ANTICIPATING AND ADAPTING TO COMPLEX TERRORIST THREATS TO SPENT FUEL

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Peter Hayes,

May 17, 2017

I. INTRODUCTION

This essay by Peter Hayes suggests that global urbanization and insecurity will generate new types of networked, long-range terrorism, especially from coastal megacities as they coalesce into gigantic urban corridors.

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Banner Image Credit: Fukushima Daiichi Nuclear Power Station pictures taken from the observation deck, March 16, 2011, TEPCO photo.

II. SPECIAL REPORT BY PETER HAYES

ANTICIPATING AND ADAPTING TO COMPLEX TERRORIST THREATS TO SPENT FUEL

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Since the nuclear security summit meetings began, important progress has been made to reduce the widespread distribution of loosely controlled fissile material and other important steps. These have been summarized elsewhere and I will not list these achievements here.

Rather, I want here to point to some global collisions, some fast, already observable here and now; others occurring in slow motion and only emerging, but nonetheless gathering enormous momentum towards an ultimate clash, that will shape how this problem plays out, in Japan, and elsewhere.

The factors leading to such collisions are: a) the proliferation of malevolent non-state actors who may attempt to conduct one or other type of nuclear terrorism, originating in, supplied from, or targeted at Japan; b) global urbanization presenting a social and physical infrastructure via which such nuclear terrorism may be implemented in the future; c) a cumulative building of potential for nuclear terrorism in various forms; d) the need for new institutional, especially multilateral, state-based frameworks to control such activity; and e), the imperative to anticipate such attacks in order to build adaptive capacity and resilience in the face of the prospect of such an event occurring in the future.

Proliferating non-state actors engaged in terrorism

Conversely, the world faces a plethora of non-state actors and organizations that are transnational, constantly innovating, and capable of amazingly malevolent creative destruction in violation of universal norms with regard to humanitarian law and norms, the laws of war, and even genocidal inclinations. An systematic attempt in 2011 to list extremist, terrorist and other organizations associated with guerrilla warfare, political violence, protest, organized crime and cyber-crime

includes more than 6,900 entries (versus, as Albert Jongman states, "the short list of 120 terrorist and extremist groups blacklisted by the United Nations, the European Union and six major countries."[1])

Global urbanization

Earth's urbanization is accelerating. Already, more than 50 percent of humans live in the 23,000 odd cities bigger than 5,000 people. Within this global trend, the urbanization of the coastal zone is accelerating rapidly and will account for an ever increasing fraction of the global urban population.

These littoral cities are the main gateways for flows of people, goods, information, finance, and investment. They are also the locale for transnational criminal gangs, and transnational terrorists, who often occupy and control the territories through which these flows must pass in or out of the city and country.[2]

Contrary to the past, much of this urbanization does not come from in-flow to the cities, but rather, is happening in-situ in rural areas in a vast, global mosaic of interconnected villages, towns, and cities.

Thus, many mega cities are becoming contiguous, along giant urban corridors such as that between Shanghai, Nanjing, Beijing, Shen Yang and Dalian; and from there, Seoul to Tokyo. Geographers call this emerging giga or billion-person city BESHOTO.[3]

Giga-cities will present new, networked, cross-border, and linear security problems, generating new types of vulnerability to terrorism, especially if these cities are fueled in part by nuclear reactors and their supporting fuel cycles.

Increasing threat of nuclear terrorism

We intuit, and I believe we are likely all persuaded, that all countries and communities are confronted the emergence of diverse, powerful non-state actors with varying motivations but unremittingly lethal intention to acquire, target, and use WMD or to engage in nuclear terrorism by targeting the nuclear fuel cycle in order to terrorize civilians *en masse*. Assuming they would select a larger settlement to target, they have no less than 2,400 human settlements larger than 100,000 people on the planet to choose from.[4] I think it is not hyperbolic to say that we are in race against time to ensure that such an attack never occurs.

Such an attack may come from outside a specific country; or originate domestically. Either way, it is likely to involve cross-border flows and be transnational in nature.

Such an attack may focus on nuclear weapons, that is, on obtaining and using warheads, separated fissile materials, radioactive materials or wastes; or, they may involve attacks fuel cycle facilities and specifically, on vulnerable sites that contain spent fuel in ponds; or in various stages of separation, recycling, and use.

Thus, spent fuel is only one possible target among many that could enable a non-state actor to conduct nuclear terrorism; and could take many forms, including physical attack on a facility, materials, organization, or individuals; or diversion of spent fuel in various forms in order to conduct various types of nuclear attacks, or to possess such weapons or materials in order to threaten such attacks, either for deterrence or compellence purposes. [5]

There are a number of standard complaints about weak nuclear security in Japan.[6] One acute American concern is the relatively weak Japanese approach to conducting personnel reliability

checks on persons working in nuclear facilities, including spent fuel repositories and in reactors.[7] Japan has increased its personnel reliability efforts as a responsibility of utilities and facility operators,[8] but this is a far cry from the intensive background checks for Americans with access to special nuclear materials, reactors, and spent fuel storage and processing facilities, let alone actual nuclear weapons facilities.

However, intensive background checks and record-keeping can also pose risks. The hacking of US Office of Personnel Management databases transferred the detailed profiles and background investigations resulting from security clearance applications of more than 21 million Americans over many years, most likely to a hacker working for or with the Chinese government. For those conversant with US military and other job titles, it is not difficult to infer which of these personnel may have Personnel Reliability Program certification, thereby creating a roadmap for those attempting to identify and approach insiders in US nuclear facilities. Moreover, the records themselves may have been edited by the hackers.

Thus, intensive background checks may screen out potentially unreliable individuals; but have also made it easier for non-state actors to identify potential insider allies, who may be approached and turned.]

In short, the best way to control a potential failure may differ across cultures and contexts; and all the approaches are susceptible to failure, likely in different ways.

Possible New Institutional Frameworks

Against this array of possible threats, what kind of multi-layered, multi-level, multi-dimensional set of legal and institutional controls could win this race against non-state actors intent on escalating terrorism to nuclear extremes?

To a large extent, US policy towards the threat of terrorism has been to defend and defeat it by eliminating terrorists, their leaders, and their networks, rather than to deter them (which implies that it is possible to co-exist with them, as is the case between states relying on classic deterrence using nuclear weapons). However, the United States has also introduced an element of nuclear threat into the equation, on occasion stating that it will hold not only terrorists, but any state found supportive of terrorists, who might use nuclear weapons, including possible use of nuclear weapons to deter such terrorists or supportive states. This approach seems to be contradictory and fatally flawed, however.[9]

In lieu of effective deterrence strategies, there is a natural inclination for states and official agencies to reach for new and additional layers of control to achieve additional protection by reducing the risk of such attack, or the impacts of such an attack should it occur. The adoption by Japan of the concept of Design Basis Threat (DBT) and related exercises to train forces able to respond adaptively to attacks of varying intensity and competence is an important step in this direction.

However, improved physical security measures and the creation and training of new security controls and forces at the national level can only ever be part of a global solution. In addition to intelligence cooperation, joint security operations designed to eliminate or constrain transnational terrorists or groups, a global institutional and legal framework based on the rule of international law is a critical element of any strategy that aims to overcome and reduce to acceptable levels the threat of nuclear terrorism.

Obviously, the full and committed implementation of bottom-up and comprehensive domestic control legislation and measures per UNSC Resolution 1540 alongside the complementary implementation

of UNSC Resolution 1573 are important steps. No country has come close to completing these tasks—even the best, including the United States and Japan, lag in important respects according to their national reports.

I surmise that effective control will demand more or less far reaching forms of extra-territoriality, applied to one's own citizens, and to non-nationals, to stop nuclear terrorism occurring as vulnerability to such threats and attacks increases.

Thus, one of the critical issues we need to consider is what types of international laws are needed to plug gaps in the patchwork quilt of anti-terrorist and other conventions aimed at avoiding nuclear terrorism.

In this brave new world, I suggest that we may need nuclear security standards, not just those entailed by the IAEA safeguards system, but universally accepted standards on levels of protection to be afforded to nuclear weapons, nuclear materials, and nuclear fuel cycle facilities that could be used to implement a nuclear terrorist strategy by non-state actors.

Complementing this approach, I suggest we need at least two new multilateral laws.

First, a convention is needed that makes nuclear and related smuggling an international crime. Strangely, this is not yet the case, in spite of the Nuclear Suppliers Group, UNSC Resolution 1540, The Convention on the Physical Protection of Nuclear Materials, and the International Convention for the Suppression of Acts of Nuclear Terrorism. Each of these covers an aspect of or a specific radioactive material, but does not criminalize nuclear smuggling per se.[10]

As Anne Marie-Slaughter asserted in 2007, we must make nuclear smuggling—and possibly all WMD smuggling--a *universal* crime against humanity—that is, one so heinous that it stands "alongside genocide and other evils," and thereby is subject to universal jurisdiction and prosecutable at the International Criminal Court and by national courts in every country, without a direct nexus to nationality or territory? [11]

This would be an important step forward as it would also mandate states to use extra-territorial jurisdiction over their own and non-nationals to hold non-state actors to account. It would also enable states to demand extradition of such non-state terrorists even in the absence of bilateral extradition traditions.

Second, either separately, or integrated into a convention that makes nuclear smuggling a universal crime, we need to make smuggling an international crime. Daniel Joyner has suggested a simple way that this could be achieved via convention that simply declares it to be an international crime to export proscribed materials, using national and international trigger lists, without a proper license.[12]

As you may know, Shin Chang Hoon at Asan Institute in Seoul proposed a similar concept for a convention to increase the controls applicable to nuclear smuggling some years ago.[13] His idea was expanded by into a wider ranging—perhaps too broad in scope for many states--International Convention on Nuclear Security published in draft form in 2015.[14]

Such conventions could be implemented regionally, perhaps originating from the trilateral senior officials or ministerial level meetings that reactivated ROK-Chinese-Japanese cooperation and collaboration on nuclear safety and counter-terrorism. Or, the ROK and Japan could promote such a concept at the 2016 Nuclear Summit in Washington, and float the key concept for post-Summit follow-up.

Imperative to Adapt to Evolving Threats

Adaptation demands that societies, and within a society, organizations and individuals, anticipate the future, especially when change is accelerating, and may lead to discontinuous, massive, and disruptive change.

Indeed, in 2007, Japanese, South Korean, and American military officials met to discuss scenarios which presented decision-makers with a "chain of regional crises for which they must analyze various possible measures to enhance tripartite collaboration in dealing with disaster, particularly centered on the military's role and capabilities in support of overall national objectives."[15] In one of these scenarios, the US military posited a major earthquake near Hokkaido, which sends a tsunami shoreward that causes carnage along the coastline and in port cities and damages two nuclear reactors. "Communications and assistance to the affected areas are being hampered by the poor conditions of infrastructure resulting from the long cold spell. The picture at the moment is bleak and information sparse."

In reality, after 3/11, tripartite military cooperation to respond to the tsunami and the Fukushima catastrophe was nearly non-existent. The US military played a major role in supporting the Japanese Self Defense Force. But Japanese civil society was left to fend for itself while the Japanese central government response was weak, confused, and generally resistant to accepting external assistance, even when offered by the ROK. Civil society, however, responded strongly. South Koreans donated $32 million to the relief effort in the first few weeks,[16] and 3/11 still resonates in the region, especially by fueling skeptical voices about the future of nuclear power in the ROK and China.

In contrast to this official scenario, an unofficial event involving participants from civil society in China, South Korea and Japan, took place in Seoul in 2010.[17] There, participants created "Jaws" in which the world in 2050 is characterized by a struggling green economy in a region characterized by regional stability and cooperation. In this narrative, nuclear energy grows at a rapid rate from 2010 to 2030. By 2030, it supplies 65 percent of energy in the region in the name of green growth. Unfortunately, the decrease in climate disrupting emissions is too late to protect the region from 47cm of sea level rise. In 2028, the Olympics are held in North Korea, and while reunification does not occur in this scenario, the international validation and recognition of the DPRK fosters economic cooperation between the two Koreas and results in increasing stability for the entire region—a result heralded by the current ROK Administration's *trust politik* and reunification policy.

In 2040, a massive earthquake triggers a tsunami that is exacerbated by the increased weight of the sea wreaking havoc upon disaster as the region's nuclear plants located on coastal shores are destroyed. These seemingly innocuous nuclear plants on the Northeast Asia seaboard are the "Jaws," the invisible sharks beneath the surface, which once awakened by the earthquake destroy that most basic infrastructure system: energy. In addition to the meltdown of the nuclear power plants, the mega-cities themselves suffer extreme damage. Levees break and communities go underwater. Flooding, homelessness, disease, and suffering abound.

The region is saved from despair by the foundation of good-will built up over the preceding three decades, which triggers international aid, although it is soon clear that what is rebuilt will not look like what was destroyed. Individual communities feel their governments failed them by relying so heavily on nuclear power and begin to shift focus towards more local governance and decentralized political systems. More threatening, however, is the shift away from nuclear and back to fossil fuel and climate-changing energy technologies.

The Jaws scenario reveals the premonitory power of imaginative thinking by cross-cultural, diverse

groups of people. Only five months after developing the Jaws scenario, the 3/11 earthquake and tsunami devastated northeastern Japan, with global ramifications. The catastrophe came three decades earlier than envisioned in the Jaws scenario, but the lesson learned — how civil society must act to save itself when governments fail — is still playing out.

Similar official and civil society-based anticipatory thinking is needed badly outside the DBT box, to help organizations build internal resilience against the potential shock that will be felt by terrorist use or threatened use of nuclear weapons, or attack on or diversion of spent fuel. I hope that we will commence this task tomorrow.

III. REFERENCES

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[3] See description of "BESOTO" and this emerging giga-city in P. Hayes, Kiho Yi, edited, *Complexity, Security and Civil Society in East Asia*, Open Book Publishers , June 2015, pp. 44–50, 66 at: http://www.openbookpublishers.com/product/326/ BESHOTO adds Shanghai to the corridor.

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[10] By which, following Joyner, we mean: “By nuclear materials, I mean specifically fissile materials, i.e. uranium and plutonium. By nuclear commodities, I mean a much broader array of single and dual use nuclear related materials. Single use nuclear commodities include uranium enrichment centrifuges, and certain chemical reprocessing technologies. Dual use nuclear commodities include items and technologies both tangible and intangible, which have both military and non-military application. These potentially include literally thousands of items, from aluminum tubes, to microscopes, to machine tools, to microprocessors, to maraging steel, that can be used in a variety of non-weapons endeavors, but that can also be used in a nuclear weapons development program. Finally, by smuggling, I mean the illegal cross-border trade in nuclear materials and commodities by non-state actors.” Daniel H. Joyner, "Nuclear Materials and Commodities Smuggling, and International Criminal Law", NAPSNet Special Reports, November 10, 2011, https://nautilus.org/napsnet/napsnet-special-reports/nuclear-materials-and-commodities-smuggling-and-international-criminal-law/

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