

# Spent Fuel Storage and Transportation Packagings

## Fabrication, Examination, Testing & Oversight of Spent Fuel Storage Systems Guideline

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# Objective

To provide standard guidance to ensure that the licensing/design basis requirements are met during the, fabrication, examination and testing process.

- **Goals**

- Ensure safety and quality
- Optimize use of NRC and utility resources
- Provide consistency

# Scoping Statement

The scope of the guidance document covers items important to safety in dry spent fuel storage and transportation systems with an emphasis on the incorporation of licensing/design into fabrication, examination and testing requirements.

# Members

- **Alan Soler** HOLTEC International
- **Bob Quinn** BNFL Fuel Solutions
- **Ram Srinivasan** BNFL Fuel Solutions
- **David Morse** Consumers Energy
- **Emil Zernick** Consumers Energy
- **Paul R. Rau** PECO Nuclear
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- **Chris Hartz** PG&E
- **Garrick Solovey** PCC
- **Bill Lee** NAC International
- **Charles Temus** Portemus Eng
- **Bob Moscardini** US Tool & Die, Inc.
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- **John Duffy** Ranor
- **Bill Borter** BNFL Fuel Solutions
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- **Mark Pyne** Duke Energy
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- **Jim Gill** Wisconsin Electric
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- **Tara Neider** Transnuclear, Inc.
- **Alan Nelson** NEI
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- **Jack Spanner** EPRI
- **Albert Machiel** EPRI
- **Bob Nickell** Anatech
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# Items Important to Safety

- Shell Assembly
- Basket Assembly
- Primary Lid System
- Secondary Lid System
- Environmental Overpack
- Trunnions, Lifting Devices
- Transfer Cask
- Internal Fuel Basket
- Support Structures

# Schedule

- Task 1: Outline/Schedule March 31 Done
- Task 2: Vendor Contacts and Example Set to Vendors April 2 Done
- Receive Sets from Vendors April 30 Done
- Task 3: Preparation of Template April 30 Done
- Task 4: Verification Exercise May Done
- Task 5: Complete Initial Draft May 26 Done
- Develop consensus document during 5 meetings Feb 28 Done
- Task 6: Finalize and Issue Draft Document Nov 24 Done
- Task 7: Discuss Guideline with NRC May 22
- Task 8: Issue Guideline as Final Report Sept 29

# Issues

- Reference ASME Section III, ASTM, ACI, etc. but with exceptions
  - Oversight: ANI's not required but permitted-with utility oversight
  - Code stamping not required
  - Partial penetration welds permitted
  - No relief valve necessary
- Some designs have been approved/licensed /Certificate of Compliance
  - Do not have to backfit to meet this standard

# Issues (Cont'd)

- Utilities are ultimately responsible for storage system and operation, with one exception
  - Much more involved in fabrication & oversight
  - Involved with NRC more
  - Fabrication and approval/licensing process varies considerably
- Most storage system processes are unique
- UT, MT or PT of final closure weld: ISG-4



# ASME Status and Coordination

- ASME Section III, Division 3: Containment Systems for Spent Nuclear Fuel & High Level Waste Transport and Storage Systems
  - WA: General Requirements
  - WB: Transport Containment Boundary
  - WC: Storage System Containment Boundary
- WC & Revised WA are fast tracked
- Complementary technical approach between ASME (for containment/confinement boundary) and EPRI

# Contents of Guideline

- Preamble: Overview of licensing and fabrication process
- Planning: Utility, designer, and fabricator plan and assign tasks
- Fabrication: Specifications, reports, procedures, drawings, materials, dimensions, surface coatings
- Examination: NDE, pressure tests, leak tests

# Contents of Guideline (Cont'd)

- Testing: Heat rejection (analysis), neutron absorber, concrete, neutron shielding, gamma shielding, lifting trunnion load tests, concrete strength tests
- Oversight
  - Items to receive oversight or review
  - Critical characteristics important to safety
  - Must be included into planning stage

# PARTIES TO THE OVERSIGHT PROCESS

- Licensee

The Licensee is the organization that implements use of the dry SNF storage system at the Independent Spent Fuel Storage Installation (ISFSI) site.

- Certificate of Compliance Holder

The Certificate of Compliance Holder is the organization that owns the dry SNF storage system and has been granted a Certificate of Compliance by the NRC for the design.

# PARTIES TO THE OVERSIGHT PROCESS (cont.)

- Storage System Owner

The Storage System Owner is the organization that intends to own the components of the dry SNF storage system upon delivery by the License Holder, or by one or more Storage System Fabricators.

- Storage System Fabricator

The Storage System Fabricator is the organization that fabricates, examines, and tests any portion of the dry SNF storage system in accordance with the Fabrication Specifications.

# OVERSIGHT ARRANGEMENTS

The primary responsibilities of the three parties are outlined in Section 4 (Licensee/Certificate of Compliance Holder), Section 5 (Storage System Owner), and Section 6 (Storage System Fabricator). Section 7 describes the range of fabrication, examination, and testing activities that are carried out to assure primary compliance with the Design Documents and Fabrication Procedures. Section 8 recommends independent oversight activities that provide verification of compliance.

# OVERSIGHT ARRANGEMENTS

The independent oversight process consists of the monitoring, analysis, and review of critical characteristics related to fabrication, examination, and testing activities by one of three parties to the fabrication process – the Licensee/Certificate of Compliance Holder, the Storage System Owner, or the Storage System Fabricator. Any of the three parties may choose to assign responsibility to a competent independent contractor.

# OVERSIGHT ARRANGEMENTS

This oversight is not intended to replace existing quality assurance and quality control (QA/QC) programs; instead, these oversight activities may supplement existing QA/QC programs by building on industry experience. The duties and responsibilities for the oversight process are to be determined by these three parties by mutual agreement prior to the fabrication process.



# OVERSIGHT ARRANGEMENTS

The three parties will collectively assign the elements of the oversight process based on primary responsibility for *performing* and *reviewing the performance* of a particular activity by two of the three organizations, and the *independence and technical competence* of the remaining organization. If one of the organizations performs more than one of these roles, special consideration will be needed to assure independent oversight.

# OVERSIGHT ARRANGEMENTS

- ORGANIZATION 1: PERFORMER OF AN ACTIVITY
- ORGANIZATION 2: REVIEWER OF THE PERFORMANCE OF AN ACTIVITY
- ORGANIZATION 3: INDEPENDENT AND TECHNICALLY COMPETENT THIRD PARTY AVAILABLE FOR OVERSIGHT OF THE ACTIVITY PERFORMANCE AND ITS REVIEW

# Contents of Guideline (Cont'd)

- Oversight Requirements Contained in Table 8
  - Review of the translation of License/Design Documents into Fabrication Specifications (by the party that is not the Storage System Fabricator and who is without primary responsibility for preparing the Fabrication Specification)
  - Review of Material Test Reports and other material documentation
  - Witnessing performance of Special Processes
  - Witnessing component assembly and fit-up verification
  - Witnessing mock-ups and proof-of-process demonstrations
  - Witnessing performance of required tests

# Contents of Guideline (Cont'd)

- Witnessing and reviewing results from nondestructive examinations
- Review of Fabrication Drawings and Fabrication Procedures
- Review of Fabrication Data Packages
- Verification of Critical Characteristics and Dimensions
- Disposition of Non-Conformances, including Safety Evaluations
- Auditing material suppliers and other suppliers/sub-suppliers

## Table 8-3 Witnessing Performance of Special Processes

| Component   | Requirement   | Primary Responsibility   | Recommended Oversight  |
|---|---|--|--|
| <b>Shell Assembly</b><br><b>Basket Assembly</b><br><b>Primary Lid System</b><br><b>Secondary Lid System</b><br><b>Storage Overpack</b><br><b>Trunnions, Lifting Devices</b><br><b>Transfer Cask</b> | <b>Special processes, such as welding, heat treatment, nondestructive examination, and chemical cleaning, must be performed by individuals and organizations with specific training and qualifications.</b> | <b>The designated Storage System Fabricator has primary responsibility for the performance of special processes, including the supervision of subcontractors performing special processes.</b> | <b>Either the Licensee/Certificate of Compliance Holder or the Storage System Owner may have oversight responsibility for witnessing the performance of special processes. The entity without primary responsibility for preparation of the designated component Fabrication Specification and the review and approval of the component Fabrication Data Package shall be so designated.</b> |

# Implementation

- Provide draft copy of Guideline to NRC
- Final Guideline will be issued in September 2000 after final editing
- Utilities will be encouraged to use Guideline in contracting and planning for Spent Fuel Storage Systems

# SUMMARY

- Guideline has been prepared under EPRI sponsorship by an industry consensus group
- Guideline provides a flexible framework for performance, review of performance, and oversight confirmation during the fabrication process
- Guideline is sufficiently robust to handle future contractual arrangements among designers, fabricators, and users
- Guideline represents a proactive, consistent, and well documented approach to fabrication