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The Secretary of Energy
Washington, DC 20585

NOV 01 1991

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CIA
1.4(c), 3.5(c)

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Authority: EO 13526
Chief, Records & Declass Div, WHS
Date: MAR 21 2016

SUBJECT: Implementation of Initiative on Warhead
Dismantlement/Destruction

Attached for your review is the Department of Energy paper on implementation of the President's Initiative in the area of warhead dismantlement/destruction as requested by BG John Gordon's memorandum of October 4, 1991. As a separate paper, we will circulate a strawman list of U.S. objectives, and whom we want to reach in these discussions on Monday, November 4, 1991.

Please forward any comments to DOE by close of business, Wednesday, November 6, 1991. The DOE point of contact is Ed Woolery, 202-586-8901.

Department of Energy Declassification Review	
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Nonproliferation Technology Support
Defense Programs

Attachment

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NSC Nuclear Initiatives Work Plan Issue 6:
Nuclear Warhead Dismantlement/Destruction

I. PURPOSE

On September 27, 1991, President Bush proposed beginning "discussions with the Soviet Union to explore cooperation" in three areas, one of which is that, "we should explore joint technical cooperation on the safe and environmentally responsible storage, transportation, dismantling and destruction of nuclear warheads." On October 5, 1991, in his response to the President's initiative, Gorbachev stated Soviet "readiness to enter into a detailed dialogue with the United States on the development of a secure and ecologically sound technology for the storing and transportation of nuclear warheads, the means of using nuclear weapons and the raising of nuclear security". While the specific topic of "warhead dismantlement and destruction" was not addressed by Gorbachev, Soviet response to President Bush's Initiatives included expressions of willingness to discuss all the issues proposed. Unofficial Soviet statements suggest that detailed dialogue in the area of warhead dismantlement could facilitate an otherwise difficult task which could only be carried out over a very long period of time. In response to NSC tasking, this paper outlines topics that might be included in the "warhead dismantlement and destruction" area and addresses how the U.S. should organize efforts to pursue bilateral discussions in this area. Because of extensive commonality between the topics and objectives of the two papers, this paper should be read and discussed in the context of the NSC tasked paper on Joint Technical Cooperation on Nuclear Safety, Storage, Security, and Transportation (Issue # 5). ✓

II. BACKGROUND

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While the U.S. routinely dismantles retired warheads, having done so since about the mid-1950s,



This was also the case for U.S. warheads prior to about 1954 when it was recognized as being necessary to disassemble retired warheads and recover the nuclear materials for recycling and reuse in new warheads. The U.S. now has well exercised, safe, secure, and environmentally responsible capabilities for nuclear warhead dismantlement including pre-

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disassembly staging and post-disassembly material and component recycling, storage, and waste disposition.

In the discussions on warhead dismantlement and destruction, the U.S. should pursue as its overall objective the facilitation of Soviet warhead dismantlement and appropriate disposition of the disassembled parts or materials in support of reciprocal, unilateral warhead reductions. It is very much in U.S. interests that reciprocal Soviet warhead dismantlement activities be accomplished in a timely fashion and that they are consistent with responsible safety, security, and environmental standards. ~~and that they be accomplished.~~ Exchanges of information about these activities, in some cases, may enable the Soviets to accomplish some dismantlement operations sooner than otherwise would have been possible. It is assumed in this joint technical cooperation that each side would accomplish its own dismantlement and destruction operations according to a schedule of its own choosing and without direct involvement of representatives of any other party.

An essential precondition for effective implementation of the initiative is that any discussions must not provide to the Soviets -- or through them, to any other state or subnational group -- information on, or access to, sensitive data, technologies, or procedures that could improve their military capabilities, readiness posture, or ability to compromise the reliable operation of U.S. nuclear weapons. Nuclear weapons and materials production processes are of special concern because of the associated nuclear proliferation risks. To ensure full protection of such data, technologies, and procedures, each topic selected for possible discussion with the Soviets must be based on unclassified or declassified sources and subjected to thorough "red teaming" before tabling with the Soviets.

III. TOPICS FOR DISCUSSION

During the initial technical discussions the following topics might be discussed with mutual benefit in understanding how the sides might facilitate their own planned stockpile reductions in terms of dismantlement of nuclear warheads.

- A. Nuclear Weapons Management. These general topics are suggested as initial information, important for understanding how the U.S. manages its nuclear operations. This, along with comparable characterizations of Soviet procedures and decision making processes, would be shared as general information on each other's weapons complex, facility and weapons safety processes, safety standards and criteria, security standards, modes of transportation, and safety analysis methodology.

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- Roles and responsibilities of Department of Defense (DOD), Department of Energy (DOE), Nuclear Weapons Council (NWC)
- Key surety groups/committees (e.g. Nuclear Explosives Safety Study Group)
- Details on the Department of Energy Personnel Assurance Program (PAP) program for critical duty personnel

This area would be the same as that described for NSC Issue Paper Five on joint technical cooperation on nuclear safety, storage, security, and transportation. Unless there are different personnel involved, there would be no need to repeat this discussion.

B. Warhead Dismantlement or Destruction Operations. The term "dismantlement" as used here should only be construed as referring to those activities necessary to retire warheads so completely that they could not reasonably be reassembled into warheads of the same kind. Warheads are disassembled and the subassemblies, components, base materials, or waste materials are disposed of in ways which meet approved safety, security, and environmental standards. Dismantlement would not preclude reusing certain plutonium or enriched uranium parts or materials in newly produced warheads.

1. Technology and Processes:

- General description of U.S. dismantlement operations
- Safety specifications for component and subassembly containers
- Specifications for gravel garties (assembly/disassembly areas) at the DOE Pantex Plant
- Dismantling operations involving high explosives
- Disposition or long-term storage of waste high explosive, light metallic compounds, low level radioactive waste, heavy metals in slurry or solution
- Disposition of recovered special nuclear materials (plutonium and enriched uranium)

2. Physical Security and Safety Arrangements:

- Safety Orders -- Safety standards and implementation
- Safety risk assessment methodology as used in U.S. nuclear weapon dismantling facilities

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- Radiation safety and standards
 - High explosive safety and standards
 - Physical security standards and integration of security procedures
 - Security force training/certification requirements
 - Soviet observers at unclassified portions of Nuclear Explosive Safety Study Group studies of weapon disassembly operations and transportation; master studies would be most conducive to unclassified discussions since the issues are treated in a generic fashion
3. Nuclear Control Arrangements:
- Two person concept
 - Custodial responsibilities from retirement until completed disassembly
4. U.S. National Environmental Protection Act (NEPA) Activities -- Environmental Impact Statement and Environmental Assessment procedures at U.S. nuclear weapon dismantling and material storage facilities.

C. Follow-on Steps. The following are potential steps which may be implemented if initial discussions are assessed as mutually beneficial and both sides agree that further cooperation would be useful. These discussion topics represent yet an increased level of detail and, in some cases involve more sensitive technologies, if sharing such information were judged to be necessary to accomplish the U.S. objective of timely, responsible and safe Soviet dismantlement.

- Specific safety issues associated with weapon dismantlement
- Emergency response capabilities for security, safety, and environmental incidents -- expand any information exchange and assistance provided during the Chernobyl episode, including use of the U.S. Atmospheric Release Advisory Capability (ARAC).
- Observation of emergency response exercises
- Joint exploration of plutonium dispersal contamination and exposure concerns and dispersal consequence mitigation concepts

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Joint Nuclear Explosive Safety Study Group (NESSG)
safety studies

- Visits to restricted areas of warhead dismantlement and of material and component storage facilities
- Joint development of access control and delay system features for storage facilities, including automated personal identification/validation technology, contraband detection, and passive/active barrier combinations

IV. Organizing U.S. Efforts.

For the U.S., the management, technical, and operational expertise for warhead disassembly and subsequent reuse or disposition of components and materials, including long term storage, resides within DOE. However, because pre-disassembly storage and staging is a joint DOD and DOE effort and because of the close interaction between DOE and DOD on all matters pertaining to nuclear weapons, these two Departments would work together to: refine the list of issues for possible discussion; recommend their prioritization; develop draft presentations for the Soviets; and "red team" those presentations to ensure full protection of U.S. sensitive data, technologies, and procedures. It is difficult to estimate how long an effective "red teaming" effort would take for all of the suggested topics, but some subjects -- e.g. general descriptions of some industrial processes associated with weapons disassembly and waste material disposal -- might be adequately "red teamed" and ready for discussion in 30-60 days. Other subjects could require longer to identify and work around potential security problems and technology transfer concerns, depending on the level of detail authorized for discussions.

As a venue for such meetings, options include Washington, Geneva and Moscow. Geneva may have the disadvantage of its association with traditional arms control negotiations. While meetings in Moscow would be difficult from the point of view of administrative support for the U.S. side, there may be advantages in Soviet flexibility to engage in technical dialogue.

To preserve the exploratory, technical, and non-negotiating thrust of the President's initiatives, to avoid creating expectations of major breakthroughs or agreements, and to protect against any efforts to exploit these discussions to obtain sensitive information, the following approach should be adopted:

- o at the next Bartholomew-Obukhov meeting, the U.S. would propose a small working group meeting on warhead dismantlement and destruction issues for about a week

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in early December, and suggest 1-2 "icebreaker" topics, e.g. general presentations on management of nuclear weapons dismantlement issues and an overall description of U.S. dismantlement operations;

- o U.S. presentations and follow-on discussions would not go beyond those materials cleared in advance by DoD and DOE; Soviet requests for further information would simply be "taken" for consideration by the U.S. at a later date (i.e. a "backstopping" mechanism would not be appropriate or necessary while bilateral meetings are in progress because of the technical details involved and the necessity for thorough, time consuming security and technology transfer review of information to be exchanged); and

- o based on each meeting, each side could propose further discussions on these or other topics through the Bartholomew-Obukhov channel.

As a rule, every effort should be made to: keep the size of the U.S. team small and largely technical in composition, bringing only those experts necessary for discussion of the pre-agreed topic(s); limit the bilateral meetings to one or two weeks, spaced apart sufficiently to permit internal reviews of results and effective preparation for any follow on; and limit topics for discussion to one or two issues per meeting. As required and appropriate, the working group might visit facilities in the U.S. and USSR of relevance to its discussions.

III. Reciprocity.

It is assumed that the discussions of topics presented under the headings "Initial Explorations" and "Follow-on Steps" would be parts of mutual exchanges of information. This does not necessarily mean that the sides would be expected to match detail for detail information provided, however, in many of these technical areas, if the U.S. is to be able to assist the Soviet processes, frank discussions including relatively unconstrained dialogue, within the previously authorized bounds, will be necessary.

It would be a mistake to assume a priori that the Soviets have nothing of technical value for the U.S. In non-weapons science and technology, the Soviet approach has shown significant differences from that of the US. The Soviets in many cases show an excellent intuitive approach to provide guidance instead of over reliance on computer models and predictions. Because of the chronic shortages in their system, they also tend to make efficient and innovative use of materials and components. The Soviet system may be sterile, but their technical people can be quite innovative.

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OSD
Section 6.2 (a)

Appendix

1. Warhead Dismantlement and Destruction

In order to gain an appreciation for the dismantlement and destruction process, one must have an understanding of the components involved -- the nuclear warheads and the associated "packaging" (e.g. reentry bodies, firing sets, etc.). Most U.S. warheads consist of two major assemblies, although a few types -- because of their relatively small size -- may only have one.

DOE SECTION
6.2(a)

Both these components or stages contain radioactive materials and, thus, present considerable risk to the environment, safety and health of personnel involved in operations associated with these weapons.

Loss of any of these components to third world countries or to other subnationalist groups could have extremely adverse consequences.

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Conventional high explosives are used to initiate the nuclear chain reaction. Explosives surround the primary.

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DOE SECTION
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The need for extreme care and strict adherence to safety practices during the removal of the high explosives cannot be understated.

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Overall, a nuclear warhead, regardless of size, is a complex device containing many potentially lethal components. Its handling during assembly, subsequent storage and transportation must be accomplished by specially trained and experienced personnel and demands extreme safety and security measures. Mishandling invites the potential for the most severe and catastrophic consequences, thus the requirement for safety cannot be understated.

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3. Dismantlement and Destruction Process

The dismantlement and destruction process can be thought of in terms of six steps, not including the transportation of weapons or warheads to interim storage facilities awaiting dismantlement:

- o Removal of RV or warhead compartment from delivery system. This would be the removal of reentry vehicles or the warhead compartments from missiles, or separation of the warhead from the gravity bomb or artillery shell. In some weapons, the warhead is an integral part of the weapon and dismantlement would not include this step. This step would normally be accomplished at a military facility whose normal mission is the maintenance of deployed weapons.

- o Separate warhead section from weapon.



DOE SECTION
6.2(a)

This step would be accomplished at a military facility whose normal mission is the maintenance of deployed weapons or at the DOE Pantex Plant, Amarillo, Texas.

- o Removal of nuclear explosive package from warhead section aeroshell. The remaining components of the Weapon Electrical System would be separated and any reusable components or materials would be recovered. This step and all following steps are performed in the U.S. at the DOE Pantex Plant, Amarillo, Texas, unless otherwise indicated.
- o Separate nuclear explosive into primary and secondary assemblies.



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- o Remove high explosive from primary pit. Once the electronics are removed from the nuclear weapon, the high explosive must also be quickly removed (with a minimum of movement and transportation) to reduce the potential for an accident, because the detonators are still present.

o

Nuclear warhead dismantlement and destruction, in this context, assumes that disassembly is accomplished in such a way that the components could not ordinarily be reassembled into a detonable warhead without extensive refabrication of materials and components.

Certain other high value, nonnuclear materials are recovered and reused, while those materials of relatively low value, considering the recovery costs, are disposed of in waste streams. These waste streams are carefully managed to ensure that maximum protection is afforded the environment as well as protection of the health and safety of personnel. Because the future supply of plutonium and HEU is expected to exceed warhead production requirements, arrangements for the safe and secure long term storage of these materials are being made.

DOT SECTION
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