Prolif

#### Small arsenals are just as dangerous – they’ll get bigger and more complex, are susceptible to instability and accidental launch.

Busch, Associate Professor of Political Science, Department of Government, Christopher Newport University, former Research Fellow, Belfer Center for Science and International Affairs, Kennedy School of Government, ‘4 (Nathan E. No End In Sight: The Continuing Menace of Nuclear Proliferation. University Press of Kentucky, p. 287-289)

Both David Karl and Jordan Seng argue that the nuclear weapons in developing countries will be relatively easy to control, even without sophisticated use control devices, because their arsenals will be small and their command systems simple." But there are serious problems with this argument. First, as we have seen, there is little evidence to suggest that emerging NWSs will remain satisfied with small arsenals and simple command structures. Instead, most evidence suggests that they will tend to develop larger, more complex systems, which increase organizational difficulties and will be much harder to control. As the Russian case demonstrates, complex systems can deteriorate during economic crises due to a lack of resources for maintenance and repairs. Moreover, even if some emerging NWSs do keep their arsenals small and simple, their controls could still be severely weakened during domestic upheavals. The most serious weaknesses in Russia's controls were caused less by the size of its nuclear arsenal or the complexity of its command structure than by the type of nuclear controls that it inherited from the Soviet Union. To be sure, the scope of Russia's problems has been exacerbated by size and complexity, but because Russia's nuclear controls relied heavily on guards, gates, and guns, Russia still would have had difficulties maintaining its nuclear controls even if its nuclear system had been much smaller. Emerging NWSs probably will have problems similar to Russia's during political upheavals because they are likely to rely on the "3 G's" for their nuclear command and control systems. Indeed, we have seen that the arsenals in China, India, and Pakistan are potentially vulnerable to accidental or unauthorized use, even though they are comparatively small. For example, although information on the incidents that occurred during the Cultural Revolution and the Tiananmen Square crisis is incomplete, these incidents do appear to be important counterexamples to Karl's and Seng's arguments. There were several close calls in China during the Cultural Revolution (including what could be interpreted as an unauthorized test launch of a nuclear weapon in 1966), even though China's arsenal ranged from twenty to one hundred warheads during these incidents." It is also quite possible that China could experience severe instability in the future. There are widespread reports of increasing dissatisfaction with the high levels of corruption in the Chinese Communist Party (CCP), increasing regionalist movements, and skyrocketing crime rates. These factors have led a number of analysts to argue that the regime could experience severe instability or even collapse. The prospects for political and economic stability have been even worse in Pakistan. Between 1998 and 2001. Pakistan's economy teetered continually on the brink of collapse. While the U.S. decision to remove economic sanctions in September 2001 has improved the prospects for Pakistan's economy, an economic recovery is by no means guaranteed!' If Pakistan were again to encounter severe economic stresses, it could experience difficulties in controlling its nuclear weapons and fissile materials that are similar to those experienced in Russia. Although Pakistan's nuclear complex is obviously much smaller than Russia's, so are its economy, technical capabilities. organizational infrastructures, and experience with nuclear weapons. Thus, it is possible that Pakistan could experience an even more severe breakdown in its nuclear controls than Russia has experienced ii its economy were again to become unstable. Moreover, during the U.S. military campaign in Afghanistan, numerous scholars expressed concerns that political upheavals could undermine Pakistani nuclear controls. 17 Although the political instability appears to have been less severe than many feared it would be, it might have worsened significantly if the bombing campaign had lasted longer than it did." The widespread public opposition to the US led invasion of Iraq in 2003, along with the military reginie's strengthening of Pakistan's radical Islamic parties in late 2002, suggests that we could yet see regime threatening instability in Pakistan!' Given the type of nuclear controls on which Pakistan relies, these controls could become severely weakened during extreme political upheavals. As these accounts suggest, the risks of accidental and unauthorized use could be very high in emerging NWSs, particularly during nuclear crises or periods of domestic instability. The prospects for proliferation are therefore especially disturbing because emerging NWSs will tend to be more unstable than the established NWSs have been. (For example, all three of the emerging nuclear powers examined in this study Iraq, Iran, and North Korea have had significant risks of domestic instability. Although Saddam Hussein proved able to crush any opposition, he did experience a number of coup attempts ithe most serious in 1992), as well as repeated riots and uprisings (in 1991, 1995. 1996, and 2000) during his time in power' And once an external invasion tcxk place, all central authority evaporated quite rapidly." The risks of regime threatening upheavals are much greater, however, in North Korea and Iran than in Ba'athist Iraq. As we have seen, neither of these countries has great prospects for political stability in the near to mid term." In the event of severe upheavals or regime collapse, they could experience a rapid deterioration of their central controls over their nuclear weapons and related materials.

Nor is it clear that simple command structures in emerging NWSs will significantly reduce the risks of accidental or unauthorized use, as Seng and Karl contend. Indeed, as several analysts have argued, the rudimentary command and control structures in India and Pakistan increase the likelihood of accidental or unauthorized use, particularly during crises. The Indian military currently has little experience in handling nuclear weapons. If India's nuclear weapons were given to the military during a crisis, they would be as inexperienced in preventing their use as they would be in using them? Moreover, hecause Pakistan currently lacks an enunciated nuclear doctrine, cxiiable decision making or communications systems, or explicit targeting information, there is an increased likelihood that Pakistan's own troops might undertake strikes on their own." These are risks that any emerging NWS would likely experience as they worked to develop nuclear weapons, formulate use doctrines, and establish command and control systems. But since many of the countries most likely to develop nuclear weapons in the foreseeable future would have to consider the chances of preventive strikes as quite high, they might choose to deploy (or be forced to deploy) their nuclear weapons before they have all these issues sufficiently worked out. In these instances, the simple command structures would not necessarily prevent accidental or unauthorized use, and in fact could increase these risks.

Case

Davenport Marston – say it’s cheaper

#### Smaller reactors solve environmental hazards

Center for Advanced Defense Studies 11

(7/1/11. Remy Bourget. “Small Modular Reactors: Opportunity for Global Leadership and Innovation” http://www.c4ads.org/global-security-monitor/small-modular-reactors-opportunity-global-leadership-and-innovation)

The environmental aspects of SMRs are also hotly debated. The smaller size of the modular reactors means they have smaller “radiological footprints” - a strong environmental case for the use of SMRs. However, opponents argue that more small reactors will produce more hazardous waste because they use more fuel per unit of energy produced than traditional reactors. They also argue that the radioactivity of thorium is 200 times that of the same mass of uranium. This point is still in dispute because other scientific models indicate that thorium reactors are more efficient and could produce 10,000 times less waste than a pressurized water reactor. This would help military bases achieve their goal of reducing carbon emissions 28% by 2020. Their small size also allows them to be buried underground to contain potential leaks. Additionally, Molten Salt Reactors that use thorium have a natural safety mechanism which does not require a cooling system run by vulnerable computers. This makes disastrous meltdowns like Fukushima, Three Mile Island and Chernobyl next to impossible. Naval vessels have been operating similar small reactors for decades without a single disaster.

#### SMR developed and deployed fast

Schlesinger 8/28/12 (Richard Schlesinger is an American television news reporter and correspondent for 48 Hours Mystery. Schlesinger was born in New York)

(“NUCLEAR aims small” http://www.energybiz.com/magazine/article/281595/nuclear-aims-small)

Third, while several fundamentally different forms of SMRs are in development here and abroad, including high-temperature gas-cooled reactors, molten salt reactors and molten metal reactors, the likelihood is that the DOE will focus on light-water reactors, because that's the technology the Nuclear Regulatory Commission is most familiar with, having already licensed large light-water reactors. "Light-water reactors are most likely to meet NRC licensing requirements within our time frame," says John E. Kelly, deputy assistant secretary for nuclear reactor technologies at the DOE. "We're open to other technologies, but how quickly they can go through the regulatory system is a concern."

The enormous up-front capital investment and the long construction time have been the greatest hurdles to the wider adoption of nuclear plants. SMRs address both issues. Large reactors have, traditionally, been built on-site. Precisely because they are smaller, SMRs are being designed to be built in factories and delivered in finished pieces for on-site installation. A large nuclear plant may take anywhere from eight to 10 years from first spade to first electron. Kathryn J. Jackson, senior vice president and chief technology officer for Westinghouse Electric, estimates construction of the company's factory-built SMRs could take just 24 months.

She notes that time frame is competitive with the 18 to 24 months it takes to construct a combined-cycle gas turbine.

The Westinghouse design is modular in the sense that it will be built in pieces and assembled on-site. "The goal is to be as modular as possible, perhaps 90 percent modular," says Jackson. "Parts will be built in factories and shipped to the site by rail or truck. Building everything in a consistent way saves enormous time. Studies have shown that building this way, every hour spent in a factory equates to about three hours at an assembly facility on-site, and that one hour is equivalent to about eight hours of stick-built construction in the hole, the traditional way of building large nuclear plants." Because construction time is perhaps the largest factor in up-front nuclear costs, cutting that time by as much as 80 percent suddenly brings nuclear into the budgetary range of many more utilities.

Warner Baxter, president and CEO of Ameren Missouri, the utility that is partnering with Westinghouse in the DOE application, agrees. "The SMR, with its smaller footprint, shorter construction period, and factory-based concept mitigates, if it doesn't eliminate, the large up-front capital risk. It makes it more attractive to us and, I believe, will make nuclear more attractive to many more utilities," he says.