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Nuclear Security Report 2016

Report by the Director General

Summary

This report has been produced for the sixtieth regular session (2016) of the General Conference in response to resolution GC(59)/RES/10, in which the General Conference requested that the Director General submit an annual report on activities undertaken by the Agency in the area of nuclear security, and on external users of the Incident and Trafficking Database (ITDB) and on past and planned activities of educational, training and collaborative networks, as well as highlighting significant accomplishments of the previous year within the framework of the Nuclear Security Plan and indicating programmatic goals and priorities for the year to come. This report covers the period 1 July 2015–30 June 2016.

Recommended Action

It is recommended that the Board of Governors take note of the Nuclear Security Report 2016.

Nuclear Security Report 2016

Report by the Director General

A. Introduction

1. This report has been produced for the sixtieth regular session of the General Conference in response to resolution GC(59)/RES/10. In operative paragraph 39 of that resolution, the General Conference requested that the Director General submit an annual report on activities undertaken by the Agency in the area of nuclear security, on external users of the Incident and Trafficking Database (ITDB) and on past and planned activities of educational, training and collaborative networks, as well as highlighting significant accomplishments of the previous year within the framework of the Nuclear Security Plan and indicating programmatic goals and priorities for the year to come. This report covers the period 1 July 2015–30 June 2016.

2. Operative paragraph 40 of GC(59)/RES/10 requested the Secretariat to report on the preparation, in close consultation with Member States, of the next International Conference on Nuclear Security to be held in December 2016 in accordance with paragraph 24 of the Ministerial Declaration of the International Conference on Nuclear Security adopted in July 2013. The report is contained in document GOV/INF/2016/11.

3. Responsibility for nuclear security rests entirely within a State. The Agency continued to provide assistance, upon request, to States in their national efforts to establish and maintain effective and sustainable nuclear security regimes. During the reporting period, the Agency continued to implement activities under the Nuclear Security Plan 2014–2017, approved by the Board of Governors in September 2013[1]. All activities were undertaken with due regard to the protection of confidential information.

B. The International Legal Framework

Legally Binding Instruments

4. Member States have recognized physical protection as a key element of nuclear security. A goal and priority for 2015–2016 set out in the Nuclear Security Report 2015[2] was the continued promotion of the entry into force of the Amendment to the Convention on the Physical Protection of Nuclear Material (CPPNM). In December 2015, the Secretariat organized the first meeting of points of contact (PoCs) and central authorities of States Parties to the CPPNM. The purpose of the meeting was to recall the responsibilities of the PoCs under the CPPNM, and to identify mechanisms to meet the additional responsibilities that would be introduced on entry into force of the Amendment. States were

[1] GOV/2013/42-GC(57)/19

[2] GOV/2015/42-GC(59)/12

also provided with a better understanding of the relevant IAEA legislative and technical assistance activities and were able to exchange their national experiences regarding the implementation of the CPPNM.

5. The threshold of ratification, acceptance or approval by two thirds of the States Parties to the CPPNM, which was required for the Amendment's entry into force, was reached on 8 April 2016, following ratification, acceptance or approval by 102 States Parties to the CPPNM. The Amendment entered into force one month later, on 8 May 2016, some 10 years after its adoption by the Conference of States Parties to the CPPNM.

6. The Amendment is important for nuclear security and its entry into force has an impact on reducing the vulnerability of States Parties to nuclear terrorism. While the CPPNM covers physical protection of nuclear material during international transport, the Amendment obliges States Parties to establish, implement and maintain a physical protection regime, including an appropriate legislative and regulatory framework, for the physical protection of nuclear facilities and nuclear material in peaceful domestic use, storage and transport. It expands the existing offences identified in the CPPNM, including the theft and robbery of nuclear material, and establishes new ones, such as the smuggling of nuclear material[3] and the actual or threatened sabotage of nuclear facilities. It also provides for expanded cooperation between and among States regarding rapid measures to locate and recover stolen or smuggled nuclear material.

7. Following the entry into force of the Amendment, the Agency will assume certain functions in addition to those already foreseen under the Convention. The Board approved these functions, details of which were set out in document GOV/2005/51 and Corr.1, on 19 September 2005.

8. The International Convention for the Suppression of Acts of Nuclear Terrorism gained five States Parties during the reporting period, bringing the total number to 104 as at 30 June 2016.

Non-Binding Instruments

9. The Code of Conduct on the Safety and Security of Radioactive Sources is a non-binding international legal instrument that provides guidance for ensuring the control of radioactive sources and for mitigating or minimizing any consequences should control measures fail. The supplementary Guidance on the Import and Export of Radioactive Sources was developed in 2004 to support States' implementation of the Code. As of 30 June 2016, 132 States had informed the Agency's Director General of their intention to implement the Code of Conduct, and 105 States of their intention to implement the supplementary Guidance.

C. Major Meetings and Coordination

10. Successive General Conference resolutions have affirmed the Agency's central role in strengthening the nuclear security globally and in coordinating international activities in the field of nuclear security[4]. The Agency has responded to these resolutions by organizing or participating in a number of major meetings and coordination efforts.

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[3] GOV/OR.1135, paragraphs 143-144

[4] See for instance operative paragraph 1 of GC(59)/RES/10

11. The Senior Regulators' Meeting, convened during the 59th session of the General Conference in September 2015, focused on the regulatory challenges for the security of radioactive material and associated facilities. The presentations and subsequent discussions underscored ongoing challenges for regulatory bodies, notably the relationship between safety and security, in the harmonization of regulatory approaches and in carrying out licensing, inspection, and enforcement processes. The challenges of regulating the security of radioactive material compared to nuclear material and nuclear facilities were also discussed, with recognition that the same approach cannot be applied to both.

12. The Agency organized the first International Coordination Meeting (ICM) for Front Line Officers (FLO) from 27 to 29 October 2015 in Vienna. Participants included Customs, Police, Border Police, Regulators, and National Security Authorities with current implementation involvement in nuclear security detection. The ICM agreed on the establishment and implementation of an International Network for Front Line Organizations to facilitate sharing experiences, addressing common issues and challenges, holding periodical meetings, and utilizing online tools to promote best practices and enhance FLO effectiveness within nuclear security detection architectures. The network will contribute to effective use of resources and approaches for exchanging information and best practices by promoting collaboration.

13. In December 2015, the Agency chaired the 20th meeting of the Border Monitoring Working Group (BMWG), in Brussels. This joint activity, established by the Agency to coordinate the activities of the Agency and major donors working in the area of effective border controls, has developed best practices for planning and delivering international assistance for capacity building related to nuclear security.

14. The Director General attended the Nuclear Security Summit, which took place on 31 March and 1 April in Washington D.C., the United States of America, as an observer. The Summit Communiqué reaffirmed the essential responsibility and the central role of the Agency in strengthening the global nuclear security architecture and in developing international guidance, and its leading role in facilitating and coordinating nuclear security activities among international organizations and initiatives and supporting the efforts of States to fulfil their nuclear security responsibilities.[5] It also welcomed and supported the Agency in convening regular high-level international conferences, such as the December 2016 international conference on nuclear security including its Ministerial segment, to maintain political momentum and continue to raise awareness of nuclear security among all stakeholders.

15. In April 2016, the Agency hosted the fifth meeting of the Working Group on Radioactive Source Security, a group established by the Agency to coordinate efforts to improve the security of radioactive sources. Discussion focused on the regulatory framework for the security of radioactive material and associated facilities, namely recent efforts by Member States to develop regulations, interaction with relevant stakeholders to bring security regulations into force, and verifying compliance with security regulations.

16. In April 2016 the Agency hosted a technical meeting in Vienna for Member States and vendors to review the current status, future needs, and improvements in detection equipment. The Agency will

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[5] See http://static1.squarespace.com/static/568be36505f8e2af8023adf7/t/56fef01a2eeb810fd917abb9/1459548186895/Communiqu%C3%A9.pdf

take this work forward through the revision of *Technical and Functional Specifications for Border Monitoring Equipment* (IAEA Nuclear Security Series No. 1) in order to improve detection capabilities globally.

17. The Fourth Open-ended Meeting of Technical and Legal Experts to Share 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 was held in Vienna on May–June 2016. The meeting was attended by 190 experts from 102 Member States and two non-Member States. Seventy-six States shared information on their national implementation of the Code and the Guidance. The meeting took note of the development of guidelines for preparation of national papers for the next such Open-ended Meeting, foreseen for 2019.

18. The Agency hosted two Information Exchange Meetings in Vienna to coordinate activities in nuclear security and avoid duplication. Participants from eleven organizations and initiatives such as the Global Initiative to Combat Nuclear Terrorism (GICNT) and the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (Global Partnership) conducted a useful exchange of information, discussed various themes within nuclear security, and reached a better understanding of activities being undertaken by each organization.

19. General Conference resolution GC(59)/RES/10[6] encouraged the Secretariat to continue to play a constructive and coordinating role in other nuclear security related initiatives within their respective mandates and membership. In response to this resolution, the Agency has continued to participate in meetings organized by such initiatives. The objective of this participation is to avoid duplication with activities being undertaken by the Agency.

20. The Agency participated, as an observer, in the following GICNT events:

- Nuclear Forensics Working Group Experts meeting in Aiken, South Carolina USA (September 2015)
- Inter-Arab detection and response exercise in Abu Dhabi, United Arab Emirates (February 2016)
- National response and public messaging workshop and exercise "Kangaroo Harbour" in Sydney, Australia (May 2016)
- 10th Anniversary Meeting in The Hague, Netherlands (June 2016)

21. The Agency serves as a task group co-chair for the Nuclear Forensics International Technical Working Group (ITWG) and participated in the 21st annual meeting of the ITWG in Lyon, France in June 2016. The ITWG is an important technical partner to the Agency in the area of nuclear forensics through its work in the development of nuclear forensics methods and procedures for the collection of evidence, the conduct of analytical and table top exercises and training, as well as nuclear forensics outreach.

22. The Agency participated, as an observer, in two Working Group Meetings of the Global Partnership held in Berlin, Germany in September 2015 and in Tokyo, Japan in January 2016. During the meetings, the Agency provided details of activities undertaken under the Nuclear Security Plan.

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[6] See https://www.iaea.org/About/Policy/GC/GC59/GC59Resolutions/English/gc59res-10_en.pdf

23. The Agency continues to work closely with the United Nations Security Council 1540 Committee. 1540 Committee experts participated in the Information Exchange Meetings as well as in Integrated Nuclear Security Support Plan Regional Workshops. The Agency participated in the following 1540 Committee events: a special meeting on the 2016 Comprehensive Review in Spain in May 2016; open consultations on the 2016 Comprehensive Review in the United States of America in June 2016; and a Regional Workshop for Central Asian States on resolution 1540 legal/ regulatory requirements for strategic trade controls in Austria in May 2016. The participation enabled the Agency to provide details of assistance available to States under the Nuclear Security Plan.

D. Major Achievements

D.1. Needs Assessment, Information and Cybersecurity

D.1.1. Incident and Trafficking Database (ITDB)

24. In the period between the inception of the ITDB and 30 June 2016, States reported — or otherwise confirmed to the ITDB — a total of 2976 incidents. During the reporting period, reports of 180 incidents were added to the database. Of these incidents, 111 occurred between 1 July 2015 and 30 June 2016, and the remaining 69 occurred prior to 1 July 2015. While the Agency does not have the ability to verify States' reports, the number of incidents reported to the ITDB demonstrates that illicit trafficking, thefts, losses and other unauthorized activities and events involving nuclear and other radioactive material continue to occur.

25. Of the 180 reported incidents during the reporting period, 14 involved unauthorized possession of and attempts to sell, purchase or otherwise use nuclear material or radioactive sources for unauthorized purposes. Five of these incidents involved nuclear material. All of the material involved in these incidents was seized by the relevant competent authorities within the reporting State.

26. There were 43 cases of reported theft or loss of radioactive sources, five of which involved the theft of Category II radioactive sources. In two of these five incidents, the ITDB has yet to receive a report on the recovery of the radioactive source by the relevant competent authorities within the reporting State.

27. A total of 123 reported incidents involved other unauthorized activities. These included unauthorized disposal of nuclear material and radioactive sources, the detection of material with radioactive contamination, the recovery of radioactive material outside of regulatory control and the discovery of nuclear material and radioactive sources in unauthorized or undeclared storage. Two of the reports involved high enriched uranium (HEU).

28. In the reporting period, external users of the ITDB included the United Nations, the United Nations Office for Disarmament Affairs, the United Nations Office on Drugs and Crime, the United Nations Economic Commission for Europe, the International Civil Aviation Organization, the International Maritime Organization, the International Rail Transport Committee, the International Criminal Police Organization (INTERPOL), the Organisation for Cooperation between Railways, the Universal Postal Union, the World Customs Organization, the Police Community of the Americas (AMERIPOL), the European Commission (EC), the Institute for Transuranium Elements of the EC's Joint Research Centre, the European Atomic Energy Community, the European Police Office (Europol), and the Organization for Security and Co-operation in Europe. As is made clear in the ITDB Terms of Reference, these external users only receive "unrestricted information" reported in

Part I (and not in Part II) of the ITDB incident notification form. This includes basic information concerning the type, form, amount and radiation levels of the nuclear and other radioactive material involved. These arrangements were reviewed at the ITDB Points of Contact meeting that took place in July 2015.

D.1.2. Information Outreach for the ITDB

29. During the reporting period, outreach efforts to promote incident notifications and membership in the ITDB included the following regional and national workshops and consultancy meetings:

- ITDB Points of Contact Meeting in Vienna (July 2015).

30. Nuclear Security Information Exchange and Coordination meetings were held in:

- Naypyitaw, Myanmar (October 2015);
- Kuwait City, Kuwait (October 2015);
- Dakar, Senegal (December 2015);
- Asuncion, Paraguay (May 2016); and
- Athens, Greece (June 2016).

31. Additionally, two national workshops were conducted. The aim of these workshops was to improve participants' understanding of ITDB processes and to improve reporting to the ITDB. This was done through discussion of recent incidents, exchange of information by States in their experiences and providing instruction and training relating to the online Web Incident Notification System Form (WebINF)[7].

D.1.3. Information Tools and Analysis

32. The triennial meeting of PoCs to the ITDB was held in July 2015 in Vienna, and was attended by representatives from 89 States as well as INTERPOL. Participants agreed on measures for improving reporting and communication. These improvements included the approval of an ITDB conceptual framework, a revised system for classifying incidents, and updated reporting guidelines. The changes will enhance communication by making a clearer distinction between trafficking and non-trafficking incidents and will provide better guidance for States on the type of information required to be reported. The meeting also provided an opportunity to train PoCs on web-based reporting of incident notifications by States. The Chair's report of the meeting was made available to all PoCs through the ITDB User Group on the Nuclear Security Information Portal (NUSEC).

D.1.4. Integrated Nuclear Security Support Plans

33. The Agency continues to give high priority to the development and implementation of Integrated Nuclear Security Support Plans (INSSPs) to assist States, upon request, in applying a structured and comprehensive approach to nuclear security capacity building and enabling increased coordination between the Agency, the State concerned and potential donors to ensure appropriate allocation of resources and to avoid duplication of efforts.

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[7] The Web-INF was designed to replace the traditional paper-based ITDB Incident Notification Form (INF) which was used by States' POCs to notify incidents to the ITDB. The Web-INF is an online reporting tool which allows POCs to process an incident notification within the secure environment of the NUSEC portal

34. During the reporting period, five Member States formally approved their INSSPs, bringing the number of approved INSSPs to 72. As of 30 June 2016, 17 INSSPs were awaiting Member States acceptance and eight INSSPs were awaiting finalisation with the respective Member States. In the course of the year, the Agency held 16 INSSP review meetings and four INSSP finalization meetings.

35. The Agency held three regional workshops during the reporting period to enhance cooperation with States in developing and implementing their country-specific INSSPs and to enhance coordination between States with similar needs and priorities. The workshops brought together States in Latin America and South East Asia, helped to identify common and specific nuclear security needs at the regional level and national level and discussed ways to meet such needs, including through bilateral, regional and international cooperation.

36. During the reporting period, the Agency developed an INSSP implementation plan for each new INSSP. The implementation plans cover a three year period coinciding with the general INSSP review cycle, with a focus on supporting the individual State's priorities for enhancing its nuclear security regime and its assessment of its most important near-term needs.

37. In response to requests from Member States, a consultancy meeting was held in May 2016 to initiate a formal review process for the INSSP template, which forms the basis for all INSSPs and ensures a consistent and comprehensive framework for discussing and identifying State needs across the nuclear security regime. A follow-up consultancy meeting is planned for October 2016. Through this review process, the INSSP template will be updated to: reflect the most recent nuclear security guidance developments and evolutions in the Agency's nuclear security assistance approaches; clarify the relationship between the INSSP process and the Nuclear Security Information Management System (NUSIMS) self-evaluation tool; and apply a graded approach to the actions Member States are recommended to undertake to strengthen their nuclear security regimes.

D.1.5. Nuclear Security Information Portal

38. The Agency continued to develop and maintain the Nuclear Security Information Portal (NUSEC) to provide a comprehensive information tool to meet the needs of Member States and exchange information across the nuclear security community. The web-based NUSEC portal has over 3340 registered users from 156 Member States and 17 organizations. This is a 33% increase in registered users in the past year, which improves the Agency's capability to reach the wider international security community with information and developments in the field of nuclear security. Improvements made to NUSEC in the reporting period include: the development of a common calendar to provide information on all events that the Agency and other international organizations are planning, separate web-portals to support large scale Agency nuclear security events and training, and the addition of a new user group area on the NUSEC portal focusing on the nuclear security legislative and regulatory framework.

D.1.6. Nuclear Security Information Management System

39. Work has continued on the further improvement of NUSIMS, a web-based platform for States to perform nuclear security self-assessment on a voluntary basis. The criteria used for the self-assessment are derived from the IAEA Nuclear Security Series Nuclear Security Fundamentals and Recommendations. NUSIMS assists States in assessing their national nuclear security regime, tracking their progress and facilitating a systematic identification of needs. Improvements included a revision of the self-assessment questionnaire and a new NUSIMS dashboard which provides a better overview

of the questionnaire. The questionnaire and profile can now be exported as a Microsoft Word document, filled in and then imported back to the system to ease the administration and collaboration at the national level.

40. During the reporting period, 16 Member States nominated Points of Contact for NUSIMS, bringing the total number to 88. The first meeting for NUSIMS Points of Contact was convened in Vienna, Austria, in February 2016 and was attended by 75 representatives from 71 Member States. The participants shared their experiences and good practices in coordinating and cooperating at the national level to obtain data for entry into NUSIMS. The meeting also provided recommendations and guidance on how to use NUSIMS in connection with developing the respective States' INSSPs and promoted the use of NUSIMS for this purpose.

D.1.7 Information and Computer Security

41. Efforts to strengthen computer security capabilities at the State and facility level, to protect against the spectrum of cyber threats that could adversely affect nuclear security, remains a high priority. Member States' requests for Agency support in computer security programme development continue to increase, including requests for additional nuclear security guidance, regional and national training, information exchanges, and direct support missions. The Agency has responded to these requests for assistance by initiating the development of additional nuclear security guidance addressing computer security, by establishing a coordinated research project to enhance computer security incident response and planning at nuclear facilities, by providing a spectrum of training courses and by promoting forums for information exchange.

D.2. Supporting the Nuclear Security Framework Globally

D.2.1. Nuclear Security Guidance Committee

42. The Nuclear Security Guidance Committee (NSGC), established by the Director General to provide greater Member State input into the production of nuclear security guidance documents, met twice during the reporting period.

43. Two Implementing Guides previously approved by the NSGC were published during the reporting period:

- *Security of Nuclear Material in Transport* (IAEA Nuclear Security Series No. 26-G)[8]; and
- *Nuclear Forensics in Support of Investigations*[9], which is a revision of IAEA Nuclear Security Series No. 2, published in 2006.

44. Three further Implementing Guides, approved by the NSGC in June 2015, are being prepared for publication. These address physical protection of nuclear material and nuclear facilities (implementation of INFCIRC/225/Revision 5), regulations and associated administrative measures for nuclear security and self-assessment of nuclear security culture.

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[8] See http://www-pub.iaea.org/MTCD/Publications/PDF/Pub1686_web.pdf

[9] See http://www-pub.iaea.org/books/IAEABooks/10797/Nuclear-Forensics-in-Support-of-Investigations

45. Final drafts of four Implementing Guides and two Technical Guidance publications were approved by the NSGC during the reporting period:

- New Implementing Guides were drafted on:
  - Sustaining a nuclear security regime;
  - Developing a national framework for managing response to nuclear security events; and
  - Building capacity for nuclear security;
- A revised Implementing Guide on preventive and protective measures against insider threats (revision of IAEA Nuclear Security Series No. 8) was drafted; and
- New Technical Guidance publications were drafted on:
  - Security of instrumentation and control systems at nuclear facilities; and
  - Establishing a system of control of nuclear material for nuclear security purposes.

46. Two draft revisions of Implementing Guides on security of radioactive material have completed the 120-day Member States' comment period, and Member States' comments are being incorporated before submission of the final drafts to the NSGC for approval. These Implementing Guides address the security of radioactive material in use and storage and associated facilities (revision of IAEA Nuclear Security Series No. 11) and security of radioactive material in transport (revision of IAEA Nuclear Security Series No. 9).

47. The NSGC has approved drafts of three other publications for submission to Member States for comment:

- An Implementing Guide on:
  - Preventive measures for nuclear and other radioactive material out of regulatory control; and
- Technical Guidance on:
  - Enhancing nuclear security in organizations associated with nuclear or other radioactive material; and
  - Planning and organization of nuclear security systems and measures for nuclear and other radioactive material out of regulatory control.

These will be submitted to Member States for comment in the second half of 2016.

48. Some 15 other Implementing Guides and Technical Guidance publications are currently in development, covering various topics in nuclear security, in accordance with the 'roadmap' agreed to with the NSGC.

49. The Interface Group, which is responsible for dealing with safety–security interfaces among IAEA Safety Standards Series and IAEA Nuclear Security Series publications, established a dedicated members' web page to facilitate consultations between the experts involved. The Interface Group was consulted on safety–security interfaces in five documents following a recommendation from the Coordination Committee on Safety Standards and Nuclear Security Series Publications.

D.2.2. Guidance related to the Code of Conduct on the Safety and Security of Radioactive Sources

50. The Agency held a second Open-ended Meeting of Legal and Technical Experts to Develop Internationally Harmonized Guidance for Implementing the Recommendations of the Code of Conduct on the Safety and Security of Radioactive Sources in Relation to the Management of Disused Radioactive Sources in Vienna in December 2015. The meeting was attended by 128 experts from

66 Member States and two international organizations. The meeting produced a draft supplementary guidance document which was submitted to Member States for comments in February 2016. A third open-ended meeting was held in Vienna in June 2016 to finalize the document by addressing the comments received from Member States. The meeting was attended by 108 experts from 69 Member States, one non Member State and one international organization. The meeting produced a revised document but no consensus was reached on whether this document should be submitted to the Board of Governors as supplementary guidance to the Code of Conduct. The Chairman recommended that the Secretariat engage in consultations with Member States with a view to finalizing the document.[10]

D.2.3. Advisory Group on Nuclear Security

51. The Director General's Advisory Group on Nuclear Security (AdSec) met in November 2015. The meeting considered the reports of its Working Groups and produced advice to the Director General in the form of a report of the meeting and a letter to the Director General from the AdSec Chair.

D.3. Coordinated Research Projects (CRPs)

52. The Agency implements coordinated research projects (CRPs) under the Nuclear Security Plan to promote research and development to support nuclear security. Details of all CRPs implemented under the Nuclear Security Plan can be found on the NUSEC portal[11] and the Agency's web site.

53. During the reporting period, the Agency continued to implement, obtained approval for or launched CRPs in the following areas:

- **Development of Nuclear Security Assessment Methodologies (NUSAM) for Regulated Facilities.** This CRP, initiated in 2013, will establish a risk-informed, performance-based methodological framework in a systematic, structured, comprehensive and appropriately transparent manner. The Agency hosted five Consultancy Meetings and one Research Coordination Meeting (RCM) during the reporting period to further refine the overall CRP documentation.

- **Identification of High Confidence Nuclear Forensics Signatures for the Development of a National Nuclear Forensics Library**. This CRP brings together investigators from nine Member States and the European Commission to identify nuclear forensics data characteristics, or signatures, which can be used as part of a nuclear forensics examination of a range of nuclear and radioactive materials. This CRP will also conduct research into improved analytical measurements of samples and modelling of the signatures created by these measurements.

- **Systems and Measures to Improve the Assessment of Initial Alarms from Radiation Detection Instruments**. This CRP will develop tools and guidelines to improve the effectiveness of alarm assessment and support front line officers in making high

[10] This relates to operative paragraphs 3, 17, 104 and 105 of resolution GC(59)/RES/9.
[11] See https://nusec.iaea.org/portal/DivisionofNuclearSecurity/MaterialsoutsideofRegulatoryControlSection/CoordinatedResearchProjects/tabid/348/Default.aspx

confidence decisions in detecting nuclear and other radioactive material out of regulatory control. During the reporting period, efforts have focused on data collection and analyses to support the development of alarm assessment algorithms. The first RCM will be held in October 2016 in Sri Lanka.

- **Nuclear Security for Research Reactors and Related Facilities**. This CRP was initiated in 2015 and a total of five research contracts and agreements were approved. Research began in 2016. This CRP will enhance the effectiveness of nuclear security programmes at research reactors and related facilities to reduce the risk of theft of nuclear and/or other radioactive material and sabotage. The CRP will also simplify the process for assessing this risk.

- **Development of Nuclear Security Culture Enhancement Solutions**. This CRP will develop practical and effective solutions to enhance nuclear security culture within organizations responsible for security of nuclear and other radioactive material. The shared outcomes of the CRP will serve to further improve nuclear security culture and address relevant challenges. Progress reports and plans for research activities for the second and third year as well as technical contracts were drafted and reviewed by nine participating institutions during the first RCM in May 2016.

- **Enhancing Computer Security Incident Analysis and Response Planning at Nuclear Facilities**: This CRP, initiated in 2016, conducts activities which support improved computer security capabilities at nuclear facilities to support the prevention and detection of, and response to, computer security incidents that have the potential to either directly or indirectly adversely affect nuclear safety and nuclear security. This CRP has four research areas: operator support for computer security incident recognition and response; analysis and technology support for computer security incident response; computer security information exchange; and cybercrime investigation.

- **Improving the Security of Radioactive Material throughout the Lifecycle, Associated Facilities, and Associated Activities**: This CRP explores methods for improving the security of facilities where radioactive material is stored and/or used throughout the facility lifetime as well as improving the security of related activities, such as in the transport of radioactive material.

D.4. Assessment through Self-Assessment and/or through Peer Review Missions

D.4.1. International Physical Protection Advisory Service (IPPAS)

54. Since 1996, 73 IPPAS missions have been conducted, upon request, in 46 Member States. During the reporting period, seven IPPAS missions were conducted in Albania, Canada, Malaysia, Norway, New Zealand, Poland and the United Kingdom. The Agency received 11 requests, from Australia, China, the Democratic Republic of Congo, Germany, Hungary, Jamaica, Lithuania, Madagascar, Sweden, Turkey and the United Arab Emirates for IPPAS missions to be conducted in 2016–2017.

55. The Agency held three national IPPAS workshops in Norway, Viet Nam and the United Arab Emirates to provide information on the processes for preparing and conducting IPPAS missions and on the benefits of such missions. The Agency held an international workshop on IPPAS,

which was attended by 49 experts from 24 Member States, to expand the pool of international nuclear security experts available for the conduct of IPPAS missions.

56. The Agency has, at the request of States that have hosted IPPAS missions, established a database of good practices identified during the conduct of missions and made these available to registered users on the NUSEC portal. Use by Member States of the good practices provided in this database facilitates the enhancement of national nuclear security regimes.

D.4.2 International Nuclear Security Advisory Service (INSServ)

57. At the invitation of the Government of Belarus, an INSServ mission on evaluation of border monitoring nuclear detection systems was conducted in November 2015. The mission reviewed the border monitoring detection systems and the capabilities of relevant competent authorities in Belarus with mandates in the area of detection systems and measures. The results of this mission to Belarus were used to revise and improve its INSSP.

58. The Agency has developed new guidance on conducting INSServ missions to improve the quality of the advice provided to States through INSServ. The new guidance ensures consistency with IPPAS guidance and between the two methodologies used to conduct such missions.

D.5. Human Resources Development

D.5.1. Nuclear Security Training

59. Member States have underlined the importance of Agency activities on education and training in nuclear security[12]. During the reporting period, the Agency continued to support comprehensive human resource development activities to ensure the sustainability of national nuclear security regimes.

60. In the course of the reporting period, the Agency provided instructor-led training to 2085 participants and e-learning modules to 680 individuals.

61. Through their INSSPs, many States have identified support to human resource development planning for organizations and personnel with functions in nuclear security as a priority. In order to enable a State to better identify its human resource, education and training needs in nuclear security, the Agency is supporting States to use a methodology based on a systematic approach to training, including regular training needs analysis, evaluation of training effectiveness, and development of instructors involved in nuclear security training. The Agency is providing support to States to implement the methodology through regional and national workshops and through the International Network for Nuclear Security Training and Support Centres (NSSC Network).

62. The Agency carried out an analysis of nuclear security training conducted from 2010 to the end of the first quarter of 2015 to gain a better understanding of how the Agency's training in nuclear security was meeting Member States' needs. This analysis included sending a survey, in all official languages, to almost 4 000 people who attended training courses between 1 October 2013 and 31 March 2015. The response rate of approximately 38% was significantly higher than for previous

[12] See pp(z) of GC(59)/RES/10

surveys. Analysis of responses received indicates that significant benefit resulted from the Agency's nuclear security training activities, with 92% of respondents saying that the training helped them improve their professional performance, 88% believing that the knowledge gained through the Agency's training course helped them improve the performance of their organization and 80% having trained others in what they learned during the training course. The Agency is using lessons learned from the analysis to improve the delivery of its training activities.

63. In March 2016, the Agency held the 2016 Annual Meeting of the NSSC Network in Islamabad, Pakistan[13], the first NSSC Network meeting to be held outside Agency Headquarters in Vienna. Over 50 participants from 33 countries attended the event. The event's key themes highlighted that by establishing a Nuclear Security Support Centre (NSSC). States can enhance their national human resource development capabilities, strengthen technical and scientific support programmes, and build durable national capacity in nuclear security. Holding the meeting in Islamabad provided Network members an opportunity to gain first-hand experience of an NSSC and to receive an account of lessons learned by Pakistan in establishing the centre.

D.5.2. Nuclear Security Education

64. The International Nuclear Security Education Network (INSEN) was established in 2010 as a partnership between the Agency and educational and research institutions, and other stakeholders, committed to ensuring the sustainable establishment of nuclear security education. INSEN members report that over 2500 students have taken part, or participated in, nuclear security education classes, modules or degree programmes since its inception.

65. INSEN held its annual meeting in August 2015 to discuss ongoing educational activities and to plan the revision of *Educational Programme in Nuclear Security* (IAEA Nuclear Security Series No.12). INSEN agreed to pursue closer collaboration with the NSSC Network on specific projects, and to plan and implement a variety of research activities in the area of nuclear security education through a coordinated research project. The Chair's report of the meeting is available on the Agency's web site[14].

66. The implementation of the master's degree programme in nuclear security continues in two universities, the University of National and World Economy in Sofia, Bulgaria and the Brandenburg University of Technology in Germany. The University of National and World Economy started to implement its master's programme in the second half of 2015. The content of the programme is in accordance with the recommendations of the IAEA Nuclear Security Series guidance document NSS 12 and supports the development of a cadre of nuclear security professionals.

67. The sixth joint International School on Nuclear Security took place at the International Centre for Theoretical Physics in Trieste, Italy in April 2016. In-depth presentations from international lectures, practical exercises and a technical visit, hosted by the Slovenian Nuclear Safety Administration, Slovenian Financial Administration and the Port of Koper, created opportunities for students to learn as well as apply theoretical knowledge in practice. The School continues to attract numerous applicants from developing countries. In the coming year, the Agency will hold Schools in Egypt in August 2016; in Indonesia in October 2016 and Spain (for Latin America) in April 2017.

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[13] The Chair's report of the meeting is available at https://www-ns.iaea.org/security/nssc-network.asp?s=9&l=76

[14] See https://www-ns.iaea.org/security/workshops/insen-wshop.asp.

D.6. Risk Reduction and Security Improvement

68. Member States continue to recognize physical protection as a key element of nuclear security. Following the entry into force of the Amendment to the CPPNM States will have new obligations to ensure the physical protection of materials and facilities.

D.6.1. Threat Characterization and Assessment

69. The Agency continued to assist States in characterizing and assessing threats to nuclear and other radioactive material. The Agency has developed a workshop to facilitate the implementation of a threat based and risk-informed approach to nuclear security by a State. The workshop provides a step-by-step methodology to develop, use and maintain a design basis threat (DBT) and includes a threat assessment. The methodology can serve as the basis for the development of a national, site or activity specific DBT or alternative threat statement (ATS). The Agency delivered nine national DBT workshops, involving more than 200 participants: in Albania in July 2015, Bosnia and Herzegovina in April 2016, Ecuador in June 2016, Lebanon in December 2015, Myanmar in August 2015, Oman in October 2015, Tunisia and Pakistan in February 2016 and Uzbekistan in May 2016. In December 2015, the Agency held a Regional Training Course (RTC) on Threat Assessment and a Risk Informed Approach to Nuclear Security Systems for Nuclear and Other Radioactive Material out of Regulatory Control in Australia. In addition, the Agency developed a series of presentations, table top exercises, and templates to assist Member States in implementing a risk informed approach process to develop a national strategy for the detection of nuclear and other radioactive materials out of regulatory control in the course of the year. These materials were used during workshops in Romania in April 2016 and Uganda in February 2016.

70. The Agency continued activities related to the identification of preventive and protective measures against insider threats in relation to unauthorized removal of nuclear and other radioactive materials and sabotage of materials and facilities. The revision of the *Preventive and Protective Measures against Insider Threats* (IAEA Nuclear Security Series No.8), taking into account *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision5)* (IAEA Nuclear Security Series No.13) and incorporating additional nuclear material accountancy and control guidance, has been completed. The revised publication was presented to the NSGC in June 2016.

D.6.2. Nuclear Security Culture in Practice

71. Nuclear security culture motivates personnel to remain vigilant and take sustainable measures to protect against credible insider and outsider threats, thereby ensuring and sustaining the security of nuclear and other radioactive material during its use, storage, transportation and disposal . In response to requests from Member States, the Agency accelerated its efforts to develop and provide practical solutions for the applications of nuclear security culture to organizations that are responsible for nuclear and other radioactive material.

72. The Agency has been directly involved in supporting a nuclear security culture self-assessment trial at two medical institutions in Malaysia. With the completion of this trial at the end of July 2016, Malaysia will become the first country in the world to apply the Agency's methodology of nuclear security culture self-assessment to medical institutions. During its first expert mission in December 2015, the Agency supported the development of a self-assessment plan and self-assessment survey statements. In the second expert mission in February 2016, the Agency provided training on tools and

analysis for nuclear security culture self-assessment, and provided support for the analysis of the survey results.

73. The Agency advanced efforts to raise awareness on the importance of nuclear security culture and promote understanding of the importance of strong nuclear security culture through the discussions held among almost 90 participants from 35 Member States at the International Workshop on Nuclear Security Culture in Spain from 29 February–4 March 2016. The Agency also conducted national workshops in Algeria in November 2015 and in Serbia in May 2016.

D.6.3. Nuclear Security for Nuclear Fuel Cycle Facilities and Associated Activities

74. The Agency developed the uranium ore concentrate (UOC) project at the request of Member States to provide guidance on implementing prudent management practices to protect, control, and manage UOC in processing, storage, and transport to regulatory bodies and industry. Activities undertaken included the development of the publication entitled "*Nuclear Security in the Uranium Extraction Industry",* published in February 2016[15].

75. The Agency started drafting an Implementing Guide provisionally entitled Security during the Lifetime of a Nuclear Facility during the reporting period, to address Member States' expressed need for international guidance on the nuclear security requirements during various phases in the lifetime of a nuclear facility. This Implementing Guide will benefit States by providing guidance to the State, competent authorities and operators for nuclear security during the different phases in the lifetime of a nuclear facility, from initial planning through final decommissioning, with the aim of ensuring that effective nuclear security is maintained at a level appropriate to each phase and in the transitions between phases.

76. The Agency updated international guidance on the design, operation and maintenance of physical protection systems for nuclear material and associated facilities and initiated activities to update the *Handbook on the physical protection of nuclear material and facilities* (IAEA-TECDOC-1276). The revision, approved as a new Technical Guidance publication by the NSGC in June 2015, is being further developed for presentation to the NSGC in June 2017.

D.6.4. Nuclear Material Accountancy and Control Relevant to Nuclear Security at Facilities

77. The Agency has developed nuclear material accountancy and control (NMAC) activities in response to requests from Member States for tools to enhance nuclear security at the facility level through the use of the NMAC system, which can improve deterrence and detection of unauthorized activities undertaken by an insider. In the course of the reporting period, a training course and e-learning module were developed based on the Implementing Guide *Use of Nuclear Material Accounting and Control for Nuclear Security Purposes at Facilities* (IAEA Nuclear Security Series No. 25-G), which was published in May 2015. A new Technical Guidance publication provisionally entitled "Establishing a System for Control of Nuclear Material for Nuclear Security Purposes at a Facility during Storage, Use, and Movement" was also approved in November 2015 for publication, and a corresponding training course is under development. The training courses benefit States by instructing them on how to apply accounting and control measures primarily for the purpose of

[15] See http://www-pub.iaea.org/books/iaeabooks/10896/Nuclear-Security-in-the-Uranium-Extraction-Industry

detecting and deterring unauthorized removal of nuclear material, particularly by a malicious insider. In addition, a new NMAC module is currently being prepared for use in IPPAS missions.

D.6.5. Securing Radioactive Sources

78. The Agency's support to States' activities on managing disused sources focuses on the establishment of comprehensive and sustainable national strategies. In the course of the year, assessment missions to Bahrain, the Plurinational State of Bolivia, Ecuador, Nicaragua, Paraguay, Uruguay and Viet Nam took place, during which the Agency worked with the States to develop specific action plans. The action plans developed by States included a combination of methods for managing disused sources, such as national storage of sources pending disposal, export of sources for recycling at authorized international recyclers or repatriation of sources to their countries of origin.

79. During the reporting period, the Agency continued to work with Member States on implementation of a pilot borehole disposal project for managing disused radioactive sources, due to expressed interest from Member States in long term national solutions for the management of radioactive material at the end of its lifecycle. The Agency focused its efforts on building capacities of operators responsible for the establishment of the borehole system and of regulatory bodies responsible for assessing the safety and security of such systems. The Agency also provided support for the repatriation of disused high activity sources located in Lebanon (Category 1) and Tunisia (Category 1). In addition, removals of disused sources from Cameroon (Category 2) and Lebanon (Category 3) were initiated during the reporting period, and are currently in process. The Agency continued its efforts to complete projects to secure high activity sources in use and storage in Colombia, Cuba, the Bolivarian Republic of Venezuela and Viet Nam, with a view to completing the work by the end of 2016. Projects to upgrade the physical protection of sources in Iraq and Lebanon were also initiated.

D.6.6. Transport Security

80. The Agency continues to assist States, upon request, in strengthening transport security arrangements by incorporating the necessary recommendations into their national frameworks and assisting with their practical implementation. Transport of nuclear and other radioactive material takes place outside secured facilities, which makes transport one of the higher risk activities in the lifetime of these materials.

81. The Agency published the Implementing Guide *Security of Nuclear Material in Transport* (IAEA Nuclear Security Series No. 26-G) in November 2015 to help minimize the risk due to the inherent vulnerabilities associated with transport. Corresponding training material for this publication was developed along with an e-learning module to complement the training. Additionally, the Agency prepared and piloted a guide entitled *Preparation, Conduct, and Evaluation of Exercises for Nuclear and Other Radioactive Material Transport Security* in national- and bilateral-level table top and field exercises.

D.6.7. Repatriation of High Enriched Uranium

82. The Agency assisted in the removal of 4.925 kg of irradiated liquid HEU fuel from the research reactor located at the Radiation and Technological Complex in Tashkent, Uzbekistan in September 2015 and of 1.83 kg of HEU from the Breeder-1 Neutron Source at Tbilisi State University, Georgia, in December 2015, both to secure storage facilities in the Russian Federation.

D.6.8 Establishing Effective Detection Architecture

83. The Agency supported States in the application of a comprehensive approach to developing a detection architecture through the integration of technology, human resources, and operational information at the State level through:

- An International Training Course on developing a defence in depth approach for the detection of transboundary movement, held in Greece (July 2015);
- An International Training Course on nuclear security detection architecture, held in Turkey (October 2015);
- Eight national workshops to strengthen national detection architecture for material out of regulatory control held in Bosnia and Herzegovina (January 2016), China (May 2016), Djibouti (January 2016), Malaysia (August 2016), Mauritania (August 2015), the Philippines (September 2015), Romania (April 2016) and Tunisia (February 2016); and
- An International coordination meeting to discuss good practices and challenges in developing and sustaining a nuclear security detection architecture, held in Cambodia (April 2016). Member States' representatives discussed recent progress, best practices, lessons learned and challenges related to implementing and sustaining nuclear security detection architecture.

84. The Agency continued to develop national capacities through the donation of equipment to States. In the course of the reporting period, border monitoring upgrade projects involving the deployment of eight fixed installed radiation portal monitors and integrated nuclear security networks were completed.

85. The Agency donated 234 personal radiation detectors, 52 radionuclide identification devices, six neutron search devices and five high resolution gamma spectrometers to States. The Agency created a dedicated laboratory-based course for performance testing of all the equipment supplied to States prior to its delivery. The Agency has also provided training to States related to acceptance testing and maintenance to improve national capacities and sustainability of related systems, including operation and maintenance of equipment. The Agency contributed to the sustainability of donated systems by providing help desk support for the repair of 20 instruments in the possession of States.

86. The Agency loaned 624 pieces of radiation detection equipment to ten States in response to short-term needs for additional equipment. This equipment was used to support the conduct of national workshops as well as to protect major public events.

87. In addition to the instruments in the equipment pool, the Agency undertook performance tests for high resolution spectrometry systems, mobile detection systems (backpacks), radioisotope identification devices, neutron search devices and personal radiation devices during the reporting period.

D.6.9. Supporting the Nuclear Security Response Framework

88. The Agency has developed a comprehensive suite of activities to assist States in enhancing nuclear security response capabilities. These activities assist States in their efforts to meet the nuclear security response recommendations set out in the IAEA Nuclear Security Series and to develop and/or strengthen national capabilities for responding to nuclear security events.

89. A National Pilot Workshop on Developing a Framework for Managing the Response to Nuclear Security Events was conducted in November 2015 in Chengdu, China. The workshop was attended by 23 participants from a range of national agencies. In May 2016 the Agency carried out a Regional Training Course in Malaysia which was attended by 25 participants from Cambodia, Indonesia, the Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Thailand and Viet Nam.

D.6.10. Major Public Events

90. The Agency has provided, upon request, assistance to Member States holding major public events to strengthen the implementation of nuclear security measures before and during the event. Such assistance is normally provided under a joint action plan that may include: 'train-the-trainers' courses on radiation detection at venues and strategic locations; on-the-job training for experts from mobile expert teams; seminars and exercises; development and/or revision of specific technical procedures; selection, provision, loan and deployment of radiation detection equipment; exchanges of information; consultations on emergency preparedness and response; and Technical Meetings to prepare outreach reports. During the reporting period, the Agency assisted States, on their request, in the following major public events:

- In Ecuador, His Holiness Pope Francis' visit (July 2015);
- In the Philippines, the Asia-Pacific Economic Cooperation Leaders' Summit (November 2015);
- In Uganda, His Holiness Pope Francis' visit (November 2015);
- In Viet Nam, the Hung King Temple Festival (April 2016);
- In Brazil, in preparation for the Rio 2016 Olympic Games and Paralympic Games (August/September 2016);
- In Madagascar, in preparation for the 16th Francophone Summit (November 2016);
- In Cameroon, in preparation for the 2016 Africa Women Cup of Nations (November/December 2016);
- In Mali, in preparation for the France Africa Summit (January 2017); and
- In Gabon, in preparation for the 31st 2017 Africa Cup of Nations (January/February 2017).

D.6.11. Radiological Crime Scene Management

91. The radiological crime scene management training activity became a regular training course offered by the Agency during the reporting period. Information on this training activity has been provided to States through several channels including during meetings held to develop INSSPs. Activities are undertaken on the basis of the INSSPs and through direct request from States.

92. The Agency initiated further development of this area of work to address State requests for additional assistance on how to establish effective radiological crime scene management capabilities. The Agency conducted training workshops on radiological crime scene management in Colombia in February 2016, Lithuania in February 2015 and the Philippines in June 2015. A total of 81 personnel from agencies involved in crime scene operations attended the workshops.

D.6.12. Nuclear Forensics

93. The Agency's nuclear forensics assistance focused on increasing national experts' awareness and understanding of the requirements of a nuclear forensics examination, including the best use of existing analytical capabilities. The Agency arranged for a three month residential assignment to a

nuclear forensics laboratory in Hungary to develop skills in both non-destructive and destructive nuclear and radioactive material analysis. The Agency further participated in the Regional Workshop on "Nuclear Forensics and Bio dosimetry" convened in Thailand in February 2016. Upon request, technical assistance in nuclear forensics was also provided to Ecuador, Iraq, Malaysia and Serbia.

E. Management Issues

E.1. Funding

94. Expenditure in the period from 1 July 2015 to 30 June 2016 was € 38 214 382. This expenditure comprised disbursements (€ 22 823 977) plus unliquidated obligations (€ 15 390 405).

95. In the period 1 July 2015–30 June 2016, the Agency accepted pledges to the Nuclear Security Fund from Belgium, Canada, China, Estonia, Finland, France, Indonesia, Italy, Japan, Kazakhstan, Republic of Korea, New Zealand, Norway, Russian Federation, Spain, Sudan, Sweden, United Kingdom, United States of America, and Zimbabwe.

96. The Secretariat developed procedures for the implementation of complex projects in response to internal audits on project management. Staff received training on the use of the new procedures and a number of pilot projects were identified which will be used to validate the procedures.

F. Goals and Priorities for 2016–2017

97. In addition to the ongoing priorities identified by Member States, the following are the main nuclear security programmatic goals and priorities for 2016–2017:

- To prepare and organize the Second International Seminar to share experience and good practices from conducting International Physical Protection Advisory Service (IPPAS) missions, to be held 22–23 November 2016 in London, UK;

- To review assistance offered to States to enable them to meet their obligations under the Amendment to the CPPNM, to work for the universalization of the CPPNM and its Amendment, and to organize and implement a meeting of representatives of States Parties to the CPPNM and the Amendment thereto from 30 November to 2 December 2016;

- To organize the International Conference on Nuclear Security: Commitments and Actions 5–9 December 2016;

- To begin preparations for the development of the Nuclear Security Plan 2018–2021 in close consultation with Member States; and

- To expand and enhance the Agency's assistance to States in establishing and maintaining effective nuclear security regulatory frameworks.