

**Oyster Creek Nuclear Generation Station (OCNGS) License Termination Plan (LTP)  
License Amendment Request Acceptance Review  
Request for Supplemental Information (RSI) -Revised**

RSI-1 Identify and describe the survey units within each area of the site, including the classification, area, and general information on surrounding survey units. Include maps with defined boundaries of the survey units, the scan and sample locations, and survey unit sizes.

Rationale: The survey unit is the fundamental unit for demonstrating compliance with release criteria. Planning, implementation, and data assessment are conducted for each survey unit. NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM) (ML003761445), Section 4.6, "Identify Survey Units," recommends survey units should be limited in size based on classification, exposure pathway modeling assumptions, and site-specific conditions, and provides maximum survey unit sizes for structures and land areas.

RSI-2 Site Characterization: Provide the radionuclide fractions, including characterization data used to derive them, to evaluate radionuclides of concern, insignificant contributors, surrogate ratios, relative ratios, and instrument efficiency.

Rationale: The site characterization surveys are designed to provide a complete and unambiguous record of the radiological status of the site. To do so the characterization survey should determine the nature and horizontal and vertical extent of the residual radioactivity. An outcome of this survey is the determination of radionuclide fractions by area or media.

RSI-3 Enclosure 5, "Oyster Creek Generating Station Site Radiological Characterization Report": For the samples selected for Hard-to-Detect (HTD) analysis, include the full suite of radionuclides in Table 2-7, "Radionuclides of Concern," or provide justification for why a full suite of radionuclides was not provided.

Rationale: NUREG-1700, "Standard Review Plan for Evaluating Nuclear Power Reactor License Termination Plans," Revision 2 (ML18116A124), "Section 2.5, "Final Radiation Survey Plan," recommends the LTP include methods to address HTD radionuclides. For open land areas, Holtec Decommissioning International, LLC (HDI) selected quality control (QC) samples for analysis of HTD beta emitters (H-3, Sr-90, C-14, Fe-55, Ni-63, Tc-99). HDI included Pu-241 for the survey areas NPA (North Protected Area), SPA (South Protected Area), and the RCA (Radiologically Controlled Area), which HDI said have the highest potential for transuranic contamination. HDI excluded other HTDs listed in Table 2-7 (C-243/Cm-244, Np-237, Pu-238, Pu-239/240) from the analysis. In addition, in Section 2.3.1, "Open Land Area Soil Sampling and Scanning," HDI committed to submitting 10% of all soil samples offsite for analysis for the full suite of radionuclides.

RSI-4 Enclosure 5, "Oyster Creek Generating Station Site Radiological Characterization Report": Justify the selection of surface soil samples without easy to-detect (ETD)

activity for HTD analysis, as these samples would not be expected to contain HTD radionuclides.

Rationale: Several of the samples identified as having HTD analysis contained no ETD activity above the Minimum Detectable Concentration (MDC), despite several unselected samples having positive results for Cs-137 and/or Co-60. Generally, biased samples with the highest activity are selected for HTD analysis for determining radionuclide fractions, surrogate ratios and relative ratios. For example, RCA-DEP1-15-B (111 pCi/g Cobalt-60, 404 pCi/g Cesium-137), RCA-SEDI-3-B (1.1 pCi/g Cobalt-60, 14 pCi/g Cesium-137), RCA-SEDI-14-B (13.2 pCi/g Cobalt-60, 32.3 pCi/g Cesium-137), and RCA-SEDI-10-B (2.87 pCi/g Cobalt-60, 2.15 pCi/g Cesium-137) included no HTD analysis.

RSI-5      Enclosure 5, "Oyster Creek Generating Station Site Radiological Characterization Report": Evaluate other contaminated media (e.g., pavement-covered areas and shallow concrete slabs, sediment, subsurface soils) for the full suite of radionuclides to establish radionuclide fractions and subsequent determination of insignificant contributors, surrogate ratios, and relative ratios.

Rationale: Most of the samples having HTD results in the characterization report were from surface soils, with only two sediment and no subsurface and asphalt samples having HTD results. Although there were sediment, asphalt, and subsurface samples exceeding the assessment criteria, these samples do not appear to be in the subset analyzed for HTDs.

RSI-6      Enclosure 6, "Oyster Creek Nuclear Generating Station Below Grade Structures Radiological Characterization Report": Provide measured activity, uncertainty, and the MDC for all radionuclide analyses conducted on each sample, including those with results less than the MDC to support the staff's review of the radionuclide fractions, insignificant contributors, surrogate ratios, and relative ratios.

Rationale: The information provided in the LTP and the "Oyster Creek Nuclear Generation Station Below Grade Structures Radiological Characterization Report" did not provide the measured activity and uncertainty, nor the MDC, for HTD or gamma emitting radionuclides analyses other than Co-60 and Cs-137. The results were presented based on percentage of the AC and only included if at least one sample exceeded the MDC.

RSI-7      OC LTP & Enclosure 6, "Oyster Creek Nuclear Generating Station Below Grade Structures Radiological Characterization Report": Samples selected for HTD analysis should include the full suite of radionuclides in Table 2-7.

Rationale: For below grade structures, samples selected for HTD analysis were not analyzed for the full suite of radionuclides. Rather, a decision logic tree (Enclosure 6, Table 3-1) was used to determine which samples were monitored for what radionuclides. The NRC staff was not able to determine which samples were analyzed for the full suite of radionuclides in Table 2-7 of the OC LTP.

RSI-8      Insignificant Contributors: Provide representative (additional) RCA sample data by area and media to support the determination of radionuclide fractions and the

subsequent evaluation of insignificant contributors based on this data. Explain what further investigations were or will be conducted to determine the horizontal and vertical extent of the Sr-90 contamination in the RCA.

Rationale: Enclosure 4, "Radionuclide Selection for DCGL Development Oyster Creek Station Site Characterization Project," and Enclosure 18, "Dose Contribution from Insignificant Radionuclides in the Oyster Creek Site-Specific Suite of Radiological Nuclides," described the evaluation for insignificant contributor determination. Several concerns were identified:

- (a) Enclosure 4: The dose contributions for Silver-108m, Barium-133, Hafnium-178m, Manganese-53, Niobium-92m, Lead-205, Promethium-145, Samarium-146, and Terbium-158, which are not available in the Decontamination and Decommissioning (DandD) code, were evaluated using the inhalation, ingestion, and direct exposures in Federal Guidance Report No. 11, "Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion," and Federal Guidance Report No. 12, "External Exposure to Radionuclides In Air, Water, and Soil." The dose conversion factors for the individual radionuclides were ratioed to that of Co-60 and multiplied by the dose result for Co-60 for each of the scenarios; however, justification was not provided to demonstrate that Co-60 would be sufficiently representative of the radiological and environmental properties of these radionuclides.
- (b) Enclosure 18: The licensee collected five biased soil samples from the RCA for analysis of HTD radionuclides. From these samples, HDI concluded that the HTDs collectively contributed less than 10% of the dose criterion and could therefore be eliminated from further detailed analysis. However, to determine the magnitude and extent of residual radioactivity, a sufficient number of samples is required to capture statistical variability in the data by areas and media. Five RCA soil samples does not represent a sufficient sample number, nor has it been demonstrated that these samples are representative of all open land areas, building structures, and embedded and buried piping.
- (c) Enclosure 18: Sr-90 was detected above the MDC in one of five samples used for the insignificant contributor analysis in Enclosure 18. Sr-90 is expected to be more mobile; therefore, the significant gamma emitting contributors may not be co-located with HTD radionuclides. Additional data across multiple media would be needed to support HDI's determination that Sr-90 is insignificant.
- (d) Section 3.3 of NUREG-1757, Volume 2, Rev. 2, indicates that uncertainty should be considered when determining insignificant radionuclides and exposure pathways. Therefore, analyses of less likely but plausible (LLBP) exposure scenarios should be considered when determining whether a radionuclide or pathway is insignificant and can be removed from detailed analysis (i.e., if a radionuclide is significant to dose for a LLBP exposure scenario, then the radionuclide should be analyzed for in Final Status Survey (FSS) and in detailed dose analysis; this does not preclude use of

surrogate ratios for HTD radionuclides that are important to dose for LLBP scenarios, if approved by the NRC). See also RSI-9 requesting information on less likely but plausible exposure scenarios.

RSI-9 Provide the Less Likely But Plausible exposure scenarios results discussed in the OCNGS LTP to provide information to the NRC staff to risk inform the compliance decision.

Rationale: The OGNGS LTP and supporting technical bases documents do not appear to provide results for less likely but plausible exposure scenarios, including residential scenarios with consideration of the groundwater pathway. Given uncertainty in the selection of the residential gardener scenario as potentially reasonably foreseeable versus less likely but plausible (given the demand for and limited area remaining for residential development), it is especially important for HDI to provide information on less likely but plausible exposure scenarios in the OCNGS LTP. This could include a relative change in DCGLs for radionuclides of concern for the industrial versus residential scenario, or calculation of dose from residential exposure scenarios at the industrial use DCGLs to inform decision-making regarding compliance with radiological criteria for license termination found in 10 CFR Part 20, Subpart E.

RSI-10 *Environmental:* Provide documentation of appropriate identification efforts of background research and/or field surveys meeting current state standards and provide a National Register of Historic Places (NRHP) evaluation of all potential historic properties – which include any building, structure, object, site, or district at or over 50 years of age at the time of project activities – that will be impacted by project activities.

*Rationale:* Based on the information provided in Section 8.8.13 of the Environmental Report, the facility may include individually eligible buildings and/or structures and may constitute a historic district. An evaluation conducted by appropriately qualified individuals (see the Secretary of the Interior's Professional Qualifications Standards and 36 CFR 800.2(a)(1)) will provide the basis for the NRC to begin consultations with all appropriate consulting parties regarding the eligibility status for the NRHP, as well as the potential effects of the undertaking on any historic properties. See 36 CFR 800.4(c) and 36 CFR 60.4 for more details about National Historic Preservation Act of 1966, as amended (NHPA) evaluations and criteria for NRHP eligibility.

RSI-11 *Environmental:* Provide site-specific analysis of the federally protected species associated with the proposed federal action in accordance with the Endangered Species Act (ESA). The site-specific analysis should include a conclusion of potential impact on each species as defined in 50 CFR 402.02. See <https://www.epa.gov/system/files/documents/2023-07/ESA-Overview.pdf> for more details about the ESA determinations.

*Rationale:* The Environmental Report does identify federally listed species under the ESA; however, there are no effects determinations provided. Section 8.8.8.1, "Terrestrial Listed Species," and Section 8.8.8.7, "Aquatic/Marine Listed Species,"

should include a site-specific analysis of the potential impacts of the proposed action on each species using the language in the ESA, namely, “no effect,” “may affect, not likely to adversely affect,” or “may affect, likely to adversely affect.” The discussion should also include any identified critical habitat listed in the area, with the corresponding impact considerations. More information about potential impacts conclusions can be found in 50 CFR 402 and the U.S. Fish and Wildlife Service (FWS) and NMFS’s ESA Section 7 Handbook.

RSI-12      *Environmental:* Provide further information about essential fish habitats (EFH) protected under the Magnuson-Stevens Fishery Conservation and Management Act that are in or near the action area.

Rationale: There is no discussion of the Magnuson-Stevens Fishery Conservation and Management Act in the Environmental Report; however, there are marine fisheries present at or near the site and thus potential impacts to the local fish habitats needs to be considered. The EFH should be described in the affected area, including any habitat areas of particular concern, and the OCNGS LTP should make an effect determination for each EFH species, life stage, and their prey in accordance with the appropriate EFH language and definitions in 50 CFR 600.10 and 50 CFR 600 Subparts J and K.

RSI-13      *Environmental:* Provide an assessment of reasonable alternative actions as required under 10 CFR 51.45(3).

Rationale: The Environmental Report must discuss reasonable alternative actions for the proposed action for the responsible federal agency to consider. At a minimum the considered alternatives must include the no-action alternative, as defined in 43 CFR 46.30. For example, the Environmental Report discusses the potential for barging waste material from the OCNGS site; this would be a possible alternative and should be discussed in more detail in this section. See NUREG-1748 Section 6.2 for information about what should be included in the alternative actions review.