



An Assessment of the Nuclear Security Centers of Excellence

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A Proliferation of Centers of Excellence

One of the key outcomes of the Nuclear Security Summit (NSS) in April 2010 was the renewed commitment made by participating states and organizations to enhance the security of nuclear materials and expertise. The summit communiqué acknowledged the need for capacity building for nuclear security¹ and cooperation at bilateral, regional, and multilateral levels to promote nuclear security culture through technology development, human resource development, education, and training. It also reiterated the importance of optimizing international cooperation and the coordination of assistance. The communiqué further emphasized that maintaining effective nuclear security will require sustained national efforts undertaken on a voluntary basis and facilitated through international cooperation. While the summit focused primarily on fissile materials, many states that attended highlighted the importance of keeping radiological materials safe and secure. Consequently, the final communiqué noted that radiological materials required similar security measures because of their potential use in “dirty bombs.”²

As their contribution to enhancing the security of both nuclear and radiological material and know-how, several states at the summit announced they were establishing “centers of excellence” for nuclear security.

- China announced it would cooperate with the United States on a nuclear center of excellence (COE).
- Japan launched a regional support center for nuclear security.

- Italy announced a school for nuclear security.
- Kazakhstan announced it was considering the establishment of an international training center for nuclear security.
- India announced the creation of a nuclear energy center with a nuclear security component.

These new ventures supplemented existing COE with a strong nuclear security component established before the 2010 NSS. For example:

- The World Institute for Nuclear Security (WINS) was established in September 2008.³
- The United States had worked with Brazil to establish a nuclear security COE and also pursued numerous engagement programs across the globe to develop capacity.
- South Korea had announced its intention to establish a nuclear security support center.
- The United Kingdom had announced a nuclear COE in 2009.
- The International Atomic Energy Agency (IAEA) had a portfolio of six nuclear security support centers with seven more planned.
- The European Commission (EC) had been developing its COE focused on Chemical, Biological, Radiological, and Nuclear (CBRN) issues.

- The nuclear industry and educational institutions had also established relevant initiatives.

Given the plethora of nuclear COE being established across the globe—with even more announced at the 2012 NSS in Seoul—several questions arise:

- Are the activities of these centers being coordinated, or have they been established with little thought to avoiding duplication of effort or without recognizing where the key priorities lie?
- Is the training offered by these centers moderated to ensure consistency at the international level?
- Are the centers likely to be short-term political initiatives or sustainable long-term ventures designed to support the establishment of robust nuclear security culture in nuclear renaissance countries?
- Does the mandate of the centers duplicate that of WINS?
- Are wider nuclear industry interests associated with the establishment of the centers? Is the nuclear security agenda being used as a cover for commercial opportunity?

The remainder of this brief seeks to shed light on these questions. It is based on a project conducted by the Centre for Science and Security Studies, King's College London, with support from the Carnegie Corporation of New York, to assess the COE concept, identify ways in which international coordination in this area could be enhanced, and examine linkages with initiatives related to nuclear security education. Additional issues examined include the prospects for the long-term sustainability of the centers, how they might be strengthened to ensure sustainability, and the wider benefits of and lessons learned from the various approaches. The brief is informed by research interviews with dozens of senior officials with responsibility for the COE as well as nuclear regulators and policymakers with responsibility for CBRN risk mitigation programs from approximately 20 governments, the EC, the IAEA, and senior nuclear industry personnel, along with nongovernmental organization (NGO) specialists and technical experts.

Categorizing the COE Based on Core Activity

To begin with, the term “center of excellence” is somewhat disingenuous. A number of observers have questioned the validity of the concept in the nuclear security field because it implies recognition by others that a proven track record of success and achievement is already in place, whereas, in reality these initiatives are still at the formative stage. Moreover, in a broad sense, the concept assumes a variety of forms with a range of objectives. It also assumes a high level of acceptance by scientific and technical peers of the quality of the research, training, and education offered by the institution, which usually only comes after a long period of operation to fully justify the label. None of the initiatives currently labeled “nuclear centers of excellence” have a lengthy track record along the lines, for example, of the Oak Ridge National Laboratory in the United States, the IAEA, or the European Commission Joint Research Centre’s Nuclear Security Unit, all of which have very good reason to be referred to as COE. All the nuclear security centers highlighted at the summit certainly “aspire to excellence,” or aim to have a “commitment to excellence,” but to call them COE from day one is decidedly premature and suggests nothing more than a political sound bite.

Some of the centers, such as those established by Japan and Pakistan, are already operational and delivering training on a wide range of nuclear security topics. Others, such as the initiatives in South Korea, China, and India, are only at the implementation stage. Other centers, like those proposed by Kazakhstan and Brazil, are still at the evaluation stage. The United Kingdom Nuclear Centre of Excellence fell at the first hurdle after a change of government in 2010⁴ and demonstrates the fragility of new initiatives in this area if centers do not have sufficient time to secure long-term funding and to build a track record of competence.⁵

The term “COE” was used in a very broad sense at the 2010 NSS and in subsequent press and policy articles. However, the term actually encompasses a range of organizations and related activities which are often quite diverse. The portfolio of centers listed in the table below embrace those examined for this study. Some of these deserve much greater recognition than they currently attract. For example, the work of the IAEA to help establish nuclear security support centers in Morocco, Columbia,

Ghana, Pakistan, Tanzania, and Malaysia was very much underplayed before, during, and after the summit. Seven more IAEA-backed centers are planned over the next few years in Chile, Cuba, Turkey, Kazakhstan, South Africa, the Philippines, and Jordan. The long-term sustainability of these initiatives will depend on the development of human resources through IAEA tailored training

programs, the development of expert networks, and the provision of appropriate technical and scientific support.

Based on an assessment of the currently active centers, and those planned for implementation over the next few years, five categories can be identified:

Types of Centers	Examples
<p>Group A Centers where the core activities are essentially technical and scientific in nature with a focus on providing training on the use, calibration, and maintenance of equipment.</p>	<ul style="list-style-type: none"> • Pakistan Nuclear Security Training Centre (NSTC)* • Japan’s Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (ISCN) • South Korean nuclear security center • IAEA nuclear security support centers • China’s center of excellence on nuclear security
<p>Group B Centers where the core activities are essentially educational, offering course(s) which, although they may have a technical content, are designed to provide a broad perspective of nuclear security and an awareness of relevant issues.</p>	<ul style="list-style-type: none"> • Italy’s International School on Nuclear Security • International Nuclear Security Education Network (INSEN)
<p>Group C Centers where the core activities encompass a wider range of topics than just nuclear security, or even wider than nuclear security, safety, and safeguards.</p>	<ul style="list-style-type: none"> • EC CBRN Centres of Excellence • Gulf Nuclear Energy Infrastructure Institute (GNEII) • France’s International Institute of Nuclear Energy (I2EN)
<p>Group D Centers where the core activity is focused on nuclear research and development or which are characterized by strong commercially driven objectives.</p>	<ul style="list-style-type: none"> • United Kingdom Nuclear Centre of Excellence** • Science and Technology Centers in Russia and Ukraine • India’s Global Centre for Nuclear Energy Partnership
<p>Group E Centers where the core activities are focused on raising awareness of nuclear security issues within the nuclear industry and beyond.</p>	<ul style="list-style-type: none"> • WINS • Middle East Scientific Institute for Security (MESIS)***
<p>* The NSTC in Pakistan is one of the first IAEA nuclear security centers, but is included separately because it provides a model example of what a center should be undertaking in terms of nuclear security training, provision of technical advice, and education to a state’s nuclear-security-competent authorities.</p> <p>** The UK Nuclear Centre of Excellence is now defunct, but is included for completeness as there are lessons associated with this initiative that are applicable to other centers.</p> <p>*** MESIS is an example of an awareness-raising organization which is in part dependent on the support of partners to provide funding for a range of nuclear security and scientist engagement activities to promote professional responsibility.</p>	

Group A: Technical and Scientific Training Centers

Group A comprises the majority of the centers and their core activities are largely technical, providing a range of training courses for personnel working in nuclear power plants or for users of radiation sources, border officials, and emergency first responders. Awareness courses are also offered to policymakers, regulators, and other public officials with an interest in nuclear security matters. Facilities include both technical laboratories for undertaking experiments on equipment and its maintenance, and education facilities for teaching a wide range of courses. One center—Pakistan’s NSTC—is also affiliated with an educational institution.

The types of courses offered by Group A centers include:

- Physical protection of nuclear material and nuclear facilities.
- Safeguards, accountancy, and control aspects.
- Use of radiation detection equipment by government officials.
- Safety and security associated with radioactive sources.
- Radiation detection equipment and maintenance.
- Combating illicit trafficking of nuclear and radiological materials.
- Search and recovery of orphan sources.
- Nuclear forensics.
- International legal instruments on nuclear security.
- Wider management skills and development of a nuclear security culture.
- Awareness raising for policymakers and other public officials whose job requires an appropriate knowledge of nuclear security.

Courses are offered to both national and international audiences and have strong connections with the IAEA for training. Some also have wider international links. For example, the United States is providing funding and equipment to help establish the COE in China.

Group B: Educational Centers

Group B primarily comprises centers whose mission is educational. Although the Italian school was the only such center to be offered as a “house gift” at the 2010 NSS, a small number of academic institutions do include elements of nuclear security in their nuclear education curricula. The IAEA also established the International Nuclear Security Education Network (INSEN) in April 2010 which is a partnership between the IAEA and several academic institutions, and other relevant stakeholders, with the aim of promoting and supporting the growth of education programs and courses in nuclear security. More than 50 educational institutions are now part of the INSEN. A particular focus of the INSEN is how best to cultivate faculty members capable of delivering academic courses in nuclear security. For example, the Centre for Science and Security Studies at King’s College London has assisted in developing a pilot “train the educators” course with support from the IAEA.

Group C: Centers With Broader Mandates

Group C centers incorporate some element of nuclear security training as a part of wider initiatives. An example is the Gulf Nuclear Energy Infrastructure Institute (GNEII) which was established to strengthen nuclear energy security, safeguards, and safety infrastructure throughout the Gulf region. Another case is the French International Institute of Nuclear Energy which has been established to facilitate access to nuclear training for foreign students. The focus of the EC centers is chemical, biological, radiological, and nuclear (CBRN) issues. If such integrated approaches are effectively implemented and managed they would offer considerable benefits in terms of learning lessons from other sectors, identifying synergies across the sectors, and capitalizing on best practices in terms of developing human resources and the professional responsibility elements associated with developing a robust nuclear security culture. However, this approach does mean that nuclear security is tackled as part of a much larger set of activities, and may, therefore, be relegated to second place if resources are, or become, limited.

Group D: Research and Development Centers

Group D centers have strong research, development, and technical elements with the aim of developing commercial products and services. The Indian Global Centre for Nuclear Energy

Partnership was one of the COE announced at the 2010 NSS. It is currently under construction and is focused on research and development of secure and proliferation-resistant reactor systems. Activities are to be undertaken within five schools, one of which will embrace nuclear security studies.

The International Science and Technology Center (ISTC) based in Moscow and the Science and Technology Center in Ukraine (STCU) were designed to counter the threat posed by the proliferation of sensitive knowledge and experience through the emigration of former weapon scientists and engineers to countries of concern following the dissolution of the Soviet Union. The ISTC is an intergovernmental organization connecting scientists from Russia, and other countries of the Commonwealth of Independent States (CIS) and the Republic of Georgia, with their peers and research organizations in Canada, the European Union (EU), Japan, the Republic of Korea, Norway, and the United States. ISTC facilitates international science projects and assists the global scientific and business community to source and engage with Russian and CIS institutes that develop or possess a high level of scientific know-how. While established as a nonproliferation initiative to deal with a Cold War legacy, the two centers are well established organizations with a strong network of contacts and a familiarity with the countries in that region. They have been included in this analysis because either, or both, of the centers could serve the role of a nuclear security center offering a variety of training and educational activities.

Group E: Centers With an Industry Focus

Group E comprises centers that have no aspirations to provide a technical or research and development function nor to hold laboratory assets. They are primarily concerned with raising awareness about the importance of nuclear security and promoting professional responsibility and best practice at all levels. For example, the World Institute for Nuclear Security (WINS) was established in 2008 to improve the security of nuclear and high-hazard radioactive materials so that they are secure from unauthorized access, theft, sabotage, and diversion and cannot be utilized for terrorist or other nefarious purposes. Its mission is to provide an international forum for those accountable for nuclear security to share and promote the implementation of best security practices.

There is also a myriad of organizations smaller than WINS with a mandate to promote best practices on nuclear security issues. Many of these receive support from major donors—such as the US National Nuclear Security Administration (NNSA), the US Department of Defense, the US State Department and the EU programs—to host and facilitate courses and workshops in Southeast Asia, North Africa, the Middle East, and elsewhere. These organizations fill an important niche role in awareness raising. Some offer “neutral territory” to facilitate training for target countries where political unrest and security concerns make it difficult to offer such opportunities at home. For example, the Middle East Science Institute for Security (MESIS), based in Jordan, offers a neutral base for training nuclear security personnel from across the Middle East region.

In summary, the categories of COE clearly demonstrate that, while they are multifaceted in their approach and makeup, they all support and facilitate the spread of best practices and professional responsibility related to nuclear security across all organizations that use nuclear and radiological materials. The categorizations also highlight the importance of ensuring effective collaboration, coordination, and networking between and amongst the centers.

The Way Ahead: Optimizing Potential and Ensuring Sustainability

Coordination and Collaboration

The establishment of many of the centers, irrespective of their specific focus, has come about largely due to the program initiatives of three powerful and influential players: the IAEA, the EC, and the US government. The US programs via State and NNSA are also substantially funding training, education, and the provision of equipment to a number of countries to enhance their nuclear security.⁶ The EC CBRN COE program is being rolled out to more than 50 countries—via eight regional secretariats—many of which are also the focus of US initiatives. The IAEA is supporting an influential and impressive program of training and education as well as encouraging a growing portfolio of nuclear security support centers in some 13 countries.

Until fairly recently, these three players seem to have spent more time implementing their respective programs leading to the establishment of

centers than thinking about how best to ensure effective coordination and collaboration. A contributory factor to this appears to have been the desire to get the centers established as quickly as possible, resulting in a lack of planning for long-term sustainability at the early stages of development. This approach has put at risk the opportunity to leverage existing organizations and expertise.

The research conducted by this author demonstrates a concern about the lack of effective coordination and collaboration among the centers, including the potential for duplication of effort. Some of the comments from project interviews included:

- Coordination between the centers and stakeholders was less than optimal.
- More effort needed to be placed on how the centers will measure the quality, impact, and success of the training to be offered.
- Insufficient time had been spent developing clear objectives, desired outcomes, metrics, or strategic plans to enhance the sustainability of the various organizations.
- It was important for the centers to focus on national priorities before offering training to an international audience.
- There needed to be an appraisal and accreditation process in place because training was being provided to an international audience (e.g., an exam-based training structure to aid monitoring and to provide tangible metrics to measure the effectiveness of training).
- Those organizations offering training should ideally have some form of charter status after having earned a certificate of competence from an appropriate body.

Certainly, it is recognized by the centers themselves that over the next few years a coordination mechanism will be required to avoid duplication of effort. A senior official from one of the Asian centers argued that such a mechanism was needed to:

- Share information on the centers' respective activities.

- Encourage proactive and constructive exchanges of opinion on how to enhance nuclear security.
- Promote the understanding of best practices in nuclear security.
- Cooperate to achieve nuclear security goals.
- Coordinate the centers' respective initiatives, in accordance with each center's priorities, to achieve the best possible results in enhancing nuclear security.

The IAEA arguably has a very important, if not crucial, role to play in coordinating the activities of the centers, particularly because the agency was instrumental in initiating work on nuclear security support centers well before 2010. The IAEA also has a key role in coordinating nuclear security by developing consensus guidelines, curricula, and so on, as well as providing detailed technical advice on equipment. The IAEA also needs to have adequate resources to provide assistance to the centers in order to ensure a common set of standards is applied during the developmental stages.

Recommendation 1. The three key players—the United States, the EU, and the IAEA—should make a concerted effort to ensure that meaningful discussions on coordinating their programs take place as they work to establish nuclear security centers.

Recommendation 2. Beyond coordination amongst the United States, EU, and IAEA, a coordinating mechanism, that encourages collaboration, should be developed for all centers.

Avoiding Silos

There is a real danger that by creating centers with a specific focus on nuclear security, opportunities will be lost to learn lessons and to share best practices from the nuclear safety sector which may be just as applicable to addressing security issues. The approach of India's Global Centre for Nuclear Energy Partnership, the Gulf Nuclear Energy Infrastructure Institute, and the French initiative to include nuclear security courses at the European Nuclear Safety Training and Tutoring Institute⁷ highlights that some countries recognize the importance of an integrated approach to security, safety, and safeguards in the design of their centers. Such an approach makes the survival of the centers much more sustainable over the long term.

Although many are likely to be dealing only with radiological material, a number of centers will need to consider the security issues associated with a sizeable civil nuclear power program and its associated nuclear materials. A flexible, balanced, and integrated approach—rather than one that creates and perpetuates a silo culture—ensures that solutions for nuclear security do not adversely influence the effectiveness of delivering nuclear safety and vice versa. A silo approach could be avoided in a number of ways including:

- Ensuring training, education, and induction courses highlight the value and benefits of an integrated approach to nuclear security, safeguards, and safety.
- Ensuring an integrated approach to the preparation of nuclear threat assessment exercises run by the centers take account of both security and safety performance needs.
- Sharing lessons learned and best practices on human resource development.

Recommendation 3. The centers should develop appropriate links and collaborations with nuclear safety organizations to foster close working relations and the sharing of best practices and lessons learned, especially in the field of human resource development and threat assessment exercises.

Effective Information Sharing

Coordination of major threat reduction programs is greatly assisted not just by regular meetings, but also by ensuring there is an effective information sharing system in place where basic data about programs and projects is made available. For many of the policy meetings held where the centers (and wider programs) are discussed, representation from interested states does not necessarily include those directly involved with program development. While the three key players mentioned above do share information and have informative Web sites, the way in which information is collated and used is clearly not optimal and improvements in this respect could improve coordination.

At present, for example, the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (Global Partnership) does produce an annual compendium of key programs

and projects⁸ that embraces much of the work undertaken on CBRN threat reduction including nuclear security projects. However, this information is not presented in a user-friendly way, nor is it organized so it is easy to gauge the level of activity in particular countries or key program areas such as scientist engagement, nuclear security capacity building, training, and so on. This makes it unnecessarily difficult to identify potential gaps and duplication of effort. The presentation of basic data in a user-friendly way may well assist the centers to identify areas where they can add value, avoid duplication, and make contact with other players in their country or region with which collaborating may be worthwhile.

Recommendation 4. Better share and more clearly present CBRN threat reduction program information to allow for gap identification to be addressed by COE.

Technical Coordinating Group

In July 2011, the IAEA hosted a meeting to discuss coordination of the current and planned efforts of states and the EU to establish and maintain COE. The aim was to identify the criteria for the centers, coordinate their activities to ensure the effective use of resources, and promote coherent approaches to exchanging information and best practices. The meeting made some limited progress in raising awareness of the range of work underway to establish the centers and the importance of establishing a collaborative network for nuclear security training and the other COE activities. A second IAEA-hosted meeting took place in early February 2012. Under US leadership in 2012, a number of technical working groups have been established in the Global Partnership to drive forward some key priorities including one on the COE. While these high-level, largely policy-focused discussions are to be welcomed⁹—and should at least ensure increased awareness of what the centers are doing and identify opportunities for collaboration—they do not go far enough to ensure there is consistency of approach in terms of the technical and educational aspects which will determine the long-term sustainability of the centers.

During the early stages in the development of the centers, there is a need for strong policy oversight of the type currently fostered by the IAEA meetings and Global Partnership's working group.

However, now that some of these centers are being established and starting to implement training courses, there is a need for a more technical, operationally based framework. Establishing such a group could:

- Incentivize the centers to take ownership of coordination of their activities and sharing best practices and lessons learned.
- Provide a framework to discuss the technical and educational curricula of their centers and identify areas which can be enhanced to develop excellence in training and education through sharing of best practices.
- Provide a framework to share information and encourage collaboration on specialist courses and exercises.
- Develop a standard set of metrics against which the effectiveness of the centers can be measured.
- Better promote the activities of the centers through a dedicated Web site.¹⁰

Recommendation 5. Establish a technical coordinating group to foster coordination and collaboration between the centers.

Standardization of Training

An important feature of the concept underlying the IAEA's nuclear security support centers is the need to increase the number of qualified nuclear security instructors to ensure the centers' long-term success and sustainability. Such personnel identify a state's overall nuclear security training needs, and the courses they are responsible for need to be subject to regular reviews to ensure quality and high standards. Some of the courses may also require certification or accreditation and moderation by training and education authorities.

If centers open training courses to an international audience, as many plan to do, it will be important to establish an accreditation process to ensure consistency in the quality of training so that participants have a clear understanding of the training they will receive and the level of competence they will reach. There is little evidence yet that the centers have given much thought to the development of an accreditation mechanism to ensure consistency of approach in nuclear security training. If the centers really aspire to become

centers of excellence for nuclear security training, then establishing a quality assurance methodology will be necessary in order to provide:

- A definitive standard for nuclear security training providers wanting to gain formal recognition for training which they deliver.
- A framework for trainers wanting to design a professional practitioner training course for nuclear security to an internationally recognized standard.
- A reference for prospective students seeking assurance about the quality of their future training.
- A benchmark for employers when recruiting practitioners who need to be trained to a high professional standard.

The establishment of an appropriate accreditation scheme for those centers offering nuclear security training courses would be a suitable objective of the technical coordinating group (recommended above) with advice from the IAEA. Even those centers purely focused on meeting their national nuclear security training needs would benefit from involvement in the development of an accreditation process so that the quality of all training is improved. Coordination of these aspects of nuclear security training could also include agreement on appropriate metrics that would be useful for the centers to demonstrate successful performance to international donors.

Recommendation 6. To consider establishing an accreditation methodology so that there is an internationally recognized quality assurance standard for the training offered by the centers.

Build on What Already Exists

The creation of the centers, and the focus on ensuring their sustainable development, may well risk missed opportunities to leverage existing organizations and expertise. Existing centers of cooperation provide ready-made organizational infrastructures and processes, networks of contacts, and familiarity with specific countries and regions. Not all countries, or even regions, will need a new center, and the delivery of training and best practice advice may just as easily, and more cost effectively, be provided from existing options, such as the Science Centers in Moscow and Kiev

and the regional centers of CRDF Global,¹¹ or one of the IAEA nuclear security support centers.¹² Unfortunately, there is not much political capital to be made for officials and bureaucrats promoting a “make do and mend policy,” and new initiatives rarely consider whether other existing centers might do the job just as well.

Additionally, WINS was established in 2008 to provide an international forum for those accountable for nuclear security to share and promote the implementation of best practices. So far, much of its effort has been dedicated to the preparation of a portfolio of best practice guides. WINS is also establishing an academy to develop a global accreditation mechanism focused on job task analysis. This will focus on providing what professional people need rather than a general education program that would take them away from their workplace for significant periods of time. The scope of the academy will essentially involve the development and provision of a suite of competency-based training modules organized around specific roles for security-related practitioners, including non-security personnel. WINS intends these to cover the obligations of operators and licensees as set out in the IAEA publication “Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities” (INF-CIRC/225/Revision 5)¹³ and cluster them around different roles and responsibilities such as:

- Board members.
- Senior management.
- Nuclear security directors.
- Engineers and scientists engaged in nuclear security related activities or with nuclear security interfaces.
- Nuclear safety and emergency planning managers.
- Off-site response force management.
- Guard force managers.

The WINS suite of materials will provide a standard against which professional development can be assessed. As a formal quality management framework WINS plans to apply for ISO 9001 certification in 2012. This initiative offers considerable opportunities for the centers to broaden their

activities by partnering with WINS and to accommodate the WINS material in their curricula.

Recommendation 7. Before contemplating the establishment of further centers, consideration should be given to whether nuclear security training and best practice advice might be delivered more cost effectively through existing centers.

Recommendation 8. Centers should partner with WINS and include its professional development material in their training curricula.

Support for IAEA Initiatives

The IAEA Office of Nuclear Security is working to provide a comprehensive portfolio of training and educational material, as well as experts, to be used in courses organized by the centers or other training workshops. While the IAEA has limited funds and human resources, training and educational networks now being established, such as INSEN, offer further opportunities to access best practices knowledge and expertise. Establishing training and education networks via the IAEA nuclear security support centers and INSEN is at a comparatively early stage of development. It will be important that these networks are fostered and that training and education advice and guidance offered are given time to take hold and become sustainable activities. Appropriate technical and financial resources will need to be made available to the IAEA Office of Nuclear Security so that it can continue to support the rollout of its nuclear security support centers and the development of the associated INSEN.

Recommendation 9. IAEA member states should continue to provide sufficient contributions to the IAEA Nuclear Security Fund to enable the successful establishment of the portfolio of nuclear security support centers and of the INSEN.

A Focus for the Global Partnership

It is clear that a number of key donors involved in internationally focused threat reduction see potential for using the centers to deliver their initiatives that include training and raising awareness of the importance of nuclear security. In the United States, for instance, the centers are seen as neutral locations to deliver projects which meet American priorities on threat reduction, especially in terms of supporting and enhancing the second line of defense programs managed by the NNSA. Examples of this include the recent Japan ISCN courses

on physical protection, involving 14 countries, and on state systems of accounting for and control of nuclear material, involving 13 countries. The centers clearly offer considerable benefits to the United States to meet its objective of enhancing global security, and this was presumably one of the main political justifications for putting approximately \$30 million toward establishing new centers in China and India, which have successful economies and are also nuclear weapon states.

There would appear to be a considerable advantage for other countries with internationally focused threat reduction programs to make similar use of the centers to support capacity-building activities in the regions where they have political interests. Key among these are likely to be the programs of the Global Partnership countries. The sustainability and long-term viability of the centers would be strengthened by their involvement. It might also improve coordination and encourage greater collaboration.

Widening involvement away from strongly focused US support for the centers would also likely make the centers more attractive to those countries which may have political difficulties in being seen as depending on American support for nuclear security initiatives. From the point of view of the United States, greater burden sharing would also attract continued congressional support for US cooperative threat reduction programs. Arguably of greater importance, it would be invaluable to have as wide a resource base as possible of lessons learned to strengthen the quality of training and wider participation in the work of the centers. This should also include nuclear regulators which, in countries such as Norway and Sweden, already devote a good deal of effort to international outreach.

Recommendation 10. The Global Partnership should consider focusing support to COE, enabling more countries to participate in and partner with GP-related projects.

Completing the Circle: Linking Training With Education

Pakistan's NSTC was one of the first centers to be assisted by the IAEA. It now has strong links with the Pakistan Institute of Engineering and Applied Sciences (PIEAS) so that elements of nuclear security can be included in the curricula of its nuclear courses. The center is also running more general

awareness courses for policymakers. Such an approach strengthens the development of nuclear security culture and ingrains the importance of the topic at an early stage in the development of nuclear professionals. In the early stages of their development, the centers categorized as having a technical focus (Group A) should concentrate on establishing their technical and scientific credibility and building up a reputation for excellence. Widening their activities to include educational courses would appear to be a highly desirable approach and should make the centers more sustainable in the long term.

Work placements, sponsored research projects, and the like would create strong and sustainable linkages between the centers and key academic institutions. Education and other scientific institutions could also assist the centers in developing appropriate metrics for their work and conduct joint research to enhance the effectiveness of equipment and so on. Establishing partnerships between COE and educational institutions would also provide the centers with access to additional skills and expertise to undertake GP-related projects on scientist engagement.

Recommendation 11. The technically focused centers (Group A) should develop partnerships with educational institutions so that a holistic approach to nuclear security education and training can be developed.

A Model Center?

The centers referred to in this brief present an interesting typology. Some centers, like the EC CBRN Centres, are in reality a network of local, regional, and international organizations. Others, like the French International Institute of Nuclear Energy, constitute points of entry for foreign access to national expertise in nuclear security education. Still others, like WINS or the Middle East Scientific Institute for Security, have no technical, research, or scientific pretensions, but specialize in raising awareness.

All of the types of centers have the potential to make a valuable contribution to establishing a robust nuclear security culture globally, with professional responsibility ingrained in those working with nuclear and radiological materials. However, the immediate- and medium-term needs of most countries are likely to involve access to technical and scientific expertise related to nuclear material

protection control and accountancy, together with enhancing their detection and response capabilities. Those states with aspirations to have nuclear as part of their future energy mix will also need to build up a cadre of nuclear scientists and engineers in order to:

- Become an informed buyer of nuclear power plants.
- Have the expertise to develop and manage safely and securely their nuclear research facilities.
- Have suitably trained and educated human resources to advise on policy and regulatory issues.
- Interact at an international level when nuclear issues are debated.

These perfectly understandable needs suggest a “model center” would be very similar to the concept developed by the IAEA for its nuclear security support centers, but with the additional function of working closely with nuclear educational institutions to ensure nuclear security is embedded into all curricula. Regardless of what such a model center might look like, before the various COE become too entrenched, consideration should be given to the ten recommendations offered here in order to enhance the centers’ long-term sustainability and capacity to reach their full potential.

Endnotes

- ¹ Nuclear security: The prevention and detection of and response to theft, sabotage, unauthorized access, illegal transfer or other malicious acts involving nuclear material, other radioactive substances, or their associated facilities (IAEA definition—Office of Nuclear Security).
- ² “Communiqué from Washington Nuclear Security Summit,” April 13, 2010. www.whitehouse.gov/the-press-office/communiqu-washington-nuclear-security-summit.
- ³ WINS was established during the General Conference of the IAEA in 2008 to provide an international forum in which nuclear security professionals can discuss and exchange best security practices and learn from each other. WINS itself is rapidly being seen by many as the premier Center of Excellence on nuclear security providing a comprehensive range of best practice guidance and advice. WINS now has over 400 individual and corporate members from 52 countries drawn from private industry,

police, government agencies, state regulators and national laboratories. www.wins.org/.

- ⁴ United Kingdom government announcement about withdrawal of funding of the center. www.decc.gov.uk/en/content/cms/news/csr_hmt_releas/csr_hmt_releas.aspx.
- ⁵ A number of those responsible for the centers noted the fragility of funding, with one commenting that “budgetary and political considerations are always important issues in sustaining the momentum of our center.”
- ⁶ The State Department’s Partnership for Nuclear Security is one such program.
- ⁷ However the nuclear security element in the new curricula is very modest with only 2 days out of 20 devoted to nuclear security issues in the Introduction to Nuclear Safety course. “Introduction to nuclear safety—2012. www.enstti.eu/Pages/Training.aspx.
- ⁸ “Global Partnership Working Group – GPWG Annual Report” Consolidated Report Data 2011, Annex. www.state.gov/documents/organization/183039.pdf.
- ⁹ Such meetings rarely involve the majority of the key players leading the work to establish the centers, with some of the meetings having no representation from key players.
- ¹⁰ The IAEA has suggested its Nuclear Security (NUSEC) portal could be used to develop the network of nuclear security support centers.
- ¹¹ CRDF Web site for details of their objectives, where they work, and projects. www.crdfglobal.org/where-we-work.
- ¹² The Tanzania nuclear security support center is now offering its services to provide maintenance of equipment to neighboring countries, meaning these countries do not need to establish their own nuclear security support center—information provided to the author by the IAEA Office of Nuclear Security.
- ¹³ IAEA, *Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities* (INFCIRC/225/Revision 5), January, 2011. www-pub.iaea.org/MTCD/publications/PDF/Pub1481_web.pdf.

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