

Appendix D

Summary of Quality Assurance Crosscheck Analyses

Table D - 1

**Comparison of Radiological Concentrations in Crosscheck Samples
between the West Valley Demonstration Project and the
Environmental Measurements Laboratory (EML)
Quality Assessment Program 36**

Isotope	Matrix	Actual	Reported	Ratio	Accept ?	Analyzed by
Be-7	Air	2.86E+01	2.96E+01	1.03	Yes	TI
Mn-54	Air	5.97E+00	6.10E+00	1.02	Yes	TI
Co-57	Air	7.93E+00	6.99E+00	0.88	Yes	TI
Co-60	Air	5.81E+00	5.81E+00	1.00	Yes	TI
Sr-90	Air	2.07E-01	3.63E-01	1.75	No	TI
Cs-134	Air	4.44E+00	4.11E+00	0.93	Yes	TI
Cs-137	Air	5.76E+00	6.07E+00	1.05	Yes	TI
Ce-144	Air	6.39E+01	6.48E+01	1.01	Yes	TI
Pu-238	Air	2.70E-01	2.52E-01	0.93	Yes	TI
Pu-239	Air	2.85E-01	2.81E-01	0.99	Yes	TI
Am-241	Air	3.34E-01	5.55E-01	1.66	No	TI
U (Bq/filter)	Air	2.00E-01	8.81E-01	4.40	No	TI
K-40	Soil	7.19E+02	7.99E+02	1.11	Yes	TI
Sr-90	Soil	4.50E+00	8.88E+00	1.97	No	TI
Cs-137	Soil	5.23E+00	6.81E+00	1.30	Pass	TI
Pu-238	Soil	5.00E-02	7.03E-02	1.41	Pass	TI
Pu-239	Soil	2.55E+01	1.41E+01	0.55	Pass	TI
Am-241	Soil	7.00E-02	9.99E-02	1.43	Pass	TI
U(Bq/kg)	Soil	5.93E+01	5.18E+01	1.04	Yes	TI
K-40	Veg	2.94E+02	4.40E+02	1.50	Pass	TI
Sr-90	Veg	3.76E+02	3.70E+02	0.98	Yes	TI
Cs-137	Veg	2.46E+01	3.57E+01	1.45	Pass	TI
Am-241	Veg	2.10E-01	4.07E-01	1.94	No	TI
H-3	Water	2.27E+02	2.26E+02	0.99	Yes	EL
Mn-54	Water	5.66E+01	5.88E+01	1.04	Yes	TI
Fe-55	Water	1.33E+02	2.22E+02	1.67	No	TI
Co-60	Water	9.40E+01	9.69E+01	1.03	Yes	TI
Sr-90	Water	2.13E+00	5.18E+00	2.43	No	TI
Cs-134	Water	7.18E+01	7.36E+01	1.03	Yes	TI
Cs-137	Water	8.46E+01	9.10E+01	1.08	Yes	TI
Ce-144	Water	1.89E+02	1.88E+02	0.99	Yes	TI
Pu-238	Water	4.50E-01	4.44E-01	0.99	Yes	TI
Pu-239	Water	5.80E-01	5.18E-01	0.89	Yes	TI
Am-241	Water	5.10E-01	1.89E-01	0.37	No	TI
U (µg/mL)	Water	3.30E-02	3.00E-02	0.91	Yes	TI

Units for air filters: Bq/filter; soil and vegetation: Bq/kg; water: Bq/L.

Uranium units as listed in the table. Samples analyzed by the Environmental Laboratory (EL) or Teledyne Isotopes (TI).

Acceptance limits of reported to actual ratio: **Yes** indicates a result within warning limits of 0.8 to 1.2;
Pass indicates a result within control limits of 0.5 to 1.5 but outside warning limits; **No** indicates a result outside control limits.

Table D - 2

**Comparison of Radiological Concentrations in Crosscheck Samples
between the West Valley Demonstration Project and the Environmental
Measurements Laboratory (EML) Quality Assessment Program 37**

Isotope	Matrix	Actual	Reported	Ratio	Accept ?	Analyzed by
Be-7	Air	3.08E+02	4.38E+02	1.42	Pass	CEP
Co-60	Air	3.06E+00	2.01E+00	0.66	Pass	CEP
Sr-90	Air	1.37E-01	2.72E-01	1.99	No	CEP
Cs-134	Air	3.72E+00	3.92E+00	1.05	Yes	CEP
Cs-137	Air	5.82E+00	7.14E+00	1.23	Pass	CEP
Pu-238	Air	4.20E-02	7.03E-02	1.67	No	CEP
Pu-239	Air	4.50E-02	8.07E-02	1.79	No	CEP
Am-241	Air	3.20E-02	3.02E-01	9.44	No	CEP
U (µg/filter)	Air	1.28E+00	1.07E+00	0.84	Yes	CEP
K-40	Soil	3.84E+02	6.07E+02	1.58	No	CEP
Sr-90	Soil	9.57E+00	1.63E+01	1.70	No	CEP
Cs-137	Soil	2.85E+02	3.74E+02	1.31	Pass	CEP
Pu-238	Soil	2.19E+01	2.37E+01	1.08	Yes	CEP
Pu-239	Soil	7.76E+00	8.14E+00	1.05	Yes	CEP
Am-241	Soil	1.83E+00	2.18E+00	1.19	Yes	CEP
U (µg/g)	Soil	2.32E+00	3.99E-01	0.17	No	CEP
K-40	Veg	1.01E+03	1.11E+03	1.10	Yes	CEP
Sr-90	Veg	4.89E+02	3.40E+02	0.70	Pass	CEP
Cs-137	Veg	2.92E+01	3.22E+01	1.10	Yes	CEP
H-3	Water	1.18E+02	1.23E+02	1.04	Yes	EL
Co-60	Water	2.78E+01	3.04E+01	1.09	Yes	EL
Sr-90	Water	2.29E+00	5.03E-01	0.23	No	CEP
Cs-134	Water	4.41E+01	4.82E+01	1.09	Yes	EL
Cs-137	Water	2.90E+01	3.35E+01	1.16	Yes	EL
Pu-238	Water	1.97E+00	1.21E+00	0.61	Pass	CEP
Pu-239	Water	2.39E-01	3.00E-01	1.26	Pass	CEP
Am-241	Water	2.05E-01	6.25E-01	3.05	No	CEP
U (Bq/L)	Water	2.30E-01	7.73E-02	0.34	No	CEP

Units for air filters: Bq/filter; soil and vegetation: Bq/kg; water: Bq/L.

Uranium units as listed in the table. Samples analyzed by the Environmental Laboratory (EL) or Controls for Environmental Pollution (CEP).

*Acceptance limits of reported to actual ratio: **Yes** indicates a result within warning limits of 0.8 to 1.2; **Pass** indicates a result within control limits of 0.5 to 1.5 but outside warning limits; **No** indicates a result outside control limits.*

Table D - 3**Comparison of Radiological Concentrations in Crosscheck Samples
between the West Valley Demonstration Project and the U.S. Environmental
Protection Agency's Environmental Monitoring Systems Laboratory (EMSL)**

Sample	Analyte	Matrix	Actual	Reported	Accept ?	Analyzed by
PE-A (April 1992)	Alpha	Water	40.0	34.3	Yes	TI
	Ra-226	Water	14.9	15.3	Yes	TI
	Ra-228	Water	14.0	15.0	Yes	TI
	U(Nat)	Water	4.0	3.9	Yes	TI
PE-B (April 1992)	Beta	Water	140.0	97.7	No	TI
	Sr-89	Water	15.0	15.7	Yes	TI
	Sr-90	Water	17.0	13.0	Yes	TI
	Co-60	Water	56.0	57.0	Yes	TI
	Cs-134	Water	24.0	23.3	Yes	TI
	Cs-137	Water	22.0	25.0	Yes	TI
PE-A (Oct 1992)	Alpha	Water	29.0	25.0	Yes	EL
	Ra-226	Water	7.4	6.07	Pass	CEP
	Ra-228	Water	10.0	11.9	Yes	CEP
	U(Nat)	Water	10.2	4.93	No	CEP
PE-B (Oct 1992)	Beta	Water	53.0	49.0	Yes	EL
	Sr-89	Water	8.0	11.0	Yes	CEP
	Sr-90	Water	10.0	10.7	Yes	CEP
	Co-60	Water	15.0	14.3	Yes	EL
	Cs-134	Water	5.0	5.7	Yes	EL
	Cs-137	Water	8.0	8.0	Yes	EL
GAM (Feb 1992)	Co-60	Water	40.0	45.0	Yes	EL
	Zn-65	Water	148.0	148.3	Yes	TI
	Ru-106	Water	203.0	192.0	Yes	TI
	Cs-134	Water	31.0	33.0	Yes	EL
	Cs-137	Water	49.0	50.3	Yes	EL
	Ba-133	Water	76.0	79.0	Yes	TI
GAM (June 1992)	Co-60	Water	20.0	22.0	Yes	EL
	Zn-65	Water	99.0	107.3	Yes	EL
	Ru-106	Water	141.0	134.3	Yes	EL
	Cs-134	Water	15.0	12.3	Yes	EL
	Cs-137	Water	15.0	17.3	Yes	EL
	Ba-133	Water	98.0	96.7	Yes	EL
TRW (Feb 1992)	H-3	Water	7904.0	83.7	No	EL
TRW (June 1992)	H-3	Water	2125.0	2158.0	Yes	EL

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Table D - 3 (concluded)

**Comparison of Radiological Concentrations in Crosscheck Samples
between the West Valley Demonstration Project and the U.S. Environmental
Protection Agency's Environmental Monitoring Systems Laboratory (EMSL)**

Sample	Analyte	Matrix	Actual	Reported	Accept ?	Analyzed by
AF (March 1992)	Alpha	Filter	7.0	8.7	Yes	EL
	Beta	Filter	41.0	43.3	Yes	EL
	Sr-90	Filter	15.0	12.7	Yes	TI
	Cs-137	Filter	10.0	10.0	Yes	TI
AF (Aug 1992)	Alpha	Filter	30.0	32.3	Yes	EL
	Beta	Filter	69.0	81.0	Pass	EL
	Sr-90	Filter	25.0	19.7	Yes	CEP
	Cs-137	Filter	18.0	27.0	No	CEP
Milk (April 1992)	Sr-89	Milk	38.0	29.3	Pass	TI
	Sr-90	Milk	29.0	27.7	Yes	TI
	I-131	Milk	78.0	72.7	Yes	TI
	Cs-137	Milk	39.0	43.3	Yes	TI
	Total K	Milk	1710.0	1720.0	Yes	TI
Milk (Sept 1992)	Sr-90	Milk	15.0	27.7	No	TI
	Cs-137	Milk	15.0	21.3	Pass	TI
	Total K	Milk	1750.0	1590.0	No	TI
ABW (May 1992)	Alpha	Water	15.0	8.3	Pass	EL
	Beta	Water	44.0	45.0	Yes	EL
ABW (Sept 1992)	Alpha	Water	45.0	19.7	No	EL
	Beta	Water	50.0	47.0	Yes	EL
PUW (Aug 1992)	Pu-239	Water	9.0	7.8	Pass	CEP

Units for water and milk = pCi/L; for air filters = pCi/filter.

Samples analyzed by the Environmental Laboratory (EL), Teledyne Isotopes (TI), or Controls for Environmental Pollution (CEP) as indicated.

Explanation of codes: PE-A = Performance Evaluation (Alpha); PE-B = Performance Evaluation (Beta); GAM = Gamma in water; TRW = Tritium in water; AF = Air filter; MILK = Milk sample; ABW = Alpha and beta in water; PUW = Plutonium in water.

Acceptance limits as defined for individual analytes and matrices by EMSL differ from crosscheck to crosscheck. **Yes** indicates a result within warning limits; **Pass** indicates a result within control limits but outside warning limits; **No** indicates a result outside control limits.

Table D - 4

**Comparison of Water Quality Parameters in Crosscheck Samples
between the West Valley Demonstration Project and the U.S. Environmental
Protection Agency 1992 Discharge Monitoring Report Quality Assurance
Program #11 for the National Pollutant Discharge Elimination System**

Analyte	Units	Actual (EPA)	Reported (WVNS)	Accept ?	Analyzed by
Aluminum	µg/L	2100	2080	Yes	E&E
Arsenic	µg/L	100	96.2	Yes	E&E
Beryllium	µg/L	100	83.2	Yes	E&E
Cadmium	µg/L	250	262	Yes	E&E
Chromium	µg/L	800	789	Yes	E&E
Cobalt	µg/L	110	97.4	Check	E&E
Copper	µg/L	790	771	Yes	E&E
Iron	µg/L	1500	1480	Yes	E&E
Lead	µg/L	550	509	Yes	E&E
Manganese	µg/L	810	816	Yes	E&E
Mercury	µg/L	5.3	4.6	Yes	E&E
Nitrate	µg/L	740	773	Yes	E&E
Selenium	µg/L	14.0	13.7	Yes	E&E
Vanadium	µg/L	10000	10000	Yes	E&E
Zinc	µg/L	360	344	Yes	E&E
pH		9.40	9.42	Yes	EL
Total Suspended Solids	mg/L	25.0	25.4	Yes	EL
Oil and Grease	mg/L	19.0	17.4	Yes	E&E
Ammonia-N	mg/L	2.50	2.62	Yes	EL
Nitrate-N	mg/L	15.0	15.1	Yes	E&E
Kjeldahl-N	mg/L	34.0	33.4	Yes	E&E
Total K	mg/L	0.94	1.06	Yes	E&E
Total Organic Carbon	mg/L	22.2	21.6	Yes	EL
BOD-5	mg/L	36.0	37.9	Yes	EL
Cyanide	mg/L	0.610	0.602	Yes	E&E
Phenolics	mg/L	0.207	0.386	No	E&E
Total Residual Chlorine	mg/L	0.440	0.200	No	E&E

Analyses were conducted by Ecology & Environment (E&E) or the Environmental Laboratory (EL) as indicated in the table.

Yes indicates a result within warning limits; Check indicates a result within control limits but outside warning limits; No indicates a result outside control limits. All Check or No results were analyses conducted by E&E.

Table D - 5

**Comparison of Water Quality Parameters in Crosscheck Samples
between the West Valley Demonstration Project
and the New York State Department of Health (NYSDOH) in 1992**

Analyte	Units	Actual (NYSDOH)	Reported (WVNS)	Accept ?	Analyzed By
BOD-5	mg/L	38.7	46.8	Yes	EL
		87.6	106.0	Yes	EL
		49.2	46.7	Yes	EL
		81.3	75.1	Yes	EL
Total Suspended Solids	mg/L	38.4	37.4	Yes	EL
		55.4	55.1	Yes	EL
		23.8	23.7	Yes	EL
		72.9	74.9	Yes	EL
pH		4.00	3.96	Yes	EL
		6.50	6.46	Yes	EL
		8.95	8.93	Yes	EL
		3.01	2.96	Yes	EL
NH ₃ -N	mg/L	2.17	2.31	Yes	EL
		4.29	4.62	Yes	EL
		2.96	3.01	Yes	EL
		3.63	3.71	Yes	EL
Total Organic Carbon	mg/L	24.3	23.6	Yes	EL
		54.4	54.0	Yes	EL
		30.2	29.5	Yes	EL
		49.7	49.3	Yes	EL

Samples analyzed by the Environmental Laboratory (EL).

Acceptable range determined by NYSDOH. Yes indicates a result within warning limits; Pass indicates a result within control limits but outside warning limits; No indicates a result outside control limits. The first two results for each analyte were part of the January crosscheck; the second two results were part of the July crosscheck.

Table D - 6

**Comparison of the West Valley Demonstration Project's
Thermoluminescent Dosimeters (TLDs) to the Co-located Nuclear Regulatory
Commission (NRC) TLDs in 1992**

4th Quarter 1991						
NRC TLD#	WVDP TLD#	NRC mR/90days	WVDP mR/Qtr	WVDP/NRC Ratio	Accept ?	
2	22	15.4	21.3	1.38	Pass	
3	5	N/A	23.9	N/A	N/A	
4	7	16.8	21.1	1.26	Pass	
5	9	20.4	21.0	1.03	Yes	
7	14	16.6	24.2	1.46	Pass	
8	15	17.0	22.1	1.30	Pass	
9	25	35.0	36.0	1.03	Yes	
11	24	1066	1293	1.21	Pass	
1st Quarter 1992						
NRC TLD#	WVDP TLD#	NRC mR/90days	WVDP mR/Qtr	WVDP/NRC Ratio	Accept ?	
2	22	15.8	21.5	1.36	Pass	
3	5	14.5	21.6	1.49	Pass	
4	7	15.3	17.1	1.12	Yes	
5	9	17.8	18.5	1.04	Yes	
7	14	15.7	21.8	1.39	Pass	
8	15	13.8	18.7	1.36	Pass	
9	25	29.2	33.7	1.15	Yes	
11	24	1038	1290	1.24	Pass	
2nd Quarter 1992						
NRC TLD#	WVDP TLD#	NRC mR/90days	WVDP mR/Qtr	WVDP/NRC Ratio	Accept ?	
2	22	15.6	16.7	1.07	Yes	
3	5	15.9	16.4	1.03	Yes	
4	7	16.5	16.0	.97	Yes	
5	9	19.7	15.8	.80	Yes	
7	14	15.9	17.6	1.11	Yes	
8	15	16.6	15.7	.95	Yes	
9	25	33.8	31.6	.93	Yes	
11	24	933	1124	1.21	Pass	
3rd Quarter 1992						
NRC TLD#	WVDP TLD#	NRC mR/90days	WVDP mR/Qtr	WVDP/NRC Ratio	Accept ?	
2	22	16.5	20.3	1.23	Pass	
3	5	16.8	21.1	1.26	Pass	
4	7	16.8	18.2	1.08	Yes	
5	9	18.3	19.4	1.06	Yes	
7	14	17.9	21.6	1.21	Pass	
8	15	16.6	20.2	1.22	Pass	
9	25	31.7	32.2	1.02	Yes	
11	24	949	1082	1.14	Yes	
4th Quarter 1992						
NRC TLD#	WVDP TLD#	NRC mR/90days	WVDP mR/Qtr	WVDP/NRC Ratio	Accept ?	
2	22	N/A	19.3	N/A	N/A	
3	5	14.0	20.0	1.43	Pass	
4	7	16.1	18.9	1.17	Yes	
5	9	20.5	18.8	.92	Yes	
7	14	15.5	21.8	1.41	Pass	
8	15	16.2	19.3	1.19	Yes	
9	25	32.7	30.7	.94	Yes	
11	24	1038	1078	1.04	Yes	

Acceptance limits of WVDP/NRC ratio: **Yes** indicates a result within limits of 0.8 to 1.2; **Pass** indicates a result within limits of 0.5 to 1.5 but outside 0.8 to 1.2; **No** indicates a result outside of 0.5 to 1.5.
N/A - Not available.