

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

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  
October 4-6, 1994

AUTHOR(S): Emil Tschoepe and Prasad K. Nair

DISTRIBUTION:

CNWRA

W. Patrick  
CNWRA Directors  
CNWRA Element Managers  
EBS Staff  
H. Karimi

NRC-NMSS

J. Linehan  
S. Fortuna  
B. Stiltenspole  
B. Meehan  
G. Comfort

NRC-RES

M. McNeil

SwRI

S. Rowe

*Delete all dist except:  
File Center  
PDR  
Nw005 Full Text*

# CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

## 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  
October 4-6, 1994

**AUTHORS:** Emil Tschoepe and Prasad Nair

### **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 available 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 NRC/CNWRA and the U.S. Department of Energy (DOE) Technical Review Group (TRG) and other DOE entities. CNWRA is supporting NRC in this SAR review.

CNWRA's comments on the draft SAR were transmitted to NRC on July 15, 1994, and 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). West Valley Demonstration Project (WVDP) responded to 160 of these comments, and these responses were reviewed and discussed during the subject meeting at West Valley. A copy of the agenda is attached to this report (Attachment B). The revised RCR (dated September 30, 1994), which incorporates WVDP responses available as of that date, is available for review from the authors of this report. A preliminary set of responses, dated September 23, 1994, had been received prior to the meeting at West Valley.

### **SUMMARY OF PERTINENT POINTS:**

Comments in the RCR were organized by order of appearance in the Draft SAR-003, and discussions of comments followed the order of the Draft SAR-003 as well. Although NRC comments were retained from the previous version of the RCR without change, many DOE review comments had been combined prior to the meeting. The revised RCR of September 30, 1994, was thus simplified and reduced in volume. Only those comments to which WVDP had responded 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, so that agreement could be reached that the status of the comment could be "conditionally accepted," 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." Independence of the NRC review was maintained by separating NRC comments from those of DOE organizations.

DOE responded to 160 of over 800 comments in the RCR at the time of the meeting. Of the 160 responses, 90 were conditionally accepted, 31 were accepted, and 38 were in open status. (One initial evaluation was not complete at the close of the meeting.) Thirty-two of the 160 responses were directed to NRC/CNWRA-originated comments.

Following are summarized general subjects of discussion along with identification of certain relevant issues arising during discussions.

1. **The September 30, 1994, RCR contained 10 general comments, which were applicable to more than a single chapter of the SAR. Of these, WVDP responded to 8, and 5 of these were NRC/CNWRA comments. WVDP agreed with all of these 5 comments and plans appropriate changes to the SAR as a result. NRC conditionally accepted these WVDP responses but retained comment GC-007 as open since the SAR did not address the three items listed in the comment.**
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. WVDP responded to all but 2 of the comments on this chapter,
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. WVDP responded to all 5 comments submitted by NRC/CNWRA and all but 4 of the remaining 24.
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. Two of the three comments submitted on this section received WVDP response.
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 of the Vitrification Facility. Of the more than 100 comments submitted in the RCR for this chapter, WVDP responded to less than 40%. Twenty-two of the comments originated from NRC/CNWRA, and WVDP responded to six of these. Three of the six responses remain in open status: Comment 4.0-018, concerning canister fill level detection; Comment 4.0-019, concerning canister remote welding and weld inspection; and Comment 4.0-098, concerning availability of

trained backup personnel availability in an emergency. Concerning comments other than those originating from NRC/CNWRA, 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.

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 structures, systems, and components (SSCs) that support safety in operation of the vitrification facility. Over 220 comments on Chapter 5 were in the RCR, and WVDP responded to 15. Of the 66 comments from NRC/CNWRA, WVDP responded to 7, all of which were conditionally accepted. A number of NRC/CNWRA comments identified locations in the SAR where the term "safety margin" is incorrectly used, and these have yet to receive a response.
7. **Chapter 6: Vitrification Facility Process Systems**  
The systems and equipment by which the sludge/liquid radioactive high-level waste is converted into borosilicate glass in stainless steel canisters and temporarily stored at WVDP are described in this chapter. WVDP responded to 25 of the 109 comments on this chapter and to 6 of the 38 submitted by NRC/CNWRA. One of these 6, Comment 6.0-017, remains in open status. It concerns the suspension/settling/concentration of solids during periods of no tank agitation. The comment is open, pending review of references in Chapter 9 and WVDP response to comment 6.0-066 on effects of evaporative losses on material balance.
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. Only one of the 13 comments on this chapter received a WVDP response, and no response was available for the single comment submitted by NRC/CNWRA.
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 September 30, 1994, RCR, and 2 of those received a WVDP response. No responses were available for any of the 5 comments submitted by NRC/CNWRA.
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. WVDP responded to one of the 115 RCR comments on this chapter; no response was received for any of the 18 NRC/CNWRA comments.
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.

WVDP responded to 26 of the total of 82 review comments on this chapter. Two of the three submitted by NRC/CNWRA received response, and they both remain in the open status.

12. Chapter 11: Derivation of Technical Safety Requirements

This chapter is intended to provide information relating to the derivation of Technical Safety Requirements (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 DOE and WVDP regarding safe facility operation. None of the 12 comments on this chapter received WVDP response (1 was submitted by NRC/CNWRA).

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. Comments on this chapter totaled 17, with one response available for the 2 originating from NRC/CNWRA. A total of 7 comments received WVDP response.

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), after an initial discussion on categories of issues represented by the comments. The final half day concerned (1) interfaces among components, to define the scope of SAR-003; (2) the connection between Safety Classification, Service Classification, and Quality Level; (3) reproducibility of ammonia tank failure analysis; and (4) summary discussions concerning issues defined on the first day of meetings. Results of the summary discussions were: (i) intent of application of the graded approach to the level of analysis instead of the level of detail in the SAR; (ii) justifications are needed for the "100 m vs 640 m" and "5 mrem vs 25 mrem" dose criteria; (iii) a review of Q-Level and Safety Classification; (iv) defense-in-depth and the EH-11 review; (v) 6430.1a Compliance; (vi) seismic qualification and analyses; (vii) interfaces; and (viii) ammonia tank. Attendees were reminded of the logistics of further coordinated review by both the DOE and NRC. The final half-day meeting was reserved for DOE-TRG discussions and was, therefore, not attended by NRC or CNWRA staff.

#### **IMPRESSIONS AND CONCLUSIONS:**

The schedule set by WVDP appears optimistic and may be affected by the TRG review process. Activities will be accelerating at WVDP, and NRC review activities are expected to accelerate accordingly. Technical details noted during the tour and identified above indicate that modifications to the facility and/or process may be needed.

#### **PENDING ACTIONS:**

Additional follow-up meetings between SAR reviewers and West Valley authors are tentatively planned for November 1-3, and December 6-8, 1994, at the WVDP site. Prior to the November meeting, about 180 additional WVDP responses are expected.

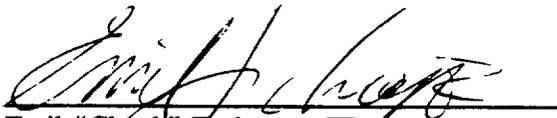
**RECOMMENDATIONS:**

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.

**PROBLEMS:**

The schedule proposed by WVDP during the first day of meetings did not allow the minimum of 3 months for Safety Evaluation Report (SER) preparation by NRC, as had been previously agreed upon. This was brought to the attention of G. Comfort at the meeting, and West Valley staff subsequently agreed to allow necessary NRC review time for the preparation of the SER.

**SIGNATURE(S):**

  
Emil "Chuck" Tschoepe, III  
Senior Research Engineer

Nov. 4, 1994  
Date

  
Prasad K. Nair  
Element Manager  
Engineered Barrier System

11/4/94  
Date

**CONCURRENCE SIGNATURE(S):**

  
Budhi Sagar  
Technical Director

11/2/94  
Date

ET/blg

Encl.: Attachment A  
Attachment B

**ATTACHMENT A**  
**LIST OF ATTENDEES**

**U.S. Department of Energy - Office of Waste Management  
Joint Review Meeting Agenda**

**October 4-6, 1994**

**West Valley Demonstration Project  
Safety Analysis Report for the Vitrification Operations and  
High Level Waste Interim Storage (WVNS-SAR-003)**

**October 4, 1994**

<b>07:45 am</b>	<b>Arrive on Site</b>
<b>08:00 am</b>	<b>Joint Review Team and WVDP Introductions</b>
<b>08:15 am</b>	<b>Presentation of Agenda</b>
<b>08:30 am</b>	<b>SAR Review/Comment Resolution Strategy</b>
<b>08:40 am</b>	<b>Topical Discussion</b>
	<b>Graded Approach</b>
	<b>Evaluation Guidelines</b>
	<b>Quality Level &amp; Safety Class</b>
	<b>Seismic Qualification</b>
	<b>Defense in Depth</b>
	<b>Boundaries and Facility Interfaces</b>
	<b>6430.1A Compliance</b>
<b>10:30 am</b>	<b>Break</b>
<b>10:45 am</b>	<b>Comment Resolution Review</b>
<b>12:00 pm</b>	<b>Lunch</b>
<b>12:30 pm</b>	<b>Comment Resolution Review - Continuation</b>
<b>02:30 pm</b>	<b>Break</b>
<b>02:45 pm</b>	<b>Comment Resolution Review - Continuation</b>
<b>04:00 pm</b>	<b>Accomplishments Overview</b>
<b>04:15 pm</b>	<b>Agenda Overview and Adjustment for October 5, 1994</b>
<b>05:00 pm</b>	<b>Depart Site</b>

**October 5, 1994**

**07:45 am** Arrive on Site  
**08:00 am** Comment Resolution Review  
**10:00 am** Break  
**10:15 am** Comment Resolution Review - Continuation  
**12:00 pm** Lunch  
**12:30 pm** Comment Resolution Review - Continuation  
**02:30 pm** Break  
**02:45 pm** Comment Resolution Review - Continuation  
**04:00 pm** Accomplishments Overview  
**04:15 pm** Agenda Overview and Adjustment for October 6, 1994  
**05:00 pm** Depart Site

**October 6, 1994**

**07:45 am** Arrive on Site  
**08:00 am** Comment Resolution Review  
**10:00 am** Break  
**10:15 am** Accomplishments Overview  
**10:30 am** Tentative Plan and Agenda for Next Meeting  
**11:30 am** First Meeting Closeout Discussion  
**12:00 pm** Depart Site

**ATTACHMENT B**

**AGENDA**

# SIGN-IN ROSTER

**SAR-TRG MEETING - TECHNICAL SESSION**

**MEETING DATE: Oct 5, 94**

**LOCATION: West Valley, NY      SUBJECT: WUNS SAR-003**

<u>NAME</u>	<u>AFFILIATION</u>	<u>LOCATION</u>	<u>PHONE</u>
1. A.L. Mazzetti	TRG-PDC	Oak Ridge, TN	615-482-9002
2. J.T. Baxter	TRG-WHC	Richland, WA	509-376-3350
3. G.L. Weinstein	TRG/CAI	Livermore, CA	510-804-4350
4. Daniel W. Smith	TRG/CAI	Livermore, CA	510-443-5071
5. Alan K. Williams	TRG/SAIC	Germantown MD	301-353-8228
6. William L. Partain	TRG/LANL	Los Alamos, NM	505-665-6314
7. David Freshwater	TRG/SAIC	Washington, DC	202-488-6626
8. Lance Cole	DAMES + MOORE	Orchard Park, NY	716-675-7130
9. Carlyle J. Roberts	DAMES + MOORE	Orchard Park, NY	716-675-7130
10. Timothy G. Dart	DAMES + MOORE	Orchard Park, NY	716-675-7130
11. JACK E. BEEK	WUNS	West Valley	716-943-3143
12. Kim Hardin	NRC	Washington, DC	301-415-8119
13. Gary Comfort	NRC	Washington DC	301-415-8106
14. PRASAD NAIR	<del>NRC</del> CNWRA	SAN ANTONIO	210-522-5152
15. CHUCK TSCHOEPE	<del>NRC</del> CNWRA	San Antonio	(210) 522-5470
16. Tom Moran	EH-11 (ANL)	Chicago	(708) 757-5901
17. See-Meng Wong	EH-11 / BNL	Upton, NY	(516) 282-2111
18. Subir Mukherjee	E-11 / Asta	Malvern, PA	(610) 993-8300
19. Mark Armstrong	EH-11 / USR	Germantown, MD	(301) 462-4193
20. John Psaras	DOE / EH-11	GTN, MD	(301) 903-2202
21. RICK KHAN	DOE-NA / EM-23	Germantown, MD	(301) 903-7259
22. T.J. JACKSON	DOE WVAO	West Valley NY	716-942-2135
23. Vince Panesko	TRG/WHC	Richland, WA	(509) 376-8123
24. C.E. Miller	DOE EM 323	GERMANTOWN MD	301-903-7194
25. DONALD TULODIESKI	TRG/VPA	RESTON, VA	703-438-3911
26. Donald K. Sutton	DOE / EH-11 / ASTA	Malvern, PA	610-993-8300
27. Subir Sen	DOE / EH-12	GTN, MD	301-903-6571
28.			
29.			
30.			

Notes:

# SIGN-IN ROSTER

SAR-TRG MEETING - TECHNICAL SESSION

MEETING DATE: Oct 4, '94

LOCATION: West Valley, N.Y. SUBJECT: WVNS-5A003

NAME	AFFILIATION	LOCATION	PHONE
1. A.L. Magzetti	TRG/PDC	Oxford, TN	615-882-9001
2. J.T. Baxter	TRG/WHC	Richland, WA	509-376-3350
3. A.K. Williams	TRG/SAIC	GermanTown MD	301-353-8228
4. G.L. Weinstein	TRG/CAI	Livermore, CA	510-443-5071
5. Daniel W. Smith	TRG/CAI	Livermore, CA	510-443-5071
6. David E. Freshwater	TRG/SAIC	Washington, DC	202-488-6626
7. William L. Partain	TRG/LANL	Los Alamos, NM	505-665-6344
8. Donald B. Tulodjeski	TRG/VPA	Reston, VA	703-438-3911
9. Don Bradley	Dames + Moore	Orchard Park	716-675-7130
10. Lance Cole	Dames + Moore	Orchard Park	716-675-7130
11. Carlyle J. Roberts	Dames + Moore	Orchard Park	716-675-7130
12. James J. Prowse	DAMES + MOORE	ORCHARD PARK	716-675-7130
13. Timothy G. Dart	DAMES + MOORE	EDMONTON, AB	208-522-1297
14. Jack E. Bess	WVNS	West Valley	(716) 942-2143
15. Tom Kocialski	WVNS	WEST VALLEY	716-942-4275
16. Prasad Nair	CNWRA (NRC)	SAN ANTONIO	210-522-5150
17. Chuck Tschoepe	CNWRA (NRC)	SAN ANTONIO, TX	(210) 522-5470
18. Tom Moran	EH-11 (ANL)	Chicago, IL	(708) 252-5901
19. See-Meng Wang	EH-11/BNL	Upton, NY	(516) 282-2111
20. Subir K. Mukherjee	EH-11/Asta	MALVERN, PA	(610) 993-8300
21. Mark E. Armstrong	EH-11/DSR	GermanTown, MD	(301) 428-1493
22. John Psaras	DOE/EH-11	GTN, MD	(301) 903-2702
23. KICK KHAN	DOE-NA/EM-23	GTN, MI	(301) 927-1604
24.LOYD DONOVAN	WVNS	WEST VALLEY	(716) 942-4801
25. Vince Panesko	TRG/WHC	RICHLAND, WA	(509) 376-8123
26. CHET Miller	DOE EM 323	GERMANTOWN, MD	301-903-7194
27. TJJACKSON	DOE-WVAO	West Valley NY	716-942-2135
28. Rick Provencher	DOE-WVAO	West Valley NY	716 942 4101
29. Subir Sen	DOE-EH-12	GTN, MD	301 903 6571
30			

Notes:

# E SN-IN ROSTER

SAR-TRG MEETING - TECHNICAL SESSION

MEETING DATE: Oct 6, 1994

SAR #

LOCATION: West Valley NY

SUBJECT: WUNS-SAR-003

NAME	AFFILIATION	LOCATION	PHONE
1. J.L. Mazzetti	TRG-SAR-PDC	Oak Ridge, TN	615-482-9004
2. J.T. Baxter	TRG - WHC	Richland, WA	509 376 3350
3. G.L. Weinstein	TRG-CAI	Livermore, CA	510-443-5071
4. Daniel W. Smith	TRG-CAI	LIVERMORE, CA	510-443-5071
5. Alan K. Williams	TRG-SAIC	Germantown MD	301-353-8228
6. William L. Partain	TRG-SAIC	Los Alamos, NM	505-665-6314
7. DAVID FRESHWATER	TRG-SAIC	Washington DC	202-488-6626
8. CARLYLE J. ROBERTS	DANES & MOORE	Orchard Park NY	716-675-7130
9. JACK E. BESS	WUNS	West Valley	716-942-2143
10. Vic DesCamp	WUNS	VIT ENGR	716-942-4513
11. PRASAD NAIR	CNWRA (NRC)	SAN ANTONIO	210-522-5150
12. CHUCK TSCHOETE	CNWRA (NRC)	San Antonio	(214) 522-5470
13. TOM MORAN	EH-11 (ANL)	Argonne IL	(708) 292-5901
14. See-Meng Wang	EH-11 / BNL	Upton, NY	(516) 282-2111
15. Subir K. Mukherjee	E-11 / Asta	Malvern, PA	(610) 993-8300
16. Mark E. Anastasio	EH-11 / DSK	Germantown, MD	(301) 428-1493
17. John Psaras	DOE / EH-11	GTN MD	(301) 903-2702
18. Donald K. Sutton	DOE / Asta	Malvern, PA	(610) 993-8300
19. Vince Pencsko	TRG / WHC	RICHLAND, WA	(509) 376-8123
20. C.E. Miller	EM-323	Germantown, MD	301-903-7194
21. DONALD TULODIESKI	TRG / VPA	RESTON, VA	703-438-3911
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

Notes: