



Department of Energy

Washington, DC 20585

October 21, 1991

Mr. John Linehan, Director
Repository Licensing and Quality
Assurance Project Directorate
Division of High-Level
Waste Management
Office of Nuclear Material
Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Mr. Linehan:

On August 8, 1991, after the U.S. Department of Energy (DOE) Defense Waste Processing Facility Orientation and Tour, Dr. Hersch K. Manaktala, of the Center for Nuclear Waste Regulatory Analysis (CNWRA), was given borosilicate glass samples specified in the Enclosure. These glass samples were provided to the CNWRA in response to your August 21, 1990, letter, in which you indicated that NRC, through the CNWRA, plans to conduct a number of independent research activities in the near future in the areas of waste form and waste package container materials.

In our letter, dated April 2, 1991, DOE suggested that technical staff from NRC and its contractors visit cognizant DOE facilities so as to become familiar with how the samples were made and tested, to understand the testing procedures analytical techniques, to review the results obtained to date, and to establish points-of-contact between the technical organizations. In your May 30, 1991, response to this letter, NRC expressed interest in visiting DOE facilities, and, under the NRC/DOE Site Specific Agreement, Appendix 7 Site Visits, such trips can be arranged. Requests for site visits of this type should be arranged through the DOE Yucca Mountain Project Office (YMPO) Regulatory Interactions Branch Chief, Susan Jones. Ms. Jones can be contacted on (702) 794-7613 or FTS 544-7613.

In the April 2, 1991, letter, DOE asked to review the results from testing of the waste glass prior to their release to the public. In the May 30, 1991, response to this letter, NRC proposed holding technical exchanges on the results of NRC's glass waste form experiments, when appropriate, which would be open to the public. DOE agrees with this recommendation and, at the next interactions meeting, scheduled for November 20, 1991, plans to discuss these technical exchanges.

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In the April 2, 1991, letter, DOE requested NRC to conduct tests on the glass waste form under a quality control program that meets the requirements of DOE/RW-0214. As an enclosure to the May 20, 1991, letter, NRC provided a copy of the CNWRA's Quality Assurance (QA) plan in which all research and testing activities are required to be conducted under a QA program that complies with requirements of Appendix G (QA) to 10 CFR Part 60. DOE appreciates your sending this document for information.

In the April 2, 1991, letter, DOE also recommended formalizing cooperation between DOE and NRC with a Memorandum of Agreement specific to waste glass testing. In the May 20, 1991, response, NRC suggested addressing this issue in the NRC/DOE site-specific procedural agreement which is under revision. DOE concurs with this suggestion.

In the May 20, 1991, letter, NRC also requested the name of the DOE point-of contact for glass waste form technical communications. All questions of a technical nature should be addressed to Michael O. Cloninger, of the DOE Yucca Mountain Project Office. His number is (702) 794-7847 or FTS 544-7847.

If you have any questions, please contact Corinne Macaluso of my staff at (202) 586-2837 or FTS 896-2837.

Sincerely,



John P. Roberts
Acting Associate Director for
Systems and Compliance
Office of Civilian Radioactive
Waste Management

Enclosure: Letter to Dr. Hersh K. Manaktala, CNWRA, from Carol M. Jantzen, Westinghouse, Savanna River Company, dated September 12, 1991.

TABLE 2.1. Compositions (weight percent oxides) of the Four Glasses Tested in the PCT Round Robin

Oxide	SRL-G		SRL-P		ARM-1		SRM-623	
	SRL Anal.	MCC(a) Mean	SRL Anal.	MCC(a) Mean	Cert. Val.	MCC(b) Mean	NIST Nom.	MCC(b) Mean
Al ₂ O ₃	4.40	4.59	4.14	4.27	5.59	5.78	6.3	6.14
B ₂ O ₃	5.82	6.00	8.25	8.49	11.30	11.80	10.7	10.10
BaO	0.15	0.14	0.20	0.18	0.658	0.65	2.2	2.00
CaO	1.32	1.31	1.32	1.30	2.24	2.32	0.7	0.69
CeO ₂					1.51	1.42		
Cr ₂ O ₃	0.15	0.10	0.15	0.10				
Cs ₂ O	n.d.	0.03	n.d.	0.13	1.17	1.08		0.03
CuO	0.40	0.37	0.67	0.64				
Dy ₂ O ₃						0.02		
Eu ₂ O ₃						0.02		
Fe ₂ O ₃	12.53	12.03	11.51	10.63		0.05		0.09
K ₂ O	2.83	3.24	4.82	6.06			0.6	1.00
La ₂ O ₃						0.02		
Li ₂ O	3.67	3.80	3.29	3.41	5.08	4.82		
MgO	3.30	3.13	3.07	2.84				
MnO ₂	--	0.02	--	0.01		0.01		
MoO ₃					1.66	1.91		
Na ₂ O	6.92	8.28	7.52	9.13	9.66	9.73	6.4	6.46
Nd ₂ O ₃					5.96	5.52		
NiO	0.74	0.64	0.78	0.66				
P ₂ O ₅					0.65			
RhO ₂								
RuO ₂								
SiO ₂	56.63	53.97	52.91	50.83	46.50	45.60	73.0	71.40
SrO		0.01		0.01	0.453	0.47		0.03
TiO ₂	0.67	0.65	1.22	1.16	3.21	3.32		0.02
Y ₂ O ₃								
ZnO					1.46	1.47		
ZrO ₂		0.03		0.03	1.80	1.87		0.05

(a) The average of three analyses performed within a short period of time.
(b) The average of two analyses performed within a short period of time.



Westinghouse
Savannah River Company

P.O. Box 616
Aiken, SC 29802

September 12, 1991

Dr. Hersh K. Manaktala
Senior Research Engineer
Center for Nuclear Waste Regulatory Analyses
Southwest Research Center
P.O. Drawer 28510
6220 Culebra Road
San Antonio Texas 78228-0510

Dear Hersh,

This letter details the history and composition of the glasses you received on August 8, 1991. You received 100 grams of each of the following: 202-G, 202-P, ARM-1, and SRM-623. The first two glasses are similar to those that will be fabricated in the DWPF. They are not completely representative of the DWPF glasses since they have no MnO_2 and have excess MgO . The ARM-1 glass is the Materials Characterization Center's "Approved Reference Material-1" and the SRM-623 is a NIST standard borosilicate glass.

As we discussed, we are providing these glasses so that you can compare your experimental results to those obtained by the eight laboratories that participated in the Product Consistency Test round robin. These are the exact same four glasses that were tested in the round robin. I enclose a copy of the report, Product Consistency Test Round Robin Conducted by the Materials Characterization Center-Summary Report (PNL-6967), which lists the compositions of the four glasses on page 2.3.

If you have any additional questions please do not hesitate to call.

Thank you.

Sincerely,

A handwritten signature in cursive script that reads "Carol M. Jantzen".

Carol M. Jantzen
Fellow Scientist
Glass Technology Group

cc: M.J. Plodinec, 773-A
W.D. Pearson, 704-S
J.G. Beard, 704-S

MCC

Materials Characterization Center

**Product Consistency Test
Round Robin Conducted by the
Materials Characterization
Center—Summary Report**

G. F. Piepel
T. E. Jones

D. L. Eggert
G. E. Mallinger

September 1989

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Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute

cc:

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