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NRC Rulemaking: Nuclear Proliferation Assessments
Docket ID: NRC-2010-0372 Agency: NRCRIN: PRM-70-9

March 7, 2011

Secretary, U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001
ATTN: Rulemakings and Adjudications Staff

Dear Colleagues:

I direct the Washington, DC, office of the James Martin Center for Nonproliferation Studies and have worked in the field of nuclear nonproliferation for over 30 years, including service as a Special Counsel at the Nuclear Regulatory Commission and as Assistant Deputy Administrator for Arms Control and Nonproliferation at the National Nuclear Security Administration.

These comments **in support of the above APS Rulemaking Petition** are presented in my personal capacity and not as those of the James Martin Center for Nonproliferation Studies or its affiliated institutions.

I. Proposed Rule

The petition requests a change in NRC fuel cycle facility licensing regulations in Title 10 of the Code of Federal Regulations, Part 70 "Domestic Licensing of Special Nuclear Material," Subpart D "License Applications," Section 70.22 "Contents of Applications" to include the requirement that applicants for licenses to construct or operate enrichment or reprocessing facilities provide a Nuclear Proliferation Assessment as part of their application. The specific wording of the proposed change is:

> 70.22o Nuclear Proliferation Assessment.
> Each applicant for the license of an enrichment or reprocessing facility shall include an assessment of the proliferation risks that construction and operation of the proposed facility might pose.

The goal of the proposed change is to require the Commission to review this assessment and thereby examine fully and specifically the proliferation consequences of issuing the requested license. Thus implicit in the rule petition is the expectation that the Commission will comment on this subject in its final ruling on licensing the facility in question, most likely as part of its

[1] Affiliation given for identification purposes, only. Comments are personal, not those of the position of the James Martin Center for Nonproliferation Studies.

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determination as to whether the construction or operation of the facility will be inimical to the common defense and security.

Because the applicant will not have access to classified information, including intelligence information on proliferation trends, it is assumed that in reviewing the assessment, the Commission will go beyond the document itself and take into account classified information pertaining to proliferation risk relevant to the licensing action. By implication, both classified and unclassified versions of the Commission's judgment regarding the assessment would normally be required.

The proposed rule change is made in the context of a pending license application by GE-Hitachi Nuclear Energy for the construction of a first-of-a-kind laser isotope separation (LIS) facility in Wilmington, North Carolina. As detailed below, this facility raises important proliferation concerns. For the proposed rule to be applicable in this instance, *it would be necessary for it to apply both to all pending and all future fuel cycle facility licenses.*

II. Background and Cause for Concern

(Because the United States does not engage in commercial spent fuel reprocessing activities, these comments focus on the construction of enrichment facilities, only.)

The role of uranium enrichment in the proliferation of nuclear weapons is well known and as current as today's headlines regarding weapons-relevant nuclear activities, past and present, in Iran, North Korea, and Libya. Indeed, at this time, uranium enrichment is the preferred path to nuclear weapons for proliferant states, in no small part because the current enrichment technology of choice, gas centrifuges, can be operated in facilities that can be relatively compact and lack other observable signatures, making them highly difficult to detect.

It is worth recalling that despite the best efforts of the world's leading intelligence agencies:

- Iran's gas centrifuge uranium enrichment program, including key facilities, went largely undetected from 1985 to 2002;
- Iran successfully masked its planned uranium enrichment facility at Qom for several years; and
- North Korea, whose uranium enrichment activities were thought to have slowed by the end of the Bush Administration, surprised the former head of Los Alamos National Laboratory in late 2010 by showing him what it claimed to be a complete gas centrifuge enrichment plant that it had secretly built at Yongbyon -- the most assiduously watched nuclear site in the country.

Enrichment facilities capable of producing weapons-grade uranium using laser isotope separation would some 70 percent smaller than comparable centrifuge plants. This would make detection all but impossible and underscores the extraordinary dangers posed by this technology. Indeed, if LIS becomes available for clandestine nuclear programs, *the United States could find itself in the same situation it confronts with respect to foreign biological weapon activities* – having to base judgments as to the status of foreign nuclear programs on little more than speculation and surmise.

There is ample evidence, moreover, that would-be nuclear weapon states are aware of the potential for laser enrichment. Iran, for example, has secretly experimented with this technology for decades, and it was also one of the enrichment options investigated by Iraq.[2]

III. The Demonstration Effect of Successful Introduction of LIS in the United States

The very commercial promise of SILEX for GE-Hitachi poses its greatest proliferation risk. If the technology were to prove a winner, what would happen next? Other states would naturally want to have LIS facilities of their own, and not all such states would want them for benign purposes. Use of SILEX, itself, would probably spread to friendly states through GE-Hitachi commercial deals, under strict rules. But even in this disciplined environment, as more and more technical employees, contractors, and subcontractors learned the technology, it would become the harder to control. This was the process through which gas centrifuge technology was compromised, leading to the success of the Pakistani nuclear weapon program and subsequent proliferation of the technology to Libya, Iran, and North Korea.

It should be stressed that even the most closely guarded U.S. enrichment technology – the U.S. gaseous diffusion uranium enrichment barrier – was on the verge of being compromised in 2008. As noted by the U.S. Department of Justice:

> **Restricted Nuclear Materials to Foreign Government** – On June 18, 2009, Roy Lynn Oakley, of Harriman, Tenn., was sentenced in the Eastern District of Tennessee to six years in prison for unlawful disclosure of restricted data under the Atomic Energy Act in connection with his efforts to sell materials used in the production of highly enriched uranium to a foreign government. Oakley pleaded guilty to this offense on Jan. 26, 2009. Oakley had worked as a contract employee at the East Tennessee Technology Park (ETTP), in Oak Ridge, Tenn., which was previously a Department of Energy facility that produced highly enriched uranium. While employed at ETTP, Oakly stole restricted nuclear materials from the facility and offered them for sale to the French government. The French government officials did not pursue the purchase of these items. The FBI launched an undercover investigation posing as an agent of the foreign government and arrested Oakley after he offered them the nuclear materials in exchange for $200,000 cash. The materials involved were pieces of equipment known as "barrier" and associated hardware items that play a crucial role in the production of highly enriched uranium. The investigation was conducted by the FBI and Department of Energy.[3]

The intensified pursuit of LIS following a successful demonstration of the technology in the United States would not be confined to friendly nations, however: demonstrated practicality here will galvanize new investment in LIS around the globe, including in states of particular proliferation concern, which now are pooling their resources. Moreover, less developed states seeking to exercise their "inalienable right" to pursue the peaceful uses of nuclear energy will clamor for access to LIS technology and claim they are being discriminated against by the efforts of the United States or others to restrict transfers of this know-how.

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[2] Charles D. Ferguson and Jack Boureston, "Laser Enrichment: Separation Anxiety," *Bulletin of Atomic Scientists*, March/April 2005, also noting clandestine LIS experiments by South Korean scientists in 2003.

[3] U.S. Department of Justice, Fact Sheet: Major U.S. Export Enforcement Prosecutions (2007 to the Present), October 2009.

Indeed, this "demonstration effect" is the crucial danger posed by construction of a commercial LIS facility in the United States. The Commission in reviewing the Proliferation Assessment Statement must carefully weigh this dimension of the Wilmington facility – and any other proposed LIS facilities.

Were the United States to forgo development of LIS technology on the proliferation grounds, it may be added, the decision would not be unique. Since the late 1970s the United States has prohibited commercial reprocessing of spent fuel because of concerns that embrace of that technology in this country would encourage others to follow suit, creating significant proliferation risks.[4]

IV. Guidance on Implementing New Rule

In light of the foregoing, the Commission, in adopting the new proposed rule, should also provide the following guidance regarding its implementation, requiring that the assessment address:

1. The role that the technology utilized in the applicant's proposed facility has played in the past proliferation of nuclear weapons.

2. If the technology is novel, the potential of the technology, if adopted outside the United States, to facilitate proliferation.

3. U.S. and international measures that have been or will be implemented to reduce the risk that the technology utilized in the applicant's proposed facility will contribute to proliferation (e.g., inclusion of the technology in the export control guidelines of the Nuclear Suppliers Group).

4. How such U.S. and international measures to reduce the risk of proliferation will be more effective than those applied to other fuel cycle technologies that have previously contributed to proliferation.

5. If the technology is novel, the "demonstration effect" of introducing the technology in the United States, that is, the encouragement that successful U.S. introduction will provide to other states to replicate the technology and the potential proliferation risks of such developments.

Conclusion

The construction of enrichment facilities in the United States raises a number of inherent proliferation risks. Given the on-going dangers of the spread of nuclear arms, in particular to states hostile to the United States and its allies, it is essential that the Commission give intensive consideration to proliferation issues when licensing new fuel cycle facilities. The proposed rule, by requiring license applicants to prepare Nonproliferation Assessments will help ensure that this crucial dimension receives the attention it deserves.

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[4] See, James Acton, "Nuclear Power, Disarmament and Technological Restraint," *Survival*, Vol. 51 No. 4, August-September 2009, pp.101-126, for an excellent discussion of the proliferation risks posed by LIS, the dangerous impact of a demonstration of the technology in the United States, and the rationale for a U.S. decision to refrain from deploying this technology.

Rulemaking Comments

From: Spector, Leonard [lspector@miis.edu]
Sent: Monday, March 07, 2011 3:53 PM
To: Rulemaking Comments
Subject: Comment re Docket ID NRC-2010-0372 Francis Slakey/American Physical Society
Attachments: Spector Comments Docket ID NRC-2010-0372.docx

Dear Colleagues:

Please find attached my comments on this pending rulemaking.

Thank you.

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