ITWG Nuclear Forensics
International Technical Working Group

ITWG UPDATE

No. 1 December 2016

THE ITWG: 20 YEARS OF SCIENCE SUPPORTING LAW ENFORCEMENT AND NUCLEAR SECURITY INVESTIGATIONS

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An introduction to the ITWG: Innovation in nuclear forensics state of practice

The Nuclear Forensics International Technical Working Group (ITWG) is an informal and unaffiliated association of nuclear forensics practitioners who are dedicated to advancing the scientific discipline of nuclear forensics in order to prevent and respond to incidents involving nuclear and other radioactive material out of regulatory control. The ITWG is open to all states, organizations and individuals that are recognized by competent national or international authorities with an interest in technical nuclear forensics.

Nuclear forensics increasingly assists many states in determining the origin and history of nuclear and other radioactive material as part of a nuclear security infrastructure. It is recognized as an important tool to help national or international authorities meet their nuclear security obligations. The ITWG provides a technical platform for nuclear scientists, forensic specialists, law enforcement officials and policy makers to voluntarily share requirements as well as exchange information on nuclear forensics supporting law enforcement and nuclear security investigations. The ITWG continues to grow through the provision of innovative solutions focused on improving nuclear forensic state of practice. The work of the ITWG has increasing relevance and wider reach as more states apply nuclear forensic examinations to high-visibility cases of nuclear and other radioactive material out of regulatory control.

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GALAXY SERPENT: EXERCISING NATIONAL NUCLEAR FORENSICS LIBRARY CAPABILITIES

STEPHEN LAMONT

'Galaxy Serpent' is an ongoing series of web-based exercises designed to illustrate the value of a national nuclear forensics library (NNFL) for investigating cases where nuclear and other radioactive materials are found outside of regulatory control. An NNFL is a country-specific endeavour and comprises the data and expertise necessary to help identify and assess the provenance of nuclear and radioactive materials. Individual exercises seek to demonstrate the method of development and application of an NNFL capability to a particular type of radioactive or nuclear material.

As part of the Nuclear Forensics International Technical Working Group (ITWG) NNFL Task Group, participation in Galaxy Serpent is open to all states, organizations and individuals that participate in the ITWG and is not an official national activity. Exercise participants organize material characteristic data and perform data analytics and provenance assessments. While focused on a single type of material for the exercise, the skills and tools developed by participants are applicable to a wider variety of materials found in a country's inventory.

Galaxy Serpent exercise teams are provided with real or synthetic data for a certain type of material and are asked to organize that data so it can be compared to data that would be available for a material under investigation. Then teams are presented with characteristics of materials from a hypothetical investigation along with questions to answer about the material based on comparisons to the data in the exercise-developed NNFL. Each step is gradually more complicated, requiring participants to utilize more sophisticated comparative analysis tools and expertise to formulate a response. Exercise steps illustrate how to effectively query a NNFL and use data analytics to answer investigative questions, including how to respond to inconclusive results.

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ITWG LEADERSHIP: GLOBAL EXPERTISE IN NUCLEAR FORENSICS

The Executive Committee, supported by the task group co-chairs, helps to shape and implement the work of the Nuclear Forensics International Technical Working Group (ITWG). Due to the working group nature of the ITWG, each of the executive members and task group co-chairs works on ITWG issues on a volunteer basis. The Executive Committee and task group co-chairs bring a wealth of knowledge to the ITWG with over 220 combined-years of nuclear forensics related experience.

ITWG Co-chairs

Dr Klaus Mayer (European Commission) is project leader at the European Commission's Joint Research Centre (JRC), Directorate for Nuclear Safety and Security, and in charge of the JRC's activities on combating illicit trafficking and nuclear forensics. He has over 26 years experience in nuclear science and applications. Mayer has participated in the ITWG since 2004 and has served, on behalf of the European Commission, as its co-chair since 2004.

Mr Michael Curry (United States) is a team leader at the US Department of State where he currently serves as the US Nuclear Forensics Coordinator. For almost 30 years, Curry has worked on a variety of arms control, non-proliferation and political-military affairs issues; focusing the last 15 years on issues related to countering nuclear and radioactive material smuggling. Curry has participated in the ITWG since 2008 and has served as its co-chair since 2014.

Executive Committee Members

Mr Paul Thompson (United Kingdom) is Technical Coordinator for Materials and Analytical Science at the Atomic Weapons Establishment (AWE) in the UK. An expert in radiochemistry, Thompson started working at AWE in 1978. Thompson has also been associated with the Comprehensive Nuclear-Test-Ban Treaty (CTBT), supporting IAEA Safeguards, and chairing sessions and presenting papers at nuclear-related conferences. Thompson has participated in ITWG meetings since the pre-meeting in 1995 and has been a member of the Executive Committee since it formed.

Dr Pong Boon Kin (Singapore) heads the Radiological-Nuclear Research Laboratory at the DSO National Laboratories in Singapore, where he established their nuclear forensics capabilities and led his team in the CMX-4 and Galaxy Serpent exercises to enhance nuclear security capabilities. Boon Kin is also a senior research fellow at the Singapore Nuclear Research and Safety Initiative, where he focuses on research to address specific radiological safety issues. Additionally, he contributes technical expertise to the advisory panel of the National Radiochemistry Laboratory. Boon Kin has participated in the ITWG since 2012.

Mr Pascal Girard (France) works for the French Alternative Energies and Atomic Energy Commission (CEA). As a nuclear forensics expert at CEA, Girard most recently assisted the ITWG with organizing the group's 21st annual meeting (2016), which brought together approximately 100 nuclear forensics experts from around the world. Girard is also supporting the CMX-5 exercise and is instrumental in the outreach efforts of the ITWG, serving as the coordinator for the development and maintenance of the ITWG websites.

Evidence Collection Task Group Co-chairs

Dr James Blankenship (United States) is a Forensic Examiner with the US Federal Bureau of Investigation (FBI) where he leads the analysis of weapons of mass destruction, specifically the threat of nuclear and radioactive dispersal devices. Prior to his work with the FBI, he supported the US Department of Defense nuclear, chemical and biological defence programs and served as a program manager to the Radiation Hardened Microelectronics Advanced Technology program. Blankenship has participated in the ITWG since 2007 and has served as the Evidence Collection Task Group co-chair since 2013.

Dr Eva Kovacs-Szeles (Hungary) is the head of the Nuclear Security Department at the Hungarian Academy of Sciences Centre for Energy Research (MTA EK) in Budapest, Hungary. Kovacs-Szeles began her work at MTA EK in 2008 as the scientist responsible for nuclear safeguards, security and nuclear forensics R&D at MTA EK. Her background is analytical chemistry and mass spectrometry. Kovacs-Szeles has participated in the ITWG since 2010 and has served as the Evidence Collection Task Group co-chair since 2013.

Exercise Task Group Co-chairs

Dr Jon Schwantes (United States) is a Senior Scientist at Pacific Northwest National Laboratory with over

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MEET THE ITWG PARTICIPANTS

Scientific and law enforcement experts from over 50 governments and 11 multilateral and international organizations have participated in Nuclear Forensics International Technical Working Group (ITWG) annual meetings or technical exercises since the working group was established in 1995. This global representation highlights the recognition by the international community of the importance of nuclear forensics to reduce the threat of nuclear and other radioactive materials out of regulatory control. The ITWG is open to new members (states, individuals and organizations) interested in nuclear forensics as recognized by the ITWG (www.nf-itwg.org).

Participating countries include Afghanistan, Algeria, Angola, Armenia, Australia, Austria, Azerbaijan, Belarus, Belgium, Brazil, Bulgaria, Canada, China, Czech Republic, Democratic Republic of the Congo, Egypt, Finland, France, Georgia, Germany, Hungary, India, Iraq, Israel, Italy, Japan, Kazakhstan, Kyrgyzstan, Lithuania, Luxembourg, Moldova, Netherlands, Pakistan, Poland, Republic of Korea, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, the United Arab Emirates, the United Kingdom, the United States and Uzbekistan.

Participating multilateral and international organizations include the European Commission (EC), the European Police Office (EUROPOL), the Global Initiative to Combat Nuclear Terrorism (GICNT), the International Atomic Energy Agency (IAEA), the International Criminal Police Organization (INTERPOL), the Organization for Security and Co-operation in Europe (OSCE), the Stockholm International Peace Research Institute (SIPRI), the United Nations Interregional Crime and Justice Research Institute (UNICRI), the United Nations Office on Drugs and Crime (UNODC), the Vienna Center for Disarmament and Non-Proliferation (VCDNP) and the World Institute for Nuclear Security (WINS). •

Map of Nuclear Forensics International Technical Working Group (ITWG) participants.

Notes: Gold colour indicates countries represented by experts at the annual ITWG meetings since 2005. National flags indicate countries with laboratories participating in collaborative material exercises (CMXs).

ITWG Leadership *continued*

Dr Jon Schwantes continued 20 years of experience as a radiochemist working in a variety of areas, including (but not limited to) super-heavy element chemistry and physics, astrophysical nucleosynthesis and nuclear forensics. Schwantes was part of the confirmatory team for the discovery of element 111 (subsequently named Roentgenium) and led a team of researchers in 2009 that identified the oldest known reactor-produced plutonium in the world. Schwantes has participated in the ITWG since 2011 and has served as the Exercise Task Group co-chair since 2012.

Ms Olivia Marsden (United Kingdom) is Group Leader for Radiochemistry, within the Materials and Analytical Science section, at the Atomic Weapons Establishment (AWE) in the UK. Marsden started at AWE in 2004, working in some of the analytical laboratories, and was the focal point for the lab's participation in the ITWG CMX-3 in 2009. Marsden has participated in the ITWG since 2010 and has served as the Exercise Task Group co-chair since 2012.

Guidelines Task Group Co-chairs

Dr Michael Kristo (United States) is an Associate Program Leader for Nuclear Forensics/Materials Analysis within the Global Security Directorate at Lawrence Livermore National Laboratory (LLNL), USA, as well as Group Leader for the Chemical & Isotopic Signatures Group. He is Principal Investigator on a wide variety of projects in the areas of nuclear forensics, non-proliferation and international collaboration. Kristo has participated in the ITWG since 2006 and has served as the Guidelines Task Group co-chair since 2006.

Dr Maria Wallenius (European Commission) is a Research Scientist who coordinates nuclear forensics casework and cooperative nuclear forensic projects at the Joint Research Centre (JRC) of the European Commission in Karlsruhe, Germany. Wallenius has worked at the JRC Karlsruhe for 20 years and has developed new methods of using various mass spectrometry techniques in the safeguards and nuclear forensics field. Wallenius has participated in the ITWG since 2000 and has served as the Guidelines Task Group co-chair since 2006.

National Nuclear Forensics Library Task Group Co-chairs

Dr Stephen LaMont (United States) is a Program Manager at the US Los Alamos National Laboratory for nuclear forensics and treaty monitoring projects. A radiochemist by training, LaMont has over 20 years of experience applying radiochemistry and mass spectrometry to non-proliferation, environmental safeguards and nuclear forensics. He spent five years as the Chief Scientist for the US Nuclear Materials Information Program, helping establish the US National Nuclear Forensics Library. LaMont has participated in the ITWG since 2011 and has served as National Nuclear Forensics Library Task Group co-chair since 2014.

Dr Ali El-Jaby (Canada) joined the Canadian Nuclear Safety Commission (CNSC) in 2009 as the Senior Technical Advisor to the Director General of the Directorate of Security and Safeguards. Previously, he served as a Nuclear Fuel and Fuel Behaviour Specialist in the CNSC's Physics and Fuel Division. El-Jaby currently leads several national projects in the area of nuclear forensics, which include Canada's National Nuclear Forensics Library Development Program. El-Jaby has participated in the ITWG since 2013 and has served as the National Nuclear Forensics Library Task Group co-chair since 2014.

Outreach and Training Task Group Co-chairs

Mr David Smith (United States) is the Nuclear Security Coordinator (Forensics) in the Division of Nuclear Security at the International Atomic Energy Agency (IAEA) where he is responsible for the program of nuclear forensic assistance to the member states. Prior to joining the IAEA, Smith held various leadership and technical staff positions in nuclear non-proliferation and nuclear security (including nuclear forensics) at Lawrence Livermore National Laboratory, USA. Smith served as the co-chair of the ITWG from 2007 to 2010 and since 2010 has served as the Outreach and Training Task Group co-chair.

Mr Ed van Zalen (The Netherlands) is a CBRN Program Manager at the Netherlands Forensic Institute in The Hague, The Netherlands. His current focus areas are the development of innovative forensic methods applicable for use at a CBRN crime scene and in the laboratory. In this role he is responsible for the development of response to a CBRN incident and the development of analytical forensic methods. Van Zalen has participated in the ITWG since 2011 and has served as the Outreach and Training Task Group co-chair since 2014. •

UPCOMING TRAININGS AND MEETINGS

- IAEA NTC Introduction to Nuclear Forensics—United Arab Emirates, Q1 2017 (TBC)
- American Association for Advancement of Science Annual Meeting—Boston, USA, February 2017
- IAEA RTC Introduction to Nuclear Forensics—South Africa, Q2 2017 (TBC)
- ITWG CMX Data Review Meeting—Romania, April 2017
- Nuclear Forensics Experts Meeting jointly hosted by US Department of State and European Commission Joint Research Centre—Karlsruhe, Germany, June 2017
- ITWG-22 Annual Meeting, European Commission Joint Research Centre—Karlsruhe, Germany, June 2017
- IAEA ITC on Practical Introduction to Nuclear Forensics—Hungary, Q3 2017 (TBC)
- IAEA Regional Nuclear Forensics Workshop—Mexico, Q3 2017 (TBC)
- 9th International Conference on Isotopes and Expo (9ICI)—Qatar, November 2017
- IAEA Nuclear Forensics Seminar—Russian Federation, 2017 (TBC)

Dates and locations of IAEA trainings and meetings will be officially confirmed with host member states; participation in IAEA trainings and meetings is by nomination and in accordance with all established IAEA procedures.

Galaxy Serpent *continued*

data analytics to answer investigative questions, including how to respond to inconclusive results.

The first Galaxy Serpent exercise (2013–14) utilized spent nuclear fuel as the material of interest.[1] Participants were provided data from the Spent Fuel Composition (SFCompo) database. They were asked to organize the data in a way to facilitate comparing an unknown material. Teams were then given a set of characteristics for an unknown material and tasked with determining if it was consistent with any of the materials in their dataset. Teams utilized a wide variety of comparative analysis techniques that ranged from relatively straightforward empirical comparisons of isotope correlations to more sophisticated principal component analysis (PCA) and linear discriminant analysis techniques. Based on the output of these comparisons, teams illustrated concepts for how to construct a functional NNFL capability for spent fuel.

The second Galaxy Serpent exercise (2015–16) focused on radioactive sources, a type of material more frequently found outside of regulatory control.[2] Similar to the first exercise, teams were first provided with a variety of source characteristic data to organize into an accessible form. Queries then tested the team's ability to assess the consistency of materials involved in hypothetical nuclear forensics cases. Again, each query was gradually more complicated, and in this case, certain 'traps' were set to reproduce likely real-world issues including transcription errors and missing data.

A third Galaxy Serpent exercise, which uses uranium ore concentrate as the material of interest, is under development. The expanding list of material types explored in the Galaxy Serpent exercises helps to illustrate that there is no one-size-fits all approach to a functional NNFL. By participating, countries gain valuable experience in NNFL development based on the materials within their borders and expertise available to identify and assess provenance. •

[1] Borgardt, J. D. and Wong, F. M. G., 'Galaxy Serpent: a web-based tabletop exercise using the concept of National Nuclear Forensics Libraries', *Journal of Nuclear Materials Management*, vol. 42, no. 4 (2014), pp. 4–11.

[2] Borgardt, J., Canady, J. and Chamberlain, D., 'Results from the second Galaxy Serpent web-based table top exercise utilizing the concept of nuclear forensics libraries', *Journal of Radioanalytical and Nuclear Chemistry* (2016, forthcoming).

THE ITWG EXERCISE TASK GROUP

JON SCHWANTES AND OLIVIA MARSDEN

The Exercise Task Group of the Nuclear Forensics International Technical Working Group (ITWG) has been working for 20 years to advance the best practices of nuclear forensics through a series of collaborative materials exercises (CMXs). Each CMX helps advance the state of practice and art of nuclear forensic science by identifying analytical techniques ready for operational use and new laboratory methods worthy of additional development.

CMXs are unique in that they target questions of both legal and national security importance. The exercises facilitate analyses that would support basic law enforcement and first responder functions—including whether material in question is radioactive or dangerous, or whether the event warrants a criminal investigation. With regard to national security interests, exercises facilitate enquiries of a more advanced nature, such as whether or not the material in question is related in any way (e.g. similar form or production history) to past seizures. Internationally recognized reporting requirements and actual materials from the nuclear fuel cycle—so far including reactor-grade plutonium oxide, highly enriched uranium oxide and highly (93 per cent) enriched uranium metal—are employed during CMXs in an effort to inject a high degree of realism.

Unlike performance tests, CMXs are designed to provide technical learning experiences for the ITWG community of participating nuclear forensics laboratories. Thus, while the ITWG endeavours to publish a summary of the major outcomes from each exercise, individual laboratory results are held in confidence and only revealed at the discretion of the individual participating laboratory. This approach aims to preserve the exercises as learning experiences and not performance tests.

As a testament to advancing the state of practice and art of nuclear forensic analysis through CMXs, participants from the fourth CMX (2015) utilized over 30 different analytical techniques—one-third of which had never before been used during a CMX—to characterize special nuclear exercise materials. The fifth materials exercise of the ITWG, CMX-5, is currently underway and represents the Task Group's largest exercise on record, with laboratories representing 20 countries or international organizations set to participate. Planning for CMX-6, which is expected to commence in the fall of 2018, has begun. •

The ITWG: 20 Years of Science *continued*

The beginnings: A response to the illicit trafficking of nuclear materials

As an informal association that bridges nuclear science and law enforcement, the ITWG has grown steadily since its inception in 1995. The ITWG represents an early venture in nuclear forensics with the specific aim of assisting in the response to the many significant cases reported to the International Atomic Energy Agency (IAEA) as well as the international community of nuclear material—to include gram quantities of highly enriched uranium and plutonium—seized after diversion from sites within the former Soviet Union. Since its beginnings, the emphasis of the working group has been on scientific solutions to advance the practice of nuclear forensics. The ITWG originally consisted of scientists and police officials who were concerned with reports of illicit trafficking and recognized that close international cooperation involving consistent forensic practice could help affected states. These experts met annually to develop a consensus approach to conducting a nuclear forensics examination. This approach gave rise to the nuclear forensics 'model action plan' that has been widely adopted as part of a nuclear security infrastructure.

A community of experts: Strengthening nuclear forensics by consensus and collaboration

The strength of the ITWG is its informal and voluntary nature and its emphasis on cooperation and collaboration. At present, more than 100 experts from around the world—representing states as well as nuclear security and nuclear-security affiliated organizations—participate in annual meetings, exercises and task group activities that are scheduled throughout the year. The ITWG is overseen by co-chairs from the European Commission and the United States as well as an Executive Committee

which is composed of internationally recognized senior professionals. ITWG working task groups report to the Executive Committee.

The task groups: The work of the ITWG

The ITWG comprises five task groups: the Evidence Collection Task Group, the Exercise Task Group, the Guidelines Task Group, the National Nuclear Forensics Library Task Group and the Outreach and Training Task Group.

The *Evidence Collection Task Group* focuses on the protection of responders, the public and procedures involved in evidence collection at a nuclear security event. The task group has produced guidelines on establishing a chain of custody for all evidence, developing an evidence collection plan and exploiting evidence contaminated with radionuclides for conventional evidence. This includes fingermarks, tool marks and genetic markers for DNA.

From its founding, a key attribute of the ITWG remains the *Exercise Task Group*'s organization of collaborative material exercises (CMXs) in which the nuclear forensics laboratories that elect to participate, analyze the same sample without attribution of the analytical results. The first CMX involved plutonium oxide (1996); the second investigated highly enriched uranium oxide (2001); the third comprised highly enriched uranium metal (2010); the fourth covered low-enriched uranium nuclear fuel pellets (2015). A fifth exercise is currently underway. These exercises are a priority for the ITWG and serve as a means for laboratories to learn from one another to optimize results from a nuclear forensics examination.

The *Guidelines Task Group* has delivered more than 10 consensus-driven best practice guidelines covering nondestructive and destructive analysis as well as provided data reporting that are available on the ITWG website. By design, the guidelines are general and not prescriptive to the widest application to the nuclear forensic laboratory and examiner.

The *National Nuclear Forensics Library Task Group* has organized a series of virtual-tabletop exercises that facilitate comparisons of samples of interest with known materials used, produced or stored as part of the nuclear fuel cycle. The ongoing 'Galaxy Serpent' exercises challenge participants to construct a comparative database and subsequently determine the consistency of exercise data with the holdings in the database.

Outreach has been a crucial task for the ITWG and has been essential to its continued growth over two decades. As an organization that promotes best practice, having the widest possible international range for the work of the ITWG is vital. In this regard, the *Outreach and Training Task Group* is focused on conveying its technical work to individuals, laboratories, organizations and states with an interest in nuclear forensics. The ITWG has recently launched a public website (www.nf-itwg.org) which provides information on the working group, including its organization and history, technical guidelines, membership and annual meetings.

In December 2016, the Outreach and Training Task Group published the inaugural edition of this newsletter, the *ITWG Update*. The newsletter emphasizes the strength of nuclear forensic science supporting law enforcement investigations, nuclear security vulnerability assessments and the criminalization of nuclear and other radioactive material out of regulatory control.

The ITWG: 20 years of nuclear forensics

The collaborative work of the ITWG helps states develop nuclear forensics capabilities making use of indigenous national and shared capabilities through informed decisions that reflect the experience of the international community. The ITWG further allows validation of techniques and methods through exercises and scientist-to-scientist exchanges with a focus on confidence building and cooperation among the world's leading group of nuclear forensics experts. Links to law enforcement are important to ensure that the ITWG products meet the important need of criminalization of nuclear and other radioactive material out of regulatory control.

After 20 years, the success of the ITWG reflects its ability to serve as a technical bridge between nuclear science, law enforcement and nuclear security dedicated to furthering nuclear forensics in the service of nuclear security. The ITWG recognizes that nuclear forensics depends on a diverse and scientific exchange representing distinct disciplines and constituencies. The strength of a nuclear forensics examination is not contingent on a single technology but is derived from demonstrated confidence in analysis and interpretation. The ITWG represents a community of nuclear forensic practitioners with a shared commitment to approach and implementation. •

NUCLEAR FORENSICS

Nuclear forensics is an essential component of national and international nuclear security response plans to events involving radioactive materials diverted outside of regulatory control. The ability to collect and preserve radiological and associated evidence as material is interdicted and conduct nuclear forensics analysis provides insights to the history and origin of nuclear material, the point of diversion, and the identity of the perpetrators.

THE NUCLEAR FORENSICS INTERNATIONAL TECHNICAL WORKING GROUP

Since its inception in 1995, the Nuclear Forensics International Technical Working Group (ITWG) has been focused on nuclear forensic best practice through the development of techniques and methods for forensic analysis of nuclear, other radioactive, and radiologically contaminated materials. The objective of the ITWG is to advance the scientific discipline of nuclear forensics and to provide a common approach and effective technical solutions to competent national or international authorities that request assistance.

ITWG PRIORITIES AND ACTIVITIES

As a technical working group, the priorities for the ITWG include identifying requirements for nuclear forensic applications, evaluating present nuclear forensic capabilities, and recommending cooperative measures that ensure all states can respond to acts involving illicit trafficking and unauthorized possession of nuclear or other radioactive materials. An objective of the working group is to encourage technical peer-review of the nuclear forensic discipline. These goals are met through annual meetings, exercises, and informal and formal publications.

Outreach is a primary goal of the ITWG. The working group disseminates recent progress in nuclear forensic analysis and interpretation with the broader community of technical and security professionals who can benefit from these advancements. Affiliated international partner organizations include the International Atomic Energy Agency (IAEA), the European Commission, the European Police Office (EUROPOL), the International Criminal Police Organization (INTERPOL), the Global Initiative to Combat Nuclear Terrorism (GICNT) and the United Nations Interregional Crime and Justice Research Institute (UNICRI).

ITWG MEMBERSHIP

Nuclear forensics is both a technical capability as well as an investigatory process. For this reason the ITWG is a working group of experts including scientists, law enforcement officers, first responders, and nuclear regulators assigned by competent national authorities, affiliated contractors, and international organizations. The ITWG is open to all states interested in nuclear forensics.

ITWG participating states and organizations recognize that radiological crimes deserve thorough investigation and, when warranted, criminal prosecution. The ITWG encourages all states to possess the basic capability to categorize nuclear or other radioactive materials to assess their threat. As an international group, the ITWG shares its expertise through its membership to advance the science of nuclear forensics as well as its application to nuclear security objectives.

http://www.nf-itwg.org/