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UCRL-CONF-154694

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American Nuclear Society Global 2003, New Orleans,
Louisiana, November 16-20, 2003

September 22, 2003

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This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

The Governance of Nuclear Technology *

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Abstract - Eisenhower's Atoms for Peace speech in 1953 is remembered for engaging the world, and the Soviet Union in particular, in a dialogue about arms control and the formulation of a nuclear regime in which national and international security concerns growing from this unprecedented emerging and frightening new weapons capability would be addressed while tapping the civilian promise of nuclear applications for the good of mankind. Out of it came a series of initiatives, leading fifteen years later to the NPT, intended to allow the growth and spread of the beneficial uses of nuclear know-how while constraining the incentives and capabilities for nuclear weapons. The last 50 years has seen a gradual spread in nations with nuclear weapons, other nations with nuclear knowledge and capabilities, and still others with nuclear weapon intentions. Still most nations of the world have forgone weapon development, most have signed and abided by the NPT, and some that have had programs or even weapons, have turned these capabilities off. Yet despite this experience, and despite a relatively successful record up to a few years ago, there is today a clear and generally recognized crisis in nuclear governance, a crisis that affects the future of all the cross-cutting civilian/security issues we have cited. The crux of this crisis is a lack of consensus among the major powers whose support of international efforts is necessary for effective governance of nuclear activities. The lack of consensus focuses on three challenges: what to do about non-compliance, what to do about non-adherence, and what to do about the possible leakage of nuclear materials and technologies to terrorist groups. Short of regaining consensus on the priority to be given to nuclear material and technology controls, it is unlikely that any international regime to control nuclear materials and technologies, let alone oversee a growth in the nuclear power sector, will be successful in the tough cases where it needs to be successful. Regaining that consensus on the other hand means alleviating some fundamental insecurity on the part of states, and weakening the hold that terrorist groups have on some state governments. This in turn requires that some fundamental issues be addressed, with recognition that these are part of a suite of complex and dynamic interactions. Among these issues are: How will states provide for their own security and other central interests while preventing further proliferation, protecting against the use of nuclear weapons, and yet allowing for the possible expansion of nuclear power?; How best can states with limited resources to fight terrorist activities and safeguard nuclear materials be assisted in securing their materials and technologies?; What is the future role of international inspections? Does the IAEA remain the right organization to carry out these tasks? If not, what are the desired characteristics of a successor agency and can there be agreement on one?; How confident can we be of non-proliferation as latent nuclear weapon capabilities spread? The policies to address these and other issues must explicitly deal with NPT members who do not observe their obligations; NPT non-members; illicit trade in SNM and weapon technologies and the possibility of a regional nuclear war.

I. Introduction

During the formative period of the early 1950s, perhaps no other world leader captured in words the issues and options that would drive the next 50 years as did President Dwight David Eisenhower in what became known as the "Atoms for Peace" speech. As the Cold War dominated global relations, the President offered

a bold proposal to address the challenges facing the world at that time. Shaped in part by the Atoms for Peace speech, the world of the last 50 years has nevertheless been stressed by technical and policy shortfalls.

While the ideas in the Atoms for Peace speech laid the basis for the implementation of an international governance regime, framed by

the largely effective Nuclear Non-Proliferation Treaty (NPT), the Cold War introduced the massive nuclear arsenals from the two superpowers. The world 50 years after Eisenhower's speech is vastly more complex than the post-World War II world of 1953. The U.S. - Soviet Union cold war rivalry has now been replaced by concerns about rogue states and terrorists.

As we begin the second 50 years following Eisenhower's Atoms for Peace initiative, there remains a lack of consensus among the major powers on what is necessary for effective governance of nuclear technologies, indeed lack of consensus on what is meant by "effective". The lack of consensus is focused on three major challenges: what to do about non-compliance, what to do about non-adherence, and what to do about the possible leakage of nuclear materials and technologies to terrorist groups. The policies and governance framework to address these and other issues must explicitly address: NPT members who do not observe their obligations; those outside the NPT, and most especially the nuclear weapons states outside the NPT; illicit trade in SNM and weapon technologies; and the possibility the use of nuclear weapons in a regional nuclear conflict. The central questions to address include:

- How will states provide for their own security and other central interests while preventing further proliferation, protecting against the use of nuclear weapons, and yet allowing for the possible expansion of nuclear power?
- How can states with limited resources be assisted in safeguarding their materials and technologies in order to best fight terrorist activities?
- What is the future role of international inspections? Does the IAEA remain the right organization to carry out these tasks? If not, what are the desired characteristics of a successor agency and can there be agreement on one?

II. Where Are We Now?

The last 50 years have seen a gradual spread in nations either with nuclear weapons, nuclear knowledge and capabilities, and/or nuclear weapon intentions. Yet most nations of the world have forgone weapon development, and have signed and abided by the NPT. Some that have had programs or even nuclear weapons, have dismantled these programs. Agreements to reduce the number of weapons have been reached between the U.S. and Russia, and weapons are actively being dismantled yet there remains a legacy. Nuclear power and technology have spread rather widely, bringing both benefits to mankind and a troubling dissemination of materials and expertise.

The NPT defines the major elements of the governance framework agreed to and adhered to by the majority on nations. A number of individual bilateral and multilateral agreements have been added to strengthen the original provisions. The IAEA's traditional role of inspection and safeguards has largely been successful except in the relatively few cases where there was deliberate opposition from governments who refused to meet their obligations under the NPT. To date these principally include, Iraq prior to 1991 and North Korea prior to its withdrawal from the NPT. In such cases, the IAEA had not been granted enforcement powers and was required, under its charter, to refer the situation to the United Nations Security Council. Even taking these cases into account, there has been no known diversion of weapon usable nuclear material from safeguarded civilian facilities since the inception of the IAEA. The recent discoveries in Iran however of HEU remain troubling and a reminder of the limitations of the current framework in detecting the intentional movement from latent capability to full weapons capability and has added to the concerns regarding future governance of nuclear technologies. While the IAEA role has both been expanded and augmented by intelligence to provide better information and assurances that legitimate civilian sector and covert activities and facilities are not masking nuclear weapons programs even as declared operations continue

under IAEA safeguards, enforcement remains problematic.

Despite the relative success of the NPT and the IAEA, the possible coupling of nuclear weapon usable material with terrorist activities is indicative of the urgency of the need for stricter controls and more effective enforcement mechanisms. We note in particular a few especially outstanding problems that any improvement in governance of the global nuclear enterprise will need to address.

- A few states with connections to terrorism are either outside the NPT altogether or may not be in compliance with their NPT obligations. Leakage of nuclear capabilities, and of even greater concern, weapons-useable material, to terrorist groups may be the dominant security concern in some states today.
- Current inspection and compliance processes have not detected nor remedied major clandestine violations of the NPT in a timely manner. We cannot be fully confident under the current regime that latent nuclear weapons capability has not moved towards breakout. Additionally it is unclear whether even if the provisions of INFCIRC 540, were to be universally adopted, that it would be sufficient to ensure that the UN and concerned members will have clear warning of breaches of agreements to control nuclear materials and technologies. Export controls have not been rigorously administered nor universally adhered to. Furthermore, violations once identified must be addressed and it is unclear who will address violations.
- Effective enforcement methods require the concurrence and long-term commitments of the major powers. Triggers for enforcement action, including the identification and the nature of appropriate actions remain a matter of disagreement among the major powers concerned. The recent divide between the majority of the UN Security Council and the U.S. government, leading up to the war in Iraq, calls this into stark relief.

- Weapon-usable nuclear materials coming out of dismantled weapons created new security risks and require disposition under controlled and accountable conditions. It is not clear whether present provisions to that end are adequate. Political and economic problems exacerbate the control of potential “loose nukes.”

III. Shaping the Future

While the elements of governance of nuclear technology remain much the same today as in 1953, the emphasis and priorities have changed, largely due to world developments. Nuclear knowledge, nuclear civilian applications, and nuclear weapons are going to be part of the world for a long time, and through governance we are working toward a time when nuclear knowledge, technologies, and materials contribute to international stability, and the underpinnings of prosperity and free trade and travel. Achieving this will require an improved system of governance, effectively balancing the need for respecting and maintaining national sovereignty against the requirement for adhering to international obligations. Governance focuses on organizations and arrangements (both formal and informal) that will define, improve, and enforce measures in today’s and the future’s political circumstances.

Thus our nuclear future must first and foremost be governed by the premise of “security first”, as well as take into consideration the following societal and technological developments. Though some countries have given up their nuclear weapons (e.g., South Africa, Kazakhstan, Belarus, and Ukraine), that situation could reverse. Yet others still seek to acquire nuclear weapons and some will always desire them, as may an increasing number of sub-national groups. There is and continues to be a substantial and growing quantity of both military and civilian nuclear material in the world that can be used to manufacture nuclear weapons. The scientific and technical knowledge to make a nuclear weapon is readily available, and the technical skills and abilities to utilize this knowledge are becoming

more pervasive. As world energy consumption increases, fossil fuels remain a dominant source of greenhouse gases, even if in a decreasing percentage. The medical, agricultural, and industrial uses of nuclear technology are significant and growing. Thus an effective governance framework must account for these. Ultimately, the objective of governance will be to develop:

- Effective international agreements, based on durable state security interests, to prevent the acquisition or use of nuclear weapons, and which include the nuclear weapons states outside the current regime.
- An effective, affordable international system to prevent or reduce the probability of nuclear terrorism while preserving essential freedoms.
- An effective regime for verification of compliance with international agreements, in which any moves toward weapon acquisition or proliferation are quickly and clearly evident, together with a clear consensus on enforcement.
- A nuclear regime in which there is as little excess weapon useable nuclear material as possible and none uncontrolled, unsafe, insecure, or unaccounted for outside of national security needs.

IV. Recommendations for Action

Thus, how do we best work to achieve our objectives? In order to reap the benefits from many of the nuclear industrial, medical, and power options on the horizon it is critical to address the security challenges.

The governance of nuclear technology can be viewed from three distinct, but related action areas: address international security; strengthen and enforce the nonproliferation regime; and secure facilities and materials. Each of these action areas involves complex interactions between diverse technology and policy elements. Summarized below are the recommendations of options for action in each area along with the outstanding governance

issues that will need to be addressed. In each of these areas U.S. leadership will be key and as a first step a Presidential representative with appropriate rank should be identified to provide such leadership.

Address International Security

So long as nations and non-state actors are motivated to acquire nuclear weapons, the United States and its allies must maintain the capability to counter nuclear threats. In particular, shortfalls exist in dealing with terrorism. While much uncertainty exists as well in how to deter and dissuade terrorism in today's world, there are measures that can be implemented to provide early warning of terrorist action as well as impede their ability to utilize nuclear technology. Thus our first option for action would be the establishment of a worldwide nuclear weapons materials control, accounting, and alerting system, based on the intelligence resources of appropriate participating countries, focusing on separated nuclear weapons materials. Secondly this network of nations should work together to jointly develop, share, and deploy cutting-edge technology (sensors and real-time) information and communications technology) for continuous, real-time monitoring, in order to enhance each nations ability to detect illicit trafficking and movement of nuclear materials. This could be implemented under U.S. or P-5/G-8 leadership, and should include both the nuclear weapons states but the major nuclear suppliers and users. This alliance of like-minded nations should work to assist the countries of greatest concerns with security and alerting measures, as well as work together to assist one another in reducing the threat of nuclear terrorism world-wide.

Secure Facilities and Materials

Acts of terrorism around the world have increased governments' concerns about nuclear materials and facilities in their homelands. The breakup of the Soviet Union and concerns over the expanding number of failed states or rogue regimes have also altered how nations think about controlling fissile material in other countries. Standards of material protection,

control, and accountability (MPC&A) once considered adequate for nation states appear inadequate for new circumstances. In addition to developing an international system of materials accountancy and tracking (as suggested above), existing facilities must be protected. Thus we recommend the following options for tightening security for existing civilian facilities that contain nuclear weapons materials worldwide.

Likely the first option for action is for INFCIRC 540 to be universally adopted, thus making nuclear-related exports conditional upon such adoption by the recipient country, whether or not that country is party to the NPT. This could be done through the IAEA in collaboration with representatives from the P-5 plus the major nuclear suppliers and users. Yet another option is to establish a committee of experts from these same countries to determine what additional control measures are technologically feasible and what measures of merit could be used to assess their desirability. Third, the presence of HEU in civilian facilities remains of grave concern world-wide. Thus under US and Russian leadership we should work to accelerate the removal of HEU from civilian facilities except where strictly necessary and under strict international controls.

Much work has been done in developing standards for a physical protection convention. We suggest as an option for action that all weapon-usable nuclear materials be controlled by credible MPC&A systems and that the IAEA's Convention on Physical Protection of Nuclear be adopted, and strengthened, again under leadership from the P-5 in collaboration with the major nuclear suppliers and users. Finally in order for each of the possible options above to be effective state-of-the-art, 21st century technologies must be applied to the problems of security, verification of agreements, management and control of materials and facilities, and to the enforcement of agreements and regulations. The world at present is largely trying to deal with a 21st century problem with 20th century technology. The IAEA must be supported in deploying these technologies. Examples of advanced technologies include tagging of materials and environmental sensors, real-time communication of safeguards and

relevant surveillance data, satellite surveillance, and modern, secure software and communications all along the information chain

Strengthen and Enforce the Nonproliferation Regime

Having declared in the United Nations Security Council at the Head of State Summit in 1992 that further proliferation would be a threat to international security, the Security Council subsequently has had difficulty acting decisively to address proliferation activities such as those in North Korea. Alternative approaches have often been taken because of the inability to reach meaningful agreement in the Security Council. Disputes reflect different political interests, but common ground might be expanded if there were greater clarity in advance on obligations and responses to violations or threats, whether involving the NPT or not. For policies to lead to effective international governance, leadership especially from the Permanent Members of the Security Council acting jointly will be needed. If this cannot be done, the utility of the UN Security Council will be decreased in dealing with the nuclear dangers just when it ought to be the greatest, and no other organization exists that could take its place with as broad a mandate or scope of representation. Nevertheless, the nature of 21st century proliferation may no longer be effectively addressed by relying solely on a 20th century agreement that did not anticipate future conditions.

The NPT is widely agreed to be a necessary tool for addressing proliferation, but in and of itself is not sufficient and should be augmented, not discarded. If allowed to unravel, the immediate decrease in security for all nations may not be recoverable. Thus the NPT should likely be supplemented with new approaches to contain, deter, and dissuade nations or non-state actors from acquiring nuclear weapons. One option is to convene an international working group with representatives from the P-5 plus the major nuclear suppliers and users to better define obligations and privileges under the NPT. These include first identifying indicators of proliferation, and then clearly elucidating the steps to be followed if the indicators of a violation appear. Those steps could include

special inspections, backed by blue-helmets where needed, and country-specific watch committees to follow. However, for these policies to lead to effective international governance, leadership especially from the Permanent Members of the Security Council acting jointly will be needed. If this cannot be done, the utility of the UN Security Council will be decreased in dealing with the nuclear dangers just when it ought to be the greatest, and no other organization exists that could take its place with as broad a mandate or scope of representation.

V. Remaining Issues

Outstanding issues remain regarding the implementation of a new framework for governance of nuclear technology. Thus we recommend in addition to selecting from the options discussed above a work program to examine the following issues.

- Rogue states may use nuclear weapons for intimidation or as an asymmetrical response to superiority in conventional weapons. Enhanced safeguards and security may be the most rapid and effective solution to dealing with the diversion of nuclear material from IAEA-safeguarded facilities, but will it help deal with the more difficult problems of detection of covert activities and breakout, which must be dealt with in a timely fashion?
- How best can states, with limited resources to fight terrorist activities and safeguard nuclear materials, be assisted in securing their materials and technologies?
- The G-8 identified the need for more protection against weapons of mass destruction and pledged to enhance export controls. Unfortunately little has been done to implement this pledge. There is a critical need to build upon the G-8 pledge to fund improvements in the nuclear technology regime, lest the world be in a position in the future of wishing it had done more. Who will take the leadership for this initiative?

- Enforcement is the key to the success of collective security agreements. The IAEA and the NPT are instruments of the member states, but it is the member states that must provide enforcement, especially the P-5 in concert with the Security Council. There is currently tension between collective security and sovereignty rights. There are questions regarding the clear definition of an NPT violation and how to ensure that predictable, effective, and rapid enforcement will follow. Who enforces if the Security Council vetoes an enforcement action? Can there be a predetermined response to violations to allow for rapid and firm reaction?

The policies to address these and other issues must explicitly deal with NPT members who do not observe their obligations; NPT non-members, illicit trade in weapon useable nuclear materials and weapon manufacturing technologies, and the possibility of nuclear war

Acknowledgements

This paper was influenced significantly and is based in large part on the Lawrence Livermore National Laboratory, Center for Global Security Research project "Atoms for Peace After 50 Years: The New Opportunities and Challenges". The authors wish to thank Charles Curtis, Tom Isaacs, Robert Schock and Sig Hecker for their contributions.

* This work was performed under the auspices of the U.S. Department of Energy by University of California Lawrence Livermore National Laboratory under contract No. W-7405-Eng-48.