POLICY ISSUE
(Notation Vote)

August 24, 2007 SECY-07-0146

FOR: The Commissioners

FROM: Luis A. Reyes
Executive Director for Operations ***/RA/***

SUBJECT: REGULATORY OPTIONS FOR LICENSING NEW URANIUM CONVERSION AND DEPLETED URANIUM DECONVERSION FACILITIES

PURPOSE:

To seek Commission approval of staff's recommended regulatory options for licensing new uranium conversion and depleted uranium deconversion facilities.

SUMMARY:

The U.S. Nuclear Regulatory Commission (NRC) staff is anticipating that commercial entities will submit license applications within the near-term for new uranium conversion and depleted uranium deconversion facilities. On March 22, 2007, the Commission issued a Staff Requirements Memorandum (SRM) stating that NRC would license future major fuel cycle facilities licensed under Part 40 (e.g., uranium conversion and depleted uranium deconversion facilities). The SRM also requested the staff to propose options for imposing 10 CFR Part 70, Subpart H, requirements for uranium conversion and depleted uranium deconversion facilities.

To be prepared to license these new facilities, NRC staff has identified three licensing issues that need to be considered. The first issue is what mechanism NRC should use to assert licensing jurisdiction over facilities that may be proposed in Agreement States. The second

CONTACT: Timothy C. Johnson, NMSS/FCSS
(301) 492-3121

issue is whether NRC should establish by rulemaking, or by the issuance of orders, licensing requirements, equivalent to the performance requirements in Part 70, Subpart H, for new uranium conversion and depleted uranium deconversion facilities. The third issue is whether the performance requirements in Part 70, Subpart H, should be imposed on the existing Honeywell uranium conversion facility in Metropolis, Illinois, the International Isotopes, Inc., facility in Idaho Falls, Idaho, and other existing uranium conversion and deconversion facilities.

BACKGROUND:

Conversion/deconversion facilities are licensed under Part 40 because they possess and use source material. In addition, if sealed sources containing byproduct material are used (e.g., for instrument calibration or use in gauges), the facilities would also need to be licensed under 10 CFR Part 30.

In the licensing proceeding for the Louisiana Energy Services (LES) uranium enrichment project, LES indicated that its preferred option for the disposition of depleted uranium, generated in its enrichment operations, would be to use commercial deconversion and disposal firms. Depleted uranium deconversion is the chemical conversion of depleted uranium hexafluoride into a uranium oxide. Because of the chemical reactivity of uranium hexafluoride, it is necessary to chemically convert the material to an oxide form to produce a more stable chemical form for long-term storage or disposal. LES has a Memorandum of Understanding with Areva Enterprises, Inc. (AREVA), to license and construct a deconversion plant. At this time, neither LES nor Areva has formally announced plans for a deconversion facility.

Other entities have expressed interest in expanding uranium conversion capacity to meet future demand. Uranium conversion is the chemical conversion of yellowcake (a uranium oxide) from uranium mining and milling operations to uranium hexafluoride, which is the chemical form of uranium used in gaseous diffusion and gas centrifuge enrichment plants. These entities may also consider the technical advantages of combining both uranium conversion and depleted uranium deconversion activities at a single plant. Plants that combine conversion and deconversion operations would be able to recycle the fluorine from the chemical processes. At this time, no entity has formally announced plans for licensing a new uranium conversion facility.

The health and safety risks at uranium conversion and depleted uranium deconversion operations are primarily chemical risks from the use of hydrogen fluoride, which is a highly reactive and corrosive chemical that presents a substantial inhalation and skin absorption hazard to workers and the public. Because of the large quantities of hydrogen fluoride on-site, unit operations and material handling must be tightly controlled to minimize a hazardous work environment and danger to off-site residents.

DISCUSSION:

As previously mentioned, three issues need to be resolved to prepare for the licensing of new uranium conversion and depleted uranium deconversion facilities.

First Issue: Licensing Jurisdiction

Congress developed Section 274 of the Atomic Energy Act (AEA), so States can be given authority to regulate certain types of nuclear material and activities. These State Agreements can cover source material, limited quantities of special nuclear material, and byproduct material as defined in Section 11e. in the AEA. The State regulates the specific category of nuclear material covered in the State Agreement for the protection of the public health and safety from radiation hazards. The NRC maintains its authority in Agreement States to regulate areas excluded in Section 274c and continues its authority under Section 274m for common defense and security. Section 274j also explains when NRC can reassert its jurisdiction when States fail to protect public health and safety.

Historically, NRC has regulated conversion facilities in the United States. For example, NRC was the licensing authority over the Allied Chemical UF6 conversion plant (now known as the Honeywell plant in Metropolis, Illinois) when Illinois became an Agreement State in 1987. NRC declined the State's request to regulate the facility and maintained regulatory authority over the facility because of its potential significance to common defense and security. NRC based its decision on a U.S. Department of Energy (DOE) letter stating that conversion facilities were important to national security for providing uranium hexafluoride to the DOE enrichment complex, for military and energy purposes (Enclosure 1). NRC implemented this decision by issuing an Order to Allied stating NRC retained licensing authority over the conversion facility when it approved the Illinois State Agreement. NRC also provided notice in the *Federal Register*, public announcement and correspondence to the Illinois Governor and Congress, that NRC would continue regulating the Allied facility using Section 274m authority for common defense and security.

On March 22, 2007, the Commission provided an SRM stating that NRC would retain licensing jurisdiction over major fuel cycle facilities licensed under Part 40 (e.g., uranium conversion and deconversion facilities). On April 13, 2007, NRC staff informed the Agreement States of that decision (Enclosure 2). On April 27, 2007, DOE responded to NRC's February 22, 2007 letter, (Enclosure 3) stating that it supports NRC's policy decision to retain licensing jurisdiction of uranium conversion and depleted uranium deconversion facilities located in Agreement States (Enclosure 4). Although some of the basis for the DOE belief has changed from its earlier rationale, i.e., the availability of weapons grade uranium and nuclear fuel, the DOE statement regarding energy security emphasizes the importance of conversion facilities to the national interest in maintaining a secure supply of nuclear fuel to critical energy infrastructure facilities. This national interest could justify NRC retaining regulatory authority over conversion and deconversion facilities under Section 274m. NRC regulation of these facilities, as opposed to regulation by various Agreement States, would provide a centralized and consistent regulatory regime.

Post-9/11 there is a heightened threat of sabotage and terrorist attacks at nuclear facilities. The NRC issued advisories, letters and orders to increase security at nuclear facilities (including conversion facilities) to prevent sabotage and terrorist attacks. Conversion and

deconversion facilities not only handle radioactive source material, but large volumes of hazardous chemicals that are involved in processing the nuclear material and that justify imposing additional security requirements. The complex procedural operations at these facilities involving large volumes of hazardous chemicals and nuclear material also make it difficult to separate the additional common defense and security requirements from the program requirements designed to protect public health and safety. In these cases, the optimal way to regulate is through an integrated regulatory program.

The NRC would be the only regulatory agency, under the AEA, that could implement such a program. Consistent with the approach taken for Honeywell, NRC would apply its regulatory authority on a facility-wide basis to avoid dual regulation of the facility in an Agreement State. Therefore, regulatory authority over all applications of source, byproduct, and special nuclear material (e.g., use of sealed sources in gauges and for instrument calibration) at new conversion and deconversion facilities would be retained by NRC. Existing fuel cycle facilities that have Agreement State licenses for storage of depleted uranium and use of sealed sources in gauges would be unaffected because no adverse impacts have been identified in the existing programs.

NRC can regulate new conversion/deconversion facilities in Agreement States by asserting its authority under Section 274m. To assert Section 274m authority for common defense and security reasons, NRC does not need to modify the State Agreement to regulate new facilities. In addition to the April 13, 2007, letter to all the Agreement States, NRC will also formally notify individually affected Agreement States by letter if a letter of intent or a facility application is submitted. No additional actions are required.

Besides the Honeywell facility, there are three Part 40 facilities, located in Agreement States, that process uranium. These facilities deconvert uranium hexafluoride or uranium tetrafluoride into uranium metal. They are the Starmet facility in Concord, Massachusetts (formerly the Nuclear Metals site); the Starmet facility in Barnwell, South Carolina; and the Aerojet Ordnance facility in Jonesborough, Tennessee. The two Starmet facilities are currently undergoing decommissioning. The Aerojet Ordnance facility fabricates depleted uranium metal for U.S. Army anti-tank rounds from depleted uranium tetrafluoride using a magnesium-thermite reduction reaction and by recycling depleted uranium metal. The magnesium-thermite reduction reaction produces uranium metal and solid magnesium fluoride with only traces of hydrogen fluoride gas. These sites do not represent a significant public hazard because the Starmet facilities are no longer in operation and the Aerojet Ordnance facility does not produce significant quantities of hydrogen fluoride or fluorine as reaction products. Because of the low hazards at these Agreement State facilities, NRC staff is recommending that these facilities remain under Agreement State licensing jurisdiction. If similar facilities are proposed in Agreement States in the future, NRC would propose to apply the recommended threshold quantities, addressed under the Third Issue discussed below, in assessing whether those new facilities should be licensed under NRC rather than Agreement State jurisdiction. Staff would communicate this direction by letter to the Agreement States.

Second Issue: Requiring an Integrated Safety Analysis

In September 2000, NRC promulgated regulations in Subpart H of Part 70, establishing performance requirements for applicants and licensees possessing greater than critical mass quantities of special nuclear material and engaged in: (1) enriched uranium processing; (2) fabrication of uranium fuel or fuel assemblies; (3) uranium enrichment; (4) enriched uranium hexafluoride conversion; (5) plutonium processing; (6) fabrication of mixed-oxide fuel or fuel assemblies; (7) scrap recovery of special nuclear material; or (8) any other activity that the Commission determines could significantly affect public health and safety. The performance requirements require applicants and licensees to prepare an integrated safety analysis that evaluates the safety hazards at the facility. The performance requirements also provide acceptable risk consequences for accidents based on the accident likelihood. These requirements provide a risk-informed, performance-based approach for evaluating hazardous conditions at facilities licensed under Part 70. Subpart H also contains requirements for establishing management measures to ensure that: (1) items relied on for safety are available and reliable when needed; (2) provides baseline design criteria for new facilities; and (3) adds additional reporting requirements.

In the SRM, dated March 22, 2007, the Commission directed the staff to propose options for requiring uranium conversion and depleted uranium deconversion facilities to complete an integrated safety analysis similar to the current Part 70, Subpart H, requirements for special nuclear material. The current regulations in Part 40 do not have specific, risk-informed requirements that address accident requirements analogous to those in Part 70, Subpart H. Because uranium conversion and depleted uranium deconversion facilities would be licensed under Part 40, an applicant would not be required to comply with the performance requirements in Part 70. However, because of the unique and significant hazards at these facilities, NRC staff considers that similar requirements are necessary for an integrated safety analysis and a structured, risk-informed approach for evaluating the consequences of facility accidents. Implementing this approach would establish a structured set of requirements, for conversion and deconversion facilities, that would be similar to the licensing requirements that other fuel fabrication, enriched uranium conversion, and enrichment facilities are already required to meet. It should be noted that the Honeywell uranium conversion facility has voluntarily prepared an integrated safety analysis, for its facility, as a means of defining accidents for its emergency plan.

To establish regulatory requirements similar to the Subpart H requirements in Part 70, the staff considered two options: impose the new requirements by rule or orders. A summary of the pros and cons of the options is enclosed (see Enclosure 5).

After consideration of the options, the staff recommends that the Commission conduct a rulemaking establishing in Part 40 the analogous requirements in Part 70, Subpart H, for new uranium conversion and deconversion facilities.

Third Issue: Impose Part 70, Subpart H, Licensing Requirements on Honeywell, International Isotopes, Inc., and Other Exisitng Uranium Conversion and Deconversion Facilities

As noted above, in its license renewal application that was approved on May 11, 2007, the Honeywell uranium conversion facility voluntarily prepared an integrated safety analysis to define accidents for its emergency plan. However, this action is not required for licensing, under Part 40. In its integrated safety analysis and license renewal application, Honeywell incorporated commitments similar to the requirements of Part 70, Subpart H, such as establishing management measures, establishing a configuration management system, following a facility change process, and annual reporting of facility changes and integrated safety analysis changes. Honeywell did not commit to additional event reporting requirements or baseline design criteria.

International Isotopes, Inc. is a uranium deconversion facility located in Idaho Falls, Idaho, and has a possession limit of 6000 kilograms of source material (uranium). The licensee utilizes a process that separates the fluorine from depleted uranium tetrafluoride (green salt) for the production of germanium fluoride (GeF4) and other compounds for use in the computer chip industry. Because of the limited operations and limited quantities of licensed material, the staff considers this facility to be a low risk facility from a health and safety perspective. This licensee made no commitments to prepare an integrated safety analysis.

As discussed under the first issue, the Starmet facilities and the Aerojet Ordnance facility are licensed by Agreement States and are low-risk facilities.

To impose Part 70, Subpart H, licensing requirements on Honeywell, International Isotopes, Inc., Starmet, and Aerojet Ordnance facilities, the staff considered four options: (1) impose the new requirements by order; (2) impose the new requirements by rule; (3) impose the new requirements by rule for new facilities and existing operating facilities with thresholds on source material possession limits and total quantities of hydrogen fluoride; and (4) continue the status quo. A summary of the pros and cons of the options is enclosed (see Enclosure 5).

After consideration of the options, the staff recommends that the Commission select Option 3 to conduct a rulemaking establishing in Part 40 the analogous requirements in Part 70, Subpart H, and to place a source material quantity threshold of 10,000 kg of uranium hexafluoride or uranium tetrafluoride and a quantity threshold of 1,000 pounds of hydrogen fluoride for imposition of the Part 70, Subpart H, requirements. Option 3 would impose the Part 70, Subpart H, requirements on new facilities as well as existing operating facilities that exceed the threshold quantities. It would not apply to decommissioning facilities.

RECOMMENDATIONS:

The staff recommends that the Commission:

1. Approve keeping the Starmet and Aerojet Ordnance facilities under Agreement State jurisdiction and, if similar new facilities are proposed in Agreement States in the future, NRC would retain jurisdiction of only those facilities that exceed the threshold quantity limits discussed below in Recommendation 2.

2. Approve conducting a rulemaking in accordance with the prioritization of the rulemaking action plan, to amend Part 40, to require new applicants and existing licensees for conversion and deconversion facilities with uranium hexafluoride or uranium tetrafluoride inventories greater than 10,000 kg (or alternative threshold quantity) and hydrogen fluoride inventories greater than 1,000 pounds (or alternate threshold quantity) to meet similar requirements, as required in Part 70, Subpart H. These requirements would not apply to existing facilities currently undergoing decommissioning. If new applicants submit license applications before the completion of the rulemaking, issue orders establishing the Part 70, Subpart H, performance requirements as part of the licensing basis for the application review.

RESOURCES:

The staff estimates that 2.0 FTEs and no technical assistance contract dollars over 2 years will be needed to promulgate regulations requiring uranium conversion or depleted uranium deconversion facilities to meet similar requirements, as in Part 70, Subpart H. The staff estimates that 0.25 FTE per order will be needed to impose the requirements by order.

If the Commission chooses to undertake the rulemakings, the new effort would be prioritized with respect to other rulemaking actions planned, and schedules would be developed, with key milestones, and transmitted to the Commission. At this time, 2.0 FTEs and no contract dollars have been budgeted for this rulemaking for fiscal years 2008 and 2009.

COORDINATION:

The Agreement State licensing jurisdiction issue was coordinated with the Agreement States by issuing the letter to Agreement States, dated April 13, 2007, in Enclosure 2. No comments from the Agreement States were received. In addition, the issue was discussed in the monthly Office of Federal and State Materials and Environmental Management Programs telephone conference calls with the Organization of Agreement States and Committee of Radiation Control Program Directors.

The Office of the General Counsel has reviewed this package and has no legal objection. The Office of the Chief Financial Officer has reviewed this Commission paper for resource implications and has no objection.

/RA/

Luis A. Reyes
Executive Director
for Operations

Enclosures:
1. DOE letter, to NRC, responding to request for input regarding regulation of the Allied conversion facility in Metropolis, Illinois.
2. NRC letter, to Agreement States, informing of Commission decision to retain jurisdiction over uranium conversion and deconversion facility licensing
3. NRC letter, to DOE requesting input on national security implications
4. DOE letter, to NRC, responding to request for input on national security implications on conversion and deconversion facilities
5. Options Summary of Pros and Cons

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OFC	ECB	Tech.Editor	ECB	ECB	OGC	OCFO
NAME	TCJohnson	EKraus (via fax)	LWilliamson (V.Cheney for)	BSmith	FCameron	WMcCabe (L. Barnett for)
DATE	06/29/07	06/21/07	07/03/07	07/03/07	07/06/07	07/10/07
OFC	FFLD	FSME	FSME	FCSS	NMSS	EDO
NAME	GJanosko	JSchlueter (SAR for)	CMiller	RPierson	MWeber	LReyes
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