



Nuclear Security:

Seoul, the Netherlands, and Beyond

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Nuclear Security: ***Seoul, the Netherlands, and Beyond***

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EXECUTIVE SUMMARY

The 2014 Nuclear Security Summit (NSS) in the Netherlands will be the third in a series of heads-of-state summits to prevent nuclear terrorism by strengthening global nuclear security. At the first summit in Washington in 2010, leaders endorsed a four-year international effort to secure all vulnerable nuclear materials worldwide. At the second summit in Seoul in 2012, leaders expanded their focus beyond protecting fissile materials to include radioactive source security and the safety and security interface at nuclear facilities. This broader definition of the nuclear security agenda provides a stable foundation for the 2014 summit to build upon.

The Netherlands summit will be the third NSS with a fourth scheduled for Washington in 2016. The agenda for 2014 has not yet been set, but participants can be expected to review the progress made since past summits and evaluate what more needs to be accomplished. NSS participants will also have the opportunity to announce a long-term vision for the nuclear security regime. This could lead to the streamlining of existing initiatives, which could provide the political impetus to unlock further progress. It is not yet known what a successor process for the NSS will look like beyond the final summit in 2016.

The nuclear industry and expert communities will hold their own parallel summits to supplement the governmental event in 2014. Similar events were held in Seoul and Washington during the previous summits. Cross-sector collaborations are critical to strengthening the nuclear security system; each sector has a unique contribution to make and a stake in preventing a nuclear or radiological terrorism incident. There needs to be regular dialogue among all stakeholder communities. Non-governmental organizations (NGOs) and the nuclear industry should be partners in the process of limiting risk, setting expectations, and communicating with the media and public on nuclear security issues.

Some of the most meaningful technical and policy initiatives to come out of the NSS process have been in the form of national and multinational commitments (“house gifts” and “gift baskets”) on highly enriched uranium (HEU) minimization, separated plutonium repatriation, and regulatory framework updates. These commitments support the priorities outlined in the official summit communiqués and offer near-term, concrete progress. They were created as a means to encourage countries to do more than the political consensus process leading up to the NSS would allow by adding projects and results to the summits. Additional house gifts and gift baskets can be expected at the 2014 summit. Some experts are encouraging participants to make pledges

that take a regional approach to nuclear security challenges and governance issues, among other recommendations.

A key hurdle in creating a more effective international nuclear security regime is the view held by many states that strengthening the regime is primarily a problem for nuclear weapon states, not a global challenge. However, to truly universalize the nuclear security agenda, ensure it remains vibrant and continues to evolve, new nuclear security leaders and champions are needed, particularly from middle powers and emerging economy nations. This is challenging because some of these countries fear the nuclear security agenda will be used to block access to nuclear technology. This is not the case. The real goal of nuclear security is to protect the public from uncontrolled releases of radiation. Developed and developing countries share an interest in creating a safe and secure future for nuclear technology. Engagement with skeptical developing countries should focus on the economic value of strengthening the global nuclear security system. A nuclear terrorism incident in any country will have widespread consequences for geopolitics and the global economy.

Another significant challenge is the largely sovereign and voluntary nature of the nuclear security regime. If the regime were designed from scratch today, it would look more like other transnational regimes, including nuclear safety, that better balance transparency with confidentiality and national sovereignty with international responsibility. Peer reviews, regular evaluations, and reporting requirements are some of the most valuable elements of the nuclear safety regime that have facilitated its improvement over time. The nuclear security regime can learn from the nuclear safety regime how to become more systemized and foster a culture of continuous improvement.

There is growing recognition that stronger governance structures are necessary in the nuclear security regime to make the national and international systems that protect nuclear materials and facilities more comprehensive and connected. Moving towards this objective should be the goal of international agencies that cover nuclear security. However, even if universalized, existing agreements still leave significant gaps, especially in implementation. There is a need to deepen and broaden today's nuclear security governance structures, but the more ambitious the proposal, the more difficult it is to gain support. One potential path forward would be for a small group of like-minded states to pursue ambitious objectives while the IAEA moves along its own universal track before eventually merging the complementary efforts.

The NSS has been very supportive of the IAEA's role in nuclear security, and the IAEA is a potential successor option when the summit process will likely end in 2016. Its member states have become somewhat more supportive of moving forward in dealing with this challenge than previously, but the IAEA needs to be significantly strengthened and overcome important political and bureaucratic challenges in order to be a successful substitute for the heads-of-state summits. The IAEA's technical capacity is unquestioned, but its ability to effectively drive a political process is still open to question.

The 2014 NSS will need to provide a clear explanation of what has been achieved over the last four years and where the regime is heading. It also could create a foundation for engaging coun-

tries beyond the 53 current participants. Multinational commitments provide one avenue for creating alliances among like-minded countries eager to test creative ideas for strengthening the regime. These projects can outlive the NSS process, involve countries beyond NSS participants, and demonstrate new concepts and principles. They can help create new norms and best practices that can be widely implemented to protect global nuclear and radiological materials and safeguard the future use of nuclear technology.

RECOMMENDATIONS

Nuclear Security: From Seoul to the Netherlands

- *Leadership of the summit host government is critical.* The hosts of future summits need to be clear about their obligations and expectations. In addition to the Sherpa and sous-Sherpa, a dedicated staff is necessary to address summit planning issues. Strength of purpose and a commitment to clear results must be demonstrated by all government participants.
- *Defining the scope is essential.* The 2010 NSS limited the scope of the summit to HEU and plutonium, but the 2012 NSS expanded the agenda to include radiological material and the nuclear safety and security interface at facilities. This expanded platform provides a stable foundation for the nuclear security agenda going forward and issues relevant to a larger number of countries inside and outside of the NSS process, especially those that do not possess any fissile material.
- *The summit vision should be ambitious, but near-term products should be concrete and measurable.* President Obama's four-year goal provided a broad vision for the future to catalyze the attention of heads-of-state at the summits. With the four-year effort ending, a new vision is needed. However, step-by-step progress also remains important. House gifts and gift baskets provide a means of combining ambitious vision with tangible, near-term action.
- *Patiently manage different country perspectives while maintaining focus.* Different countries have different threat perspectives and visions for the future. This fact needs to be accommodated in order to have agreement on the official documents. It is not an excuse for inaction.
- *Determine and prioritize the summit's goals.* If the goal is to build consensus around nuclear security issues, focus should be on negotiating the strongest possible consensus communiqué. If the goal is to achieve as many concrete actions and demonstrable programs as possible, then it is better to focus on developing house gifts and gift baskets around ideas where consensus is not required.
- *Include all stakeholders.* NGOs and the nuclear industry should be partners in the process of measuring risk and setting expectations for nuclear security. Globally inclusive forums, particularly those organized by the IAEA, should be used to help engage the full scope of

countries.

- *Engage often with journalists in the lead up to the summit.* The issue of nuclear security is not well understood by most journalists and is often confused with nonproliferation and nuclear safety. Journalists are important both for communicating news and translating highly technical information into understandable language for a non-technical audience. The NSS host country should use nuclear security related events already taking place around the world to educate journalists on the substance of the issue and why it is important. This will help them understand the significance of the summit and its outcomes. Organizers at the 2012 NSS held formal briefings, screened movies, and launched an official website. They even commissioned a Korean pop star to perform an official 2012 NSS theme song. An understanding of the issues must be developed in advance of the summit since once journalists are on the ground their attention will be mainly directed to the actions of the leaders.
- *Avoid providing overly technical information to the public and media.* Communication outputs must be digestible to those not steeped in the technical details of this issue to be effective. Journalists are telling the story of the summit to the public and they cannot do this with only technical materials. Summit accomplishments need to be placed in a societal context that conveys why this issue, which does not normally drive headlines, warrants personal attention from world leaders.

Technical and Policy Initiatives within the NSS

- *Report on progress toward meeting HEU commitments.* Several countries signed joint statements to initiate collaborative research projects focused on transitioning away from civil uses of HEU. Though these projects will likely not be completed before the 2014 summit, progress reports should be provided at the event on achievements to date.
- *Bring the 2005 Convention on the Physical Protection of Nuclear Material (CPPNM) amendment into force.* Full implementation of the existing elements of the international nuclear security regime has been a core focus of the summit process. Leaders should ensure that their governments complete all necessary national procedures for approving the 2005 amendment prior to the 2014 NSS to meet one of the basic goals of the Seoul Communiqué.
- *Better align plutonium production with its use.* An internationally recognized hard cap on global plutonium separation is unlikely to gain universal support, but production management processes can be improved. National strategies for matching plutonium use with its production to avoid further stockpile accumulations should be pursued.
- *Increase the barriers to radiological terrorism.* Radioactive sources are vital to the operation of medical industrial sectors around the world. However, these sources are not adequately protected and local law enforcement personnel may be unaware of their existence in their jurisdiction or how to most effectively respond if a threat arises. The

U.S. National Nuclear Security Administration (NNSA) offers a range of physical barrier upgrades and training programs that can help radioactive source holders and law enforcement officials enhance their preparedness to fend off radiological security threats.

- *Encourage the use of technologies that do not use high-activity radioactive sources whenever possible.* National policies should favor the use of alternative technologies over those relying on high-activity radioactive sources whenever possible. Summit participants could present demonstration projects of such technologies as house gifts at the 2014 NSS.
- *Hold annual dialogues for international nuclear regulators.* The first international nuclear regulators' conference was held in December 2012. This event was a good first step. However, to truly improve regulator performance across borders through best practice exchanges, it should be made more interactive and held on a regular basis. A pledge to take the lead in regularizing the event and enhancing its agenda could be offered as a gift basket at the 2014 NSS.
- *Explore regional approaches to nuclear security advancement.* The NSS has concentrated on consensus-based communiqués but regional groupings may be better suited for delivering near-term results. New nuclear power development is largely concentrated in regional clusters. These countries and their neighbors share similar cultures and have direct interests in the nuclear security practices of states on their borders. Encouraging region-wide dialogues among these states could build confidence in national programs, prepare for emergency response, and counter nuclear smuggling.
- *Create regional radiological security zones.* States should consider working with other nations in their region to generate new ideas about radiological tracking, disposal, and physical security. They should pursue region-wide implementation of measures they determine are best suited to their circumstances. Assistance from outside the region, such as from the NNSA, could help make these zones a reality.
- *Develop new EU guidance or a directive on nuclear security.* The EU completed and published reports on the results of the nuclear safety and security stress tests conducted in the aftermath of the Fukushima accident. The EU should consider offering a gift basket at the 2014 NSS that provides details on how the lessons learned will be integrated into EU guidance or a new directive and what lessons may be applicable to other countries and regions.

Perspectives on Nuclear Security: Emerging Economies and the Non-Aligned Movement

- *Encourage prioritization of nuclear and radiological security by all states.* Not all states have nuclear facilities, materials, or experience with terrorism, but this does not make them immune to the global economic impacts of a nuclear terrorist event. This economic stake should be emphasized.

- *Analyze the global economic impacts of nuclear and radiological terrorism.* A robust economic analysis on the global consequences of nuclear and radiological terrorism is needed to demonstrate the stake that all countries have in prevention. Studies to date have been largely focused on the impacts of an event on Western capitals and trading ports and most of these are classified. It would be beneficial to have a public analysis of the impact on a non-Western nation.
- *Be clear about the goals of nuclear security.* Some developing nations are concerned that the focus on nuclear security will deny them access to nuclear technology. However, the purpose of nuclear security is to protect the public from uncontrolled releases of radiation stemming from misuse, not to limit technology access. NSS documents have made this point, but it must continue to be emphasized that strong nuclear security is vital to the peaceful use of nuclear technologies by all responsible states and actors.
- *Increase IAEA regular budget allocations for nuclear security and technical assistance.* Large portions of the IAEA's nuclear security and technical assistance programs are funded by voluntary contributions outside of its regular budgeting process. Both programs would benefit from more stable funding from the regular budget. A political compromise should be sought to raise both programs' regular budget allocations.

Building Future Cooperation between Industry, Experts, and Government

- *Take a more comprehensive approach to global nuclear security governance.* There are significant gaps in the national efforts and international instruments that make up the global nuclear security regime. A more comprehensive approach that emphasizes cohesion, transparency, and accountability is needed. An international nuclear security framework agreement is one way to unify the regime and better align national actions with international responsibilities.
- *Consult with the nuclear industry on new governance policies.* Nuclear industry actors play a vital role in global security. Their input and participation in the creation of new policy frameworks is key to ensuring that proposed policy solutions are practical and will result in the outcomes that policy makers intend.
- *Publicize nuclear security principles in action.* Companies that are taking their nuclear security responsibilities seriously should make their actions more widely known to build confidence among the public. The 2014 NSS offers an opportunity for companies to present how they put nuclear security principles into action. The World Institute for Nuclear Security (WINS) could help companies package this information as part of an industry gift basket for the summit.
- *Issue a nuclear industry joint statement on nuclear security.* The 2014 nuclear industry summit offers companies an opportunity to share best practices, initiate dialogue on challenges, and showcase their progress in the field of nuclear security. The lessons learned from this event and the working group activities that precede it should be captured in a

joint statement issued by industry at the conclusion of their summit.

- *Commit to join WINS.* While WINS' membership continues to grow, there are still actors not represented. Participants at the 2014 industry summit should commit to joining WINS. This pledge could be included in a joint statement to demonstrate a commitment to long-term, continued engagement on nuclear security.
- *Encourage industry groups to take a more active role in nuclear security.* Groups such as World Association of Nuclear Operations (WANO), World Nuclear Association (WNA), and WINS are well positioned to lead industry-wide efforts to improve nuclear security. They could facilitate new dialogues on information sharing and transparency and encourage broader acceptance and implementation of Carnegie Endowment for International Peace's (CEIP) Principles of Conduct for Nuclear Exporters.
- *Create regional nuclear security working groups of industry actors.* Industry summit organizers should consider creating regional working groups in the run-up to 2014. These groups may be better suited to develop practical solutions to specific challenges that regions at different stages of nuclear program development are facing than groups organized by topics. All working groups should be encouraged to produce sustainable commitments for the 2014 NSS that demonstrate industry's resolve to keep nuclear materials and facilities secure.

The Nuclear Safety/Security Interface

- *Bring together nuclear safety and security regulators.* Performance-based regulation could help improve the overall safety and security at nuclear facilities. National safety and security regulators should engage each other and their international peers to explore the pros and cons of this approach and to generate new ideas on how this could be accomplished.
- *Investigate methods for broadening the impact of IAEA IPPAS missions.* International Physical Protection Advisory Service (IPPAS) missions are important and useful, but their mechanisms for peer review and information sharing are limited because they are done at the request of states and results are confidential. To broaden the benefits of these missions, the IAEA could offer them to states as well as the option to share lessons learned from the missions.
- *Encourage voluntary reporting on nuclear security activities.* States should establish a new norm, in the absence of formal requirements, to regularly report to the IAEA on their nuclear security efforts. These reports could include guidance on how widely the information should be shared.
- *Support voluntary peer reviews of nuclear security reporting.* States could commit to voluntarily engaging in dialogues with other countries, such as at the NSS or among regional groups, about their nuclear security practices. Though not legally required to supply in-

formation, states could demonstrate a commitment to global nuclear security progress and best practice exchanges by answering questions posed by their peers.

- *Report on how to balance confidentiality and transparency in nuclear security information sharing.* A nuclear security center of excellence, WINS, or a group of countries could offer a gift basket at the 2014 NSS on the appropriate balance of confidentiality and transparency in nuclear security in regard to regular evaluations, peer reviews, and reporting. A technical group could determine what information could be safely shared and its findings tested with computer modeling on an artificial facility. The results could be shared with participants at the 2014 NSS.

Innovating Global Nuclear Security Governance

- *Encourage small groups of states to test nuclear security governance concepts.* Universality is necessary to fully realize strong nuclear security governance objectives, but waiting for all states to move forward together is a recipe for inaction. Instead, encouraging small groups of like-minded states to lead by example and undertake proof-of-concept nuclear security governance projects could help jump-start the process and establish a path toward more ambitious goals. The results of these efforts could be shared and promoted through the IAEA to facilitate long-term universalization.
- *Ensure involvement by top-level nuclear industry executives.* Chief officers should be familiar with their company's nuclear security policies and whether they are being properly implemented. Without top-level attention, nuclear security is unlikely to be highly prioritized within the company structure. These executives should provide assurances to national regulators that security at their facilities is being properly attended to so regulators can confidently carry that message to the international level.
- *Expand on the 2012 national progress reports.* The national progress reports submitted for the 2012 NSS were an important step toward greater nuclear security information sharing. States were free to share whatever they chose about their progress in implementing the summit's objectives, and these reports were posted online. To strengthen their quality and utility, future progress reports could have a common format or be subject to a question and answer exchange with NSS peers. Such dialogue could help introduce peer review into the nuclear security regime.
- *Create a nuclear security statement of principles.* The NSS process lacks a long-term vision. The 2014 NSS could begin to define an end point with a statement of principles for nuclear security; it could even be a restatement of the IAEA's Fundamentals of Nuclear Security. This political document could take many forms, such as a gift basket offered by a few NSS participants or an annex to the communiqué that is open to signature from all states. A target of 25 initial signatories should be sought to help lay the foundation of a document that outlives the NSS process. The statement could facilitate continued innovation in nuclear security and become the core of an international framework convention.

- *Look for governance models outside of the nuclear field.* The twenty-first century governance challenges facing the nuclear security regime are not unique. Other businesses and fields are grappling with similar transnational issues and pursuing innovative ways to deal with them. Nuclear security stakeholders should look for adaptable governance models from fields as diverse as health, aviation, finance, and information technology.
- *Use voluntary regimes to improve performance.* NSS participants should be considering alternative structures that create strong incentives for better regime-wide performance. Financial, reputational, and accreditation incentives have been used in other industries to raise performance above legal mandates.

Maintaining Political Momentum

- *Maintain a high-level political process.* The convening of the NSS process reflects the importance of adding a political dimension to the largely technical issue of nuclear security. Both elements—technical services and political involvement—are necessary to compel progress into the future. If the NSS ends, a forum that continues to foster high-level political support will remain necessary.
- *Offer a nuclear security governance gift basket in 2014.* While not all states may be willing to continue to devote high-level attention to nuclear security, those states that prioritize the issue could offer a nuclear security governance-focused gift basket in 2014. This could establish an informal structure for cooperation among a core group of states willing to lead on this issue. As IAEA members, they could report to the full membership on their efforts to provide input into the broader global system.

NUCLEAR SECURITY: FROM SEOUL TO THE NETHERLANDS

The scope of the Nuclear Security Summit (NSS) has evolved since the process was initiated in 2010. The NSS originally focused only on fissile materials, but now also addresses radioactive source security and the safety and security interface at nuclear facilities. Many consider nuclear security a vital foundation of the global nuclear regime, but it has not been as prominent a discipline as nonproliferation or nuclear safety. However, progress on nuclear disarmament, nonproliferation, and peaceful use are predicated on adequate security structures keeping the material and related equipment protected. In this way, nuclear security underpins, but is separate from, the Nuclear Non-Proliferation Treaty (NPT) and its politics related to nuclear weapons “haves” and “have nots.” There is an opportunity for the 2014 Netherlands NSS to build on the evolving concept of nuclear security and to build public confidence in the safe and secure uses of nuclear and radiological materials. Education and communication outreach to journalists, the public, and countries outside of the NSS process also should be key elements of any engagement strategy.

The first NSS held in Washington in April 2010 focused on quickly securing highly enriched uranium (HEU) and plutonium. In the 2010 communiqué, leaders from 47 countries and three international organizations endorsed a four-year goal to secure all of the world’s vulnerable nuclear materials. This ambitious objective was first articulated by U.S. President Barack Obama in his April 2009 Prague speech that laid out his vision for a nuclear weapon-free world. The 2010 Washington summit lightly touched on radiological material security, but the issue remained outside its official scope.

The primary focus of the 2012 Seoul NSS remained on fissile materials, but its agenda was broadened to better reflect the interests of the 53 countries and four international organizations that participated. The Fukushima nuclear accident occurred during preparations for the 2012 NSS and generated new concerns about the safety and security of nuclear facilities and materials. As a result, the nuclear safety and security interface issue was integrated into the 2012 NSS planning scope. Also, pressure from some participants to include radioactive source security in the agenda led to its more thorough treatment at the 2012 summit. Nonproliferation, disarmament, and country-specific nuclear programs (e.g. Iran and North Korea) have largely remained outside of the summit process as these issues already have established forums for discussion, and it was

believed they would detract from consensus building around strengthened nuclear and radioactive source security measures. The upcoming summit's agenda is expected to be similar to the 2012 summit's scope.

Political commitments contained in the 2012 summit's consensus communiqué were the result of six meetings between participant governments' representatives, known as Sherpas and sous-Sherpas. Two important target dates were set for taking additional action. The NSS participants committed to releasing national action plans on minimizing HEU by 2013 and to work to ratify the 2005 amendment to the Convention on the Physical Protection of Nuclear Material (CPPNM) by 2014. In addition, approximately 100 national commitments ("house gifts") and 13 joint statements ("gift baskets") were offered in Seoul, including commitments on nuclear material removal, reactor and isotope production conversion research projects, and capacity building exercises and training. All participants submitted nuclear security progress reports that served as *de facto* implementation review mechanisms on concrete achievements since the 2010 NSS.

Two parallel non-governmental events also were convened: an expert symposium and a nuclear industry summit. The 2012 Nuclear Security Symposium for the expert community was co-hosted by the Korea Institute of Nuclear Nonproliferation and Control (KINAC) and the Institute of Foreign Affairs and National Security (IFANS). KINAC and IFANS assembled approximately 300 nuclear security experts for the event. The 2012 Nuclear Industry Summit was hosted by Korea Hydro and Nuclear Power (KHNP). While the 2010 industry summit was chiefly a gathering of chief executive officers (CEO), the 2012 meeting benefited from the advanced efforts of three working groups on HEU minimization, nuclear information security, and the interface of nuclear safety and security. The working group outcomes formed the basis for a joint statement which was released at the industry event.

The South Korean hosts of the government, experts, and industry summits faced important challenges in making the NSS relevant to their citizens. The South Korean public overwhelmingly associates nuclear threats with their nuclear weapon-armed neighbor, North Korea. Governmental communication and educational outreach linked the transnational nature of the nuclear and radiological terrorism threat to the potential economic impacts for South Korea and the global economy. Data from the IAEA illicit trafficking database was used to demonstrate that this threat is not abstract; there are non-state actors attempting to obtain nuclear and radiological material on the black market. Organizers also emphasized the responsibilities that countries and operators have to protect the public when using nuclear technology. A connection was drawn between nuclear accidents and nuclear incidents. They described how the crisis at the Fukushima plant, which resulted from natural disasters, could similarly have been triggered by an act of sabotage if strong nuclear security measures were not in place. Notably, Korean summit officials found that arguments focused on domestic implications resonated much better with their public than those focused on nuclear terrorism's transnational implications.

The Netherlands summit will be the third NSS with a fourth one scheduled for Washington in 2016. Experts are encouraging leaders at the 2014 NSS to factor the need for stronger global nuclear security governance into their decision making. As planning for the summit begins, there are important lessons learned from the previous summits that should be considered.

RECOMMENDATIONS

- *Leadership of the summit host government is critical.* The hosts of future summits need to be clear about their obligations and expectations. In addition to the Sherpa and sous-Sherpa, a dedicated staff is necessary to address summit planning issues. Strength of purpose and a commitment to clear results must be demonstrated by all government participants.
- *Defining the scope is essential.* The 2010 NSS limited the scope of the summit to HEU and plutonium, but the 2012 meeting expanded the agenda to include radiological material and the nuclear safety and security interface at facilities. This expanded platform provides a stable foundation for the nuclear security agenda going forward and issues relevant to a larger number of countries inside and outside of the NSS process, especially those that do not possess any fissile material.
- *The summit vision should be ambitious, but near-term products should be concrete and measureable.* President Obama's four-year goal provided a broad vision for the future to catalyze the attention of heads-of-state at the summits. With the four-year effort ending, a new vision is needed. However, step-by-step progress remains important, and the house gifts and gift baskets provide a means of combining ambitious vision with tangible, near-term action.
- *Patiently manage different country perspectives while maintaining focus.* Different countries have different threat perspectives and visions for the future. This fact needs to be accommodated in order to reach agreement on the official documents. It is not an excuse for inaction.
- *Determine and prioritize the summit's goals.* If the goal is to build consensus around nuclear security issues, focus should be on negotiating the strongest possible consensus communiqué. If the goal is to achieve as many concrete actions and demonstrable programs as possible, then it is better to focus on developing house gifts and gift baskets around ideas where consensus is not required.
- *Include all stakeholders.* Non-governmental organizations (NGO) and the nuclear industry should be partners in the process of measuring risk and setting expectations for nuclear security. Globally inclusive forums, particularly those organized by the IAEA, should be used to help engage the full scope of countries.
- *Engage often with journalists in the lead up to the summit.* The issue of nuclear security is not well understood by most journalists and is often confused with nonproliferation and nuclear safety. Journalists are important both for communicating news and translating highly technical information into understandable language for a non-technical audience. The NSS host country should use nuclear security related events already taking place around the world to educate journalists on why nuclear security is important. This will help them understand the significance of the summit and its outcomes. Organizers at the 2012 NSS held formal briefings, screened movies, and launched an official website.

They even commissioned a Korean pop star to perform an official summit theme song. An understanding of the issues must be developed in advance of the summit because once journalists are on the ground their attention will be mainly directed to the actions of the leaders.

- *Avoid providing overly technical information to the public and media.* Communication outputs must be digestible to those not steeped in the technical details of this issue to be effective. Journalists are telling the story of the summit to the public and they cannot do this with only technical materials. Summit accomplishments need to be placed in a societal context that conveys why this issue, which does not normally drive headlines, warrants personal attention from world leaders.

TECHNICAL AND POLICY INITIATIVES WITHIN THE NSS

With diversified interests but a common objective, NSS countries have pursued a range of technical and policy initiatives to advance global nuclear security. Some actions have been nationally focused while others involve groupings of like-minded states. The 2012 summit's innovation of encouraging multilateral commitments in the form of "gift baskets" created a new pathway for small groups of states to take bolder steps forward. More ambitious house gifts and gift baskets should be developed for the 2014 NSS among countries and the other stakeholders. Some baskets could involve demonstration projects that are conducted ahead of time with their results reviewed at the summit.

Highly Enriched Uranium. HEU is the easiest type of fissile material to fashion into a crude gun-type bomb. Therefore, special precautions need to be taken by those who possess it, regardless of whether that material is enriched to 20, 40, or 90 percent. The 2012 Seoul Communiqué encouraged states to minimize the use of HEU and announced a voluntary, specific action plan for how they would do this by the end of 2013. The communiqué also recommended the conversion of HEU-fueled reactors to low-enriched uranium (LEU) fuel and the preferential use of LEU in commercial applications, such as medical isotope production, whenever possible.

Some of the most meaningful steps toward HEU minimization at the 2012 summit came in the form of house gifts and gift baskets. Several countries pledged to repatriate HEU in their territories to its country of origin. Belgium, France, the Netherlands, and the United States committed to support the conversion of European medical isotope production to non-HEU-based processes by 2015. In a second HEU-focused gift basket, Belgium, France, South Korea, and the United States committed to cooperating on a project to produce high-density LEU fuel to facilitate the conversion of more research reactors from HEU to LEU fuel. Despite these important steps, work remains to be done in Belarus, Russia, and South Africa, which have exhibited various degrees of resistance to conversion measures.

The summit's focus on civilian HEU is not meant to validate the use of HEU for weapons. Civilian materials are often stored in less secure locations than military HEU and, therefore, are more vulnerable to theft. Consolidating HEU to the fewest, most secure locations possible can save money and increase global security. Entry into force of the 2005 CPPNM amendment would

greatly assist HEU consolidations, security, and repatriation efforts. The 2012 communiqué urged countries to accelerate their domestic approval processes so that the amendment could be brought into force by 2014. It also recognized the need for effective national inventory management and tracking mechanisms.

Separated Plutonium. The NSS process has not addressed in detail the dangers of separated plutonium. The 2010 and 2012 NSS communiqués merely noted it “requires special precautions” and encouraged states to consider timely removal and disposition of this material when no longer in use. However, President Obama used the Seoul NSS as an opportunity to elaborate on a U.S. plutonium policy. In comments at Hankuk University before the summit, he said, “We simply can’t go on accumulating huge amounts of the very material, like separated plutonium, that we’re trying to keep away from terrorists.” Italy, the Netherlands, and Sweden all pledged to give up small stocks of separated plutonium at Seoul.

While critics argue there are legitimate research reasons to keep small quantities of separated plutonium, sound management practices are critical. The IAEA offers Plutonium Management Guidelines (INFCIRC/549), but not all states with plutonium have agreed to them. Only nine states have declared their plutonium holdings to the IAEA annually, and some of these reports are incomplete.¹ Total civilian holdings of separated plutonium are approximately 250 MT and expected to rise. Limiting the number of locations at which the material is stored and reprocessed are important elements of good management practices.

Additionally, the lag time between plutonium production and use is problematic. While a hard cap on production is anathema for some nations, better matching production and use is an important concept that should be more widely implemented.

Drawing down plutonium stockpiles through use in mixed oxide (MOX) fuel is one option being pursued by Russia and the United States and applied in Europe and Japan. Some experts believe the G-8 should encourage the use of MOX fuel in more reactors to demonstrate it as a viable way to more broadly deal with accumulated plutonium stockpiles. Nearly every reactor in the United States can handle the fuel, and there is a facility currently under construction to produce it. However, the challenge in the United States has been finding customers for MOX fuel because of its expense, including licensing and reactor adaptation costs. Determining how best to deal with the plutonium accumulated by Japan, Russia, the United Kingdom, and the United States continues to be a difficult issue.

Radioactive Sources. While the importance of improving radioactive source security is increasingly recognized by NSS countries, the issue is not a global priority. In the 2012 communiqué, states encouraged widespread ratification of the International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT), implementation of IAEA radioactive source recommendations, and strengthened national management strategies. Germany spearheaded a gift basket on radioactive sources, which noted the importance of sound management strategies for “end of life issues” associated with these sources. Some international cooperation is taking place on a volun-

¹ These states are Belgium, China, France, Germany, Japan, Russia, Switzerland, the United Kingdom, and the United States.

tary basis, including security upgrades, detection, interdiction, recovery, and training of personnel. Morocco, France, Australia, and the United States are active in this area.

The U.S. National Nuclear Security Administration (NNSA) is also taking steps to increase the barriers to radiological terrorism. NNSA has worked with several domestic hospitals and food irradiators to increase the security of the radioactive sources that are vital to their operations. NNSA helps identify and install new physical barriers and works with local law enforcement to better prepare them to respond to a threat. Their program could be applied around the world; upgrades cost approximately \$320,000 per medical facility.

The 2014 NSS may wish to advance the radiological security agenda by recommending alternatives to technologies that use high-activity radioactive sources whenever possible. There is already research underway on this issue and more demonstration projects would be helpful.

Regulatory Cooperation. International cooperation and transparency among national nuclear regulators is limited. Only 13 of 32 countries with weapons-usable nuclear materials publish their regulations and annual reports. The 2012 communiqué noted the critical role that nuclear regulators play in promoting a strong nuclear security culture, sound facility management, and robust legal frameworks to prevent and respond to potential emergencies. Safety regulators meet on the margins of the IAEA General Conference each year, and a similar option is being explored for security. The session on nuclear security regulators held at the 2012 IAEA General Conference could become a regular gathering.

The IAEA could also play a larger role in bringing regulators together. It should consider publishing a best practice guide for regulators. The World Institute for Nuclear Security (WINS) could assist with this task. In addition, there is a need to stop addressing issues of transparency conceptually and to start producing examples of documents on hypothetical facilities to show regulators the type of information that they could be publishing to increase confidence and effectiveness through greater transparency.

At the 2012 NSS, the United States pledged to convene the first meeting of international nuclear regulators in December 2012. Topics of discussion at this event included the nuclear safety and security interface, design basis threat assessments, personnel reliability and training, cyber security, and other activities relevant to enhancing regulatory approaches for civilian facility security. The engagement process going forward could regularize this event and explore more interactive peer review opportunities for regulators. The European Association of Nuclear Regulators is one group that may be well-suited to lead such efforts, perhaps even offering it as a 2014 NSS gift basket. The group was created to conduct best practice exchanges and could help countries think through regional approaches to nuclear security regulation.

Regional Approaches. The NSS process has not fully explored the potential of regional approaches for making progress on building a stronger nuclear security regime even though many of the new countries developing or expanding nuclear programs are located in the same regions. Working with regional partners from the outset would help ingrain strong cultural norms of safety, security, and cooperation region-wide. This ultimately would make all countries safer, in-

cluding neighboring countries that do not possess fissile material but would be affected by an accident or incident in the region. Countries without materials in the region should be engaged on issues of nuclear transport and counter-smuggling. Existing multilateral groups, such as the G-8 Global Partnership against Weapons and Materials of Mass Destruction (Global Partnership), can be useful for such regional efforts. States that participate in Nuclear Weapon Free Zones may also be targets for engagement since they have already bought into one form of nuclear material control and may be willing to expand.

While regional consolidation of radioactive materials may not be feasible, there is space for practical collaboration on transport and storage management best practices. In Southeast Asia, there is already a well-received regional strategy for radioactive source security underway. NNSA and the U.S. Congress are interested in creating regional zones of radiological security with interested partners around the world.

In the European Union (EU), countries collaborated after Fukushima to conduct nuclear reactor stress tests. Details on how the results of the safety and security tests will be integrated into EU guidance or a new directive could be made into a gift basket in 2014. The EU is also pursuing regionally focused outreach and capacity building through its chemical, radiological, biological, and nuclear (CRBN) centers of excellence action plan. These CBRN center projects are just now beginning to be implemented. NSS countries should consider how these regional models and concepts could be applied to other summit topics, particularly using gift baskets.

RECOMMENDATIONS

- *Report on progress toward meeting HEU commitments.* Several countries signed joint statements to initiate collaborative research projects focused on transitioning away from civil uses of HEU. Though these projects will likely not be completed before the 2014 summit, progress reports should be provided at the event on achievements to date.
- *Bring the 2005 CPPNM amendment into force.* Full implementation of the existing elements of the international nuclear security regime has been a core focus of the summit process. Leaders should ensure that their governments complete all necessary national procedures for approving the 2005 amendment prior to the 2014 NSS to meet one of the basic goals of the Seoul Communiqué.
- *Better align plutonium production with its use.* An internationally recognized hard cap on global plutonium separation is unlikely to gain universal support, but production management processes can be improved. National strategies for matching plutonium use with its production to avoid further stockpile accumulations should be pursued.
- *Increase the barriers to radiological terrorism.* Radioactive sources are vital to the operation of medical industrial sectors around the world. However, these sources are not adequately protected and local law enforcement personnel may be unaware of their existence in their jurisdiction and how to most effectively respond if a threat arises. The U.S. NNSA offers a range of physical barrier upgrades and training programs that can

help radioactive source holders and law enforcement officials enhance their preparedness to fend off security threats.

- *Encourage the use of technologies that do not use high-activity radioactive sources whenever possible.* National policies should favor the use of alternative technologies to those relying on high-activity radioactive sources whenever possible. Summit participants could present demonstration projects of such technologies as house gifts at the 2014 NSS.
- *Hold annual dialogues for international nuclear regulators.* The first international nuclear regulators' conference was held in December 2012. This event was a good first step. However, to truly improve regulator performance across borders through best practice exchanges, it should be made more interactive and held on a regular basis. A pledge to take the lead in regularizing the event and enhancing its agenda could be offered as a gift basket at the 2014 NSS.
- *Explore regional approaches to nuclear security advancement.* The NSS has concentrated on consensus-based communiqués but regional groupings may be better suited for delivering near-term results. New nuclear power development is largely concentrated in regional clusters. These countries and their neighbors share similar cultures and have direct interests in the nuclear security practices of states on their borders. Encouraging region-wide dialogues among these states could build confidence in national programs, prepare for emergency response, and counter nuclear smuggling.
- *Create regional radiological security zones.* States should consider working with other nations in their region to generate new ideas about radiological tracking, disposal, and physical security. They should pursue region-wide implementation of measures they determine are best suited to their circumstances. Assistance from outside the region, such as from the NNSA, could help make these zones a reality.
- *Develop new EU guidance or a directive on nuclear security.* The EU completed and published reports on the results of the nuclear safety and security stress tests conducted in the aftermath of the Fukushima accident. The EU should consider offering a gift basket at the 2014 NSS that provides details on how the lessons learned will be integrated into EU guidance or a new directive and what lessons may be applicable to other countries and regions.

PERSPECTIVES ON NUCLEAR SECURITY: EMERGING ECONOMIES AND THE NON-ALIGNED MOVEMENT

Countering nuclear security challenges should involve a full range of global actors. Economic, rather than threat-centric, arguments are better suited to bringing new countries on board. The expansion of the NSS agenda beyond fissile materials to include the security of nuclear facilities and radioactive sources provides a more sustainable foundation for moving the agenda forward with broader support. Old logic about nuclear terrorism's irrelevance to certain regions will likely persist if the focus is limited to fissile materials associated with nuclear weapons. Rather, engagement should be framed as countries taking responsibility beyond the rules to protect the continued peaceful use of nuclear technology. Creating safe and secure nuclear power systems that are protected against sabotage is a point of shared interest between the developing and developed worlds. Developing a better understanding of the global economic impacts of a nuclear or radiological terrorist event could help countries better understand their stake in its prevention.

Divergent threat perceptions will always complicate efforts to address transnational issues. With nuclear and radiological terrorism, this issue is further compounded by the perception that the United States and its allies are trying to impose their priorities on developing countries that would prefer to focus on local challenges. States without nuclear facilities, materials, or experience with terrorism resist making the prevention of nuclear terrorism a priority, despite warnings of dire global economic impacts. This disconnect is further exacerbated by the perceived hypocrisy of the United States and other nuclear-weapon states given their large stockpiles of nuclear materials and weapons.

Beyond that difference in perceptions, developing states worry that more aggressive nuclear security actions will be used to block their access to nuclear technology. They already believe efforts to enforce the NPT are too skewed toward nonproliferation without enough emphasis on disarmament or assistance with peaceful uses of nuclear technology. Some countries feel strict control systems for dual-use technologies are aimed at limiting access, not preventing misuse. However, the nuclear security agenda is about erecting barriers to uncontrolled releases of radiation, not limiting access to technology. The 2012 communiqué explicitly states, “Measures to

strengthen nuclear security will not hamper the rights of States to develop and utilize nuclear energy for peaceful purposes.”

Progress on nuclear security will require avoiding NPT politics as much as possible. A letter from Egypt on behalf of the Non-Aligned Movement (NAM) to the United Nations in April 2012 provides a potential jumping-off point for dialogue with NAM countries on nuclear security. However, some experts warn that pursuing nuclear security dialogues through a NAM framework could create more problems.

It is important not to think about NAM as a monolithic group of actors, despite its common statements, but rather as a diverse group. Not all NAM states agree with these pronouncements, as demonstrated at IAEA Board of Governors meetings, when extreme statements about the Iranian nuclear program are read on behalf of NAM but followed by contradicting national statements from member countries. Too often the extreme wing of NAM speaks for the group, but even moderate countries see budget allocations at the IAEA as a zero-sum game and view increasing funding at the agency for nuclear security as a potential threat to funding for technical cooperation. There is room for compromise here, particularly by increasing the portion of both programs’ funding that comes from the regular IAEA budget. This option has been discussed within the IAEA to no avail as of yet. However, if compromise were achieved the dynamics of the agency and its members could change for the better.

New nuclear security leaders and champions are needed, particularly from middle powers and emerging economies. Focusing on threat assessments with these countries will not convince them of the utility of the nuclear security agenda. Instead, advocates for a stronger nuclear security system need to make arguments about the economic imperative of strengthening the global system. Unfortunately, there is an absence of economic analysis on the global consequences of nuclear and radiological terrorism. A specific analysis of what impact nuclear terrorism would have on the global economy could help make the nuclear security challenge more relevant for more countries. It could also help countries better understand their stake in prevention. Any country’s involvement in the nuclear security agenda must be based on national interest, not to block alignment, to be sustainable.

According to some experts, the IAEA Nuclear Security Guidance Committee has contributed to a positive shift in attitude among many IAEA members. Within the NSS process, the dual-tracks of a consensus communiqué and supplemental house gifts and gift baskets have allowed for a level of collective progress that also gives a pathway forward to countries who want to move faster. These additional commitments show that some countries are willing to go beyond the status quo and take on new leadership positions, such as the Indonesian gift basket on national legislation implementation. Such actions should be applauded and nurtured. However, new leaders will be most effective if they are not seen as proxies for the United States or Western states, and it must be made clear they are acting in their own national interests in recognition of a global threat.

Countries also can take steps to improve their nuclear security without even realizing it. For example, China shut down three nuclear power plants ahead of the Beijing Olympics to limit the potential for nuclear accidents or terrorist attacks. The Chinese framed their action as a nuclear

safety measure, but it also had clear security implications. If countries better understood the broad array of activities that fall under the nuclear security definition, they may find that improvements are already part of their national planning.

RECOMMENDATIONS

- *Encourage prioritization of nuclear and radiological security by all states.* Not all states have nuclear facilities, materials, or experience with terrorism, but this does not make them immune to the global economic impacts of a nuclear terrorist event. This economic stake should be emphasized.
- *Analyze the global economic impacts of nuclear and radiological terrorism.* A robust economic analysis on the global consequences of nuclear and radiological terrorism is needed to demonstrate the stake that all countries have in prevention. Studies to date have been largely focused on the impacts of an event on Western capitals and trading ports and most of these are classified. It would be beneficial to have a public analysis of the impact on a non-Western nation.
- *Be clear about the goals of nuclear security.* Some developing nations are concerned that the focus on nuclear security will deny them access to nuclear technology. However, the purpose of nuclear security is to protect the public from uncontrolled releases of radiation stemming from misuse, not to limit access to technology. NSS documents have made this point, but it must continue to be emphasized that strong nuclear security is vital to the peaceful use of nuclear technologies by all responsible states and actors.
- *Increase IAEA regular budget allocations for nuclear security and technical assistance.* Large portions of the IAEA's nuclear security and technical assistance programs are funded by voluntary contributions outside of its regular budgeting process. Both programs would benefit from more stable funding from the regular budget. A political compromise should be sought to raise both programs' regular budget allocations.

BUILDING FUTURE COOPERATION BETWEEN INDUSTRY, EXPERTS, AND GOVERNMENT

Cross-sector engagement between NGOs, the nuclear industry, governments, and international organizations is critical because each offers unique and complementary capacities. NGOs are often innovative, politically neutral, and can make connections that others miss. Industry controls resources and on-the-ground decision making about facilities and materials. Industry also has practical experience with how facilities function and operate within legal constraints and regulatory frameworks. Governments are accountable to the public and their legislatures. They have larger relationship dynamics to consider and possess intelligence that cannot be widely shared. International organizations act as coordinators and force multipliers as well as offering specialized expertise, but they can only do what is asked of them and require outside resource commitments to function. There needs to be semipermeable barriers and regular dialogues among the stakeholder communities. Collaboration by these sectors at and around the 2014 NSS would be an important step toward showing the public that actors within the nuclear security system are working together to capitalize on each sector's strengths and protect the public.

The 2010 governmental, expert, and industry summits took place within their own spheres with few connections between them. In 2012, the events were more closely coordinated; unfortunately, the industry and expert events were held at the same time in different locations, preventing cross-sector attendance. They also took place the weekend before the governmental summit thereby impeding interactions with officials because most delegations had either not yet arrived or were busy with their own meetings.

Many experts who were active in the 2010 and 2012 expert symposiums are advocating a more proactive approach to global nuclear security governance. “Innovating nuclear security governance” was one of the key themes explored at the 2012 symposium. Assessing the current nuclear security architecture has left many with the impression that the current patchwork of instruments does not provide coverage commensurate with the threat. A more comprehensive approach is needed that includes greater transparency, accountability, and cohesion. Support in the NGO community is growing for baseline security standards, universalization of the existing regime structures, and HEU and plutonium guidelines. An international framework agreement is one

proposal for linking countries' nuclear security efforts with international instruments and with their responsibilities to the public. Potential articles for a framework agreement are currently being drafted by a South Korean think tank.

Government and international organization actors remain wary of proposals for a global convention that goes beyond current international agreements. The unevenness of the current regime is not disputed, but states are reluctant to agree to a stronger unifying instrument. Their primary concerns are political in nature. National sovereignty issues are one important reason for this hesitancy, along with difficulty of encouraging all nations to accede to or ratify the less expansive instruments of the current regime, ICSANT and the CPPNM amendment. The price for raising the bar on nuclear security is another concern, primarily for governments and industry.

“Industry” is the shorthand for several different nuclear sectors that are neither monolithic nor driven by the same interests. There are government-run market participants and commercial actors associated with fuel cycle facilities, nuclear power plants and utilities, transportation services, storage and material management, research reactors, and medical isotope production. There are educational and research actors who deal with research reactors, labs, critical assemblies, and other equipment. Some are civilian facilities, but others are non-civilian, such as the national laboratory contractors and naval fuel cycle facilities. The government-run market participants have different profit motives and are more affected by policy concept changes than the commercial actors who are compliant with laws and regulations but market driven.

The IAEA and international policy frameworks established by conventions and treaties guide national policies and regulatory frameworks all the way down to the site level. Site-level management encompasses company policies that are ideally informed by widely accepted best practices. It is important to include industry in developing policy frameworks because what goes into them will ultimately filter down and be their responsibility to implement.

There are several items that industry wants in a governing framework, including predictability, stability, and an even playing field. It wants defined and shared responsibility, an understandable basis for actions, and preservation of the technical base and capabilities. Industry also seeks to provide input into policy.

Early and frequent engagement with industry is critical for gaining buy-in to new policies. It creates a sense of participation and clearly defines a role in the solution. It acknowledges that operators are the implementers of policy and therefore key national security actors. The conventional wisdom is that as a result of past nuclear accidents, there is a more deeply entrenched culture of safety than of security in industry. Some believe that industry views safety as its responsibility but sees security primarily as the responsibility of governments or law enforcement. Shifting the perspectives of industry actors who take this view is important. While many companies do take their role in nuclear security seriously, as proven by investments of time and money in protection, most experts agree that this sense of responsibility varies from country to country. To build confidence among the public, companies could make presentations or handouts on nuclear security principles “in action” for the 2014 NSS. Companies should tell their story and perhaps craft this and other ideas into house gifts and gift baskets offered by the nuclear industry.

The agenda for the 2014 industry summit will likely be very similar to that of the Seoul Summit. While it will be held in the Netherlands, technical tours may take place outside of the country, with the goal of broadening the event to the European community. The Dutch company URENCO in collaboration with international partners is planning the industry summit. It aims to build on the results of the previous two industry and governmental summits, as well as to use the event as a platform for the entire nuclear industry to discuss and showcase progress in the field of nuclear security. The industry summit organizers hope to produce a common statement at the summit that can support the governmental summit efforts.

The industry summit likely will focus on three topics—strengthening self-control mechanisms, cyber security, and material security. However these topics could be supplemented with other actions. For instance, nuclear security culture and transparency dialogues at the operator level could be spearheaded by industry, perhaps with the assistance from the World Association of Nuclear Operators (WANO). Industry could commit to explore new information, sharing ideas with WINS, WANO, and the World Nuclear Association (WNA). It could build on the Carnegie Endowment for International Peace’s (CEIP) Principles of Conduct for Nuclear Exporters that includes provisions on physical protection for accessing technology. Moreover, the industry summit’s joint statement could include a commitment of all signatories to join WINS.

Some companies feel that they are held back from further action by fear of how regulators will react to their efforts. Similar feelings were expressed in the post-Fukushima report by the Japanese utility TEPCO when considering why more was not done to proactively improve safety. This should be a warning flag. Operators should not be satisfied with “lowest common denominator” solutions imposed on them. Pursuing regional models for progress may be one way to raise the performance bar in a practical manner. This could be facilitated by organizing the industry summit’s working groups on regional levels. Sustainable commitments to further demonstrate industry’s resolve to keep nuclear material and facilities safe and secure should be produced at the 2014 NSS.

RECOMMENDATIONS

- *Take a more comprehensive approach to global nuclear security governance.* There are significant gaps in the national efforts and international instruments that make up the global nuclear security regime. A more comprehensive approach that emphasizes cohesion, transparency, and accountability is needed. An international nuclear security framework agreement is one way to unify the regime and better align national actions with international responsibilities.
- *Consult with the nuclear industry on new governance policies.* Nuclear industry actors play a vital role in global security. Their input and participation in the creation of new policy frameworks are key to ensuring that proposed policy solutions are practical and will result in the outcomes that policy makers intend.
- *Publicize nuclear security principles in action.* Companies that are taking their nuclear security responsibilities seriously should make their actions more widely known in order

to build public confidence. The 2014 NSS offers an opportunity for companies to present how they put nuclear security principles into action. WINS could help companies package this information as part of an industry gift basket for the summit.

- *Issue a nuclear industry joint statement on security.* The 2014 nuclear industry summit offers companies an opportunity to share best practices, initiate dialogue on challenges, and showcase their progress in the field of nuclear security. The lessons learned from this event and the working group activities that precede it should be captured in a joint statement issued by industry at the conclusion of its summit.
- *Commit to join WINS.* While WINS membership continues to grow, there are still actors not represented. Participants at the 2014 industry summit should commit to joining WINS. This pledge could be included in a joint statement to demonstrate a commitment to long-term, continued engagement on nuclear security.
- *Encourage industry groups to take a more active role in nuclear security.* Groups such as WANO, WNA, and WINS are well positioned to lead industry-wide efforts to improve nuclear security. They could facilitate new dialogues on information sharing and transparency and encourage broader acceptance and implementation of CEIP's Principles of Conduct for Nuclear Exporters.
- *Create regional nuclear security working groups of industry actors.* Industry summit organizers should consider creating regional working groups in the run-up to 2014. These groups may be better suited to develop practical solutions to specific challenges that regions at different stages of nuclear program development are facing than groups organized by topics. All working groups should be encouraged to produce sustainable commitments for the 2014 NSS that demonstrate industry's resolve to keep nuclear materials and facilities secure.

THE NUCLEAR SAFETY/ SECURITY INTERFACE

The nuclear security regime has expanded primarily in reaction to opportunity and threats. If it were designed from scratch today, an ideal system would balance transparency with confidentiality and national sovereignty with international responsibility. The nuclear security field needs to be more systemized and institutionalized, and its evolution should be informed by nuclear safety experience. Peer reviews, regular evaluations, and reporting are some of the most valuable elements that have facilitated improvement in the nuclear safety regime over time. They are embodied in the Convention on Nuclear Safety (CNS) but are not part of the nuclear security regime. In addition, endorsing the creation of an accreditation system for nuclear security professionals is one option that the 2014 NSS could explore.

The basic objective of both the nuclear safety and security regimes is to protect people from radiation. However, nuclear safety aims to prevent accidents to protect people and the environment, while nuclear security aims to protect people from other people by securing and controlling nuclear materials, facilities, and equipment. The primary stakeholders for nuclear safety include regulators, operators, and international organizations. For security, they are regulators, operators, international organizations, law enforcement, and national security agencies. There are important differences between nuclear safety and security, but a major similarity is the necessity of incorporating nuclear safety and security controls into national laws and regulations.

Until recently, it was rare for safety regulators to have security responsibilities, but this is changing in many countries. Safety and security are more commonly dealt with by the same regulatory agency. Regulator delineation is a legacy that must be worked out through the national level to improve oversight. The separation of safety and security impedes cooperation among regulators. Bringing regulators together in domestic and international dialogues to generate new ideas for performance-based regulations could help improve overall safety and security of facilities.

In addition to national regulators, there is a component of international law in both the nuclear safety and security regimes, with the safety convention more cohesive than the security instruments. Prior to the safety accidents at Three Mile Island and Chernobyl, there was no international nuclear safety convention. Whereas now, CNS has treaty review mechanisms under which parties regularly participate in meetings and report on implementation of convention objectives.

Nuclear security has a few conventions, but no regular implementation review mechanism. A review conference may be requested under the CPPNM by its members, but this has only happened twice since it was adopted in 1979. The most recent was in 2005, during which the convention was amended. There was discussion at that time about including a treaty review mechanism similar to that contained in the CNS, but it was rejected. Another CPPNM conference could be called at any time, but any information exchanges would be done on a voluntary basis.

In the absence of the mandatory reporting and evaluations required by the CNS, the IAEA offers International Physical Protection Advisory Service (IPPAS) missions to member states. These missions involve a team of IAEA experts examining a facility where nuclear materials are held and making recommendations to strengthen its physical protection in accordance with international guidelines and best practices. However, there are basic differences between IPPAS missions and conferences of state parties that make it difficult for this service to serve a similar function. First, countries request IPPAS missions; they are not required to periodically undergo these reviews. Second, the results of CNS reviews are shared among its parties, but the results of IPPAS missions are confidential and shared only between the reviewed-state and the IAEA. This limits IPPAS's potential as a form of peer review and information sharing through which countries can learn from each other's experiences. A closer look at the set up and modalities of IPPAS missions could foster understanding about its potential to evolve in this direction.

There are nuclear security elements in the reporting requirements of other international instruments, but this information is not comprehensive and has not been fully integrated into the nuclear security regime. United Nations Security Council Resolutions (UNSCR), particularly UNSCR 1540, mandate reporting on nuclear security measures in implementation progress reports. Safeguards agreements also produce information beneficial to nuclear security through their assessments of accounting and control processes. In addition, the IAEA Additional Protocol and national export controls were created to prevent proliferation, but they functionally support nuclear security as well.

While there are no legally binding standards for global nuclear security, the IAEA's guidelines serve as voluntary standards. These guidelines are voluntary in principle but they can obtain the force of law when referred to in bilateral or multilateral agreements, as is the case with the physical protection measures contained in INFCIRC 225/Rev.5. Some experts point out that the question is not whether there are binding standards or non-binding guidance, but rather, which is the most effective for sustaining high levels of performance.

One example of non-binding but effective performance results is the Organization for Security and Cooperation for Europe (OSCE). It operates with only political commitments, but effectively deals with sensitive issues. OSCE parties reply to each other's questions on military, human rights, and other issues. They treat commitments to dialogue on these issues as binding, despite not being legally required to supply information. In short, voluntary reporting that is questioned by other parties could be an important step forward in the nuclear security regime, a form of peer review and exchange of best practices that is currently lacking in the system.

Nuclear industry organizations and the IAEA provide far more opportunities for nuclear safety peer reviews than are available for nuclear security. The IAEA manages several databases that contain safety and security information, but there is a much larger volume of data available on safety than security. This does not speak to the quality of the information, but volume is an issue to consider. The IAEA collects information on nuclear security fundamentals that is unclassified and could be shared, but distributing this information would require approval by IAEA members. To circumvent negotiations within the IAEA, states might consider producing regular reports on their steps to improve nuclear security and voluntarily submit them to the IAEA with guidance on how widely the information might be shared with other states. This could demonstrate a new norm that other countries could gradually adopt.

Nuclear security centers of excellence, WINS, or some group of countries could help shed light on the appropriate balance of confidentiality and transparency in a nuclear security information sharing gift basket offered at or before the 2014 NSS. They could commit to determine the continuum of information and confidentiality requirements for each area. A technical group would determine what information would not cross the confidentiality line in regular evaluations, peer review, and reporting. Its conclusions could be tested with computer modeling of an artificial facility and shared in the Netherlands. This would help make clear what nuclear security information could be safely shared without giving away facility secrets.

RECOMMENDATIONS

- *Bring together nuclear safety and security regulators.* Performance-based regulation could help improve the overall safety and security at nuclear facilities. National safety and security regulators should engage each other and their international peers to explore the pros and cons of this approach and to generate new ideas on how it could be accomplished.
- *Investigate methods for broadening the impact of IAEA IPPAS missions.* IPPAS missions are important and useful, but their mechanisms for peer review and information sharing are limited because they are done at the request of states and results are confidential. To broaden the benefits of these missions, the IAEA could offer them to states as well as the option to share lessons learned from the missions.
- *Encourage voluntary reporting on nuclear security activities.* States should establish a new norm, in the absence of formal requirements, to regularly report to the IAEA on their nuclear security efforts. These reports could include guidance on how widely the information should be shared.
- *Support voluntary peer reviews of nuclear security reporting.* States could commit to voluntarily engaging in dialogues with other countries, such as at the NSS or among regional groups, about their nuclear security practices. Though not legally required to supply information, they could demonstrate a commitment to global nuclear security progress and best practice exchanges by answering questions posed by their peers.

- *Report on how to balance confidentiality and transparency in nuclear security information sharing.* A nuclear security center of excellence, WINS, or a group of countries could offer a gift basket at the 2014 NSS on the appropriate balance of confidentiality and transparency in nuclear security in regard to regular evaluations, peer reviews, and reporting. A technical group could determine what information could be safely shared and its findings tested with computer modeling on an artificial facility. The results could be shared with participants at the 2014 NSS.

INNOVATING GLOBAL NUCLEAR SECURITY GOVERNANCE

Nuclear threats are transnational by nature, and in a globalized world, the impact of an event anywhere would be widespread. There is growing recognition that disparate measures to address nuclear security threats need to become more comprehensive, cohesive, and concrete through stronger global governance structures. The concept of nuclear security governance is about making the national and international systems that protect nuclear materials more connected and ever-improving. This includes nuclear security norms, culture, standards, and actors from the private sector, civil society, and governments. Governance principles are not just aimed at the international level. They are also relevant for national systems and are reflected in facility-level structures, mechanisms, and actors. A twenty-first century global nuclear security governance system demands greater assurances, transparency, and information sharing mechanisms at every level.

Both the NSS and the IAEA have been working to universalize the existing nuclear security system with little direct acknowledgement of its significant gaps. There is a need to deepen and broaden today's nuclear security governance structure, but the more ambitious the proposal, the more difficult it is to gain universality. One potential path forward would be for small groups of like-minded states to pursue ambitious objectives while the IAEA moves along its own, universal track before eventually merging the complementary efforts.

Critics of “global governance” claim that it is a simple catch-all phrase without real meaning. They assert nuclear security governance already exists, just in a fragmented state with elements that require strengthening. However, it is precisely this fragmented state—a combination of hard and soft laws and separate initiatives—that make the current regime too fragmented to be as effective as it needs to be. This makes it necessary to rethink governance structures for nuclear security.

The language “global governance” invokes different feelings among countries. The term has traditionally been associated with big powers, but South Korea introduced this concept before the 2012 NSS in order to pull together the full range of nuclear security issues that are operating in many different directions without an overarching set of rules for the agenda. This idea has resonance with many middle power countries that are interested in working through multilateral

frameworks. However, some countries attach negative connotations to the term and feel it implies rules being imposed on them. Regardless of the terminology, the issue is whether there is a cohesive nuclear security policy and if so, whether there is confidence that the policy is being broadly and properly implemented.

Governance is ultimately about accountability. The Australian Prime Minister pointed out at the 2012 NSS: “We need to establish an accountability framework for nuclear security that builds confidence beyond 2014.” A better-defined concept of accountability should come out of the next summit. The term “governance” does not need to appear in the communiqué, but steps need to be taken to build in more confidence at every level of the system. It is important not to hide behind confidentiality and secrecy to avoid providing adequate nuclear security assurances. There is a graduated set of options to consider for improving the nuclear security system that require varying degrees of energy and commitment. It will be important for the NSS to push for options as ambitious as the energy and commitment of states will allow.

The goal is a nuclear security system without weak links. It may be conceptual, but it is a clear objective that will help make this issue relevant and understandable to the public in a way that more technical discussions do not. When thinking about how to eliminate weak links, it is important to consider what each level of the system will be able to provide in terms of assurances.

At the international level, analysis should be done of the treaties, conventions, and other commitments that states make. Assessments should be made of states’ activities and whether they are implementing their commitments.

However, the process also needs to be analyzed from the bottom up. It starts at the facility-level because this is the first critical node from which information must continuously flow upward. Within companies, there is a need to have in place a system that asks the right questions. Whether the chief officer is aware of the nuclear security policies and knows if they are being properly implemented is not easily determined. There needs to be a process for CEOs to provide assurances to national regulators about the effectiveness of the security policies employed at their facilities. This information must give the national regulators adequate confidence that nuclear security is being properly handled so that they can carry that message upward to the international level.

In many ways, this is a risk assessment exercise in response to a lack of confidence in the current system. New forms of transparency and information sharing could be introduced into the nuclear security system. Examples include the employment of checklists, questions and answers, and peer review. One of the best aspects of the 2012 NSS was the national progress reports submitted by countries. This was a step in the right direction that should be expanded upon in 2014 and 2016.

Part of the problem with the current nuclear security system is that the various pieces do not create a coherent image when brought together. ICSANT is under the management of the United Nations and pertains to nuclear and radioactive sources. The CPPNM and its amendment are under the management of the IAEA and pertain only to nuclear materials. They are managed by different agencies, and while this should not impact implementation and integration, it does.

Some experts argue for a broad interpretation of ICSANT authorities as a way to provide full legal coverage for the expanded definition of nuclear security. Article 8 of ICSANT states: “For purposes of preventing offences under this Convention, States Parties shall make every effort to adopt appropriate measures to ensure the protection of radioactive material, taking into account relevant recommendations and functions of the International Atomic Energy Agency.” This language provides a direct link between the legally binding convention and IAEA guidance on protecting nuclear and radiological materials. Therefore, some experts believe that it could be used to say that states already have an obligation to implement the IAEA’s nuclear and radiological security guidance, and the 2014 NSS should explicitly recognize this.

However, others believe that Article 8 is too vague to be used in this way. Even if a broader interpretation was envisioned by ICSANT’s drafters, it leaves ample loopholes. Furthermore, even with a broad interpretation of Article 8, ICSANT mainly enumerates post-event response measures, not preventative steps. The universal ratification of ICSANT, combined with an amended CPPNM, would provide fuller coverage of nuclear and radiological materials, but it would not be comprehensive or make IAEA recommendations universally binding.

The NSS process has provided the nuclear security issue a unique window of opportunity that will not remain open much longer. The summit process has been moving incrementally forward without a long-term vision. An initial step toward defining an end point could be an annex to the 2014 communiqué or a gift basket that is a statement of principles for nuclear security objectives, including transparency and greater assurances that actions are being taken in accordance with IAEA guidance. It could even be a restatement of the IAEA’s Fundamentals document. Such a statement would be a political document. It would counter criticisms about NSS selectiveness and be open to signature by all states. This could ultimately provide the core of an international framework convention for nuclear security.

The IAEA will remain central to the nuclear security agenda, but countries that have particular interests can also take additional steps outside the agency framework. Like-minded states could work together on this nuclear security statement of principles. A target of 25 countries could be sought, including some states without nuclear materials that would be willing to sign if it were open to all. In short, the document would outlive the NSS process, involve all sector stakeholders, and allow them to continue innovating on the issue. Non-universal groups are not ideal, but they may be necessary in the short-term.

Attention should be paid to how other transnational issue forums operate. At the last World Economic Forum, participants judged the lack of economic governance as a critical challenge to the international community. Other fields have done a better job of incorporating governance principles into their business operations than the field of nuclear security. Fields as diverse as health and aviation have instituted reports, rules, and inspections that nuclear security stakeholders could learn from. Voluntary incentive regimes have been used in a variety of industries to encourage continuous improvement with financial, reputational, and accreditation benefits. The NSS should also be thinking about structures that can be put in place to provide incentives for stronger industry- and regime-wide performance into the future.

RECOMMENDATIONS

- *Encourage small groups of states to test nuclear security governance concepts.* Universality is necessary to fully realize strong nuclear security governance objectives, but waiting for all states to move forward together is a recipe for inaction. Instead, encouraging small groups of like-minded states to lead by example and undertake proof-of-concept nuclear security governance projects could help jump-start the process and establish a path toward more ambitious goals. The results of these efforts could be shared and promoted through the IAEA to facilitate long-term universalization.
- *Ensure involvement by top-level nuclear industry executives.* Chief officers should be familiar with their company's nuclear security policies and whether they are being properly implemented. Without top-level attention, nuclear security is unlikely to be highly prioritized within the company structure. These executives should provide assurances to national regulators that security at their facilities is being properly attended to so regulators can confidently carry that message to the international level.
- *Expand on the 2012 national progress reports.* The national progress reports submitted for the 2012 NSS were an important step toward greater nuclear security information sharing. States were free to share whatever information they chose about their progress in implementing the summit's objectives, and these reports were posted online. To strengthen their quality and utility, future progress reports could have a common format or be subject to a question and answer exchange with NSS peers. Such dialogue could help introduce peer review into the nuclear security regime.
- *Create a nuclear security statement of principles.* The NSS process lacks a long-term vision. The 2014 NSS could begin to define that vision with a statement of principles for nuclear security; it could even be a restatement of the IAEA's Fundamentals of Nuclear Security. This political document could take many forms, such as a gift basket offered by a few NSS participants or as an annex to the communiqué that is open to signature from all states. A target of 25 initial signatories should be sought to help lay the foundation of a document that outlives the NSS process. The statement could facilitate continued innovation in nuclear security and become the core of an international framework convention.
- *Look for governance models outside of the nuclear field.* The twenty-first century governance challenges facing the nuclear security regime are not unique. Other businesses and fields are grappling with similar transnational issues and pursuing innovative approaches to deal with them. Nuclear security stakeholders should look for adaptable governance models from fields as diverse as health, aviation, finance, and information technology.
- *Use voluntary regimes to improve performance.* NSS participants should be considering alternative structures that create strong incentives for better regime-wide performance. Financial, reputational, and accreditation incentives have been used in other industries to raise performance above legal mandates.

Maintaining Political Momentum

There are two more scheduled Nuclear Security Summits: one in The Hague in 2014 and the other in Washington in 2016. The Washington summit likely will end this process, but high-level political attention to the nuclear security issue needs to endure. The major aims of the summit process up to this point have been to secure all vulnerable nuclear materials in four years and empower existing nuclear security initiatives and instruments. But the four-year objective was always somewhat vague and the current regime instruments allow significant gaps to exist and persist. In assessing the opportunities in 2014, 2016, and beyond, countries will need to objectively assess if the summit process has made significant improvements in the prevention of nuclear terrorism and global nuclear security. In making this decision, they should evaluate the threat environment, consider the consequences of a nuclear terrorist act, and determine if they are satisfied with the preparations that they have made to prevent this catastrophe. They should consider if the shortcomings of the existing nuclear security governance structures have been adequately strengthened and how political will to continue to improve the system will be maintained.

If the summit process ends in 2016, there are several options for how political commitment can be maintained. One option is to downgrade participation to the ministerial level. This would garner less global attention and action and could cause confusion in some states about which official should represent them. Another alternative might be to hold future summits further apart or on an ad hoc basis but with the same level of representation. A process for convening future summits would need to be agreed upon, perhaps involving a secretariat made up of past NSS chairs. Others have suggested broadening the summit's agenda topics to include more developing world priorities, such as nuclear disarmament. However, disarmament already has its own international forum.

Still another alternative would be to integrate the NSS agenda into an existing multilateral initiative, such as the G-8, G-20, the Global Initiative to Combat Nuclear Terrorism (GICNT), or the IAEA. The G-8 has experience addressing nuclear security challenges through its Global Partnership and could bring NSS issues within its purview. However, it also has a very limited membership and that would further reduce the likelihood for global buy-in. The G-20 is a more representative body, but is unlikely to expand its scope beyond economic issues.

A GICNT hand-off would provide the benefits of biennial plenaries of more than 80 countries and working groups to address substantive challenges between gatherings. While the GICNT is chaired by the United States and Russia, its working groups are led by three middle powers, Morocco, Australia, and the Netherlands. Plenary meetings could be upgraded to a higher level if the GICNT took over the NSS agenda. However, some GICNT countries were not invited to the NSS and may object to this arrangement.

Another option, that the IAEA take the lead role in promoting a more effective international regime, is the most obvious and perhaps most favored option at this time, but it faces several obstacles. The NSS has been very supportive of the IAEA's role in nuclear security, and the agency will continue to play a central role after the NSS process ends. However, for the IAEA to take over the NSS' agenda it would need to be significantly strengthened. The structures of doing business in the IAEA and NSS are fundamentally different. While each ultimately relies on consensus, one forum is universal while the other is selective; one forum is mostly technical while the other is primarily political. The IAEA has the benefit of legitimacy by virtue of having more than 100 member states. It also has technical expertise and facilities with ties to academic and industry representatives that the NSS lacks. However, its size and bureaucratic structures are also drawbacks that would likely make its initiatives less ambitious.

The ministerial-level conference on nuclear security that the IAEA held in July 2013, *International Conference on Nuclear Security: Enhancing Global Efforts*, was generally considered to be a useful and successful event. Thirty-four states were represented at the ministerial level, and the conference's ministerial declaration contained several references to the need for improved nuclear security governance. The Director General of the IAEA Yukiya Amano in both published and oral commentary called for peer review of nuclear security.

Another alternative is to engage CPPNM countries on nuclear security, rather than the full IAEA. If and when the 2005 amendment enters into force, it contains a strong set of rules that would allow for continued discussions on implementing an improved regulatory structure under a legally binding regime. One major drawback of this approach is that it would leave out radioactive sources.

Ultimately, two elements are necessary for a future nuclear security system: high-level political pressure and services at the technical level. These processes should be parallel. The IAEA already does good work at the technical level, but it may not be well suited for demanding and focusing high-level political support. The politics within the IAEA are quite different from those within the NSS process. Parties may be able to report back to the IAEA on progress made in implementing nuclear security improvements, but there is a need for a parallel process that drives innovation and higher performance standards.

It may be possible to create a more compact group of states able to make important strides forward in creating new norms that others will want to adopt. The members of such a group would need to reach out to others bilaterally and multilaterally so that results radiate outward, particularly to countries with large nuclear programs and material stockpiles. One approach would be to pursue a nuclear security governance-focused gift basket in 2014. The gift basket option was

developed precisely because countries wanted to move at different paces. Some experts argue against leaving states that are passive or obstructive out of a future-oriented nuclear security governance gift basket because they are precisely the countries that need to be engaged on this agenda, but even while championing inclusiveness, most experts would acknowledge that the leadership of a small group of states will be essential to moving the nuclear security agenda forward and testing new governance concepts and principles.

RECOMMENDATIONS

- *Maintain a high-level political process.* The convening of the NSS process reflects the importance of adding a political dimension to the largely technical issue of nuclear security. Both elements—technical services and political involvement—are necessary to propel progress into the future. If the NSS ends, a forum that continues to foster high-level political support will remain necessary.
- *Offer a nuclear security governance gift basket in 2014.* While not all states may be willing to continue to devote high-level attention to nuclear security, those states that prioritize the issue could offer a nuclear security governance-focused gift basket in 2014. This would establish an informal structure for cooperation among a core group of states willing to lead on this issue. As IAEA members, they would report to the full membership on their efforts to provide input into the broader global system.



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