

POINT BEACH NUCLEAR PLANT, UNITS 1 AND 2 (PBN) SUBSEQUENT LICENSE RENEWAL APPLICATION (SLRA) DRAFT REQUEST FOR ADDITIONAL INFORMATION (RAI) SAFETY - SET 9

Note: This is a follow-up RAI to address the applicant's responses to RAIs B.2.3.27-1 and B.2.3.27-4, dated August 11, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21223A308).

SLRA Section B.2.3.27, "Buried and Underground Piping and Tanks"

DRAI B.2.3.27-1a [Cathodic Protection for Buried Steel Piping/Preventive Action Category E]

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 it to make 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, in part, that "[t]he PBN Buried and Underground Piping and Tanks AMP [aging management program], with enhancements, will be consistent with exception [not related to the subject RAI] with the 10 elements of NUREG-2191 ['Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report'], Section XI.M41, 'Buried and Underground Piping and Tanks.'"

The applicant's responses to RAIs B.2.3.27-1 and B.2.3.27-4 state, in part, the following:

- (RAI B.2.3.27-1 response) “[t]he 2015 cathodic protection survey for PBN states that the following buried piping systems have cathodic protection: circulating water supply and return, service water supply and return, fire protection water, fuel oil, and propane system lines. However, not all of these buried piping systems are completely cathodically protected. No activities are currently planned to increase the coverage of cathodic protection system to 100 percent of the buried SLR [subsequent license renewal]-scope piping.”
- (RAI B.2.3.27-4 response) “[s]ince not all of the buried piping within the scope of SLR is cathodically protected and no activities are planned to increase the cathodic protection coverage to 100 percent, a clarification is added to state that buried SLR-scope piping will be classified as Category E, unless a reevaluation based on future OE [operating experience] and soil conditions, as defined in NUREG 2191, Table XI.M41-2, [“Inspection of Buried and Underground Piping and Tanks,”] determines that another Preventive Action Category, such as Category F, is more applicable. Preventive Action Category C will not be used.”
- (RAI B.2.3.27-1 response) “[a] 1992 analysis of soil samples was obtained during the installation of 4 groundwater monitoring wells in the Unit 1 and Unit 2 facades, near the containment structures. The soil samples were extracted every 5 feet during the well borings and the samples were analyzed for pH, resistivity, and chlorides. The samples had an average resistivity of 16,740 ohm-cm, which was considered “mildly corrosive” per the sampling manual used, “Corrosion Control,” *Air Force Manual (AFM), No. 88-9*. The average pH was 9.52, which was considered to be within the optimum range of 8.5 to 11.0. The average amount of chlorides was approximately 59 ppm, which was well below the 500 ppm minimum for an aggressive chloride environment.”
- (RAI B.2.3.27-1 response) “[a] 2009 analysis of soil samples in the immediate vicinity of the buried fire protection system piping was performed after the piping had been excavated for 10-year inspections.... The sample results indicated that resistivity was within the 13,800-16,600 Ohm-cm range, redox potential had a range of 81.9-172 mV [millivolts], the soil pH was 7.9, chlorides were measured at 31.8 mg/kg, sulfides were within a range of 11.6-13.4 mg/kg, and moisture content was at 19.1 percent. The associated action request (AR) stated that the soil sample results proved that the soil was nonaggressive.”

- (RAI B.2.3.27-1 response) “[a] review of PBN plant-specific operating experience (OE) spanning the 10-year operating period prior to January 1, 2020, was performed and was documented in SLRA Section B.2.3.27. The OE review was inclusive of all buried components, including components outside the scope of SLR. No aging-related failures were identified for buried piping or tank components.... The OE review indicated that when excavations were performed in 2009 and 2016, no evidence of wall loss was identified.”

GALL-SLR Report Table XI.M41-2 states that 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 been determined to not be corrosive.

GALL-SLR Report Table XI.M41-2 references American Water Works Association (AWWA) C105, “Polyethylene Encasement for Ductile-Iron Pipe Systems,” Table A.1, “Soil-Test Evaluation,” with respect to determining soil corrosivity. AWWA C105, Table A.1 uses the soil parameters of soil resistivity, pH, redox potential, sulfides, and moisture to determine the overall soil corrosivity index.

Issue

The responses to the RAIs B.2.3.27-1 and B.2.3.27-4 did not quantify the coverage of the cathodic protection system with respect to in-scope buried steel piping. Without this information, the NRC staff cannot make a reasonable assurance finding with respect to whether Preventive Action Category E is appropriate for in-scope buried steel piping. The staff notes that Preventive Action Category E applies when a cathodic protection system has been installed but fails to meet any of the criteria of Preventive Action Category C piping. It was not the staff’s intent that Preventive Action Category E would be used where cathodic protection was not installed.

The staff also notes the following: (a) the 1992 soil analysis does not provide results related to redox potential, sulfides, or moisture; and (b) these soil parameters are cited in AWWA C105, Table A.1 to determine the overall soil corrosivity index for steel components.

Request

Provide additional information quantifying the coverage of the cathodic protection system with respect to in-scope buried steel piping. If cathodic protection will not be provided for a significant majority of in-scope buried steel piping, provide additional technical justification for why cathodic protection is not necessary (e.g., the number of inspections performed on buried

steel piping between 2009 and 2016, whether these inspections were performed on cathodically protected or non-cathodically protecting piping, number of soil analyses performed in 1992 and 2009, location of the soil samples with respect to in-scope buried steel piping, discussion of external surface loss of material rates for buried steel piping).