



The Under Secretary of Energy
Washington, DC 20585

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MEMORANDUM FOR BG JOHN GORDON
NATIONAL SECURITY COUNCIL

SUBJECT: Strawman Measures for Soviet Tactical Nuclear Weapons

Attached for your use is the Department of Energy paper on strawman measures to address concerns about Soviet nuclear weapons as outlined in your October 31, 1991, paper on Tactical Systems and as tasked in the November 1, 1991, meeting of the President's Nuclear Initiative Steering Group.

Victor E. Alessi
Victor E. Alessi
Director
Office of Arms Control and
Nonproliferation Technology Support
Defense Programs

Attachment

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STRAWMAN MEASURES
TO ADDRESS CONCERNS ABOUT SOVIET NUCLEAR WEAPONS

PURPOSE AND SCOPE

This paper responds to the November 1, 1991, request by the President's Nuclear Initiative Steering Group that strawman measures, "quick fixes", be developed to address perceived problems with the safety and security (surety)¹ and elimination of the tactical nuclear weapons in the rapidly changing USSR.

In developing the list of strawman measures, it was initially thought important to identify the possible political/nuclear weapon outcomes that could result from the collapse of the central Soviet government, thinking that the concerns and solutions would differ for each case. Three possible scenarios were posed² but further examination convinced us that the substance of the concerns remains constant, i.e., safe and secure maintenance, storage and transportation of nuclear weapons and/or their safe demilitarization and dismantlement. Depending on the given political/nuclear weapon scenario, the nature and/or scope of the problem(s) may differ in detail. Examples are: (1) in the case of proliferating nuclear republics, it would be more difficult to address the obvious need for Soviet weapon laboratory cooperation in implementing safety measures, demilitarization, and so forth; (2) the number and political complexion of partners in joint technical discussions would differ; and (3) the scope of problems such as transportation or facilities for demilitarization or dismantlement would be different.

CAVEATS

Very little is known about Soviet nuclear weapon design and surety. Therefore the actions proposed are based on U.S. experience and the assumption that Soviet nuclear weapon practices are similar to those of the U.S. Initial exploratory discussions in these areas should have as a priority the validation of this assumption, or progress in understanding where Soviet approaches and philosophy differ. This is pivotal to any success we may have with ameliorative measures.

¹The term "surety" is used frequently in connection with nuclear weapons to include nuclear safety, physical security, use control, and assessment technology.

² Scenario 1: Other nuclear republics return all tactical nuclear weapons or control over weapons to the Russian Republic; Scenario 2: Other nuclear republics declare their intention to retain under their control some or all of the tactical nuclear weapons located on their territory, with the intent to keep some or all of these weapons operational; Scenario 3: Other nuclear republics declare their intention to retain rather than return weapons on their territory, and to dismantle or destroy them.

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In addition, this paper does not address options which might involve direct financial assistance to the Center or the Republics in nuclear warhead dismantlement, except as a passing reference. Such options could become important and should be examined.

SHORT TERM MEASURES TO AMELIORATE PERCEIVED DANGERS

The measures listed below are proposed in the context of objectives 4 and 5 of BG Gordon's October 31 Tactical Systems Paper: (1) Objective 4. Facilitate the prompt and safe elimination of the tactical nuclear weapons cited in Gorbachev's October 5 announcement. and (2) Objective 5. Rapidly enhance the security of nuclear weapons against hostile takeover or other loss of control by recognized nuclear weapons command and control authorities. These measures represent short term "fixes" to be undertaken very early. Longer term operations/cooperation are discussed in NSC Papers 5 and 6, but they will require further elaboration and consideration after initial discussions clarify the scope and nature of the problem and the willingness of the central government or disparate republics to engage in a problem-solving process.

The most important initial step in meeting the fourth objective is the prompt, safe, and secure interim storage for weapons pending further steps toward dismantlement. Secondly, the focus should be on interim forms of field demilitarization which can be accomplished in a much shorter time scale than full-scale elimination. Properly done, demilitarization should improve nuclear detonation safety as well as ~~reduce~~ the security risk should possession be lost. Although the objective statement emphasizes elimination of tactical nuclear weapons, these same measures would be applicable to any Soviet nuclear weapons, including those warheads associated with certain strategic offensive arms, which the Soviets may choose to eliminate. This said, it should be noted that the facilities, procedures, and expertise which would be required are likely to be weapon specific, if the U.S. model is valid.

Meeting either objective, but especially the fifth, necessitates improved understanding of Soviet surety measures and practices. However, explanations of U.S. practices and procedures to the Soviets in general terms could provide a way of beginning the discussions.

The principal measures proposed are listed below. Relative priority of these measures depends upon details of Soviet nuclear weapon practices as discussed in initial exploratory discussions.

- o Explain U.S. surety philosophy, procedures, and facilities. The purpose is to offer the U.S. view of potential safety and security problems. This, in turn, could lead to Center and Republic recognition of the need to improve practices. As a minimum, the result would be to remind the Center and inform the Republics of the problems inherent with ownership and the potential costs of responsible management of nuclear weapons.

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- Indicate how all nuclear weapon operations, particularly transportation and storage of weapons, might be improved to achieve optimal safety and security practices.
- Facilitate methods for warhead accounting and control. This could include explanations of inventory control and could involve use of tags (See appendix for elaboration on inventorying and tagging Soviet weapons).
- o Explain U.S. philosophy and procedures for enhancing security of operations, including transportation, storage, and maintenance of nuclear weapons. This would include presentations on U.S. training for safety and security, use of safety studies and assessments, and possible "quick" hardware or procedural fixes.
 - Possibly offer training and U.S. assets in support of emergency response situations involving accidents or involving recapture or recovery of one or more nuclear weapons.
- o Propose consolidating nuclear weapons controlled by the Center and the Republics in those few sites having the best security and control capabilities and which are separate from operational units. The preferred number of sites would be small rather than large to reduce the resource requirements for protection.
 - Provide technology and perhaps equipment to maintain adequate security if their systems become suspect (i.e. personnel reliability decreases substantially)
- o Advise and possibly assist in methods for rapid, safe, secure, and preferably irreversible demilitarization of warheads in the Republics as an interim measure while awaiting future dismantlement and destruction (e.g. remove tritium and store separately; remove and destroy fuzes, firing sets, and neutron generators, etc). Such measures could be important for those weapons whose scheduled dismantlement may be years in the future and interim protection is critical. This would improve nuclear detonation safety and alleviate some security and control concerns. See Appendix for demilitarization options which could be recommended.
- o Assist in the safe, rapid, transparent transportation and dismantling of nuclear weapons in Russia, and safe and transparent disposition of the special material. This assistance would involve detailed interaction with Soviet scientists and engineers

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knowledgeable about their weapons. Dismantlement and destruction of large numbers of nuclear warheads is a process involving years not months. Nevertheless, early planning, preparation, and initiation of the processes should be encouraged and supported.

- U.S. presence could be offered to the Center and the Republics to monitor some aspects of dismantlement operations and the continued safe and secure disposition of enriched uranium and plutonium derived from nuclear warheads eliminated in the republics. Such presence might be arranged as part of a cooperative arrangement involving the Russian weapon design laboratories and would support confidence by the other republics, as well as the U.S., that these nuclear materials would not be diverted for weapons purposes. See Appendix for further discussion.
- If Republics insist on dismantlement or irreversible demilitarization at facilities other than those in the Russian Republic, solutions to the problems could become prohibitively expensive and, unless technical assistance by the weapons design laboratories located in Russia can be made available, would be ill-advised.

MOST APPROPRIATE OFFICIALS AND TECHNICAL EXPERTS

In addition to those U.S. government officials participating in initial policy discussions with some combination of central government and republic representatives, it is important that a small group of government officials and technical experts having management authority for and technical knowledge about nuclear weapons development, production, transportation, storage, retirement, dismantlement, and destruction be available to support the discussions.

- o Government official(s) responsible for oversight of nuclear weapons surety -- safety, security, and use-control.
- o Senior technical manager(s) of nuclear weapons production complex.
- o Senior military officer(s) having responsibilities and special experience in nuclear weapons operations including transportation, storage, and maintenance.
- o Senior scientist(s) and engineer(s) from nuclear weapons laboratories and having special experience in nuclear explosives design, production, and maintenance, including solving post-production nuclear weapons problems.

Counterpart officials, military officers, scientists, and engineers from the Center and the Republics should also be available to support the discussions. It is especially important that if the Republics choose to retain any weapons under their authority and control that those officials having responsibility

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for these weapons have complete understanding of the problems they must address. To the extent that the republics may lack appropriate infrastructure to manage safe, secure, and environmentally sound transportation, storage, dismantlement and destruction of nuclear warheads, it is extremely important that they understand both financial costs as well as risks associated with attempting to manage these activities.

REVIEW OF INFORMATION PRIOR TO TECHNICAL DISCUSSIONS

While we must carefully review all information which is to be discussed with the Center and the Republics, we should recognize that these are not normal times. In order to be effective, the U.S. response may need to consider a more expeditious method of processing and transferring safety, security, transportation, storage, and dismantlement information and technologies. In the case of Restricted Data and Sensitive Use Control Information, there is presently no intention to discuss topics requiring exchange of Restricted Data or Sensitive Use Control Information regarding U.S. nuclear weapons. However, discussion of weapon design information associated with Center and Republic nuclear weapons may be necessary and will require U.S. administrative or legislative action to permit U.S. representatives to discuss such information.

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APPENDIX

ESTABLISHING "PRESENCE" AT NUCLEAR WEAPONS DISMANTLEMENT AND STORAGE FACILITIES.

Presence of U.S. personnel to monitor the continued safe and secure storage of enriched uranium and plutonium derived from nuclear warheads eliminated in the republics could serve U.S. interests as well as interests of the republics. Such presence would support confidence by the other republics, as well as the U.S. that, these nuclear materials would not be diverted for weapons purposes and could be established under the auspices of the UN, involving only U.S. and republic representatives. Monitoring could be encouraged as a condition for U.S. financial assistance to the republics in eliminating warheads. Because the U.S. poses no incremental nuclear weapons safety and security threat to the republics, discussing or accepting presence of Republic representatives in the U.S. would solve no real problem and should not be proposed. Nevertheless, if it should become expedient for some republic representatives to monitor some U.S. dismantlement operations and subsequent component or material storage, we should evaluate just what level of republic presence could be tolerated.

Because of the obvious nuclear nonproliferation concerns, it would be totally inappropriate for any representatives other than U.S. or the republics to be involved. If there were any mutually unacceptable condition proposed in establishing presence in the republics, we should be prepared to drop the issue of establishing presence rather than jeopardize the central objectives as stated in BG Gordon's October 31 Tactical Systems Paper.

DISMANTLEMENT AND DESTRUCTION.

The term "dismantlement and destruction" 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 and most likely could not ordinarily be reassembled into a detonable warhead without extensive refabrication of materials and components. Warheads should be disassembled and the subassemblies, components, base materials, or waste materials should be 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 and other high value materials in newly produced warheads. "Destruction" as used in this context, should not be construed as implying some kind of violent action, but, on the contrary, should be taken as qualifying "dismantlement" so as to make clear that the actions are essentially irreversible.

The term "elimination" when applied to nuclear weapon systems does not necessarily imply any specific action with respect to the associated nuclear warhead(s). In START and INF, for example, only the delivery vehicles are involved and each side may choose its own course of action regarding the warheads. If "elimination" is used in association with nuclear warheads, it is assumed that the term is equivalent to "dismantlement and destruction".

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The dismantlement and destruction process may involve some or all of the following steps, not including the transportation of weapons or warheads to interim storage facilities awaiting dismantlement.

- o Initial demilitarization. (First two steps in NSC Issue Paper Number 6)
- o Removal of nuclear explosive package from warhead section aeroshell.
- o Separate nuclear explosive into primary and secondary assemblies.
- o Remove electrical systems and detonators.
- o Remove high explosive from primary pit.
- o Disassemble primary pit and secondary components to recover nuclear materials. These components may be stored in safe and secure locations as an alternative to recovery of nuclear materials. Disassemble or destroy non-nuclear components.
- o Safe, secure storage for nuclear materials not needed for reuse. (This step not addressed in NSC Issue Paper Number 6)
- o Safe and environmentally responsible destruction and disposition of non-nuclear warhead components such as fuzes, firing sets, and neutron generators.
- o Safe and environmentally responsible disposition of nonnuclear waste materials. (This step not addressed in NSC Issue Paper Number 6)

DEMILITARIZATION.

In the context of nuclear weapons, demilitarization is one or more deliberate changes performed on a nuclear weapon or warhead to render it incapable of being used in its intended mode of operation. Minor changes may be easily reversible by authorized or knowledgeable persons and afford only very limited protection from safety and security risks. Extensive changes could be irreversible and attempts by unauthorized persons to reconstitute the object into some kind of weapon capable of producing nuclear yield would be extremely difficult if not impossible. In some cases, removal of major components and secure storage in physically separate locations of the separated subassemblies could be a very effective and long term means of protecting nuclear weapons which must be retained in operational status. Even extensive demilitarization, however, may leave an assembly which may be incapable of producing nuclear yield but could nevertheless represent significant safety and security risks because of the potential for high explosive scattering of plutonium.

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Possible demilitarization actions range from those which are easy and less effective to those which are difficult, very effective, and require more extensive time and resources. The former could be recommended to the republics as actions they could take based on relatively limited information available to the U.S. while the latter would require much more detailed exchange of information about the specific weapons to be demilitarized.

Table of Possible Demilitarization Actions

Easy -- Less effective -- Less knowledge required

- Interface cables and connectors destroyed (cut pins)
- Damage external controls
- Destroy use-control codes
- Prevent delivery and launch
 - Remove RVs or warhead compartments from missiles and store separately
 - Remove lugs, fins, and parachute from gravity bombs
 - Separate sections of artillery fired atomic projectiles (AFAPs) and store separately
- Destroy manuals and wiring diagrams
- Remove limited life components (i.e. tritium and deuterium gas bottles, batteries)
- In situ safing -- specific action would be warhead design dependent
- Damage internal components
- Spike or nail through capacitor
- Remove or disable critical components (i.e. firing sets, neutron generators)
- Remove or disable detonators
- Poison pit of primary
- Damage nuclear components
- Separate special nuclear material

Difficult -- Very effective -- Time consuming -- More knowledge required

Any of these steps would reduce safety and security risks associated with a nuclear weapon and could provide varying levels of protection against converting the residual components as a nuclear explosive. The usability of a nuclear weapon should be viewed as a continuum, ranging from use of an unmodified system in its intended mode to use of critical components of a demilitarized weapon (e.g., the intact pit) as an improvised nuclear device (IND). In the former case, the weapon would be assumed to be intact with coded information or access control information available to the user. In the latter case, the weapon is assumed to have been disabled (or demilitarized) to some degree, thus requiring the user to perform some modifications or "jury-rigging" in order to achieve a nuclear detonation.

In defining the mandatory degradation of "usability" which would be acceptable for various interim storage options, a threat definition and time frame for "usability reconstitution" (analogous to that which is currently used to set requirements for US security systems) must be specified.

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INVENTORYING AND TAGGING SOVIET WEAPONS.

Because of the potential for diverting even a few nuclear weapons to parties other than the legitimate and authorized custodians of nuclear weapons which may come to be in the custody of the republics, it is important that the responsible officials be able to account for all weapons on a continuing basis. Assistance in strict accountability and inventory control measures should be made available to those republics whose officials may have little or no experience in managing nuclear weapons but suddenly find themselves responsible for at least a small stockpile of nuclear weapons. Inventories and tags, as initial actions as well as continuous inventory control, represent an important part of the overall accountability which must be exercised. Those republics which declare intention of eliminating all nuclear weapons should be assisted in doing so and complete inventories and transparent accountability would build confidence in the view of others that neither operational weapons nor materials for building nuclear weapons were diverted to other parties.

In the present circumstances, for either the Center or the Republics, it could become important to employ tags (beacons) on nuclear weapons scheduled for elimination to provide capability for remotely tracking and locating weapons whose control has been lost to unauthorized persons.

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