

Petition for NRC Rule Change

The American Physical Society is filing a petition to request the following rule change: that the Nuclear Regulatory Commission include proliferation assessments as part of the licensing process.

In order to address the points required in an NRC rule change request, the petition is broken into three parts:

- I. Background on the Petitioner
- II. Petitioner's Concerns
- III. Petitioner's Specific Request for a Rule Change

I. Background on Petitioner:

The American Physical Society (APS), established more than 110 years ago, is the nation's leading organization of research physicists, with more than 48,000 members in academia, national laboratories, and industry. APS is not an advocacy organization; rather, as clarified in its mission statement, it "strives to be the leading voice for physics and an authoritative source of physics information for the advancement of physics and the benefit of humanity." It is within this spirit that APS submits its petition to the NRC.

APS has a long and distinguished history of speaking publicly about issues surrounding both nuclear power and nuclear weapons. Its involvement with such issues is appropriate given that it was physicists who were centrally involved in the creation of nuclear weapons and who continue to be involved in the U.S. nuclear weapons complex and the use and development of nuclear power.

Historically APS has strongly supported nuclear power, but it has also emphasized that nuclear power and nuclear materials must be deployed in a safe, secure and responsible manner. Several public APS statements speak to the Society's position on nuclear issues and the way in which energy security, national security and non-proliferation are coupled:

"A balanced energy policy... requires that the Department of Energy have strong programs to keep the nuclear energy option open."ⁱ

"Nuclear reactors themselves are not the primary proliferation risk; the principal concern is that countries with the intent to proliferate can covertly use the associated enrichment or reprocessing plants to produce the essential material for a nuclear explosive."ⁱⁱ

"Today's increasing demand for clean, affordable energy demands renewed positive emphasis on nuclear power."ⁱⁱⁱ

“The Administration should urgently address the challenge of how to increase global reliance on nuclear energy without increasing the risks of nuclear proliferation.”^{iv}

Consistent with its publicly stated support of nuclear power and its positions on nuclear non-proliferation, APS believes its petition for an NRC rule change is in the energy and national security interests of the United States.

II. Petitioner’s Concerns:

On February 18, 2010, the APS Panel on Public Affairs (POPA) released a report entitled “Technical Steps to Support Nuclear Arsenal Downsizing”.^v The membership of the Study Group that drafted the APS/POPA “Downsizing” report comprises some of the country’s leading experts on both the technical and policy issues related to nuclear power, nuclear weapons and proliferation. They have served in key positions in the IAEA, on treaty negotiating teams and on on-site inspection teams. They have also contributed to the R & D of technical safeguards at our national laboratories.

In the APS/POPA “Downsizing” report, the select Study Group took special note that:

“Over the next several years, the Nuclear Regulatory Commission will be reviewing license applications for new technologies that could carry substantial proliferation risks.”^{vi}

Specifically, the Study Group found that some of the new technologies could represent proliferation game changers since they would lead to smaller more efficient methods for the production and use of nuclear materials that would be more difficult to detect. One example is laser isotope separation, which, according to company comments and presentations,^{vii} is both 75% smaller and substantially more energy efficient than centrifuge technology. Consequently, the technology has raised proliferation concerns.^{viii} The current NRC Chairman, Gregory Jaczko, acknowledged this concern in a recent interview:

“It’s a very new technology, or a novel technology. It’s not similar to the kinds of enrichment facilities we’ve licensed in the past. So, I certainly think there may be some things we need to take a look at and make sure we’ve got the right approach to ensuring that kind of protection of the technology and the material.”^{ix}

The APS Study Group is not the first to conclude that new technologies could pose unique proliferation risks.^x A briefing from the IAEA, in particular, highlighted the issue of the detection of covert facilities and the inadequacy of existing detection technologies.^{xi} Indeed, the IAEA is sufficiently concerned about this issue that it established a division specifically tasked with improving detection technology.^{xii} The U.S. National Nuclear Security Agency (NNSA) has also established a program tasked with carrying out R&D to improve detection technology, with one effort dedicated to detecting laser enrichment.^{xiii}

In light of its concerns about the impact of new enrichment technologies on proliferation and to understand how proliferation concerns affect decisions on licensing, the Study Group requested and received a briefing from NRC.^{xiv} Based upon the briefing the Study Group concluded in the APS/POPA “Downsizing” report that:

“While the NRC has laid out a compelling strategic plan that appears to include nonproliferation at the proper level of importance, it is critical that the NRC make nonproliferation a priority, in fact and in practice. At this time, based on publicly available NRC documents, nonproliferation is not an obvious part of the license evaluation.”^{xv}

In other words, the NRC is not formally required to consider nonproliferation as part of its licensing process. The Study Group considered this a serious omission and therefore the APS/POPA report recommends that NRC directly address non-proliferation threats of new technologies in the licensing process.

III. Petitioner’s Specific Request for Rule Change:

Because the NRC will be considering license applications for nuclear technologies that are smaller, more efficient and harder to detect -- thus increasing the risk of proliferation -- APS considers it timely to request that NRC rules be amended to formally require non-proliferation assessments as a step in evaluating licenses.

The non-proliferation assessments can be included in the *Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility - Final Report* (NUREG 1520 Revision 1) as follows:

Under Section 1.2.3, Areas for Review, create a new bullet to state the following:
“Proliferation Review: The application should include sufficient technical information to permit an assessment of the risks that construction and operation of the proposed facility might pose.”

Non-proliferation assessments would be within the jurisdiction of the NRC. According to Section 103 of the Atomic Energy Act (AEA) of 1954, as amended, the NRC should evaluate whether the issuance of a license “would be inimical to the common defense and security or to the health and safety of the public.”^{xvi} (emphasis added) Assessing the proliferation risks of technology is consistent with this NRC obligation to ensure the common defense and security of the public.

In the case of enrichment facilities in particular, if the designs are not adequately secured then there is a risk of repeating the type of breach that led to A.Q. Khan’s taking centrifuge designs to Pakistan – an occurrence that has directly impacted the defense and security decisions of the US government. Therefore, one question an NRC non-proliferation assessment of enrichment facilities must address is:

- Can both the facility design and core technical discoveries be secured against theft?

This question is of critical proliferation concern in the event that the facility can be used to fabricate weapons grade fissile material, all its components are dual use, and it is potentially undetectable in its construction and operation.

Such non-proliferation assessments would also be consistent with NRC's own Strategic Plan. The NRC's 2008-2013 Strategic Plan (NUREG-1614) notes that the NRC will:

“... coordinate with Federal and international counterparts to provide appropriate security and control to prevent the proliferation of special fissile materials and nuclear technology and to reduce the potential for harmful use of high-risk radioactive material.”^{xvii}

Carrying out nonproliferation assessments as part of the NRC licensing process is consistent with the Strategic Plan's intent to assure U.S. and international counterparts that proliferation is being appropriately considered and controlled.

It is also consistent with the Strategic Plan's mandate that the NRC “remain vigilant of the security of nuclear facilities and materials” and that it achieve its “common defense and security goal using licensing and oversight programs similar to those employed in achieving its safety goal.”

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ⁱ Position of the APS Council since 1993: http://www.aps.org/policy/statements/93_7.cfm.

ⁱⁱ “Nuclear Power and Proliferation Resistance: Securing Benefits, Limiting Risks”, APS/POPA Report, 2005: <http://www.aps.org/policy/reports/popa-reports/proliferation-resistance/upload/proliferation.pdf>.

ⁱⁱⁱ “Readiness of the US Nuclear Workforce for 21st Century Challenges”, APS/POPA Report, 2008: <http://www.aps.org/policy/reports/popa-reports/upload/Nuclear-Readiness-Report-FINAL-2.pdf>.

^{iv} “Nuclear Weapons in 21st Century US National Security”, APS/AAAS/CSIS Report, 2008: <http://www.aps.org/policy/reports/popa-reports/upload/nuclear-weapons.PDF>.

^v “Technical Steps to Support Nuclear Arsenal Downsizing”, APS/POPA Report, 2010: <http://www.aps.org/link/downsizing.cfm>.

^{vi} Ibid, p 20.

^{vii} <http://www.silex.com.au/public/uploads/announce/House%20of%20Reps%20Presentation%20090206.pdf>.

^{viii} John Lyman, “Enrichment Separative Capacity for SILEX,” Los Alamos National Laboratory, LA-UR-05-3786.

^{ix} Laser Nuclear Technology Might Pose Security Risk, by Richard Harris, April 12, 2010, <http://www.npr.org/templates/story/story.php?storyId=125787318>

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- ^x For example: Houston G. Wood, Alexander Glaser, R. Scott Kemp, “*The Gas Centrifuge and Nuclear Weapons Proliferation*,” *Physics Today*, September 2008; R. Scott Kemp, briefing to APS/POPA committee: <http://www.aps.org/policy/reports/popa-reports/loader.cfm?csModule=security/getfile&pageid=212695>; Martin B. Kalinowski, University of Hamburg, committee briefing: <http://www.aps.org/policy/reports/popa-reports/loader.cfm?csModule=security/getfile&pageid=212699>.
- ^{xi} Julian Whichello, IAEA, briefing to APS/POPA committee: <http://www.aps.org/policy/reports/popa-reports/loader.cfm?csModule=security/getfile&pageid=212701>.
- ^{xii} N. Khlebnikov, D. Parise, and J. Whichello, “*Novel technologies for the detection of undeclared nuclear activities*,” IAEA-CN-148/32.
- ^{xiii} Rhys Williams, “NA-22: Program and R&D Overview,” briefing to APS/POPA committee: <http://www.aps.org/policy/reports/popa-reports/loader.cfm?csModule=security/getfile&pageid=212697>.
- ^{xiv} Brian Smith and Mike Tschiltz, briefing to APS/POPA committee, April 22, 2009.
- ^{xv} “*Technical Steps to Support Nuclear Arsenal Downsizing*”, APS/POPA Report, 2010, page 21: <http://www.aps.org/link/downsizing.cfm>.
- ^{xvi} Atomic Energy Act of 1954, as amended, Sec. 103. Commercial Licenses.
- ^{xvii} NRC Strategic Plan Fiscal Years 2008-2013 At-A-Glance, p 12.