



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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JAN 07 1992

Mr. Bryan A. Roy, Manager
Engineering and Technical Resources
Scientific Ecology Group, Inc.
P.O. Box 2350
1560 Bear Creek Road
Oak Ridge, Tennessee 37831-2530

Dear Mr. Roy:

Enclosed is the NRC Request for Additional Information (RAI) #2, regarding Topical Report (TR) WM-20, which we discussed in our telecon on January 6, 1992. Your prompt attention to this matter would be greatly appreciated, as it would help us to complete the Interim Technical Evaluation Report on the subject TR. Please fax a copy of your responses to Jennifer Davis, Mail Stop 5E4. Our new fax numbers are (FTS) 964-2259, or (FTS) 964-1137. If you have any questions about RAI #2, please call me at (FTS) 964-2697.

Sincerely,

(Original Signed by _____)

B. Jennifer Davis, Materials Engineer
Technical and Special Issues Section
Low-Level Waste Management Branch
Division of Low-Level Waste Management
and Decommissioning
Office of Nuclear Material Safety
and Safeguards

Request for Information #2
January 6, 1992

SEG (nee LN Technologies) Topical Report
Docket Number WM-20

I. Solidification (General)

A. Sample Preparation

- 1a. What technique is used for capping the test specimens prior to compressive strength testing?
- 1b. How would the capping process influence compressive strength results?
- 1c. If ASTM C617 (Standard Practice for Capping Cylindrical Concrete Specimens) was used, which capping material was used?
2. On pages 21 and 22 of the Topical Report (TR), the samples for biodegradation testing and thermal cycling are described as being "unspiked". What does this mean?
3. What temperatures were the 28 day cure samples subjected to during curing?

B. Testing Methods

3. What method was used to ensure that the test specimens subjected to thermal cycling were allowed to come to thermal equilibrium at the high and low temperature limits during testing?

II. Powdered Resin: Ecodex P203H, Formula A and Ecodex P202H, Formula D

A. Waste Characterization - Qualification Samples

4. Page 34 of the TR states "The Ecodex P202H is a mixture of cation and strong base anion resins in the H^+OH^- form and a cellulosic fibrous material (approximately 35% by weight). The Ecodex P203H is composed of the same materials as the P202H, but differs in the cation-to-anion ratio and contains a greater amount of fibrous material (up to 50% by weight)."
- 4a. What is the cation-to-anion ratio for each resin type (Ecodex P202H and Ecodex P203H) used in the manufacture of the qualification test samples?
- 4b. What is the level of depletion for each resin type (Ecodex P202H and Ecodex P203H) used in the manufacture of the qualification test samples?
- 4c. How were the ion exchange resins used in the qualification samples depleted?
5. What was the pH of the representative "waste" used for qualification sample manufacture?

6. What were the approximate tolerances/ranges for the ingredients used to manufacture the qualification samples?

7. What was the temperature of the representative "waste" used for qualification sample manufacture?

B. Formulations - Qualification Samples

8. In Table D.4.a of the TR (Appendix D), the amount of hydrated lime in formulations A-D of the Powdex PCH is 1.5g. The amounts of hydrated lime in formulations A-D of Ecodex P202H are 9.0g, 8.8g, 8.8g and 8.8g respectively. However, in Enclosure 3 to the March 23, 1989 Submittal (Responses to Request for Additional Information (RAI) # 1), the amounts of lime in formulations A-D of the Powdex PCH are 9.0g, 8.8g, 8.8g and 8.8g, respectively, while the amount of lime in each of the formulations A-D of Ecodex P202H is listed as 1.2g. All other component quantities are consistent.

8a. Which table is correct with regard to the amounts of lime in the Ecodex P202H formulations?

8b. If Enclosure 3 to the March 23, 1989 Submittal is correct, is the lime quantity 1.2g or 1.5g?

C. Waste Characterization - Actual Waste/PCP Program

9. In the Nov. 15, 1988 Response to RAI #1, the response to RAI Question 25 states in part: "This will... adjust the water and cement quantities to compensate for corrosion products and other solids present in the waste."

9a. What are the controls/tolerances on corrosion products and other solids in the waste?

9b. What are the "other solids" likely to consist of?

9c. How were these impurities accounted for in the qualification program?

10. Are there any controls/limits for the level of depletion for the resins that can be solidified?

11. What is the allowed temperature range for PCP samples/solidifications?

D. PCP Instructions

12. In the Nov. 15, 1988 Submittal (Response to RAI #1), the response to RAI Question 39 states in part: "The water content is then adjusted by adding or removing water to match the water content of the laboratory test data presented in the topical report."

If the waste water content (already in the solidification liner) is higher than the final desired water content, what process is used to remove the excess?

13. In the most recent (Nov. 27, 1991) Response to RAI #1, the response to RAI Question 36 is incomplete. Please provide the full response.

III. Filter Encapsulation

A. Formulation

14. In Enclosure (3) to the March 23, 1989 Response to RAI #1, the formulas for the concrete and the cement grout used for the filter encapsulation liner are listed as shown below:

	Water(ml)	Stone(g)	Cement(g)	Sand(g)
Concrete	9.6	41.6	20.1	28.7
Cement Grout	---	170	---	100

In Enclosure (3) of the August 18, 1989 Submittal (Response to RAI #1), the formulas for the concrete and the cement grout used for filter encapsulation are listed as shown below:

	Water(ml)	Stone(g)	Cement(g)	Sand(g)
Concrete	9.6	41.6	20.1	28.7
Cement Grout	100	---	170	---

Is 100ml of water and 170g of cement the correct formulation for the cement grout?

B. Material to be Encapsulated

15. The "Procedure for Using the SEG Filter Encapsulation Liner at Diablo Canyon" (SS-034, Rev. K), and the "Design Analysis Report for the LN Filter Encapsulation Liner" (LN-87-003) both indicate that the liner may be used to encapsulate "any acceptable waste in accordance with 10 CFR 61 and disposal site requirements, i.e. ion exchange resins and filter media" in addition to contaminated mechanical filters. What is the rationale for permitting these other types of wastes to be encapsulated?

16. What controls are in place to ensure that the contents of the FE Liner do not weigh more than 2300 lbs as specified in paragraph 2.3.1 of document LN-87-003?

The interim approvals will allow SEG to use the six waste/binder formulations for twelve months. During that time, SEG will perform additional waste form qualification testing, and will revise the PCP documents in accordance with the revised Technical Position on Waste Form. SEG will submit these new data and the revised PCP documents to NRC for evaluation, before the end of the 12-month period. NRC will issue final approvals for those recipes for which the additional testing is successful, meaning that the data confirm that the waste forms will meet the criteria described in Appendix A of the Technical Position. If the additional test data indicate that the cementitious waste forms will not meet these criteria, the formulations will be changed to "disapproved" status.

In this time period, SEG will also have the opportunity to execute the full series of Appendix A qualification testing on the "not-approved" waste forms listed in Table III, to update the applicable PCP documents, and to devise and qualify a design for filter encapsulation in grout. These formulations will then be evaluated by the NRC, and will be classified as either "approved" or "disapproved."

The topical report should be revised to include all appropriate information that was developed during the technical review. Proprietary and non-proprietary interim approved versions of the topical report should be submitted to the NRC within 60 days of this letter. They should be titled with the designations "P-IA" and "NP-IA," indicating proprietary-interim approved, and non-proprietary interim approved, respectively. The topical report should not include information on the "not-approved" formulations at this time. Applicable information should be submitted in the final version.

Final approval of the topical report is based on submission and approval of a final revised topical report (proprietary and non-proprietary versions) to include all appropriate information that was developed during the technical review and confirmatory testing.

Final approval of the interim approved and "not-approved" waste/binder formulations are subject to the following additional conditions, as set forth in the TER:

- (1) During the period of interim approval, SEG will perform additional qualification testing on the six interim approved waste streams, as described in Section 5.3 of the TER.
- (2) SEG will revise the PCP documents in accordance with the conditions in Sections 4.7.1 and 5.4 of the TER.
- (3) For the low-PE powdered resin, the filter sludge, and the sodium sulfate with mixed solids formulations, SEG will prepare, store and test surveillance specimens in accordance with Section 5.5 of the TER.
- (4) For final approval of the "not-approved" formulations, SEG shall comply with (2) and (3) above, and shall perform additional qualification testing in accordance with Section 5.3 of the TER.