

September 28, 2001

Paul H. Genoa, Senior Project Manager
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1776 I Street, NW, Suite 400
Washington, DC 20006-3708

SUBJECT: NUCLEAR ENERGY INSTITUTE LICENSE TERMINATION TASK FORCE
GUIDANCE CLARIFICATION QUESTION AND ANSWER (Q&A) INITIATIVE,
Q&As 1-10

Dear Mr. Genoa:

On July 16, 2001, you submitted the first ten questions and answers (Q&As) that were developed by the Nuclear Energy Institute's (NEI's) License Termination Task Force, in an effort to clarify existing guidance associated with the License Termination Rule (10 CFR 20 Subpart E). We have completed our review of this first set of Q&As and have found that the proposed approaches, or answers to the questions, warrant further development. In general, the staff believes that the answers either did not adequately consider U.S. Nuclear Regulatory Commission (NRC) regulations and existing guidance, or the answers lacked a sound technical basis.

As discussed in the public workshop on the NMSS Decommissioning Guidance Consolidation Project, held on June 1, 2001, we have attached to this letter a summary of our general concerns with the individual Q&As. NEI is welcome to revise the Q&As to incorporate the attached comments and submit them to NRC for reconsideration. If we find the revised Q&As to be acceptable, we will publish them as an Appendix to the draft of Volume 2 of the NMSS Decommissioning Policy & Guidance Update and Consolidation. At that time, the public will have an opportunity to provide formal comments on the Q&As.

We look forward to working with you to develop acceptable approaches for addressing the technical issues involved with license termination. If you have any questions regarding this response, please contact me at (301) 415-7234, or you may contact Stewart Schneider of my staff at (301) 415-7765.

Sincerely,

/RA/

Larry W. Camper, Chief
Decommissioning Branch
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Attachment: Review of Q&As 1-10

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**REVIEW OF NUCLEAR ENERGY INSTITUTE'S LICENSE TERMINATION TASK FORCE
Q&AS 1-10**

Question 1: During the process of developing an initial radionuclide profile for characterizing commercial light water reactor sites, which nuclides are typically considered?

Answer: The nuclides that need to be considered are listed below:
Contamination Suite: H-3, C-14, Mn-54, Fe-55, Co-57, Co-60, Ni-59, Ni-63, Sr-90, Nb-94, Tc-99, Sb-125, Cs-134, Cs-137, Eu-152, Eu-154, Ce-144, Pu-238, Pu-239/240, Pu-241, Am-241, Cm-243/244
Activation Suite: H-3, C-14, Fe-55, Ni-63, Co-60, Cs-134, Cs-137, Eu-152, Eu-154, Eu-155

Comment: The "Activation Suite" included in the Answer is not responsive to issues identified in NUREG/CR-3474, "Long-Lived Activation Products in Reactor Materials," such as considerations that would result in the presence of contamination of concrete and other material surfaces. The "Contamination Suite" is similarly not responsive. Also, citing a presentation made at the 2001 Annual Health Physics Society Meeting is not considered to be an appropriate reference.

Question 2: When developing gross DCGLs for the Final Status Survey, which detected radionuclides can be de-selected from further consideration?

Answer: For radionuclides that are detectable, it is acceptable to de-select those that collectively contribute less than 10% of the total dose.

Comment: The Answer implies that the 10% de-selection rule for detectable radionuclides is discussed in 10 CFR 20.1402, "Radiological criteria for unrestricted use." This is an incorrect implication, as 10 CFR 20.1402 makes no reference to this procedure. However, discussions related to this topic are included in NUREG-1727, "NMSS Decommissioning Standard Review Plan." Furthermore, the regulations cited in the Basis refer to regulations concerning *occupational* doses, whereas the Final Status Survey is used to demonstrate compliance with *public* doses under license termination. This comparison is confusing. Finally, NRC Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," is related to effluent releases; the discussion provided seems out of place.

Question 3: For the building occupancy scenario, what dose modeling pathways need to be considered for grouted pipe embedded in buildings (e.g., walls, ceilings, and floors)?

Answer: Only the direct dose contribution to building occupants needs to be considered for grouted, embedded pipe.

Comment: Vents and openings in the pipe are not adequately discussed, nor is the durability of the grout discussed. The durability of the grout relative to the concrete, in which the pipe is embedded, needs to be addressed. Since grout degradation prior to that of the concrete could occur, the argument that beta or alpha emitters would not contribute to the dose is no longer valid.

Question 4: What is an acceptable level of residual surface contamination on grouted, embedded pipe?

Answer: In addition to accounting for the direct shine dose pathway as discussed in question 3, grouted, embedded pipe containing an average contamination level of 100,000 dpm/100 cm² and a maximum of 1,000,000 dpm/100 cm² is acceptable.

Comment: The discussion should make it clear that an average contamination level of 100,000 dpm/100 cm² and a maximum of 1,000,000 dpm/100 cm² is acceptable as residual radioactive material left inside the surfaces of the pipe. However, when grouted embedded pipes are disturbed, the dose to an individual from alpha and beta emitters needs to be considered in addition to the direct shine pathway. Thus, the discussion in the Basis is incomplete and should be revised to include the alpha and beta exposure pathways, since a cut pipe could expose workers to removable and airborne contamination.

Question 5: What methods may be used to survey embedded pipe?

Answer: A recent study by EPRI evaluated several techniques that proved acceptable for surveying the radiological contamination on the inside of embedded pipe. Measurement techniques included pipe crawlers, gamma-ray scanners, dose rate measurements with dose-to-curie computations, scraping samples with radiochemical analyses, and smear samples with radiochemical analyses.

Comment: The Answer/Basis is incomplete. The discussion should include what pre-survey requirements would need to be imposed before conducting such surveys. Also, the removal of contaminated sludge and sediments needs to be addressed prior to the analysis. Survey design data quality objectives need to be considered, as such systems often pose challenging situations with respect to implementation. Finally, endorsement of an Electric Power Research Institute report as a cited reference would need to be evaluated by NRC staff.

Question 6: What are acceptable methods to employ in the determination of soil k_d values used in site-specific DCGL determination?

Answer: As indicated in NUREG-1727, Appendix C, Section 7.2.3, site-specific k_d values for soil may be determined by the following:

- (1) Identify site soil type(s). These may be found through historical records, literature sources, or direct geological investigation.
- (2) Using the soil type(s), identify the k_d range using available literature.
- (3) When using deterministic dose modeling codes, compare the k_d ranges with the default k_d value. If the range encompasses the default, then utilize the default. If, however, the default falls outside the range, then site-specific values may need to be developed. When using probabilistic dose modeling, which supports the direct input of a range of values, enter the values directly.

Comment: Both the DandD and RESRAD modeling programs use default screening values. However, it is still the responsibility of the licensee to demonstrate that the default k_d values used by either of these programs is applicable to the licensee's site. This critical point needs to be emphasized. In addition, the question asks, "What are the acceptable methods..." The answer describes only one method, a literature search. Please note that merely indicating that a site-specific value may need to be developed is vague and does not address the question. Either the question should be reworded to limit its scope or the answer should be expanded to address other acceptable methods.

Question 7: What are acceptable methods to employ in the determination of concrete k_d values used in site-specific DCGL determination?

Answer: As indicated in NUREG-1727, Appendix C, Section 7.2.3, site specific k_d values for concrete may be determined by the following:

- (1) Perform a literature search (Krupka, K.M., and R.J. Serne, 1998).
- (2) If k_d values for the radionuclide(s) of interest are not found in the literature, evaluate elements of similar chemical characteristics.
- (3) If no correlation can be found, a sensitivity analysis may be performed to determine a reasonably conservative k_d value.
- (4) If sensitivity analysis shows this k_d value to be critical, then empirical evidence may be required.

Comment: Same comment as that for Question 6 above.

Question 8: Is it acceptable to define the process and acceptance criteria for demonstrating that instruments are sufficiently sensitive rather than providing the sensitivities for all instruments in the LTP?

Answer: Yes, it is acceptable to define the process and acceptance criteria rather than provide a comprehensive list of all the instruments.

Comment: NRC staff agrees that the process should be defined. However, the Answer/Basis should also state that the licensee needs to provide an example that demonstrates the licensee's understanding of how the constituents of the total instrument efficiency are evaluated and applied to specific situations.

Question 9: Is characterization data required in the LTP for structures, components, and soils that will be removed from the facility prior to license termination?

Answer: No. In general, the only characterization data necessary is that which supports the financial and environmental aspects of the license termination. However, detailed characterization data need not be included in the License Termination Plan (LTP) for structures, components, and soils that will be removed from the facility.

Comment: The discussion provided for this Answer/Basis appears to contradict the thought process given under Question 1 where characterization is considered to be an important component of the License Termination Plan. The text should also explain that existing licensee programs (i.e., those procedures/programs developed specifically for an operating nuclear power plant) may need to be modified to include decommissioning related activities. In addition, a description of the hydrology of the site will likely be required to support the derived concentration guidelines (DCGLs) for soils. If soil screening DCGLs are proposed, the licensee will need to demonstrate that there is no groundwater contamination in the subject areas, as the screening DCGLs were derived based on this assumption. If site-specific soil DCGLs are proposed, hydrogeologic characterization will likely be required to support the selection of the model(s) and the associated parameters, that are used to derive the DCGLs.

Question 10: How much characterization data is required, in addition to the Historic Site Assessment, to support initial classification where structures, components, and soils require remediation?

Answer: In general, areas classified as Class 1 do not require characterization data to support that classification.

Comment: NRC staff does agree that for the **initial classification** of an area as Class 1, characterization data is not required to support that classification, if the Historical Site Assessment (HSA) or process knowledge provide the details to meet the data quality objectives of Multi-Agency Radiation Survey and Site Investigation Manual. However, the staff believes that the above Answer may lead licensees to the incorrect conclusion that no characterization data (besides what may be drawn from the HSA and process knowledge) is required for Class 1 areas, in general. As part of NRC's determination that the design of a Class 1 Final

Status Survey is adequate, appropriate data are needed to support concerns related to, for example, the elevated measurement comparison, DCGL implementation, and use of surrogate ratios. In addition, as discussed in response to Q&A 9, hydrogeologic characterization may be required to justify the DCGLs chosen/derived for Class 1 areas. Therefore, if the HSA contains incomplete information, in regard to characterization, it is necessary for the licensee to provide this and any other supplemental information in the LTP to support the basis for the design of the Final Status Survey plan. The Answer should be revised to reflect this.