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U.S. NRC TRANSPORTATION PACKAGINGS AND SPENT FUEL DRY CASK STORAGE SYSTEMS VENDOR INSPECTION PROGRAM

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Presentation Outline

- NMSS/SFST Overview
- Vendor/CoC/QAP Approval Holder Relationship
- 10 CFR Part 71 Inspection Process
- 10 CFR Part 72 Inspection Process
- Common Inspection Findings

NMSS/SFST Overview

- **Office of Nuclear Material Safety and Safeguards (NMSS)**
  - **Division of Fuel Cycle Safety and Safeguards**
  - **Division of Spent Fuel Alternative Strategies**
  - **Division of Spent Fuel Storage and Transportation (SFST)**

NMSS/SFST Overview (continued)

SFST Functions

- Reviews and approves, through issuance of a Certificate of Compliance (CoC), commercial transportation packaging designs under 10 CFR Part 71 and spent fuel dry cask storage designs under 10 CFR Part 72
- Reviews and approves quality assurance programs (QAPs) for use under Part 71 and 72
- Conducts inspections of the implementation of QAPs by CoC holders for the design and fabrication of transportation packagings and dry cask storage systems

Vendor/CoC/QAP Approval Holder Relationship

- **SFST conducts inspections of all Part 71 packaging CoC holders and Part 72 dry cask storage system CoC holders; commonly referred to as packaging and cask vendors**
- **Unlike most vendors that NRR/NRO inspect, the vendors SFST inspect all have direct regulatory ties to the NRC in that they hold NRC issued CoCs and QAP approvals**
- **As the majority of Part 71 and 72 CoC holders manufacture packagings and casks at contracted fabrication facilities, SFST also conducts inspections at these facilities; inspection reports and findings are issued to the CoC holder that is using the fabrication facility**

10 CFR Part 71: Packaging and Transportation of Radioactive Material

- **Part 71 provides regulatory requirements for:**
  - **Review and approval of Type B and fissile material packagings through issuance of a CoC**
  - **Review and approval of QAP descriptions for all NRC CoC holders and NRC licensee users of Type B and fissile material packagings**

Part 71 QAP Requirements

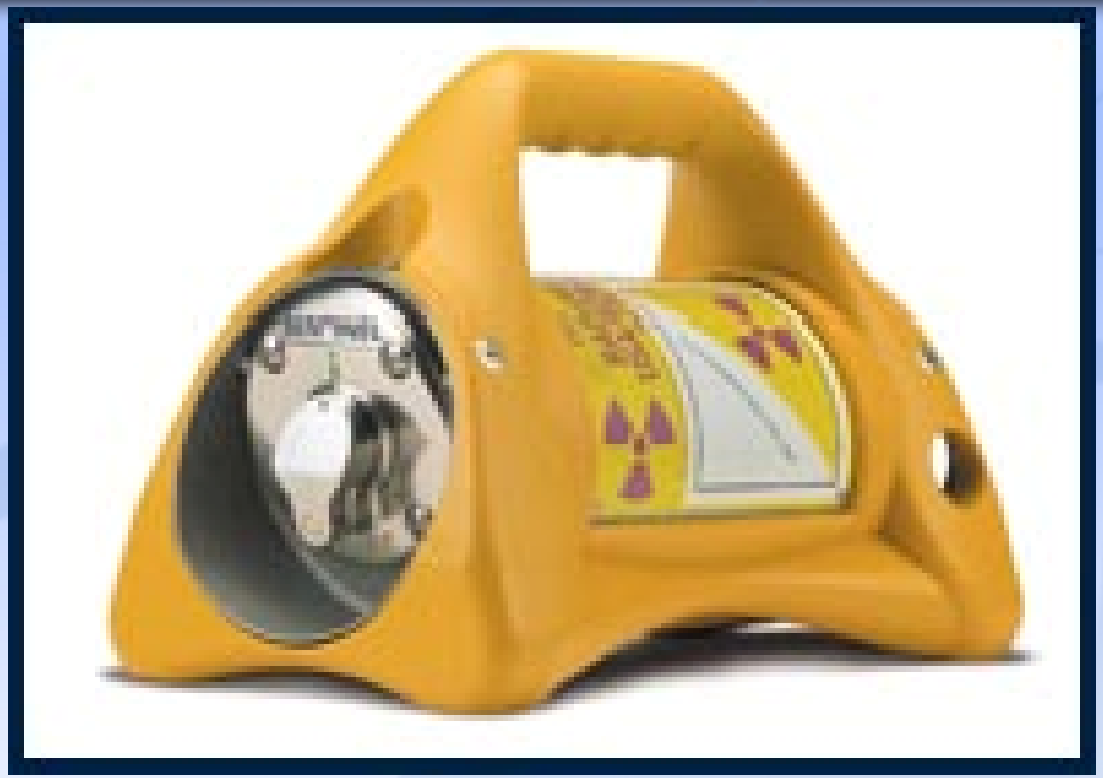
- 10 CFR 71.37 requires CoC applicant to submit a QAP description for review and approval by NRC
- Applicant must address how the eighteen (18) criteria specified in Part 71, Subpart H, will be applied; Subpart H is essentially the same as Part 50, Appendix B
- NRC issues QAP Approval certificate
- QAP Approval holder expected to implement NRC QA requirements in working level procedures

NRC QA Program Requirements (continued)

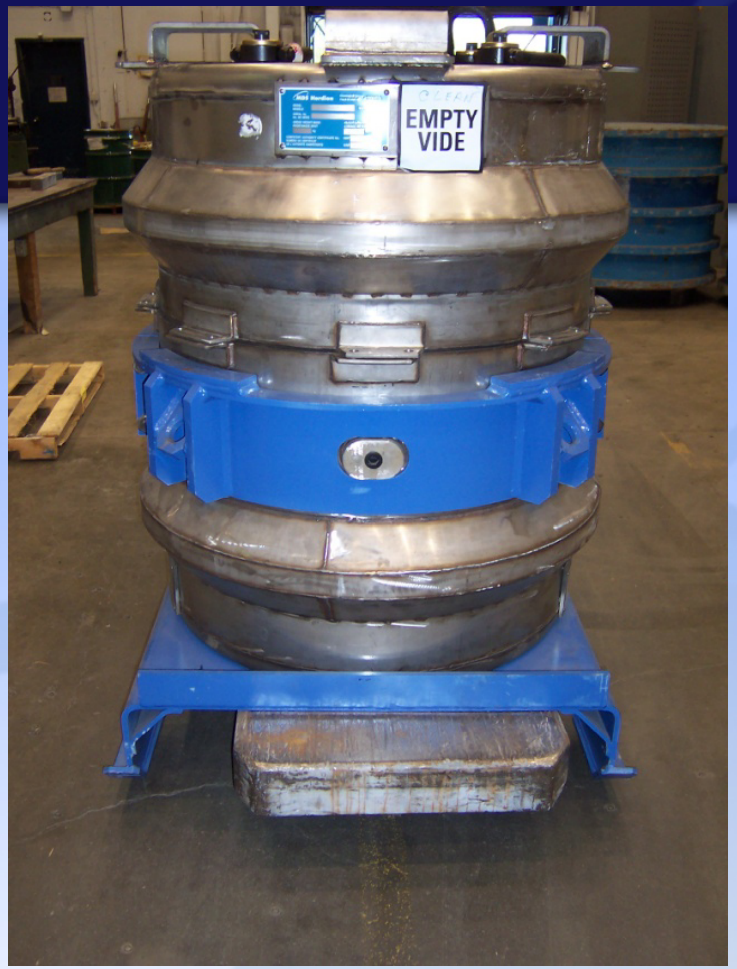
- **Currently twenty-eight (28) CoC/QAP Approval holders; some with multiple CoCs, some with just one CoC, and three in process of obtaining their first CoC.**

  (3) Designers/fabricators of radiography camera devices
  (7) Fuel fabricators; packagings for new fuel or powder
  (7) Designers/users of packagings for medical isotopes
  (8) Designers/users of packagings for commercial purposes
  (3) Dry cask storage vendors for dual-purpose cask designs

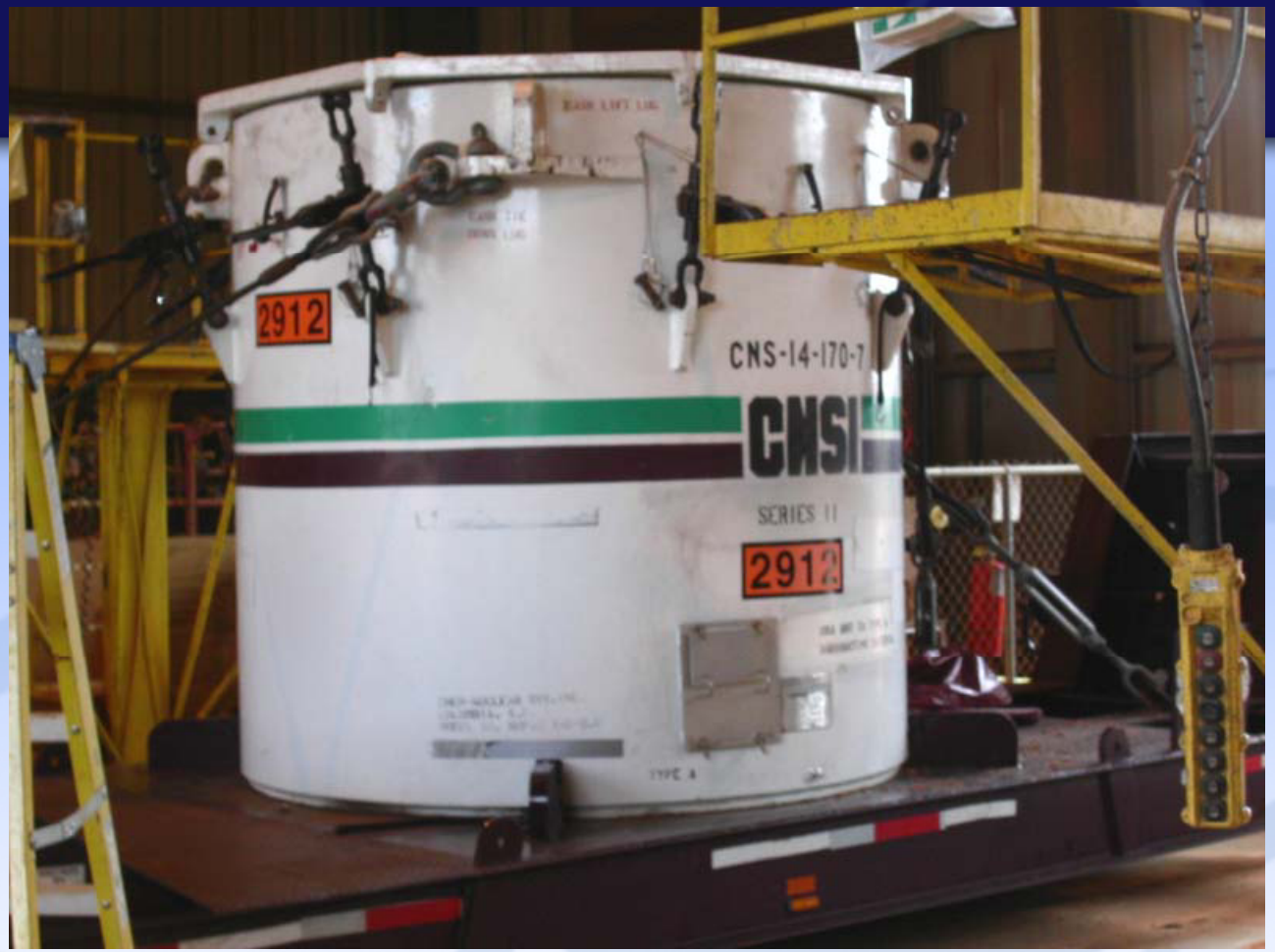
EXAMPLES OF PART 71 CoC PACKAGINGS



Radiography Camera



PACKAGING USED FOR SHIPMENT OF BULK COBALT-60 FOR USE IN INDUSTRIAL STERILIZATION FACILITIES



PACKAGING COMMONLY USED AT NUCLEAR PLANTS FOR SHIPMENT OF SPENT RESINS

PACKAGING USED EXTENSIVELY FOR RESEARCH REACTOR SPENT FUEL SHIPMENTS AND RETURN OF FOREIGN REACTOR FUEL PROGRAM

Part 71 Inspection Program

- QAP Approval holder responsible to ensure proper implementation of their NRC-approved QAP
- NRC conducts periodic planned and reactive safety inspections of all CoC/QAP Approval holders
- Average frequency of five (5) years; inspection frequency adjusted based on performance
- Inspection guidance contained in NRC Inspection Procedure 86001 and NUREG/CR-6314
- NUREG/CR-6314 breaks inspection areas into four (4) major categories

Part 71 Inspection Program (continued)

- **Management Controls**
  - Quality Assurance Policy
  - Nonconformance Controls
  - Documentation Controls
  - Audit Program
- **Design Controls**
  - Design Development and Modifications
- **Fabrication Controls**
  - Material Procurement
  - Fabrication and Assembly
  - Test and Inspection, Tools and Equipment
- **Maintenance Controls**
  - Maintenance Activities
  - Tools and Equipment

Part 71 Inspection Program (continued)

- Scope and extent of inspection dependent upon activities at the inspection site
  - Full-scope inspections
  - Corporate inspections without fabrication
  - Contracted fabrication facilities
- Inspection results documented in publicly available inspection reports
- Noncompliances dispositioned in accordance with NRC Enforcement Policy Manual

Part 72: Licensing Requirements for the Independent Storage of Spent Nuclear Fuel (abbreviated title)

- **As required by Part 72, licensees and CoC holders must have an NRC-approved QAP**
- **QAP requirements are contained in Part 72, subpart G**
- **The cask vendors all hold QAP Approvals issued under 10 Part 71 subpart H as they all design/fabricate dual purpose cask systems that can be used for both transportation and storage purposes**
- **10 CFR 72 subpart G allows the cask vendors to take credit for their Part 71 QAP Approval in meeting the Part 72 QAP requirements**

Part 72 Vendors

- **There are three active cask vendors, all located in the United States. They are:**
- **Transnuclear (TN), Inc.**
- **Holtec International**
- **NAC International**

EXAMPLES OF PART 72 DRY CASK STORAGE COMPONENTS

FUEL CANISTER

CONCRETE OVERPACKS ON ISFSI PAD

CONCRETE HORIZONTAL STORAGE MODULES

Part 72 Vendors (continued)

- **The three vendors conduct fabrication at the following locations:**
- **Holtec: Holtec Manufacturing Division located in Turtle Creek, PA (formerly US Tool and Die)**
- **NAC: GE Hitachi facility in Canonsburg, PA; Hitachi-Zosen in Arao, Japan; and Petersen, Incorporated, in Ogden, UT**
- **TN: Kobe Steel in Takasago, Japan; Hitachi-Zosen in Arao, Japan; ENSA in Santander, Spain; Larson and Toubro (L&T) in Mumbai and Vadodara, India, and Sedae Enertec in South Korea**
- **First time fabrication inspections will be conducted in FY 2012 and 2013 of Petersen, L&T, and Sedae Enertec.**

Part 72 Inspection Procedures

- **SFST uses various procedures and documents for the planned inspections of Part 72 vendor and fabrication facilities. These include:**

- **IP 60851, "Design Control of ISFSI Components"**
- **IP 60852, "ISFSI Component Fabrication by Outside Fabricators"**
- **IP 60857, "Review of 10 CFR 72.48 Evaluations"**
- **NUREG/CR-6314, "Quality Assurance Inspections for Shipping and Storage Containers"**

Part 72 Inspection Process

- **Routine inspections of each Part 72 cask vendor are conducted on a three year cycle**
- **Each fabrication facility is also inspected on a three year cycle**
- **Flexibility is maintained to reduce the inspection cycle to less than three years in those instances where performance or programmatic concerns have been identified during inspections or where adverse incidents have occurred**

Common Part 71/72 Inspection Findings

- **Categories from NUREG/CR 6314: Management, Design, Fabrication, and Maintenance Controls**

- **Findings Across All Categories**
  - Failure to incorporate QAP description statements in appropriate QA procedures
  - Failure to follow procedures affecting quality activities
  - Failure to adequately prescribe activities affecting quality in appropriate procedures

- **Design Controls**
  - Lack of guidance regarding when packaging modifications require regulatory approval (Part 71)

Common Part 71/72 Inspection Findings (continued)

- **Management Controls**
  - Failure to provide justification for “use-as-is” or “repair” disposition of nonconformance reports
  - Lack of procedural guidance when converting from paper-based systems to electronic QA records

- **Fabrication Controls**
  - Improper flow-down of QA requirements to vendors/suppliers
  - Controls on commercial grade dedication (CGD)
    - CGD by sub-suppliers
    - Material traceability for valid test samples

CONCLUSION OF PRESENTATION