

U.S. Nuclear Regulatory Commission Public Meeting Summary

Title: Discussion between South Texas Project, Units 1 and 2, and NRC staff regarding the revised Aluminum Bronze Selective Leaching Aging Management Program for All Potentially Susceptible Welds throughout the Facility

Meeting Identifier: 20160445

Date of Meeting: Tuesday, June 21, 2016

Location: NRC One White Flint North, O16B4
11555 Rockville Pike
Rockville, MD

Type of Meeting: Category 1

Purpose of the Meeting(s):

The purpose of the meeting is to gain an understanding of the revised Aluminum Bronze Selective Leaching Aging Management Program (AMP) for All Potentially Susceptible Welds throughout the Facility, specifically the AMP and the technical basis.

General Details:

The U.S. Nuclear Regulatory Commission (NRC) held a meeting on June 21, 2016, from 1:00 p.m. - 4:00 p.m. EST. The meetings began with an introduction, a review of meeting ground rules, and introductions of all in attendance. The NRC staff began the discussion by discussing the aging management program (AMP) elements as defined in the "Generic Aging Lessons Learned" (GALL). The meeting was a detailed technical discussion about each program element and specific NRC staff questions.

Approximately 18 people participated in the meeting. No members of the public attended the meeting. Meeting participants included representatives from STP Nuclear Operating Company.

Summary of Presentation:

The NRC staff led the discussion by reviewing the AMP elements as described in NUREG-1800, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants," Appendix A.1.2.3, "Aging Management Program Elements." The key points for each program element are outlined below.

1. Scope of Program

The AMP states that extruded tees with weld repairs will be replaced if it is determined that “the repair size is such that failure of the repair would affect structural integrity of the component.” However, during the audit in March 2016, the applicant stated that weld repair size was not known for all of the affected tees.

The NRC staff stated it needs to understand how the structural determination will be made in the absence of detailed information about weld repair size was not known for all of the affected tees.

The applicant stated that it had found old tests and results that can be used to do structural analyses. If an analysis cannot be performed, the extruded tees would be replaced. The applicant stated that it will provide a description of the types of information it used and how the size was extrapolated from this information when it forwards the revised AMP.

2. Preventive Actions

NUREG-1800 states that activities for prevention and mitigation programs should be described. These actions should mitigate or prevent aging degradation. In this light, the NRC staff stated that the AMP should document which portions of the buried essential cooling water system are coated and cite the coating as a preventive action.

The applicant stated that the external surfaces of all buried piping are coated with coal tar, which makes the exterior surface not susceptible to selective leaching. Further, the applicant stated that above ground piping is not coated. The applicant stated that it will update the AMP accordingly.

3. Parameters Monitored or Inspected

The NRC staff expressed two concerns.

What is being monitored or inspected - The AMP should consistently cite the following the appropriate parameters to be monitored or inspected:

- Loss of material, which is sometimes referred to as selective leaching in the applicant’s AMP, is an aging effect that is a result of dealloying. It will be monitored via system walkdowns and destructive examinations.
- Cracking is an aging effect that is associated with dealloying in certain weld configurations. It will be monitored via volumetric examination.
- Phase distribution is a key factor in the basis for the AMP and is an indirect measure of the potential for continuous dealloying. It will be monitored via destructive examination.

The applicant agreed that it will address these considerations in its update to the AMP.

What operating experience demonstrates – The AMP states that operating experience has shown that certain welds are “not susceptible to cracking caused by selective leaching.” The NRC staff stated that operating experience is not that definitive. Rather, the operating experience only demonstrates that there are no through-wall indications.

The applicant stated that they understood the two concerns and will address them in the revised AMP and background basis.

4. Detection of Aging Effects

NUREG-1800 states that detection of aging effects should occur before there is a loss of the structure- and component-intended function(s).

The NRC staff asked, when buried pipe are exposed, what is the method of inspection and is the inspection conducted on internal, external, or both surfaces?

The applicant stated that the method of inspection would be visual inspection of the outside coating. If degradation is found near a weld, volumetric examination would be used.

The applicant stated that they understood the question and will address them in the revised AMP and background basis.

Weld with No Backing Rings

The NRC staff notes that the AMP indicates that the purpose of the volumetric inspection is to identify cracks. The staff questioned whether crack identification was appropriate. This AMP is specifically for aluminum-bronze selective leaching. Therefore, the parameter to be monitored should be cracks with indication of dealloying. The applicant agreed.

The NRC staff questioned whether a sample size of 3% of the welds with a maximum of 10 welds was sufficient or consistent with the GALL Report recommendations. The staff pointed to AMP XI.M32, “One-Time Inspection,” which recommends 20% with a maximum of 25 prior to period of extended operation (PEO). The applicant agreed to increase the sample size to 20% with a maximum of 25 prior to PEO.

The NRC staff questioned how many rejectable weld flaws can be identified during the one-time inspection to transition to periodic monitoring? The applicant stated that if one rejectable weld flaw is found, the scope of the one-time inspection will be increased by five and if one more rejectable weld flaw is found, the AMP will transition to periodic monitoring.

Weld with Backing Rings

Similar to Weld with No Backing Rings, the NRC notes that the AMP indicates that the purpose of the volumetric inspection is to identify cracks. The staff questioned whether crack identification was appropriate. This AMP is specifically for aluminum-bronze selective

leaching. Therefore, the parameter to be monitored should be cracks with indication of dealloying. The applicant agreed and will update the AMP.

The NRC staff noted that the periodic inspection of these welds begin with a scope of 20% of the welds with a maximum of 25 welds and, "if no weld defects are found," the number of inspections will be reduced to 3% with a maximum of 10 welds. The staff questioned the criteria for reducing the number of welds inspected. The application stated that if one weld flaws is found, the number of welds inspected will not decrease. The staff requested that the basis for reducing the number of welds inspected be strengthened. The applicant agreed to provide a stronger basis for the reduction.

Destructive Examinations

The NRC staff first questioned whether the AMP actually dealt with two distinct populations - welds without backing rings and welds with backing rings because the applicant's proposed susceptibility is different for each group.

- Backing rings – results in crevice that can result in a greater potential for weld cracks and selective leaching
- Without backing rings – there is less dilution and a longer cooling period in root pass which creates a more susceptible microstructure for selective leaching

The applicant confirmed that they have two distinct populations and will update the AMP.

Next, the NRC staff questioned the number of destructive examinations to be conducted and the population to be inspected. Two welds with backing rings only is not consistent with the GALL Report recommendation and does not address both populations. Regarding the number of welds, AMP XI.M32, for example, recommends 20% with a maximum of 25. The staff indicated that both populations should be inspected. The applicant agreed and will update the AMP.

The NRC staff then discussed the purpose of the destructive examinations:

- for welds without backing rings, destructive examinations demonstrate:
 - no loss of material due to dealloying (layer –like, plug-like),
 - a phase distribution that supports the basis document,
 - and no cracking accompanied with dealloying
- for welds with backing rings, destructive examinations demonstrate:
 - no loss of material due to dealloying,
 - a phase distribution that supports the basis document,
 - and the frequency of occurrence of cracking accompanied with dealloying

The applicant agreed that it will address these considerations in its update to the AMP.

Inspection Locations

The NRC staff noted that the AMP states that inspection locations will be randomly selected. The staff indicated that the inspections should be representative of range of weld sizes and

consider factors such as heat input and weld orientation. The applicant agreed and will update the AMP.

Inspection Timing

The NRC staff asked for clarification on when one-time inspections occur prior to PEO and how often the periodic inspection will be. The staff recognized that the phase distribution in the weld metal is not time dependent. The applicant stated that the one-time inspection will be performed in the 10 years prior to PEO. The applicant further stated that the initial periodic inspections will be performed in the 10 years prior to PEO and then on a 10-year basis. The applicant stated that they are just about within 10 years prior to PEO so inspections will be done in the next 10 years and completed on 10-year intervals.

5. Monitoring and Trending

The NRC staff recognizes that qualitative results will not be obtained by the planned volumetric and destructive inspections/examinations. However, without planned trending, inspection results would be “buried” in the corrective action program. The staff questioned why the results of the volumetric and destructive inspections would not be compiled (trended) and evaluated, and why the results of the walk downs would not be compiled (trended) and evaluated. The applicant agreed to include compilation of results and evaluation as trending into the AMP.

6. Acceptance Criteria

The NRC staff and the applicant discussed what the acceptance criteria should be for the inspections and examinations.

Volumetric Examinations

The NRC staff noted that the AMP states the acceptance criteria for welds is no defects. However, the staff was unsure of what “no defects” mean. The applicant agreed to provide specific, detailed criteria for determining what indicates a rejectable weld indication.

Destructive Examinations

The NRC staff noted that the AMP does not provide acceptance criteria for the destructive examinations. The applicant agreed to provide specific, detailed criteria for determining acceptance criteria, including cracking, loss of material, and phase distribution.

Buried Pipe Coatings

The NRC staff noted that the AMP does not provide acceptance criteria for buried pipe coatings. The applicant agreed to revise the AMP to reference criteria cited in its Buried Piping and Tanks Inspection program during direct visual inspections of buried pipe coatings.

7. Corrective Actions

Expansion of Examinations

The NRC staff acknowledges that STP does not expect leaks associated with aluminum-bronze selective leaching once the casting components have been replaced. However, corrective action is a key element of an AMP. Therefore, the AMP should describe

- What type of inspections will be conducted if aboveground leaks are detected?
- What type of inspections will be conducted if buried pipe welds leak?
- What type of expanded inspection will be conducted if leaks are detected (e.g., volumetric, destructive).
- For welds without backing rings, what corrective actions will occur if dealloying is detected?
- For welds with backing rings, what corrective actions will occur depending on the frequency of occurrence of cracking accompanied with dealloying?
- Will expansion of destructive examinations be conducted if acceptance criteria for destructive examinations is not met?
- What corrective actions will be taken for the detection of plug-like or uniform dealloying?
- What corrective actions will be taken for buried pipe coating defects?

The applicant agreed to expand the corrective action element of the AMP.

Basis Document

The staff discussed a few questions on the Basis document. The staff noted that the margin between the detectable limit and the allowed flaw size for one set of buried pipe fittings was very low (i.e., 1.01). The applicant agreed to provide a stringer basis for the acceptability of these fittings.

Editorial Comments

The staff discussed several editorial comments on the AMP. The staff classified these as editorial changes because they believed that the applicant's intent was to include the information. The applicant agreed to address the editorial comments in its AMP update.

Public Participation Themes:

None.

Next Step:

STP will revise the Aluminum Bronze Selective Leaching Aging Management Plan and basis document (if necessary).

Attachments:

- Meeting description and agenda – ML16139A221
- Attendance List – ML16175A021
- NRC presentation – ML16172A019

Next Step:

STP will revise the Aluminum Bronze Selective Leaching Aging Management Plan and basis document (if necessary).

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ADAMS Accession No.:

Package: ML16180A015

Meeting Summary: ML16180A014

Meeting description and agenda: ML16139A221

Attendance List: ML16175A021

NRC presentation: ML16172A019

***concurred via email**

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