

WEAKER U.S. EXPORT CONTROLS ON BOMB-GRADE URANIUM: CAUSES, CONSEQUENCES, AND PROSPECTS*

A. J. Kuperman
Nuclear Control Institute
1000 Connecticut Ave. NW, Suite 400
Washington, DC 20036
and
LBJ School of Public Affairs
University of Texas
Austin, TX 78703

ABSTRACT

In summer 2005, the United States loosened restrictions on the export of bomb-grade, highly-enriched uranium (HEU) to five countries (Canada, Belgium, France, Germany, and the Netherlands) for use as targets to produce medical isotopes. The new law represents a step backward from the quarter-century U.S. effort to phase out commerce in bomb-grade uranium to reduce risks of nuclear proliferation and terrorism. This paper first investigates the actors behind this change – including foreign producers of medical isotopes, their U.S.-based lobbyists, supportive sectors of the American medical community, and the lawmakers who spearheaded efforts on Capitol Hill – and their motivations. Second, it explores the dramatic and complicated legislative process that led to this weakening of export controls. Third, it projects the likely consequences in the short and long run for U.S. HEU exports, risks of nuclear terrorism, and the production of medical isotopes in the United States and elsewhere – assuming the new law remains in place. Finally, the paper examines prospects for additional changes in U.S. HEU export control law, either to further loosen restrictions on export of HEU for targets and/or fuel, restore previous controls, or adopt new strategies to phase out HEU commerce.

1. Introduction

In summer 2005, the United States loosened restrictions on the export of bomb-grade, highly-enriched uranium (HEU) to five countries (Canada, Belgium, France, Germany, and the Netherlands) for use as targets to produce medical isotopes. The new law represents a step backward from the quarter-century U.S. effort to phase out commerce in bomb-grade uranium to reduce risks of nuclear proliferation and terrorism. This paper first investigates the actors behind this change – including foreign producers of medical isotopes, their U.S.-based lobbyists, supportive sectors of the American medical community, and the lawmakers who spearheaded efforts on Capitol Hill – and their motivations. Second, it explores the dramatic and complicated legislative process that led to this weakening of export controls. Third, it projects the likely consequences in the short and long run for U.S. HEU exports, risks of nuclear terrorism, and the

* Presented to the 27th Annual International Meeting on Reduced Enrichment for Research and Test Reactors (RERTR), Boston, MA, November 8, 2005.

production of medical isotopes in the United States and elsewhere – assuming the new law remains in place. Finally, the paper examines prospects for additional changes in U.S. HEU export control law, either to further loosen restrictions on export of HEU for targets and/or fuel, restore previous controls, or adopt new strategies to phase out HEU commerce.

2. Who Pushed for Weaker Controls?

The primary agitator for weakening U.S. export controls on bomb-grade uranium was the Canadian company MDS Nordion, the world's largest producer of medical isotopes and main supplier of such isotopes to the U.S. market. Nordion sought to escape from a U.S. anti-terror and nonproliferation law (the Schumer Amendment to the Energy Policy Act of 1992) that required recipients of U.S. HEU to convert their reactor fuel – and their targets used to produce isotopes – from HEU to low-enriched uranium (LEU), which is unsuitable for weapons. Although Nordion had pledged in 1990 to design its new production facility to use LEU targets [1], it broke this pledge, then dragged its feet on converting the target design while the facility was being built in the 1990s, and finally in 2003 halted cooperation with the RERTR program's LEU target development effort, on grounds that conversion would be too expensive and interrupt operations now that the facility was completed and would be radioactive. [2,3] The new Nordion facility still has yet to begin commercial operation due to safety concerns with its associated new Maple reactors that have blocked their licensing and thereby prevented irradiation of the targets. In the meantime Nordion continues to produce isotopes with a decades-old reactor and processing facility, which also rely on targets of HEU supplied by the United States.

The 1992 U.S. law explicitly barred exports of HEU in the absence of an LEU conversion program for the recipient in order to promote the phase out of dangerous commerce in bomb-grade uranium, stating:

The [Nuclear Regulatory] Commission may issue a license for the export of highly enriched uranium to be used as a fuel or target in a nuclear research or test reactor only if, in addition to any other requirement of this Act, the Commission determines that---(1) there is no alternative [LEU] nuclear reactor fuel or target enriched in the isotope 235 to a lesser percent than the proposed export, that can be used in the reactor; (2) the proposed recipient of that uranium has provided assurances that, whenever an alternative nuclear reactor fuel or target can be used in that reactor, it will use that alternative in lieu of highly enriched uranium; and (3) the United States Government is actively developing an alternative nuclear reactor fuel or target that can be used in that reactor.

The 1992 U.S. law appeared to give Nordion only two choices in the long-run: resume cooperation with the United States on conversion to LEU targets or halt production of isotopes. But Nordion devised a third option: change the U.S. law. Nordion hired Washington, DC attorney James Glasgow, a former U.S. government

official, who in 2003 drafted an amendment to water down the anti-terrorism export restrictions. [4]

To sponsor the bill in Congress, Nordion enlisted then-Rep. Richard Burr (D-NC) in 2003. Burr later explained his sponsorship on grounds that he had been lobbied by radiologists at Wake Forest University's medical school, located in his congressional district. Doctors and officials at the school had also donated \$30,000 to his campaigns over the preceding six years. [5] In addition, Burr was a well-known supporter of the nuclear industry, which had contributed \$66,500 to his campaign in the preceding election cycle, making him the 7th highest recipient from the industry among all 435 members of the House of Representatives. [6]

Nordion established the U.S.-based Committee on Isotope Supply, sponsored by the Council on Radionuclides and Radiopharmaceuticals (CORAR), Inc. The committee is nominally based in Moraga, CA, but is chaired by Grant Malkoske, a Nordion vice-president in Canada. [7] It lists the aforementioned James Glasgow as its “Consultant - Legislative Language.”

Nordion also hired a Washington, DC-based lobbying firm, the Alpine Group, Inc., which donated more than \$25,000 to the members of the congressional energy committees overseeing the HEU export-control legislation. [8] Two of Alpine’s employees, James D. Massie and Richard C. White, are listed by CORAR as “Congressional Lobbyist” for Nordion’s U.S.-based committee. [7] Alpine’s Richard White also ghost-wrote a lobbying letter to U.S. legislators signed by members of the American College of Nuclear Physicians (ACNP). [9] His hidden hand came to light when ACNP members forwarded the letter to Congress as a word-processing file but forgot to change the file’s properties section, which lists the “author” as Rich White. The lobbyists also recruited help from the Society of Nuclear Medicine, in Reston, VA, which posted a draft letter for its members to send to Congress. [10] The letter’s properties section likewise indicates that the letter’s author, Courtney Johnson, also works for the Alpine Group.

Nordion recruited to its lobbying effort another top producer of medical isotopes, Mallinckrodt, which is headquartered in Missouri but produces isotopes in the Netherlands. Mallinckrodt’s facility in the Netherlands has not recently depended on U.S. HEU exports, instead using an existing stock of HEU. But the company may anticipate a potential future need for HEU, either because of losses during the production process or expansion of production, because in 2003 it successfully pressured its home-state Senator Christopher (“Kit”) Bond (R-MO) to sponsor the Nordion amendment in the Senate. [5] The company also may fear that conversion to LEU targets by any large producer could compel it to follow suit.

3. Scare Tactics

Nordion garnered the support of many American physicians, who in turn prevailed on many members of Congress, based on the false claim that unless the Burr-Bond amendment were adopted, the 1992 law could interrupt the supply of medical isotopes in the United States. This was a misleading scare tactic on several grounds. First, in 13 years under the 1992 law the United States had never rejected a single license application to export HEU for use as targets to produce medical isotopes. Second, the 1992 law explicitly permitted such exports so long as the recipient cooperated towards eventual conversion of its production process to LEU targets. Third, the current peak capacity for global isotope production is 250 percent of current demand, and Nordion is the only major isotope producer in recent years to rely on U.S. exports of HEU. [11] Thus, even if the United States were to halt HEU exports to Nordion for refusing to cooperate on conversion to LEU, other global producers could ramp up production temporarily to prevent an interruption in the U.S. supply of isotopes, while longer-term solutions were arranged. Fourth, Nordion maintains a stockpile of HEU sufficient for targets to produce isotopes for at least two years, so even if U.S. exports of HEU were halted suddenly the other producers would have at least two years – more than sufficient – to arrange to satisfy the U.S. demand for isotopes without interruption. For all these reasons, Nordion’s claim that the 1992 law threatened to interrupt the U.S. supply of isotopes was patently false.

4. Machinations in Congress

In 2003, Rep. Burr successfully attached the Nordion-drafted amendment to the House energy bill in committee, and Sen. Bond attached it to a separate Senate environment bill in committee. When a House-Senate conference attempted to forge consensus on the energy bill, it substituted a “compromise” version of the Burr amendment that does not differ substantially from the original because it was negotiated by two legislators who supported the original amendment’s intent, Rep. Burr and Sen. Pete Domenici (R-NM). Most importantly, both versions of the amendment waive the 1992 law’s restrictions as they pertain to HEU exports for isotope production in five states: Canada, Belgium, France, Germany, and the Netherlands.

The revised version of the Burr amendment does have a few minor differences: (1) It does not permit the Nuclear Regulatory Commission to expand the list of states subject to the waiver; (2) The National Academy of Sciences must report on the feasibility (including cost) of producing isotopes without HEU; (3) The Secretary of Energy must then report if any companies will supply the U.S. market with isotopes produced without HEU; (4) If production of isotopes without HEU is feasible but not occurring, the Secretary of Energy must investigate options for domestic production of isotopes without HEU; and (5) When U.S. isotope requirements can be met by producers without HEU, no further HEU export license applications will be considered.

Although the revised amendment appears to create a path toward phasing out HEU exports, it is riddled with loopholes that could obstruct this outcome and perpetuate HEU exports indefinitely – and even facilitate their increase. Four of the states receiving waivers are in the European Union, so the amendment opens the door for U.S. HEU to be retransferred to 21 other EU member states without notification under the terms of the U.S.-Euratom nuclear cooperation agreement, and to additional states as the EU expands. Ironically, the United States has expended considerable resources to remove HEU from some of these states to reduce risks of nuclear terrorism. The amendment also contains at least four loopholes under which conversion of isotope production to LEU would be deemed “unfeasible,” so that HEU exports could continue: (1) If producers refuse to cooperate in testing LEU targets at their facilities; (2) If conversion would increase their costs more than 10 percent; (3) If the process of converting their facilities would temporarily interrupt the supply of isotopes; or (4) If they cannot already satisfy the entire U.S. isotope requirement without HEU. These loopholes eliminate the incentives in the 1992 law for producers to cooperate on conversion to LEU targets. It is true, as I have argued previously, that if one or more maverick companies chose to produce the entire U.S. isotope requirement without HEU, the amendment would halt further exports of HEU for isotope production. [3] But the amendment eliminates the other incentives for companies to pursue this path.

The energy bill stalled in Congress in 2003 for reasons unrelated to the HEU provision but was revived two years later. In 2005, committees in both houses included the revised Burr amendment in their versions of the energy bill. But on June 23, 2005, the full Senate voted 52-46, approving an amendment sponsored by Senators Charles Schumer (D-NY) and Jon Kyl (R-AZ) to delete the Burr amendment. Notably, this was the only vote ever by either house of Congress on the Burr amendment itself, and it was a clear rejection. The chairman of the House energy committee, Rep. Joe Barton (R-TX), also expressed concerns about the Burr amendment, especially because the U.S.-Euratom agreement effectively would expand the number of states eligible to receive U.S. HEU exports from five to 26. Barton worked with Rep. Ed Markey (D-MA), a staunch opponent of the Burr amendment, to develop a substitute that would delete the Burr amendment and restore the intent of the 1992 law. But Sen. Domenici precluded this possibility. Rather than defending the Senate’s position in conference, Domenici opposed it and persuaded all other Republican Senate conferees to do likewise. As a result, on July 19, 2005, the Senate conferees voted 10-4 to restore the Burr amendment that had been rejected by the full Senate and was opposed by the chairman of the House energy committee. [12] Domenici’s staff told the House committee staff that he refused to reopen discussions on the provision. [13] The energy bill, including the Burr amendment, was passed by Congress on July 29, 2005, and signed into law by President George W. Bush on August 8, 2005.

5. Undermining RERTR and the War on Terror

Enactment of the Burr amendment threatens to undermine in several ways the RERTR program’s longstanding goal of phasing out commerce in bomb-grade uranium,

and thereby undermine the war on terror. Most obviously, the Burr amendment will perpetuate U.S. HEU exports to the Canadian company Nordion, the only isotope producer that currently receives such exports. Under the 1992 law, these exports were to terminate as soon as Nordion could convert to LEU targets, or sooner if Nordion refused to cooperate on such conversion. The United States now annually exports to Nordion approximately 20 kg of HEU, an amount expected to grow with the expansion of isotope production if Nordion does not convert to LEU targets.

The Burr amendment likely also will foster U.S. HEU exports to additional producers. In the past, isotope producers in Belgium and the Netherlands did not qualify for U.S. HEU exports because they refused to cooperate on conversion to LEU targets, so they instead relied on their own dwindling stocks of HEU. It was anticipated that in the near future, as these companies consumed their HEU stocks and/or expanded their isotope production, they would face strong incentives to convert to LEU targets. Indeed, Mallinckrodt seriously explored the feasibility of such conversion. But the Burr amendment has removed the foreign companies' main incentive to convert because they now will qualify for U.S. HEU exports. As a result, U.S. HEU exports for isotope production could more than triple.

In addition, emerging producers of medical isotopes who had planned to use LEU targets may now instead demand U.S. HEU exports on grounds of non-discrimination, citing the Burr amendment's erosion of the norm against HEU commerce. Similarly, operators of research reactors that have converted, or are in the process of converting, their fuel from HEU to LEU may reverse course and demand U.S. HEU exports. If the United States refuses, these operators could seek HEU from Russia, and Washington would have little ground to object given the precedent of the Burr amendment. All told, annual worldwide HEU commerce could increase by several hundred kilograms – sufficient for several nuclear weapons each year – and continue indefinitely instead of being phased out as envisioned prior to the Burr amendment. Given the relatively lax security at civilian nuclear facilities, the ease of making a nuclear weapon with HEU, and the expressed will of groups like al-Qaeda to acquire and use such weapons, the specter of increasing HEU commerce raises grave concerns for international security and the war on terror.

6. Prospects for Further U.S. Action

The U.S. commitment to the RERTR program's goal of phasing out HEU commerce has fluctuated over the last two decades. In the late 1980s, funding was eliminated for development of advanced high-density LEU fuels, in acquiescence to operators of high-power reactors who required such fuel to convert but did not want to convert. But soon after, the United States restored this funding and expanded its commitment to phase out HEU commerce. In 1989, the RERTR program started developing LEU targets to replace HEU targets for the production of medical isotopes. In 1992, the Schumer Amendment mandated the phase-out of all remaining U.S. HEU exports, either gradually through development of advanced LEU fuels and targets, or

immediately if recipients refused to commit to convert to LEU or if the RERTR development program again were terminated. In the 1990s, the United States also extended the RERTR program to facilitate conversion of reactors in, and supplied by, China and the former Soviet Union, so the phase-out of HEU commerce could be global in scope. The attacks of September 11, 2001, heightened U.S. concerns about potential nuclear terrorism, spurring the Department of Energy to create the Global Threat Reduction Initiative (GTRI) that incorporated, and significantly increased funding for, the RERTR program. [15, 16] Unfortunately, enactment of the Burr amendment represents a step backward in the U.S. commitment to phase out HEU commerce.

Looking ahead, there are four plausible trajectories for U.S. policy on HEU exports. First, the Burr amendment could be viewed as a justified and circumscribed exception to the longstanding U.S. objective of phasing out HEU commerce, so this exception would be sustained but not expanded. A second possibility is that other current and potential HEU users – including operators of high-power reactors and isotope producers outside the five states in the Burr amendment – could successfully appeal for similar exemptions from the 1992 U.S. HEU export control law and/or the 1986 NRC order requiring conversion of domestic licensed reactors, on grounds that their operations are neither less important nor more risky than those covered by the Burr amendment. This could lead to a steady erosion of the RERTR program's main achievement of sharply reducing HEU commerce over the last 27 years. Third, the United States could reverse the Burr amendment to reestablish restrictions intended to phase out all remaining U.S. HEU exports. The justification for such a reversal would be that the Burr amendment would otherwise “undermine support of the U.S. HEU minimization policy and nuclear export control system,” as stated by the Department of Energy's then-Deputy Administrator for Defense Nuclear Nonproliferation, Paul M. Longworth, in a July 15, 2005 letter to the Union of Concerned Scientists. [17] Finally, the United States could develop a domestic isotope production capacity that does not rely on HEU and is sufficient to satisfy U.S. requirements. If successful, the United States would be required under the Burr amendment to terminate further licensing of HEU exports for isotope production.

All four scenarios are plausible, but the trend of U.S. policy over the last quarter-century suggests that restrictions on HEU commerce are more likely to strengthen than weaken over the long run. At its founding in 1978, the RERTR program initially focused on the modest goal of converting low-power, U.S.-supplied, foreign research reactors from HEU to LEU fuel. Since then, the scope of the conversion program has been expanded repeatedly to include the following: high-power, U.S.-supplied, foreign research reactors; domestic research reactors; research reactors in and supplied by China and the former Soviet Union; and medical isotope production. Although there have been temporary delays and even backward steps along the way as users of HEU resisted conversion, these obstacles consistently have been overcome. For example, conversion to LEU fuel originally was opposed by operators of licensed U.S. reactors, DOE reactors, and high-power European reactors such as HFR-Petten, but each group has since been compelled to cooperate towards conversion.

The most likely path forward, therefore, is that the United States either will repeal the Burr amendment's exemption of foreign isotope producers from HEU export restrictions or develop a domestic capacity to produce isotopes without HEU, thereby halting further U.S. exports of HEU for isotope production. In either case, foreign isotope producers would face strong incentives to convert their production processes from HEU to LEU, to avoid interruption in their production and/or maintain market share.

7. Conclusion

The case of the Burr amendment demonstrates that a single foreign company – by throwing sufficient money at U.S. legislators and lobbyists, and employing sufficiently misleading scare tactics – can achieve a weakening of U.S. national security law to avoid temporarily the expense and inconvenience of converting from HEU to LEU. But it is unlikely that Nordion's success on the Burr amendment will enable the company to remain economically viable for very long without converting to LEU, given the likely trajectory of U.S. policy. If the United States repeals the Burr amendment's exemption for foreign isotope producers, Nordion will have to resume work on conversion to qualify for HEU exports in the interim. If the Burr amendment remains law, the United States may develop a domestic capacity to produce isotopes without HEU, which would terminate HEU exports to Nordion.

Even if the United States neither repeals the Burr amendment nor develops a domestic isotope production capacity, maverick foreign isotope producers could still capture the U.S. market from Nordion by converting to LEU. As I argued last year, although the Burr amendment was intended to and now has hindered the effort to phase out HEU for isotope production, it also endorses a principle that the United States should exclusively purchase medical isotopes produced without HEU when that becomes possible. [3] At some point, one or more far-sighted companies will produce a sufficient quantity of isotopes without HEU to capture the U.S. market, while remaining producers who rely on HEU will suffer significant losses in market share.

Nordion is likely to respond to the Burr amendment by further postponing or completely terminating its stalled effort to convert from HEU to LEU targets. But that would be a pyrrhic victory, because in so doing the company would sabotage its prospects of retaining dominance of the U.S. market and thereby threaten the long-term financial viability of its isotope production activities. Thus, ironically, despite its victory on the Burr amendment, Nordion still faces the same stark choice: convert to LEU or ultimately perish.

References

- [1] J.B. Slater, General Manager, Major Facilities Business Centre Operations, AECL Research, “The Program on Future HEU Supply for AECL’s Radioisotope Production Operation,” submitted in support of XSNM-02667, December 4, 1990, available at <http://www.nci.org/05nci/11/Full%20page%20fax%20print.pdf>.
- [2] Alan J. Kuperman and Paul L. Leventhal, NCI, letter to Chairman Nils J. Diaz, NRC, February 26, 2004, available at <http://www.nci.org/04nci/03/Nordion-NRU-letter-4th-License-amend.htm>.
- [3] Alan J. Kuperman, “The Global Threat Reduction Initiative and Conversion of Isotope Production to LEU Targets,” presented to the 26th Annual International Meeting on Reduced Enrichment for Research and Test Reactors, IAEA, Vienna, Austria, November 8, 2004, available at <http://www.nci.org/05nci/08/domenic04/InternationalRERTRconference-2004-Paper.pdf>.
- [4] “Addition of a new Section 4030 to Subtitle B of Title IV,” March 12, 2003, available at <http://www.nci.org/05nci/08/IndustryDocuments/2003BurrAmendmentdraftedbyGlasgow.htm>.
- [5] R. Jeffrey Smith, “Measure Would Alter Nuclear Nonproliferation Policy: Energy Bill Provision Backed by Two Firms Would Ease Constraints on Exports of Bomb-Grade Uranium,” *Washington Post*, October 4, 2003, p. A2, available at <http://www.fairopinions.com/news/index.asp?id=190277>.
- [6] “Hot Waste, Cold Cash: Nuclear Industry PAC Contributions to the Members of the 108th Congress,” Public Citizen’s Critical Mass Energy and Environment Program, May 20, 2003, available at <http://www.citizen.org/documents/ACF6B48.pdf>.
- [7] “Committee on Isotope Supply,” available at <http://www.nci.org/05nci/08/IndustryDocuments/LobbyingCoalitionforBurrAmendment.pdf>.
- [8] Information tabulated by Union of Concerned Scientists based on data from the Center for Responsive Politics, available at <http://www.nci.org/05nci/08/IndustryDocuments/UCS-LobbyistContributionsToKeyLegislators.pdf>.
- [9] Letter from Carol S. Marcus, president of the California chapter of the American College of Nuclear Physicians, to U.S. Senator Barbara Boxer, March 25, 2003, available at

- <http://www.nci.org/05nci/08/IndustryDocuments/LobbyletterdraftedbyAlpine-March2003.htm>.
- [10] "Action Alert: Support HEU Export For The Purpose Of Medical Isotope Production," June 11, 2003, available at <http://interactive.snm.org/index.cfm?PageID=538&RPID=971>
- [11] "Production of Fission Isotopes in the World," chart from Henri Bonet and Bernard David, Institut National des Radioéléments, Belgium, "Production of Mo-99 in Europe: Status and Perspectives," presented at 9th International Topical Meeting on Research Reactor Fuel Management (RRFM), Budapest, April 2005, available at <http://www.nci.org/05nci/08/OtherDocuments/Noshortageofisotopeproductioncapacity.pdf>. See also, letter from Henri Bonet to the Honorable Joe Barton, John D. Dingell, Pete Domenici, and Jeff Bingaman, July 20, 2005, clarifying that peak production levels cannot be sustained for extended periods given existing reactor operating cycles and target-processing capacity.
- [13] Alan J. Kuperman, "The Energy Bill's Gift to Terrorists," *New York Times*, op-ed, August 11, 2005, available at <http://www.nci.org/05nci/08/domenic04/NYToped-TheEnergyBill'sGifttoTerrorists.htm>.
- [14] Personal communication with Congressional staff, July 24, 2005.
- [15] U.S. Department of Energy, "Department of Energy Launches New Global Threat Reduction Initiative; Will accelerate and expand the security and removal of proliferation-sensitive materials," Vienna, Austria, May 26, 2004.
- [16] "Global Threat Reduction Initiative Highlights," available at http://www.usun-vienna.usia.co.at/Statements/Global_Threat_Reduction_Initiative_Highlights.htm.
- [17] Letter from Paul M. Longworth, Deputy Administrator for Defense Nuclear Nonproliferation, U.S. Department of Energy, to Dr. Kurt Gottfried, Union of Concerned Scientists, July 15, 2005, available at <http://www.nci.org/05nci/08/domenic04/DOELetter-July2005.gif>.