Oconee SLRA: Breakout Questions

SLRA Section B2.1.26, "Buried and Underground Piping and Tanks"

TRP: 14

Question Number	SLRA Section	SLRA Page	Background / Issue (As applicable/needed)	Discussion Question / Request
1	B2.1.26	B-181	Exception No. 2 – Alternative limiting critical potential. Exception No. 2 states the following in part: • NUREG-2191 recommends the limiting critical potential for cathodic protection systems should not be more negative than -1200 mV. The Oconee Buried and Underground Piping and Tanks AMP will maintain the instant-off potential of all test locations between -850 mV and -2000 mV. • The cathodic protection system for the standby shutdown facility diesel engine fuel oil tank was installed in 2010 to replace the original passive sacrificial anode system. Due to the location of the tank and space limitations in the area, anodes could not be installed on the south side of the tank that is adjacent to the standby shutdown facility building wall. Also, the design depth for the anodes on the north side of the tank could not be obtained due to a shallow bedrock layer in the	The subject enhancement (as written) applies to all buried steel within the scope of subsequent license renewal, but the justification focuses on the standby shutdown facility diesel engine fuel oil tank. Clarification needed regarding whether this exception is applicable for instant-off potential measurements (a) in the vicinity of the standby shutdown facility diesel engine fuel oil tank; or (b) site-wide. The staff requests a clarification discussion regarding how the "two part system consisting of a high build epoxy primer and a high build coal tar epoxy finish coat" can accommodate voltages more negative than -1,200 mV. The -1,200 mV limiting critical potential is an industry standard value.

			area. In order to achieve adequate polarization at test locations for the south side of the tank, an instant-off potential more negative than -1200 mV was required for test locations for the north side of the tank. • The coating used for the standby shutdown facility diesel engine fuel oil tank is a two part system consisting of a high build epoxy primer and a high build coal tar epoxy finish coat. Epoxy coating systems are less susceptible to cathodic disbondment than other coating systems such as tape wrap coatings.	
2	N/A	N/A	Buried Gray Cast Iron Piping– The staff reviewed SLR-ONS-AMPR-XI.M41, "Buried and Underground Piping and Tanks AMP Evaluation Report," Revision 1, and noted the program address gray cast iron piping. The staff also notes that there are no aging management review items for gray cast iron exposed to a soil environment.	Clarification needed regarding if there is in-scope buried gray cast iron piping at ONS.
3	Table 3.3.1	3-480	SLRA Table 3.3.1 (item 144) states stainless steel piping and piping components exposed to soil are managed for cracking due to stress corrosion cracking (SCC). The following stainless steel components exposed to soil do not cite cracking due to SCC.	Clarification needed regarding why the subject components do not cite cracking due to SCC.

			• Valve bodies in the high pressure service water system. • Piping in the condenser circulating water and siphon seal water systems.	
4	Various	Various	Enhancement No. 1 states "[i]nstall a cathodic protection system in accordance with NACE SP0169-2007 for buried carbon steel piping within the scope of the program." The SLRA states ductile iron piping exposed to soil in the High Pressure Service Water and Keowee Fire Detection/Protection systems will be managed for loss of material by the Buried and Underground Piping and Tanks program. SLR-ONS-AMPR-XI.M41 states "[b]uried piping in the High Pressure Service Water System and Keowee Fire Detection/Protection System is designed and installed in accordance with NFPA 24." SLRA Sections 2.3.3.4.1, "High Pressure Service Water System," and 2.3.3.4.3, "Keowee Fire Detection/Protection System," state these systems are within the scope of SLR in accordance with the criteria of 10 CFR 54.4(a)(2) and 10 CFR 54.4(a)(3) [fire protection]. GALL-SLR AMP XI.M41 states "[f]or fire mains installed in accordance with	The staff requests a clarifying discussion on the following. The staff's understanding is that cathodic protection will not be provided for buried ductile iron piping based on the following reasons: (a) the subject piping is within the scope of SLR in accordance with the criteria of 10 CFR 54.4(a)(3) [fire protection]; (b) the subject piping was installed in accordance with NFPA 24; and (c) preventive actions beyond those in NFPA 24 (i.e., cathodic protection) are not required based on GALL-SLR Report recommendations.

			National Fire Protection Association (NFPA) NFPA® 24, preventive actions beyond those in NFPA 24 need not be provided if…" The staff notes that NFPA 24 does not provide recommendations related to cathodic protection.	
5	B2.1.26 Table 3.3.2-56	B-185 3-1002	Underground-to-soil interface corrosion: SLRA Table 3.3.2-56, "Standby Shutdown Facility Fuel Oil System," cites soil and underground external environments for the diesel engine fuel oil storage tank. Enhancement No. 9 states "[i]nternal volumetric inspections of the standby shutdown facility diesel engine fuel oil tank will cover at least 25 percent of the surface area of the tank and include at least some of both the top and bottom of the tank."	The inspection recommendations for buried and underground tanks provided in the enhancement are consistent with GALL-SLR Report AMP XI.M41 recommendations; however, these recommendations are based on tanks being exposed to a buried or underground environment (i.e., not tanks with an underground-to-soil external interface, where there is an increased potential for degradation at interface locations). The staff seeks clarification regarding if inspections of the subject tank will account for the potential for corrosion at the underground-to-soil interface.
6	B2.1.26	B-184	Enhancement No. 7 states "[p]erform visual inspections of at least two ten-linear foot sections of buried uncoated stainless steel piping at least once every ten years…" GALL-SLR Report Table XI.M41-1, "Preventive Actions for Buried and	The number of inspections in Enhancement No. 7 for stainless steel piping is consistent with GALL-SLR Report AMP XI.M41 recommendations; however, the recommended inspections are based on coatings being

			Underground Piping and Tanks," recommends coatings for buried stainless steel piping. GALL-SLR Report AMP XI.M41 states "[a]dditional inspections, beyond those in Table XI.M41-2 may be appropriate if exceptions are taken to program element 2, "preventive actions"…." SLR-ONS-AMPR-XI.M41 provides soil sampling results from 2008 (average values only) for the following soil parameters: soil resistivity, chlorides, and sulfates.	provided. Based on coatings not being provided for buried stainless steel at ONS, the staff requests a clarifying discussion to understand why two inspections in each 10-year interval is appropriate. The staff also notes that Table 9-4, "Soil Corrosivity Index from BPWORKS," of EPRI Report 3002005294, "Soil Sampling and Testing Methods to Evaluate the Corrosivity of the Environment for Buried Piping and Tanks at Nuclear Power Plants," (this document in on the ePortal) includes the following soil parameters when determining the soil corrosivity for stainless steel piping: soil resistivity, pH, redox potential, sulfides, chlorides, soil moisture, and soil consortia (bacteria). The staff seeks clarification regarding why pH, redox potential, soil moisture, and soil consortia were not considered for stainless steel.
7	A2.26	A-27	The UFSAR states the acceptance criterion for cathodic protection system effectiveness is -850 mV relative to copper/copper sulfate reference electrode.	GALL-SLR Report Table XI-01, "FSAR Supplement Summaries for GALL-SLR Report Chapter XI Aging Management Programs," states "[f]or steel components,

			GALL-SLR Report Table XI-01 includes the following statement “[w]here the coatings, backfill or the condition of exposed piping does not meet acceptance criteria such that the depth or extent of degradation of the base metal could have resulted in a loss of pressure boundary function when the loss of material rate is extrapolated to the end of the subsequent period of extended operation, an increase in the sample size is conducted. If a reduction in the number of inspections recommended in GALL--SLR Report, AMP XI.M41, Table XI.M41-2 is claimed based on a lack of soil corrosivity as determined by soil testing, then soil testing is conducted once in each 10-year period starting 10 years prior to the subsequent period of extended operation.” GALL-SLR Report AMP XI.M41 states Preventive Action Category E applies when a cathodic protection system has been installed but all or portions of the piping covered by that system fail to meet any of the criteria of Preventive Action Category C piping, provided (a) coatings and backfill are provided in accordance with the “preventive actions” program element of this AMP; (b) plant-specific OE is acceptable (i.e., no leaks in buried piping due to external corrosion, no significant coating degradation or metal loss in more than 10 percent of inspections conducted); and (c) *soil has*	where the acceptance criteria for the effectiveness of the cathodic protection is other than -850 mV instant-off…” The cathodic protection acceptance criterion in the UFSAR does not specify instant-off. The staff seeks clarification regarding why the quoted statement to the left is not included in SLRA Section A2.26. SLRA Section A2.26 does not discuss soil testing; therefore, it is unclear why Preventive Action Category E would be applicable at ONS.

			been determined to not be corrosive [emphasis added by the staff].	