

US fissile material initiatives: Implications for the IAEA

Under two US initiatives, the IAEA would play a greater role in safeguarding fissile material that can be used for nuclear weapons

by
Fred McGoldrick

In a comprehensive statement of United States non-proliferation policy on 27 September 1993, President Clinton proposed a number of major new initiatives to help strengthen US policy and practice in this area of vital importance to US and global security and, more generally, to help reinforce the international nuclear non-proliferation regime. Some of these initiatives can and will be carried out by the United States acting on its own. Others must be a common effort by the United States and other countries if we are to build a more secure future for all humankind. Many of the proposed initiatives have important implications for the IAEA, and especially for its crucial role in applying international safeguards.

Key among the initiatives proposed by President Clinton are several designed to mitigate the continuing threat posed by weapons-usable fissile material. This article focuses on two initiatives in particular: US policy to deal with existing stockpiles of fissile materials including its intention to submit fissile material excess to US defense needs to IAEA safeguards, and the proposed global treaty banning the production of fissile material for nuclear weapons or other nuclear explosives.

Submitting excess fissile material from US weapons to safeguards

The United States has begun a process of submitting US fissile material no longer needed for the US deterrent or other defense purposes to inspection by the IAEA. As a nuclear-weapon State party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the United States is not obligated to place its nuclear activities under

IAEA safeguards. However, in 1980 the US concluded a safeguards agreement with the IAEA which makes eligible for safeguards all source and fissionable materials in all its nuclear facilities except only those facilities associated with activities of direct national security significance. Historically, the IAEA has typically selected for safeguarding one to three of the some 230 nuclear facilities that the US has made eligible for inspections. It is the US intent to place excess highly-enriched uranium (HEU) and plutonium from the US defense program under this US-IAEA voluntary safeguards agreement.

The Nuclear Weapons Council — an inter-agency US body charged with the responsibility of determining how much nuclear material is necessary to meet defense requirements — has made some initial decisions on what nuclear materials are excess and therefore eligible for safeguards. This will be a continuing process, and it is impossible to predict at this stage how long it will take.

Nuclear materials excess to defense requirements are located in a variety of facilities, some of which maintain a national security mission. Excess materials will need to be segregated from nuclear materials retained for defense purposes in order to permit IAEA inspection. They will also be in a variety of different forms including residues, spent fuel, HEU in metal form, and plutonium in oxide and metallic forms. Much of the material resulting from the dismantlement of nuclear weapons will be in the form of nuclear weapons components since the US presently has no facilities for converting such components into less sensitive forms.

The US is proceeding in a step-by-step fashion. As a first step in September 1994, the United States placed approximately 10 tonnes in non-sensitive forms of HEU located in Oak Ridge, Tennessee, on the eligible list of the US-IAEA safeguards agreement. The IAEA conducted its initial inspection the same month. The United

Mr. McGoldrick is the Principal Deputy Director of the Office of Nuclear Energy Affairs, US Department of State, Washington, D.C.

States informed the Agency that it would not remove such material from safeguards for nuclear explosive purposes.

The US has submitted several tonnes of plutonium in oxide and metallic form located in Hanford, Washington, and expects to submit additional quantities of plutonium at Rocky Flats, Colorado in the near future.

Submitting nuclear weapon components to IAEA safeguards will pose particularly challenging and as yet unresolved issues. If nuclear weapons components are to be inspected by the IAEA, the US and the IAEA must devise an inspection approach which will provide the IAEA with the opportunity for credible verification of the nuclear material concerned while at the same time protecting sensitive nuclear weapons design information.

The US is conducting two major reviews to address the issue of component inspection. In the first study, we are examining potential inspection and measurement alternatives to those involved in standard IAEA practices. Such approaches include verification of non-sensitive characteristics of weapons components, or confirmation of sensitive information without such information being revealed to inspectors. At the same time, a study is under way to examine whether revealing certain information about nuclear weapons components, such as mass, would involve serious proliferation risks.

The results of these studies will be closely co-ordinated to identify inspection options that result in a high level of verification while minimizing proliferation risk. The US intends to work closely with the IAEA in assessing the inspection options and in designing procedures which will provide a high degree of assurance to the international community that material removed from nuclear weapons and declared excess will not be returned to such use.

US-Russian joint summit statement. In addition to this unilateral step, President Clinton and President Yeltsin issued a joint summit statement on non-proliferation on 14 January 1994, in which

“They agreed among other things to establish a joint working group to consider steps to ensure the transparency and irreversibility of the process of reduction of nuclear weapons, including the possibility of putting a portion of fissionable material under IAEA safeguards. Particular attention would be given to materials released in the process of nuclear disarmament and steps to ensure that these materials would not be used again for nuclear weapons.”

They also agreed to consider including in their voluntary safeguards offers with the IAEA all source and special fissionable materials ex-

cluding only those associated with activities having direct national security significance.

In furtherance of the Presidents' statement, the US Department of Energy and the Russian Ministry of Atomic Energy announced on 16 March 1994 their intention to host reciprocal inspections to facilities containing plutonium removed from nuclear weapons. The US and Russian sides also registered their intention to conclude an agreement on the means of confirming the plutonium and HEU inventories from nuclear disarmament. They also noted that these inspections would be an important step in the process of establishing a worldwide control regime for fissile materials.

The United States and Russia have established two working groups to address fissile material issues. One is a working group on safeguards, transparency, and irreversibility (STI) which is examining specific measures to improve confidence in and increase the transparency and irreversibility of the process of reducing nuclear weapons. At their September 1994 summit meeting, Presidents Clinton and Yeltsin agreed that their two governments should also work together to:

- co-operate on a bilateral and multilateral basis, including through the exchange of appropriate information, to prevent illegal trade in nuclear materials and undertake measures to strengthen the regime of control and physical protection of such materials;
- exchange detailed information at the next meeting of the Gore-Chernomyrdin Commission on aggregate stockpiles of nuclear warheads, on stocks of fissile materials, and on their safety and security;
- direct their joint working group on STI to pursue by March 1995 further measures to improve confidence in and increase the transparency and irreversibility of the process of reducing nuclear weapons;
- facilitate broad co-operation among appropriate agencies in both countries to ensure effective control, accounting and physical protection of nuclear materials;
- facilitate co-operative programmes between US and Russian national laboratories in the areas of safety, physical protection, control and accounting of nuclear materials;

The US and Russian steps noted above can have only a salutary impact on arms control, non-proliferation, and international and regional peace and security. Some of these initiatives could also have a major impact on the IAEA as they will be the first cases in which the IAEA will play a role in verifying certain aspects of the disarmament process. Over time they will also have an important effect on the costs of IAEA

safeguards. Some argue that the benefits of safeguards in nuclear-weapon States are not commensurate with the costs. Such safeguards are in the security interests of all States. We must therefore find the resources for the application of safeguards to nuclear materials excess to defense needs.

Proposed treaty on the cut-off of production of fissile material

In his non-proliferation statement of 27 September 1993, President Clinton also called for an international treaty prohibiting the production of highly enriched uranium and the separation of plutonium for nuclear explosives or outside international safeguards.

In December 1993, the United Nations General Assembly adopted by consensus a resolution on the prohibition of the production of fissile material for nuclear weapons or other nuclear explosive devices. This resolution, *inter alia*,

- expresses the conviction of the international community that a nondiscriminatory, multi-lateral and internationally and effectively verifiable treaty banning the production of fissile material for nuclear weapons or other nuclear explosive devices would be a significant contribution to nuclear non-proliferation in all its respects;
- recommends the negotiation of such a treaty in the most appropriate international forum;
- requests the IAEA to provide assistance for examination of verification arrangements for such a treaty as required; and
- calls upon all States to demonstrate their commitment to the objectives of such a treaty.

The United States attaches great importance to the proposed treaty, and envisages a key role for the IAEA in verifying the commitments made pursuant to it. The purpose of such a treaty is to strengthen international nuclear non-proliferation norms generally, and to give constraints on weapons-usable nuclear material the additional weight of a binding international commitment. The United States believes the main undertakings of such a convention should include commitments to:

- refrain from producing fissile materials for use in nuclear explosive devices;
- refrain from assisting other States to produce fissile materials for proscribed purposes; and
- accept IAEA safeguards to verify the undertaking not to produce fissile materials for purposes proscribed by the treaty.

The United States believes that the treaty should be open to universal membership, and should be non-discriminatory in its provisions. The United States does not envisage the treaty as

prohibiting the production of HEU or the separation of plutonium for civil nuclear activities under safeguards. Nor does the US see the convention as requiring full-scope safeguards. It would, however, have the important effect of imposing a "cap" on the fissile material available to the treaty's members — both nuclear weapon States and non-nuclear weapon States — for nuclear explosives.

It is particularly important that the ban on HEU production and plutonium separation for nuclear explosives be credibly verified. The United States sees the IAEA as the appropriate agency to carry out this role. The safeguards measures themselves should be nondiscriminatory and applied in a similar manner in all States party to the treaty.

The verification of the basic obligations of the cut-off treaty raises a number of significant safeguards issues. A key question is what facilities and materials would be subject to safeguards under the treaty. There are various possibilities.

One option would apply safeguards to all reprocessing and enrichment facilities in States party to the treaty as well as the plutonium and HEU products of these plants. One question is how far through the fuel cycle safeguards should follow the HEU and plutonium. In order to provide credible verification of the basic undertaking of the treaty, safeguards would have to apply to these materials at least up to the point of their irradiation in a reactor. Safeguards would, of course, apply to any reprocessing of the spent fuel.

A second option would be a more extensive one in which safeguards would apply to all nuclear materials in a State party to the cut-off treaty except the unsafeguarded special fissionable materials produced prior to entry into force of the treaty. This would not be full-scope safeguards but would provide a greater level of assurance of the undertakings of the cut-off than would the first option. It would, however, raise the cost of verification.

A third approach would be a phased one which would start with the first option described above and move over time to a more extensive option. The broadening of safeguards coverage could take place according to a predetermined schedule, or the parties to the treaty could meet periodically to take a decision on whether and to what extent safeguards coverage should be expanded under the treaty.

It is also possible to consider certain transparency measures to supplement classical safeguards. For example, State Parties could declare the location of all nuclear activities in their territories, whether civil or military. Depending on which safeguards option is selected and on the

sensitivity of the activity, these declarations could range from a simple declaration of the location and purpose of facilities to detailed reporting on the nature of the activities and the quantities of nuclear material. Such transparency measures would, of course, be a complement to, not a substitute for, IAEA safeguards.

Clearly, States will have to weigh options such as these (and perhaps others) very carefully. Each has profound implications for the IAEA's safeguards system, as well as for the resources required, not only for the IAEA but for the States and operators being inspected.

Adequate verification of this treaty will require the IAEA to have the right to carry out its safeguards responsibilities to ensure against undeclared activities prohibited by the treaty. Special or challenge inspections under a cut-off treaty raise certain questions since States will have sensitive facilities on their territories. Perhaps some form of managed accessibility along the lines of that found in the Chemical Weapons Convention or other approaches should be examined for their applicability to the cut-off treaty.

Several important technical safeguards questions will also arise under a cut-off treaty. The treaty, as we envisage it, will prohibit the production of HEU, plutonium, and uranium-233 for nuclear explosives. It would not, however, prevent the production of tritium or the use of HEU for nonexplosive military uses such as naval reactors. In the case of tritium production, if safeguards were applied to HEU fuel in a reactor, inspections would have to be carried out without exposing information which States regard as classified.

The IAEA may also be called upon to safeguard old reprocessing facilities which were built to separate weapons grade plutonium for nuclear weapons programmes and were never designed to facilitate the application of safeguards. This will place significant demands on the Agency's ingenuity and resources. The IAEA will also take on some new tasks such as verifying that certain enrichment and reprocessing plants are shut down, and perhaps safeguarding enrichment facilities which are producing HEU. These challenges will require the development of new safeguards approaches.

Another important issue arising from the proposed cut-off treaty is what sort of legal instrument should be used to define the Agency's safeguards rights and obligations in verifying the undertakings of the cut-off treaty. In considering this question we must keep two facts in mind. First, the parties to this treaty will be nuclear weapon States, non-nuclear weapon States which have full-scope safeguards agreements; and non-nuclear weapon States which have cer-

tain unsafeguarded nuclear activities. Second, whatever the legal form or forms of the safeguards arrangements chosen, the verification of the treaty's undertakings must be nondiscriminatory in its effect. The safeguards obligations of nuclear weapon States, NPT parties, and States without a full-scope safeguards agreement must be the same under the treaty.

The United States does not expect that a cut-off treaty and its associated safeguards arrangements will be concluded over night. Many issues need to be thoroughly vetted and resolved not only with respect to the safeguards aspects of the treaty but also a number of other treaty-related issues. Nevertheless, the U.S. strongly favors moving forward in negotiating this treaty as expeditiously as possible.

The United States and Russia have already taken steps in advance of the cut-off treaty to cease production of fissile materials. Both countries have ceased the production of HEU for nuclear weapons. In addition, in June 1994, US Vice President Gore and Russian Prime Minister Chernomyrdin signed an agreement providing for the shutdown of plutonium production reactors and the cessation of the use of newly produced plutonium for nuclear weapons. Under this agreement all plutonium production reactors in both countries will cease operations no later than the year 2000. The US has ceased production of plutonium for nuclear weapons and has already shut down its production reactors, and under this agreement the Russians have pledged to cease operation of their three remaining production reactors at Tomsk and Krasnoyarsk. In October 1990, Russia also has ceased production of plutonium for nuclear weapons. The US and Russia are now studying ways to develop replacement sources of heat and electricity to enable the Russian reactors to shut down on schedule. In addition, the two sides are developing procedures necessary to ensure that plutonium produced by these production reactors before shutdown will not be used in nuclear weapons. The parties also agreed to strive to reach agreement on the earliest possible total cessation of the production of plutonium for use in nuclear weapons.

We hope that all States producing unsafeguarded fissile material could take similar positive steps in advance of the conclusion of a cut-off treaty.

There is little doubt that a cut-off treaty, once in effect will have profound impact on the IAEA's safeguards responsibilities. It will greatly increase its inspection activities and could result in a significant increase in the resources required for the safeguards function of the IAEA. Most importantly, it will greatly expand the Agency's contribution to an effective international non-proliferation regime. □