

MAR 3 1992

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MEMORANDUM FOR: Gary Comfort, Project Manager
Fuel Cycle Safety Branch
Division of Industrial
and Medical Nuclear Safety

FROM: Mary Adams, Civil Engineer
Low-Level Waste Management Branch
Division of Low-Level Waste Management
and Decommissioning

SUBJECT: REVIEW OF REPLACEMENT WASTE QUALIFICATION NOTEBOOK,
WEST VALLEY DEMONSTRATION PROJECT, SLUDGE WASH CEMENT

I have reviewed the subject Notebook, formally titled Waste Form Qualification Program for Cement Solidification of Sludge Wash Liquid, which I received on February 10, 1992. This version of the Notebook was provided by the West Valley Project Office as a replacement for the original Notebook, that was received and reviewed by the Low-Level Waste Management Branch last fall. The replacement is necessary because the original sludge wash cement recipe was unsuccessful in producing a satisfactory and stable waste form.

This replacement Notebook contains plans for qualification testing of several different cement recipes. The Notebook is not complete; it is arranged in a tabular format with several blank tabs which will be filled in as the documents are completed. Because the documents are preliminary, I have not sent them to Brookhaven National Laboratory (BNL) for contract review. I plan to send the Notebook to BNL when the remaining test plans are submitted, but I do not plan to wait for the Test Summary Reports before requesting the Nuclear Regulatory Commission's contractor review.

The documents included in the Notebook so far are the following:

WVNS-TPL-70-12	Test Plan, Cement Waste Form Qualification of Sludge Wash Liquids
WVNS-TRQ-034	Test Request, Production of Cement Product from Actual Laboratory Sludge Wash Liquid
WVNS-TP-034	Test Procedure, Confirmatory Cube
WVNS-TRQ-044	Test Request, Waste Form Qualification Work for Sludge Wash Liquids
WVNS-TP-044	Test Procedure, Procedure for Waste Form Qualification Work for Sludge Wash Liquids
WVNS-TRQ-045	Test Request, Multivariant Testing of Cement Waste Forms Using Simulated Sludge Wash Solutions

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Documents that are not yet in the Notebook are TP-045, TRQ- and TP-046 (no titles), and the Test Summary Reports (TSRs) that correspond to each TRQ/TP set. It was anticipated that these additional documents would be completed and submitted as the testing was performed; however, early indications are that the new recipes are not producing satisfactory waste forms. Ron Palmer of West Valley Nuclear Services (WVNS) reported to the NRC by telephone on February 13, 1992, that the new cement recipe waste forms were losing strength under water immersion, as did the original recipe. For this reason, the documents in the Notebook may be revised again, and the additional documents may be delayed.

My comments on the documents received so far are enclosed. Please call me if you have any questions about my comments, or if you receive any new information about the qualification testing plans or test results.

(Original Signed by _____)

Mary Adams, Civil Engineer
Low-Level Waste Management Branch
Division of Low-Level Waste Management
and Decommissioning

Enclosures: As stated

Distribution: Central File JShepard NMSS r/f
RBangart WBranch JAustin JSurmeier PLOhaus
JKane JKennedy MAdams LLWM t/f LLWB r/f

PDR YES
PDR NO Category: Proprietary ___ or CF Only ___
ACNW YES NO

SUBJECT ABSTRACT: REVIEW OF REPLACEMENT WASTE QUALIFICATION NOTEBOOK, WEST VALLEY DEMONSTRATION PROJECT, SLUDGE WASH CEMENT
*See previous concurrence

OFC :LLWB :LLWB *ADK* :LLWB *PAK*

NAME: MAdams/pn :JKane :PLOhaus

DATE: 3/2/92 : 3/2/92 : 3/2/92

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Mary Adams, Civil Engineer
 Low-Level Waste Management Branch
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Distribution:	Central File	JShepard	NMSS r/f
RBangart	WBrach	JSurmeier	PLohaus
JKane	JKennedy	LLWM t/f	LLWB r/f

PDR YES
 PDR NO
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OFC :LLWB <i>mga</i>	:LLWB	:LLWB
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JKane

REVIEW COMMENTS ON

REPLACEMENT

WEST VALLEY WASTE FORM QUALIFICATION PROGRAM
FOR CEMENT SOLIDIFICATION OF SLUDGE WASH LIQUID

This review includes the following Test Plan (TPL), Test Requests (TRQs), and Test Procedures (TPs):

WVNS-TPL-70-12	Test Plan, Cement Waste Form Qualification of Sludge Wash Liquids
WVNS-TRQ-034	Test Request, Production of Cement Product from Actual Laboratory Sludge Wash Liquid
WVNS-TP-034	Test Procedure, Confirmatory Cube
WVNS-TRQ-044	Test Request, Waste Form Qualification Work for Sludge Wash Liquids
WVNS-TP-044	Test Procedure, Procedure for Waste Form Qualification Work for Sludge Wash Liquids
WVNS-TRQ-045	Test Request, Multivariant Testing of Cement Waste Forms Using Simulated Sludge Wash Solutions

Blank tabs are provided in the Notebook for documents to be provided later, as they are completed, including TP-045, TRQ- and TP-046, and the Test Summary Reports (TSRs) that correspond to each TRQ/TP set.

1. TPL-70-12, Section 4.0

The series of TRQ-, TP-, and TSR-XXX discussed in subsections 4.2 through 4.5 should be identified by number and/or title.

2. TP-034, Section 6.1.2

If solids form during evaporation and the percent solids are within the specified range, the concentration will be filtered and the solids analyzed for the same parameters as the concentrate. It is not appropriate to analyze filtered solids for total dissolved solids and total suspended solids, but they should be analyzed for total solids or moisture content.

3. TP-034, Sections 6.1.16 and 6.1.17

The clause, "after weighing the cube, tare the scale to zero," in section 6.1.17 should be moved to the end of subsection 6.1.16, so that the scale is tared before the cement is added to the cube mold.

Enclosure

4. TP-034, Section 6.1.23

The reference to Section 6.3.22 should be corrected to refer to Sections 6.1.25 and 6.1.26.

5. TP-034, Section 6.1.17

This section should include instructions to weigh the cube after curing, so that the dry density can be calculated.

6. TP-034, Attachment A

This Table should clarify that the analytical results are for waste forms prepared with 29-33 % solids, to avoid confusion with the other recipes.

7. TRQ-044, Sections 2.1 and 2.2

These subsections should clarify that the instrumented form should be prepared several days before the molds are filled, so that the temperature profile determined in Section 2.1 is available for determining the curing temperature for the cast cylinders.

8. TRQ-045, Section 2.1 and Table 2

Table 2 indicates that the "nominal" nitrate:nitrite ratio is approximately 1.18, calculated from the atomic weights of the nitrite in the sodium nitrite and the nitrate in the sodium, potassium, and calcium nitrates. Section 2.1 specifies a nominal proportion of 1.21, with a low of 1.14 and a high of 1.28. It appears that the calculations may have inadvertently omitted the atomic weight of the 4 water molecules attached to the calcium nitrate cement additive. These calculations should be checked and corrected if necessary.

Section 2.2 should also clarify how the ratio will be varied, i.e., by the increase of nitrate, decrease of nitrite, or both. It appears that the ratio will be varied by the changes in the amount of calcium nitrate only.

9. TRQ-045, Table 1

This test design includes one set of duplicate variations of the sulfate content only (trials 13 through 16), which is also the only single-variable test. The TRQ or the TSR for this test should discuss why this one single-variable test was duplicated.

The test design includes a duplicate set of trials for variables 2-5 (trials 9 through 12 and 33 through 36). These sets vary the nitrate/nitrite ratio and the calcium nitrate fraction in cement. The Test Procedure should provide clear instructions for the preparation of these specimens, specifically how the ratio is increased while the calcium nitrate is decreased.

The test design does not include sets for variables 1-3, 3-5, and 4-5, indicating an assumption that there is little interaction between these constituents. Combination 3-5, sulfate and water/cement ratio, appears to be an important variation that should also be tested.