

# Calvert Cliffs Independent Spent Fuel Storage Installation

## License Renewal Application

### Discussion of Request for Additional Information

Rockville, Maryland

July 17, 2014



**Exelon** Generation®

## Attendees – Calvert Cliffs

- Pamela Cowan – Director, Spent Fuel & Decommissioning
- Jim Wood – Manager, ISFSI Implementation & Support
- John Massari – Manager, Nuclear Fuels
- Paul Gregory – Sr. Program Manager, Dry Cask Storage
- Tom Konerth – Engineering Manager
- Heidi Valenta – Consultant Engineer, D&Z
- Paul Robbins – Engineer, Mechanical/Civil
- Ken Greene – Principal Engineer, Regulatory Assurance

# Agenda

- Introductions
- Objective of Meeting
- Background
- Discussion of Requests for Additional Information and Calvert Cliffs Proposed Responses
- Closing Remarks

# Acronyms

ACI	American Concrete Institute
AMP	Aging Management Program
AMR	Aging Management Review
ANSI	American National Standard Institute
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CISCC	Chloride Induced Stress Corrosion Cracking
DSC	Dry Shielded Canister
EPRI	Electric Power Research Institute
HSM	Horizontal Storage Module
ISFSI	Independent Spent Fuel Storage Installation
LRA	License Renewal Application
NDE	Non-destructive Examination
NRC	Nuclear Regulatory Commission
OE	Operating Experience
RAI	Request for Additional Information
RSI	Request for Supplemental Information
SCC	Stress Corrosion Cracking
USAR	Updated Safety Analysis Report

## Objective of Meeting

- Ensure clear understanding of RAIs
- Reach agreement on response strategies

## Background

- ISFSI Operations commenced – 1992
- Submitted CCNPP ISFSI License Renewal Application– September 2010
  - Requested 40 year extension beyond November 2012
- Responses to RSIs Submitted – February 2011
- Responses to 1<sup>st</sup> Set of RAIs Submitted – June 2011
- Responses to Environmental Set of RAI Responses Submitted – June 2011
- Responses to 2<sup>nd</sup> Set of RAIs Responses Submitted – December 2011
- Lead Canister Inspection Report Submitted – July 2012
- Responses to 3<sup>rd</sup> Set of RAIs Responses Submitted – June 2013

## Discussion of RAI-1

- RAI-1
  - Revise the evaluation that demonstrates DSC in HSM will maintain design basis confinement integrity and include 1) minimum chloride for SCC, 2) time to develop minimum Cl concentration, and 3) activation energy for CISCC propagation rates.

# Discussion of RAI-1

## Response to RAI-1:

- Toll gates will specify initial and determine subsequent inspection frequency.
  - Environmental calculation based times no longer being considered and will not be revised.
  - Chloride threshold for SCC initiation referenced by NRC staff in RAI-1 supports low probability of CISC during renewal period.
- Additional dose calculations not required.
  - Existing accident dose calcs (USAR Ch. 12.8.2.8 and CA07718) treat release from confinement failure as a bounding puff release.



## Discussion of RAI-2

RAI-2:

- Provide a revised AMP that considers the potential for CISCC on the DSC.

## Discussion of RAI-2

### Response to RAI-2:

- AMP for DSC CISCC provided in 6/14/2013 RAI response will be revised to address the 10 elements described in NUREG-1927 Section 3.6.
- Toll gate inspection planned for 2017.
  - Visual based on accepted standards and chloride sampling.
- Subsequent toll gate will apply information from prior toll gate and OE from other inspections and research to determine future inspection frequency and technique.
- AMP will be included in a revision to Appendix A of the 9/17/2010 License Renewal Application.

## Discussion of RAI-3

### RAI-3:

- Revise the Transfer Cask Lifting Yoke AMP and include standards for visual examination methods and details of magnetic particle testing.

## Discussion of RAI-3

### **Response to RAI-3:**

- Perform NDE Inspections IAW ANSI/ASME III Div.1 1986 and ANSI N14.6 1978 (refer to MPM10151G-Hook and Yoke Baseline data).
- Perform MT IAW ANSI/ASME Section III Div.1, 1986 PAR. NF 5340.

## Discussion of RAI-4

### RAI-4:

- Revise the Transfer Cask AMP and include standards for visual examination methods and details of penetrant testing.

## Discussion of RAI-4

### **Response to RAI-4:**

- Visual evidence of degradation of external surfaces of Transfer Cask once every five years or prior to each use.
- Perform inspections of coated materials for degradation.
- Acceptance criteria not met if corrosion is observed.  
See RAI-6.
- Corrective Action Program relies on engineering evaluation for further action.

## Discussion of RAI-5

### RAI-5:

- Address aging effects/mechanisms for concrete structures consistent with ACI 349.3R or provide detailed site-specific technical justifications.

# Discussion of RAI-5

## **Response to RAI-5:**

- Revise HSM AMP to address aging effects/mechanisms consistent with ACI 349.3R.
- Revise HSM AMP to include inspections and acceptance criteria IAW ACI 349.3R.
- Will provide site specific technical justification if any exclusions taken.



## Discussion of RAI-6

### RAI-6:

- Define and justify the use of other codes, standards, or quantitative guidelines for the acceptance criteria of stainless and carbon steel in the HSMs.

## Discussion of RAI-6

### **Response to RAI-6:**

- Acceptance Criteria for the HSM AMP for both stainless and carbon steel components shall be based on the design methodologies defined in CCNPP ISFSI USAR Section 4.2.1.1.
- CCNPP ISFSI USAR Section 4.2.1.1 references “American Institute of Steel construction (AISC), “ Specification for the Design, Fabrication and Erection of Structural Steel for Buildings”” 8<sup>th</sup> Edition.

## Discussion of RAI-7

### RAI-7:

- Revise the HSM AMP to include inspections of the interior and underground foundation consistent with ACI 349.3R.

## Discussion of RAI-7

### **Response to RAI-7:**

- Prioritization and selection for periodic evaluation of interior and underground foundation is based on 10 program elements in NUREG-1927.
- Periodic internal inspection by remote device to inspect interior of HSM.

## Discussion of RAI-8

RAI-8:

- Revise HSM AMP to include a groundwater chemistry program.

## Discussion of RAI-8

### Response to RAI-8:

- Revise HSM AMP to include a groundwater chemistry program.
- Groundwater sampling of ISFSI pad in a minimum of 3 locations every 10 years to trend potential for corrosive environment.
- Provide technical basis for deviation from ACI 349.3R acceptance criteria.

## Discussion of RAI-9

RAI-9:

- Confirm if HSMs contain BISCO NS-3.

## Discussion of RAI-9

### **Response to RAI-9:**

- There is no NS-3 in the HSMs at CCNPP.
- The 2" of NS-3 in the HSM door of the original NUHOMS design described in NUH-002 was replaced by 10.75" of concrete for the CCNPP site specific design to accommodate a higher neutron source.
- This is described in Table 4.1-1 of the CCNPP ISFSI USAR.



## Discussion of RAI-10

### RAI-10:

- Clarify if HSMs have experienced freeze-thaw degradation at anchor bolts of the outlet vents.
- Revise Table 3.4-1 of License Renewal Application to remove subscript Note 1.
- Revise OE subsection of HSM AMP.

## Discussion of RAI-10

### Response to RAI-10:

- The in-service HSMs (#1 through #72) have embedment around the vent areas to which the vent screens are bolted. The new modular HSMs have structural mounting bolts attaching the outlet vent modules. To date there has been no “Freeze-Thaw” degradation on either the in-service or new HSMs.
- Remove Note 1 from Table 3.4-1 of License Renewal Application.
- Revise CCNPP HSM AMP Operating Experience to include applicable TMI-2 (INL) experience.

## Discussion of RAI-11

### RAI-11:

- Discuss the CAP and when inspection results of the concrete pad will initiate an Action request, change to the AMP, or notification to the NRC. Also address use of OE from other ISFSIs.

## Discussion of RAI-11

### Response to RAI-11:

- Section A 2.1 of the CCNPP HSM AMP will reflect the ACI 349.3R quantitative three-tier acceptance criteria for visual inspections of concrete.
- Degradations identified are entered into site's 10 CFR 50 Appendix B CAP.
- OE is reviewed as part of the site's CAP for ISFSI issues identified by NRC and industry.

## Discussion of RAI-12

RAI-12:

- Revise HSM AMP to include details of the scope of rebar inspections in the HSMs.

# Discussion of RAI-12

## **Response to RAI-12:**

- HSM AMP to be revised to include greater detail on the scope, acceptance criteria, and frequency for monitoring rebar.
- Revised HSM will address the 10 program elements detailed in NUREG-1927.

## Discussion of RAI-13

### RAI-13:

- Revise OE in HSM AMP to include results of engineering evaluation used to determine the concrete degradation mechanisms identified in site condition reports.

## Discussion of RAI-13

### **Response to RAI-13:**

- Professional Structural Engineering firm conducted an evaluation of selected HSMs in June 2012. Consisted of up-close visual survey and hammer sounding of selected units where degradation was previously identified in CAP.
- CRs evaluated as being non age-related degradation were assessed against age-related degradation definition contained in ACI 349.3R-02.
- Results of evaluation to be incorporated in HSM AMP OE.



## Discussion of RAI-14

### RAI-14:

- Clarify the normal and off normal doses presented in RAI response and confirm confinement release calculations are correct.

## Discussion of RAI-14

### **Response to RAI-14:**

- Page 7 of the 6/14/2013 Attachment (1) RAI response contained an editorial error.
- The units on the Normal and Off-Normal doses indicated should have been  $\mu\text{rem}$  rather than  $\text{mrem}$ .
- With that change, the results indicated are identical to those provided in the QA'd calculation CA07718 provided in the 12/15/2011 RAI response.

## Discussion of RAI-15

### RAI-15:

- Provide an AMP for high burnup fuel behavior addressing the elements indicated in Section 3.6 of NUREG-1927.

## Discussion of RAI-15

### **Response to RAI-15:**

- CCNPP will provide an AMP based on the DOE High Burnup Cask Demonstration test plan.
- AMP will address the 10 elements described in NUREG-1927 Section 3.6.
- AMP will include Toll Gate Assessments.
- AMP will be included in a revision to Appendix A of the 9/17/2010 License Renewal Application.

# Closing Remarks