

~~WITHHOLD IN ITS ENTIRETY EX3~~

Region I Comments on Draft TIA for Seabrook ASR Issue

General Comment:

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Specific Comments:

1. *Reference:* Various sections throughout related to aging management and in particular Question No. 1.

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2. *Reference:* Section 1.c refers to NRC letter of June 29, 2011.

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3. *Reference:* Section 1 (e) on Aggressive Groundwater

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4. *Reference:* Section 1 (f) on how representative the concrete core samples are if they do not go through wall to the exterior.

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6. *References:* Sections 1 (h) on ASR severity

Short Description: The basis for this standard is not clear.

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7. *References:* Sections 1 (i) on ASR Severity and the Use of Consultants

Short Description: The basis for this standard is not clear.

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8. *References:* Sections 2 (d) Global and Local building load analysis should be based on actual measured material properties base on the use of ACI 349.3R.

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9. *References:* Sections 3 (a) and (b) deal with sampling methods for concrete cores and in-place methods to estimating concrete strength.

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10. *References:* Sections 3 (c) deals with sampling and representativeness of the samples to in-situ conditions.

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11. *References:* Sections 3 (d) need for a plan and the use of Consultants and Reference that may not be a part of the Current Licensing Basis (CLB).

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12. *Reference:* Section 4 (d) on alkali reactivity testing of coarse aggregates

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13. *Reference:* Section 4 (e) on the need to do stiffness damage tests

Short Description: The regulatory basis for the suggested test not clear.

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14. *Reference:* Section 4 (f) on the need to monitor in-situ temperature and humidity of buildings affected by ASR.

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15. *Reference:* Section 4 on Regulatory Requirements

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Excerpt ML11178A338 NRC Letter dated June 29, 2011

Follow-up RAI B2.1.31-1:

Background:

By letter dated April 14, 2011, the applicant responded to a staff RAI regarding concrete degradation due to groundwater in-leakage and the occurrence of Alkali-Silica Reaction (ASR) in the concrete. The applicant stated that an extent of condition investigation regarding the ASR degradation was on-going, along with the development of a long range aging management plan. The applicant explained that the plan would not be fully developed and implemented until December 2013. The applicant's response also listed several American Society for Testing and Materials (ASTM) standards that would be used to estimate the ASR reaction rate.

Issue:

The applicant provided no specific information about the applicability of the original operability determination conducted when ASR was initially identified. The response also lacked specific information about what tests (laboratory and in-situ) would be conducted and when. The response also made no mention of how possible reductions in concrete shear strength were being estimated and addressed. In addition, the RAI response stated that cores were being taken in accordance with American Concrete Institute (ACI) 228.1R-03; however, it did not address the statistical validity and size of core samples taken or planned at each location.

Request:

1. Explain if the current operability determination remains valid until the long term aging management plan is developed and implemented.
2. Explain how the concrete tests and evaluations performed so far can be used to establish a trend in degradation of the affected structures until the long term aging management plan is implemented.
3. Provide detailed and comprehensive information regarding the planned approach to addressing ASR degradation throughout the site. The description of the actions planned to test, evaluate, and mitigate ASR in the RAI response do not provide sufficient details for the staff to determine if the aging of the structures will be adequately managed during the period of extended operation.

At a minimum include a discussion of the following:

- a. The locations where monitoring or sampling will be conducted, and how these results will be used to address other susceptible locations.
- b. The frequency of the monitoring and sampling to establish a trend in degradation of the structures and rate of ASR, and why the provided frequency is adequate.
- c. Detailed information about the planned in-situ monitoring or testing and laboratory testing. This should include the test method, frequency, and schedule.

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- d. How the number of concrete samples taken or planned from each structure will ensure statistical validity.
 - e. How the length of core samples taken or planned will account for variation of ASR across the wall thickness.
 - f. How the extent of degradation/corrosion of rebars will be established in the ASR affected areas during the period of extended operation.
 - g. How the reduction in load carrying capacity in the steel embedments and anchors used to support equipment, piping, conduits, and other commodities will be established in the ASR affected areas during the period of extended operation.
 - h. How the results of the petrographic examination will be used to determine quantitative damage in concrete and rate of degradation for the period of extended operation.
 - i. Plans, if any, for relative humidity and temperature measurements of affected concrete areas over the long term.
 - j. Plans to perform stiffness damage tests to estimate the expansion attained to date in ASR affected concrete.
 - k. How the current and future rate of expansion of concrete will be determined to ensure that bond between the rebar and concrete is effective over the long term.
 - l. How the results of concrete compressive strength and modulus of elasticity conducted so far will be adjusted to account for future degradation during the period of extended operation.
4. Explain how the possibility of a reduction in shear strength capacity due to ASR degradation is being evaluated and addressed since core samples are not being used to establish the tensile strength of concrete. The response should include a discussion of how the possible reduction is being quantified and how the reduction is shown to be acceptable for the period of extended operation.