# Public Meeting

# Seabrook Station
# Alkali-Silica Reaction Testing Program
# December 18, 2013

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United States Nuclear Regulatory Commission
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# Agenda

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- Introductions and Opening Remarks
- Large Scale Testing Program
- Continuing NRC Oversight Activities
- License Renewal Activities
- Transition to Public Question & Answer (After ten minute break)

# NRC Representatives

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- David Lew – Deputy Regional Administrator
- James Trapp – Deputy Director, Division of Reactor Safety (DRS)
- Michael Marshall, Chief, Aging Management of Structures, Electrical and Systems Branch, Division of License Renewal
- Glenn Dentel – Chief, Projects Branch 3, Division of Reactor Projects (DRP)
- Mel Gray – Chief, Engineering Branch 1, DRS
- William Cook – Inspection Team Leader

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# Testing Program Presentation by NextEra

# Continuing Regulatory Oversight Activities

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- Periodic onsite inspections focused on NextEra's actions to resolve the ASR non-conforming condition (PI&R Samples)
- Inspections and monitoring of NextEra's large-scale specimen testing at the Ferguson Structural Engineering Laboratory, University of Texas – Austin
- Coordinate NRC Review of ASR via the Seabrook ASR Issue Technical Team (SAITT)
- Resident inspectors onsite

# Continuing Regulatory Activities License Renewal Application

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- Need reasonable assurance aging effects can be managed
- Recent license renewal activities concerning ASR:

| | | |
|---|---|---|
| June 2010 | NextEra submit ted Seabrook license renewal application | ML101590094 |
| Feb 2013 | Public meeting on actions/programs in application | ML13066A488 |
| Sep 2013 | NextEra supplemented application | ML13261A145 |
| Nov 2013 | NRC conducted license renewal audit | Pending |

- Remaining safety review milestones are TBD
- Safety review is ongoing
- No regulatory decision made on the application

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# Transition to Public Question and Answer Session

- 10 Minute Break to Set-up

# Contacting the NRC

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- 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, or
    - Neil Sheehan, 610-332-5331 neil.sheehan@nrc.gov

# Key Points

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- Seabrook Structures Remain Operable
- NextEra has detailed plans for additional research and testing
- Significant NRC oversight will continue
- Resolution of the Seabrook ASR issue will require further NRC review

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# Back-Up Slides

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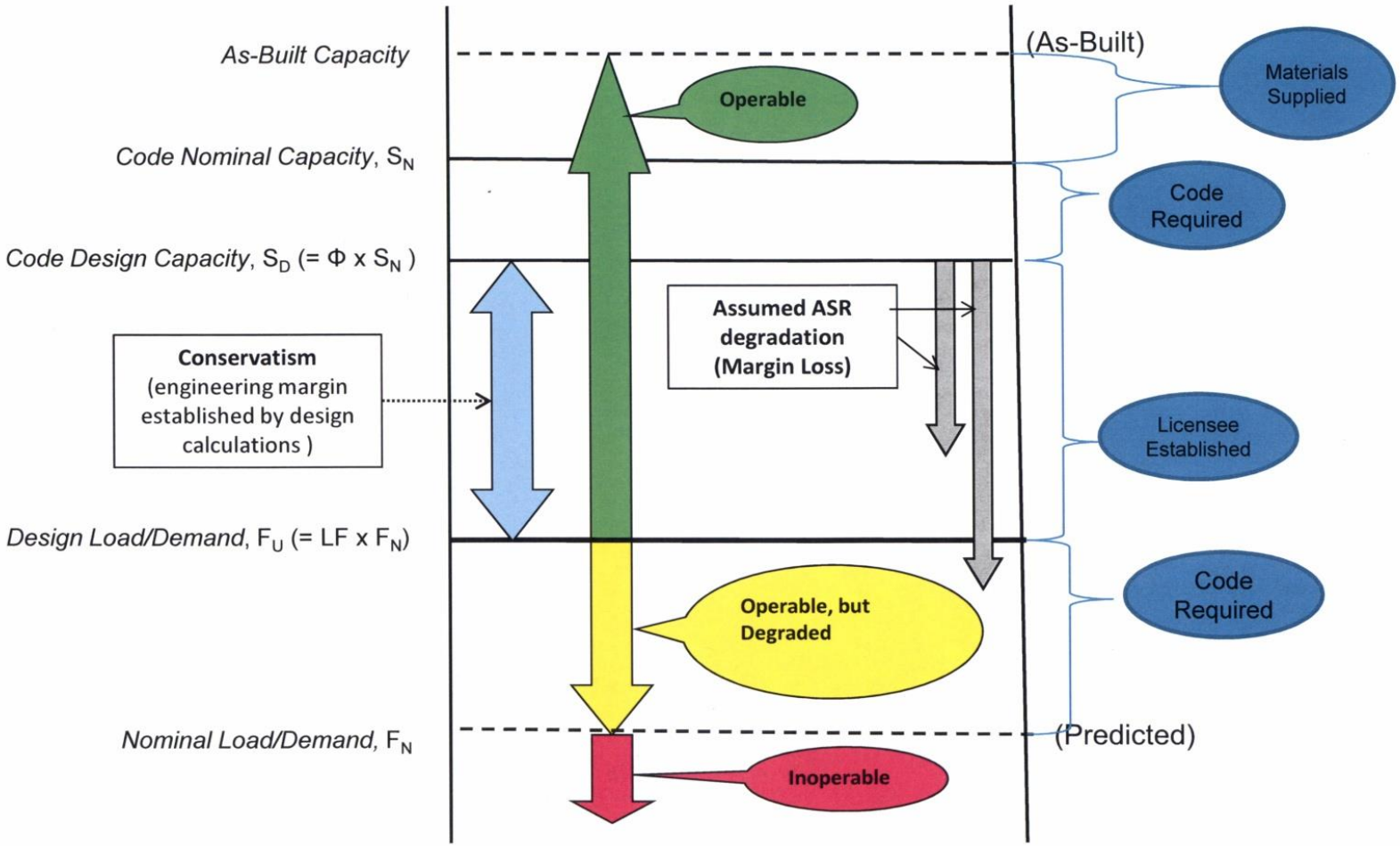
# SAFETY RELATED STRUCTURES REMAIN OPERABLE

- NextEra's structural engineering analysis (independently reviewed by NRC team) provides reasonable assurance of adequate design (safety) margin 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

# Margins Assessment



# Reference Documents ADAMS Ascension Numbers

- Confirmatory Action Letter (CAL) Closure Letter, dated October 9, 2013 (ML13274A670)
- CAL Follow-Up Inspection Report No. 05000443/2012009, dated December 3, 2012 (ML12338A283)
- CAL Follow-Up Inspection Report No. 05000443/2012010, dated August 9, 2013 (ML13221A172)

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# CAL Follow-Up Inspection Report No. 05000443/2012009

## CAL Items Closed

- **Prompt Operability Determinations for "B" Electrical Tunnel and Extent of Condition identified structures (CAL Nos. 1, 5)**
- **Interim Structural Assessment (CAL No. 3)**
- **Completed Mortar Bar Test (CAL No. 6)**
- **Initial six-month interval crack measurement results from 26 locations (CAL No. 10)**

# CAL Follow-Up Inspection Report No. 05000443/2012010

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**CAL Items Closed**

- **Revised the Root Cause Evaluation (CAL No. 2)**
- **Revised the Integrated Corrective Action Plan (CAL No. 4)**
- **Cancelled the Prism Test (CAL No. 7)**
- **Technical details for Large-scale Beam Testing Program (CAL No. 8)**
- **Revised the Structures Monitoring Program (CAL No. 9)**
- **Technical details for Anchor Testing Program (CAL No. 11)**
- **Review of open issues from IR 05000443/2012009**

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- Part 50.59 – this regulation outlines the processes by which a licensee may make changes to their facility, procedures, tests, experiments or evaluation methods as described in the Final Safety Analysis Report
- Part 50.90 – this regulation outlines the process by which a licensee requests an amendment to their operating license

# What is ASR?

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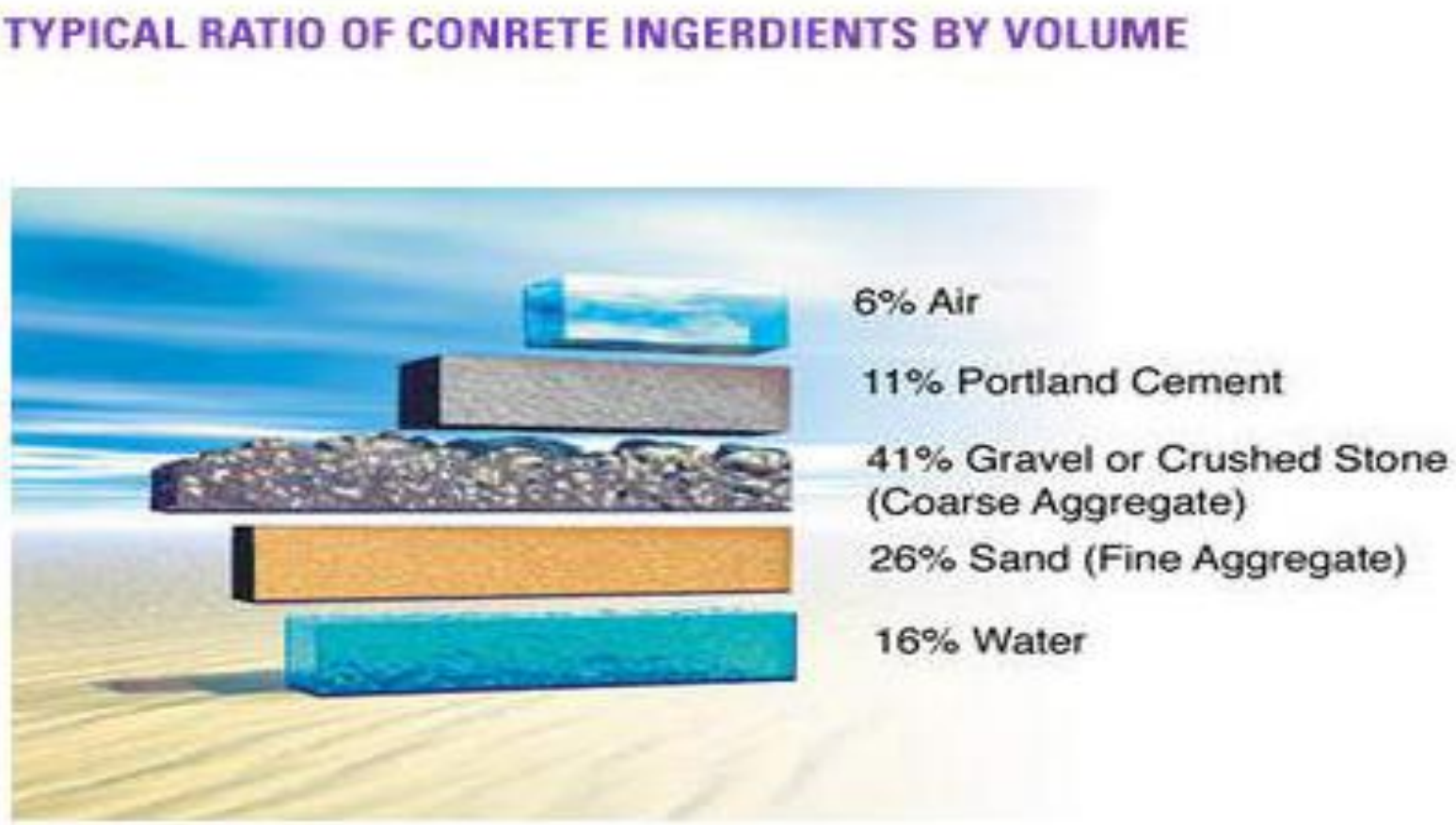
## Concrete Ingredients



# What is ASR?

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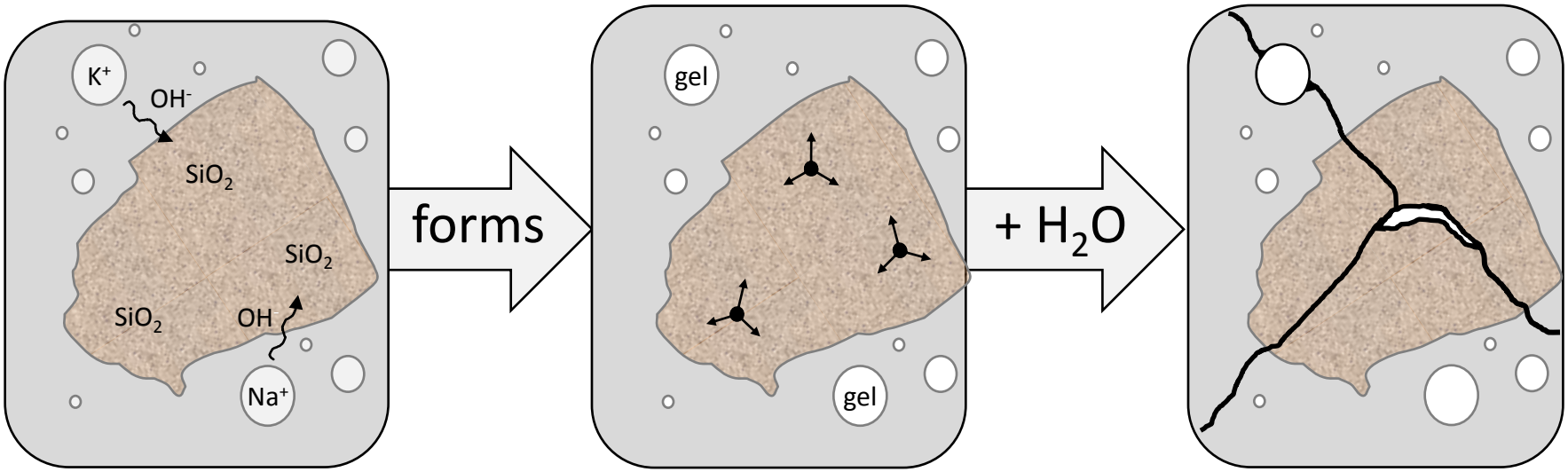
## Chemical Reaction



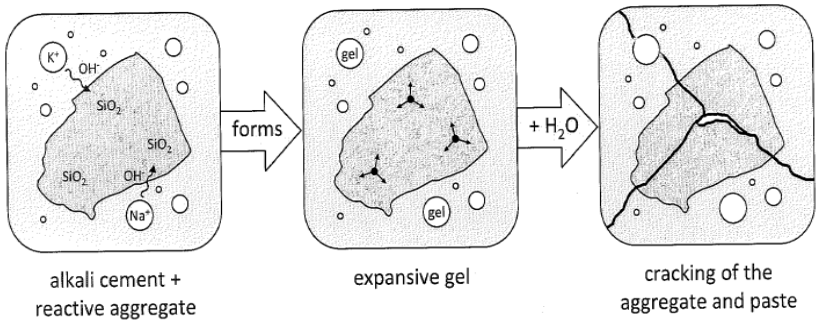

alkali (in cement) reacts with silica (in aggregate) and water

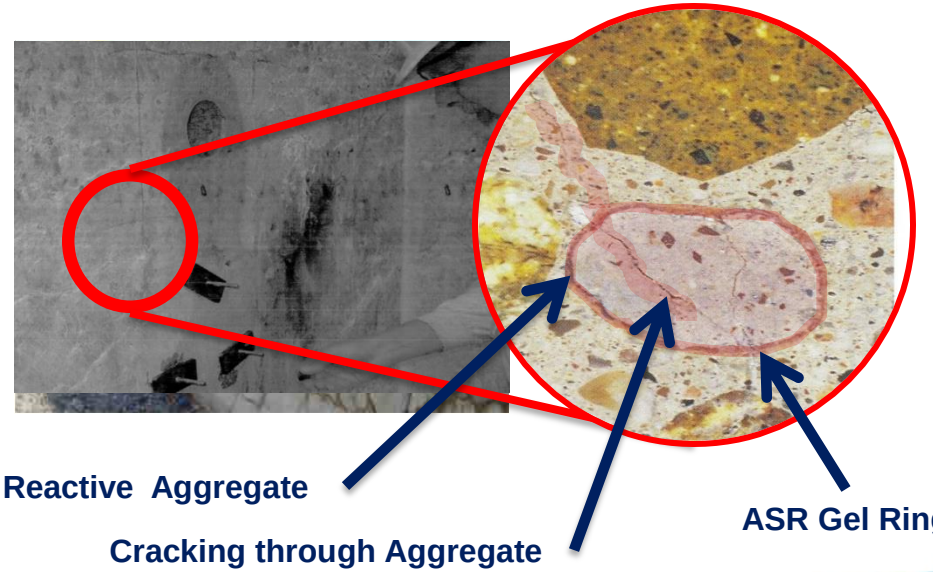
silica gel forms

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

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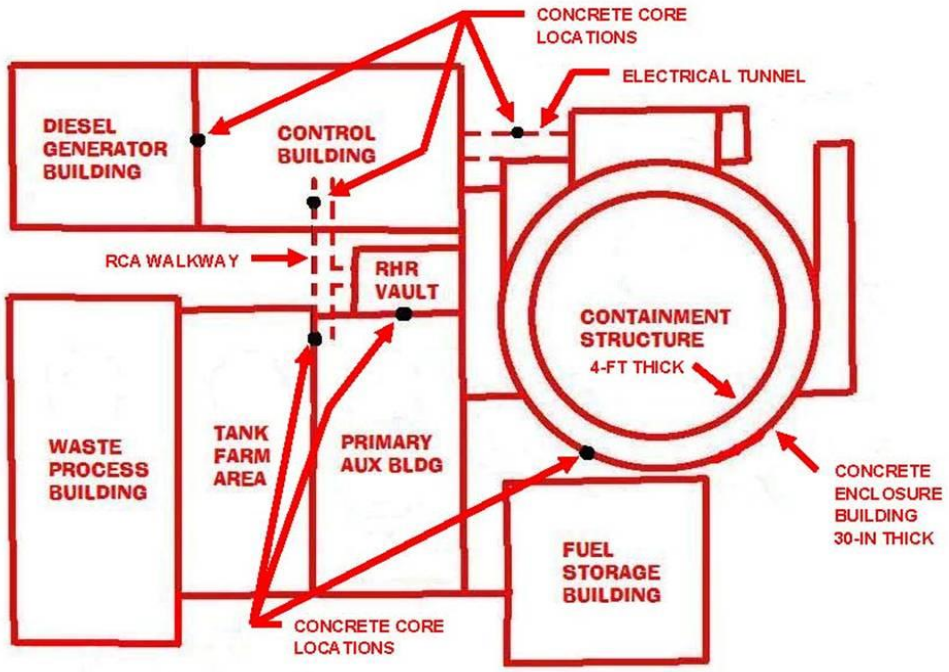
## Confirmed localized areas of ASR

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



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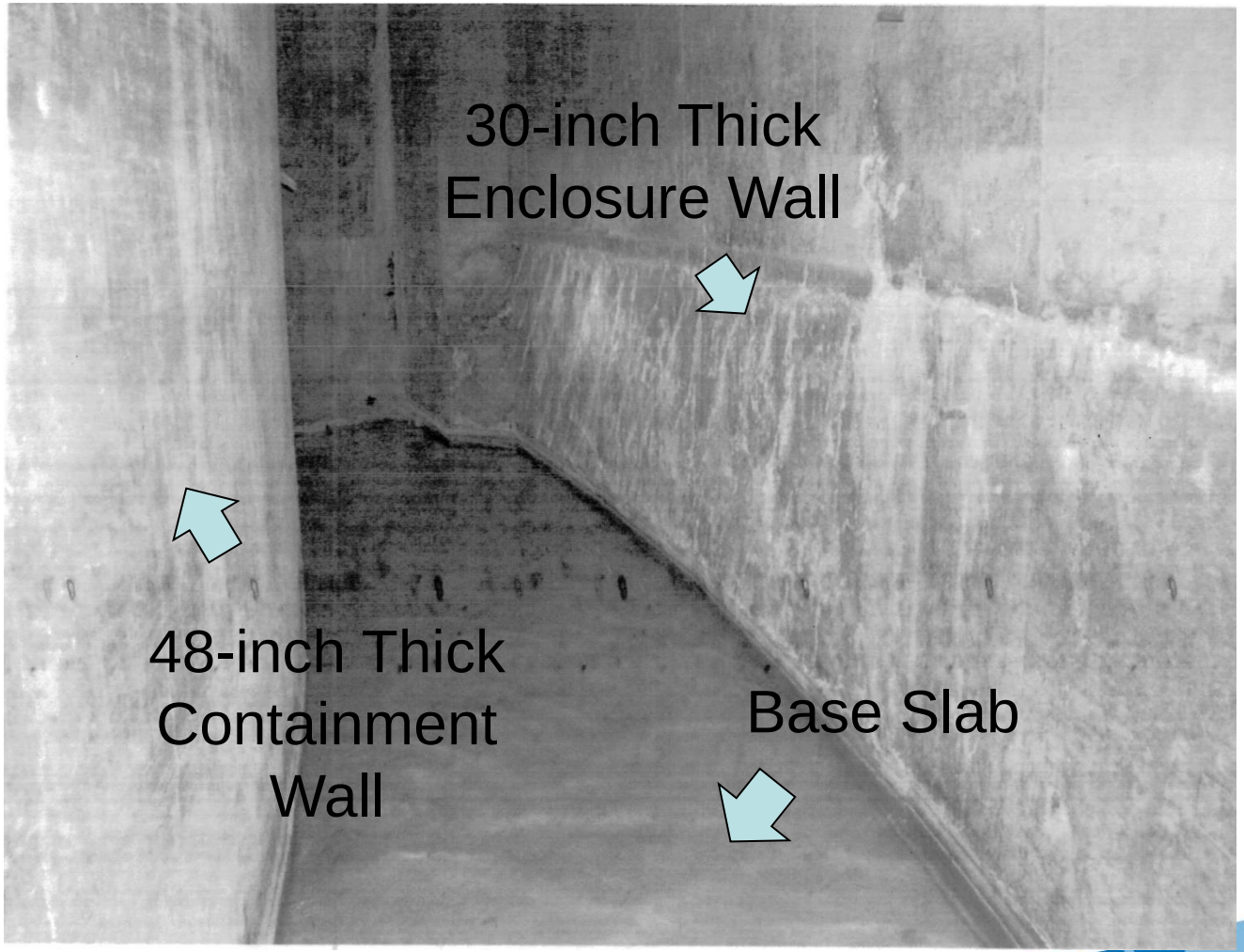


Annulus area between Primary Containment and Containment Enclosure Building

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## 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

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

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## ASR Monitoring Method