VSC-24 CoC Renewal Application Pre-Submittal Meeting

Rockville, MD
January 19, 2012

Introductions/Purpose of Meeting

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- Introductions
  - Steven Sisley – Licensing/Regulatory Compliance Manager
  - James Hopf – Project Engineer
- Purpose of Meeting
  - Discuss CoC Renewal Application for the VSC-24 Storage System
  - Obtain NRC feedback

Agenda

- Background
- Application Content
- Scoping Evaluation
- Aging Management Review (AMR)
- Aging Management Program (AMP)
- Time-Limited Aging Analysis (TLAA)
- Lead Cask Inspection
- Schedule
- Summary
- Discussion/Questions

Background

- VSC-24 Ventilated Storage Cask System is approved under 10 CFR 72, Subpart K (Docket No. 72-1007).
- VSC-24 CoC initially issued May 7, 1993 and will currently expire May 7, 2013.
- EnergySolutions will submit a CoC renewal application for the VSC-24 Storage Cask System
  - The requested 40-year CoC renewal term would extend the CoC expiration date to May 7, 2053.

Background (continued)

- 58 VSC-24 casks loaded and stored at three different ISFSIs between May 1993 and June 2003;
  - 18 casks at Palisades
  - 16 casks at Point Beach
  - 24 casks at ANO
- SNF assemblies stored in VSC-24 casks have low heat loads and low burnup.
  - Max. initial heat load of 58 loaded VSC-24 casks is < 15 kW.
  - Highest burnup of all SNF assemblies in 58 loaded VSC-24 casks is < 42 GWd/MTU.

Background (continued)

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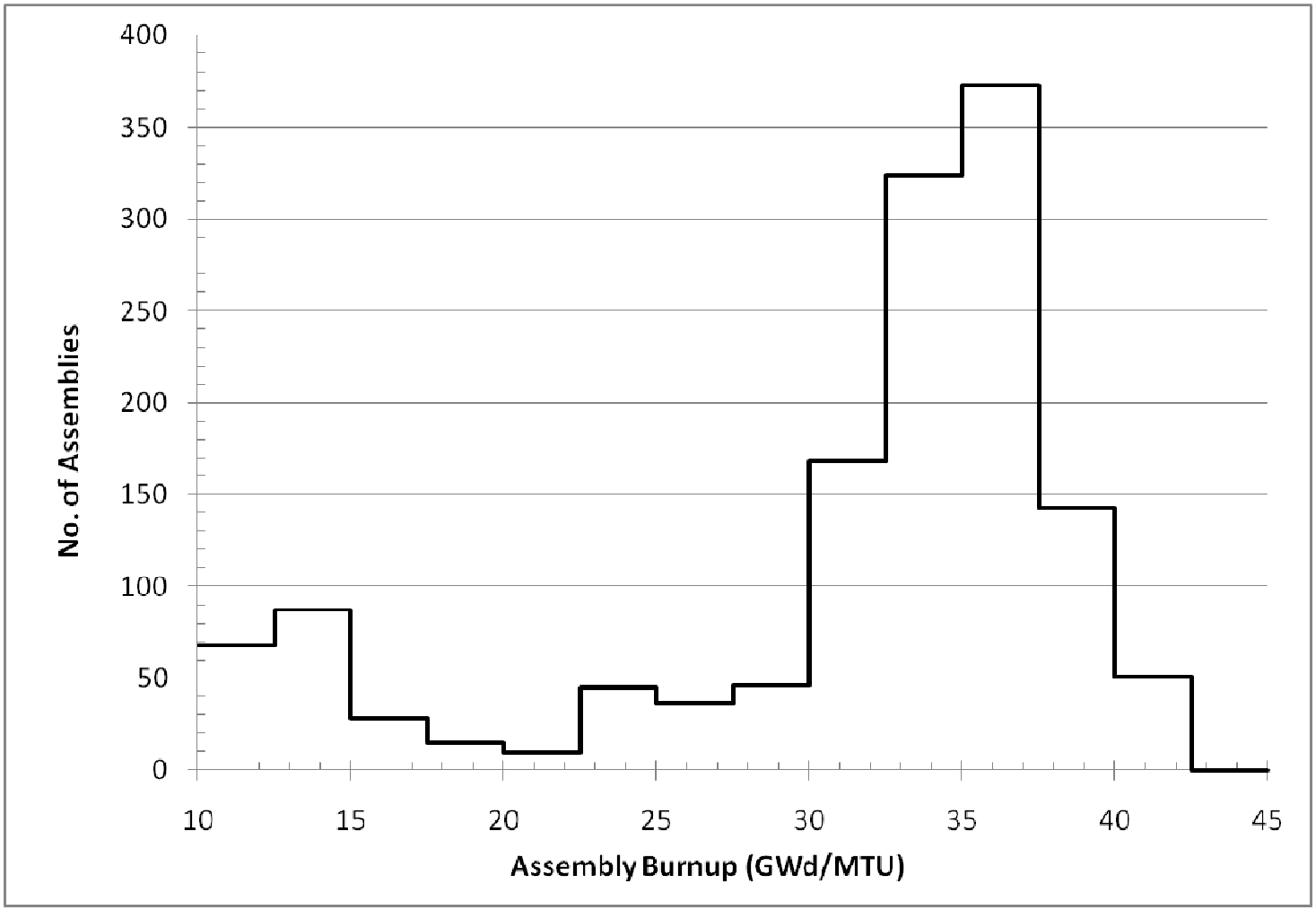
MSB Fuel Assembly Burnup Distribution



Background (continued)

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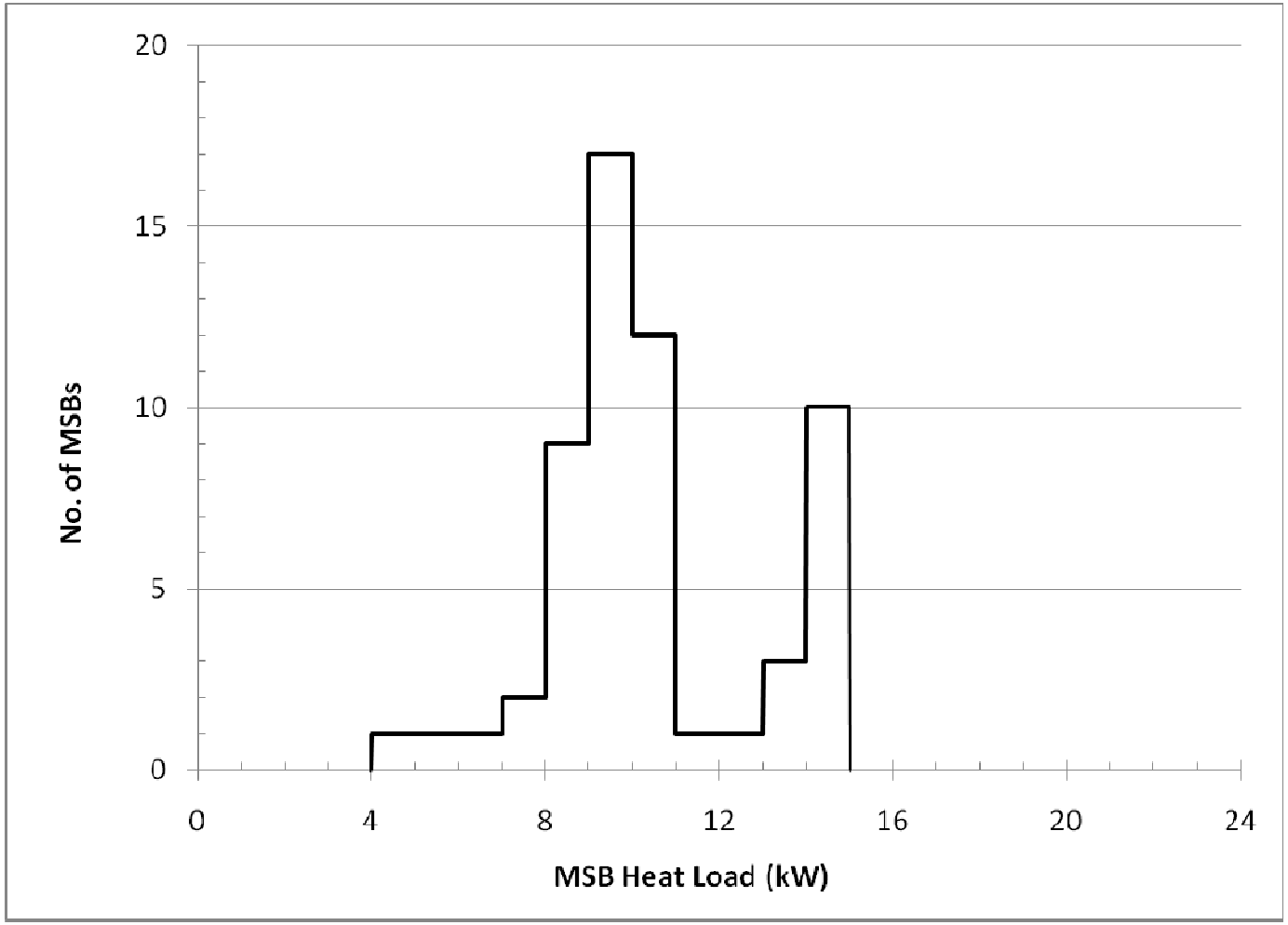
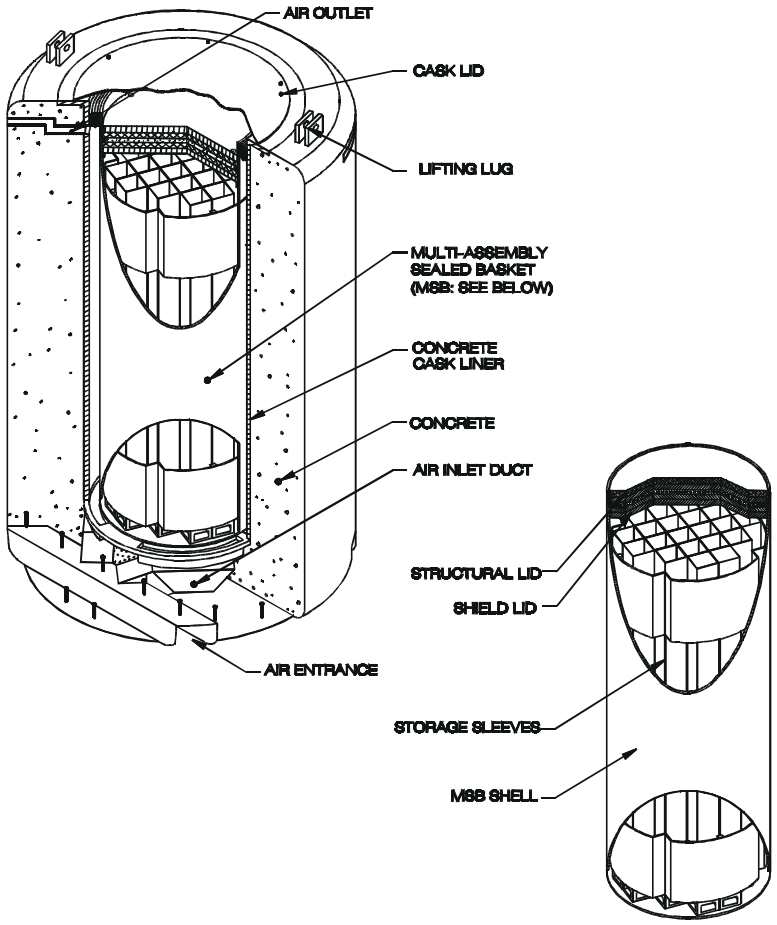
MSB Heat Load Distribution



Background (continued)

- Principal System Components
  - Ventilated Concrete Cask (VCC)
  - Multi-assembly Sealed Basket (MSB)
  - MSB Transfer Cask (MTC)
- VCC Design Features
  - Reinforced concrete shell
  - Coated CS liner, shield ring, and lid
  - Ceramic tiles support MSB
- MSB Design Features
  - Coated CS construction
    - MSB shell coating not relied upon for corrosion protection
  - Storage sleeve assembly has no neutron absorber plates
  - Payload: 24 PWR SNF assemblies



Application Content

- Format and content per guidance from NUREG-1927
  - General Information
  - Scoping Evaluation
  - Aging Management Review
  - Time-Limited Aging Analyses
  - Aging Management Program
  - FSAR Changes and Additions
  - Technical Specification Changes and Additions
- Review of other renewal applications for guideance

Scoping Evaluation

- Identify SSCs that will be reviewed for aging effects
- Scoping process per Section 2 of NUREG-1927
  - Identify SSCs as in-scope or not in-scope of renewal
  - Identify and describe subcomponents of in-scope SSCs that support the intended safety function(s) of the SSCs
- Scoping Criteria
  - Criteria 1: SSC is Important to Safety (ITS)
  - Criteria 2: SSC not ITS, but failure could prevent fulfillment of a function that is ITS

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Example - Scoping Evaluation Results

SSC Description	Scoping Results		In-Scope SSC?
	Criteria 1[(1)]	Criteria 2[(2)]	
MSB Assembly	Yes	N/A	Yes
VCC Assembly	Yes	N/A	Yes
MTC Assembly	Yes	N/A	Yes
Spent Fuel Assembly[(3)]	Yes	N/A	Yes
Fuel Transfer and Auxiliary Equipment[(4)(5)]	No	No	No
ISFSI Storage Pad	No	No	No
ISFSI Security Equipment[(6)]	No	No	No

Notes:

(1) SSC is Important-To-Safety (ITS).

(2) SSC is Not-Important-To-Safety (NITS), but its failure could prevent an ITS function from being fulfilled.

(3) Fuel pellets are not within the scope of the renewal.

(4) Fuel transfer equipment includes the lifting yoke, hydraulic roller skid, air-pallets, heavy haul trailer, and engineered cask transporter.

(5) Auxiliary equipment includes MSB closure equipment used to drain, backfill, and seal the MSB assembly (e.g., the vacuum drying system (VDS), welding equipment, weld inspection equipment, drain pump equipment, and helium leak detection equipment.)

(6) ISFSI security equipment Includes the ISFSI security fences and gates, lighting, communications, and alarms.

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Example – Intended Functions of MSB Subcomponents

Subcomponent	Part or I.D. No.	Reference Drawing (1)	Intended Functions (2)
Shell	MSB-001	MSB-24-002	HT, RS, PR, SS
Bottom Plate	MSB-002	MSB-24-002	HT, RS, PR, SS
Shield Lid Support Ring	MSB-003	MSB-24-002	SS
Lifting Lug	MSB-004	MSB-24-002	SS
Structural Lid	MSB-005	MSB-24-002	HT, RS, PR, SS
Closure Weld Backing Ring	MSB-010	MSB-24-001	---
Shim	MSB-006	MSB-24-001	RS
Shield Lid Top Plate	MSB-011	MSB-24-003	RS, PR, SS
Shield Lid Bottom Plate	MSB-012	MSB-24-003	RS, PR, SS
Shield Lid Side Ring	MSB-013	MSB-24-003	PR, SS
Shield Lid Neutron Shield	MSB-014	MSB-24-003	RS
Shield Lid Pipe & Flex Tubing	MSB-007 & -016	MSB-24-003	---
Swagelok Quick Connect	MSB-008	MSB-24-003	---
Structural Lid Valve Covers	MSB-009	MSB-24-002	PR
Shield Lid Support Plate	MSB-017	MSB-24-003	RS, SS
Storage Sleeve	MSB-018	MSB-24-004	CC, HT, RS, SS
Basket Edge Structure	MSB-019 thru -021	MSB-24-004	SS
Coating	Dwg. Note 1	MSB-24-001	---(3)

Notes:

(1) Included in Section 1.5 of the VSC-24 FSAR.

(2) Intended functions are abbreviated as follows: Criticality Control (CC), Heat Transfer (HT), Radiation Shielding (RS), Confinement (PR), and Structural Support (SS).

(3) The MSB carbon steel surfaces are coated with a zinc primer, but the primer is conservatively neglected in the licensing analyses.

Aging Management Review

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- Identify Materials of In-Scope SSCs
  - Fuel assembly: zirconium alloys, stainless steel, inconel
  - MSB: carbon steel (w/ coatings), RX-277 neutron shield
  - VCC: coated carbon steel, reinforced concrete
  - MTC: coated carbon steel, lead, RX-277 neutron shield
- Identify Environments
  - Inert helium
    - applies for: MSB interior
    - considerations: temperature, residual moisture/oxygen
  - Sheltered (air)
    - applies for: MTC, MSB exterior, VCC interior (ducts, etc.)
    - considerations: temperature, humidity, salinity, trace elements (pollutants)
  - External Environment
    - applies for: VCC exterior
    - considerations: temperature, humidity, rain/water, salinity, trace elements, wind, solar insolation

Aging Management Review (continued)

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- Identify Aging Effects & Mechanisms (for in-scope SSCs)
  - Based upon component materials and environment
  - Determined using:
    - Site and industry operating experience
    - Literature review
- Spent Fuel Assembly Aging Effects
  - Direct inspection impractical
  - Aging effects unlikely
    - NUREG/CR-6745 and ISG-11
    - Low burnup fuel (< 45 GWd/MTU)
    - Zircalloy cladding
    - Actual maximum cladding temperatures << 400 ^{o}C

Aging Management Program

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- Scope
  - In-Scope SSCs
  - Aging effects that could result in loss of design function for an SSC
  - Each SSC for which the AMR identifies an aging effect that requires management
- AMP Features/Implementation
  - 10 AMP elements (NUREG-1927)
  - AMP Methods
    - Prevention (coating/concrete repairs/touch-ups)
    - Mitigation (cathodic protection systems)
    - Condition monitoring (visual inspections)
    - Performance monitoring (e.g., dose rates)

Time-Limited Aging Analysis (TLAA)

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- Identification of TLAAs based on following criteria:
  - TLAA already in design basis (i.e., SAR, SER, etc.)
  - TLAA for in-scope SSCs with a pre-determined life span.
  - Involves time-limited assumptions defined by the current operating term.
  - Must consider extended operational lifetime of SSCs that have a defined lifetime limit.
  - Provide conclusions or basis for conclusion for capability of SSC to perform intended function for extended operation.

Time-Limited Aging Analysis (continued)

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- TLAAs currently identified for VSC-24 storage system
  - MSB Corrosion Analysis
    - Maximum corrosion in shell & bottom plate over 60 years.
    - Maximum combined stresses in MSB shell & bottom plate shown to satisfy allowable stress design criteria.
  - MSB Fatigue Analysis
    - MSB satisfies fatigue acceptance criteria for anticipated cyclic loading over 60 years of service.
  - MSB Helium Leakage Analysis
    - Concludes that effect of 2.7% Helium loss over 60 years is smaller than effect of reduction in heat load over same period.
  - Fuel Cladding Creep Analysis
    - Shows that cladding creep beyond 40 years is negligible due to reduced temperature.

Lead Cask Inspection

- Cask Selection Parameters
  - Time in service
  - Heat load
  - Location of cask on pad
  - Site conditions
- Examinations Performed
  - Visual inspections, in accordance with NUREG-1927
  - MSB exterior, including side and top surfaces
  - VCC exterior and interior cavity surfaces, including ducts and vents
- Inspection Currently Planned for Summer of 2012
  - Shortly after submittal of renewal application in May 2012
  - Lead cask inspection results will be submitted within 30-days

Schedule

- Planned submittal in May 2012
  - CoC expires on May 7, 2013
  - Conditions for renewal (10CFR72.240)
    - Application must be submitted not less than 30 days before expiration date of CoC (i.e., on or before April 7, 2013)
    - Existing CoC will not expire until the application for renewal has been determined by NRC
- Discussion of NRC review schedule
  - Acceptance review (est. 2 mo.)
  - Initial technical review (est. 4 mo.)
  - RAI response review (est. 3 mo.)
  - Rulemaking (est. 24 weeks)
    - Finish after CoC expiration date?

Summary

- VSC-24 CoC renewal application is planned for submittal to NRC in May 2012
- Application format and content per NUREG-1927
  - First CoC renewal application for generic cask design

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Questions?


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