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Comments of the Union of Concerned Scientists on the Draft Regulatory Basis for a Potential Rulemaking on Spent Nuclear Fuel Reprocessing Facilities

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The Union of Concerned Scientists (UCS) is pleased to submit the following comments on the NRC's draft regulatory basis for the potential reprocessing rulemaking. The major concern of UCS lies with the potential nuclear terrorism risks associated with such facilities, and so we are addressing those issues first.

IV. Material Control and Accounting, Security and Financial Considerations

Gap 8 – Risk-Informing 10 CFR Part 73 and 10 CFR Part 74

1. UCS commends the NRC for not pushing forward at this time with its misguided proposal to weaken security and material control and accounting (MC&A) requirements on weapon-usable special nuclear materials in certain forms based on the highly subjective notion of their "attractiveness" to adversaries. Such a move would set a terrible example for other countries and would undermine the Obama administration's attempt to "lock down" vulnerable weapon-usable materials around the world in advance of the 2012 Nuclear Security Summit. It would also be premature because the public does not now have access to the staff's actual proposal, as SECY-09-0123 is being blocked from public release even though at least one Commissioner (other than the Chairman) has said privately that the bulk of the document is not security-related information and should be publicly available. In addition, the Los Alamos National Laboratory study mentioned in the draft regulatory basis document should also be released publicly when completed, in order for the public to be fully informed on this issue.

However, UCS already knows enough about the staff's proposal to conclude that it goes in the wrong direction and should be scrapped. UCS believes that in the current threat environment security and MC&A rules for weapon-usable materials need to be enhanced, rather than weakened. To this end, the reprocessing regulatory basis should evaluate whether the current requirements are conservative enough to protect against reasonably foreseeable future threats. Part 73 and 74 requirements for special nuclear material should be strengthened prior to submission of any reprocessing plant application, or costly revisions to the application may be needed to address new security and MC&A system design issues.

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Gap 17 – Diversion Path Analysis Requirements

UCS supports the inclusion of a diversion path analysis (DPA) requirement in 10 CFR 74 that would apply to any facility seeking a license to possess or use special nuclear material, not only to reprocessing plants. The MC&A system performance specifications emerging from such an analysis would be highly dependent on assumptions regarding adversary capabilities, especially the extent and nature of insider assistance. The DPA should encompass a range of challenging scenarios, including conspiracies involving multiple insiders, from rank-and-file personnel to MC&A program managers, capable of providing both passive and active assistance to a diversion effort. In recognition of the close coupling between MC&A and physical protection, the DPA should include scenarios involving collusion between MC&A and security personnel, and those that consider abrupt diversions coincident with external assaults or extreme natural events. Access authorization requirements should be regarded as defense-in-depth measures and should not be given credit for exempting applicants from consideration of extensive internal conspiracies in the DPA.

Gap 18 – Approaches Toward Material Accounting Management

1.UCS strongly opposes NRC's proposal to water down its current requirements for timely detection of diversion of bomb-significant quantities of special nuclear materials in order to facilitate the licensing of defective reprocessing plants that cannot meet these goals. The fundamental goal of MC&A is to ensure that diversion of a bomb-significant quantity of special nuclear material can be detected in time to mount an effective response. If applicants for reprocessing plants and other bulk-handling facilities cannot demonstrate that they can meet this objective then these facilities simply should not be licensed. The fact that the International Atomic Energy Agency has never been able to meet its own detection goals at large bulk-handling facilities should be an embarrassment for those countries whose own regulatory authorities have allowed these facilities to operate while flagrantly violating basic safeguards standards. The United States should not contribute to the global threat of nuclear terrorism by authorizing the development of more unsafeguardable facilities. It is already facing exactly such a problem at the Mixed Oxide Fuel Fabrication Facility (MFFF), which the NRC staff has decided can be licensed despite major flaws in the MC&A approach with regard to timely detection and resolution of anomalies.

On the other hand, UCS does support the inclusion of specific requirements for control and accounting of nuclear material holdup. Such requirements, however, would emerge naturally from the implementation of stringent standards for timely detection, as large amounts of holdup are among the major sources of uncertainties in material accountancy measurements.

Finally, UCS supports the development of a regulation requiring "safeguards by design." Such a requirement would be closely related to a proposed diversion path analysis requirement. If such a requirement had been in place, the MFFF might have been designed more intelligently and

avoided the MC&A problems it is now encountering --- problems that may require significant and costly retrofits to correct.

I. Regulatory Framework and Definitions

1.UCS supports the inclusion of an emergency planning requirement for reprocessing plants that will provide adequate protection of the public at risk from an accident or terrorist attack. Since we do not believe that current emergency planning requirements for power reactors are adequate, especially in light of Fukushima, we think such requirements need to be significantly strengthened for all NRC-licensed facilities with source terms that are radiologically significant.

Current emergency planning requirements for power reactors within the 10-mile zone are designed primarily to avoid the occurrence of fatalities from acute radiation syndrome (with the exception of potassium iodide distribution). However, unless reprocessing plants are processing large quantities of green (recently discharged) spent fuel, most accidents would be unlikely to cause significant numbers of early fatalities well beyond the controlled area boundary of the plant. Emergency planning efforts therefore must be focused on helping the public to avoid radiation doses that could result in significant increases in lifetime cancer risk following a wide range of severe accidents or terrorist attacks. As for power reactors, UCS expects the accident scenario spectrum to include more severe events than were considered prior to Fukushima. The rule should also include requirements for challenging and realistic exercises. Determination of the size and shape of the appropriate emergency planning zones should be done based on site-specific analyses, utilizing conservative parameters for source terms and meteorological conditions.

2. UCS has not reviewed NFPA 801. However, to the extent that the approach would involve the use of quantitative risk information, we do not believe such methods are sufficiently mature to allow a shift away from a deterministic fire protection standard.

3. UCS thinks it is self-evident that reprocessing plants must meet the highest seismic standards, and the regulations must reflect this.

Gap 6 -- Definitions

1.UCS strongly concurs with the staff position that "reprocessing" and "recycling" are not interchangeable terms and opposes any effort to rebrand a reprocessing plant as a "recycling" facility. Dictionary definitions of "recycling" refer to processes that reclaim materials "for human use." A reprocessing plant should not be referred to as a recycling plant unless the applicant can demonstrate that a significant fraction of the output has a "human use." This would entail provision of proof of contractual commitments for the purchase and use of the vast majority of all end products, including reprocessed uranium, plutonium and other transuranic materials. A facility producing separated plutonium and reprocessed uranium for indefinite storage without any demonstrated path for consumption of these products should not be regarded

as a recycling facility. In fact, since such plutonium would be vulnerable to theft by terrorists for use in a nuclear device, it could be regarded as having only an "inhuman use," not a "human use."

II. Safety, Risk and Licensing Considerations

Gap 5 – Safety and Risk Assessment Methodology

UCS agrees that the current Part 70 approach is not appropriate for licensing reprocessing plants. However, we do not believe the right approach is to modify Part 70 to include "very high consequence accidents" and to increase reliance on the use of probabilistic risk assessment (PRA) methods. We do not believe such methods are sufficiently well developed even for power reactors for routine use in licensing; the methods are even less well-defined for fuel cycle facilities. Even though we do not oppose the development of a new Part 7x for reprocessing plants, we believe the regulation should be more closely modeled on deterministic requirements for power reactors than on performance-based requirements for fuel cycle facilities.

Gap 10 – One-Step Licensing and ITAAC

UCS opposes the introduction of a Part 52-like one-step licensing process for reprocessing plants. The NRC clearly envisioned that plants that process plutonium need an additional level of review of the design bases prior to authorization of construction, §10 CFR 70.23(b), as well as an additional level of assurance that the principal systems, structures and components have been constructed in accordance with the application, §10 CFR 70.23(a)(8). The public may have the opportunity to request a hearing at the first two stages and possibly also at the third. A reprocessing plant can certainly be considered a plant that processes plutonium and as such should be subject to a construction authorization requirement. Also, many proposed reprocessing plant designs include integral MOX fuel fabrication facilities. The NRC will have to decide how these hybrid facilities will be licensed, but the minimum standards for plutonium processing and fuel fabrication plant licensing, including preservation of the public's existing hearing rights at the construction authorization stage, will have to be maintained.

Gap 19 – Effluent Controls and Monitoring

UCS believes that the radionuclide release limits established in 40 CFR 190.10(b) remain appropriate today and should be incorporated into NRC regulations, along with controls on other radionuclides that have been evaluated as important to the collective dose burden from reprocessing plant emissions (e.g. C-14 and tritium). UCS disagrees with the viewpoint of the Advisory Committee on Nuclear Waste and Materials and maintains that collective dose is a useful parameter for evaluating the global radiological consequences of reprocessing. It should therefore be a basis for NRC's reprocessing effluent control requirements.

Rulemaking Comments

From: Edwin Lyman [ELyman@ucsusa.org]
Sent: Thursday, July 07, 2011 10:59 PM
To: Rulemaking Comments
Subject: Docket ID NRC–2010–0267
Attachments: UCS comments draft regulatory basis reprocessing rulemaking.pdf

Please find attached the comments of the Union of Concerned Scientists on the Draft Regulatory Basis for a Potential Rulemaking on Spent Nuclear Fuel Reprocessing Facilities, NRC Staff Proposals.

Sincerely,

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