UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

REQUEST FOR ADDITIONAL INFORMATION

RELATED TO NUCLEAR ENERGY INSTITUTE (NEI)

TECHNICAL REPORT NEI 22-01

LICENSE TERMINATION PROCESS

By letter dated January 6, 2025, (Agencywide Documents Access and Management System (ADAMS) Accession No. ML25006A201), the Nuclear Energy Institute (NEI) requested formal U.S. Nuclear Regulatory Commission (NRC) endorsement of technical report NEI 22-01, Revision 1, "License Termination Process," on behalf of its members. NEI 22-01 was developed to assist decommissioning reactor licensees in the development of License Termination Plans (LTPs) that satisfy NRC requirements and provide an approach that aligns with previously published NRC guidance.

The NRC staff has reviewed the information submitted and determined that additional information is required to complete its review. The specific requests for additional information (RAIs) are listed below. The topics of these RAIs were identified in the summary of the March 6, 2025, public meeting (ML25087A010) as topics warranting further dialogue between NEI and the NRC staff. Included below the RAIs are some additional observations that the NRC staff have identified that may take additional time to address. Responses provided to the observations in conjunction with the RAIs would support the remainder of the review and a determination regarding an extension to the fee waiver request.

RAI 1 Determining Dose Contributions from Backfill

Basis:

In response to NRC Suggestion 2.23 in the letter dated April 30, 2024, NEI added additional language to a Subsection of 5.2.8, "Use of Soil and Demolition Debris as Backfill," of NEI 22-01, Revision 1. This new language included

- A citation of NUREG-1757, Volume 2, Revision 2, "Consolidated Decommissioning Guidance, Characterization, Survey and Determination of Radiological Criteria" (ML22194A859) and DUWP-ISG-02, "Radiological Survey and Dose Modeling of the Subsurface to Support License Termination," date October 2023 (ML23177A008).
- A statement that backfill from onsite should be characterized to rigor of final status surveys (FSS), compared to applicable Derived Concentration Guideline Levels (DCGL).
- A statement that if a licensee assumes there is no added residual radioactivity in backfill, support should be provided for this assumption. If there is uncertainty that soils are from

a non-impacted areas, a statistical test such as a Scenario B type analysis could be used.

- A discussion of the Zion plant, as an example, which NEI states, “a license conservatively assumed that soil contained licensed material at [MDC]… even though there were no detectable radionuclides present. Although conservative assumptions are sometimes used to simplify dose modeling, the use of [MDC] values as real characterization data is not required or recommended.”
- A statement that licensees should continue to discuss proposed plans with NRC since there are complex issues associated with measurement capabilities and site-specific dose assessments.

During the March 6, 2025 public meeting, NRC and NEI concluded that additional discussion on this topic was needed.

Issue:

During the March 6, 2025, public meeting NEI disagreed with the concept of assigning dose to radionuclides of concern (ROCs) that are below detection limits for impacted materials. NEI pointed to NUREG-1575, “Multi-Agency Radiological Survey and Site Investigation Manual” (MARSSIM),” Section 2.3.5, which provides guidance to ‘Report the actual result of the analysis. Do not report data as “less than the detection limit.’ Even negative results and results with large uncertainties can be used in the statistical tests to demonstrate compliance.”

The NRC staff notes that there is some confusion around the idea of “detection limits” and related terminology such as the critical level (Lc), MDC, and lower limit of detection (LLD). Detailed information on this topic can be found in MARLAP, Chapter 20, “Detection and Quantification Capabilities,” and Attachment 3B, “Analyte Detection.” MARLAP recommends that when a detection decision is required, it should be made by comparing the measured value to its critical value, which is a measure of detection limit, and not to the MDC or LLD. As pointed out by NEI, MARSSIM Section 2.3.5 recommends reporting the actual results of analysis, even negative results. NRC agrees that, ideally, initial reporting should include actual results and not zero out any negative values. However, while negative values may be appropriate to use for MARSSIM statistical tests or summary statistics, negative results should not be used when determining compliance doses, because a negative dose is not a realistic concept. When conducting any sort of dose estimate, negative results could either be zeroed out on an individual basis or zeroed out after all sample results are averaged. Zeroing out negative averages is a method that is most likely to minimize bias in the results.

In either scenario, if the analytical result is between the critical level and MDC (a posteriori), the result should not be set to zero. If results are reported as “<MDC,” then the MDC should be used for a dose estimate. If actual result values are reported, then those results or MDC value could be used for dose estimates. If an individual sample measurement result is below the defined critical level, the value should still be reported, but the result can be noted as a non-detect and can be zeroed out for dose estimated purposes. However, if results were below MDC (a posteriori), but above the critical level, samples could not be considered non-detectable, and the value could not be zeroed out.

When assessing potential dose from backfill, some traditional sampling of fines (small concrete debris) may be a more practical way of assessing the potential dose from using impacted materials as backfill. It may be worth considering the backfill a class 3 well mixed survey unit with samples taken at various intervals of backfill.

Request:

Further discussions between NEI and the NRC staff are warranted on the topic of assessing potential dose from backfill. Based on these discussions, NEI should add specific language to Section 5.2.8 stating that reporting of actual results is recommended along with a discussion regarding the use of negative values for summary statistics and statistical tests vs. dose estimation as outlined above.

RAI 2 Reporting Groundwater Radionuclide Results

Basis:

The guidance in NUREG-1576, "Multi-Agency Radiological Laboratory Analytical Protocols [MARLAP] Manual," dated July 2004, provided definitions for critical level and minimum detection concentration (MDC) on which to base detection decisions for water samples. This information is needed to assure compliance with 10 CFR 20.1501, "General," that the site has been adequately characterized.

Issue:

In the March 6, 2025, public meeting between the NRC staff and NEI, it was stated that continued discussion of the detection decision and use of analytical results in the range between the critical level and MDC may be needed.

Section 2.2 of NEI 22-01 describes analytical results relevant to laboratory analyses of samples in a framework consistent to MARLAP. However, Section 2.2 did not provide a statement of what should be reported. The NRC staff notes that the use of analytical results for estimates of groundwater contamination or dose should not follow a MARSSIM-type statistical treatment. The NRC staff additionally acknowledge that there are some site and LTP dependencies for treatment and use of analytical results for groundwater. Dependencies include magnitude of the allotment of dose for existing groundwater contamination, magnitude of contamination, claim of zero contamination, and groundwater quality. An NRC review would focus on potential underestimation of dose.

For results between the Lc and MDC, reporting of results should include the critical level, the analytical result, and the MDC (*a posteriori*). For results above the MDC, only the analytical results need to be reported. Any result below the Lc value can be treated as zero radioactivity. MARLAP guidance indicated that the results in the range between the Lc and MDC are unreliable (and if reliability is needed, a more refined analytical approach should be used) but that any value above the critical level is statistically interpreted as a detection of radioactivity. Staff acknowledges that results close to the Lc value are potentially false positives from a statistical standpoint. Support for a false positive conclusion may include reanalysis or resampling and preponderance of results. Therefore, if the analytical result falls between the critical level and MDC (*a posteriori*), the result should not be set to zero. If results are reported as <MDC, then the MDC should be used for a dose estimate. If actual analytical result values are reported, then either those results or the MDC value can be used for dose estimates.

If an alternative approach for reporting analytical results is provided, then the licensee should provide supporting information on how that alternative approach meets the intent of the MARLAP guidance. Most commonly, sites that retain the usage of lower limits of detection

terminology should provide information on their detection decision such that dose is not underestimated.

Request:

Clarify in NEI 22-01 the treatment and reporting of analytical results that fall between the critical level and the MDC for estimating residual radioactivity and dose due to residual radioactivity in groundwater. Clarify the interpretation of laboratory analytical results between the critical level and MDC. Discussions between NEI and the NRC staff are warranted to ensure agreement on the clarifications.

RAI 3 Sorption Coefficient (Kd) Estimates

Basis:

In response to NRC Suggestion 2.49 in the letter dated April 30, 2024, NEI revised text to Section 6.1.2, "Evolution of Dose Model Scenarios," in NEI 22-01, Revision 1, to address the selection of K_d values. Sorption coefficients are an important RESRAD input for estimating DCGLs and the dose from residual radioactivity at a site. The NRC must have reasonable assurance that the dose-based requirements in 10 CFR Part 20, "Standards for Protection Against Radiation," Subpart E, "Radiological Criteria for License Termination," are met to reach favorable decisions regarding license termination.

Issue:

In the March 6, 2025, public meeting, a discussion was held regarding the text in Section 6.1.2, which appears to emphasize the use of measurements to support the Kd values and does not provide a lot of detail on alternate approaches or the treatment of uncertainty with respect to potentially underestimating dose. DUWP-ISG-02 provides several methods and considerations for estimating Kd values for a site with the suggestion that a graded approach should be selected based on site conditions, data availability, dose modeling approach, and treatment of Kd inputs in RESRAD (e.g., site-based uncertainty versus selection 25/75 percentile based on generic tables).

Request:

Clarify in the NEI 22-01 guidance that measurements of sorption coefficients are not required at sites based on NRC's guidance in DUWP-ISG-02. Further discussions between NEI and the NRC staff are warranted on what is meant by site-dependent information and representativeness of site information to the appropriate media (e.g., contaminated zone or groundwater flow pathways).

Observations

1. As Low As Is Reasonably Achievable (ALARA) Evaluation

Section 4.3, "Remediation Levels and ALARA Evaluations," of NEI 22-01, Revision 1, contains added language from NUREG-1757 Volume. 2, Appendix N on satisfying the ALARA provision of 10 CFR 20, Subpart E. Staff want to reiterate that there are at least two options for demonstrating ALARA compliance for decommissioning sites. The first option is a performance-

based ALARA compliance, which can be found in NUREG-1757, Volume 2, Section 6.3.6, "Compliance Methods at the Time of Decommissioning." The second option is the predetermined compliance measure, which is already discussed in NEI-22-01. It appears from recent submittals that the predetermined compliance measure methodology may not be practical for some sites, while on the other hand, the performance-based methodology is most likely simply an extension of ALARA committee activities that were occurring during operation of the facility and so should be relatively easy to incorporate into an LTP. Note that both options are briefly discussed in section 6.3.6 of NUREG-1757, Volume 2, Appendix N. NEI 22-01, Revision 1, is focused on discussing the pre-determined compliance measure methodology, which is necessary for a proposed restricted release scenario. The NRC staff plan to clarify NUREG-1757 ALARA guidance in the future to make this more apparent.

Proposed Change:

Cite NUREG-1757, Volume 2, Section 6.3.6 and include a discussion on the option of performance-based ALARA compliance. The performance-based ALARA compliance method is likely an extension of ALARA committee activities that were occurring during the operation of the facility and, while a pre-determined compliance measure methodology is necessary for a proposed restricted release scenario, this is not the case for an unrestricted release scenario. Either a performance based methodology or a pre-determined compliance measure methodology are available for licensees.

2. <u>In-Situ Gamma Spectroscopy</u>

By letter dated April 30, 2024, (ML23103A329), the NRC issued the results of its technical review, providing comprehensive insights and observations on NEI 22-01, Revision 0. In response to the initial NRC Suggestion 2.9, NEI added additional language to Section 2.1.2, "Types of Concrete Characterization," of NEI 22-01, Revision 1. Further discussion was held during the March 6, 2025, public meeting with regards to the "proofing" of in-situ gamma spectroscopy measurements through the collection and analysis of actual soil samples.

Proposed Change:

Language could be included, when using in-situ gamma spectroscopy, to reflect that efforts should be made to ensure this instrumentation is used for relatively homogeneous materials. As such, preliminary scans using handheld gamma detectors may be practical to provide assurance that "hot spots" are not being averaged out due to wide field-of-view settings. If an elevation is detected, the instrument may need to be brought closer to provide a smaller field-of-view, to assess "hot spot" contamination levels. It is also necessary to provide a good model of the contamination profile in the material being analyzed, so some characterization may be required. Lastly, the efficiency model should be of the actual materials being analyzed while some of the criteria may be in "dry" units (e.g., pCi/g criteria in soil). Sampling may be necessary to assess the percent moisture or similar parameters to correct the measurement data for proper comparison

3. <u>Monitoring Plan for Groundwater to support FSS</u>

Chapter 5, "Final Radiation Survey Plan," of NEI 22-01, Revision 1, did not contain a section on plans for the inputs needed for the existing dose due to groundwater contamination. This information may include (i) the extent to which the monitoring network may capture the highest concentration in the groundwater, (ii) any additional analysis to compensate for the wells not

being optimally located, (iii) modification of or support that the sample analyses cover the initial suite of radionuclides or the reduced list of ROCs for groundwater, and (iv) the duration of monitoring and number of sampling events after the last disturbance of soil at the site.

Proposed Change:

Licensees should provide an evaluation of groundwater monitoring network and a plan for the sampling program that meets the needs specified in the LTP for the final status survey. This evaluation and plan should consider the need for trends in groundwater data over some period of time after completion of potential soil disturbance activities such as excavations, building demolition, or other demolition activities that may mobilize radionuclides. The period of time is site-dependent but generally on the order of two years. While the evaluation and plan are most directly applicable the common choice to use the maximum concentration at the site for the compliance calculation, aspects would also be applicable to sites where the licensee has chosen to apply sophisticated tools to estimate different concentrations to different areas of the site.

4. Site Characterization

Section 2.0, “Site Characterization,” of NEI 22-01, Revision 1, now includes site release process objectives taken directly from MARSSIM, including those objectives for site characterization. While much of this information is captured in subsections of NEI 22-01, the NRC staff notes that including additional information to fully capture the primary objectives of site characterization up front could be beneficial.
Proposed Change:

Other site characterization objectives that could be included up front are:

- Provide data needs identified from the Historical Site Analysis
- Provide initial site assessment for survey unit classification (survey “areas” as referred to in Section 2.1)
- Provide data to determine ROCs and Mixture Fractions and variations/boundaries for which this data applies (this should consist of samples of significant contamination found across the site)
- Provide site data sufficient to support site dose modeling being performed (e.g., K_ds, groundwater gradient/flow, etc.)
- Determine activity in reference areas/materials, if needed

Include the bulleted information in the next revision of NEI 22-01 in Section 2.0.

5. Objectives of Site Characterization

Section 2.1, “Objectives of Site Characterization,” of NEI 22-01, Revision 1, provides a description of site characterization and an overview of the ultimate objectives.

Proposed Change:

Add language to Section 2.1 stating that if continuing characterization is planned due to the inaccessibility of some site areas, the characterization section of the LTP should discuss how that data will be incorporated into the site decommissioning planning process as those areas

become available for characterization. If the initial evaluation is conservative compared to data collected by the continuing characterization, it can be justified that no change is necessary to the final status survey plans for that area, otherwise it should be communicated to the NRC and a possible LTP revision may be needed.

Language could be added to note that samples of the highest activity materials in the reactor vessel and surrounding concrete should be taken to obtain concentrations in support of potential discrete radioactive particles (DRP) assessments.

6. Surrogate Radionuclides

Section 2.5.5, "Surrogate Radionuclides," of NEI 22-01, Revision 1, includes a discussion of how to develop a surrogate relationship between hard to detect to easy to detect radionuclides.

Proposed Change:

Include the following comments.

- Surrogate radionuclides presume some similarity in movement/causality is present. This may not hold up if the radionuclides are of significantly different chemical properties (e.g., non-soluble vs soluble in groundwater). If there is a significantly different chemical property anticipated amongst the radionuclides, which may be the case for certain soluble radionuclides such as H-3, Tc-99, Np-237, etc, then separate chemical analytical analysis for these radionuclides may be necessary as opposed to assuming a surrogate relationship exists.

- The primary and surrogate radionuclides should have a well-defined relationship. Statistically, a R value greater than 0.7 is typically considered a well correlated relationship.

- Surrogate ratios are for a given survey area and may not apply across the whole site. If a surrogate ratio is derived from one survey area for example, from a sample drain line, it may not be extrapolated to the whole site. It is the burden of the survey planner to prove that the radionuclide ratios used to develop the surrogate approach are representative for the area that the surrogates are being used.

- Extending the use of surrogates beyond one inferred radionuclide is difficult to do. This difficulty arises from demonstrating that a consistent ratio exists between two radionuclides and adding more creates greater complexity so more sampling and analysis will be required for justification of multiple surrogates.

7. Ongoing Contamination Control

Section 4.5, "Ongoing Contamination Control of Remediated Areas & Equipment," of NEI 22-01, Revision 1, discusses isolation and control measures necessary until a survey area is released from the license.

Proposed Change:

Additional information could be included to note that while limited operations may occur within a previously surveyed area prior to license termination, care should be taken not to utilize it for storage or handling of impacted materials that originated outside of the survey unit, even if the materials were previously surveyed for release.

8. Final Radiation Surveys

Section 5.0, "Final Radiation Survey Plan," of NEI 22-01, Revision 1, contains an overview of the standard techniques used to conduct FSS at nuclear plants being decommissioned.

Proposed Change:

Add language to Section 5.0 that while the NRC may approve methods for the FSS, there are assumptions associated with an FSS plan of which the licensee should be aware. If actual circumstances vary from the assumptions, a modification to the methods is warranted and the NRC is accepting if more conservative and suitable methods are applied. For example, most scanning is established for a minimum area of diffuse contamination (e.g., 0.25 m^2). If smaller areas or discrete materials are present, then scanning procedures should be modified to be more sensitive to the contaminating material. These variations should be documented in the FSSR along with how the data quality objectives (DQOs) and measurement quality objectives (MQOs) were adjusted.

9. Media Specific DCGL

Section 5.1.2, "Radiological Release Limit Terminology," of NEI 22-01, Revision 1, added a statement regarding media specific DCGL, such as DCGLBP.
Proposed Change:

The NRC staff notes that it may be worth adding additional discussion to elaborate on this statement. The following language could be added to Section 5.1.2: Often the base case DCGLs are corrected for insignificant contributors and then smaller values corresponding to lower doses are allocated amongst the various media. The media specific DCGLs, such as DCGLBP, are often used to guide the remediation efforts and design the FSS. However, ultimately the 25 mrem/y $DCGL_W$ values are used for demonstrating compliance.

10. Reference Areas and Materials

Section 5.2.7, "Additional Building Surface FSS Challenges," of NEI 22-01, Revision 1, discusses determining both ambient background and media specific background.

Proposed Change:

NEI may want to include additional discussion that apparent biases can be very noticeable in final reported data if non-conservatively determining the ambient background/reference material concentrations. If most or all net results are negative, this is indicative of a non-conservative bias being present and effort should be made to better determine a suitable background. If no contamination is truly present, the instrument readings should fluctuate around zero with some positive and some negative. The average of the readings may be slightly negative but should be "zeroed" for demonstrating compliance with the dose criterion.

The NRC staff notes that NEI did not incorporate ideas from NRC Suggestion 2.21 in the letter dated April 30, 2024, regarding detector distance. Include language in Section 5.2.7 that holding the detector a sufficient distance away from the surface to eliminate betas may be inadequate for Sr-90/Y-90 (10 ft beta in air) and that background measurements should (either the sufficient distance or beta absorber method) be collected in areas away from suspected contamination.

11. Small Decision Units

Section 5.2.8, “Building FSS Techniques and Alternate Approaches,” of NEI 22-01, Revision 1, discusses experiences from the Zion plant regarding the use of soil as backfill.

Proposed Change:

The final version of DUWP-ISG-02 has guidance that can be cited for “small decision units.”

12. Removeable Activity

Section 5.2.9, “Survey of Non-RCA [Radiological Control Area] Buildings,” of NEI 22-01, Revision 1, contains a general discussion of “free release” surveys of non-RCA buildings if building surfaces are surveyed to unconditional release limits.

Proposed Change:

Include language in Section 5.2.9 that the MDC for smears is significantly less than the MDC for handheld fixed measurements. If “no measurable activity” is the criteria, then approval from the regulator should be sought that may allow <10% of the total fixed activity measurement MDC to be acceptable for removable activity. Typically, criteria for these surveys are based off of the sensitivity of handheld instrumentation.

13. Scanning/Instrument Sensitivity

Section 5.3.1, “Residual Radioactivity in Surface Soils,” of NEI 22-01, Revision 1, states that the technician walks slowly across the survey unit while swinging the detector slowly back and forth. If an increase in meter response occurs, the technician stops to confirm the increase.

Proposed Change:

Clarify that the “meter responses” discussed in this section are audible meter responses. Include language that operators should be aware and trained to ensure that scanning being performed is consistent with, or more conservative than that approved in the LTP. If discrete radioactive materials may be present, adjustments to the scanning process may be needed to ensure an adequate sensitivity.

14. Small Decision Units

Section 5.3.2, “Residual Radioactivity in Subsurface Soil,” of NEI 22-01, Revision 1, mentions how any soil excavation at the Zion plant created to expose or remove a potentially contaminated subgrade basement structure was subjected to FSS prior to backfill.

Proposed Change:

Additional information could be added to Section 5.3.2 explicitly advising FSS to be performed prior to backfilling. Additional surveys of backfilled materials may also be warranted. Surveying backfilled/impacted areas prior to covering with non-impacted materials/grading could avoid additional costs for subsurface sampling. Communicate with regulators if safety is a concern when sampling and use of alternative sampling methods are desired. Language could also be added to Section 5.3.2 noting that when using a GeoProbe or boring to get samples, the entire length of the core should be scanned with a gamma detector to verify that there is no "layer" of contamination that will be averaged out when compiling the sample from the core.

15. Removeable Activity

Section 9.2, "Final Status Report Content," of NEI 22-01, Revision 1, includes information taken from NUREG-1757, Volume 2, Section 4.5, "Final Status Survey Report," discussing minimum information that should be included in a FSS report along with other additional recommended information to be included.

Proposed Change:

Incorporate the following bullets in the "other information to be included in the survey unit and FSS reports," portion of Section 9.2.

- What existed in the survey unit
- What radiological operations occurred in the survey unit
- What remediation was performed or what structures removed
- Were any DRPs identified during FSS
- Was a FSS failed and had to be reperformed, and if so, what was the scope of any post FSS remediation
- Did scanning identify significant elevations that required investigation
- Were any elevations identified
- Are there any unusual characteristics that the reviewer should be aware of (e.g., two surveys reported for a survey unit...one of bottom of excavation and another of top of backfill,), etc.

16. Inspection Procedures

Section 9.3.1, "NRC Oversight," of NEI 22-01, Revision 1, discusses NRC inspection procedures. The NRC staff is currently revising most of their decommissioning inspection procedures. Revised procedures should be completed soon.

Proposed Change:

Adjust references accordingly.

17. Confirmatory Surveys

Section 9.3.2, "Confirmatory Surveys," of NEI 22-01, Revision 1, describes the process for conducting a confirmatory survey by the NRC or its contractor and includes the statement

"Confirmatory survey design should follow that of the approved licensee FSS design (scan speed, sample density, etc.)."

Proposed Change:

The language cited above should be changed to reflect that while a confirmatory survey attempts to replicate the licensee's survey design, it is not necessary to follow all aspects of the survey design. For example, if discrete objects or very small, elevated areas are found, they may elect to slow the scanning speed and detector height to ensure better sensibility. They may also elect to use traditional handheld detectors in lieu of in-situ gamma spectroscopy to characterize a structure.

18. Novel Technologies

Appendix A, "Application of Advanced Technologies to Show Compliance," of NEI 22-01, Revision 1, discusses advanced and novel survey technologies that could be used to show compliance.

Proposed Change:

Add language to Appendix A that if novel technology is planned for use for surveying or otherwise in the decommissioning process, the licensee should consider direct comparisons to traditional methodologies (e.g., sampling, handheld detector use, etc.). A white paper or topical report on the technology or methodology should be submitted as early in the process as possible because NRC understanding and acceptance may require additional research and verification.

19. DRPs

Section H.1, "Introduction," of NEI 22-01, Revision 1, states that DRPs are small, on the order of 1 mm, beta emitting, and although highly radioactive, produce a dose distribution that is both highly non-uniform and localized.

Proposed Change:

Add language to Section H.1 that DRPs may also be considered small chips of the bioshield materials or small pieces of metal which could exceed 1mm. Basically, any discrete material that should typically be picked up during contamination surveys and controlled. They are intrinsically different than the diffuse contamination discussed in MARSSIM and evaluated using RESRAD. The NRC is giving credit for a licensee's decontamination efforts if they have performed an adequate survey for DRPs in an area where a release has occurred. All DRPs should have been identified/removed prior to FSS. The NRC should be informed if any DRPs are collected during FSS and scanning survey methods for suspect survey units should be adjusted, to the extent practical, to be as sensitive as possible to ensure maximum sensitivity to DRPs. The NRC recognizes that DRP generation is intrinsic to the process of decommissioning a nuclear power plant. If contamination is robustly controlled at the source during decommissioning, then the operational concerns for DRPs should be sufficient to resolve concerns. If DRPs are present as residual radioactivity in the environment after site remediation

is complete, the NRC staff is focusing its concerns for decommissioning, as this poses an additional risk to the public/future site occupant.

20. DRP Detection Capability

Section H.3.1, “Detection Capability,” of NEI 22-01, Revision 1, discusses detection capabilities for DRP surveys.

Proposed Change:

Add language to Section H.3.1 to explain that if there are issues with the survey such as terrain difficulties, it may be beneficial to perform the survey more than once to minimize human error and general misses that may occur during the 1st scanning survey.

21. Advanced Instrumentation

Section H.3.2, “Advanced Instrumentation,” of NEI 22-01, Revision 1, discusses advanced instrumentation in relation to DRPs. Research is ongoing regarding continuously collected data evaluations which may be beneficial for measurements using some of these techniques.

Proposed Change:

Note that any advanced technique should be benchmarked to surveys using traditional hand-held detectors.

22. DRP Dose Assessment and Safety Significance

Section H.4.1, “DRP Dose Assessment and Safety Significance,” of NEI 22-01, Revision 1, states that “If inhaled DRPs are not considered to be able to impact the lungs but instead are trapped in the upper respiratory system and ultimately cleared through the GI tract (ingestion scenario).”

Proposed Change:

Change current language to Section H.4.1 to reflect that DRPs trapped in the upper respiratory system are either cleared to the GI tract or to the environment. The size of the particle will determine the clearance half-life and likelihood of where it will be cleared.

23. Discussion of Data Quality Assessment (DQA) topics

Section 2.5, “Radiological Data Assessment,” of NEI 22-01, Revision 1, has omitted several important ancillary DQA topics.

Proposed Change:

Adding a paragraph that discusses the control of analytical data could be beneficial. Such as how data is received, controlled, verified, and then released for use by the project. Licensees

could be referred to the DQO and DQA sections of MARSSIM and/or the U.S. Environmental Protection Agency guidance document on this topic for more information.

Also, to minimize the impact on the analytical results and provide consistency of those results, please include the following:

- Reviewing lab receipt reports to ensure that the samples were received as inspected (integrity, temperature, preservative, etc…)
- Verifying that the results are dry and homogenized so that results in pCi/g are relevant and reliable.
- Verifying that water samples were or were NOT filtered prior to analysis, as specified
- Verifying that samples were processed as expected (screened for particle size, rocks and organic material removed, etc…)
- Adequate sample volumes were received
- A review of the data for statistical outliers, with a review to include the data point or to eliminate it. The decision should be documented**.**

24. Data Trends

Section 2.5.1, “Identifying Data Trends and Statistical Observations,” of NEI 22-01, Revision 1, states that, “[t]he purpose of this trending is to ascertain which data sets can be grouped together in the event there are ROCs specific to such groupings.” This section also states that, “in evaluating the potential data trends, the reported measurement uncertainties should be considered for whether data should be included within a trend group.” Measurement uncertainties are considered in the DQA step and unreliable results are to be discarded. It is not clear what this has to do with a “trend group”.

Proposed Change:

Clarify these sentences. It is not clear what NEI would like to convey. Also, clarity is needed regarding the equation. The need to “grow-in” Am-241 is questionable, as most DCGLs include the progeny in their derivation.

25. Activity Fractions

Section 2.5.2, Determining Radionuclide Activity Fractions,” of NEI 22-01, Revision 1, discusses methods that can be used to determine activity fractions from the analytical data.

Proposed Change:

Adding an introductory paragraph to explain why the activity fractions need to be calculated would be beneficial. The introduction might also explain that these calculations should be performed among similar media with similar modes of contamination. For example, Cs-137:U-38 rations in wet soil will likely be very different from that in dry sand. Water samples will be completely different as well.

26. Insignificant Radionuclides

Section 2.5.3, “Determining Insignificant Radionuclides,” of NEI 22-01, Revision 1, discusses insignificant contributors that must be accounted for in the final operational DCGLs.

Proposed Change:

Provide clarity that this determination should be made for each media for which DCGLs will be determined (water, soils). Radionuclides may behave differently in various media (uranium may be mobile or immobile depending on the pH, U-234 can come o/o equilibrium in water, etc…)

27. Surrogates

Section 2.5.5, “Surrogate Radionuclides,” of NEI 22-01, Revision 1, discusses the selection of surrogate radionuclides in order to speed analysis, reduce analytical costs, and to account for hard to detect radionuclides. The approach described in this section would likely be inadequate as described, and might be rejected in the LTP review.

Proposed Change:

Provide clarity regarding why this could or should be done. Depending on the environment being sampled, the relationship between the two can be highly variable. In some cases, the relationship between two radionuclides might not be well established or not reliable. In those cases, no surrogate could be used, or a VERY conservative ratio would be selected and documented.

28. Supplement to the Environmental Report

In response to NRC Suggestion 2.40 in the letter dated April 30, 2024, NEI expanded the general guidance section, but NEI 22-01, Revision 1, does not reference the specific guidance documents regarding consultations.

Proposed Change:

Referencing guidance documents from Advisory Council on Historic Properties (ACHP), U.S. Fish and Wildlife Service (FWS), and National Oceanic and Atmospheric Administration would provide accurate descriptions of NRC’s environmental review process and consultation requirements under the Endangered Species Act (ESA) and National Historic Preservation Act (NHPA). Incorporate the reference documents into Section 8.7, “Threatened and Endangered Species,” and Section 8.9, “Cultural and Historic Activities Beyond the Operational Area.”

29. Protected Ecological Resources

The NRC must consider the effects of its actions on ecological resources protected under several Federal statutes and must consult with FWS and National Marine Fisheries Service (NMFS) or National Oceanic and Atmospheric Administration (NOAA) prior to taking action in cases where an agency action may affect those resources. These statutes include the Endangered Species Act (ESA), Magnuson-Stevens Fishery Conservation and Management Act (MSA), and National Marine Sanctuaries Act (NMSA).

NEI 22-01 Rev. 1 does not inform prospective applicants of the ecological consultations that NRC may be required to conduct or what statutes require such consultations; the types of information environmental reports should contain to facilitate and support each consultation; or the permits and authorizations that may result from these consultations. Additionally, NEI 22-01, Revision 1 includes incorrect information, such as stating that relocation of threatened and endangered species may be appropriate. The ESA forbids take of federally listed species, which includes any activity that would harass, hunt, shoot, capture, trap, kill, collect, wound, harm, or pursue an ESA-listed species, without an incidental take statement under ESA Section 7 or incidental take permit under ESA Section 10.

Proposed Change:

Review Appendix A, “Interagency Consultations for Ecological Resources,” in NUREG-1555, “Standard Review Plans for Environmental Reviews for Nuclear Power Plants, Supplement 1: Operating License Renewal,” Revision 2 (ML23201A227) and incorporating pertinent information into NEI 22-01, Revision 1. Although this document is tailored to operating reactor license renewal, the guidance pertaining to ecological consultations is relevant to any NRC action.

30. Accident Scenarios

Section 8.2, “General Guidance,” of NEI 22-01, Revision 1, contains a paragraph discussing the focus of the environmental report and the safety evaluation report, including a discussion of accident scenarios. The NRC staff’s environmental assessment (EA) or environmental impact statement (EIS) for an LTP does not discuss environmental impacts from accident scenarios.

Proposed Change:

The NRC staff suggests removing the discussion of accident scenarios from this section.

31. Environmental Justice

On April 10, 2025, the NRC Commission issued SRM COMSECY-25-0007 (ML251A00106), directing the NRC staff to “refrain from explicitly addressing [environmental justice] in its reviews under the National Environmental Policy Act of 1969 (NEPA) and ensure that those reviews fully comply with the requirements of NEPA.” Additionally, the Commission withdrew its Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions and its Environmental Justice Strategy (90 FR 17887).

Proposed Change:

Section 8.8, “Environmental Justice,” of NEI 22-01, Revision 1, includes a discussion on environmental justice. Note that environmental justice does not need to be included in the LTP application. The NRC staff will not be including environmental justice information in its environmental review.

32. NRC Letter Dated April 30, 2024, Comments Remaining to Be Addressed

No response to NRC Suggestion 2.50 “Critical Group”, and 2.51, “NRC Published Screening Values for Structures”, has been provided. NRC Suggestion 2.49, “Parameter Sensitivity Analysis”, appears to only be partially addressed.

Proposed Change:

Expanding the discussion would provide more clarity.

33. Citation of DUWP-ISG-02

NEI 22-01, Revision 1, cites the draft version of NRC Interim Staff Guidance, DUWP-ISG-02, "Radiological Survey and Dose Modeling of the Subsurface to Support License Termination," published in October 2023. A final version was issued on September 27, 2024 (ML24197A219).

Proposed Change:

Consider updating the references in NEI 22-01 to the final version of this guidance

34. Editorial

Section 5.3.4, "Groundwater Assessments," of NEI 22-01, Revision 1, references Section F.3, but this reference should point to Section F.4. Section F.2.1, "Connecticut Yankee," has the following added text that says "Additionally, for those radionuclides where the K_d does not have a significant impact on the dose assessment…."

Proposed Change:

This paragraph is about sensitive parameters in general. Given the context of this sentence, the term "K_d" should say "parameter" instead.