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MEETING REPORT

SUBJECT: Review of Safety Analysis Report for Vitrification Operations and High-Level Waste Interim Storage
20-5706-002

DATE/PLACE: West Valley Demonstration Project
November 1-3, 1994

AUTHORS: Emil Tschoepe and Prasad Nair

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PERSONS PRESENT:

The participants were P. Nair and E. Tschoepe from the Center for Nuclear Waste Regulatory Analyses (CNWRA) and G. Comfort and K. Hardin from the Nuclear Regulatory Commission (NRC)-NMSS/HLW. The list of all the attendees at the review is presented in Attachment A.

BACKGROUND AND PURPOSE OF MEETING:

The purpose of this meeting was to review the second batch of West Valley Demonstration Project (WVDP) responses to the comments on the Draft WVDP Safety Analysis Report (SAR) for the Vitrification Operations and High-Level Waste Interim Storage (WVNS-SAR-003) generated by the NRC/CNWRA and U.S. Department of Energy (DOE) Technical Review Group (TRG) and other DOE entities. The CNWRA is supporting the NRC in this SAR review.

The CNWRA's comments on the draft SAR were transmitted to NRC on July 15, 1994, and the NRC subsequently combined CNWRA comments with NRC comments for transmittal to the DOE TRG. A joint Review Comment Record (RCR) was produced by the DOE TRG, and the RCR included comments from the NRC as well as the TRG and other DOE organizations (EH-11, EH-12, EH-331, EM-23, and EM-323). The WVDP responses to 160 of these comments were reviewed during a previous meeting (October 4-6, 1994). A second batch of responses was received from West Valley after that meeting, and these responses were reviewed and discussed at the subject meeting at West Valley. A copy of the agenda is attached to this report (Attachment B). The revised RCR (dated October 28, 1994), which incorporates WVDP responses available as of that date, is available for review from the authors of this report.

SUMMARY OF PERTINENT POINTS:

Comments in the RCR were organized by order of the chapters in the Draft SAR-003, and discussions of comments also followed the order of the Draft SAR-003. NRC comments were retained separate from those of the various DOE review groups. The revised RCR of October 28, 1994, contained West Valley responses to 177 comments, in addition to those previously received in the September 30, 1994, version. Only those comments to which the WVDP had most recently responded and those in open status from the previous meeting were discussed at the meeting, although discussions on general categories of comments and issues were also addressed. After acceptability of individual WVDP responses were discussed by each commenter, the discussion was opened to the entire group in attendance. In some cases,

the response to the comment was determined during discussion to be satisfactory, and judged to be "conditionally acceptable," pending appearance of the agreed resolution in the final SAR. For nonmandatory (editorial) comments, a satisfactory response to the comment allowed the comment to be categorized as "accepted." In other cases, when the WVDP response was determined to require addition or change to be satisfactory, the comment resolution status was left as "open."

To date, West Valley Nuclear Services (WVNS) has responded to 339 of the total of over 800 comments in the RCR. Of those responses, 210 have received acceptance or conditional acceptance, and 2 comments have been withdrawn. At the meeting, 177 new WVNS responses were reviewed, leaving over 500 comments requiring WVNS response.

The following is the summary of the discussions of relevant issues arising during the meeting.

1. The October 28, 1994, version of the RCR included seven new comments. The new comments dealt with issues of interfaces between components covered in SAR-003 and other SARs, identification of references, inconsistencies in nomenclature, definition of safety classification, and the need for Technical Safety Requirements (TSRs). No new responses to comments were available for this meeting.
2. **Chapter 1: Introduction and General Description of Vitrification Facility**
This section provides a general description of the vitrification process and facility and describes the SAR. No new responses to comments on this chapter were available for this meeting.
3. **Chapter 2: Summary Safety Analysis**
This chapter summarizes the natural phenomena and characteristics associated with the West Valley site and nearby facilities. Safety impacts of normal operations, abnormal operations, and potential accidents are also summarized. These topics are considered in greater detail in subsequent SAR chapters. No new responses to comments were available for this meeting.
4. **Chapter 3: Site Characteristics**
This chapter lists the characteristics of the West Valley site and the natural phenomena associated with it. The details of the topics in the list are covered under a separate SAR, SAR-001. These include seismology, hydrology, and meteorology. Effects of nearby, unrelated human activities are also considered. All three comments submitted on this section received WVDP response, and one comment was closed as the response was accepted.
5. **Chapter 4: Principal Design Criteria**
This chapter identifies and discusses the principal engineering design criteria and design bases for the structures, systems, and components (SSCs) of the Vitrification Facility. WVNS provided two new responses to the 107 comments on this chapter, leaving more than 60 percent yet to receive a response. Neither of the 2 new responses was directed to any of the 22 comments originating from the NRC/CNWRA. Concerning comments other than those originating from the NRC/CNWRA, the WVDP did not yet respond to Comment 4.0-056 (JVP-032). This comment questioned the SAR estimate of 29,000 curies of Cs-137 per canister, for 270 to 300 canisters, since the Tanks 8D-1 and 8D-4

reportedly contain a total of about 14 million curies. Another comment yet to receive a response is 4.0-044, concerning the use of radiation-hardened equipment in-cell, such as equipment anchors.

6. **Chapter 5: Vitrification Facility Design**
This chapter is the longest chapter in the Draft SAR, and it is intended to present information on the design and engineering of SSCs that support safety in operation of the vitrification facility. Over 220 comments on chapter 5 were in the RCR, and the WVDP has responded to 35. Of the 20 new responses, 3 were in regard to NRC/CNWRA comments. A number of comments related to seismic performance of components did not receive response yet, and they are not expected to be resolved until the source of the WVDP Design Basis Earthquake (DBE) is adequately described. One WVDP response, to Comment 5.0-035, cannot be resolved until receipt of an EBASCO 1994 seismic analysis of vitrification facility response to an "evaluation basis earthquake." The EBASCO analysis, which is not expected before January 1995, describes soil structure interaction and damping. Two new comments on chapter 5 were generated since the previous (October) meeting by reviewers other than the NRC/CNWRA.
7. **Chapter 6: Vitrification Facility Process Systems**
The systems and equipment by which the sludge/liquid radioactive high-level waste (HLW) is converted into borosilicate glass in stainless steel canisters and temporarily stored at the WVDP are described in this chapter. New responses to comments in this chapter numbered 11, of which one was directed toward an NRC/CNWRA comment. The WVDP has, to date, responded to 36 of the 109 comments on this chapter and to 7 of the 38 submitted by the NRC/CNWRA. Several unanswered NRC/CNWRA comments regard melter electrode cooling and the potential for concentration of radioactive isotopes in unagitated storage tanks or in ventilation ductwork.
8. **Chapter 7: Waste Confinement and Management**
This chapter discusses the disposition of radioactive and mixed waste generated on-site at the WVDP, along with environmental releases during operations. One new comment on this chapter was included in the RCR since the previous meeting, and no new responses were provided by the WVDP.
9. **Chapter 8: Hazards Protection**
Protection of workers and the general public from radiological and nonradiological hazards exposure is discussed in this chapter. More than 50 comments on chapter 8 were in the RCR, and 23 new responses were received from the WVDP in addition to the 2 previous responses. Of the 5 comments submitted by the NRC/CNWRA, 1 received a response, and it was conditionally accepted. It is of interest to note that radiation shine from the 3-inch seismic joint is precluded by an overlap of radiation shielding in the design of the joint (Re: Comment 8.0-001).
10. **Chapter 9: Hazard and Accident Analysis**
The hazard and accident analysis in this chapter includes hazard classification, process hazards analysis, analysis of Evaluation Basis Accidents, Design Basis Accidents, and consideration of Beyond Design Basis Events. The WVDP has responded to 84 of the 126 RCR comments on this chapter, and 83 of the responses were new. Of the new

responses, 16 were directed toward the NRC/CNWRA comments, of which 2 were accepted and 1 was conditionally accepted. Several references were received either during or shortly after the meeting to provide insight on resolution of comments on criticality (Yuan, 1993; Mishima, 1993; and Crocker, 1989). Only 2 of the 18 NRC/CNWRA comments remain without response, and one of these (Comment 9.0-022) concerns explanation of the design basis earthquake.

11. **Chapter 10: Conduct of Operations**
In this chapter, the Draft SAR discusses the organizational structure, pre-operational testing and operation, training programs, normal operations, and emergency planning. The WVDP provided 29 new responses, with 2 of those directed toward NRC/CNWRA comments. Both of those responses were conditionally accepted. Responses are yet to be received for 26 of the total of 82 review comments on this chapter.
12. **Chapter 11: Derivation of Technical Safety Requirements**
This chapter is intended to provide information relating to the derivation of TSRs, by linking the accident analyses, through descriptions of the Safety Class SSCs to TSR documents. The TSR document is intended to define the agreement between the DOE and WVDP regarding safe facility operation. All of the responses (10) received on this chapter were new. None responded to the NRC/CNWRA comment concerning the following information missing in the SAR-003: (1) Table C.4.4.2-1, which lists safety class SSCs; and (2) Figure C.2-2, which relates off-site evaluation guidelines to radiation dose.
13. **Chapter 12: Quality Assurance**
This chapter describes certain aspects of the WVDP QA Program, which is described in greater detail in WVNS-SAR-001. No new responses were submitted by the WVDP for this chapter.

The meeting was conducted over 2 1/2 days. The first 2 days were dedicated to discussion of individual responses to comments and their status (accept, conditionally accept, or open). The final half day was dedicated to prioritizing for early response comments selected from those not yet having received a response. At the beginning of the final half-day meeting, the NRC/CNWRA re-emphasized that all remaining comments were expected to receive response, although that may not occur prior to the next RCR meeting. The prioritizing of the remaining comments was in response to recognition that a large number of comments had not received a response at the time of the meeting. The following NRC/CNWRA comments (RCR Identification Number and brief summary) were included in the priority category:

- | | |
|---------|--|
| 5.0-017 | Concerns aging of the seismic joint between the two buildings |
| 5.0-031 | Probability of occurrence for DBE—inconsistency between various numerical values called out in the SAR |
| 5.0-050 | Entry of 0.6 DBE for crane rail and support clip |

- 5.0-091 Effect of failure of multiple in-cell cooler units and the corresponding cooling capacity
- 5.0-113 Effect of natural gas explosion
- 5.0-124 Closed-Loop Cooling Water: manual operation of cooling water for melter electrodes
- 5.0-126 Chilled Water: adequacy of single air-cooled chiller in absence of water-cooled chillers
- 5.0-145 Need for operator available in the permanent ventilation system (PVS) building to manually switch over power supply for Vitrification Facility Fire Alarm Control Panel (VFFACP)
- 5.0-156 Effect of deluge system on operability of diesel generator
- 5.0-172 Effect of a local fire on availability of combustion air to the turbocharger for the diesel engine
- 5.0-179 Need justification that the ventilation supply air (VSA) need not be seismically qualified
- 5.0-184 High-efficiency particulate air (HEPA) filter integrity and potential for breach of secondary filter in similar fashion to breach of first filter
- 5.0-186 HEPA filter integrity and potential for breach of secondary filter in similar fashion to breach of first filter
- 5.0-198 Adequacy of gradient of piping runs
- 5.0-204 Errors in Table C.5.2.3-1
- 5.0-206 No entries in Table C.5.2.3-1 should be < 1
- 5.0-209 Entry for Pump column margin of safety > 0.5 DBE
- 5.0-210 Margin of safety for Pump column is marginal
- 5.0-211 Margin of safety for tear of expansion bellows at Tank 8D-1 and 8D-2 is > 0.5 DBT—needs an explanation
- 5.0-212 Table C.5.2.6-2: Crane Rail and Support Clip Yield margin of safety of 0.6 DBE needs an explanation
- 5.0-216 Table C.5.5.3-2: entries with margin of safety of > 1.0 DBE need discussion
- 6.0-017 Suspension of solids/agitation

- 6.0-025 Concerning melter electrode cooling (note the potential for glass migrating from the melter along the electrode path)
- 6.0-050 Collection or plating out of isotopes in ductwork
- 6.0-104 Need for interlocks on electrode cooling
- 8.0-012 Operational considerations with respect to 10 CFR Part 20
- 8.0-017 Need for consideration of the high-level waste interim storage facility (HLWISF) as an area containing a large amount of radioactive material
- 8.0-022 Consideration of airborne particles from filters removed during maintenance
- 9.0-022 Accident Analysis, Design Basis Accident, DBE

In addition to the above 29 comments, 84 comments originating from reviewers other than the NRC/CNWRA were identified for priority response.

IMPRESSIONS AND CONCLUSIONS:

The schedule set by the WVDP has been optimistic, but there is recognition now that some comments will not receive response by the final RCR meeting in December. Activities have accelerated at the WVDP, and NRC review activities have accelerated accordingly.

PENDING ACTIONS:

An additional follow-up meeting between SAR reviewers and West Valley authors is tentatively planned for December 6-8, 1994, at the WVDP site. Prior to the December meeting, 100-200 additional WVDP responses are expected. All remaining comments will reportedly be responded to by mid-December. There is a potential for an additional RCR meeting in January 1995 to evaluate the mid-December responses.

A seismic analysis by EBASCO is expected to be complete by the end of calendar year 1994, and it is to be transmitted to the NRC/CNWRA when it is complete. A meeting with key WVDP personnel and the NRC/CNWRA reviewers is expected to occur after that report has been reviewed, possibly in January 1995.

RECOMMENDATIONS:

The NRC/CNWRA should plan to attend the follow-up meetings with the TRG and WVDP authors on coordination of review comments on the draft SAR-003 so that any issues dealing with radiological health and safety can be incorporated in the final SAR-003. In addition, the NRC/CNWRA should plan to meet with key WVDP personnel concerning the EBASCO seismic analysis at the appropriate time.

PROBLEMS:

The schedule proposed by the WVDP for submittal of responses after the final RCR meeting may impact the schedule for developing the Safety Evaluation Report (SER). A minimum of 3 months is required for preparation of the SER after completion of the SAR, as has been previously agreed upon.

SIGNATURE(S):

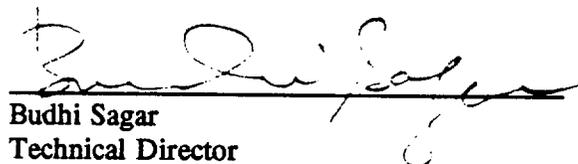

Emil "Chuck" Tschoepe, III
Senior Research Engineer

Nov 22, 1994
Date


Prasad K. Nair
Element Manager
Engineered Barrier System

11/22/94
Date

CONCURRENCE SIGNATURE(S):


Budhi Sagar
Technical Director

11/23/94
Date

ET/blg

Encl.: Attachment A
Attachment B

ATTACHMENT A
LIST OF ATTENDEES

West Valley Demonstration Project - WVNS-SAR-003 - Meeting Roster - November 1-4, 1994

	Name	Affiliation	Address	City	Phone/Fax	Nov 1	Nov 2	Nov 3	Nov 4
1.	Mazzetti, August L.	SAR-TRG/PDC	109 Jefferson Avenue	Oak Ridge, TN 37830	615-482-9004 615-482-4970				
2.	Panesko, J. Vince	SAR-TRG/WHC	MS: B1-58 Westinghouse Hanford Co. P.O. Box 1970	Richland, WA 99352	509-376-8123 509-372-2045				
3.	Baxter, John T.	SAR-TRG/WHC	MS: H5-55 Westinghouse Hanford Co. P.O. Box 1970	Richland, WA 99352	509-376-3350 509-376-7382				
4.	Freshwater, Dave	TRG/SAIC	SAIC Suite 201, 901 "D" Street, SW	Washington, DC 20024	202-488-6626 202-488-3158				
5.	Partain, William L.	SAR-TRG/LANL	MS: K557 Los Alamos National Laboratory P.O. Box 1663	Los Alamos, NM 87545	505-665-6314 505-665-2897				
6.	Smith, Daniel W.	SAR-TRG/CAI	M. H. Chew & Associates, Inc. 1424 Concannon Blvd.	Livermore, CA 94550- 6006	510-433-5071 510-373-0624				
7.	Thorne, Stephen D.	SAR-TRG/CAI	Thorne & Associates 44412 S.E. 151st	North Bend, WA 98045	206-831-5068 206-888-0887				
8.	Tulodieski, Don	SAR-TRG/VPA	1170 Santa Luisa Drive	Solana Beach, CA 92075	703-438-3911 703-438-3915				
9.	Velen, Steve R.	SAR-TRG/CAI	M. H. Chew & Associates, Inc. 1424 Concannon Blvd.	Livermore, CA 94550- 6006	510-433-5071 510-373-0624				
10.	Weinstein, Gerald L.	SAR-TRG/CAI	M. H. Chew & Associates, Inc. 1424 Concannon Blvd.	Livermore, CA 94550- 6006	510-433-5071 510-373-0624				
11.	Williams, Alan K.	SAR-TRG/SAIC	SAIC 20201 Century Blvd., Third Floor	Germantown, MD 20874	301-353-8228 301-428-0145				
12.	Miller, Chester, E.	DOE-HQ/EM-323	U.S. Department of Energy Trevion II Bldg, 19901 Germantown Rd.	Germantown, MD 29874-1290	301-903-7194 301-903-8506				
13.	Bradley, Don	Dames & Moore			716-675-7130				
14.	Cole, Lance	Dames & Moore			716-675-7130				
15.	Roberts, Carlyle J.	Dames & Moore			716-675-7130				
16.	Prowse, James J.	Dames & Moore		West Valley, NY	716-675-7130				
17.	Dart, Timothy G.	Dames & Moore		Idaho Falls, ID	208-522-1297				

	Name	Affiliation	Address	City	Phone/Fax	Nov 1	Nov 2	Nov 3	Nov 4
18.	Bess, Jack E.	WVNS	P.O. Box 191, Rock Spring Road	West Valley, NY 14171	716-942-2143				
19.	Kocialski, Tom	WVNS	P.O. Box 191, Rock Spring Road	West Valley, NY 14171	716-942-4275				
20.	Donovan, Loyd	WVNS	P.O. Box 191, Rock Spring Road	West Valley, NY 14171	716-942-4805				
21.	DesCamp, Vic	WVNS	P.O. Box 191, Rock Spring Road	West Valley, NY 14171	716-942-4513				
22.	Lawrence, R. E.	WVNS	P.O. Box 191, Rock Spring Road	West Valley, NY 14171	716-942-4390				
23.	Nair, Prasad K.	NRC/CNWRA	S.W. Research Institute CNWRA/ Bldg 189 P.O. Drawer 28510	San Antonio, TX 78238-5166	210-522-5150 210-522-6081				
24.	Tschoepe, Emil "Chuck"	NRC/CNWRA	S.W. Research Institute CNWRA/ Bldg 189 P.O. Drawer 28510	San Antonio, TX 78238-5166	210-522-5470 210-522-6081				
25.	Hardin, Kimberly J.	NRC	USNRC MSTWFN-8-A33 Licensing Section 2 Licensing Branch Div. of Fuel Cycle Sfty. and Safegds, NMSS	Washington, DC 20555	301-415-8119				
26.	Comfort, Gary C., Jr.	NRC	USNRC MSTWFN-8-A33 Licensing Section 2 Licensing Branch Div. of Fuel Cycle Sfty. and Safegds, NMSS	Washington, DC 20555	301-415-8106 301-415-5370				
27.	Moran, Thomas J.	EH-11/ANL	ANL RE 208, 9700 South Cass Ave.	Argonne, IL 60439	708-252-5901 708-252-3361				
28.	Wong, See-Meng	EH-11/BNL	Brookhaven National Lab 32 Lewis Avenue, Bldg 130	Upton, NY 11973	516-282-2111 516-282-5730				
29.	Mukherjee, Subir K.	EH-11/ASTA	ASTA 325 Technology Drive	Malvern, PA 19355	610-993-8300 610-993-8308				
30.	Armstrong, Mark E.	EH-11/DSR	Digital Systems Research (DSR) 20030 Century Blvd., Suite 101	Germantown, MD 20874	301-428-1493 301-428-1498				
31.	Sutton, Donald K.	EH-11/ASTA	ASTA 325 Technology Drive	Malvern, PA 19355	610-993-8300 610-993-8308				
32.	Psaras, John D.	DOE-HQ/EH-11	19901 Germantown Rd. Room 432	Germantown, MD 20874-1290	301-903-2702 301-903-4672				
33.	Sen, Subir K.	DOE-HA/EH-12	D/429 19901 Germantown Rd.	Germantown, MD 20874-1290	301-903-6571 301-903-2329				

ATTACHMENT B

AGENDA

**Meeting Agenda for
Safety Analysis Report for the Vitrification Operations**

Tuesday, November 1, 1994

Conference Room B

7:45	Arrive on Site
8:00	Presentation of Agenda
8:15	Comment Resolution Closure Strategy
8:45	Topical Discussion
	Technical Safety Requirements
	Seismic Qualification
	Anhydrous Ammonia
10:30	Break
10:45	Topical Discussion - Continuation
12:00	Lunch
1:00	Comment Resolution Review
2:30	Break
2:45	Comment Resolution Review - Continuation
4:00	Accomplishments Overview
4:15	Agenda Overview and Adjustment for November 2, 1994
5:00	Depart Site

**Meeting Agenda for
Safety Analysis Report for the Vitrification Operations**

Wednesday, November 2, 1994

Conference Room B

7:45	Arrive on Site
8:00	Comment Resolution Review
10:00	Break
10:15	Comment Resolution Review
12:00	Lunch
1:00	Comment Resolution Review - Continuation
2:30	Break
2:45	Comment Resolution Review - Continuation
4:00	Accomplishments Overview
4:15	Agenda Overview and Adjustment for November 2, 1994
5:00	Depart Site

Thursday, November 3, 1994

Conference Room B

7:45	Arrive on Site
8:00	Comment Resolution Review
10:00	Break
10:15	Accomplishments Overview
10:30	Tentative Plan and Agenda for Final Meeting
11:30	Second Meeting Closeout Discussion
12:00	Lunch
1:00	First Meeting Closeout Discussion - Continuation
4:15	Depart Site