

# **NRC's recent and ongoing activities to authorize nuclear waste reprocessing**

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**West Valley CTF, September 28, 2011**

## **SUMMARY**

**NRC is in the early/middle stage of issuing regulations under which new reprocessing plants can operate in the U.S.**

**The process of issuing regulations is known as 'rulemaking.' Rulemaking typically takes several months to a few years. Agencies generally provide notice (and esp. opportunity for public comment) in the *Federal Register*.**

**NRC's recent work on this rulemaking shows no awareness of the West Valley reprocessing plant which operated in 1966-72 as *the only commercial reprocessing facility in the U.S.***

## BACKGROUND

In 2008, two nuclear companies told NRC they intended to seek reprocessing facility licenses.

NRC told its staff, in a memorandum designated SRM–SECY–07–0081, to perform a ‘gap analysis’ to **identify what changes in regulatory requirements would be necessary to license a reprocessing facility.**

NRC is now looking at the **basis of a potential rulemaking** for spent nuclear fuel reprocessing facilities; held two public workshops in Sept.-Oct. 2010 (Rockville, MD, and Albuquerque, NM).

NRC also held a June 2011 public meeting in Augusta, GA.

These have been the steps in NRC’s work on “a draft regulatory basis document for **a potential rulemaking on spent nuclear fuel reprocessing facilities.**”

As a related issue, NRC has been asked to use the term ‘recycling’ instead of ‘reprocessing.’

See *75 Federal Register* 45167 (August 2, 2010) and *76 Federal Register* 34007 (June 10, 2011).

# NRC Perspective: Regulatory Framework for Reprocessing

**Jack Davis**  
Deputy Director, HWLRS  
U.S. Nuclear Regulatory Commission

Reprocessing Public Meeting  
June 21, 2011



## **NRC Perspective**



- NRC is an independent government agency
- Protect public health and safety and the environment in commercial uses of radioactive material
- Where appropriate, use risk-informed, performance based regulations to meet NRC's mission
- Seeking stakeholder input on proposed rulemaking for reprocessing facilities
- NRC does not set national policy for reprocessing, but will provide a stable framework in response to evolution of national policy and licensee needs
- Provide framework fully informed by latest scientific knowledge and stakeholder input
- Provide flexibility for future technological developments
- Does not constitute endorsement of reprocessing

## Who would write the regulations?



- Lead: Division of High Level Waste in Office of Nuclear Material Safety and Safeguards (**NMSS**)
- Rulemaking and Technical Support: Office of Federal and State Materials and Environmental Management Programs (**FSME**)
- Interoffice collaboration including
  - Office of Nuclear Security and Incident Response (**NSIR**)
  - Office of Nuclear Regulatory Research (**RES**)
  - Division of Fuel Cycle Safety and Safeguards (**FCSS**, former lead office)

## What is the process?



- SECY-09-0082 identified 19 gaps in current regulations to be resolved for licensing to occur
- Draft regulatory basis document and rulemaking recommendation due to Commission in September 2011
- Parallel rulemaking efforts close some gaps
- Commission will provide rulemaking direction
- If recommended for rulemaking
  - Final gap document
  - Rulemaking plan
  - Environmental Impact Statement
  - Regulatory Guidance

## What is the timeline?



## Where are we now?



- Draft regulatory basis document development and SECY paper planned for September 2011
- Technical staff proposed closures to gaps
- Proposed gap closures presented in this meeting for input
  - Overview presentations
  - Summaries provided online
  - Roundtable discussions
  - Opportunities for public comment
- Stakeholder interactions considered in writing of final draft
- Final draft of Environmental Topical Report (FSME) planned for November 2011

## Stakeholder Views



- Input from previous public meetings
- Examples of written input considered include
  - NUREG-1909 (from ACNW&M)
  - NEI White Paper
  - Correspondence from Union of Concerned Scientists
- Letters received from AREVA and GE-Hitachi in Spring 2011
- DOE seminars on reprocessing (aqueous and electrochemical)
- Preliminary recommendations from Blue Ribbon Commission

## June 21-22, 2011 Meeting



- Booklet provided with summaries of gap issue and proposed closures or alternatives
- Specific questions for which stakeholder input is sought; will provide focus of discussions
- Further comments can be submitted on [www.regulations.gov](http://www.regulations.gov) until July 7<sup>th</sup>
- Feedback form about this meeting

### **SOME OF NRC's 'GAP' ISSUES**

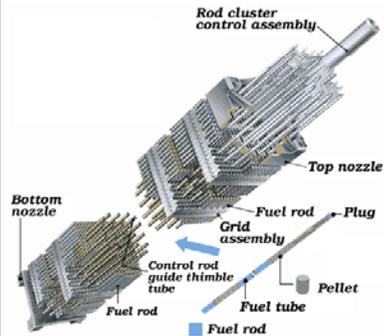
- 2. Independent Storage of High-Level Waste
- 6. Definition for Reprocessing Related Terms (*e.g., 'recycling'*)
- 10. One-Step Licensing and Inspection, Testing and Acceptance Criteria (ITAAC) Requirements
- 12. Financial Protection Requirements and Indemnity Agreements
- 15. Waste Confidence: *Relates to long-term waste storage*
- 17. Diversion Path Analysis Requirements: *Protection against diversion of plutonium, etc.*
- 18. Approaches Toward Material Accounting Management: *Can the facility keep track of plutonium, etc.?*
- 19. Effluent Controls and Monitoring

**Reprocessing:**

**Should it be renamed  
'recycling'?**

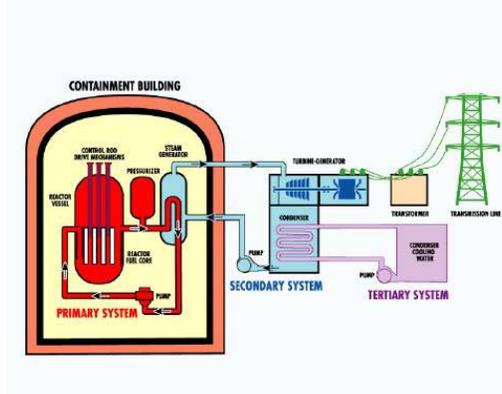
## NUCLEAR FUEL

PWR Fuel Assembly



A fuel assembly consists of a square array of 179 to 264 fuel rods, and 121 to 193 fuel assemblies are loaded into an individual reactor. After the nuclear fuel is used at nuclear power plants, it can be reused as recycled fuel through chemical processing at a reprocessing plant.

## NUCLEAR REACTOR



Sources: [www.mnf.co.jp/pages2/pwr2.htm](http://www.mnf.co.jp/pages2/pwr2.htm),  
[www.reachingcriticalwill.org/resources/factsheets/fuelcycle.html](http://www.reachingcriticalwill.org/resources/factsheets/fuelcycle.html)

### FRESH FUEL

U-238

U-235\*

U-238

or (if MOX fuel)

U-238

U-235\*

U-238

Pu-239\*

>>>>>>>>>>

**NUCLEAR  
FISSION**  
(atoms split,  
heat is  
generated)

>>>>>>>>>>

### “SPENT” FUEL

U-238 (4.5 B yr)

U-235\* (700 M yr)

Pu-239\* (24 K yr)

I-129 (15.9 M yr)

I-131 (8 days)

Cs-137 (30 yr)

Sr-90 (29 yr)

Tc-99 (212 K yr)

etc., etc.

\*Fissionable  
 Radioactive half-life in blue

"SPENT" FUEL		END RESULT
U-238 (4.5 B yr)	>>>>>>>>> <b>Reprocessing</b> ("recycling") (fuel rods are chopped up, chemically dissolved, to recover some of the uranium and plutonium) >>>>>>>>>	U-238 (recycled)
U-235* (700 M yr)		U-235* (recycled)
Pu-239* (24 K yr)		Pu-239* (recycled)
I-129 (15.9 M yr)		I-129 (waste)
I-131 (8 days)		I-131 (gone)
Cs-137 (30 yr)		Cs-137 (waste)
Sr-90 (29 yr)		Sr-90 (waste)
Tc-99 (212 K yr)		Tc-99 (waste)
etc., etc.		etc., etc.

**NRC doesn't seem to recognize  
 the six-year West Valley  
 experience with reprocessing:**

**Should it?**

**Is the West Valley reprocessing history irrelevant now, or does our experience offer information that remains useful regarding:**

- Worker exposures during operation
- Levels of radioactive discharge to air and water during operation
- Ability or inability to remove wastes from site once they have arrived
- Ability or inability of the facility to keep accurate inventories of plutonium, etc.
- Whether costs of operation are 'externalized,' so that major future costs have no clear funding source
- Etc.



**ORAU TEAM**  
Dose Reconstruction  
Project for NIOSH

Oak Ridge Associated Universities | Deale Moeller & Associates | M.J.V. Corporation

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**LIQUID WASTE EFFLUENTS  
from a NUCLEAR FUEL  
REPROCESSING PLANT**

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November 1978



U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE  
Public Health Service  
Bureau of Radiological Health  
Baltimore, Maryland 20512

Etc.

Etc.

**Relevant? Or just ancient history?**