

USED FUEL STORAGE AND TRANSPORTATION ISSUE SCREENING FORM

Issue Number: N-10-01

Title: ISFSIs Located in Marine Environments

I. a. Problem Statement (Provide a clear, concise description of the issue.)

Marine atmospheric corrosion of storage casks located in a marine environment is possible in the short term.

b. Background Information (Summarize industry events, licensing actions, inspection information, correspondence, and other documents germane to the issue. Attach documents as appropriate)

NRC sponsored research indicates that austenitic stainless steel dry cask storage canisters may be susceptible to stress corrosion cracking when exposed to a coastal marine atmosphere. The Office of Nuclear Regulatory Research published NUREG/CR-7030 entitled: "Atmospheric stress corrosion cracking susceptibility of welded and unwelded 304, 304L, and 316L austenitic stainless steels commonly used for dry cask storage containers exposed to marine environments."

The study does not suggest the marine atmosphere corrosion issue is limited only to long term storage. There is not information to suggest a time-line for any possible effects. The study indicates under accelerated test conditions, a problem does result.

II. Screening Criteria (Provide an explanation as to how the issue meets each of the screening criteria to be considered for generic issue resolution.)

- Does the proposed issue involve spent fuel storage or transportation and affect multiple 10 CFR 71 and/or 10 CFR 72 regulated entities (provide basis)?** Yes. Potential candidates include Calvert Cliffs, Maine Yankee, Diablo Canyon, Millstone, Seabrooke, Oyster Creek, Hope Creek, Salem, St. Lucie, and San Onofre. The list is not intended to be all-inclusive, only to show that multiple entities are potentially affected.
- Does the proposed issue warrant generic resolution (provide basis)?** Yes. Part 72 licensees and CoC holders should address this with a consistent acceptable approach for all entities potentially affected.
- Does the issue warrant engagement between the industry and NRC (provide basis)?** Yes. A forward looking resolution to the potential problem will prevent enforcement action.
- Will generic resolution of the issue produce tangible benefits (provide basis)?** Yes. A consistent, stable, and predictable regulatory approach may preclude enforcement action and costs to recover.
- Is the issue already adequately covered by another process (provide basis)?** No. The issue is emerging and forward looking and could receive mutual industry and regulatory benefit from using the RIRP to resolve.

POC: Are all screening criteria satisfied ("Yes" responses to questions 1-4 and "No" to question 5) ?

Yes No

Comment [N1]: This problem statement should contain more detail, in order to clearly describe the issue to be resolved by this RIRP.

We should take care in defining an issue that can be resolved by the RIRP protocol. This could be a lack of data (e.g. understand and characterize when SCC in a Marine Environment is anticipated to occur). It may also be developing a set of criteria for determining whether a site needs to consider the possibility of ME SCC (e.g. distance from salt water).

Industry believes that the current data does not support the conclusion that there is SCC in the short term. This problem statement suggests that the NRC believes there may be SCC in the short term.

It is recommended that "Short term" be defined in years in order to determine whether the issue pertains to the initial license of casks, license renewal, or beyond license renewal.

Comment [N2]: "Marine Environment" should be defined as a set of criteria that can be used objectively to determine whether a particular location qualifies as "Marine Environment" and is potentially affected by this issue.

Comment [N3]: This statement cannot be determined from the NUREG/CR. There are significant differences between the conditions of the tests in the NUREG/CR and loaded casks in actual conditions. Therefore the results relating to time of occurrence cannot be extrapolated from the NUREG/CR to actual conditions. There is an important finding in the NUREG/CR with regards to temperatures at which ME SCC can occur. However, it should be recognized that differences between the test and actual conditions may impact this finding. For example, if test samples have ... [1]

Comment [N4]: The background should include discussion of the ERPI reports, their findings, and the potential applicability to loaded casks under actual conditions. One of the EPRI reports contains an estimation of cask surface temperatures. This data could be combined with the NUREG/CR data to suggest a time frame when Marine Environment SCC might be of concern.

Comment [N5]: The Background should contain a list of References. Please include the NUREG/CR and the two EPRI reports. If other references are available, please include those.

Comment [N6]: This should not identify specific licensees. Please reword this to state something like "This issue potentially affects around 12 ISFSI's located near salt water."

Comment [N7]: Yes. This issue affects multiple licensees and is not specific to any single cask design.

Comment [N8]: The answer to this question depends on what is defined as the issue to resolve with this RIRP. If the issue is the occurrence of SCC in the short term and this is a safety issue, then other processes exist, and the answer here would be "yes". Industry believes that SCC does not occur in the short term, and that the short term issue is a lack of data, which would result in "no" for this question.

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III. Success Criteria (Describe the criteria to be used to define success for resolving this issue.)

Industry proposal to adopt a mitigation method such as periodic washing at locations near the ocean or industry address how FSAR Chapter 9 maintenance programs of casks and sites near marine environments are addressing the possibility of marine atmosphere corrosion in the short term.

IV. Date: _____

Comment [N9]: Please see previous comments about defining the issue to be resolved by this RIRP. The success criteria should be related to the issue being resolved by this RIRP.

Industry believes that the problem should be a lack of data on ME SCC, and the success criteria could be for industry to develop criteria to determine whether/when a site is potentially affected by ME SCC; and to gain NRC agreement on industry's guidance. Or, success criteria could be that industry performs some analysis/data collection of conditions of loaded casks in actual conditions. Or, it could be to develop inspection techniques and criteria to determine whether a cask is susceptible to Marine Environment SCC.

Comment [N10]: Specific examples of mitigative techniques create limitations to address the problem statement. Instead, the resolution plan should have the actions for industry to propose the techniques and gain agreement by NRC.

Industry is concerned that "periodic washing" might introduce a problem where a problem does not exist. ME SCC requires stress, salt and moisture. Current data suggests that stress and salt may be present, while moisture is absent due to the surface temperature of the casks. Putting water on the casks may introduce the missing element, resulting in SCC, where it would otherwise not be expected to occur. In addition, at least one system is not licensed to have the inlet or outlet vents opened for some period of time to facilitate a washing operation. Every ounce of wash water would have to be captured and sampled in accordance with licensee REM (Radiological Environment Monitoring Program) requirements. This is very dose and resource intensive.

This statement cannot be determined from the NUREG/CR. There are significant differences between the conditions of the tests in the NUREG/CR and loaded casks in actual conditions. Therefore the results relating to time of occurrence cannot be extrapolated from the NUREG/CR to actual conditions. There is an important finding in the NUREG/CR with regards to temperatures at which ME SCC can occur. However, it should be recognized that differences between the test and actual conditions may impact this finding. For example, if test samples have higher tensile stress than actual casks, the temperature at which ME SCC occurs may be different. This may also be true for parameters such as relative humidity, salt deposition, and perhaps others. We should be consider the limitations of the applicability of these tests to loaded casks in actual conditions.