

Seabrook Station
Public Meeting
Safety Implications and Status of
Alkali-Silica Reaction Condition in
Safety Related Structures

Nuclear Regulatory Commission

NRC Representatives



- Christopher Miller – Director, Division of Reactor Safety
- Michele Evans Director – Division of Operating Reactor Licensing
- Richard Conte – Senior Project Manager
- William Cook – Team Leader
- William Raymond – Senior Resident Inspector

NRC Representatives

Karl Farrar



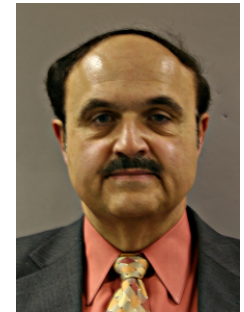
Chris Miller



Michele Evans



Rich Conte



Bill Raymond



Bill Cook



Agenda

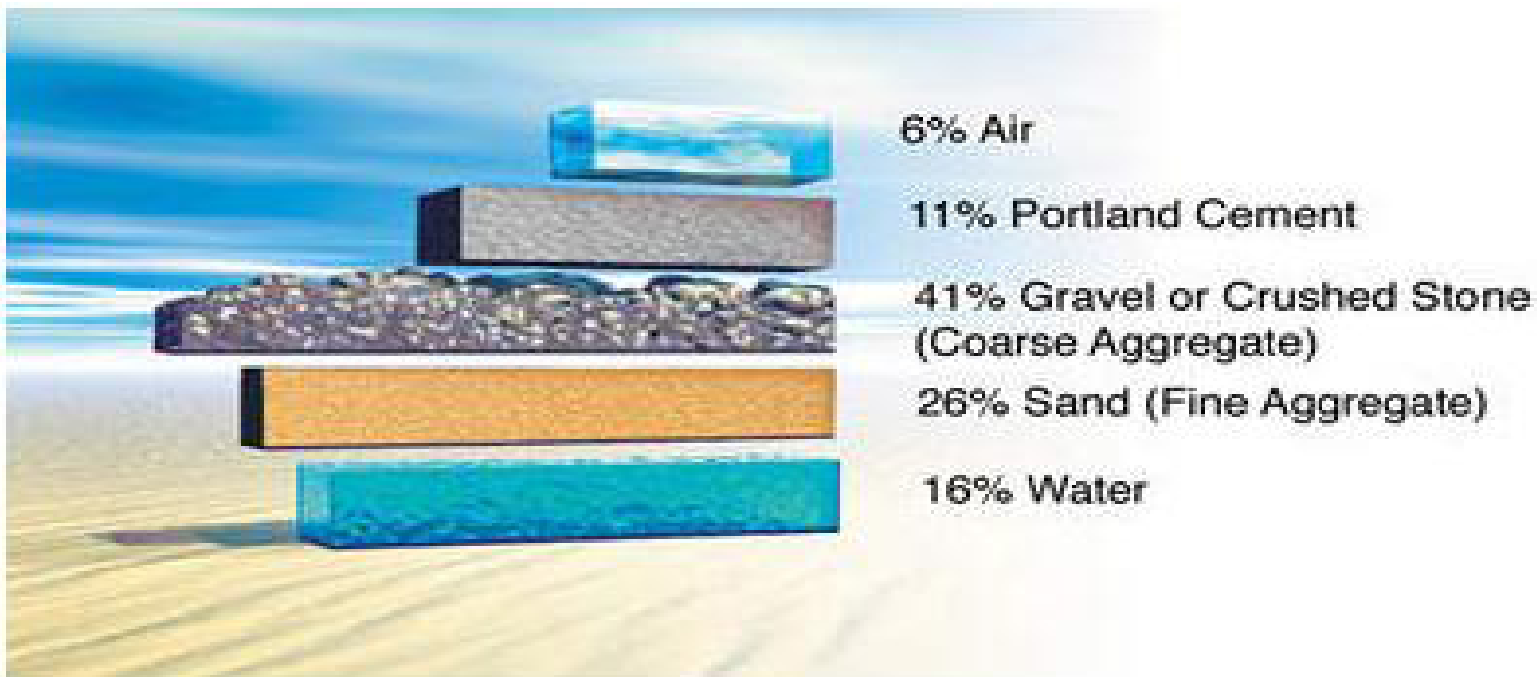
- What is Alkali-Silica Reaction (ASR)
- Virtual Tour of Plant
- Safety Implications
- Inspection Results, to date
- Future Activities
- Closing Remarks
- Respond to Questions



What is ASR?

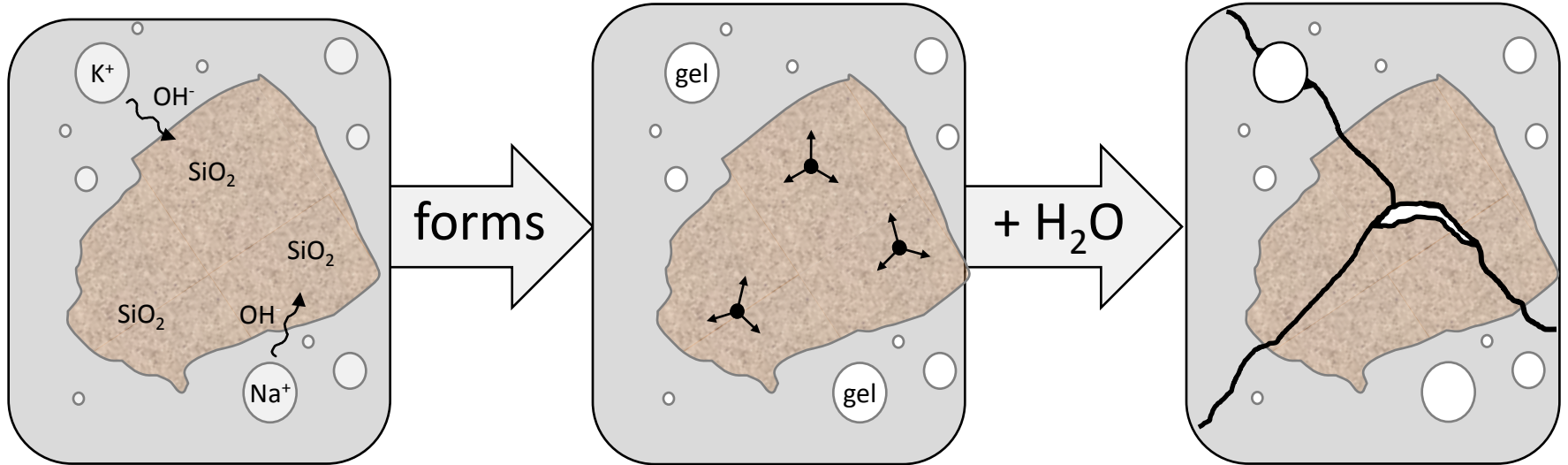
Concrete Ingredients

TYPICAL RATIO OF CONCRETE INGREDIENTS BY VOLUME



What is ASR?

Chemical Reaction



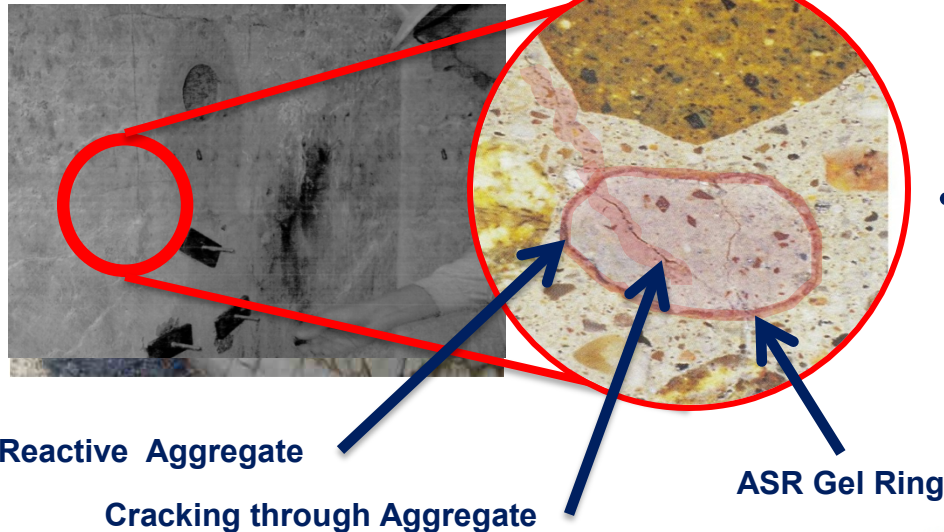
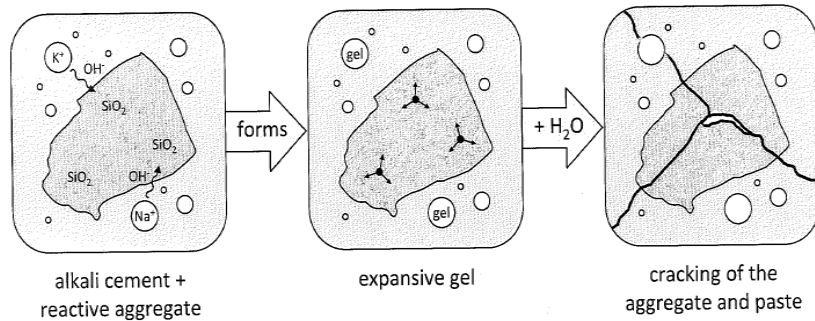
alkali (in cement)
reacts with silica (in
aggregate) and
water

silica gel forms

cracking occurs
as gel expands

What is ASR?

Indications of ASR

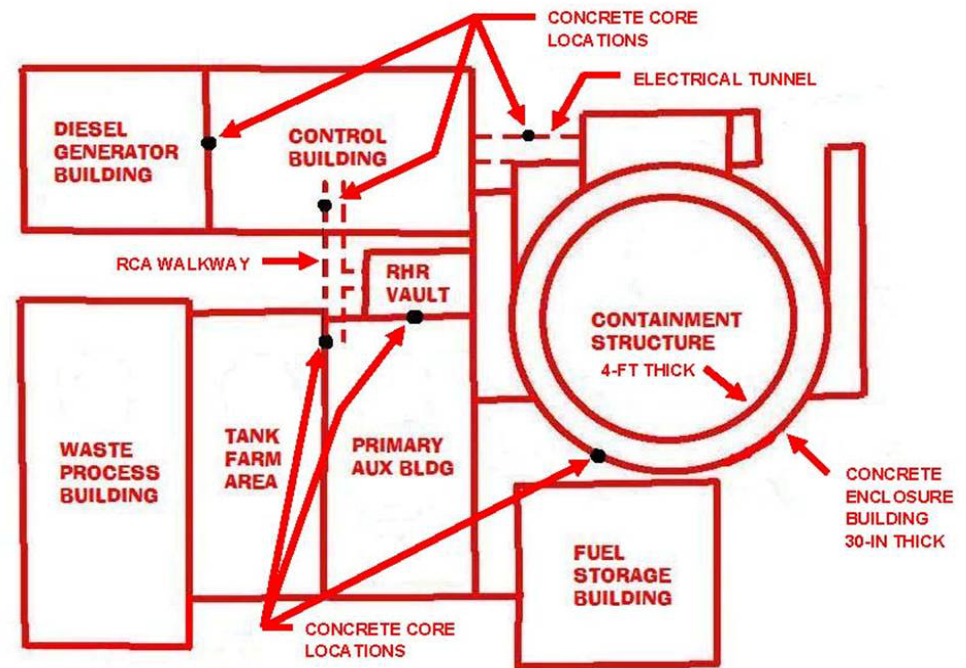


- ASR has been identified in localized areas of Seabrook concrete structures
- ASR is a chemical reaction in concrete, which occurs over time in the presence of water, between the alkaline cement and reactive silica found in some aggregates.
- ASR forms a gel that expands causing micro-cracks that effect concrete material properties

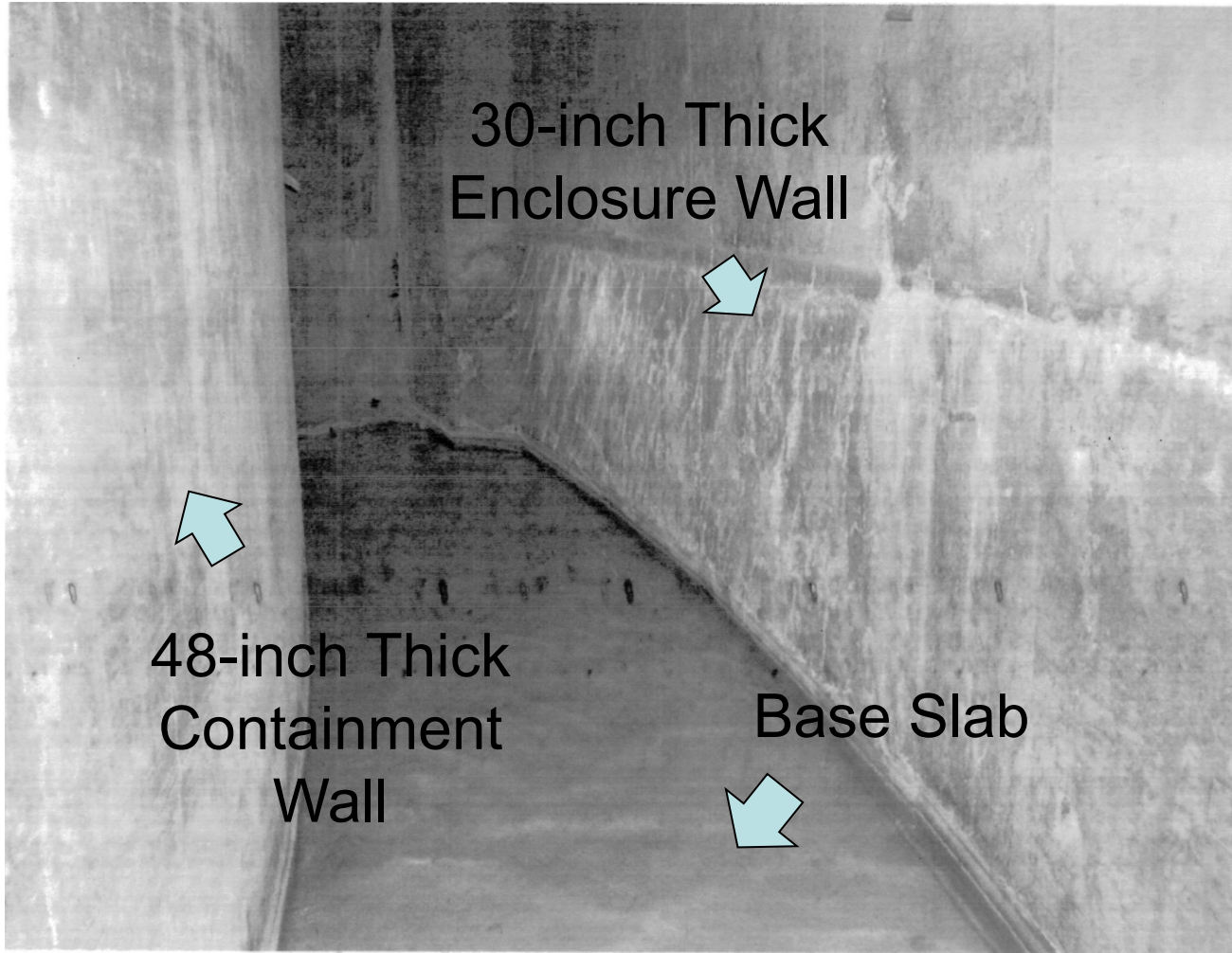
TOUR OF PLANT

Confirmed localized areas of ASR

- Effected Structures include:
 - “B” Electrical Tunnel
 - Containment Enclosure Building
 - Residual Heat Removal Vault
 - Emergency Diesel Generator Building
 - Emergency Feedwater Building



TOUR OF PLANT



Annulus area
between Primary
Containment and
Containment
Enclosure Building

TOUR OF PLANT

Other locations where ASR identified

- Primary Auxiliary Building
- Main Steam/Feedwater Pipe Chase East
- Alternate Cooling Tower
- Service Water Pump House
- Containment

VISUAL CRITERIA

Pattern cracking
Secondary deposits
Staining and discoloration
Deposits of alkali silica gel

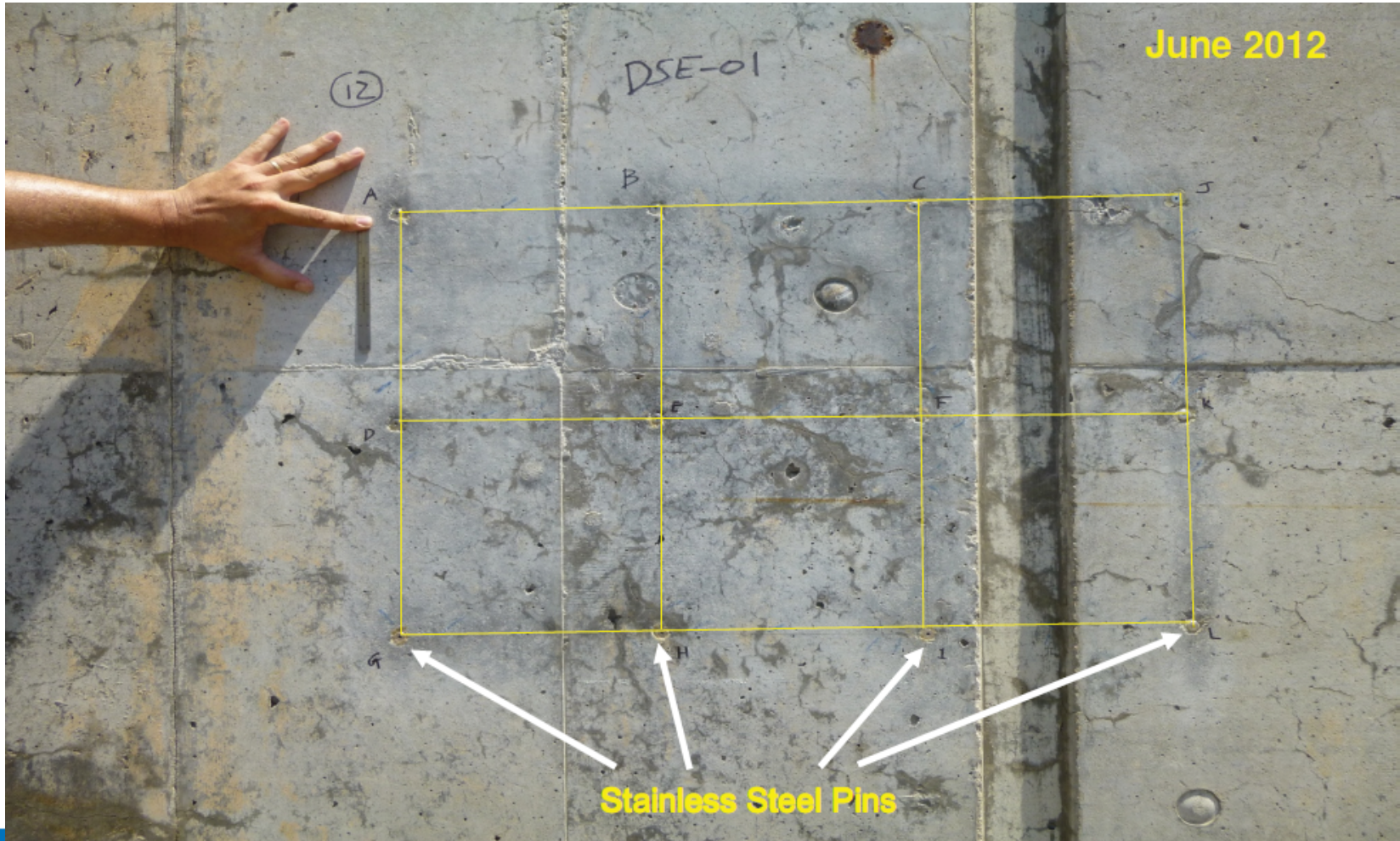
TOUR OF PLANT

Pattern Cracking (approx. 3 ft x 3 ft area)



TOUR OF PLANT

ASR Monitoring Method



SAFETY IMPLICATIONS

- NextEra engineering analysis (independently reviewed by NRC team) confirmed adequate design (safety) margin remains for ASR-affected reinforced concrete structures
- No significant visible deformations, distortions, or displacement identified in affected structures
- No indications of rebar degradation
- ASR limited to localized areas of the effected structures
- ASR degradation progressed slowly



Confirmatory Action Letter (CAL) 1-2012-002



Letter dated May 16, 2012, confirming eleven commitments made by NextEra, during a meeting with the NRC staff on April 23, 2012, associated with corrective actions to address ASR-affected reinforced concrete structures at Seabrook Station.



CAL Commitments

- Revise Prompt Operability Determination (POD) for B electrical tunnel**
- Submit root cause evaluation**
- Submit Interim Assessment**
- Submit integrated corrective action plan**
- Revise POD for buildings identified in extent-of-condition review**
- Complete short term aggregate expansion testing**
- Complete long term aggregate expansion testing**
- Submit technical details of testing plan**
- Update Structures Monitoring Program**
- Perform six-month crack measurements**
- Complete anchor testing program**

INSPECTION RESULTS

Review of Confirmatory Action Letter (CAL) Items (6 of 11 Reviewed, 5 Closed)

- Prompt Operability Determination for “B” Electrical Tunnel (CAL No. 1) - Closed
- Prompt Operability Determination for Other Effected Structures (CAL No. 5) - Closed
- Interim Structural Assessment (CAL No. 3) - Closed
- Complete Mortar Bar Test (CAL No. 6) - Closed
- Initial Six-Month Crack Measurements (CAL No. 10) - Closed



INSPECTION RESULTS

Other Areas Reviewed

- NextEra's inspection of structures for evidence of ASR, independently reviewed by NRC staff
- Primary Containment engineering evaluation and operability assessment completed for ASR indications on three areas of the containment exterior surface
- Two issues closed, related to adequacy of operability determinations and engineering analysis calculations effected by ASR



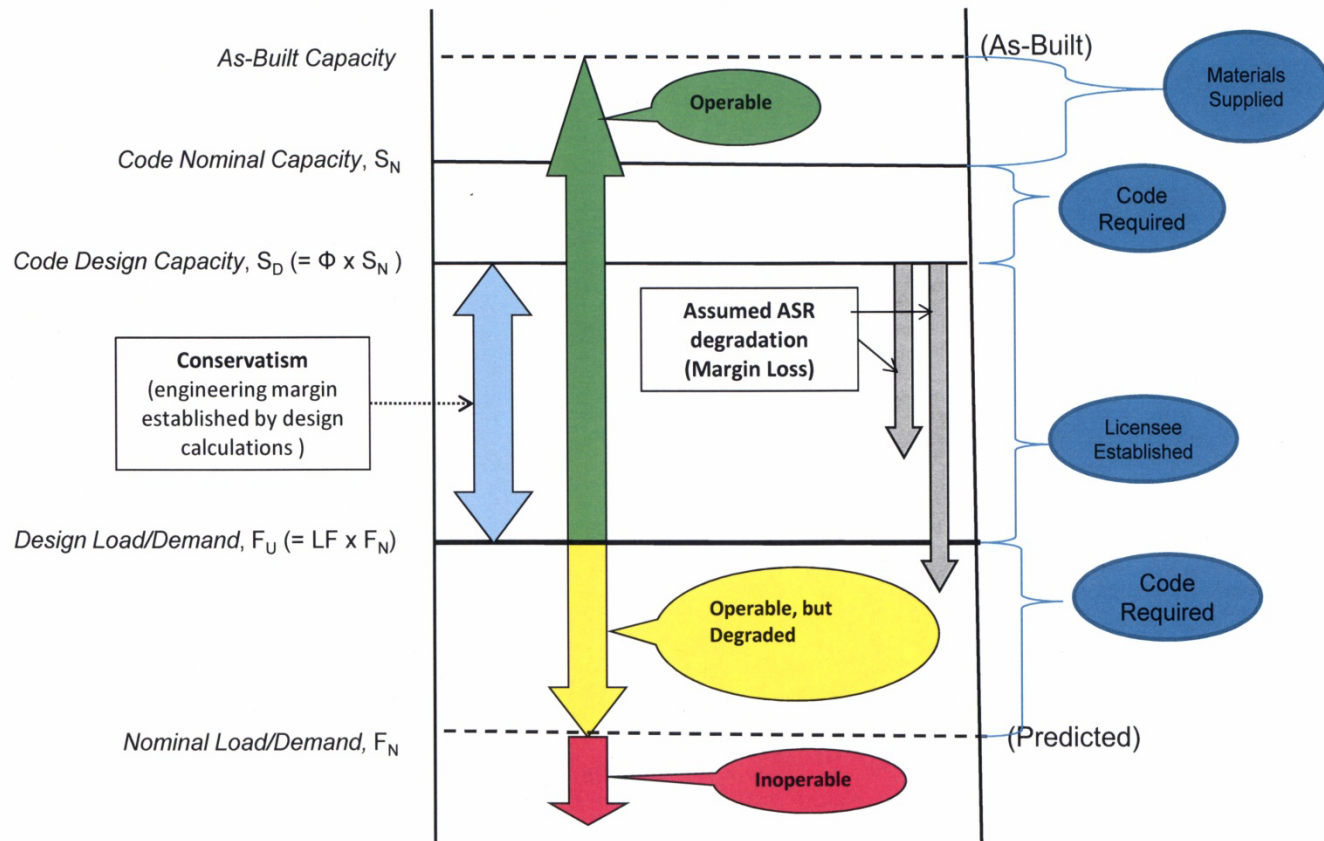
INSPECTION RESULTS

Team Conclusions

- NextEra's methods used for assessing operability of ASR-affected reinforced concrete structures - reasonable and generally comprehensive.
- NextEra's margins assessment provided a reasonable operability basis; the degraded and non-conforming condition is being addressed via a testing program, expected to be completed mid-2014
- NRC staff plans to review NextEra's monitoring and testing program to address uncertainties in evaluating the current level and progression of ASR – early 2013

INSPECTION RESULTS

Margins Assessment



THE FUTURE

What is to be addressed in Next Report?

- Remaining six CAL items:
 - Root cause evaluation
 - Integrated action plan
 - Research and development plan
 - Anchor testing
 - Prism testing
 - Structures Monitoring Program
- Follow-up of observations from first report

CLOSING REMARKS



Chris Miller
Director Division of Reactor Safety



Questions and Answers



List of Key Documents

- Confirmatory Action Letter No. 2012-002, issued May 16, 2012 (ML12125A172)
- Inspection Report No. 05000443/2012009, issued December 3, 2012 (ML12338A283)
- NextEra Letter of May 24, 2012, in response to CAL Item No. 3, provided the Interim Structural Assessment (ML12151A397)



Contacting the NRC



- Report a safety concern
 - 1-800-695-7403
 - allegation@nrc.gov

General questions

- www.nrc.gov
- Region I Public Affairs
 - Diane Screnci, 610-332-5330
diane.screnci@nrc.gov
 - Neil Sheehan, 610-332-5331 or
neil.sheehan@nrc.gov