APPENDIX D

HIGH-LEVEL WASTE SUPPORTING DOCUMENTATION

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HIGH-LEVEL WASTE SUPPORTING DOCUMENTATION

Appendix D contains documentation supporting the high-level waste (HLW) feed staging analysis presented in Section 4 of Volume I. Table D-1 lists the composition of HLW feed for each Phase 1 tank of staged waste. The volumes and densities of liquids and solids are provided. Radionuclides are shown in curies and chemical components are shown in kilograms. The radionuclides are decayed to the date of delivery for each tank of stage waste.

Table D-2 reports the composition of immobilized HLW (IHLW) glass and the composition of glass frit added to the waste to make the glass. The glass composition is based on the Pacific Northwest National Laboratory glass properties model. The composition of the waste oxides can be calculated by subtracting the glass frit components from the glass oxide components. The total mass of waste oxides produced from each Phase 1 tank of staged waste is shown at the end of the table.

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Table D-1. High-Level Waste Composition in Delivered Feed.

HLW Batch Group	1		2		3		4		5		6		7	
Source Tanks	AZ-101		AZ-102		AY-102/C-106		AY-101/C-104		SY-102		C-107/AW-103		AW-104/AW-103	
Total Volume (gal)	8.07E+05		8.52E+05		5.48E+05		8.91E+05		5.49E+05		8.46E+05		8.08E+05	
Liquid Volume (gal), Sp	7.97E+05	1.25E+00	8.37E+05	1.13E+00	5.15E+05	1.07E+00	8.34E+05	1.10E+00	5.34E+05	1.22E+00	8.04E+05	1.15E+00	7.95E+05	1.39E+00
Solid Volume (gal), Sp	9.00E+03	3.00E+00	1.50E+04	3.00E+00	3.36E+04	3.00E+00	5.75E+04	2.96E+00	1.49E+04	2.99E+00	4.18E+04	3.00E+00	1.32E+04	3.00E+00
Component	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid
Radionuclides (curies)														
106-Ru(Ci)	1.06E-04	4.81E+00	3.93E-04	4.15E+00	1.54E-03	1.19E-05	1.43E-09	1.94E-05	2.29E-08	9.98E-04	3.09E-06	7.44E-05	5.71E-07	1.81E-05
113m-Cd(Ci)	0.00E+00	9.85E+02	2.10E-02	4.88E+02	5.38E+00	2.15E+01	7.88E+00	6.70E+02	6.59E+00	8.42E+01	2.89E+00	6.66E+01	7.94E+00	2.41E-01
125-Sb(Ci)	8.49E+02	3.41E+03	2.21E+02	2.02E+03	1.15E+00	4.93E+00	1.38E-01	5.30E-01	4.56E+00	1.93E+01	9.40E-02	2.09E-01	1.26E-01	7.60E-02
126-Sn(Ci)	0.00E+00	5.73E+01	0.00E+00	2.75E+01	2.43E+00	2.32E+01	5.94E+00	1.47E+02	1.22E+00	1.07E+01	1.78E+00	3.41E+01	1.48E+00	3.06E-02
129-I(Ci)	2.63E+00	0.00E+00	1.40E+00	0.00E+00	1.55E-01	6.00E-02	4.60E-02	2.30E-02	3.95E-01	3.50E-02	1.50E-01	2.92E-03	3.77E-01	3.76E-09
134-Cs(Ci)	4.88E+02	0.00E+00	3.54E+02	0.00E+00	8.93E-01	2.57E-03	5.10E-02	3.08E-03	1.33E+00	5.90E-04	1.75E-02	1.92E-04	1.02E-02	1.56E-10
137-Cs(Ci)	4.83E+06	3.63E+05	2.69E+06	1.73E+05	4.65E+04	1.89E+05	4.23E+04	5.54E+04	3.33E+05	1.48E+05	1.43E+05	1.96E+04	3.37E+05	6.28E+03
137m-Ba(Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14-C(Ci)	2.65E-01	2.19E-01	7.64E-01	8.66E-07	3.67E+00	6.00E-02	3.62E+00	1.79E+00	9.36E+00	2.40E-02	6.38E+00	2.51E-01	1.86E+01	3.27E-07
151-Sm(Ci)	3.05E-02	1.12E+05	1.98E+00	5.59E+04	2.27E+03	5.10E+04	4.44E+02	2.80E+05	2.13E+03	2.29E+04	9.74E+02	6.89E+04	2.70E+03	5.49E+01
152-Eu(Ci)	1.93E-05	1.21E+02	1.96E+00	5.25E+01	1.30E+00	2.54E+01	2.71E+00	8.80E+01	2.54E-01	5.57E+00	6.31E+00	1.01E+00	3.14E-01	9.70E-02
154-Eu(Ci)	2.75E-03	1.72E+04	2.11E+02	5.65E+03	3.90E+01	1.19E+03	9.72E+01	3.34E+03	2.19E+01	4.32E+02	4.53E+02	3.60E+01	1.75E+01	1.87E+00
155-Eu(Ci)	1.57E-03	9.83E+03	1.07E+02	2.86E+03	2.53E+01	3.71E+02	2.95E+01	9.02E+02	5.83E+00	1.39E+02	1.14E+02	1.02E+01	3.37E+00	1.99E+00
226-Ra(Ci)	4.67E-07	1.55E-04	1.06E-06	6.46E-05	4.09E-05	3.66E-03	5.81E-04	9.66E-03	3.38E-05	2.64E-04	1.65E-05	2.72E-03	4.84E-05	2.96E-07
227-Ac(Ci)	1.38E-10	5.70E-04	3.73E-08	2.39E-04	1.35E-04	1.30E-02	1.85E-05	3.19E+01	1.01E-04	9.19E-04	4.72E-05	1.67E-02	1.25E-04	9.44E-07
228-Ra(Ci)	7.32E-12	2.43E-09	1.78E-11	1.08E-09	5.94E-05	4.64E-05	7.51E-04	2.75E+00	2.41E-03	6.10E-02	8.89E-04	5.90E-04	2.58E-03	3.59E-05
229-Th(Ci)	5.78E-09	1.04E-06	3.11E-08	5.01E-07	9.17E-06	1.14E-04	6.09E-04	4.03E-01	5.86E-04	1.10E-02	8.76E-04	2.15E-03	6.81E-04	9.17E-06
231-Pa(Ci)	0.00E+00	2.70E-03	2.15E-07	1.39E-03	8.11E-04	1.40E-02	2.28E-02	1.03E+02	1.21E-03	6.73E-03	4.56E-04	5.00E-02	1.33E-03	8.37E-06
232-Th(Ci)	7.72E-11	1.39E-08	4.30E-10	6.92E-09	3.17E-05	2.60E-05	1.65E-03	1.01E+00	2.21E-03	5.20E-02	8.86E-04	2.30E-04	2.65E-03	3.91E-05
232-U(Ci)	3.22E-04	3.56E-02	8.04E-04	1.08E-02	1.81E-03	2.05E-03	2.30E-02	1.02E+01	6.20E-02	1.42E-01	1.67E-02	1.68E-02	1.02E-02	5.12E-03
233-U(Ci)	1.40E-03	1.48E-01	3.34E-03	4.80E-02	6.87E-03	6.89E-03	1.04E-01	4.65E+01	2.91E-01	6.68E-01	8.30E-02	8.40E-02	5.60E-02	2.04E-02
234-U(Ci)	1.02E-02	1.02E+00	2.31E-01	3.40E+00	1.74E-01	1.12E+00	3.50E-02	1.13E+01	1.49E-01	2.91E-01	5.01E-01	1.01E+01	6.38E-01	1.43E+01
235-U(Ci)	3.69E-04	4.07E-02	1.06E-02	1.29E-01	6.76E-03	4.10E-02	1.41E-03	4.48E-01	6.82E-03	1.10E-02	1.69E-02	3.84E-01	2.55E-02	5.41E-01
236-U(Ci)	7.87E-04	8.10E-02	2.10E-02	2.80E-01	9.40E-02	8.10E-02	1.34E-03	4.94E-01	3.58E-03	1.10E-02	2.50E-02	7.69E-01	5.10E-02	1.17E+00
237-Np(Ci)	1.48E-01	1.69E+01	5.38E-01	8.62E+00	1.14E-01	7.40E-02	1.96E-01	1.15E-01	5.16E-01	9.04E-01	2.26E-01	2.49E-02	6.02E-01	5.14E-03
238-Pu(Ci)	5.70E+00	1.20E+02	9.39E-08	1.26E+02	5.45E-01	6.37E+01	6.10E-02	1.87E+02	3.31E-01	4.45E+00	7.31E-01	4.38E+01	1.24E+00	9.29E+01
238-U(Ci)	5.12E-03	7.07E-01	1.61E-01	2.34E+00	1.61E-01	8.26E-01	3.40E-02	9.52E+00	1.56E-01	2.53E-01	4.35E-01	7.19E+00	4.44E-01	9.78E+00
239-Pu(Ci)	3.69E+01	7.94E+02	1.06E-04	9.68E+02	9.31E+00	1.37E+03	1.62E+00	4.30E+03	8.11E+00	1.80E+03	1.44E+01	1.15E+03	1.76E+01	9.11E+02
240-Pu(Ci)	1.04E+01	2.24E+02	1.72E-07	2.87E+02	1.91E+00	2.87E+02	3.22E-01	8.89E+02	1.50E+00	4.47E+02	3.21E+00	2.28E+02	4.97E+00	2.76E+02
241-Am(Ci)	5.97E+02	1.87E+04	6.62E+02	1.07E+04	3.09E+00	3.07E+03	6.26E+01	6.40E+03	2.95E+01	8.02E+03	3.12E+02	1.12E+03	5.23E+01	3.03E+00
241-Pu(Ci)	1.80E+02	3.87E+03	2.91E-06	6.78E+03	1.49E+01	2.39E+03	2.05E+00	6.13E+03	8.65E+00	1.12E+02	2.64E+01	1.44E+03	4.70E+01	3.57E+03
242-Cm(Ci)	4.14E-09	2.50E-08	2.28E-11	3.78E-09	1.88E-13	1.37E-10	7.57E-14	5.75E-12	2.19E-15	1.15E-14	1.17E-17	8.56E-16	6.44E-19	4.12E-19
242-Pu(Ci)	2.86E-03	6.10E-02	4.73E-11	2.70E-02	2.05E-04	3.30E-02	2.91E-05	9.20E-02	1.60E-04	2.34E-03	3.32E-04	1.69E-02	5.66E-04	4.08E-02
243-Am(Ci)	2.70E-01	8.44E+00	2.04E-01	3.25E+00	9.40E-02	2.22E-01	6.06E-03	3.91E-01	1.00E-02	2.77E-01	2.49E-02	6.70E-02	1.98E-04	6.45E-04
243-Cm(Ci)	3.96E-01	2.39E+00	5.41E-03	9.73E-01	2.04E-03	1.74E+00	5.09E-03	4.11E-01	1.30E-02	6.90E-02	1.12E-03	1.29E-01	8.91E-04	9.61E-04
244-Cm(Ci)	8.25E+00	4.98E+01	1.14E-01	1.90E+01	4.10E-02	3.72E+01	1.52E-01	1.21E+01	2.13E-01	1.24E+00	2.29E-02	3.06E+00	5.11E-03	4.43E-03
3-H(Ci)	2.18E+00	0.00E+00	7.92E+02	0.00E+00	4.71E+01	0.00E+00	1.19E+01	0.00E+00	2.93E+01	0.00E+00	2.40E+01	0.00E+00	4.77E+01	0.00E+00
59-Ni(Ci)	2.44E-03	1.85E+01	1.36E-03	8.95E+00	5.77E+00	7.89E+01	3.39E+00	1.22E+02	3.74E-01	3.97E+00	4.18E-01	4.19E+01	4.69E-01	2.55E-02
60-Co(Ci)	6.21E+01	6.50E+02	6.40E-02	4.24E+02	9.50E-01	1.10E+01	2.00E+00	1.27E+02	1.79E+00	1.19E+01	2.28E-01	3.09E+01	4.64E-01	3.67E-02
63-Ni(Ci)	2.39E-01	1.81E+03	1.34E-01	8.74E+02	4.77E+02	6.55E+03	2.79E+02	9.95E+03	3.12E+01	3.23E+02	3.32E+01	3.46E+03	3.65E+01	2.38E+00
79-Se(Ci)	3.95E+01	0.00E+00	2.11E+01	0.00E+00	1.49E+01	1.24E+00	8.90E+01	7.61E+00	2.89E+00	3.58E-03	2.21E+01	2.92E-01	1.47E+00	3.77E-07
90-Sr(Ci)	1.11E+05	3.94E+06	6.31E+02	2.06E+06	8.94E+02	3.51E+06	1.10E+05	1.48E+06	9.78E+03	1.52E+05	3.18E+03	9.41E+05	2.45E+03	2.76E+03
90-Y(Ci)	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
93-Zr(Ci)	0.00E+00	1.73E+02	1.09E-02	8.61E+01	3.64E+00	6.27E+01	1.27E+01	4.15E+02	3.94E+00	3.43E+01	1.69E+00	9.46E+01	4.79E+00	8.70E-02
93m-Nb(Ci)	7.04E+00	3.23E+01	1.65E+00	1.51E+01	4.02E+00	2.24E+01	9.31E+00	1.17E+02	1.29E+00	7.28E+00	4.97E-01	2.53E+01	1.06E+00	1.02E-02
99-Tc(Ci)	9.12E+02	1.26E+02	5.53E+02	1.03E-03	1.89E+01	1.02E+01	3.34E+01	2.75E+01	1.72E+02	6.34E+01	1.26E+02	3.45E+01	2.99E+02	1.15E+01
Total Radionuclides	4.95E+06	4.47E+06	2.69E+06	2.32E+06	5.04E+04	3.77E+06	1.54E+05	1.85E+06	3.45E+05	3.34E+05	1.48E+05	1.04E+06	3.43E+05	1.40E+04

Table D-1. High-Level Waste Composition in Delivered Feed.

HLW Batch Group	1		2		3		4		5		6		7	
Source Tanks	AZ-101		AZ-102		AY-102/C-106		AY-101/C-104		SY-102		C-107/AW-103		AW-104/AW-103	
Total Volume (gal)	8.07E+05		8.52E+05		5.48E+05		8.91E+05		5.49E+05		8.46E+05		8.08E+05	
Liquid Volume (gal), Sp	7.97E+05	1.25E+00	8.37E+05	1.13E+00	5.15E+05	1.07E+00	8.34E+05	1.10E+00	5.34E+05	1.22E+00	8.04E+05	1.15E+00	7.95E+05	1.39E+00
Solid Volume (gal), Sp	9.00E+03	3.00E+00	1.50E+04	3.00E+00	3.36E+04	3.00E+00	5.75E+04	2.96E+00	1.49E+04	2.99E+00	4.18E+04	3.00E+00	1.32E+04	3.00E+00
Component	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid
	Chemicals (kilograms)													
Ag	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E-16	0.00E+00	3.63E-11	3.38E+00	2.87E+02	2.46E+00	2.05E+02
Al(OH)4-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E-02	0.00E+00	5.80E-02	0.00E+00	2.30E-02	0.00E+00	3.00E-02	0.00E+00	2.30E-02	0.00E+00
Al	3.30E+04	1.26E+04	4.72E+03	2.00E+04	2.70E+03	3.40E+04	1.11E+03	8.52E+04	2.56E+04	2.01E+04	2.27E+04	3.72E+04	6.53E+04	4.96E+03
As	0.00E+00	1.17E+02	0.00E+00	4.66E-04	0.00E+00	5.34E-33	0.00E+00	1.84E-67	0.00E+00	3.82E+00	3.38E+00	1.05E+03	2.45E+00	7.50E+02
B	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+00	6.94E+02	1.21E+00	4.95E+02
Ba	8.16E+00	0.00E+00	1.35E-07	0.00E+00	1.40E-49	1.11E+01	2.19E-97	9.08E-01	4.91E+00	2.56E+01	1.74E+00	5.37E+02	1.35E+00	3.82E+02
Be	0.00E+00	3.54E+00	0.00E+00	1.41E-05	0.00E+00	1.61E-34	0.00E+00	5.55E-69	0.00E+00	1.14E-01	1.67E-01	5.87E+01	1.22E-01	4.18E+01
Bi	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.62E+00	5.91E-01	6.65E+00	2.18E+01	1.92E+01	3.82E+02	2.14E+01	1.45E+04	4.67E+01	1.63E+02
Ca	1.48E+00	4.91E+02	1.39E+01	8.49E+02	6.84E+00	3.00E+03	1.78E+02	3.73E+03	4.19E+01	8.48E+02	1.46E+02	1.89E+03	3.28E+02	2.76E+03
Cd	1.42E+01	0.00E+00	2.35E-07	0.00E+00	2.44E-49	0.00E+00	3.82E-97	0.00E+00	9.25E-01	1.20E+01	1.92E-01	5.39E+01	2.04E-01	3.84E+01
Ce	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-39	1.10E-37	2.40E-47	2.09E-13	7.03E+00	1.38E-01	1.35E+01	1.09E+03	2.56E+01	7.65E+02
Cl	6.01E+02	1.18E+01	2.94E+01	4.13E-03	1.53E+03	2.01E-01	1.08E+03	3.40E-02	7.24E+03	2.59E+00	6.37E+03	1.00E-01	1.57E+04	6.10E-02
CN	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Co	0.00E+00	2.34E+02	0.00E+00	9.29E-04	0.00E+00	1.07E-32	0.00E+00	3.67E-67	0.00E+00	7.60E+00	1.21E+00	2.15E+02	8.62E-01	1.53E+02
CO3-2	1.03E+05	1.28E+00	1.09E+05	6.88E+03	6.24E+04	7.39E+04	5.73E+04	8.69E+03	2.96E+04	3.50E+03	2.49E+04	1.02E+04	1.08E+05	5.49E+01
Cr(OH)4-	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-04	0.00E+00	4.05E-04	0.00E+00	1.58E-03	0.00E+00	1.22E-03	0.00E+00	9.19E-04	0.00E+00
Cr(TOTAL)	2.34E+03	1.72E+02	3.15E+03	4.17E+02	4.09E+02	9.41E+02	1.73E+02	1.77E+03	1.71E+03	4.82E+03	1.60E+03	1.36E+03	3.15E+03	1.65E+03
Cs	1.08E+02	3.40E+01	6.67E+01	1.02E+01	2.24E+00	9.08E+00	2.15E+00	2.82E+00	1.28E+01	1.75E+01	6.44E+00	2.22E+00	1.25E+01	7.95E+00
Cu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.34E-01	1.07E+02	2.40E-01	7.65E+01
F	5.68E+03	1.36E+02	3.29E+03	8.45E+01	5.09E+02	1.11E+02	3.04E+04	5.17E+01	8.54E+02	1.42E+02	3.48E+04	9.03E+03	3.66E+04	8.13E+03
Fe	3.39E+01	2.02E+04	3.34E+01	3.75E+04	5.13E+00	6.10E+04	9.96E+00	3.96E+04	2.11E+01	4.49E+03	4.76E+01	4.11E+04	1.22E+02	5.00E+03
H+	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
H2O	2.69E+06	0.00E+00	3.03E+06	0.00E+00	1.90E+06	0.00E+00	3.10E+06	0.00E+00	1.77E+06	0.00E+00	2.77E+06	0.00E+00	2.47E+06	0.00E+00
Hg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-01	3.03E+01	4.21E+00	1.21E+02	5.06E-01	1.63E-04	7.50E-02	8.07E+01	8.20E-02	1.04E-04
K	1.42E+04	7.23E+02	9.81E+03	4.10E+02	5.83E+02	5.48E+02	4.95E+02	1.25E+03	3.21E+03	2.51E+03	1.16E+04	4.79E+02	1.96E+04	2.15E+02
La	9.42E-05	7.69E+02	8.57E+00	1.29E+03	4.59E+00	5.48E+02	1.89E+00	8.16E+02	2.16E+00	5.12E+01	4.82E+00	6.30E+02	9.28E+00	3.64E+02
Li	0.00E+00	1.50E+01	0.00E+00	5.94E-05	0.00E+00	6.81E-34	0.00E+00	2.35E-68	0.00E+00	4.85E-01	3.59E-01	1.05E+02	3.37E-01	7.52E+01
Mg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.50E-02	1.07E+03	2.24E-01	7.65E+02
Mn	4.07E-02	6.14E+02	2.26E+00	8.21E+02	1.44E+00	7.40E+03	4.02E-01	6.72E+03	2.49E+01	1.27E+03	7.43E+00	2.02E+03	1.98E+01	1.63E+03
Mo	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+00	5.36E+02	1.21E+00	3.82E+02
Na	3.34E+05	3.86E+03	1.72E+05	1.06E+04	6.63E+04	5.84E+04	1.15E+05	9.29E+04	2.17E+05	7.56E+04	2.42E+05	5.51E+04	5.66E+05	1.85E+03
Nd	0.00E+00	5.51E+02	0.00E+00	2.00E-03	0.00E+00	2.51E-32	0.00E+00	8.63E-67	0.00E+00	1.79E+01	3.37E+00	1.05E+03	2.40E+00	7.50E+02
NH3	9.05E+02	0.00E+00	4.25E+02	0.00E+00	4.41E+01	1.07E+03	1.13E+03	1.07E+03	2.77E+03	1.74E+00	5.18E+03	1.11E+03	7.56E+03	1.00E-03
Ni	1.58E-01	1.18E+03	6.63E+00	2.54E+03	5.66E+01	7.28E+02	1.20E+02	2.65E+03	1.72E+01	1.87E+02	8.40E+01	1.34E+03	1.17E+02	2.03E+03
NO2	1.98E+05	2.79E+03	9.54E+04	9.50E+01	1.55E+04	7.12E+01	5.44E+04	1.37E+02	9.89E+04	5.10E+02	9.29E+04	1.03E+02	2.24E+05	1.09E+02
NO3	2.30E+05	2.17E+03	7.33E+04	5.56E+01	1.26E+03	1.49E+01	3.56E+04	1.75E+02	1.95E+05	9.38E+02	1.46E+05	2.99E+04	3.76E+05	5.89E+02
OH(BOUND)	5.09E+04	4.12E+04	7.52E+02	7.45E+04	6.95E+03	1.13E+05	1.92E+03	2.73E+05	4.53E+04	4.04E+04	3.72E+04	1.25E+05	7.90E+04	2.68E+04
OH-	5.16E+04	0.00E+00	6.77E+03	0.00E+00	4.94E+02	0.00E+00	4.47E+04	0.00E+00	4.65E+04	0.00E+00	6.47E+04	0.00E+00	1.65E+05	0.00E+00
Pb	0.00E+00	3.96E+02	0.00E+00	3.12E+02	9.78E+01	2.12E+03	2.09E+02	9.80E+02	4.83E+02	3.38E+02	1.98E+02	2.92E+03	4.36E+02	7.90E+02
Pd	0.00E+00	3.71E-04	0.00E+00	1.47E-09	0.00E+00	1.69E-38	0.00E+00	5.81E-73	0.00E+00	1.20E-05	4.47E+00	4.81E-11	3.19E+00	2.61E-55
PO4	4.44E+03	9.40E+01	4.23E+02	3.73E-04	8.07E+03	3.16E+03	5.51E+03	2.89E+03	4.70E+03	3.41E+03	3.45E+04	2.80E+04	9.39E+03	1.29E+03
Pr	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Pu	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rb	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rh	0.00E+00	8.88E+01	0.00E+00	3.52E-04	0.00E+00	4.04E-33	0.00E+00	1.39E-67	0.00E+00	2.88E+00	8.40E-02	4.38E+02	6.10E-02	3.12E+02
Ru	0.00E+00	1.80E+02	0.00E+00	7.15E-04	0.00E+00	8.20E-33	0.00E+00	2.82E-67	0.00E+00	5.85E+00	3.30E-02	5.48E+01	2.55E-02	3.91E+01
Sb	0.00E+00	5.51E+02	0.00E+00	2.00E-03	0.00E+00	2.51E-32	0.00E+00	8.63E-67	0.00E+00	1.79E+01	2.03E+00	7.41E+02	1.45E+00	5.29E+02
Se	0.00E+00	3.71E+02	0.00E+00	1.00E-03	0.00E+00	1.69E-32	0.00E+00	5.81E-67	0.00E+00	1.20E+01	3.34E-01	1.83E+02	2.40E-01	1.30E+02
Si	1.11E+03	1.86E+02	1.68E+03	1.25E+03	1.03E+03	9.51E+03	5.15E+02	9.63E+03	2.00E+02	9.17E+02	9.75E+02	1.03E+04	1.15E+03	1.68E+03
SO4	5.49E+04	8.56E+02	5.68E+04	2.38E+02	4.58E+03	2.08E+02	7.23E+03	9.71E+01	9.54E+03	1.13E+03	8.56E+03	3.41E+02	1.59E+04	1.40E+03

Table D-1. High-Level Waste Composition in Delivered Feed.

HLW Batch Group	1		2		3		4		5		6		7	
Source Tanks	AZ-101		AZ-102		AY-102/C-106		AY-101/C-104		SY-102		C-107/AW-103		AW-104/AW-103	
Total Volume (gal)	8.07E+05		8.52E+05		5.48E+05		8.91E+05		5.49E+05		8.46E+05		8.08E+05	
Liquid Volume (gal), Sp	7.97E+05	1.25E+00	8.37E+05	1.13E+00	5.15E+05	1.07E+00	8.34E+05	1.10E+00	5.34E+05	1.22E+00	8.04E+05	1.15E+00	7.95E+05	1.39E+00
Solid Volume (gal), Sp	9.00E+03	3.00E+00	1.50E+04	3.00E+00	3.36E+04	3.00E+00	5.75E+04	2.96E+00	1.49E+04	2.99E+00	4.18E+04	3.00E+00	1.32E+04	3.00E+00
Component	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid	Liquid	Solid
Sr (w/o 90 Sr)	2.80E+00	9.93E+01	6.02E-01	9.38E+01	6.65E-01	1.03E+02	3.06E+01	1.11E+02	1.52E+00	2.56E+01	5.37E+00	2.14E+02	5.71E+00	7.39E+01
Ta	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.00E+01	0.00E+00	4.99E+01
Tc	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Te	0.00E+00	3.93E+02	0.00E+00	2.00E-03	0.00E+00	1.79E-32	0.00E+00	6.17E-67	0.00E+00	1.28E+01	1.17E-01	1.83E+02	8.20E-02	1.30E+02
Th	0.00E+00	2.52E+02	0.00E+00	1.00E-03	0.00E+00	1.15E-32	0.00E+00	3.96E-67	0.00E+00	8.20E+00	1.17E-01	1.83E+02	8.20E-02	1.30E+02
Ti	0.00E+00	1.33E+02	0.00E+00	5.28E-04	0.00E+00	6.06E-33	0.00E+00	2.09E-67	0.00E+00	4.33E+00	3.34E-01	1.02E+02	2.40E-01	7.24E+01
Tl	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.76E+00	2.11E+03	4.82E+00	1.50E+03
TOC	4.35E+03	1.31E+03	4.99E+03	6.53E+02	6.59E+03	8.15E+03	5.30E+03	7.73E+03	3.64E+03	5.58E+03	8.65E+03	2.51E+03	1.48E+04	4.84E+03
U (w/o 232, 3, 4, 5, 6, &	2.04E-02	2.13E+00	1.61E-01	2.38E+00	1.54E+01	1.27E+00	3.40E-02	2.38E+01	3.25E-03	7.27E-01	1.02E+00	5.90E-02	2.29E+00	2.93E+01
V	0.00E+00	5.30E+00	0.00E+00	2.10E-05	0.00E+00	2.41E-34	0.00E+00	8.31E-69	4.81E+00	1.73E-01	1.91E+00	5.54E+02	1.62E+00	3.95E+02
W	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Y	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zn	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.85E-01	1.21E+02	4.85E-01	8.60E+01
Zr	0.00E+00	7.15E+03	1.31E+01	5.20E+03	6.56E+00	8.08E+02	1.29E+01	7.51E+04	6.55E+00	2.73E+02	1.85E+03	6.54E+04	1.43E+03	4.63E+04
Sr (inc. 90Sr)	3.61E+00	1.28E+02	6.07E-01	1.09E+02	6.72E-01	1.28E+02	3.14E+01	1.22E+02	1.59E+00	2.67E+01	5.40E+00	2.21E+02	5.72E+00	7.39E+01
U (inc. all U isotopes)	1.54E+01	2.13E+03	4.84E+02	7.02E+03	4.99E+02	2.48E+03	1.02E+02	2.86E+04	4.67E+02	7.59E+02	1.30E+03	2.16E+04	1.34E+03	2.94E+04
Total Chemicals	3.77E+06	1.02E+05	3.57E+06	1.71E+05	2.08E+06	3.81E+05	3.46E+06	6.43E+05	2.46E+06	1.68E+05	3.51E+06	4.74E+05	4.18E+06	1.50E+05

Table D-2. Composition of Immobilized High-Level Waste Glass.

HLW Batch Group	1	2	3	4	5	6	7
Source Tanks	AZ-101	AZ-102	AY-102/ C-106	AY-101/ C-104	SY-102	C-107/ AW-103	AW-104/ AW-103
Oxide (kg)	Total Oxides including Waste and Frit						
Al2O3	2.41E+04	3.78E+04	2.11E+04	1.39E+04	8.66E+04	4.64E+04	3.05E+04
As2O5	1.80E+02	7.15E-04	8.20E-33	2.82E-67	5.85E+00	1.61E+03	1.15E+03
BaO	0.0356591	1.008E-09	12.398	1.012	28.639	599.216	426.79
Bi2O3	0.00E+00	0.00E+00	7.46E-01	2.44E+01	4.26E+02	1.57E+04	1.82E+02
B2O3	1.53E+04	1.99E+04	5.08E+04	5.25E+04	1.11E+05	4.37E+04	2.74E+04
CaO	8.39E+02	1.32E+03	3.59E+04	8.17E+04	8.59E+03	2.86E+03	3.95E+03
CdO	7.10E-02	2.63E-03	1.17E-04	3.60E-03	1.37E+01	6.16E+01	4.39E+01
CeO2	0.00E+00	0.00E+00	1.29E-37	2.44E-13	2.04E-01	1.27E+03	8.96E+02
Cl-	1.43E+01	1.99E-01	1.92E+01	1.07E+01	4.01E+01	7.14E+01	7.12E+01
Cr2O3	2.66E+02	6.40E+02	9.63E+02	1.54E+03	3.48E+03	1.20E+03	2.07E+03
Co2O3	3.29E+02	1.45E-03	1.47E-05	1.67E-04	1.07E+01	3.02E+02	2.15E+02
CuO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E+02	9.57E+01
Dy2O3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
F-	1.59E+02	1.07E+02	1.17E+02	3.51E+02	1.47E+02	9.42E+03	8.30E+03
Fe2O3	2.89E+04	5.36E+04	8.66E+04	5.60E+04	4.97E+04	5.87E+04	1.10E+04
La2O3	9.01E+02	1.51E+03	6.43E+02	9.57E+02	6.00E+01	7.39E+02	4.27E+02
PbO	4.57E+02	3.61E+02	2.45E+03	1.13E+03	3.93E+02	3.38E+03	9.14E+02
Li2O	9.95E+03	1.50E+04	1.38E+04	2.02E+04	1.90E+04	2.29E+04	1.57E+04
MgO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.78E+03	1.27E+03
MnO2	7.92E+02	1.06E+03	2.37E+04	4.27E+04	4.94E+03	2.61E+03	2.11E+03
MoO3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.04E+02	5.74E+02
Nd2O3	6.43E+02	3.00E-03	2.92E-32	1.01E-66	2.09E+01	1.23E+03	8.74E+02
NiO	1.67E+03	3.58E+03	1.03E+03	3.73E+03	2.64E+02	1.89E+03	2.86E+03
P2O5	8.40E+01	2.11E+00	7.62E+02	8.18E+02	8.13E+02	5.06E+03	2.20E+02
PuO2	1.62E+01	1.92E+01	2.65E+01	8.29E+01	3.50E+01	2.22E+01	1.81E+01
K2O	9.43E+02	5.72E+02	6.69E+02	1.52E+03	3.05E+03	7.33E+02	3.66E+02
Re2O3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Rh2O3	1.09E+02	4.34E-04	4.98E-33	1.72E-67	3.55E+00	5.40E+02	3.85E+02
Ru2O3	2.23E+02	8.86E-04	1.53E-11	9.42E-12	7.24E+00	6.78E+01	4.84E+01
Sb2O3	7.32E+02	6.35E-03	7.21E-06	7.54E-07	2.38E+01	9.85E+02	7.03E+02
SeO2	5.96E+02	5.65E-03	3.40E-02	1.95E-01	1.94E+01	2.94E+02	2.10E+02
SiO2	1.06E+05	1.63E+05	2.78E+05	4.66E+05	3.07E+05	3.60E+05	2.28E+05
Ag2O	0.00E+00	0.00E+00	0.00E+00	1.27E-16	3.90E-11	3.08E+02	2.20E+02
Na2O	4.10E+04	6.19E+04	6.29E+04	1.63E+05	9.72E+04	1.74E+05	1.09E+05
SrO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
SO3	9.04E+02	5.15E+02	5.03E+01	6.05E+01	7.70E+02	8.59E+01	9.65E+01
TeO2	5.41E+02	2.00E-03	2.46E-32	8.48E-67	1.76E+01	2.52E+02	1.79E+02
ThO2	2.87E+02	1.06E-03	2.75E-01	1.05E+04	5.44E+02	2.11E+02	1.49E+02
TiO2	2.22E+02	8.81E-04	1.01E-32	3.48E-67	7.21E+00	1.69E+02	1.21E+02
Tl2O3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E+03	1.68E+03
U3O8	2.27E+03	7.50E+03	2.65E+03	3.05E+04	8.07E+02	2.31E+04	3.14E+04
V2O5	9.46E+00	3.75E-05	4.30E-34	1.48E-68	3.53E-01	9.89E+02	7.05E+02
ZnO	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.50E+02	1.07E+02
ZrO2	9.76E+03	7.07E+03	1.12E+03	1.02E+05	3.87E+02	8.84E+04	6.25E+04
Am2O3	6.17E+00	3.62E+00	9.84E-01	2.05E+00	2.57E+00	4.09E-01	1.05E-03

Table D-2. Composition of Immobilized High-Level Waste Glass.

HLW Batch Group	1	2	3	4	5	6	7
Source Tanks	AZ-101	AZ-102	AY-102/ C-106	AY-101/ C-104	SY-102	C-107/ AW-103	AW-104/ AW-103
Oxide (kg)	Total Oxides including Waste and Frit						
BeO	9.83E+00	3.90E-05	4.47E-34	1.54E-68	3.19E-01	1.63E+02	1.16E+02
Cm2O3	7.38E-04	2.84E-04	5.52E-04	1.76E-04	1.87E-05	4.51E-05	8.20E-08
Cs2O	1.02E+02	5.05E+01	2.77E+01	4.95E+01	5.40E+01	2.85E+01	1.95E+01
Nb2O5	1.67E-04	7.84E-05	1.17E-04	6.07E-04	3.79E-05	1.31E-04	8.45E-08
NpO2	2.74E+01	1.46E+01	1.21E-01	1.84E-01	1.46E+00	2.09E-01	1.52E-02
Rb2O	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Sm2O3	4.94E+00	2.47E+00	2.26E+00	1.24E+01	1.02E+00	3.05E+00	2.97E-03
SnO2	2.57E+00	1.23E+00	1.04E+00	6.58E+00	4.81E-01	1.53E+00	1.63E-03
Tc2O7	8.41E+01	4.76E+01	4.26E+01	1.74E+02	9.19E+01	9.87E+01	1.92E+01
WO3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TOTAL	2.49E+05	3.75E+05	5.84E+05	1.05E+06	6.96E+05	8.75E+05	5.48E+05
Oxide (just glass frit)	Mass (kg)	Mass (kg)	Mass (kg)	Mass (kg)	Mass (kg)	Mass (kg)	Mass (kg)
SiO2	1.06E+05	1.60E+05	2.63E+05	4.54E+05	3.06E+05	3.40E+05	2.25E+05
B2O3	1.53E+04	1.99E+04	5.08E+04	5.25E+04	1.11E+05	4.15E+04	2.58E+04
Na2O	3.39E+04	4.61E+04	5.56E+04	1.56E+05	7.96E+03	1.62E+05	1.04E+05
Li2O	9.91E+03	1.50E+04	1.38E+04	2.02E+04	1.90E+04	2.27E+04	1.55E+04
Al2O3	0.00E+00	0.00E+00	8.81E+03	7.23E+03	7.56E+04	2.11E+04	2.41E+04
Fe2O3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.33E+04	0.00E+00	3.81E+03
TOTAL	1.65E+05	2.41E+05	3.92E+05	6.90E+05	5.63E+05	5.88E+05	3.98E+05
In Glass without Frit							
Non-volatile waste oxide (kg)	8.37E+04	1.34E+05	1.92E+05	3.59E+05	1.33E+05	2.87E+05	1.50E+05

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