



**IAEA**

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الوكالة الدولية للطاقة الذرية

国际原子能机构

International Atomic Energy Agency

Agence internationale de l'énergie atomique

Международное агентство по атомной энергии

Organismo Internacional de Energía Atómica

Vienna International Centre, PO Box 100, 1400 Vienna, Austria

Phone: (+43 1) 2600 • Fax: (+43 1) 26007

Email: [Official.Mail@iaea.org](mailto:Official.Mail@iaea.org) • Internet: <http://www.iaea.org>

In reply please refer to:

Dial directly to extension: (+431) 2600-26074

**2009/Note 38**

## **Note by the Secretariat**

### **Technical Meeting on Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources with Regards to Long Term Strategies for the Management of Sealed Sources**

#### **Report of the Chairman**

#### **Summary**

The Agency held a technical meeting on implementation of the Code of Conduct on the Safety and Security of Radioactive Sources (the Code of Conduct) with regard to long term strategies for the management of sealed sources from 29 June to 1 July 2009 at the Agency's headquarters. The meeting was attended by 75 experts from 51 Member States, as well as observers from the European Commission and the International Source Suppliers and Producers Association (ISSPA).

The Chairman's report of the Meeting is attached for the information of Member States.



13 August 2009



# Technical Meeting on Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources with Regard to Long Term Strategies for the Management of Sealed Sources

## Report of the Chairman

1. A technical meeting on implementation of the Code of Conduct on the Safety and Security of Radioactive Sources with regard to long term strategies for the management of sealed sources was held from 29 June to 1 July 2009 at the IAEA Headquarters in Vienna under the chairmanship of Mr S. McIntosh (Australia). This meeting was suggested after issues related to the management of sealed sources, in particular when these sources are reaching the end of their life cycle or when orphan sources are detected at borders or during transport, have been raised in previous meetings on sharing of information on States' implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources in 2007 and 2008.
2. The meeting was attended by 75 experts from 51 Member States of the IAEA (Algeria, Argentina, Armenia, Australia, Bangladesh, Belgium, Brazil, Bulgaria, Cameroon, Canada, China, Croatia, Cuba, Czech Republic, Dominican Republic, Egypt, France, Germany, Ghana, Greece, Hungary, India, Indonesia, Iran, Jordan, Kuwait, Lebanon, Lithuania, Malaysia, Mexico, Myanmar, Norway, Pakistan, Romania, Russian Federation, Saudi Arabia, Slovak Republic, Slovenia, South Africa, Spain, Sweden, Thailand, Tunisia, Turkey, Uganda, Ukraine, United Republic of Tanzania, United States of America, Venezuela and Vietnam). The meeting was also attended by observers from the European Commission and the International Source Suppliers and Producers Association (ISSPA). The Scientific Secretaries for the meeting were Mr H. Mansoux (Division of Radiation Transport and Waste Safety) and Mr W. Tonhauser (Office of Legal Affairs).
3. The meeting was opened by Mr T. Taniguchi, Deputy Director General of the IAEA Department of Nuclear Safety and Security. In his opening remarks, Mr Taniguchi recalled the formal process for a voluntary, periodic exchange of information among States on their implementation of the Code and Guidance that was endorsed by the IAEA Board of Governors in 2006. He announced that the next information exchange meeting will be organized in May 2010, subject to the availability of funds. He introduced the objectives of this meeting to discuss certain legal and technical issues and possible strategies related to the management of sealed sources, in particular when these sources are reaching the end of their life cycle, or when orphan sources are detected at borders or during transport. He called for constructive discussions aiming at the establishment of harmonized strategies based on a more effective communication and cooperation among States, regulators, suppliers, shippers, users and waste management organizations. Finally, he noted that the USA had provided the extra-budgetary funding to the IAEA specifically to support participants from States that otherwise could not have attended the meeting.

4. After the opening session, the Secretariat presented its main activities related to the safety and security of sources, with emphasis on development of standards, guidance and services for the management of disused or orphan sources. The Secretariat reported on the status of international support for the Code and the Guidance. It was noted that 95 States had written to the Director General of the IAEA to express political commitment to implement the Code, and that 53 of those States had additionally notified the Director General of their intention to act in a harmonized manner in accordance with the Guidance. 88 States had nominated points of contact for facilitating exchange of information, and 42 States had completed and returned the Self-Assessment Questionnaire provided in the Annex to the Guidance. The Secretariat emphasized the importance of the political commitment and also of the designation of points of contact to facilitate international transfers of radioactive sources, briefed the participants on the main on-going programmes of the IAEA to assist States in implementing the provisions of the Code and the Guidance, and invited them to suggest any improvements in these programmes.

5. In preparation for the meeting, the Secretariat invited all participants to prepare a presentation on their experience and challenges with the long term management of disused sources and orphan sources. Eleven presentations were given, and their content is discussed under the various themes below. The meeting was organized in thematic discussion sessions. The key issues discussed are summarised below.

## **Management of disused sources**

### Reuse and recycling of radioactive sources

6. Participants recalled that paragraph 14 of the Code provides: “Every State should encourage the reuse or recycling of radioactive sources, when practicable and consistent with considerations of safety and security.” It was noted that such encouragement might not necessarily be a role of the regulatory body. Reuse does not involve disruption of the source capsule, and may be as simple as transferring the device to another user. On the other hand, recycling of sources – which involves disruption of the source capsule - is a technically demanding task which can only be performed by a body which has particular expertise and is licensed to undertake such work.

7. Participants noted that reuse of a source – perhaps in a different context, given that decay may have made it no longer useful for its original purpose – is the simplest operation, and occurs today in a number of countries. Even then, however, the removal of the source from the device in which it is housed and its emplacement in a new device – if required - is a potentially hazardous operation which should only be carried out by persons or bodies with the appropriate licence, knowledge and skill. Reuse could be facilitated by the operation of a service or database which matches a person with a disused source of a particular type with a person wanting to acquire such a source. However, participants cautioned that export for reuse by recipients in another country should not be used as a cheap alternative to disposal of disused sources.

8. Participants then discussed the recycling of sources. It was noted that in many cases, the reduced activity of the original sources is compensated for by incorporating the radioactive material from multiple original sources in a single newly fabricated source. This refabricated source could be larger in size than the former source – meaning that modifications of the device in which it is housed would also be required, or the new source must be accommodated in a different device. These steps entail costs (which may be greater than the costs of long-term storage or disposal), the generation of process waste and challenges for regulators dealing with what may effectively be new source designs. These issues need to be taken into account in deciding whether a particular type of source should be recycled. Participants noted that sources are more likely to be recycled if they are of high activity, high value

and/or long-lived. Recycling may require international transport, with the attendant logistical challenges (see discussion in paragraph 13 below).

9. An issue also discussed in this connection was the recertification of sources. Certification of a source is the process by which a source manufacturer checks the compliance of the source with the relevant regulations, characterizes its properties (nuclide, activity at a certain date, dimensions) and defines a recommended working life. The result of the source certification is the production of a source certificate by the manufacturer. When the recommended working life is exceeded, the manufacturer may perform additional examination of the source (visual inspection, leak tests), and extend the recommended working life. In that case, a new certificate is issued, and this complementary examination is called source recertification.

10. Although the recommended working life is often a contractual rather than a regulatory issue, recertification does bear upon the safety and security of sources. It was noted that recertification normally entailed the return of the source to the supplier, which could be expensive and logistically difficult to organise. Users may well feel that it is simpler to purchase a fresh source instead, making the original source disused and increasing the total number of sources in circulation – an outcome not consistent with safety and security objectives. In response, the representative of ISSPA noted that at least one supplier had introduced a system of recertification of some types of sources by way of studying pictures and results of tests of the source in question. Whilst those pictures and tests would need to be made in a hot cell or similar facility, national facilities may be used for that purpose. Such a process would avoid the logistical challenges of international transport, thus making recertification of sources easier. While it was acknowledged that such a practice required particular expertise, ISSPA was encouraged to promote such practices among all its members.

11. It was recommended that an international database of recyclers be created. In this connection, it was noted that the IAEA International Catalogue of Sealed Radioactive Sources and Devices contains a list of manufacturers which could be updated to specifically include recyclers. ISSPA also undertook to consider whether it could provide such information.

#### Return of disused sources to supplier

12. Participants recalled that paragraph 20(e)(vii) of the Code provides: “Every State should ensure that the regulatory body established by its legislation has the authority to attach clear and unambiguous conditions to the authorizations issued by it, including conditions relating to the safe and secure management of disused sources, including, where applicable, agreements regarding the return of disused sources to a supplier.” For many states, return of disused sources to the supplier is clearly the preferred option – and this is now often a condition of licence. Some supplier states now issue export and import licences for sources simultaneously, thereby facilitating the eventual return of the source to the supplier. This was viewed as good practice.

13. Suppliers were encouraged to include a provision in the contract of sale of the source undertaking to take the source back when so requested. Such a provision might be accompanied by the inclusion in the sale price of an up-front charge for the cost of return and the subsequent management by the supplier. However, it was acknowledged that an appropriate charge would be difficult to calculate, particularly where the supplier had no disposal option, and that such a charge might impose a competitive disadvantage on the supplier (which could only be remedied if national legislation or regulations required such a payment and thereby created a level playing field).

14. It was noted that currently such contractual provisions might include a time period for return well short of the working life of the source, or a provision voiding the right of return if there are changes in

regulations. Such restrictions made it less likely that users would be able to avail themselves of the option of return to the supplier.

15. The first issue in discussing the right of return to a supplier is deciding who the appropriate “supplier” is. In most cases, the radioactive material in a source goes through a chain of suppliers from the original isotope producer to the final distributor before it ends up with the user. France noted that its national law provides a right of return to the previous person in the supply chain – with a preferred outcome of its return to the company which issued the source certificate, or failing that to another qualified supplier (this did not mean that the disused source was physically transferred to each step in the chain). That company would have the capability to reuse, recycle or safely and securely store the source.

16. Another issue concerning the return of sources to a supplier is the difficulties in arranging transportation of the source, whether because of denial of shipment by the carrier or because the source itself, or the container in which the source was originally transported, is now out of certification. The United States noted that they are currently in the first stages of development of a new design Type B container which could be used to transport a wide variety of types of sources. It is hoped that the container will be available for use within two-three years.

17. A further obstacle to return of a disused source to a supplier is the application to disused sources of provisions in national law which forbid the importation of radioactive waste— even if those sources were originally exported from the state in question. The situation is particularly difficult where such a law applies to sources exported prior to its entry into force – thereby imposing an unanticipated long-term management burden on states which had allowed the importation of such sources on the basis that they would be returned to the supplier. One participant suggested that the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management should be amended so as to effectively prevent States Parties from taking such a step. Other participants felt that, given the difficulties involved in amending conventions and the need for existing States Parties to subsequently ratify the amendment separately, that proposal was not realistic. However, the issue should be brought to the attention of the parties to the Joint Convention.

18. Some states noted that the problem outlined in the previous paragraph could be avoided if the source was not designated as waste at the time it is sent back, rather being declared as waste only after the source has been examined and it has been determined that the source cannot practically or economically be reused or recycled. It was agreed that supplier states should strive to avoid a situation whereby legislative changes or national policy mean that disused sources cannot be returned to the supplier. It was suggested that states whose national law prevents return of sources to a supplier should consider whether their suppliers should continue to export sources, although there was no uniform view on this suggestion.

19. Participants recalled that paragraph 22(b) of the Code provides: “Every State should ensure that its regulatory body ensures that arrangements are made for the safe management and secure protection of radioactive sources, including financial provisions where appropriate, once they have become disused.” Pursuant to this provision, a number of states require source users to supply a financial guarantee at the time of receipt of a source, or are considering introducing or extending such a scheme. That financial guarantee may be used to cover the costs of return to the supplier and/or the costs of the long-term storage or disposal of the source should return to the supplier be impossible. Obviously, such a scheme can only function properly if national waste management facilities are available.

20. It was noted that there are a range of possible situations to be addressed. If there was a contractual provision in place covering return to supplier, a supplier willing to accept return and no impediments in national law, the return comes down to a matter of cost and resolving possible issues

of denial of shipment by the carrier. On the other hand, if the supplier has gone out of business or there are prohibitions in national law, other remedies may need to be further explored.

### Long-term storage

21. Participants recalled that paragraph 20(q) of the Code provides: “Every State should ensure that the regulatory body established by its legislation has the authority to ensure that, where disused sources are stored for extended periods of time, the facilities in which they are stored are fit for that purpose.” “Fit for purpose” clearly means that the stores are both safe and secure, particularly given that they will house significant aggregations of sources. Many states indicated that, given the risks of disused sources becoming orphaned and thereby becoming safety and/or security risks, licensees were required to either send disused sources back to the manufacturer or to send them to a licensed recycling or waste management facility. It was agreed that this was good practice.

22. Many participants also indicated that it was the responsibility of the state to provide central storage or disposal facilities for disused or orphaned sources which could not be returned to the supplier. In the case of disused sources, licensees should be charged an appropriate one-off fee – set high enough so as to encourage return to the supplier as the preferred option, but not so high as to encourage licensees to abandon disused sources. In the case of orphan sources, or sources in respect of which the licensee was located beyond national jurisdiction, the state (or a fund created by contributions by all licensees) should bear the costs.

23. Some participants noted that their national regulatory authorities had recently conducted national collection programs for disused sources – either for all disused sources, or for a class of such sources (e.g. radium sources). This was noted as good practice.

### Disposal

24. The meeting noted that storage is not an ultimate solution. Although the actual safe lifetime of a source is usually much longer than the “design life”, eventually the encapsulation will fail. Sources which have not been disposed of also constitute an ongoing safety and security risk. For longer-lived sources, a disposal route is therefore necessary. The existence of a disposal route will also make it possible for full life cycle costs to be more accurately calculated.

25. For states with nuclear fuel cycle facilities or facilities undergoing decommissioning, disused sources will form only a small fraction of the overall volume of waste to be managed. Their disposal together with waste from such facilities might therefore not present significant technical problems (although public acceptance problems may still exist in some states). However, for states without nuclear fuel cycle facilities, particularly very small states, the public acceptance, financial and technical obstacles to the siting of waste disposal facilities may be significant. The technical problems may be able to be addressed by borehole disposal strategies, should their proponents be able to demonstrate their suitability (including long-term safety) for high-activity sources. However, the public acceptance problems may not be able to be addressed, making it necessary for national authorities to export the sources for recycling – which is an expensive exercise. It was noted that the IAEA and some individual states support technical assistance projects for source collection in countries and transfer to a central store located in the country concerned or to the supplier state.

### **Management of orphan sources**

26. Participants recalled that paragraph 13(a) of the Code provides: “Every State should promote awareness among industry, health professionals, the public, and government bodies of the safety and security hazards associated with orphan sources”. A number of participants described their programs in this regard. Particular attention was paid to promoting awareness among users of mobile sources, such as industrial radiography and well-logging sources, as these had a greater potential to become orphaned.

27. Participants recalled that paragraph 8(c) of the Code provides: “Every State should have in place an effective national legislative and regulatory system of control over the management and protection of radioactive sources. Such a system should include national strategies for gaining or regaining control over orphan sources.” In this connection, it was noted that the Agency is currently developing a Safety Guide entitled “Methodology for a National Strategy for Regaining Control over Orphan Sources”, based on TECDOC-1388 of 2004.

28. Participants also noted that the need for such strategies to be invoked would be reduced by the introduction of strategies to prevent sources being orphaned at all. In that regard, the United States and Canada noted that recently introduced national source tracking systems would greatly assist in that regard. Participants also noted that the application of the Guidance on the Import and Export of Radioactive Sources, and the introduction of requirements for regular inventory verification by licensees and regular inspections of relevant facilities, had assisted them to reduce the incidence of orphan sources.

29. Participants recalled that paragraph 9(a) of the Code provides: “Every State should ensure that appropriate facilities and services for radiation protection, safety and security are available to, and used by, the persons who are authorized to manage radioactive sources. Such facilities and services should include... those needed for searching for missing sources and securing found sources.” It was noted that those “facilities and services” should not be limited only to technical equipment – rather, discovery of orphan sources was often the result of investigations of relevant records and particular circumstances, or of notification from members of the public or the media.

### Scrap metal

30. Participants recalled that paragraph 13(b) of the Code provides: “Every State should encourage bodies and persons likely to encounter orphan sources during the course of their operations (such as scrap metal recyclers and customs posts) to implement appropriate monitoring programmes to detect such sources.” In this connection, participants were reminded that the International Conference on Control and Management of Inadvertent Radioactive Material in Scrap Metal held in Tarragona, Spain from 23 to 27 February 2009 had raised a number of issues relating to the inadvertent movement of radioactive sources between States. In particular:

“The participants of the conference were unanimous in recognising the potential benefit that would result from establishing some form of binding international agreement between governments to unify the approach to trans-border issues concerning metal scrap containing radioactive material. This should now be a subject for the international agencies to consider and to determine the most effective mechanism for the purpose. In doing this they might explore the possibility that certain existing international instruments, for example, the international Regulations for the Transport of Radioactive Materials, could address some of the trans-border issues. Many of the topics raised by conference participants in this context have been addressed in the United Nations Economic Commission for Europe recommendations and they could, therefore, be one of the starting points for deliberations.”

31. The conference also found that the “Spanish Protocol for Collaboration on the Radiation Monitoring of Metallic Materials” provided a model for national arrangements allocating responsibilities in cases where a source contained in scrap metal, or contaminated material, was discovered.

32. Clearly, incidents of sources being melted down in scrap metal continued to occur. If the resulting product is then exported to another state and the contamination only discovered there, questions of responsibility arise. It was generally accepted that the state where the metal was melted down should, after bilateral discussion between the responsible regulators, take the contaminated material back. It was noted that there are some bilateral and subregional arrangements in place to facilitate such return. The determination of ultimate legal responsibility for the costs involved should best be done by reference to the applicable contracts rather than by way of international recommendations.

33. The extent of regulatory bodies’ jurisdiction over such facilities is very variable. In cases where the regulatory body has no such jurisdiction, it should liaise with the governmental authorities with jurisdiction to ensure that the problem is addressed.

34. Questions as to the ultimate fate of, and criteria governing the future use of, the material involved (in particular, possible harmonisation of clearance procedures and levels) lay beyond the scope of this meeting. However, participants felt that this should be the subject of further discussion in other Agency forums.

35. It was also noted that radiation detectors do not provide a guarantee that all sources will be detected. In particular, a source contained within a well shielded container may not be detected. Participants agreed that the use of radiation detectors should therefore be supplemented by other detection strategies, including discussions with consignors and visual inspection. These issues will be further elaborated in a forthcoming Agency Safety Guide, “Orphan Sources and Other Radioactive Material in the Metal Recycling and Production Industries”.

#### Interception of Sources at Borders

36. Participants discussed an issue raised at the 2007 Information Exchange Meeting - the fate of orphan sources intercepted at borders. At that meeting, it was noted that in many cases, the vehicle carrying the source was refused entry and then returned to the state from which it had come. However, this risked the source becoming “re-orphaned”, and thereby posing renewed safety and security hazards. Participants agreed that, if an orphan source is detected at the border, the regulatory body in the both the state concerned and the state from which the shipment came should be advised of the discovery.

37. However, there were different views as to what should happen to the source. It was noted that there are some bilateral and subregional arrangements in place to facilitate such return. Some participants felt that, as the source had not crossed the border, their national regulator could not take responsibility for it. Other participants felt that such an outcome was not consistent with the safety and security of the source in question, and that the national regulator should take custody of the source while questions as to its ultimate fate were resolved. A third group of participants felt that, given the variety of situations which could occur (sea ports, airports, land crossings), it was inappropriate to seek a single rule which could cover all those situations. Nevertheless, considerations of safety and security should remain paramount, and points of entry should have appropriate facilities for holding such sources. Participants felt that this issue should be further considered and discussed at the 2010 Open-ended Meeting of Technical and Legal Experts for Sharing of Information as to States’

Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources.

**Possible strategies for internationally agreed and harmonized management of disused and orphan sources**

38. Although the Code of Conduct and the Joint Convention have their own legally distinct scope, they do both cover the management of disused sources and orphan sources once they are designated as radioactive waste (this issue is discussed in more depth in paragraph 17 of this report). Accordingly, it would be useful to explore whether that part of the report of the 2010 Open-ended Meeting of Technical and Legal Experts for Sharing of Information as to States' Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources which covers the management of disused sources should be distributed at the 2012 Joint Convention Review Meeting, so that those participating in the latter meeting are aware of the issues facing the wider group of states which participated in the Code meeting. Likewise, a summary of the discussion on management of disused sources in the 2012 Joint Convention meeting might be distributed at the following Code meeting.

39. In addition, it might be useful for a future meeting under the Code (perhaps in 2011) to focus specifically on the issues surrounding the disposal of disused and orphan sources designated as radioactive waste, particularly the development of national waste management strategies. Such a meeting could be assisted by the participation of individuals with experience in the application of the Joint Convention, and of representatives of bodies such as TRANSSEC with expertise in issues such as transport of orphan sources.

40. It was suggested that regulatory bodies should emphasise to national radioactive waste management organisations that their future waste management strategies should include consideration of disused and orphan sources.

41. It was agreed that these proposals should be further considered and discussed at the 2010 Open-ended Meeting of Technical and Legal Experts for Sharing of Information as to States' Implementation of the Code of Conduct on the Safety and Security of Radioactive Sources and its supplementary Guidance on the Import and Export of Radioactive Sources.

42. Participants suggested that the Director-General might wish to submit this report to the Agency's policy-making organs for their information and take it into account in developing future Agency actions in this area.

Steven McIntosh  
Chairman  
1 July 2009