

**ST. LUCIE NUCLEAR PLANT, UNITS 1 AND 2**  
**SUBSEQUENT LICENSE RENEWAL APPLICATION (SLRA)**  
**REQUESTS FOR ADDITIONAL INFORMATION**  
**(Second Round)**

**SAFETY REVIEW**

**RAI B.2.3.27-1a**

Regulatory Basis

Section 54.21(a)(3) of Title 10 of the *Code of Federal Regulations* (10 CFR) requires an applicant to demonstrate that the effects of aging for structures and components will be adequately managed so that the intended function(s) will be maintained consistent with the current licensing basis for the period of extended operation. One of the findings that the U.S. Nuclear Regulatory Commission (NRC) staff must make to issue a renewed license (10 CFR 54.29(a)) is that actions have been identified and have been or will be taken with respect to managing the effects of aging during the period of extended operation on the functionality of structures and components that have been identified to require review under 10 CFR 54.21, such that there is reasonable assurance that the activities authorized by the renewed license will continue to be conducted in accordance with the current licensing basis. In order to complete its review and enable making a finding under 10 CFR 54.29(a), the staff requires additional information in regard to the matters described below.

Background

SLRA Section B.2.3.27, "Buried and Underground Piping and Tanks," states "[t]he number of inspections for each 10-year inspection period, commencing 10 years prior to the start of SPEO, are based on the inspection quantities noted in NUREG-2191, Table XI.M41-2, adjusted for a 2-Unit plant site."

GALL-SLR Report Table XI.M41-1, "Preventive Actions for Buried and Underground Piping and Tanks," recommends that buried stainless steel piping is externally coated in accordance with the "preventive actions" program element of GALL-SLR Report AMP XI.M41, "Buried and Underground Piping and Tanks."

In addition, GALL-SLR Report AMP XI.M41 states the following:

- "[a]dditional inspections, beyond those in Table XI.M41-2, "Inspection of Buried and Underground Piping and Tanks," may be appropriate if exceptions are taken to program element 2, "preventive actions," or in response to plant-specific operating experience."
- "[t]here are no recommended preventive actions [e.g., external coatings] for titanium alloy, super austenitic stainless steels, and nickel alloy materials."

By letter dated June 13, 2022 (ADAMS Accession No. ML22164A802), the applicant stated the following in response to RAIs B.2.3.27-1 and B.2.3.21-2 (respectively):

- "[a] portion of the Unit 1 auxiliary feedwater (AFW) and condensate system (AFW pump suction) is buried stainless steel piping in sand beneath the turbine building. No coating

was identified, however, due to the location beneath the turbine building, this buried piping is not susceptible to wetting.”

- “[t]he table [referring to the soil corrosivity sampling results table] does not include an outlier soil sample associated with a Unit 2 intake cooling water (ICW) line, since that sample had been impacted by local saltwater foaming from the ICW discharge overflow/standpipe. The caulking between the standpipe and the concrete decking was weathered and porous, allowing saltwater foam to permeate into the soil.”

In response to RAI B.2.3.21-2, the applicant provided results from seven soil corrosivity samples which included the following parameters: pH, soil resistivity, moisture, chlorides, sulfates, redox potential, and microbiology. Based on its review of this data, the staff noted that the soil can be considered appreciably corrosive (using average values) or severely corrosive (using least conservative values) to stainless steel when scoring in accordance with Table 9-4, “Soil Corrosivity Index from BPWORKS,” of Electric Power Research Institute (EPRI) Report 3002005294, “Soil Sampling and Testing Methods to Evaluate the Corrosivity of the Environment for Buried Piping and Tanks at Nuclear Power Plants.”

#### Issue

The basis provided by the applicant for having uncoated buried stainless steel (i.e., an exception to GALL-SLR AMP XI.M41 guidance) is that the piping is not exposed to significant amounts of moisture (i.e., wetting). However, the staff notes that soil parameters beyond moisture (i.e., pH, soil resistivity, chlorides, sulfates, redox potential, and microbiology) impact the susceptibility of buried stainless steel to external corrosion. Based on the soil corrosivity data provided in the response to RAI B.2.3.21-2, the environment at St. Lucie can be considered corrosive to buried stainless steel. In addition, based on its review of the response to RAI B.2.3.21-2, the staff notes that there has been at least one incident of saltwater intrusion into the soil. Based on its review of Table 9-4 of EPRI Report 3002005294, the staff also notes buried stainless is more sensitive to the effects of chlorides than any other material type.

#### Request

1. State the approximate length of uncoated in-scope buried stainless steel piping.
2. State the basis for why the inspection quantities in GALL-SLR Report Table XI.M41-2 are appropriate for buried stainless steel piping. The technical basis could include (but is not limited to) discussion of the following: results of soil corrosivity testing in the vicinity of the subject piping, results of inspections of buried uncoated stainless steel piping, and type(s) of in-scope stainless steel (e.g., super austenitic) piping utilized in uncoated buried applications, etc.

#### References.

- EPRI. EPRI 3002005294, “Soil Sampling and Testing Methods to Evaluate the Corrosivity of the Environment for Buried Piping and Tanks at Nuclear Power Plants.” Palo Alto, California: Electric Power Research Institute. November 6, 2015.