Preparatory Committee for the 2026 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons

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Nuclear forensic science for nuclear security

Working paper submitted by Australia on behalf of Canada, Czech Republic, Finland, France, Germany, Hungary, Italy, Japan, Mexico, Netherlands (Kingdom of the), Norway, the Republic of Korea, Singapore, Sweden, Switzerland, Thailand, the United Kingdom of Great Britain and Northern Ireland and the United States of America

1. The three pillars of the Treaty on the Non-Proliferation of Nuclear Weapons are interdependent and mutually reinforcing. Critical to the third pillar of the Non-Proliferation Treaty, the peaceful uses of nuclear energy, is ensuring the application of the highest levels of nuclear security and safety. The present working paper seeks to highlight the key contribution that nuclear forensic science makes to effective national nuclear security regimes and national response plans and, consequently, how building nuclear forensic capability contributes to the Treaty.

2. Nuclear forensic science is the examination of nuclear and other radioactive materials using analytical techniques to determine the origin and history of this material in the context of law enforcement investigations or the assessment of nuclear security vulnerabilities. Nuclear forensic capabilities form an essential component of an effective nuclear security architecture and help States to make informed decisions to improve their nuclear security practices.

3. Building international capacity in nuclear forensic methods and tools assists States in investigating nuclear and other radioactive materials out of regulatory control, thereby contributing to the overarching Non-Proliferation Treaty objective of safeguarding global security.

4. Regional collaboration facilitates the building of capabilities in nuclear forensic science that are aligned with regional nuclear security requirements. Examples of such regional collaboration, whether this be multilateral activities under the auspices of existing regional and international networks or activities occurring within bilateral partnerships, are:

(a) Workshops on national capabilities and practices that include presentation and discussion, for example, the Forum for Nuclear Cooperation in Asia;

(b) Nuclear forensics training that includes classroom learning or practical (laboratory or field) activities to develop a spectrum of required capabilities, such as the International Atomic Energy Agency (IAEA) Regional Training Course on Practical Introduction to Nuclear Forensics;

(c) Information exchange on practices and experience in conducting an examination of nuclear and other radioactive material, for example, collaborative material exercises.

5. Recognizing that the practical implementation and sustainment of nuclear forensic capabilities are enduring components of nuclear security, it is hoped that the present paper will:

(a) Encourage States to develop and enhance nuclear forensic capabilities and utilize, as appropriate, the support of IAEA and the Nuclear Forensics International Technical Working Group in areas such as enhancing nuclear forensic capabilities and providing relevant training assistance to States;

(b) Promote the work of IAEA in advancing nuclear forensic science as a key element of effective nuclear security and the provision of guidance and assistance to IAEA member States in enhancing nuclear forensic science capabilities;

(c) Reaffirm the beneficial role that regional approaches to cooperation and training can play in advancing and maturing nuclear forensic expertise, capabilities and networks, and recognize that the beneficial outcomes of cooperation and training can be amplified when undertaken at the regional level;

(d) Welcome training opportunities provided by IAEA in recent years to build capability on the application of nuclear forensic science in response to incidents involving nuclear and other radioactive materials out of regulatory control, including demonstrating links to radiological crime scene management;

(e) Encourage States to continue hosting regional training courses and workshops on nuclear forensics, so as to facilitate the continued sharing of expertise on the theoretical and practical aspects of nuclear forensics within their regions, including those being led by IAEA, such as the Regional Training Courses on Practical Introduction to Nuclear Forensics;

(f) Promote the employment of existing national nuclear science capabilities to support nuclear forensics;

(g) Encourage States to evaluate and adapt existing national response frameworks to incorporate the effective use of nuclear forensic capabilities;

(h) Encourage cooperation within regions to identify areas of focus for future regional training activities in relation to nuclear forensics, with a view to enhancing training effectiveness and to ensuring that the provision of training matches the needs of States within the region.