NEI Task Force
Closing the Fuel Cycle
White Paper Overview

NRC Public Meeting
February 26, 2009

NUCLEAR ENERGY INSTITUTE

Closing the Fuel Cycle Task Force

- Creation of Task Force
  - Spring 2008 - NEI/Industry discussions regarding formation of task force
  - June 2008 - Chairman Klein's FCIX reference to industry engagement with NRC on recycling
  - July 2008 - Task Force Kick-off
- Task Force Members
  - Utilities (TVA, Exelon, Duke, Constellation, Entergy)
  - Industrial Teams (Energy Solutions, AREVA, GE, GA)
  - Supporting organizations (CH2M Hill, B&W, Talisman)

Closing the Fuel Cycle Task Force Initiatives

- Licensing Framework for Recycling
  - Focus of this meeting
- Other areas for later Task Force actions
  - Transportation
  - Safeguards and Security
  - Environmental Standards
  - Waste Management
  - Fuel Use in Existing reactors (MOX)

Licensing Framework for Recycling

- Working team formed by Task force to develop licensing framework (B&W/AREVA, Talisman, GE)
- White paper submitted by NEI in December 19, 2008
- Framework addresses Part 7x and other Parts
- Recognize this meeting is first of many stakeholder discussions
- Proposed workshop in June in conjunction with 2009 FCIX

Topics for Part 7x Overview

- Why Part 7x
- Fundamental Concepts
- Scope of Framework
- Safety Philosophy
- Key Features of Part 7x
- Production Facility Thresholds
- Safety Envelope and Safety Report
- Baseline Design Criteria
- Technical Specifications
- Licensing of Operators
- Licensing Flexibility
- Content of Applications
- Outline of Proposed 7x

Why Part 7x ?

- Current Part 50
  - Focuses LWR design and technology
  - Does not have a design basis for a reprocessing plant
  - Does not address the chemical hazards of a reprocessing plant
  - Is not risk informed and performance based similar to Part 70
  - Has requirements that can not be met (i.e. remove HLW waste to a repository in 10 years)
- Current Part 70
  - Recycling was not a clean fit
  - Existing licensees concerned about burdening the regulation

Discussion

Views on a new Part 7X

Fundamental Concepts

- Move non-reactor production licensing out of Part 50
- Create a new Part 7x for licensing recycling facility (non-reactor production facility)
- Utilize a risk informed performance based approach based on Part 70 model
- Allow flexibility while assuring appropriate regulatory review processes
  - One or two step licensing
  - Single or multiple licenses on a site
- Technology neutral

Scope of Framework for Fuel Recycling Facility

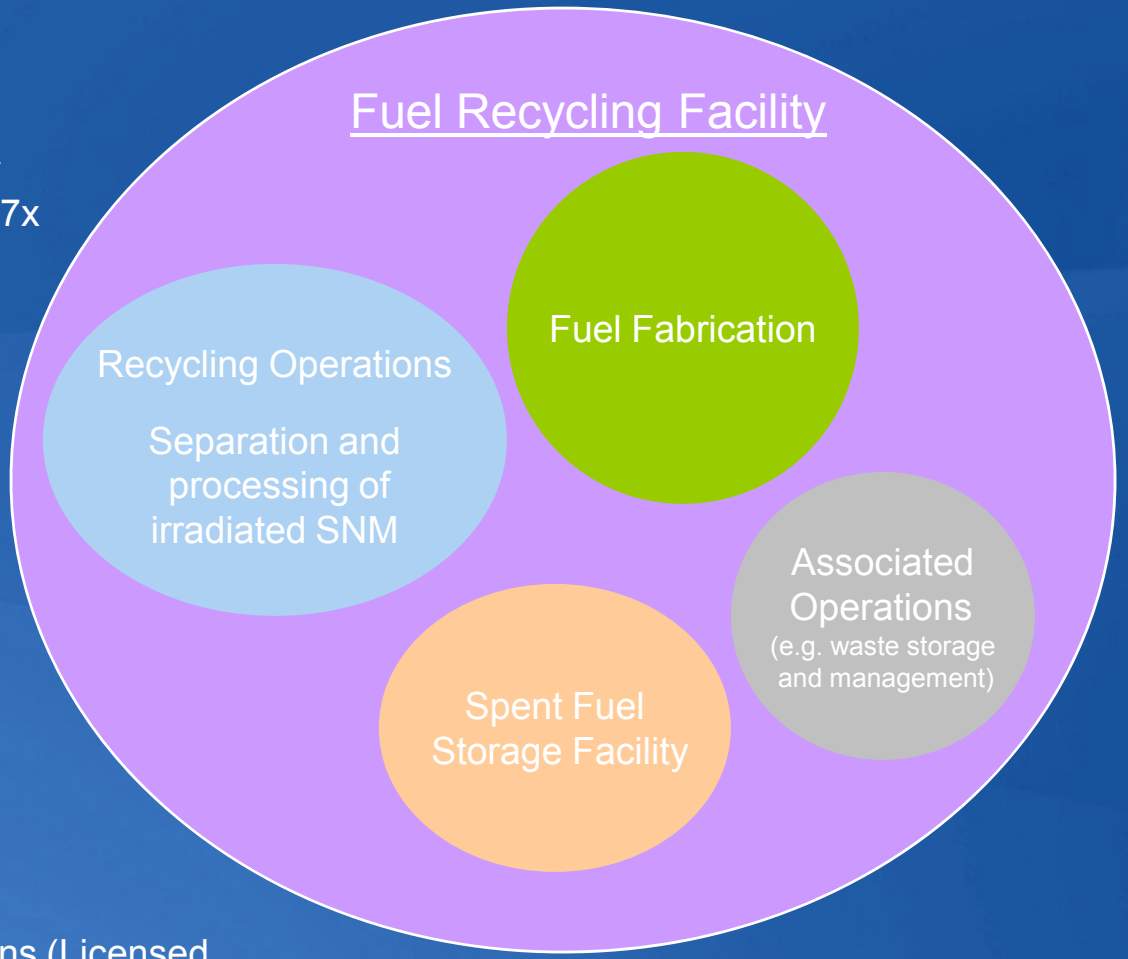
As used in proposed 7x

- *Recycling* means (1) the separation of radioactive elements and (2) the processing of irradiated materials containing special nuclear material.

- Fuel Recycling Facility (FRF) is a facility for recycling and its associated activities on a contiguous site to the extent such activities are included in the application

What is a Fuel Recycling Facility?

- Fuel Recycling Facility licensed under 10CFR7x
- Production Facility licensed under 10CFR7x
- Fuel Fabrication Facility Licensed under 10CFR7x or 10CFR70
- Spent Fuel Storage Facility (Licensed under 10CFR7x or 10CFR72)
- Associated Operations (Licensed under 10CFR7x or Part 30, State, etc.)



Discussion

Views on Concepts and Scope

Framework Adopts the Safety Philosophy of 10 CFR Part 70

Utilizes a risk-informed and performance-based regulatory approach

- Identification of performance requirements for prevention of accidents or mitigation of their consequences
- Establishes Baseline Design Criteria (BDC)
- Performance of an Integrated Safety Analysis (ISA) to identify potential accidents at the facility and the items relied on for safety (IROFS)
- Implementation of Management Measures to ensure that the IROFS are available and reliable to perform their function when needed
- Maintenance of the safety bases, including the reporting of changes to the NRC
- Allowance for licensees to make certain changes to their safety program and facilities without prior NRC approval

Discussion

Views on proposed Safety Philosophy

Key Features of Framework

- Safety Envelope Based on an ISA using performance requirements form 70.61 - Some quantitative analysis
- Enhanced Baseline Design Criteria incorporating criteria from 10 CFR 50, 70 and 72
- Application content similar to 10 CFR 70
- Added concept of “safety report” for technical information
- Technical Specifications

Key Features of Framework

- Licensed Operators for certain functions
- Use of ITAACS for combined licensing
- Licensing Flexibility
- Hearing Opportunities
  - Construction Permit (mandatory)
  - Operating license (if requested)
  - Combined construction and operation (mandatory)
  - ITAAC (if requested and criteria met)

Production Facility Thresholds

- A FRF may encompass activities other than production activities
- Thresholds set to recognize unique aspects of production facilities
- Proposed thresholds are at the level of a high consequence event involving fission product releases to an individual outside the controlled area
- Thresholds applies to
  - Quantitative analysis within ISA
  - Technical Specifications
  - Operator licensing

Discussion

Views on Key Features and Thresholds

Safety Envelope

- Proposed rule introduces the term “Safety Report” to define the technical portions of the application
- The Safety Report contains:
  - The description of FRF and describes application of Baseline Design Criteria
  - The ISA Summary
  - The safety program that provides description of applicant’s process for
    - The ISA
    - Fire protection
    - Chemical safety
    - Nuclear criticality
    - Radiation protection
    - Management measures
    - Process safety information

Safety Report

Safety Report is living document of radiological licensing basis and is controlled throughout life of FRF by change process

- Applicants and licensees must maintain the safety program, ISA and ISA Summary
- The Safety Report is expected to be made up of multiple volumes
- A configuration management change process must be in place to evaluate, implement and track each change in the Safety Report
- Proposed change process modeled after 10 CFR 70 with consideration of 10 CFR 50

Discussion

Views on

Safety Envelopes

Safety Report Concept

Baseline Design Criteria

- BDC are the criteria that must be applied to demonstrate that there is reasonable assurance the performance requirements are met
- Provide for defense-in-depth protection against accidents
- BDC are the initial set of design safety considerations, the ISA process intended to identify additional safety provisions
- Some BDC may not be necessary based on the ISA
- BDC for fuel recycling facilities derived from applicable portions of 10 CFR Part 70, 10 CFR Part 50 and 10 CFR Part 72

Baseline Design Criteria
28 Criteria

- Overall Requirements (1-7)
- Radiological Protection (8-14)
- Chemical and Hazardous Materials Protection (15-16)
- Equipment Services Protection (17-21)
- Facility Confinement Protection (22-28)

Discussion

Views on Baseline Design Criteria

Technical Specifications (TS)

- TS required by AEA for production facilities
- AEA provides TS address
  - Amount, kind, and source of SNM
  - Place of use
  - Specific characteristics of the facility
  - Such other information necessary for common defense and security and public health and safety
- Information contained in the application supplements proposed Technical Specification provision

Technical Specifications (TS)

- The proposed TS provisions limit TS to risk significant aspects of producing SNM based on the ISA
- Applicants would propose TS to address IROFS to prevent or mitigate accident scenarios that could result in high consequence events involving fission product releases to an individual outside the controlled area

Discussion

Views on Technical Specification

Licensing of Operators

- The AEA requires operators be licensed for production facilities but does not specify the process
- Many operators at a FRF (Most Operations Similar to Part 70 Facilities)
- Under proposed part 7x only licensed operators may manipulate the controls which affects the prevention or mitigation of identified accident scenarios that could result in a high consequence event involving fission product releases to an individual outside the controlled area

Licensing of Operators

- Proposed Part 7x provides for a certification process
  - The application needs to provide for NRC approval program for training and certifying operators including periodic testing, and requalification
  - The application needs to identify which operator positions including supervisory positions the applicant will certify to the NRC as technically, mentally, and physically competent and NRC will license
  - Certification means operator is trained and is technically, medically, and physically competent based on an NRC approved certification program

Licensing of Operators

- Based on approved certification program and its implementation, NRC will approve and issue an operator license
- NRC expected to audit the facility's certification process to be satisfied that the certified operators are competent and capable of performing licensed operations
  - NRC may observe training and examinations and review individuals' training and certification documentation
  - NRC afforded access to training material, tests, test results, practical training (simulator, if utilized)
- Under the certification concept , NRC will largely rely on facility's certification that applicant is technically competent based on the facility's approved training and certification program

Discussion

Views on Licensing Operators

Licensing Flexibility

- Flexibility provides for appropriate regulatory reviews and processes
- Applicant may license parts of the facility early and later transfer to a single license
- May limit application for a fuel recycling facility to just recycling activities or to include in its application one or more associated activities conducted on a contiguous site;
- Non recycling activities could be licensed under other parts(e.g. 70 or 72)
- Cumulative impacts of site needs to be fully considered
  - Safety and Security
  - Environmental Report
- Allows the applicant a choice of either a one or two-step licensing process and limited work authorization

Discussion

Views on Flexibility

Content of Application

(a) Material to be licensed

(b)Technical qualifications

(c) Safety Report

(1)Description of the Facility and Application of Baseline Design Criteria

(2) Integrated Safety Analysis Summary (ISA Summary)

(3) Safety Program

(d) Decommissioning

(e) Technical specifications

(f) Environment, effluent releases and waste management

(g) Financial qualification

(h) Emergency Preparedness Plan

Content of Application

(i) Material Control and Accounting Plan(s)

(j) Plan for physical protection of special nuclear material in transit

(k) Physical security plan(s)

(l) Safeguards contingency plan(s)

(m) Protection of classified safeguards information and material.

(n) Financial protection and indemnity

(o) Inspections, tests, analyses and acceptance criteria (ITAAC)

(p) Operators to be licensed

Looks very much like a Part 70 Application with enhancements

Outline of Proposed Part 7x

Subpart A General Provisions

Subpart B Requirement of License, Exceptions and Exemptions

Subpart C Requirements for Applicants

Subpart D Licenses and License Conditions

Subpart E Amendment of License or Construction Permit at Request of Holder, Renewal, and Termination

Subpart F Acquisition, Use, and Transfer of Special Nuclear Material, Creditors' Rights

Subpart G Reports, Records, and Inspections

Subpart H Modification and Revocation of Licenses.

Subpart I Licensed operators

Subpart J Enforcement

Discussion

Views on

Overall Content