POLICY ISSUE
(Information)

May 28, 2009 SECY-09-0082

FOR: The Commissioners

FROM: Michael F. Weber, Director
Office of Nuclear Material Safety
and Safeguards

SUBJECT: UPDATE ON REPROCESSING REGULATORY FRAMEWORK-
SUMMARY OF GAP ANALYSIS

PURPOSE:

This paper updates the Commission on the progress by the staff of the U.S. Nuclear Regulatory Commission (NRC) towards establishing a regulatory framework for the licensing of reprocessing facilities. Included in this update is a summary of the staff's final reprocessing regulatory gap analysis.

SUMMARY:

This Commission paper and its enclosure provide the staff's summary of the regulatory gap analysis for developing the necessary framework to license reprocessing, and their associated (e.g., vitrification, fuel fabrication, independent spent fuel storage installations, etc.) facilities. The staff has characterized each gap among four different gap types and qualitatively assessed: 1) the need for resolution of each gap; and 2) the estimated resources that may be needed to develop the technical basis for resolution of each gap. Based on the gap analysis, the staff plans to develop the technical basis for a proposed rule that would resolve the high priority gaps. The staff plans to continue to appropriately engage stakeholders during the development of the technical basis, achieving transparency and openness in the regulatory process. Completion of the technical basis will be contingent on the availability of resources, which the Commission will decide in the development of the Agency budget for fiscal year 2011.

BACKGROUND:

In the Staff Requirements Memorandum (SRM) to SECY-07-0081, "Regulatory Options for Licensing Facilities Associated with the Global Nuclear Energy Partnership," dated

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June 27, 2007, the Commission directed the staff to complete an analysis of Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I to identify regulatory gaps for licensing an advanced reprocessing facility and recycling reactor.

In mid-2008, two nuclear industry companies informed the agency of their intent to seek a license for a reprocessing facility in the U.S. An additional company expressed its support for updating the regulatory framework for reprocessing, but stopped short of stating its intent to seek a license for such a facility. At the time, the staff also noted that progress on some Global Nuclear Energy Partnership (GNEP) initiatives had waned and it appeared appropriate to shift the focus of the staff's efforts from specific GNEP-facility regulations to a more broadly applicable framework for commercial reprocessing facilities.

In SECY-08-0134, titled, "Regulatory Structure for Spent Fuel Reprocessing," dated September 12, 2008, the staff discussed the shift in its approach to developing the regulatory framework development for commercial reprocessing facilities. The staff noted that it would defer additional work on regulatory framework development efforts for advanced recycling reactors and focus on the framework revisions necessary to license a potential application for commercial reprocessing. As a result of this shift, the staff indicated that an additional review of the initial gap analysis was warranted. A summary of the significant regulatory gaps is enclosed. This paper does not detail conforming regulatory changes that may cascade from resolution of the gaps, administrative conforming changes and other similar minor gaps.

The working group and Steering Committee for reprocessing framework development included representatives from the Offices of Nuclear Material Safety and Safeguards, Federal and State Materials and Environmental Management Programs, Nuclear Regulatory Research, Nuclear Security and Incident Response, General Counsel, and New Reactors.

DISCUSSION:

Currently, 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," provides the licensing framework for production and utilization facilities. Although a reprocessing facility is one type of production facility, its industrial processes are more akin to fuel cycle processes. Therefore, in accordance with SRM-SECY-07-0081, the gap analysis focused on necessary changes to 10 CFR Part 70, "Domestic Licensing of Special Nuclear Material," considering requirements, where appropriate, from Part 50, as the basis for a revised reprocessing regulatory framework.

The NRC staff has completed the final regulatory gap analysis for licensing and regulating reprocessing facilities and has summarized the analysis in this paper and its enclosure. The staff has considered several documents in this analysis, including: NUREG-1909, a white paper authored by the Advisory Committee on Nuclear Waste and Materials (ACNW&M) titled "Background, Status and Issues Related to the Regulation of Advanced Spent Nuclear Fuel Recycle Facilities," issued June 2008; correspondence from the Union of Concerned Scientists titled, "Revising the Rules for Materials Protection, Control and Accounting;" and an NEI white paper titled, "Regulatory Framework for an NRC Licensed Recycling Facility." The enclosure discusses the specifics of the staff's analysis of these documents, where relevant.

The staff categorized each gap identified in the enclosure as one of four different types:

- Lack of regulations.
- Existing regulations pose a significant hindrance or regulatory burden to effective and efficient licensing.
- Gap resulting from potentially licensing a production facility under Part 70 (versus Part 50).
- Requirements exist, but modifications may be needed for clarity.

Additionally, the staff assigned the gaps qualitative priorities for resolution (i.e., low, moderate, or high priority). Gaps 1-14 are characterized as "high" priority, gaps 15-19 are "moderate," and gaps 20-23 are "low" priority gaps.

High priority gaps are those that must be resolved to establish an effective and efficient regulatory framework. An example of a high priority gap is Gap 2, "Independent storage of high level waste." Gap 2 describes the lack of available independent waste storage options to accommodate solidified high level waste. The staff will pursue high priority gaps in the technical basis development.

Moderate priority gaps are those that should be resolved, but are not essential, at this stage. An example of a moderate priority gap is Gap 15, "Waste confidence for reprocessing facilities." Gap 15 details that the existing waste confidence rule does not apply to reprocessing facilities. Because applicants for reprocessing facility licenses can address long-term storage of their waste in their environmental reports, resolution of Gap 15 was not determined to be essential at this point. However, the effectiveness and efficiency of the regulatory process could be enhanced by resolving this gap through rulemaking. Moderate priority gaps will be addressed in the technical basis development, in conjunction with the high priority gaps, if sufficient resources are available.

Low priority gaps could be resolved, but are not determined to be essential. An example of a low priority gap is Gap 20, "Advanced fuel cycles and transuranic special nuclear material (SNM) classification." Gap 20 details the need to expand SNM requirements to other materials in order to accommodate reprocessing technologies. The Commission did not support this expansion, as stated in the SRM to SECY-08-0059, "Rulemaking Plan: Part 74—Material Control and Accounting of Special Nuclear Material," dated February 5, 2009, and this gap will not be pursued in the reprocessing technical basis. Staff has determined that for the reprocessing framework development, low priority gaps are not essential and will not be pursued in the technical basis development, unless the Commission directs the staff to do so.

Other topics

Diminished GNEP Support

Recently, Congress and the U.S. Department of Energy (DOE) support for GNEP-related activities has diminished. Although GNEP was not supported, the Advanced Fuel Cycle Initiative (AFCI), a predecessor initiative to GNEP, continues to be funded. One of the primary goals of the AFCI is to develop and demonstrate advanced, proliferation-resistant fuel cycle technologies for the treatment of commercial light-water reactor spent fuel. AFCI is designed to

develop these new technologies so that they may be deployed to support the operation of current nuclear power plants. Additionally, if funding from AFCI were to be used to support a pilot plant to demonstrate various reprocessing technologies, the NRC may still need to be prepared to license such a facility.

The original GNEP initiative included discussions of a DOE established demonstration scale reprocessing facility. SECY-07-0081 described DOE's shift in this approach, which moved away from demonstration scale facilities and toward commercial scale facilities. A commercial scale facility would require DOE to partner with industry for its development. DOE engaged industry by soliciting expressions of interest to design and build facilities that used advanced fuel technologies for spent fuel reprocessing and advanced fast burner reactors. These types of facilities would be licensed by the NRC. As a result, NRC's approach since DOE's shift has focused on preparing for licensing commercial scale reprocessing facilities. However, if ongoing government efforts to consider options for spent nuclear fuel disposal results in re-consideration of demonstration scale reprocessing facilities, then it is important to note that the NRC does not have statutory authority to license a demonstration scale DOE reprocessing facility, or its other associated demonstration scale facilities. As described in SECY-06-0066, "Regulatory and Resource Implications of a Department of Energy Spent Nuclear Fuel Recycling Program," dated March 22, 2006, if DOE were to pursue establishment of a demonstration scale reprocessing facility, then a legislative change would be needed if the NRC were to have licensing authority for such a facility.

Industry Interest in Reprocessing

The industry continues to express interest in pursuing licensing of a commercial reprocessing facility, most recently at the February 26, 2009 public meeting between the staff and the Nuclear Energy Institute (NEI). NEI's ongoing task force, "Closing the Fuel Cycle" consists of industry representatives with the primary objective to facilitate implementation of a regulatory structure to license reprocessing, and associated facilities. The staff continues to believe that it is appropriate to devote resources, at a pace consistent with industry interest and commitment, to develop an appropriate, effective, and efficient regulatory framework for licensing a potential spent nuclear fuel reprocessing facility.

Additional Review for Non Light Water Reactor Reprocessed Fuel Applications

In this analysis and as indicated in SECY-08-0134, the staff did not consider the framework for advanced fuel cycles that would support fast reactor utility (i.e., spent fuel reprocessing with recycling of the fuel in a fast reactor). The reprocessing framework will enable licensing of pyroprocessing facilities due to a risk-informed, performance-based approach. However, the framework will not support fast reactors, the usual disposition path for pyroprocessed fuel. The Advanced Reactor Program in the Office of New Reactors has had limited interactions with several potential applicants developing fast reactor designs and would, if warranted, develop a regulatory approach for reviewing these or other advanced reactor designs. Additionally, applications that result in separate, pure streams of various transuranics, such as americium and neptunium, and others, as demonstrated in some uranium extraction (i.e., UREX+) reprocessing applications will require further evaluation. Currently, the NRC is devoting resources primarily toward establishing a regulatory framework for existing technology that can be used to reprocess and re-fabricate mixed-oxide fuel for recycling in light-water reactors.

Potential Unintended Consequences of Ongoing Rulemakings on Reprocessing Framework

Potential gaps for licensing reprocessing facilities can result from future rulemakings if reprocessing framework efforts are not considered as part of the process. For example, simultaneous rulemakings involving multiple NRC offices are in various stages with regard to changes to 10 CFR Part 73, "Physical Protection of Plants and Materials," and 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material." In particular, a high priority rulemaking for 10 CFR Part 73 related to fuel cycle facilities will be informed by the reprocessing working group efforts. As a result, additional changes may be proposed to the 10 CFR Part 73 rulemaking efforts in order to provide an appropriate security regulatory framework for a licensed reprocessing facility. As an additional example of potential unintended consequences with ongoing rulemakings, the Commission directed the staff to immediately begin engaging stakeholders and interested parties to initiate development of the technical basis for possible revision of 10 CFR Part 20, "Standards for Protection against Radiation," as appropriate, and where scientifically justified, to achieve greater alignment with the 2007 recommendations of the International Commission on Radiological Protection (ICRP) contained in ICRP Publication 103 issued February 2008 (see SECY-08-0197, "Options to Revise Radiation Protection Regulations and Guidance with Respect to the 2007 Recommendations of the International Commission on Radiological Protection," dated December 18, 2008). Such revisions, may directly or indirectly impact the regulations for licensing of a spent fuel reprocessing facility. Staff will, to the extent practicable, continue to maintain awareness of ongoing rulemakings and help ensure a consistent and coordinated effort for these rulemakings to avoid potential future gaps in the reprocessing framework.

Effluent Limits Established by the Environmental Protection Agency

The U.S. Environmental Protection Agency (EPA) regulations at 40 CFR Part 190, "Environmental Radiation Protection Standards for Nuclear Power Operations," establish dose and effluent limits for "uranium fuel cycle" operations, which includes the "reprocessing of spent uranium fuel" (40 CFR 190.02(b), 40 CFR 190.10). These EPA dose and effluent limits could pose a challenge for reprocessing facilities. However, as these limits are established by the EPA, they are not considered in the NRC regulatory gap analysis. The staff is aware of industry efforts to raise the awareness of this issue with EPA. If EPA considers revisions to 40 CFR Part 190, the NRC staff will keep the Commission informed and ensure that appropriate conforming changes to our regulations are forwarded for Commission consideration.

CONCLUSIONS:

The staff will develop the technical basis for a rulemaking to address the high priority gaps and revise the regulatory framework for reprocessing as indicated in the 'Resources' section below. The staff continues to believe that it is appropriate to devote resources, at a pace consistent with industry interest and commitment, to develop an appropriate, effective, and efficient regulatory framework for licensing a potential spent nuclear fuel reprocessing facility.

RESOURCES:

In SECY-07-0081, the staff discussed in detail the resources necessary to complete the rulemaking activity. At the time, the staff considered the scope of GNEP facilities, which

included a regulatory framework for the advanced burner reactor, and estimated that it would need 15.8 full-time equivalents (FTEs) and $1.1 million.

Although the revised regulatory framework for an advanced burner reactor is no longer included in the scope, the staff has reviewed its estimates for completing the regulatory framework for reprocessing and concluded that the activity will: (1) be more comprehensive than originally envisioned; (2) will involve resolution of several complex technical and policy-related issues; (3) will entail the development of new and substantive regulatory guidance; and (4) will require extensive stakeholder involvement.

The staff's effort to revise the reprocessing framework will require significant resources. The staff has revised its resource estimate for completing the technical basis document considering the factors listed above. The staff now estimates that about 5 FTE, will be needed to complete the technical basis development by 2010. Neither the fiscal year (FY) 2009 nor the FY 2010 budget includes these activities. For FY 2009, affected Offices will continue to reallocate from within, in accordance with guidelines set forth in the Resource Allocation memorandum. FY 2010 resource requirements are being considered through the proposed FY 2010 shortfall list as part of the FY 2011 budget process. See the table below for details. If the additional resources are not made available, the staff's schedule for completing the technical basis document will be extended.

Office	FY 2009 Base Budget		Reprogram Within FY 2009 Base Budget		FY 2010 Base Budget		Reprogram Within FY 2010 Base Budget		Requested thru FY 2010 Shortfall List	
	FTE	CS $	FTE	CS $	FTE	CS $	FTE	CS $	FTE	CS $
NMSS	0.0	0	2.0	0	0.0	0	1.0	0	0.0	0
FSME	0.0	0	0.2	0	0.5	60	0.0	0	0.0	750
RES	0.0	0	0.1	0	0.0	0	0.2	0	0.0	300
NSIR	0.0	0	0.1	0	0.0	0	0.2	0	0.0	0
OGC	0.1	0	0.0	0	0.6	0	0.0	0	0.0	0
TOTAL	**0.1**	**0**	**2.4**	**0**	**1.1**	**60**	**1.4**	**0**	**0.0**	**1050**

Total Resources for FY 2009 - FY 2010 = $1,110K and 5.0 FTE

The Office of General Counsel has budgeted 0.1 FTE in FY 2009. The following offices will reallocate 2.4 FTE within their FY 2009 base budget: NMSS 2.0, FSME 0.2, RES 0.1 and NSIR 0.1. For FY 2010, FSME has budgeted $60K and 0.5 FTE; OGC has budgeted 0.6 FTE. FSME and RES have also requested $1,050K through the FY 2010 Shortfall process.

The FY 2010 reprogramming of 1.4 FTE will be from the Licensing Product Line in the New Fuel Facilities Business Line as follows: RES 0.2 FTE from the MOX Facility Licensing/Inspection planned activity; NSIR 0.2 FTE from the HLS Safeguards Licensing planned activity (0.1 FTE from MOX Licensing and 0.1 FTE from AREVA); and NMSS 1.0 FTE from the Licensing Product Line in the New Fuel Facilities Business Line based on efficiencies gained in licensing reviews (MOX, AREVA) and a delay in submittal of the license application for International Isotopes uranium deconversion facility. The reprogramming will not adversely impact the schedules for

new facility licensing and, if the efficiencies are not realized, then the reprocessing framework development activities will be delayed as necessary to support licensing.

As stated in industry correspondence, industry's intent is to submit an application for a reprocessing facility in the 2013-2014 timeframe. To be prepared to review a potential application in that timeframe, the staff planned to complete the revised regulatory framework in FY 2012. The staff estimates that in order to complete the rulemaking activities in FY 2012, a total of approximately 15-20 FTE and $1.5-$2.0 million dollars will be needed in the FY 2010 – 2012 period. The staff recognizes that resolution of several policy and technical issues, independent of the resources available, may inform the final schedule for revising the reprocessing regulatory framework, such as the Secretary of Energy's plan to create a commission to study alternatives to a nuclear waste repository at Yucca Mountain.

For FY 2011, the estimated resources for revising the regulatory framework for reprocessing are being considered in the Planning, Budgeting and Performance Management process. If the requested resources are not available, the staff will defer or delay rulemaking activities and revise its schedule for completion of the rulemaking activity based on the available resources.

COORDINATION:

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

/RA/

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Enclosure: As stated

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OFFICE	FCSS	FCSS	TechEd.	FCSS	FCSS	OGC	OIP
NAME	KMarkham	CGibbs	EKraus	THiltz	DDorman	BJones	MDoane
DATE	05/07/09	05/21/09	05/13/09	05/13/09	05/18/09	05/20/09	05/12/09

OFFICE	NRO	RES	FSME	NSIR	CFO	NMSS
NAME	WReckley	BSheron	GPangburn	RCorreia	TPulliam	MWeber
DATE	05/20/09	05/19/09	05/19/09	05/18/09	05/27/09	05/28/09

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