and considered that the Transport Web Portal could be considered as “information pack” for transport. The electronic version was preferred to a paper version since it allowed for easier updates.

Working Group #1 recommends to consider the Transport Web Portal as “information packs” on transport.
Annex 1

Working Paper #1
The confinement system

Summary

The definition of the confinement system in para. 209 was clearly incorrect when it was introduced in the 1996 Edition of the IAEA Regulations for the Safe Transport of Radioactive Material. In addition, the implementation of the requirement involving the confinement system in paras 680-683 is incorrect and confusing. It has been difficult to find the original intent of this requirement but it appears to be available and goes back to the years before the first edition 1961 of the Regulations.

It is proposed that the confinement system, as a term, should be removed from the Regulations. The current interpretation of listing components of particular importance to criticality safety may be preserved. There is no need for a specific term for such a list of components and it is unsafe to imply that some components are not essential for criticality safety. It is also unsafe to imply that the fissile material and packaging components alone can preserve criticality safety.

The requirements of paras 682 and 683, building on specifications in paras 680-681, need to be clarified. They are so complicated that they are expressly not applied by criticality specialists at competent authorities (TM-38941, IAEA technical meeting, January 2010).

The United States (U.S.) has not adopted the concept of the confinement system in national regulations. It was interesting to note that at the 2010 TM the U.S. appears to be the only country that has preserved the original intent of the requirements in paras 680-683. IAEA is recommended to support the original requirement of the containment system being subcritical. A clarification of the containment system definition would be needed to clarify that it also has criticality safety functions.

1. Illustration of the confinement system history

Figure 1 shows the requirement for the 1996 definition of the confinement system. Criticality safety shall be preserved (includes accident conditions of transport) for a large number of cylinders with $^{235}\text{U}$ as the only contents. The thermal and other tests need to be applied. Hydrogenous moderation between cylinders is assumed.

Figure 2 shows an individual package with a water-reflected containment system with UF$_6$ as required to be subcritical before the 1996 Regulations. The containment system with UF$_6$ was required to be subcritical and not to preserve criticality safety under transport.

Figure 3 shows that the 2009 edition of the Regulations changed the contents from pure $^{235}\text{U}$ to actual UF$_6$. The other problems remain.
2. Definition in SSR-6, 2012 Edition

Confinement system

209. Confinement system shall mean the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety.
3. SSR-6 paragraphs on assessment of an individual package in isolation

680. For a package in isolation, it shall be assumed that water can leak into or out of all void spaces of the package, including those within the containment system. However, if the design incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include either of the following:

(a) ...  
(b) ...

681. It shall be assumed that the confinement system is closely reflected by at least 20 cm of water or such greater reflection as may additionally be provided by the surrounding material of the packaging. However, when it can be demonstrated that the confinement system remains within the packaging following the tests prescribed in para. 685(b), close reflection of the package by at least 20 cm of water may be assumed in para. 682(c).

682. The package shall be subcritical under the conditions of paras 680 and 681 and with the package conditions that result in the maximum neutron multiplication consistent with:

(a) Routine conditions of transport (incident free);
(b) The tests specified in para. 684(b);
(c) The tests specified in para. 685(b).

683. For packages to be transported by air:

(a) ...  
(b) In the assessment of para. 682, allowance shall not be made for special features of para. 680 unless, following the Type C package tests specified in para. 734 and, subsequently, the water in-leakage test of para. 733, leakage of water into or out of the void spaces is prevented.

4. Introduction of the confinement system and previous history of requirement
The term “confinement system” was introduced in the 1996 Edition of the IAEA Regulations. The term was established at IAEA consultant services meetings preceding the approval of the 1996 edition.

It is now becoming clear that the background of the requirement for subcriticality of the containment system goes back to a criticality safety guide published in the U.S.A before 1961. The Fissile Class II criteria in the first IAEA Regulations 1961 were based on U.S. practices of using “bird cages” with the “bird” being the containment system with fissile material and the cage being a spacing structure surrounding the bird. Water reflection of a single bird was an obvious requirement for criticality safety. For configurations of multiple packages, water reflection was not an issue since flooding would isolate the birds in different packages from each other.
5. Actual meaning of para. 209 in the first introduction

There are a number of incorrect and misleading terms. The whole sentence does not reflect the intention(s).

- The term “confinement system” was selected to replace a previous text on the “containment system”. This appears reasonable since confinement and containment are similar concepts. However, the requirements where the confinement system (and previously the containment system) is applied involves subcriticality and not containment or confinement.
- Fissile material from 1985 up to 2009 means nothing else than the four specific fissile nuclides 233U, 235U, 239Pu and 241Pu. Other constituents of the contents are not included. Such constituents may include 236U, absorbing materials, moderators (water, polyethylene, graphite) that are in the contents and even in the same material as the fissile nuclides.
- The statement that the confinement system is specified by the designer is confusing. Does this not apply to all package design specifications?
- The statement (can even be viewed as a requirement) that the confinement system is agreed to by the designer is confusing. Does this not apply to all package design specifications?
- “Intended to preserve criticality safety” is possible but rarely required of an assembly of fissile material and packaging components. Various controls are required before and during transport as well as in the case of incidents and accidents. Intended to be subcritical may be an appropriate expression.
- The confinement system definition applies to criticality safety in transport. This includes individual packages and configurations of multiple packages. The intention was to apply the confinement system to individual packages. This is also the paragraph where it is used.
- There is no information or requirement on subcriticality of the containment system. This was the original intent of the requirement where the confinement system is applied.
- The fissile material is not intended to preserve safety or subcriticality. It is a part of the dangerous goods that the Regulations are intended to provide protection from.


A transport package contains 25 used PWR fuel assemblies. The fissile material between 1985 and 2009 was 235U for fresh fuel and a mixture of 235U, 239Pu and 241Pu for used fuel. The confinement system would not contain any other actinide nuclides (no 238U or 240Pu) and no fission products.

The confinement system for a UF6 cylinder would include the 235U but no 238U or fluorine.

The new definition of fissile material in the 2009 Edition of the Regulations includes the element, compound or mixture in which the fissile nuclides are constituents of. The other problems with the confinement system remain.

7. Actual meaning of paragraphs 680-683 related to the confinement system

The subcriticality requirement is only in para. 682. The other paragraphs provide specifications for application of para. 682. It is noted that:

- Subcriticality is required of the package but not specifically of the confinement system on its own.
- There are two cases when subcriticality of the package and of the confinement system are equivalent:
  - If the confinement system is defined as the complete package and:
  - If the confinement system is separated from the remainder of the packaging. In this case the confinement system is the only essential part of the package.
• The water barriers preventing water in- or out-leakage may be outside the confinement system. Para. 680 still allows the water barriers to be accounted for. The confinement system in the form of a structure with several fuel assemblies may not be subcritical when flooded. The definition and the application of the confinement system are not consistent with each other unless the definition is interpreted as a requirement. The multiple water barriers need to be included in the confinement system.

8. Interpretation of the confinement system since 1996.
The extra session on the confinement system at the IAEA TM-38941 in 2010 showed that almost all of the representatives of competent authorities used the definition in para. 209 as a stand-alone requirement. The application in paragraph 681 was essentially neglected. Representatives from U.S. (NRC and DOT) confirmed that the confinement system is not introduced in the national regulations (CFR). The containment system subcriticality requirements are applied as found appropriate for the package design. The difficulties expressed by some European competent authorities before 1996 appear not to have caused any significant problems in the U.S.

The confinement system has been recognized as a significant issue in 2010. It was considered too difficult and too late to find a widely acceptable solution for the upcoming 2012 SSR-6 version of the Regulations.

9. Emergency preparedness and response – Subcriticality of the containment system
It has been suggested that it is valuable information for emergency response and for handling of packages at nuclear sites to know that the containment system is subcritical when water-reflected. The Regulations would not apply to the safety of such operations but the information is required to be available.

Before the 1996 edition of the Regulations the containment system when undamaged provided both radiation protection and subcriticality. It is a significant complication for such operations to consider both containment systems and confinement systems.

10. The definition as a set of requirements, overriding the actual requirements
The incorrect and misleading definition in para. 209 has been applied as a set of requirements while the actual requirements related to the confinement system in para. 682 have been neglected since 1996. This is not a healthy development.

11. Cost and other consequences of a change
There is no cost for removing a concept that is incorrectly defined, misleading and has no actual purpose. The confinement system requirements are already (since 1996) present for the individual package and were never intended to apply to configurations (arrays) of packages. A list of packaging components and fissile material properties can be made at any time without calling it something confusing. Quality assurance and other requirements assure that all safety related features are defined and controlled.

The subcriticality requirement of the water-reflected containment system before the 1996 Regulations could be used for emergency response and to support safe handling of packages at nuclear sites. It provides safety information for intentional removal of the containment system from the remainder of the packaging (if not available such a safety evaluation and licensing approval may be very costly and delaying the intended operations). No documentation has been found that this was an original purpose but it is valuable information.
The 1996 Regulations do not require the confinement system to be subcritical if it remains in the remainder of the packaging after the tests. Intentional removal is not accounted for. If this purpose is requested, going back to the requirements before 1996 would be sufficient. The purpose of the containment system should then be clarified in the definition and in guidance material.

12. Implications of a regulatory change

The confinement system was introduced to solve an interpretation problem of “subcriticality of the containment system” that some competent authorities had before 1996. Studies of working material from meetings and documents leading to the confinement system introduction show that there were two main alternatives:

a) Clarification of the purpose of the containment system related to criticality safety
b) Introduction of a new term that modifies the containment system concept

Alternative b) was selected by the IAEA consultants.

The proposal here is to go back to alternative a). To do that, the original purposes of the associated requirements need to be established. In addition, the introduction of the confinement system may have led to uses that were not intended at the time of introduction of the confinement system in 1996.

Practical effects of not using the confinement system can be observed in the U.S. It appears as if the original safety purposes of the associated requirements have been preserved in the U.S. but not in other IAEA member states. Adding the confinement system to U.S. safety reports and certificates intended for international use does not appear to have caused any practical difficulty. The confinement system definition is just a list of features already available. The requirements in paragraph 682 are less strict than before 1996 and in the national U.S. regulations.

The confinement system has been introduced in the IAEA Regulations and in UN modal regulations. There is some guidance in the IAEA Advisory Material but it is essentially inconsistent with the definition in the Regulations and probably more confusing than helpful. The guidance is more correct than the Regulations. The problem with the confinement system being based on the fissile nuclides only and not on the actual material was for many years accounted for in the Advisory Material by a statement that the Regulations did not always mean what they expressed (fissile material).

Removal of the confinement system concept will simplify future Regulations, UN modal regulations and guidance material. Simplification of the translation into other languages is an important advantage (“containment system” in English is translated to “système de confinement” in French versions of the Regulations).

Clarification of the actual purpose of the associated requirements and of the containment system improves safety directly. The improved transparency of the requirements will provide an increase to safety.
SCOPE
From SSR-6 (2012 Edition):

106. These Regulations apply to the transport of radioactive material by all modes on land, water, or in the air, including transport that is incidental to the use of the radioactive material. Transport comprises all operations and conditions associated with, and involved in, the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages.

Summary of identified problem and proposal for change of the scope

The scope of the IAEA Regulations for the Safe Transport of Radioactive Material must be clearly defined. The developers and users of these Regulations, as well as the public, need to know the range of protection expected to be provided by the Regulations. It is equally necessary to establish limitations of the scope to avoid conflicting requirements (ambiguity) from multiple regulations and to be able to identify any gap between regulations for different types of operation. Nuclear liability considerations may be involved.

The current scope in para. 106 appears to confuse applicability or coverage (scope) of the Regulations with areas of importance. The title of the Regulations clearly indicates the scope: transport (carriage) of radioactive material.

Transport covers all modes on land, water, or in the air. In-transit storage is covered under specific conditions. Preparation, consigning, loading, unloading and receipt at the final destination of loads of radioactive material and packages, as approved for transport, may be included under specific conditions.

Transport that is incidental to the use of the radioactive material is a confusing phrase that involves operations that are clearly not covered by the requirements and options of the Regulations. Transport does not comprise all operations and conditions associated with, and involved in, the movement of radioactive material. Design, manufacture, maintenance and repair of packaging are operations that are not transport. The Regulations do not attempt to provide safety for such operations and the competent authority does not approve such operations according to the Regulations. The competent authority in some countries may approve such operations according to some other national regulations.

The Regulations require many operations that are not covered by the Regulations themselves. The regulations should not imply that the safety of such operations is covered by the Regulations and that a package design approval explicitly or implicitly approves such operations.

In the United States (U.S.), recent changes in the national regulations were justified by the need for clarity in the storage of packages for used fuel. Previously, the nuclear site regulations and the transport regulations could be in conflict. Potential conflicts will occur between transport and other regulations anywhere transport of radioactive material occurs.

Examples of operations that are not covered by the Regulations but required as a condition for transport include:

- Measurement of irradiated fuel to confirm the predicted composition (paras 677(b) and 503(b));
- All operations with an incomplete or damaged package. Safety of operations with packagings without radioactive contents are of course not covered by the Regulations (even if they involve radiation in some form);
- Loading or unloading of radioactive material is covered by the Regulations only if it refers to the transport vehicle and not to the package. Loading and unloading of radioactive material contents into and from a packaging respectively is not covered by the Regulations; it is not transport. If such loading or unloading is not licensed according to other regulations, it is not acceptable.

There are no costs involved in a clarification of the scope.
Proposal for revision – Scope of SSR-6

Transparency – Clarification of purpose of definitions

1. Containment system

Current definition:

213. Containment system shall mean the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport.

Proposal: In the process of removing the confinement system, a modification of the containment system definition may be appropriate.

213. Containment system shall mean the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport. “Additional components may be specified by the designer as intended for the containment system to be subcritical when loaded with fissile material and reflected by water.”

This definition is consistent with the purpose of the containment system before the 1996 Edition of the Regulations.

2. Criticality safety index

Current definition:

218. Criticality safety index (CSI) assigned to a package, overpack or freight container containing fissile material shall mean a number that is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material.

Proposal: A CSI of zero is not required to provide control over accumulation. However, a CSI of zero provides information that even a single package may require criticality safety control during loading or unloading of the contents and in emergency situations. This should be clear from the definition. This makes a difference to para. 417 exception provisions that don’t require any CSI at all and where there is no criticality hazard of a single package.

218. Criticality safety index (CSI) assigned to a package, overpack or freight container containing fissile material shall mean a number that is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material. “The presence of a CSI also indicates that criticality safety may require consideration during loading or unloading of the contents and in emergency situations. This applies even for a package with a CSI of zero.”

3. Low specific activity material

Current definition:

226. Low specific activity (LSA) material shall mean radioactive material that by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

Proposal: The LSA requirements in the Regulations show that some type of criticality safety considerations are applied to the acceptance criteria for LSA materials. Fissile material in packages complying with para. 417 exceptions are allowed to be LSA-I material while fissile material in packages complying with other criticality safety provisions are not allowed as LSA-I.
The technical basis for criticality safety of the Regulations does not support the assumption that the criticality hazard of some provisions is less than that of other provisions. Rather, it has been expressed that the level of safety has been attempted to be on the same level.

This issue is most clear when the “15 g” fissile nuclide mass exception has been applied in past Regulations. The material could often be accepted as LSA-I material. An improvement of the criticality safety requirements in SSR-6 (2012 Edition) has prevented the material from being accepted as LSA-I material. The reason is not clear at all and has caused significant concern to the nuclear industry.

The basis for allowing some fissile materials and not others as LSA-I material should be indicated in the definition of LSA material. The alternative is not to restrict the LSA-I material based on criticality safety. This is the proposed alternative. A general statement that LSA-I material that is also fissile material shall comply with paragraph 673 is sufficient.

4. Radiation protection programme

Current definition:

234. Radiation protection programme shall mean systematic arrangements that are aimed at providing adequate consideration of radiation protection measures.

Proposal: It is clear from the Regulations that the radiation protection programme also must account for criticality safety measures in some cases. Para. 576(a) is the most obvious example. It allows use of other controls than CSI for restricting accumulation of packages with fissile material on a special use vessel.

234. Radiation protection programme shall mean systematic arrangements that are aimed at providing adequate consideration of radiation protection measures. “In some cases the arrangements are aimed at providing subcriticality control.”

5. Radioactive material

Current definition:

236. Radioactive material shall mean any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in paras 402–407.

Proposal: The title of the Regulations refers to safety of radioactive material. The criticality hazard of a material is not related to the activity (often the opposite is true; high activity indicates low criticality hazard). Since one of the objectives of the Regulations is to prevent criticality during transport it is essential that all materials that could lead to criticality are covered. It is informative to include this information in the definition of radioactive material. This needs to be added to the radioactive material definition (not to the fissile material definition) since that definition must account both for radiation protection and criticality safety.

236. Radioactive material shall mean any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in paras 402–407. “A fissile material containing radionuclides not exceeding those values has been determined not to be a criticality hazard during transport.”
6. Package

Current definition:

231. *Package* shall mean the complete product of the packing operation, consisting of the *packaging* and its contents prepared for transport. The types of *package* covered by these Regulations that are subject to the activity limits and material restrictions of Section IV and meet the corresponding requirements are:

(a) Excepted package;
(b) Industrial package Type 1 (Type IP-1);
(c) Industrial package Type 2 (Type IP-2);
(d) Industrial package Type 3 (Type IP-3);
(e) Type A package;
(f) Type B(U) package;
(g) Type B(M) package;
(h) Type C package.

*Packages* containing fissile material or uranium hexafluoride are subject to additional requirements.

**Proposal:** The first package type, *excepted package*, includes additional requirements for fissile material, when applicable. A type F package type for fissile material in 1981 was discussed, accepted and drafted. This decision was reversed before publication, with the justification that the package types should be based on activity limits only and with criticality considerations as an additional concern.

The *excepted package* type is a complicated concept. The classification in Section IV allows any fissile provision to be applied to an *excepted package*. At the time of transport, Section V, the *excepted package*, when containing fissile material, has to comply with certain criticality safety provisions. This implies that those provisions provide a lower criticality probability than other provisions. There is no intended technical basis for such a conclusion but that is not the purpose of this proposal.

Even if the lower criticality probability is correct, it changes the general principle for package types to reflect activity only and not criticality concerns. Independent of the activity, the perceived criticality safety properties are used to determine the package type.

It makes sense to have a concept for a package that has both low activity and low criticality probability. The *excepted package* concept should then not be referred to as a package type. It covers both activity and criticality concerns.

Removal of subpara. 231(a) and addition of some text at the end of para. 231 is proposed.

231. *Package* shall mean the complete product of the packing operation, consisting of the *packaging* and its contents prepared for transport. The types of *package* covered by these Regulations that are subject to the activity limits and material restrictions of Section IV and meet the corresponding requirements are:

(a) Industrial package Type 1 (Type IP-1);
(b) Industrial package Type 2 (Type IP-2);
(c) Industrial package Type 3 (Type IP-3);
(d) Type A package;
(e) Type B(U) package;
(f) Type B(M) package;
(g) Type C package.

*Packages* containing fissile material or uranium hexafluoride are subject to additional requirements.

A special package, the *excepted package*, is available to provide a combination of low activity and very low criticality probability.
Annex 7.2  Report for Working Group 2
WORKING GROUP 2 – DENIAL OF SHIPMENTS

1. Working Group Structure

The working group was structured as follows:

Mario César Mallupoma Gutierrez – Peru: Work Group Leader
Ronald Beck Pope – USA: Recording Secretary
Natanael Bruno – Brazil
Zhengcai Chen – China
Meenamkunnu Chandrasekharan Dinakaran – India
Laurent Kueny, France
Bernard Monot, France
Justin Emmanuel Ngaile – United Republic of Tanzania
Julius Rijpkema, International Source Suppliers and Producers Association (ISSPA)
Zsófia Szepes – Hungary (part time)
Joseph Lucien Radaorolala Zafimanjato – Madagascar

2. Work to be done – Terms of Reference

The participants of this Working Group were requested by the Secretariat to consider, and prepare a working group report on the following issues:

1) What revisions to the regulations would reduce incidences of denial?

2) Review of Draft Security Requirements Documents:
   a. If implemented, could the security requirements in the documents lead to denials?
   b. If so, are there changes in the transport regulations that could preclude this?
   c. If not, the proposed security provisions that could cause difficulties in transport should be highlighted.

3) Provisions of the ISC action plan should be reviewed. Do any of the action plan provisions require changes to the regulations?

The WG addressed the items listed in the Terms of Reference as well as other items deemed relevant to Working Group’s mandate.
3. Findings and Recommendations of WG2

The following summarizes the findings and recommendations of the WG, each is identified by the section of this report where it is discussed and justified.

- The WG generally did not identify any changes that might be needed to the Transport Regulations as a result of D/DOS issues, recognizing that the current more comprehensive review/revision process currently underway might provide recommendations for change related to D/DOS issue. [Section 4.1] However, it was noted that conflicts between various forms of the regulations can increase likelihood of delay or denial.

- The WG recommends consideration be given to expanding the subsection in Chapter 3 of SSR-6 dealing with “Training” to also address “Education”, ensuring that all those involved in carriage of radioactive material are properly educated, focusing on each functional element in the supply chain; consideration could also be given to expanding the guidance documents to reflect these changes. [Section 4.1]

- The WG recognized that a feedback process is absolutely essential for the Secretariat and TRANSSC; and the basis for the changes caused by delay and denial of shipments must be effectively communicated to the CSS. [Section 4.1]

- The WG recommends that consideration could be given to writing a series of implementing guides and preparing associated training materials, similar to those being developed for security transport, structured around specific types of shipments, focusing in part on how to interact and interface with carriers, customs agencies and other entities that can cause problems with delay and denial. The development of this material should consider and take advantage of the experience and training material already gained in regional training courses (e.g. the course in Panama). [Section 4.1]

- The WG concluded that NST022 could potentially impact delay and denial in a positive, rather than negative fashion; enhancing proper transfer of information, education and understanding. [Section 4.2]

- The WG determined that neither the security of nuclear material in transport document nor the radiological crime scene management document appeared to pose any difficulties with regard to delay or denial of shipments. [Section 4.2]

- The WG recommends that, if the Action Plan is revised, the focus should be on simplification and workability. [Section 4.3.2]

- The WG suggests that implementation of national and regional networks should give priority to the creation and/or implementation of a communication strategy. [Section 4.3.4]

- The WG encourages the establishment of the new inter-UN agency committee for the long term and effective management of DOS issues. [Section 5]

- The WG suggested that the Secretariat investigate whether changes to the radiation protection programme could be implemented to ease delays and denials without sacrificing the adequacy of radiation protection. [Section 5]
The WG concurred with the current transport safety work plan and recommended that it continue to be applied. [Section 6.1]

The WG recommended consideration should be given by the Agency to sending a letter directed to all Member States encouraging Member States to become members of TRANSSC and to appoint an NFP if they have not already done so. This is significantly important since about 2/3 of the Member States are not members of TRANSSC. [Section 6.2]

The WG recommended that collaborative efforts between safety and security entities within the IAEA and elsewhere should be encouraged. [Section 6.3]

The WG noted that the new UN inter-agency committee for implementing the DOS Action Plan needs to be properly structured and implemented. [Section 6.4]

The WG further recognized that it may also be necessary to consider focusing on training of the NFPs and RCs—something that has not been accomplished in the past. [Section 6.4]

The WG recommends that (a) the ISC review and approve the Handbook for Addressing Instances of Denial/Delays of Shipment of Radioactive Material, and then (b) a meeting be convened by the Agency to review and finalize the handbook, and recommending the method and timing of publication and issuance (possibly as a technical report of the IAEA). [Section 6.5]

The WG supports inviting the ad-hoc expanded inter-agency group and TRANSSC representative to the 8th meeting of the ISC in June 2013. [Section 6.6]

The WG recommends that the ISC, working with the Agency and other involved agencies, explore who should be the owner of the delay/denial databases and responsible for assessment of the data. [Section 6.7]

The WG fully supports actions needed to develop guidance for customs officials, which is especially needed in the area of radiation protection, while noting that NSNS has already issued guidance for customs and border officials. [Section 6.8]

The WG suggests that the Agency should consider convening a technical meeting to collect experience on issues relating to customs operations that have caused delays or denials in shipments. [Section 6.8]

The WG suggests that TRANSSC take on this task as part of its Terms of Reference such that, when it is reviewing draft security documents, the issue of denial of shipments is addressed. [Section 6.9]

The WG endorses the recommendation of the ISC with regard to the newly proposed spreadsheet process, recognizing that the process needs to be clarified on how to use the forms. [6.10]

The WG recommends that the safety and the security staff at the Agency, working together, evaluate existing training materials to ensure the information presented to
participants is sufficient to address concerns and actions needed as related to safety and security issues that may accrue from a delay or denial of a shipment. [6.11]

- The WG also recommends that the Secretariat work within the Agency to define the adequacy of training material for national and regional training needs and the ability of Technical Cooperation to support this effort. [Section 6.11]

- The WG recommends that the Secretariat must provide a detailed site map of a country and regional template for the SharePoint site, in order to define a harmonized national and regional network so that the Member States can provide feedback early in the development of the network. [Section 7]

- The WG recommends that the Agency consider enhancing the training course for customs and border officials to include delay and denial of shipments.[Section 8]

4. Initial Deliberations

The working group (WG) initiated discussions by considering both the terms of reference noted above, and the detailed issues listed on slide 7 of the Work Plan Agenda Item 1.

It was agreed that the WG would proceed first with the three items listed specifically in the terms of reference.

4.1. General Discussion on Issues Relating to Denial – Impact of Regulatory Requirements

Regulatory requirements alone do not cause denial. However, conflicts between different regulatory requirements imposed by controlling bodies (e.g. nuclear authorities and modal authorities) can result in delays or denials. Lack of communication and understanding contributes greatly to denial and delay of shipments. These conclusions are supported by the Chairman’s Report of TM-43560.

Thus, the WG did not identify any changes that might be needed to the Transport Regulations as a result of D/DOS issues, recognizing that the current more comprehensive review/revision process currently underway might provide recommendations for change related to D/DOS issue.

However, it was noted that conflicts between various forms of the regulations can increase likelihood of delay or denial. In addition it was noted that overzealous, over-reading and misinterpretation by non-technical controllers can also result in denials and delays.

An example was cited of a radionuclide supplier in South Africa that was having difficulties with its local air carrier, where many shipments were being denied or delayed. The supplier worked directly with the carrier, educating them on the regulations, the types of packages they used, the importance of the contents to medical diagnostics and applications, and to agricultural and industrial applications. The consignor and the carrier mutually agreed on standardizing the designs of packages, on a training program that the supplier would provide to its cargo handlers (both at the origin location and the destination locations), and further agreed that the supplier would have a “rapid response team”
available whenever a shipment was provided to quickly address any issues that may arise at the departure airport. This mutual communication effort and the resulting agreements and procedures resolved their delay and denial problems.

Education and training is important, to build trust between the operators and the carriers. They need to know and understand the importance of the material, why it needs to be transported, what can be done to simplify the process. Possibly the Secretariat should look at Chapter 3 to see what can be placed in the Regulations to improve the producer/carrier relationships.

For example, the WG recommends consideration be given to expanding the subsection in Chapter 3 of SSR-6 dealing with “Training” to also address “Education”, ensuring that all those involve in carriage of radioactive material are properly educated, focusing on each functional element in the supply chain; consideration could also be given to expanding the guidance documents to reflect these changes.

States have already been encouraged by TRANSSC to have individual states report on experiences with application of the Transport Regulations, and how specific issues impact delay or denial of shipments.

The WG recognized that a feedback process is absolutely essential for the Secretariat and TRANSSC; and the basis for the changes caused by delay and denial of shipments must be effectively communicated to the CSS.

The WG recommends that consideration could be given to writing a series of implementing guides and preparing associated training materials, similar to those being developed for security transport, structured around specific types of shipments, focusing in part on how to interact and interface with carriers, customs agencies and other entities that can cause problems with delay and denial. The development of this material should consider and take advantage of the experience and training material already gained in regional training courses (e.g. the regional training course in Panama with one day dedicated to delay and denial of shipments).

Education activities should address the technical features of the packagings, the purpose and importance of transporting the materials, the economics involved, the need for advanced communication with involved entities, etc.

### 4.2. General Discussion on Draft Security Documents

The NSNS representative reviewed the draft documents presented to which are:

- (a) Security of Nuclear Material in Transport (NST017),
- (b) Radiological Crime Scene Management (NST013), and
- (c) Protection and Confidentiality of Sensitive Information in Nuclear Security (NST022).

The discussion concerned how, if any of these documents impact transport safety which potentially could impact denial of future shipments later on.

It was the view of the NSNS representative that none of these documents have a significant impact on the denial of shipments of radioactive material. Following preliminary discussion, the WG provisionally agreed with the Agency representative’s assessment.
However, the WG concluded that NST022 (the NSS document on information sharing) could potentially impact delay and denial in a positive, rather than negative fashion. Application of these recommendations on protection and confidentiality of sensitive information could assist in the proper transfer of information, and could enhance the education and understanding of those involved in a shipment chain. This discussion prompted elaboration on two actual scenarios.

In Brazil, a recent convoy of a shipment of radioactive material was blocked by a small community’s activist group. The action by this group was the result of miscommunication regarding the contents and details of the shipment, and resulted in various demonstrations and problems reaching to high levels of government. Demonstrations, caused by improper communications and misunderstandings can lead to stoppages which could then lead to adversaries having opportunities to take advantage of the stopped shipment in a public domain where providing security could be difficult to achieve.

Considering the problems experienced in recent shipments of vitrified high level waste from France to Germany, the protection and confidentiality of sensitive information document could possibly help reduce the impact of delay by establishing protocols (which would need to be agreed to and implemented by governments) for properly managing the confidentiality of information; limiting such communications to only those who have a need to know. Proper application of such procedures would require a proactive application of the recommendations by governments.

In contrast, the WG determined that neither the security of nuclear material in transport document nor the radiological crime scene management document appeared to pose any difficulties with regard to delay or denial of shipments.

4.3. General Discussion on Provisions of the ISC action plan

Annex 21 of the ISC report was considered by the WG.

The Chair of the ISC presented the following conclusions based on the objectives of the seventh meeting of the ISC, which were then assessed by the WG:

4.3.1 Review the milestones in the implementation of the Action Plan and the status of implementation of actions by members of the Steering Committee

Related to the substance of this point, on the first day of the meeting the status and update of the Action Plan was presented to all members of the ISC. It resulted in the identification of a series of weaknesses and strengths that should be considered in the update of the action plan.

A crucial consideration that was mentioned was the need to improve communication. In this respect, the experience developed by Brazil was mentioned with the creation of a National Committee on denial and delay of shipments that considered the participation of various stakeholders. It has permitted to better identify the bottlenecks and to find appropriate solutions. Thanks to the implementation of this strategy it has been possible to significantly decrease instances of denial and delay.
### Discussion and Conclusion by the WG:

This does not generally apply to considerations of the WG; however, the text that states: “It permitted the identification of a series of weaknesses and strengths that should be considered in the update of the action plan” should be further considered by the WG.

With regard to the 2nd paragraph, this issue does not directly impact the regulatory requirements in any way other than how communications could be enhanced by way of the regulatory requirements in Chapter 3 of SSR-6; as identified earlier in discussing Section 3.1 above.

#### 4.3.2 Review and revise, if necessary, the Action Plan on Denial of Shipments of Radioactive Material

The action plan on denial of shipments of radioactive material was reviewed and updated. Some advances were identified as well as some actions which have not been implemented.

**Discussion and Conclusion by the WG:**

Mr. Dinakaran referred to the Action Plan from the last meeting (February 2012), as reproduced from the ISC report (see Annex 1, below; Annex 17-B of the ISC Report), and elaborated on each of the 12 points provided in that plan.

Are there provisions in the Regulations that should be considered for revision, based upon these 12 points? The feeling of the group was generally, that the answer is “NO”.

For example, specific regulatory provisions could be considered for simplification with a view to making them more understandable or more user-friendly without removing any constraints imposed.

The WG recommends that, if the Action Plan is revised, the focus should be on simplification and workability, while not changing the intent and impact packaging or operations for the purposes of safety.

The question that needs to be asked is “are there actions listed that point to any underpinning to justify changing the regulations?” The WG felt that the answer to this could require a detailed review of the Regulations, which was beyond the scope of the WG.

#### 4.3.3 Discuss specific actions for 2012

**Discussion and Conclusion by the WG:**

The specific actions for 2012 were developed considering the need to focus attention on some specific main actions needed for reducing delays and denials, as developed by the NFP in each country.

#### 4.3.4 Advise on the continuation of regional work, including whether there is a need for updating the Regional Networks
Discussion and Conclusion by the WG:
The WG suggests that implementation of national and regional networks should give priority to the creation and/or implementation of a communication strategy. Communication was considered essential among stakeholders.

4.3.5 Provide additional recommendations for Agency consideration.

Discussion and Conclusion by the WG:
Providing additional recommendations was not specifically addressed by the WG at this time; however, further discussion of the ISC findings was directed towards the report of the last ISC meeting. It was noted in that visually presented report that the last ISC meeting tasked five working groups to address the following areas:

1. The future for the ISC;
2. The ISC Action Plan;
3. Self-Assessment Test questions;
4. A new denials reporting method;
5. Define the content of the IRPA paper.

5. General discussion of the second day

The WG leader initiated discussion using a of actions derived from the presentations made by Mr. Bajwa on Monday. It was emphasized that the WG should focus on developing actions for IAEA consideration, addressing both transport safety and security. WG2 needs to focus on denial of shipments, and any changes to the Regulations that should be considered during the current review cycle, and/or any additional studies that may be needed to determine if a change to the regulations should be considered.

Specifically, the WG needs to focus on defining any provisions that require changes to regulations that can reduce the incidents of denial of shipments.

For example, the 2011 Transport Conference and the 2011 follow-up technical meeting defined 11 potential actions relating to denial of shipments as presented in the Work Plan Agenda Item 2.1, as follows:

1. Continue transport safety work plan
2. Use TRANSSC to distribute denial reporting forms
3. Efforts should be made to overcome barriers at the IAEA and elsewhere in creating joint safety and security networks and collaboration should continue to be encouraged
4. Continue ISC action plan via proposed new UN inter-agency committee
   - Utilise information available on industry, IAEA/IMO/ICAO/NGO and competent authority websites
   - Survey broader transport safety network on communication needs
• Web based regulation access refers to MS safety and security regulations
• Emphasis on education and training at all levels important
• Make use of broader transport safety network to encourage denial reporting

5. Distribute consolidated ISC action plan to wider audience (safety, security and inter-agency) requesting that these actions be considered in their work plans.

6. Invite ad-hoc expanded inter-agency group and TRANSSC representative to the 8th meeting of the ISC in June 2013.

7. Consider funding issues for database to ensure it can remain operational

8. Support development of guidance for customs to facilitate shipments of radioactive material crossing borders as well as training material

9. Ensure denial continues to be considered when developing security documents and in particular their application

10. Ask Industry to survey port problems and report air and sea problems to National Focal Points (NFP)
    • Extend to supply chain
    • Consider as possible resource the Cargo Incident Notification System survey

11. Develop training material on the safety and security implications of shipments being held as a result of denial for organizations involved in transport of radioactive material.
    • Consider whether Technical Cooperation (TC) can support conduct of this training

The WG considered TM-43560 Chairman’s report: (Introduction) --- presentation by Paul Gray on sustainability (Agenda Item 2.4). The WG reviewed this presentation on denial of shipments (DOS) as a guide to its deliberations, presenting and discussing the following insights:

• DOS is a continuing problem
• DOS is hindering radioactive source returns and beneficial uses
• Efforts to reduce DOS will have both safety and security benefits
• ISC was developed to help address the DOS issues, consists of various stakeholders
• Participation of National Focal Points (NFP) has been significant (more than 80 countries represented), has resulted in significant benefits
• Regional Networks (RN) – directed to facilitated communication, with benefits of countries working together to resolve local denial issues
• Reasons for denial per IMO and IAEA findings
  o Negative perception
  o Cost and extent of training
  o Multiplicity and diversity of regulations; including lack of harmonization of regulations between member states and between modal organizations
  o Lack of outreach, resulting in lack of public awareness
• ISC action plan embodied six proposed activities:
From these activities it becomes clear that DOS is a global problem, and therefore requires a global solution.

Problems:
- Budgets have been / are being reduced, this impacts the ability of the ISC to function properly.
- Denial Report Database – more than 230 reports in database (many of these have insufficient information to define root cause); and there are several hundred additional denial reports are outstanding due to confidentiality concerns.

Five working groups were formed at the last ISC meeting
- The goal was to have DOS “insignificant” in 2013.
- Greater involvement by international organizations was encouraged.
- Discussions / integration between various international organizations was suggested.
- Development of a Self Assessment Tool (SAT) by the IAEA to assist member states.
- New method for recording denials was suggested; specifically collecting data from shippers.
- Discuss issues with IRPA.

Harmonization – significant number of denials is lack of harmonization with regulations; thus integration of inter-agency model would help facilitate improved global harmonization. This will require coordination between various international bodies.

Recommended that ISC be maintained, and that a new inter-UN agency committee be established for long term management of DOS issues; where the committee would involve the IAEA and the relevant modal organizations. The establishment of this committee is still pending, but in the meantime an ad-hoc working group is addressing DOS. Thus, the WG encourages the establishment of the new inter-UN agency committee for the long term and effective management of DOS issues.

Considering the lack of consistency between regulations at the MS and international level – need to
- ID variances
- Resolve differences
- Establish a communication mechanism
- Integrate RNs and NFPs

Many recommendations were made to continue integration and to utilize the various RNs and NFPs and the ISC to enhance communication; and to address concerns in other areas.

An alternate report form was then discussed. The presentation of this form also addressed communications (brochure, training materials, video development and a website).
Emphasis was on how to discuss Class 7, where emphasis should be placed on the importance of the shipment of these materials can be life saving. The presentation also looks at variations in the modal regulations (primarily on air and maritime carriage). The situation with air carriage is improving because it has high-level support of ICAO in helping to resolve DOS issues. It was illustrated that the ISC for DOS is well organized.

Discussion then turned to the experience of one member state in applying the guidelines and program of the ISC at the State level.

Next, the results of the first day deliberation of WG4 were introduced by the Secretariat. It was noted that the WG4 members’ view is that the radiation protection programme requirements of SSR-6 could potentially be contributing to the DOS. As a result of this input from WG4, the WG suggested that the Secretariat investigate whether changes to the radiation protection programme could be implemented to ease delays and denials without sacrificing the adequacy of radiation protection.

The Secretariat also discussed the potential future of the ISC.

- The focus is on ensuring that it is a functional interagency group.
- The Self Assessment Tool is up and functioning.
- The new method for reporting denials has been tested by a couple of companies, and it has proven to be successful.
- The IMO is discussing the IMO database this week.
- Harmonization – recent efforts are addressing establishing standard procedures for addressing shipment problems throughout the world.

### 6. Consideration of tasks from Workplan Agenda Item 2.1

With all of the foregoing discussion, the WG returned to the list of eleven items tasked by the Secretariat to the WG (pages 7 and 8 of Workplan agenda item 2.1); specifically these six items are listed and discussed as follows:

6.1 Continue transport safety work plan

**Discussion / Conclusions:**

The TM Chair briefly outlined what the transport safety work plan for the WG. Based on this discussion, the WG concurred with the current transport safety work plan and recommended that it continue to be applied.

6.2 Use TRANSSC to distribute denial reporting forms

**Discussion / Conclusions:**

Briefings were provided by the Secretariat and the TM Chairman, indicating that some of the members of TRANSSC are also involved in the ISC.

It was noted that, in the event that an NFP has not been formally appointed, the TRANSSC members essentially function as the NFP. Discussion concerned how Member States
should be informed of this policy.

The WG recommended consideration should be given by the Agency to sending a letter directed to all Member States encouraging Member States to become members of TRANSSC and to appoint an NFP if they have not already done so. This is significantly important since about 2/3rd of the Member States are not members of TRANSSC.

Otherwise, the WG concurs with this recommendation, according to the level of participation of each Member State in TRANSSC (active member, corresponding member, or non-member).

6.3. Efforts should be made to overcome barriers at the IAEA and elsewhere in creating joint safety and security networks and collaboration should continue to be encouraged

Discussion / Conclusions:

Such joint networks may exist informally, but it may not be appropriate to formally create such networks. However, The WG recommends that collaborative efforts between safety and security entities within the IAEA and elsewhere should be encouraged.

It was noted that, in many Member States, the role of both transport safety and transport security is accomplished by one entity.

It was also acknowledged that the IAEA has now established an interface group between safety and security, but this group only addresses publications issues; whereas the chairs of the various committees (including the chair of TRANSSC) are working together to enhance collaboration within the Agency.

6.4. Continue ISC action plan via proposed new UN inter-agency committee

- Utilise information available on industry, IAEA/IMO/ICAO/NGO and competent authority website
- Survey broader transport safety network on communication needs
- Web based regulation access refers to MS safety and security regulations
- Emphasis on education and training at all levels important
- Make use of broader transport safety network to encourage denial reporting

Discussion / Conclusions:

It was noted that the new plan essentially moves the process from voluntary actions to involuntary actions; thus TRANSSC becomes crucial in making the process successful.

The WG noted that the new UN inter-agency committee for implementing the DOS Action Plan needs to be properly structured and implemented.

The WG further recognized that it may also be necessary to consider focusing on training of the NFPs and RCs– something that has not been accomplished in the past.

There is a need to strengthen the national networks and the collaboration between the
regional coordinators and the NFPs.

6.5 Distribute consolidated ISC Action Plan to wider audience (safety, security and inter-agency) requesting that these actions be considered in their work plans.

Discussion / Conclusions:
The WG generally agrees with this recommendation with the following caveats and considerations.

The distribution of the action plan should focus on all involved stakeholders, and should be accompanied by appropriate follow-up actions.

The Action Plan (see Annex 1) delineates specific responsibilities for implementing the different activities, and this should be used as a guide for each Member State.

A better structured action plan, adequate budget, appropriate manpower and mechanisms for controlling the action plan may be needed.

Furthermore, it was noted that the Secretariat has prepared various briefing packages to address specific involved entities. These materials could help in implementing the action plan at the State level.

The manner by which authority, at all levels, for implementing the action plan needs to be clear; this could be partly accomplished by specifying the functions and responsibilities of the NFP. The empowerment ultimately depends upon the NFP’s own organization.

Member States should assign responsibilities, authorities and resources to support the NFP, subject to individual Member State situations and concerns.

All of these factors need to be clearly specified and emphasized in the *Handbook for Addressing Instances of Denial/Delays of Shipment of Radioactive Material* – currently in draft form. This handbook needs to be given an appropriate level of exposure which could enhance Member State implementation of the action plan at the State level.

In conclusion, the WG recommends that (a) the ISC review and approve the *Handbook for Addressing Instances of Denial/Delays of Shipment of Radioactive Material*, and then (b) a meeting be convened by the Agency to review and finalize the handbook, and recommending the method and timing of publication and issuance (possibly as a technical report of the IAEA).

6.6 Invite ad-hoc expanded inter-agency group and TRANSSC representative to the 8th meeting of the ISC in June 2013.

Discussion / Conclusions:
The WG supports this recommendation.
6.7 Consider funding issues for database to ensure it can remain operational

Discussion / Conclusions:
The database is definitely needed and it needs to be properly funded.

It was initially recommended that the database be shifted to the Agency, and maintained by the Agency; where each modal agency would have its own supplementary database, feeding the global base maintained by the Agency. However, it was recognized that the Agency may not have the manpower and economic resources to satisfy this recommendation, nor should it have that responsibility since the DOS issue is not a safety issue.

Alternatives to finding the host for the database (or databases if more than one is to be used) needs to be fully explored, taking into account past experience and resources that may be available at various entities. This effort should really be directed to the entity (or entities) where it belongs, recognizing that the IAEA may not be that entity.

Consideration should be given to having each Member State maintain its own database. This approach this would impose a small burden on each country, whereas should the Agency be assigned the responsibility for the database, the burden could be significant.

Assigning the responsibility for the database to individual States would require that a standardized approach be followed to develop, and maintain and communicate between the individual State’s databases. This approach would also create more focus on DOS at the State level.

Thus, the WG recommends that the ISC, working with the Agency and other involved agencies, explore who should be the owner of the delay/denial databases and responsible for assessment of the data.

6.8 Support development of guidance for customs to facilitate shipments of radioactive material crossing borders as well as training material

Discussion / Conclusions:
This issue was previously covered in discussion on the first day; e.g. see the discussion in Section 3.1 of this report.

The WG fully supports actions needed to develop guidance for customs officials, which is especially needed in the area of radiation protection, while noting that NSNS has already issued guidance for customs and border officials.

Consideration may also be needed to providing such guidance to other entities, such as coast guards, port authorities, various importers and exporters, etc.

The Agency and some Member States are already providing training to port authorities, etc. for transport security purposes; thus consideration could be given to coordinating with these activities and building DOS issues into their guidance and training information to reduce delays and denials. For example, the Transport Safety Unit already provides
inputs to the customs-related activities at the Agency.

The WG suggests that the Agency should consider convening a technical meeting to collect experience on issues relating to customs operations that have caused delays or denials in shipments.

6.9 Ensure denial continues to be considered when developing security documents and in particular their application.

Discussion Conclusions:
The WG suggests that TRANSSC take on this task as part of its Terms of Reference such that, when it is reviewing draft security documents, the issue of denial of shipments is addressed.

6.10 Ask industry to survey port problems and report air and sea problems to National Focal Points (NFP)

- Extend the supply chain
- Consider as possible resource the Cargo Incident Notification System survey

Discussion / Conclusions:
In the current reporting system, many of the incidents have not been documented due to confidentiality of information, which then of course doesn't make it into the database.

Proposed new spreadsheets were distributed (see Annex 2) that address the collection of data in a form that essentially eliminates the need for incorporating confidential information. The forms focus on collecting data by individual modes (e.g. air and sea).

The proposed new reporting system was approved at the last ISC meeting. The ISC proposed that the new spreadsheets be used by consignors for the collection of the needed data and this data would then be provided to and coordinated with the NFPs and RNs on a twice per year (every six months) basis.

The WG endorses the recommendation of the ISC with regard to the newly proposed spreadsheet process, recognizing that the process needs to be clarified on how to use the forms. For example, the term “transshipment refusal” can be interpreted in multiple ways which could result in inconsistent data reporting. The “refusals” can be motivated by political issues, intervener actions; and economics such as when carriers view the transport of radioactive material as such a small market that it is not worth their cooperation.

The WG chose to not address issues with regard to the Cargo Incident Notification System survey; it does not appear to be relevant to the DOS problem due to limited resources at the IMO. The Cargo Incident Notification System philosophy was incorporated into the new spreadsheets. Without added information, the WG chose to not address this issue further.
6.11 Develop training material on the safety and security implications of shipments being held as a result of denial for organizations involved in transport of radioactive material.

- Consider whether Technical Cooperation (TC) can support conduct of this training

Discussion / Conclusions:

The discussion revolved around the fact that denial or delay of shipments can have both safety and security implications should a package of radioactive material be denied transshipment and the package goes out of control.

The IMO training course was acknowledged, but it was the view of the WG that it could be enhanced to better address delay and denial issues.

The WG recommends that the safety and the security staff at the Agency, working together, evaluate existing training materials to ensure the information presented to participants is sufficient to address concerns and actions needed as related to safety and security issues that may accrue from a delay or denial of a shipment.

The ability of Technical Cooperation to adequately fund the training on the safety and security implications of shipments being held as a result of denial for organizations involved in transport of radioactive material will need to resolved by the Secretariat.

The WG therefore recommends that the Secretariat work within the Agency to define the adequacy of training material for national and regional training needs and the ability of Technical Cooperation to support this effort.

7. Consideration on Proposal of country’s template for IAEA SharePoint

The WG then considered an additional topic identified by the WG members that was viewed as an issue of high priority because communication is essential to success in resolving the D/DOS issues.

The potential use of SharePoint capability for each Member State for sharing key documents among Member States and within Member States was addressed.

The WG Leader shared with the WG a concept of a template for potential use on SharePoint for transport in general. This presentation provided a very detailed set of web pages (as a possible template) for consideration for use in SharePoint. It would give users the opportunity to explore for information on packaging and transport of radioactive material, organizations, etc. by country or within a country. In summary, the proposed template contained six major elements as follows:

1. General Information
2. Libraries/Publications
3. Lists
4. Discussions
5. Sites (Links)
6. People and Groups

The Scientific Secretary then shared with the WG an example diagram of what the Agency is considering for SharePoint; which is identified as “One Entry Point: “Transport Web Portal” (see Annex 3). This portal will provide all information that is available at and to the Agency.

As illustrated in Annex 3, at the top level it is currently envisioned to have five elements as follows:

1. Calendar and Current Events
2. Regulations and Guidance
3. Hot Topics
4. Member States Portal
5. Tools

The view of the Secretariat is that the SharePoint site would not duplicate sites or information; its goal would be to provide a user-friendly tool to assist Member States in communicating with each other and with the IAEA and potentially other international organizations.

Concerns of the WG members focused around the maintaining of the material on the SharePoint site, what will be the commitment in terms of time, personnel and costs.

The diagram as presented by the Secretariat was viewed as a very positive step forward.

The WG recommends that the Secretariat must provide a detailed site map of a country and regional template for the SharePoint site, in order to define a harmonized national and regional network so that the Member States can provide feedback early in the development of the network. This should be provided with a view to obtaining inputs from NFPs and RFs and other stakeholders, as appropriate.

8. Customs Training – Briefing by Agency Staff

Mr. Hazem Suman of the Secretariat provided a briefing on training that is available for customs and border agents. A course was developed approximately ten years ago, based on TS-R-1, and has been given at both regional and national levels in various Member States. It is a one-week course. The focus is on educating customs officers to properly deal with shipments of radioactive material passing through their border. It outlines what is needed for radiation safety. It has also been incorporated training elements on security.

It was mentioned by the WG that the course might be expanded slightly to address issues relating to denial and delay of shipments. In addition, the course needs to be updated to reflect SSR-6.

The WG recommends that the Agency consider enhancing the training course for customs and border officials to include delay and denial of shipments.
Annex 1

The Action Plan for 2012, as presented in the ISA Report (in Annex 17-b) is as follows:

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Focus Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Prioritize the most crucial stakeholders from the 48 stakeholder groups involved in the movement of RAM</td>
<td>Recipients of training</td>
</tr>
<tr>
<td>2.</td>
<td>Deploy the training material available with IAEA and modal agencies to carry out training among the selected stakeholders</td>
<td>Courseware development at IAEA and Regions</td>
</tr>
<tr>
<td>3.</td>
<td>ISC should encourage member countries, who have not yet addressed the problem of denials, to replicate the Brazilian experience to carry out distance education and on-site training, using the new paradigm of Regional projects.</td>
<td>Project Management</td>
</tr>
<tr>
<td>4.</td>
<td>Member states should periodically report back to IAEA on the action taken.</td>
<td>Reporting Mechanism</td>
</tr>
<tr>
<td>5.</td>
<td>Create a strategy for Public-Private Participation in member states to organize regular training programs.</td>
<td>Initiatives from the Nuclear Industry</td>
</tr>
<tr>
<td>6.</td>
<td><strong>Awareness &amp; Publicity</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Declare the birthday of Marie Curie, November 7 as the World Radiisotope Day and use the occasion to create publicity and awareness programs on the transportation of RAM. IAEA should plan, along with modal organizations, full day-long programs in all member states.</td>
<td>Branding Class 7 cargo as life-affirming to counter existing biases among users, stakeholders and decision-makers.</td>
</tr>
<tr>
<td>7.</td>
<td>Create a new mechanism for enabling free-flow of information between regulators, carrier associations, inter-governmental organizations and consignors of RAM.</td>
<td>Preparing for the post-ISC era.</td>
</tr>
<tr>
<td>8.</td>
<td>Update the details of competent authorities which ensure cross border transport of RAM and accord wide publicity to this among stakeholders</td>
<td>Database Management and dissemination of information</td>
</tr>
<tr>
<td>9.</td>
<td>Develop a web-based access to transport regulations related to Class 7 cargo movement of all member states for facilitating flow of RAM between multiple countries.</td>
<td>Tackling transport issues between borders</td>
</tr>
<tr>
<td>Review of the Regional Projects</td>
<td></td>
<td></td>
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<tr>
<td>--------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Strengthening effective compliance assurance for the transport of radioactive material”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Points 1 to 9 are in alignment with the TC project mentioned above

11. Governance and Facilitation

Redesign the existing structure of relationship between ISC, Management Team, Regional Coordinators, National Focal Points etc., in the light of the closure of ISC in year 2013.

Options for Synergy

12. Work towards the harmonization of regulations leading to uniformity in rules regulating transportation of RAM globally.

<table>
<thead>
<tr>
<th>Permanent (non-voluntary) mechanism to facilitate transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC projects &amp; Network priorities</td>
</tr>
</tbody>
</table>
Annex 2

New Reporting Format for Denial and Delay of Shipments
### DENIAL/DELAY OF CLASS 7 BY SEA

**Summary report from mm/yyyy to mm/yyyy**

**Member State where consignor is based**

*THE IDENTITY OF THE REPORTING ORGANISATION WILL BE KEPT CONFIDENTIAL.*

<table>
<thead>
<tr>
<th>Sea port where denial / delay took place</th>
<th>Origin and/or destination (optional)</th>
<th>Number of occurrences denial / delay</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Reason for denial or delay</td>
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<td>Company policy of carrier</td>
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<td>Port transit refusal</td>
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<td>Feeder vessel issues</td>
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<td>Documentation rejected in error</td>
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<td>Replaced by higher priority / value cargo</td>
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<td>Vessel insurance issues</td>
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Please record each occurrence of a denial or delay - reportee to be advised accordingly.

Please complete and send to: [NFP name]

[Email address]
### DENIAL/Delay of Class 7 by Air

**Summary report from mm/yyyy to mm/yyyy**

**Member State where consignor is based**

*THE IDENTITY OF THE REPORTING ORGANISATION WILL BE KEPT CONFIDENTIAL.*

<table>
<thead>
<tr>
<th>Airport where denial / delay took place</th>
<th>Number of occurrences of denial / delay</th>
<th>TOTAL</th>
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<td>Carrier denial (company policy)</td>
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<td>TL limit on aircraft exceeded</td>
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<td>Replaced by higher priority / value cargo</td>
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<td>Refusal by aircraft Captain</td>
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<td>Customs cleared at destination</td>
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<td>Other - please specify</td>
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</table>

**TOTAL**

Please complete and send to: NFP name

E-mail address
Annex 3

Example Diagram of the Agency’s Proposed SharePoint Site
Annex 7.3  Report for Working Group 3
1. **Participants**
   - M. Budu (Russia)
   - C. Clemente (France), Part time
   - C. Fasten (Germany), Chairperson
   - F. Kirchnawy (Austria)
   - A. Konnai (Japan), Secretary
   - J.Y. Reculeau (IAEA)
   - N. Sboui (Tunisia)
   - D. C. Sinaga (Indonesia)
   - Zs. Szepes (Hungary)
   - S. Trivelloni (Italy)
   - V. Tran-Thien (France), Part time

2. **Provisional Terms of Reference for Working Group #3**

   **Work to be done:**

   1) What revisions might need to be made to SSR-6 or the UN Orange book (UN)/ modal regulations to promote further harmonization?

   2) Consider review of TS-G-1.6 in developing simpler “model” regulations for Member States.

   3) Develop and outline of a methodology for determining cost of safety regulatory changes

       a. What changes would be needed to incorporate such a methodology into the regulations?

   4) What changes to the regulations could improve the clarity of regulatory language?

3. **Report**

   1) What revisions might need to be made to SSR-6 or the UN Orange book (UN)/ modal regulations to promote further harmonization?

   A. Harmonisation SSR-6, UN and modal regulations

   WG#3 recommends harmonising the following items:
1. Difference of requirements for UN Packing groups and IAEA types of packages (eg. Industrial Packages)
2. Certification requirements for non-approved package designs
3. Primary and subsidiary risk (technical basis for criteria)
4. Limited quantity, Excepted quantity vs Excepted package
5. Transport of samples (UNOB 2.0.4)
6. Salvage packaging (UNOB 4.1.1.18, 6.1.5.1.11)
7. Expand emergency provisions with general mode-independent requirements (304, 305 and 554 (c) of SSR-6)
8. Assessment of special provisions of UNOB, applicable for radioactive material
9. Segregation requirements and guidance for persons (public and workers), para 562 of SSR-6

B. Harmonisation between countries

WG#3 recommends examining the following items:

1. Reduce differences between the state regulations and international safety standards (eg. Licence vs certificate, approval)
2. Mutual recognition of approval of package design
3. Consider developing IAEA “package design safety report” guide as a possible standard
4. Support developing the international applicant review guide

2) Consider review of TS-G-1.6 in developing simpler “model” regulations for Member States.

WG#3 concluded that TS-G-1.6 (Schedules) is not a format to make the model regulations simpler. To comply with the requirements, full text of the applicable modal regulations is needed. Nevertheless, WG#3 recommends using the Schedules as a basis to improve Class 7 requirements in the table of Chapter 3.2 in UNOB and the modal agreements/regulations.

WG#3 has an opinion that Schedules are very useful for regulators, shippers and for training purposes for beginners. Therefore, WG#3 recommends posting the E-Schedules on the IAEA web site.

Moreover the WG#3 recommends inserting the flow diagram of TS-G-1.6 into SSR-6, Section 4 (Classification) and also into UNOB, Chapter 2.7. Some corrections are needed before inserting of the flow diagram, eg. UN 3507 shall be added.
3) Develop and outline of a methodology for determining cost of safety regulatory changes

Determining the cost of safety regulatory changes is useful for increasing the efficiency of the regulations both for governmental bodies and the industry. The governmental bodies nowadays, when some countries are affected by financial crisis, could benefit from such assessments in raising the efficiency of their budget expenses, saving important sums that could be allocated for more personnel, better qualifications etc. The resources of industry can also be used in a more cost effective way to improve safety.

A graded approach is necessary: the efforts made to evaluate the administrative costs of a proposed regulatory change should commensurate with the significance of this change. A general qualitative assessment is sufficient for minor changes. A more detailed assessment, possibly illustrated with the case of one or several Member States or including world-wide cost estimates, can be required for more significant changes.

A safety regulatory change at international level impacts various countries and various organizations. Estimating the costs of such change for all these countries and all these organizations is likely not achievable. When proposing such a change, the author of the proposal should then focus on a limited set of data. The most important pieces of information to gather are whether the administrative burden is increased or decreased, the type of entities affected by this increase/decrease and elements to appreciate the order of magnitude of this increase/decrease. The method, assumptions and data sources used should be presented in a transparent way.

At national level, the cost of each (case by case) transport safety regulatory change can then be estimated following a few main steps:

1. Identification of information

The input information required for developing a cost estimation for a proposed regulatory change is, inter-alia:

- administrative regulatory information: bodies involved in the regulatory process, procedures and interactions between them, manpower and technical (physical) resources required for each procedure (example: modification of certificate vs. new certificate issuance);
- financial regulatory information: is the regulatory body working as a service-tariff self financed body, or is it financed from the state budget? What are the tariff/budget expenses for each regulatory procedure?
- based on transports statistics proportional coefficients shall be determined for material categories, package types, modes of transport etc. These coefficients help refining the cost impact of regulatory provisions.
- determination of appropriateness and form of the proposed changes.

Result: bodies, procedures, manpower, regulatory costs (budgetary or tariff based), coefficients for materials, packages, modes of transport, identified change.

2. Proper categorization of the analyzed transport safety regulatory change
For the intended regulatory change all the affected regulatory procedures and the change cost impact should be identified (less manpower and more technical resources? Example: usage of electronic systems).

If the regulatory change affects several radioactive materials/package types/transport modes, then the proportion coefficients determined at point 1 should be applied in determining the overall cost of the change implementation.

Another aspect to be taken into consideration for a proper characterization of the change: is it an administrative change only (organizational change), does it impact package design, associated equipment, safety case demonstration or existing packagings/conveyances/equipment that are involved in transport?

A questionnaire or a diagram can be developed in support for a correct categorization of a regulatory change.

Result: a selection of impacted procedures, administrative/technology impacting change, one or several selected impacted materials/packages/modes of transport.

3. Cost calculation

For each element determined at point 2 implementation cost of the current provision and of the new changed one shall be determined. Since the factors involved in determining the implementation cost for one or another regulatory provision can vary independently one from the other during a change (manpower, technical resources, equipment etc.), then the new implementation cost may result bigger or smaller than the current cost estimation in an unforeseeable way. For this reason each cost factor (human resources, technical resources, financial, legal, training etc.) should be reassessed while calculating the new implementation cost.

Result: new implementation cost

4. Cost assessment

At this step the new implementation cost is analyzed against the current implementation cost and against the possible expenses resulted from not implementing the respective change. Conclusions and recommendations should be elaborated at the end of this step.

Result: conclusions and recommendations

a) What changes would be needed to incorporate such a methodology into the regulations?

WG#3 recommends developing a new safety guide at IAEA level with the involvement of all member states to incorporate a methodology for determining cost of safety regulatory changes. Afterwards a monitoring of the safety guide implementation at state level by the means of organizing workshops for obtaining permanent feedback and experience exchange (lessons learned) could be useful for the further application of such methodology in SSR-6, especially for the regulatory process. Furthermore WG#3 recommends developing and making available a model of the cost assessment methodology for the transport of radioactive material.
WG#3 stated that this methodology can be very helpful in support for proposing changes in the IAEA requirements.

IAEA requires already that for the current review process of SSR-6, that it is necessary to have an estimated cost for each proposal (see 6. in the submission form):

“6. Justification of proposed change

State expected cost of implementation (negligible, low, medium or high). Add detail as necessary.”

WG#3 recommends

- to use a cost assessment methodology as a tool for this item 6, if applicable
- to change for the next review process for SSR-6 the item 6 in so far, that special costs are to be determined, if applicable

Some examples for cost assessment methodologies:

- The Cost driven Approach to Regulatory burdens (CAR).

4) What changes to the regulations could improve the clarity of regulatory language?

WG#3 recommends considering the following items:

- Clear definitions, no requirements in the definitions
- Consistent use of definition
- One requirement per one paragraph
- Standards for legislation: use of shall, should, must, might
- Use of “and” and “or”
- Not doubling of negative words
- Short, precise and concise sentences
- Clear punctuation
- More visual things, e.g. flow diagrams, tables
- Avoid cross references, if possible (rewrite, if short regs)

Furthermore, WG#3 recommends the following means to improve the clarity of the regulatory language:

- To use the Inter-agency group for concurring the text
- To organise translation conference (for 6 UN-languages).
Annex 7.4 Report for Working Group 4
Technical Meeting to Produce Consolidated Drafts of the IAEA’s New Transport Safety Standards Taking into Account the Results of the 2011 International Conference on the Safe and Secure Transport of Radioactive Material
TM-44897, April 2013

Working Group #4 Summary

A. Working Group #4 Members

Mr. Garry Owen  WNTI - Chair
Mr. Woon-Kap Cho  Republic of Korea
Mr. Bernd Keller  Netherlands
Ms. Nontutuzelo Mmutle  South Africa
Mr. Jeff Ramsay  Canada

Also thank you to Jean-Francois LaFortune, Emergency Response Coordinator for the IAEA Incident and Emergency Center for his contributions to the discussions on emergency response.

B. Terms of Reference

Based on the terms of reference provided, the working group considered the following issues:

1) What regulatory issues cause problems to implementation of the regulations by Member States?
   a. What changes or revisions to the regulations could solve these problems?

2) Examine lessons learned from non-radioactive transport or other incidents where the response system did not work as well as expected.
   a. What applications can be made to transport of radioactive material?
   b. Are changes to the regulations warranted given these “lessons learned”?
   c. What is the nature of these regulatory changes?

C. Summary of Discussions

1) What regulatory issues cause problems to implementation of the regulations by Member States?
   a. What changes or revisions to the regulations could solve these problems?

The working group members contributed the following regulatory issues:

1.1 Radiation Protection Programs (RPP)
   a. Sometimes a burden for industry, carrier and cause of denials of shipment.
Class 7’s play a negligible role for many carriers and the ‘burden outweighs the benefit’.

Is there a way to reduce the regulatory burden without reducing safety?

Recommendation:
- Investigate reducing RPP requirements depending on the type of packages handled and the level of risk. Consider removing the requirement for RPP for packages of a low TI in TS-G-1.3.
- Develop further RPP examples for common radioactive materials within TS-G-1.3 (UO₂, natural uranium, UF₆, etc.).

1.2 Natural Uranium Classification

The working group members discussed the case of Uranium Oxide and whether it is considered to be classified as natural uranium within the regulations. The members concluded that the regulations lacked clarity and would benefit from review.

- Distinction between unirradiated uranium (para. 246 SSR-6) and natural uranium (para .247 SSR-6) and the term U-natural requires further clarification [5].

Recommendation:
- Add guidance material to TS-G-1.1 to clarify terms and definitions for unirradiated uranium, natural uranium and U-natural.

1.3 Large Component Shipments

The decommissioning of nuclear facilities has introduced new challenges for transport. In many cases there is a significant safety benefit in maintaining the integrity of large components, avoiding any dismantling activities of these components. As these shipments become more common they need to be properly facilitated within the regulations.

- Difficulty shipping large components, primarily from decommissioned nuclear power plants, without a special arrangement (e.g. conveyance limit).
- Much experience in some member states with these types of shipments.
- A Canadian draft proposal is under development.

Recommendation:
- Inclusion of large component provisions into SSR-6 would be beneficial for the industry, particularly in respect of increased decommissioning activities.
1.4 Change to Special Arrangement Nomenclature or Regulations

- The term “Special Arrangement” draws public attention for shipments that provide an equivalent level of safety.
- Proposal for an alternative to Special Arrangement is under development by Canada.

Recommendation:
- There was not unanimous support for this in the working group, however further investigation of the issue may be beneficial for future discussion at TRANSSC.

1.5 Compliance Assurance – Dealing with Non-compliances

Working group members were concerned whether there was sufficient information available to assist in the scenario where a package is found to be ‘non-compliant’. The IAEA regulations were reviewed in addition to the modal regulations and found to be adequate.

- The working group reviewed TS-G-1.1 and TS-G-1.5 and found there was sufficient guidance in this area.

Recommendation:
- No recommendation for further effort or regulatory change.

1.6 Radiation Monitoring

This issue related to the variability in monitoring instruments and monitoring techniques. This variability has the potential to create uncertainty, particularly where the TI’s are close to certain limits, eg, TI=10, conveyance limits.

- Wide range of methods, instruments can lead to different qualities of measurement and uncertainties in measurement (mostly for neutron, but also gamma).
- This can cause issues when measurements by different groups (consignor, consignee, regulators) on the same package produce different results.

Recommendation:
- Experts in radiation protection should review and investigate if additional guidance material could be added to TS-G-1.1 (para. 233) in order to improve consistency in measurement methods.
1.7 Simplification and Clarification of Requirements

Simplification and clarification of regulatory requirements generally helps understanding and improves overall compliance and safety.

- The regulations can be difficult to interpret in some instances, especially for countries that do not do a lot of radioactive material transport (see 1.2 above).
- Are users understanding and interpreting the regulations as intended?

Recommendation:
- Simplification of regulations should be identified as an area for further study.
- Providing examples of completed transport documents in TS-G-1.1 or TS-G-1.4 for different packages would be beneficial.
- Testing understanding and interpretation (fissile exceptions and secular equilibrium for example) of the users would help ensure compliance.

1.8 Administrative Burden

- Must be optimized to balance the amount of documentation against the safety requirement.
- For example, often the same documentation is required for an empty package as a loaded package.
- High administrative burden could lead to greater risk of human error.

Recommendation:
- The amount of administrative burden (documentation, filing, checks, etc.) required for different shipments be reviewed in terms of the benefit versus the safety implications.

2) Examine lessons learned from non-radioactive transport or other incidents where the response system did not work as well as expected.
   a. What applications can be made to transport of radioactive material?
   b. Are changes to the regulations warranted given these “lessons learned”?
   c. What is the nature of these regulatory changes?

The working group reviewed the following documents on non-radioactive transport events which provide a sample of the lessons learned from non-radioactive events;

- The Nimrod review (including Columbia Space Shuttle event) [8]
Deep Water Horizon (British Petroleum) incident [9]
The Buncefield incident [10]
Piper Alpha Accident [11]
Exxon Valdez oil spill [12]

The OECD document on Guiding Principles for Chemical Accident Prevention, Preparedness and Response was also briefly reviewed [13].

The above documents show that, regardless of the event, assessing the potential for a major event and implementation of an effective emergency response system is critical to a successful recovery.

The lessons learned from all of the above events are uncannily similar. Some of the more key lessons learned that apply to radioactive material transport are examined in further detail in sections 2.1 to 2.6 below.

In section 2.7 below, lessons learned from the Fukushima event were also reviewed and considered in context of improvements to the response system and applications to the transport of radioactive material.

2.1 Incident Command Structure (ICS)

- Emergency planning experience has shown that ICS or similar provisions are beneficial in responding to transport incidents.
- Safety Standard GS-R-2, Preparedness and Response for a Nuclear or Radiological Emergency, is currently being reviewed and updated.
- Accordingly, TS-G-1.2 is also currently being reviewed and updated to reflect current practices in emergency response, including ICS. Revisions to TS-G-1.2 will focus more on transport events than on radiological consequences.

Recommendation:
- No recommendation for further effort or regulatory change to SSR-6 and TS-G-1.1.
- Safety Standard GS-R-2 and TS-G-1.2 are currently under revision and lessons learned from both radioactive and non-radioactive events should be considered for these documents.

2.2 Determining Extent of Risk

- In all emergencies it is important to determine the extent of the risk, including:
  - Identification and evaluation
  - Transfer of information (to first responders and the public)
  - The need for the emergency arrangements to be commensurate with the potential magnitude and nature of the threat;
The need to conduct a periodic review to ensure all practices and situations that could necessitate an emergency response are identified, and to ensure that an assessment of the threat is conducted for such practices and situations
   - Guidance on risk assessment is currently available in the IAEA Manual for First Responders [16].
   - It should be recognized that most transport events do not have any radiological impacts.

**Recommendation:**
   - No recommendation for further effort or regulatory change to SSR-6 and TS-G-1.1.
   - Revisions to TS-G-1.2 should provide guidance on the radiological impacts of an event and to recognize that most transport events do not have any radiological impacts.

### 2.3 Accident Management Drills/Exercises for Training

   - Drills and exercise are important for effective emergency response in all industries. The impact of an event can be greatly reduced by effective accident management.
   - Within the working group it was noted there seems to be an inconsistent level of radioactive material transport drills/exercises performed in member states.
   - Guidance on accident drills/exercises for training is provided in TS-G-1.2.

**Recommendation:**
   - Recommend this topic as an area for further study.
   - No recommendation for further effort or regulatory change to SSR-6 or TS-G-1.1 at this time.

### 2.4 Sharing of Operational Experience, Accidents and Good Practices

   - It is important to learn from mistakes and successes.
   - There have not been many significant transport events to share experiences on. However, the learning from other non-radioactive events shares common underlying factors.
   - INES database is in place for tracking of radioactive material transport incidents.
   - The working group reviewed IRSN [1] and HPA [2] incident reports:
     - General conclusion is that the majority of transport accidents are low risk.
     - IRSN reported a large number of events, while the HPA reported a low number of events. The IRSN report, however, looked at a much wider spectrum of events than required by ADR.

**Recommendation:**
   - No recommendation for further effort or regulatory change to SSR-6 and TS-G-1.1.
2.5 Human Factors / Operational Issues

- Analysis of accident statistics indicates that a majority of transport-related incidents and accidents happen during loading/unloading operations [3].
- Further detailed analysis shows that the human factor element (human error) is by far the most important cause of accidents [3].

Recommendation:
- Review human factors and provide more guidance in this area in TS-G-1.1 and TS-G-1.4.
- No recommendation for change to SSR-6.

2.6 Ensuring a proper safety culture, awareness of the “Swiss cheese” model

- A strong and effective safety culture is vital to reducing accidents.
- The role of leadership is critical in safety culture.
- The safety system is comprised of more layers than just design. Other layers include inspection and maintenance, quality assurance, compliance, training and their human factors.
- The “Swiss cheese” model (see figure below) is often used to illustrate how the various defensive layers and the ‘hierarchy’ of preventative and improvement measures are aligned [8]. A strong safety culture in all layers of an organization is imperative to ensure the “holes” don’t line up.
Recommendation:
- Review safety culture implications, including existing accident causation models, in transport of radioactive material and provide more guidance in this area in TS-G-1.1 and TS-G-1.4.
- No recommendation for change to SSR-6.

2.7 Fukushima Lessons Learned [14, 15]
- Impact of a prolonged event (available resources, access).
- Exercise scenarios are generally short term and do not cover extreme events.
- Redundancy in emergency communications is important (for instance, if the emergency control center is compromised, emergency efforts may be affected).
- Human factors were also a factor (response workers’ psychology, shift changes, communications between responders and to the public).
- Multi-event scenario (tsunami and earthquake) was a challenge.
- Decontamination after the event is generally more complicated and longer term for radioactive material.
- Dual-purpose package performance following the events of Fukushima demonstrated a high level of safety (dry-storage flasks).

Recommendation:
- N.B. The International Nuclear Events Scale (INES) recognizes that the potential radiological effect of events associated with transport packages is much lower than a nuclear facility [6].
- Nonetheless, TS-G-1.2 should consider lessons learned from the Fukushima event in relation to emergency response capabilities, although such considerations are generally beyond the package design basis.
- No change to SSR-6 is seen to be necessary.
D. Final Conclusions

1) What regulatory issues cause problems to implementation of the regulations by Member States?
   a. What changes or revisions to the regulations could solve these problems?

   Key recommendations are:
   
   o Inclusion of large component provisions into SSR-6 would be beneficial for the industry, particularly in respect of increased decommissioning activities. (High priority)
   o Investigate reducing RPP requirements depending on the type of packages handled and the level of risk. Consider removing the requirement for RPP for packages of a low TI in TS-G-1.3.
   o Develop further RPP examples for common radioactive materials within TS-G-1.3 (UO$_2$, natural uranium, UF$_6$, etc.).
   o Add guidance material to TS-G-1.1 to clarify terms and definitions for unirradiated uranium, natural uranium and U-natural.
   o Experts in radiation protection should review and investigate if additional guidance material could be added to TS-G-1.1 (para. 233) in order to improve consistency in measurement methods.
   o Simplification of regulations should be identified as an area for further study.
   o Providing examples of completed transport documents in TS-G-1.1 or TS-G-1.4 for different packages would be beneficial.
   o Testing understanding and interpretation (fissile exceptions and secular equilibrium for example) of the users would help ensure compliance.

2) Examine lessons learned from non-radioactive transport or other incidents where the response system did not work as well as expected.
   a. What applications can be made to transport of radioactive material?
   b. Are changes to the regulations warranted given these “lessons learned”?
   c. What is the nature of these regulatory changes?

   Key recommendations are:
   
   o Review human factors and provide more guidance in this area in TS-G-1.1 and TS-G-1.4. (High priority)
   o Review safety culture implications, including existing accident causation models, in transport of radioactive material and provide more guidance in this area in TS-G-1.1 and TS-G-1.4. (High priority)
   o Revisions to TS-G-1.2 should provide guidance on the radiological impacts of an event and to recognize that most transport events do not have any radiological impacts.
E. References