

Policy Issues and Initiatives

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In this post-Cold War era, retiring and dismantling warheads and managing warhead materials will constitute a new type of mission for the Federal Government. As discussed in chapters 2 and 3, the Department of Energy (DOE) continues to dismantle nuclear warheads retired by the Department of Defense (DOD) as it has in the past. Yet, important differences in the purpose of dismantlement—including the domestic and international context in which it is being conducted—render this a fundamentally different endeavor from what it was during the Cold War.

One of the major differences is that changed national security requirements and arms control agreements between the United States and Russia have diminished the need to maintain as large a stockpile of nuclear weapons. Thus, the present objective of weapons retirement and dismantlement both here and in Russia is to reduce the nuclear weapons stockpile, rather than—as in the past—merely to update and maintain it.

Further, there is now an international dimension to the weapons dismantlement and materials management effort. Decisions by the United States on these matters could either enhance or diminish the opportunity to reduce risks to international security and the environment. The United States is attempting to encourage Russia and other former Soviet Republics to dismantle their nuclear weapons and safely manage the materials coming out of warheads. At some point, the United States may need to point to its own accomplishments in this area to set an example for other nations to follow. In other words, success in this new purpose may be important not only in the domestic arena but also in the international one.

Point

“Here. . . is another example of the policy and political process going totally backwards—technical debate among experts, exploring limited sets of alternatives prior to the formulation of key government decisions about national goals and policies.”

National public interest group
reviewer of OTA report

Counterpoint

“There are always those who would like to make a grand task out of a rather straightforward one—politics is sure to make anything difficult.”

DOE contractor official
reviewer of OTA report

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Failure to safely and securely dismantle retired warheads or to manage warhead materials here and abroad could have harmful consequences, in terms of both security and the environment, for the United States and the international community. To avoid these consequences, policies and programs are needed for dismantling warheads, and for managing the plutonium and highly enriched uranium from them, in a manner that reduces risks to national security, the environment, and human health.

The United States will have to define its national security objectives in the post-Cold War era with respect to nuclear weapons policy, and decide how best to conduct its own dismantlement programs so as to accomplish both domestic and international objectives. The United States will also have to develop the processes for determining what materials are surplus for weapons purposes and deciding how nuclear materials are to be managed over the long term. Finally, the United States will need to reshape its institutional structure so it can capably deal with nuclear materials from warheads.

At this time, the United States may still have an opportunity to assume a leadership role in ensuring that efforts to control the risks associated with nuclear weapons are initiated and carried out. However, if the United States does not act in a timely manner to define and implement a new policy of nuclear weapons dismantlement and materials management suitable to this post-Cold War era, changing international events may make it more difficult to have an impact on these matters in the future.

It is therefore important at this time that the policy basis for this new mission be declared at the top levels of Government, and that the mission be defined and articulated within the agencies responsible for implementing the policy. This can be done by the executive branch—initiated by the President and carried out by DOD and DOE—or Congress may take the initiative by directing the Administration to formulate a national dismantlement

policy and providing guidance as to its scope and content.

Congress and the Administration can take a number of steps to help meet the technical, institutional, and political challenges of warhead dismantlement and materials management here, and to cooperate with Russia in meeting similar challenges there. The Office of Technology Assessment (OTA) has developed a series of policy initiatives that could improve prospects for successful nuclear weapons dismantlement and materials management programs. Although legislative action could appropriately be taken with respect to all the initiatives, and funds would have to be authorized and appropriated to carry out most of them, important steps toward accomplishing many of the initiatives can initially be taken by the President and the responsible executive agencies. The initiatives address the following matters that would be useful in improving the present situation:

- establish a *national dismantlement policy* **that** includes the objectives and scope of such dismantlement and a decision on the amount of materials from retired and dismantled warheads that will be declared surplus;
- *strengthen DOE management* of current and near-term activities to enhance worker and public safety as well as environmental protection functions;
- *setup a process, and the appropriate institutional structures, for making and carrying out decisions about the storage and ultimate disposition of nuclear materials from warheads;*
- establish a new organizational structure to manage long-term materials disposition and other activities;
- *increase access to information* regarding dismantlement and materials management decisions that are of public concern and interest; and

- . determine approaches for *working cooperatively with Russia* to achieve mutually desirable outcomes.

These initiatives and some possible mechanisms for carrying them out, are discussed below.

A NATIONAL DISMANTLEMENT POLICY

The Nation needs, but does not have, a policy that sets forth clear, long-term goals for nuclear weapons retirement and dismantlement, and for management and disposition of materials from warheads. In addition to providing a broad framework for dismantlement and materials management, the Administration needs to decide on some specific features of future efforts. One such decision is the number of weapons to be retired and dismantled, and a time frame for completing dismantlement that is consistent with both safety and protection of human health and the environment. Another is the amount of plutonium and highly enriched uranium (HEU) currently available from dismantled warheads that is not needed to support nuclear weapons stockpile requirements, as well as the amount of such materials expected to accumulate incrementally and when dismantlement is completed. After these decisions are made, Congress and the Administration can begin to set objectives for long-term management of nuclear materials from warheads.

Openly developing and announcing a dismantlement policy could serve as confirmation to the international community that the United States is serious about disassembling most of its nuclear warheads and is willing to declare some of the materials from warheads as surplus no longer needed for strategic purposes. Statement of these policies will set an example that Russia's leaders could use to support similar dismantlement efforts there, as well as enhance prospects for further U.S.-Russian cooperation in setting and achieving mutual warhead dismantlement goals.

Setting Dismantlement Objectives

A dismantlement policy should specify the total number of weapons in the active stockpile that the Administration intends to retire and dismantle, and a time frame for the completion of their dismantlement. Announcing specific objectives and schedules will require careful coordination within the varied DOD and DOE organizational structures to make sure that all aspects are included and that the plan is practical, feasible, and safe from a technical and management standpoint. If a public document is issued, it will have to be carefully declassified, a task that will require additional time and resources.

The policy should clarify management responsibility and accountability within DOE and the contractor structure, and should provide uniform guidance to all field offices. Knowing what the entire dismantlement effort entails would allow for better planning and coordinating to incorporate safety and protection of the environment and human health into all operations. The projected cost of dismantlement could also be determined.

Determining and Disclosing Amounts of Surplus Materials

Once the number of warheads to be dismantled has been determined, the amounts of plutonium and HEU that must be managed will be known. An important part of the new dismantlement and materials management mission is to begin to move toward decisions about demilitarization and ultimate disposition of these nuclear materials from warheads. If policy is directed from the top levels of government, basic decisions about surplus materials could be made and announced in the near future, although the amounts may change as the international situation evolves.

Given the probability that the United States does not need to use all the plutonium and HEU from dismantled weapons to support stockpile requirements, it would be useful for DOE, DOD, and other involved agencies to determine as soon as possible the quantities of weapons plutonium

and HEU **that now exist-and are expected to exist** after completion of warhead dismantlement—that will not be required for any future strategic uses. After a decision is made about what materials are surplus for such uses, those materials can be put on an irreversible path to demilitarization, and some preliminary actions can be taken that will lead to ultimate disposition decisions.

To encourage this decisionmaking process, Congress could direct that an unclassified report be submitted to Congress, and updated annually, specifying the amount of plutonium and HEU on hand from dismantled warheads that will not be needed to support stockpile requirements. An unclassified report on the materials allocated to nonstockpile use would serve to inform the public of the amount of material that must be dealt with in both the near and the distant future, and could facilitate analysis and public discussion of the safe storage and ultimate disposition of such materials. In this post-Cold War era, disclosure of the amounts of surplus materials should be possible without threatening national security or aiding potential proliferators. However, it would require careful study and a sound declassification process. Some initial information on possible future surplus nuclear materials has already been released by DOE and this policy could build on those first steps.

Designating materials as excess to stockpile uses would also lay the foundation for working cooperatively with Russia to encourage a similar policy of placing surplus materials from weapons dismantled there on a permanent demilitarization path.

STRENGTHENING DOE MANAGEMENT

For weapons dismantlement and materials management policies to be successfully implemented, DOE must carry out its responsibilities in a manner that satisfies the public that protection of the environment, health, and safety is being achieved. Success in dismantlement and materials management will be judged not only on

whether DOE does its assigned job, but on whether it does it well from an environmental, health, and safety perspective. Thus, DOE must redefine its objectives in terms that will allow it to attain operational goals, while also meeting environmental requirements and expectations, and earning the public's trust. To do this, DOE must overcome the management assumption that, because dismantlement activities have been conducted for many years, nothing new or different is required in current or future operations. To ensure that DOE succeeds in doing so, both internal and external oversight of ongoing DOE activities will have to be strengthened.

Conduct of Dismantlement Programs

Although DOE is attempting to establish better environmental, safety, and health programs in its various operations, as described in chapter 3, the Defense Nuclear Facilities Safety Board has found that numerous problems persist where weapons dismantlement and materials management programs are being conducted. These findings point to a need for more vigorous efforts to upgrade environmental, health, and safety programs; to devote sufficient resources to these purposes; and to institute more effective training programs in connection with dismantlement and materials management. These factors strongly indicate that DOE; its Defense Programs Office, which has the responsibility for dismantlement; and its contractors who are involved in dismantlement and materials management programs will have to ensure that protection of the environment, safety, and health is a fundamental organizational objective.

To successfully accomplish this, there must be strong and visible management commitment to this objective at all levels—headquarters, DOE field offices, management and operations contractors, and subcontractors. The responsible DOE and contractor managers should institute a comprehensive environmental, health, and safety program in connection with dismantlement and

materials management. The key elements of such a program are the establishment of specific policies and procedures, and their implementation in day-to-day operations; a credible and open internal evaluation process; and incentives for accomplishing the desired results. To succeed, the program must have adequate resources, including well-trained personnel, funding, facilities, and equipment. And, as discussed below, expanded external oversight is also needed.

DOE and its field offices should be more involved with planning and evaluating operations at the sites. A planning and evaluation process is needed within DOE that has purview over the entire dismantlement and materials management mission (including both Pantex and Y-12). DOE could establish an environment, safety, and health policy planning group that encompasses the total dismantlement and materials management program. That group could then issue clear guidance to managers as to how to implement the results of the planning process at all levels.

To achieve this new operational mode, workers must understand clearly how each program activity affects environmental and occupational safety and health objectives. Individuals with operational responsibility for actual dismantlement and materials management must take on “ownership” of the mission of protecting environment, health, and safety, and must be empowered to identify and seek solutions for problems as they arise.

To protect worker safety and health during dismantlement and materials storage operations, managers responsible for operations should assign occupational safety and health matters a high priority, implement effective worker protection strategies, enforce standards of the Occupational Safety and Health Administration (OSHA), and maintain clear chains of command.

Continuous efforts to institutionalize these changes are needed. Central to this is the development of operational practices and procedures with the participation of all relevant personnel, and continuous training of all personnel involved. It is

also important to link personnel evaluations and rewards to environmental, health, and safety accomplishments, to provide strong incentives (monetary and otherwise) to achieve the desired results.

A vigorous internal audit and evaluation process is required to track accomplishments and identify areas for improvement. To this end, an organization and process should be established within DOE’s Office of Defense Programs to conduct regular audits, and evaluate environmental, health, and safety awareness as well as results. In addition, DOE’s Office of Environment, Safety, and Health should provide effective and continuous internal oversight.

External Oversight

To ensure continuous progress in the environmental, safety, and health aspects of current programs, it is necessary to have effective independent external evaluation and scrutiny by both technical experts and the public. Thus, it maybe desirable for Congress to authorize additional oversight of ongoing dismantlement and materials management activities by the Defense Nuclear Facilities Safety Board, which already provides oversight of nuclear safety and related matters.

Congress may wish to give the Board responsibility to evaluate and approve Safety Analysis Reports and Operational Readiness Reviews for each weapons dismantlement program before it begins, and to monitor each program to ensure compliance. The Board itself could develop a process to ensure that environmental, health, and safety guidelines are being followed during weapons dismantlement and materials management activities. Areas that are not now emphasized—including environmental monitoring and environmental health issues—deserve particular attention. The Board would need additional resources and personnel to expand its activities in these areas.

Congress may also wish to direct the Board to provide more opportunity for public involvement

in its oversight process. For example, instead of publishing final recommendations in the *Federal Register*, the Board could publish its draft recommendations and issue reports in unclassified versions, while more actively seeking public involvement in both processes. These actions would strengthen oversight and help assure communities that qualified outside parties are fairly and independently reviewing DOE's conduct of dismantlement and temporary storage activities.

With respect to worker health and safety, Congress could extend OSHA jurisdiction to DOE facilities. DOE's credibility would be enhanced if dismantlement and materials management activities were not subject exclusively to its jurisdiction. Until the necessary resources can be made available to OSHA, DOE's Office of Environment, Safety, and Health could invite it to conduct periodic reviews with respect to the warhead dismantlement and materials management program.

State oversight could be facilitated through better information exchange and increased funding. In addition, mechanisms through which interested citizens and experts could provide outside oversight at relevant sites should be considered. One such mechanism is establishment at a potentially affected site of a site-specific citizen advisory board, with full-time technical staff, to provide advice and input to DOE or other involved agencies on environmental, health, and safety issues relevant to warhead dismantlement and the temporary storage of warhead materials. This type of mechanism is discussed in greater detail in OTA's report *Complex Cleanup*, published in 1991.

NUCLEAR MATERIALS STORAGE

Permanent stockpile reduction means that fewer, if any, new weapons will be built in the future, which reduces the opportunity to recycle materials from disassembled warheads for use in other weapons. As a result, more materials from warheads must be managed for longer periods of time

than in the past. In particular, additional storage of materials such as plutonium pits and HEU must be provided. Some amount of both plutonium and HEU will have to remain in 'temporary storage,' most likely for several decades.

At present, plutonium pits and HEU removed from disassembled U.S. warheads are in the custody of DOE's Defense Programs and are stored at its Pantex and Y-12 plants, respectively. DOE views storage of pits at Pantex as temporary (6 to 10 years) but has yet to announce plans or a timetable for any longer-term arrangements. In contrast, indications are that DOE intends to continue storing HEU from dismantled warheads at Y-12 in Oak Ridge for the indefinite future. As explained in chapter 4, regardless of what decisions are eventually made about the disposition of plutonium and HEU from warheads, storage of these materials for several decades will be required.

Planning for long-term storage involves resolving many technical, regulatory, institutional, and perhaps international issues—some of which are not within the purview and expertise of DOE. Yet, DOE's planning for long-term materials storage is not well coordinated with other agencies, and decisions being made in connection with the Weapons Complex reconfiguration could limit future options. As outlined in chapter 5, concerns have been expressed about prospective storage arrangements. Lack of public information on this subject has made it difficult for interested citizens to evaluate the adequacy of existing storage, as well as any plans for future modifications in current arrangements. Unless potentially controversial issues are identified and resolved early, it may be very difficult to implement long-term storage arrangements in a timely manner.

The schedule for Federal Government funding, design, and construction of a new facility, or even modifying an existing one, can take more than a decade. It would therefore be prudent to begin now to identify and evaluate alternatives that could provide safe, long-term storage arrangements for materials from warheads. Such alterna-

tives might include upgraded arrangements or new facilities at various sites within or outside the Nuclear Weapons Complex. Once a national policy has been articulated, the next step is to determine how much plutonium and HEU will have to be stored over what period of time, and to provide capacity for that amount. Next, the form in which the material is to be stored should be determined since it is relevant to any future steps that would be taken. Finally, the infrastructure and materials processing capability necessary for a complete, safe, and modern storage facility must be provided.

Present plans appear to call for DOE to design a storage facility for plutonium pits that would be constructed on a Weapons Complex site and be operated by the Office of Defense Programs. Present plans also assume that the material to be stored in the new facility would be military in nature and thus not subject to licensing by the Nuclear Regulatory Commission or to regulation by OSHA. However, if many of the materials are at some point declared surplus, those assumptions would not necessarily apply.

Decisions about long-term storage of surplus plutonium and HEU from dismantled nuclear warheads involve many considerations that are not primarily within the purview of DOE. Such considerations include the scope of external regulation to which storage facilities and related activities should be subject, and the extent of transparency that may be needed to accommodate present or future U.S. foreign policy objectives. It would be desirable for these types of issues to be carefully considered early in the planning process by Federal agencies with primary responsibility for these matters. The early input of these and other agencies on relevant issues could help avoid problems later in the process.

To obtain this broad input, an interagency planning process could be constituted by the President to review the key issues surrounding storage of materials from dismantled U.S. warheads. One way to accomplish this is for the President to establish an interagency task force. If

placed at a sufficiently high level within the Federal Government, this task force could bring a national focus to the important task of providing safe and secure storage of materials from dismantled weapons for as long as necessary. The task force could make recommendations regarding the most effective way to ensure safe and secure long-term storage of the materials from warheads. In addition, the task force could evaluate related issues such as the feasibility and consequences of storing the surplus plutonium and HEU separately from materials reserved for stockpile requirements, and the means for effectively involving the public in the siting of any new or modified facilities that may be needed in connection with long-term storage. To ensure that an interagency planning process takes place in a timely fashion, Congress could express its support for this process and direct the President to transmit recommendations about long-term storage of warhead materials to Congress by a specified date.

The task force could be composed of representatives from DOE (including not only the Office of Defense Programs, but also the Office of Environment, Safety, and Health, and the Office of Intelligence and National Security), DOD (including the Corps of Engineers), the Environmental Protection Agency (EPA), Nuclear Regulatory Commission (NRC), Department of Labor (particularly OSHA), State Department, Arms Control and Disarmament Agency (ACDA), and the National Security Council. Representatives of State regulatory agencies could be invited to participate as appropriate. The task force could be headed by an official in the Executive Office of the President and work for a period of approximately one year. Although this is an ambitious schedule, time is of the essence if the short-term storage problem is not to become by default a long-term storage crisis.

The task force should actively solicit expert and public views, possibly through hearings and interactive meetings with interested parties outside government, throughout the course of its

work. Its draft reports could be submitted for public comment through the *Federal Register*. Extensive input from interested and potentially affected States should be solicited—possibly through an advisory panel composed of State representatives. Although these steps are time-consuming, they will help in obtaining relevant input early in the process so that issues raised can be properly addressed.

By expanding the planning process beyond DOE and including relevant expertise from other agencies, issues that DOE may not be factoring into its process are more likely to be considered. Environmental agencies such as EPA could encourage early consideration of issues such as pollution prevention, waste management, and environmental and radiation standards. Regulatory agencies such as the NRC should be able to bring to bear their experience in licensing analogous types of storage facilities. On the other hand, agencies that are actively involved in dealing with the international situation (such as the State Department and ACDA) could provide input about the likelihood and parameters of any transparency features that might be necessary. The States and the public could bring their perspectives to bear as well.

An important consideration in any future decisions involving storage is whether it would be feasible and useful to store surplus (nondefense) materials separately from those reserved for strategic purposes. A task force could weigh the advantages and disadvantages of separation from relevant viewpoints—international as well as domestic. The task force could also evaluate options for separate storage, such as whether such storage facilities should be located on the same or different sites, and whether strategic and surplus materials should be in the custody of the same or different agencies.

One potential consideration that should be weighed is whether separation of the two types of materials would facilitate transparency should bilateral verification or inspection be agreed on with respect to surplus weapons materials. In the

case of plutonium pits, the task force could consider whether it would be desirable to “de-classify” the shape and size of the pit, or the amount of plutonium in it, or whether the pits could be subject to nonintrusive monitoring or radiation measurements while in their containers. The task force could also consider whether physical separation of the civilian materials would more easily allow the United States to voluntarily render them subject to International Atomic Energy Agency (IAEA) safeguards—or perhaps even to place these materials under some level of IAEA management—should the United States and Russia ever reach an agreement to do so. Another consideration is whether separation of surplus materials from strategic ones would provide greater certainty to the public and to other nations that the surplus materials will not be used again for weapons.

Another factor for a task force to consider is whether, under current laws and regulations, the physical separation of U.S. civilian materials could facilitate subjecting these facilities and materials to the environmental, health, and safety requirements and standards applicable to all nonmilitary nuclear facilities—such as NRC licensing of any facilities in which the materials are to be stored—and also subjecting operations to NRC and OSHA regulation and oversight. The task force could also determine the legislative or regulatory changes that might be desirable to ensure that the materials will be stored and maintained under appropriate conditions so as to prevent accidents; protect the environment, health, and safety; and reduce worker exposure to radiation.

An important economic determination in terms of physical separation is the additional cost of security and safeguard measures. If civilian materials are stored at a different site from weapons materials, there will be duplication of security and safeguard services. Also consideration will have to be given to siting of a processing facility for plutonium pit maintenance, which DOE believes

must be located at the same site as a long-term plutonium storage facility.

The interagency task force would also be in a good position to recommend a process for further involving the public in choosing options for modifying existing facilities or selecting locations for new, long-term storage facilities. As analogous problems (such as the Waste Isolation Pilot Plant in New Mexico and the high-level radioactive waste repository proposed for Nevada) have shown, arriving at a suitable and publicly acceptable process to select a site for facilities to contain toxic materials involves many institutional issues that can be even more difficult to resolve than technical matters. A carefully thought-out process is necessary to secure relevant input early and continuously. Any process for siting new facilities (both storage and associated processing facilities) or modifying existing ones should be developed and initiated now with continuous public involvement. The task force can bring to bear on this controversial matter the combined experience of the various agencies in public involvement.

Instead of delaying public discussion of longer-term storage until DOE's long-delayed reconfiguration process takes its course, or limiting public involvement to procedures associated with the National Environmental Policy Act process, it would be prudent to facilitate early public involvement so as to identify issues that need to be resolved. The interagency task force could solicit State and public input, consider the important factors from different points of view, define the issues to be resolved, and recommend a broad-based process for involving the public in discussions of the key issues before decisions are made and funds committed.

NUCLEAR MATERIALS DISPOSITION

Although DOE considers plutonium and HEU from weapons to be national assets, there is no national policy on what should be done with them. Options have hardly begun to be analyzed

from a technical or institutional point of view, and there are wide differences of opinion about their merits, time and cost of development, and relative benefits. Today the discussion of disposition scenarios is often framed in terms of whether the materials are deemed "assets" or "waste." Rather than attempting to label the materials in this manner, it may be more useful to begin developing national policies and objectives for the disposition of surplus plutonium and HEU from warheads.

Thus, after a dismantlement policy has been established, a process should be initiated to bring together relevant governmental and nongovernmental views to provide the President and Congress with a comprehensive basis for making the policy decisions necessary before disposition of U.S. nuclear materials can be undertaken. Given the numerous political and technical uncertainties inherent in most of the approaches being discussed, definitive choices among potential options are difficult at this time. Nonetheless, it is prudent to start a process soon that looks toward long-term disposition of surplus U.S. nuclear materials, and considers the practical political and institutional realities of developing or applying particular technologies.

Although advocates of certain disposition technologies are optimistic that their favored technologies can be implemented successfully in certain time frames, many of the options being discussed at present are complicated and will be difficult to accomplish because economic and institutional issues, as well as technical ones, still have to be resolved. Institutional issues related to siting and other decisions have not been analyzed.

With respect to plutonium, storage will be required for several decades. Beyond that, however, it has not yet been determined whether plutonium should be stored indefinitely or used in some way (for either strategic purposes, commercial purposes, or both), or whether it should be disposed of expeditiously in whatever manner is feasible and acceptable. As indicated in chapter 4, some of the technologies being discussed in

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connection with plutonium disposition—such as advanced reactors and converters of various types—will take decades to develop, demonstrate, construct, and put into operation in the United States on a scale needed to accommodate the expected amounts of plutonium from warheads. Just as important, all of these technologies will produce waste in several forms—as spent fuel or other byproducts. At present, the Nation has no repository for such waste.

The situation with HEU, although somewhat different, also leads to the conclusion that storage will be necessary for a very long time. Although HEU can be blended down to low-enriched uranium (LEU) and used for commercial fuel, there is no present plan to do so with U.S. materials. Further, since the United States plans to purchase LEU blended down from Russia's HEU to fulfill some of its contracts for commercial reactor fuel, it is unlikely that the U.S. supply of HEU will be needed for this purpose any time soon. Therefore, storage will be necessary for these materials for some time to come, although eventually the United States may have to consider whether converting HEU for civilian use could have domestic or international advantages.

At present, as outlined in chapter 4, there are ongoing studies both within and outside DOE that address disposition scenarios for nuclear materials from warheads. Most of the discussions to date have been confined to the scientific community and have generally been conducted in technical terms. However, the analysis and selection of disposition scenarios encompass not only technical, but also public policy, issues. These issues range from facility siting, through the potential social, environmental, and economic costs and benefits of various approaches, to bilateral and international relationships, and perhaps ultimately even the future of nuclear energy. A process is needed for addressing these issues before decisions are made.

To get this process started, Congress or the President could create a national commission to recommend appropriate goals, policies, and pro-

grams relevant to the ultimate disposition of nuclear materials from warheads. A commission working over a period of approximately one year could gather the broad preliminary input from both public and private sources that is needed to inform the policy process. Such a commission should be composed of governmental and non-governmental experts, as well as public interest and community representatives and other interested parties. This type of broad representation is needed to identify the wide range of issues involved in planning for ultimate disposition of nuclear materials from warheads. A commission would also provide an effective forum for identifying the relationship between potential disposition scenarios and U.S. policies and objectives here and abroad.

The commission could seek broad input on formulating both the objectives themselves and the plans that should be made to meet them. The objectives with regard to plutonium might well be different from those with regard to HEU—but in both cases, defining the objectives can help determine the most effective actions and the priority accorded them. The commission can also help determine the consistency of individual scenarios with these objectives and with broader national policies. This process could help avoid public expenditures on options that are inconsistent with national policies or objectives.

The commission could also outline the steps that might be needed to meet its recommended objectives. For example, an objective to convert plutonium as quickly as possible into a form that is less available or less usable for weapons would call for developing or applying technologies that can accomplish this in a reasonably short time frame. It may be useful in that case to select relatively near-term approaches using the most developed technologies such as vitrification, other modest processing, or available reactor systems.

If, however, the objective is to destroy as much plutonium as possible over the long term, then the plutonium would have to be retained in secure

storage (and security costs would have to be considered) until more advanced technologies are developed that could bring about more extensive transformation of the elements or until other solutions can be implemented. In that case, the commission could attempt to define the level of effort needed to develop some of the advanced reactor or convertor options that would take longer to put into operation. Processes for handling and disposing of spent fuel or fission products would also have to be evaluated.

Advanced technologies associated with many of the disposition options will take decades to develop and cost a great deal of money. Before embarking on such programs, it is important to develop criteria against which options can be evaluated. Such criteria would include how well the processes and materials can be controlled and safeguarded, and how amenable they are to transparency in the interest of international cooperation. The commission could draw upon and expand the work of the interagency task force (discussed above) to develop and recommend criteria and indicate the priority that should be given to each.

Disposition of U.S. materials involves both short-term and long-term dimensions that require careful planning—particularly to prevent adverse environmental, health, and safety impacts. The commission could help identify and evaluate the relative advantages and disadvantages of individual options in protecting the environment, as well as human health and safety. It could also help assess technical availability—that is, how long, how expensive, and how difficult it would be to implement a particular option.

Most disposition scenarios would involve substantial processing of nuclear materials. Processing raises local environmental and public health concerns, as well as significant concerns about occupational health and safety. As discussed in chapter 5, one of the major objectives of public interest groups at DOE sites is to have the public included more actively, and earlier, in the decisionmaking process in order to better understand

the health and environmental impacts of DOE activities on the community.

Meaningful involvement by an informed public and the States could help achieve acceptable outcomes. The commission could provide an early forum for the expression of community concerns and for preliminary discussion of the risks, as well as the advantages, of possible technical options. The commission could also recommend a process for facilitating public access to relevant information, and for early and effective public involvement in important decisions—including the location of facilities (for storage, processing, and disposal) that may be needed in connection with the ultimate disposition of nuclear materials.

Finally, the commission could examine the relationship of domestic to international scenarios. For example, any proposal to convert U.S. HEU to LEU and use it in commercial reactors would have to be evaluated in light of the LEU that the United States is planning to purchase from Russia for commercial reactor purposes. Taking these and other interrelated factors into account is necessary if disposition scenarios are to be evaluated properly.

The commission's work could provide useful input to future national policy decisions by Congress and the President. As discussed below, decisions will then have to be implemented by an organization with the capability to carry out the necessary activities in a manner appropriate to today's post-Cold War context.

A NEW MATERIALS MANAGEMENT ORGANIZATION

In addition to decisions on storage and disposition approaches, there is a need to develop and put in place an institutional structure **capable of** carrying out storage and ultimate disposition activities over the long term. Dealing with surplus plutonium and HEU from dismantled warheads over the long term is a mission that requires management to meet a new set of technical,

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institutional, and political challenges. In addition to possessing adequate technical skills, the organization that undertakes this mission should have the capability to carry out activities in a manner different from that traditionally associated with the defense mission at DOE.

For much of its past history, for example, the DOE weapons production mission, which is military in nature, was largely self-regulating. In contrast, the mission of surplus nuclear materials storage and disposition is largely civilian in nature and will not only have to be conducted from the start in compliance with environmental, health, and safety laws and regulations, but will also presumably be subject to appropriate outside regulation and oversight by Federal agencies such as the NRC, EPA, and OSHA, and by the States. Any facilities—including those for storage and processing—involved in materials disposition could presumably be licensed by the NRC and subject to EPA and OSHA regulation even if located within Federal facilities. Thus, it would be appropriate to have as the responsible organization one that can capably plan and carry out its activities in a regulated setting—a mode of operation that has not been the norm in the DOE weapons production organization.

Also, in the past, Weapons Complex operations have been conducted under extremely restrictive information access procedures. In contrast, the organization responsible for nuclear materials management and disposition—while continuing to protect properly classified information—will have to develop new approaches to information availability and access such as those described below. In a new organization, these approaches could be shaped on the basis of civilian, rather than military, objectives. In addition, a new organization could engage in a more open decisionmaking process to conduct credible environmental and related analyses in connection with the development and selection of technologies, the selection of sites, and the management of ultimate disposition activities.

Further, the new mission of materials storage and disposition may have to be conducted in a manner consistent with whatever bilateral or international considerations become relevant in the future. A new organization dealing with ultimate disposition of nuclear materials from warheads could start with a well-defined mission that includes not only domestic but also international imperatives, and be structured from the outset to integrate international considerations into its programs and actions.

The responsibility for materials disposition could be assigned to a new organization that is given both the clear and primary mission of developing and implementing plans for ultimate disposition of surplus nuclear materials from warheads, and the personnel qualified to carry out that mission. Congress may wish to establish a new organization for materials management and disposition as a separate agency outside DOE. Or a new office could be created within DOU separate from and independent of the Office of Defense Programs—with a strictly civilian, non-weapons mission.

Alternatively, such an organization could be established within another Federal agency. To avoid past practices that led to widespread contamination at nuclear weapons sites, the new organization must take appropriate measures to conduct activities so as to minimize health and environmental risks. Because past policies have led to the inability to locate or operate nuclear waste repositories, the new organization will have to gain the acceptance and support of the American public. It is therefore important to develop a decisionmaking process that is open, fair, and responsive to public concerns, and the managers of the organization should be selected in part on the basis of their ability to operate in a mode that stresses openness and public involvement.

Although the establishment of a new materials management and disposition organization will take some time, the process need not delay ongoing dismantlement activities. The transition to a new organization could begin to be planned

at any time, and its implementation could await the formulation of a national dismantlement policy and completion of the interagency planning process for long-term materials storage discussed above.

An important advantage of giving materials disposition responsibilities to a new organization is that it can start with a “clean slate” and consciously approach its mission in a manner that would earn the public’s trust and confidence. A new organization would have the advantage of being able to give priority to institutional matters such as interaction with the public, building credibility through early and effective public involvement, and being genuinely responsive to public concerns. A significant advantage of a new organization that has a purely civilian mission is that it can deal with materials disposition issues pertinent to U.S. relations with Russia and the rest of the international community on civilian rather than on military terms.

INFORMATION ACCESS

As discussed in chapter 6, the present institutional context for dismantlement and materials management differs from that of the past. Although DOE still enjoys some degree of self-regulation over its nuclear activities under the Atomic Energy Act, many of its activities are now subject to environmental regulation and safety oversight. There is also more public scrutiny of whether DOE conducts these operations safely, with maximum protection of human health and the environment. To assure the public that this is being done, DOE (or a new organization discussed above) will have to make more information available than has been done during past activities dealing with nuclear weapons production.

In the interest of national security, legislative requirements have long prohibited public access to a broad range of information related to nuclear weapons. DOE and DOD also have discretion to further limit information access related to these

and other matters. While restricting access to data on nuclear weapons design and manufacture that could aid proliferators and terrorists continues to be important, the end of the Cold War raises the question of whether current restrictions on access to information that maybe relevant to dismantlement and materials management are still necessary.

This question is particularly relevant when it comes to disclosure of information regarding environmental, safety, and health issues associated with nuclear weapons dismantlement and materials management and disposition. Data that citizens consider essential to discussions of environment, safety, and health are often not accessible to interested persons outside DOE, because the data may be contained in documents that also contain classified or otherwise controlled information. A lengthy and meticulous review process is necessary to remove even small amounts of classified information from documents in order to release unclassified information to the public. As a result, the ability of the public to acquire adequate and timely information related to these activities has been impaired.

Another problem facing citizens is the generally slow and often inadequate responsiveness of DOE to many legitimate requests for information. Citizens frustrated by lack of information access are not likely to trust the agency in question or support its plans and programs. Yet such trust and support are critical if warhead dismantlement and materials disposition programs are to gain needed public acceptance.

Although there are several ongoing efforts within the executive branch—and particularly within DOE—to review information classification procedures and increase public access to information, Congress may wish to consider whether the existing legal basis for restricting access to information is appropriate in light of today’s post-Cold War national security objectives. Congress may also wish to provide additional resources to accelerate the declassification of documents and the enhancement of public

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access to information. In particular, Congress could consider enacting updated standards for dealing with information relevant to nuclear warhead dismantlement and materials management or disposition—particularly data relating to environmental, health, and safety matters—and require agencies to promulgate rules and adopt procedures consistent with those standards.

In preparation for possible legislative revisions, Congress could request DOE, DOD, and other involved agencies to prepare joint recommendations for comprehensive legislative provisions regarding access to information relevant to nuclear weapons dismantlement and materials management and disposition, particularly with respect to environmental, safety, and health issues. This effort could include a review of Atomic Energy Act provisions, and implementing rules and regulations dealing with ‘Restricted Data,’ ‘Formerly Restricted Data,’ and ‘Unclassified, Controlled Nuclear Information’ (UCNI). The agencies could be requested to recommend whether repeal or modification is necessary or appropriate in light of changed national security requirements. Recommendations could also be made for new legislative standards that would constitute the exclusive basis for restricting access to data and documents and for disclosing or disseminating information.

The review could also encompass the standards and procedures for national security classification and other categories of restrictions that may apply to nuclear warhead dismantlement and materials disposition. Depending on the nature of the recommendations, they could be implemented by revising existing laws, enacting a new law that would supersede conflicting sections of existing laws, issuing an Executive order, or promulgating new rules and regulations pursuant to the notice and comment requirements of the Administrative Procedures Act.

The rules could, for example, set up procedures for allowing general declassification requests for

certain types of information to be made by parties outside DOE. The rules could also establish procedures that place the burden on those who wish to retain classification status or other restrictions on information, and provide for resolution of issues in favor of disclosure. Since this may entail a more difficult and complicated process than exists at present, enhanced resources will be required.

Pending consideration and enactment of needed fundamental changes, Congress could require DOE to accelerate efforts to declassify or remove from the UCNI category appropriate documents that contain information relevant to issues of environment, safety, and health. Also, to emphasize the importance of information access, there could be established within DOE’s Office of Defense Programs an ‘office of declassification’ that would be responsible for issuing unclassified versions of classified documents and unrestricted-access versions of UCNI information.

There could also be established within DOE’s present Office of Classification an “office of information access.” The new office could be given the task of promptly investigating and addressing any complaints from the public about the timeliness of information requests regarding weapons dismantlement and materials disposition issues under the Freedom of Information Act or other procedures. The office could also anticipate public interest in forthcoming reports about dismantlement and materials disposition and related health and safety matters, and make sure that unclassified versions are issued.

Increasing information access at the agencies involved in warhead dismantlement and materials management would give interested parties the ability to examine the relevant data and to intelligently evaluate proposed decisions about warhead dismantlement and materials management and disposition. This in turn could result in more informed and effective public input to DOE’s decisionmaking process.

COOPERATION WITH RUSSIA

The United States cannot single-handedly reduce or eliminate all the security and environmental risks posed by nuclear weapons and materials since it does not control all weapons and materials worldwide. At present, most of the non-U.S. weapons and materials are in Russia.¹ As described in chapter 6, the United States has initiated a program of assistance to Russia with regard to safe, secure dismantlement, including the construction of a plutonium and HEU storage facility. In addition, an agreement is pending whereby Russia will convert its HEU from weapons into LEU and sell it to the United States. No clear policy exists in Russia for ultimate disposition of plutonium from weapons, but reports indicate that many officials favor technologies that will use the material in power-producing reactors.

The United States at present has not been able to verify what weapons have been or are planned to be dismantled in Russia, what quantities of weapons-grade nuclear materials exist or are being produced, and what is being done with materials from dismantled warheads. The United States will presumably maintain appropriate security and accountability systems for its own nuclear weapons and materials. However, similar results may not be easy to achieve abroad. Given these circumstances, the United States will have to decide whether its present initiatives and programs to assist Russia are adequately promoting national security objectives, or whether there is a need to develop different or additional approaches.

Past U.S. efforts to assist Russia with dismantlement and materials management have provided important opportunities for cooperation, but there is not yet a mature process for coordinating and focusing policy at the highest levels of government. The United States and Russia should agree on the most important immediate and

long-term objectives of each with respect to warhead dismantlement, and materials management and disposition. It is important to develop a plan for attempting to reconcile differing national objectives and requirements. Without such a plan, the United States may be implementing programs to assist Russia that have conflicting goals, lead to unexpected or undesired consequences, or do not address the most important issues.

Russia has indicated that it does not want the United States directly involved in the dismantlement of its warheads and that it wishes to construct its own materials storage facility (with U.S. design assistance). On the other hand, Russia has been willing to enter into an agreement with the United States on plans to sell uranium from Russian warheads and has not ruled out the possibility of cooperative efforts on approaches to plutonium disposition. There is now an opportunity to pursue such efforts, but it is not clear how long that opportunity will exist.

Developing a Strategy for Cooperation

It is in the national interest to seize the present opportunity and work cooperatively with Russia to achieve desirable outcomes, particularly with respect to plutonium disposition. A process is needed to ascertain the feasibility of U.S.-Russian cooperation in materials disposition efforts. If more active U.S. involvement were deemed prudent, choices would have to be made regarding the technologies that need to be developed or applied to meet desired objectives, and the amount and sources of funding to be devoted to these purposes would have to be determined. There may be fiscal benefits to establishing such policies early, and technology development could be focused on helping to achieve disposition options for Russian nuclear weapons materials consistent with international security objectives.

Since any cooperative programs involving Russia and the United States will ultimately

¹ While this report does not **specifically** address nuclear weapons in Ukraine, which are the subject of diplomatic efforts, U.S. initiatives similar to those discussed here could be considered with respect to Ukraine.

depend on mutual trust between the two nations, it is important for each nation to have assurance that the storage and disposition of nuclear materials from dismantled warheads are being managed in a manner that is safe and secure, and that protects against proliferation and prevents future use of the materials in weapons. Some type of reciprocal information disclosure and verification could greatly assist in strengthening and maintaining mutual trust and cooperation.

U.S. initiatives to assist Russia in materials management and disposition efforts so as to prevent proliferation are more likely to succeed if they are guided by a high-level, focused, national policy that calls for the United States to work cooperatively with Russia to achieve mutually acceptable disposition of both nations' surplus materials. To strengthen prospects for United States and Russian cooperation with respect to the disposition of materials from warheads, the President and relevant Executive agencies need to increase coordination at the highest levels to develop a strategy and plan for this purpose. The strategy should be aimed at identifying key issues and reconciling differing national objectives, requirements, and priorities. This would serve as a foundation for developing a mutually acceptable plan for disposition of Russian plutonium and perhaps for U.S. assistance in that effort.

Key components of an effective strategy should include strengthening the relationship between U.S. assistance in materials disposition programs and other programs in which assistance is desired by Russia; and developing and negotiating with Russia an initiative for mutual disclosure of information and for reciprocal arrangements to verify the amounts and monitor the status of these materials over the next decade. Another element of a strategy could be to strengthen the link between U.S. and Russian efforts in nuclear materials management and disposition.

Strengthening Cooperative Efforts

One approach to cooperating with Russia on key issues is for the United States to help Russia understand the nature of U.S. materials management and disposition efforts. Although U.S. objectives with respect to its own weapons plutonium and HEU maybe quite different from Russia's, joint deliberations on these subjects and joint technical studies may help Russia to understand what the United States is doing and to evaluate its own options. To accomplish this, coordination is especially necessary between agencies responsible for U.S. materials management and disposition programs and those responsible for U.S. policy toward Russia, and initial steps should be taken toward conducting joint studies and negotiating some reciprocal arrangements for materials monitoring.

To develop an effective relationship between U.S. and Russian programs, agencies (such as DOE) that are knowledgeable about U.S. materials management and disposition will have to work more formally and continuously with agencies (such as the National Security Council and the State Department) that shape and conduct U.S. relationships with Russia and other former Soviet republics on these matters. Strengthened inter-governmental coordination would help ensure that programs for U.S. dismantlement and materials disposition—as well as programs to assist and work with Russia in these matters—are carried out consistently with U.S. policies and are aimed at achieving mutually acceptable goals.

A joint U.S.-Russian effort to analyze and evaluate nuclear materials disposition technologies is one approach that could provide useful insights into the important immediate and long-term objectives of the United States and Russia with respect to the disposition of weapons materials. Such a project could be conducted over a 2-year period and be directed jointly by individuals from the United States and Russia, and the project team could include persons from all the relevant disciplines and also draw upon expertise

in Europe and in other nations. The team's work could be reviewed by an advisory panel composed of members from the Government, national laboratories, and industry; the scientific, academic, and environmental communities; and the public sector in the United States, Russia, and Europe.

The project team could also consider formulating a proposal for U.S. participation in developing and applying technologies deemed necessary to implement feasible disposition options in Russia, particularly options that could help demilitarize plutonium as soon as possible. In addition, technology sharing among the United States, Russia, and European or other nations with regard to disposition options can also help achieve cooperation in the ultimate disposition process, perhaps avoid options that could lead to proliferation, and help settle on approaches that promote nonproliferation as well as protection of the environment and health. It could also provide a foundation for future cooperative participation by the U.S. government and the private sector. A clear U.S. objective to encourage and assist Russia in converting plutonium, as soon as possible, into a form not usable for weapons could reasonably involve U.S. participation in developing technologies for that purpose—regardless of whether those technologies would be used for the disposition of U.S. materials.

Another approach may be to link efforts to work cooperatively on nuclear materials management and disposition with other efforts to assist Russia in some of its critical needs and interests not related to nuclear weapons dismantlement. For example, there are pressing environmental restoration needs in various parts of Russia. More active U.S. assistance in this and other areas deemed important by Russia could be part of the overall assistance offered with respect to materials management and disposition. Also, since political instability and economic concerns could directly affect the success of Russian dismantlement and materials disposition efforts, the United States may decide that spending more funds in

Russia would actually decrease the risk from nuclear weapons if it resulted in increased economic and political stability there. A flexible approach that aims to assist with some of Russia's priority needs may be more successful than some of the present programs, and could lessen criticism in Russia that U.S. programs are diminishing its international status or that the United States is attempting to dictate specific aspects of Russia's nuclear enterprise.

To strengthen and maintain mutual trust and cooperation, the United States should develop means, consistent with recent legislative provisions, that would enable Russia and the United States to exchange information about nuclear materials from warheads. This initiative could apply to the plutonium from dismantled warheads and also supplement any transparency arrangements made in connection with the agreement for the sale of Russian LEU to the United States for use in the commercial power market. Exchanging information about amounts of nuclear materials in the custody of each nation would help the United States better understand the dimensions of Russia's problems in managing these materials. Information exchange would enable the United States to offer any relevant assistance in accounting for the materials or keeping them safe and secure through whatever disposition processes Russia undertakes. Presumably, such information will not be volunteered by Russia without some offer of reciprocity on the part of the United States; thus a U.S. initiative in this direction will be needed.

In addition, Russia may soon begin to look to disposition options for its plutonium—options that may involve moving this material from place to place, processing it, and changing its form. U.S. concerns about preventing any of the Russian materials from getting into the wrong hands or causing serious environmental harm could best be addressed through arrangements that permit the United States to verify the amount and status of the plutonium in these various processes and to monitor the processes as appropriate. Again, it is

unlikely that Russia will agree to such monitoring without some reciprocity with respect to U.S. materials.

Thus, if an arrangement can be worked out that will not compromise the national security of the United States, bilateral reciprocal agreements entered into as soon as possible could forestall potential problems with respect to the nuclear materials from warheads in the former Soviet Union. Such arrangements would also enable the United States and Russia to cooperate in the common goal of preventing the proliferation of nuclear weapons. Finally, this approach could be effective in pursuing U.S. goals of international security.

CONCLUSION

The policy initiatives discussed in this chapter were developed from OTA's analysis of the

problems facing current efforts in dismantlement and materials management, as well as the opportunities that exist today to move forward and make significant progress in stockpile reduction and control of future risks. Box 7-A summarizes these conclusions and initiatives. OTA's analysis indicates that each initiative has individual merit and could be implemented separately. Alternatively, several or all of the initiatives could be implemented collectively. Congressional action in the form of legislation or oversight could begin the process for each, but most could also be implemented by the Administration directly. Success in safe dismantlement and adequate protection of people and the environment for generations to come is an important national goal—the Federal Government has a serious responsibility to meet that goal.

Box 7-A—Key Policy Conclusions and Initiatives

1. A National Dismantlement Policy

Conclusion

Although the responsible Federal agencies (DOD and DOE) have been carrying out warhead dismantlement and view this as business as usual, dismantlement and nuclear materials management in today's post-Cold War context constitute a new type of mission for which a national policy is needed to **guide future actions**.

Initiative

Develop and announce a national policy that sets goals **for warhead dismantlement and materials management, and specifies the amount of plutonium and highly enriched uranium (HEU) from dismantled warheads that will not be** needed to support future stockpile requirements.

2. Strengthening DOE Management

Conclusion

Although DOE is attempting to make improvements in its environmental, health, and safety practices, more attention still needs to be devoted to these matters in connection with warhead dismantlement and materials management.

Initiative

Implement DOE management system that gives priority to protecting the environment, health, and safety; expand and strengthen external oversight of DOE dismantlement and materials management activities by independent outside entities.

3. Nuclear Materials Storage

Conclusion

Since storage of surplus nuclear materials from warheads will be needed for several decades, and many issues outside the purview of DOE will have to be addressed before long-term storage can be implemented, an interagency planning process to identify and resolve these issues should begin as soon as possible.

Initiative

Establish an interagency task force that includes Federal agencies with expertise in regulatory, international, and public involvement matters to recommend a plan for safe and secure storage of nuclear materials, and to develop a process acceptable to the interested public for siting new or modified storage facilities.

4. Nuclear Materials Disposition

Conclusion

Consensus is lacking about whether surplus warhead materials should be stored indefinitely, converted into forms usable for commercial power generation, or **disposed** of as waste, and about the technical, economic, and political merits of various disposition options and technologies, and a process for openly discussing and reconciling diverse governmental and nongovernmental perspectives on these issues is needed.

Initiative

Create a national commission to recommend goals, policies, and programs for ultimate disposition of surplus plutonium and HEU from warheads, and to provide a basis for developing an ultimate disposition policy for those materials.

5. A New Materials Management Organization

Conclusion

Since carrying out programs for the ultimate disposition of surplus plutonium and HEU from dismantled warheads is essentially a civilian mission that will require not only technical skills, but also the ability to meet a new set of institutional and political challenges, the DOE organization that has been carrying out the weapons production mission is not well suited to take on the new materials disposition mission.

Initiative

Create a new organization outside DOE to manage surplus materials from warheads, or establish a new organization for this purpose within DOE or some other existing agency.

6. Information Access

Conclusion

Some of the restrictions on access to information relevant to warhead dismantlement and materials management may no longer be required in this post-Cold War context, and enhancing information access could increase public trust and confidence with respect to these activities.

Initiative

Review and possibly revise the existing legal basis for restricting access to information in light of today's post-cold War national security objectives, and accelerate efforts to increase access to information relevant to warhead dismantlement and materials disposition.

7. Cooperation with Russia

Conclusion

Although important steps have been taken to assist Russia with weapons dismantlement and materials management, a focused and coordinated strategy within the **Federal Government can improve prospects for cooperating with Russia** to develop a mutually acceptable plan for disposition of its plutonium.

Initiative

Strengthen the relationship between U.S. assistance to Russia for materials disposition and other programs in which assistance is desired by Russia; develop a means for joint assessment of plutonium disposition technologies; and negotiate mutual disclosure of information and reciprocal materials monitoring arrangements.