

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 38**

Isotope	Matrix	Actual	Reported	Ratio	Accept ?	Analyzed by
Be-7	Air	2.74E+01	2.40E+01	.88	Yes	TI
Co-60	Air	1.70E+00	1.50E+00	.88	Yes	TI
Sr-90	Air	1.52E-01	1.60E-01	1.05	Yes	TI
Cs-134	Air	1.96E+00	1.70E+00	.87	Yes	TI
Cs-137	Air	3.07E+00	2.80E+00	.91	Yes	TI
Pu-238	Air	3.63E-02	2.40E-02	.66	Pass	TI
Pu-239	Air	2.34E-02	1.90E-02	.81	Yes	TI
Am-241	Air	4.14E-02	5.20E-02	1.26	Pass	TI
U(μ g)	Air	1.80E+00	7.40E-01	.41	No	TI
K-40	Soil	3.21E+02	3.60E+02	1.12	Yes	TI
Sr-90	Soil	4.17E+01	3.50E+01	.84	Yes	TI
Cs-137	Soil	9.23E+02	1.10E+03	1.19	Yes	TI
Pu-239	Soil	1.16E+01	1.40E+01	1.21	Pass	TI
Am-241	Soil	6.50E+00	5.40E+00	.83	Yes	TI
U(Bq)	Soil	7.69E+01	3.20E+01	.42	No	TI
K-40	Veg	3.83E+02	4.80E+02	1.25	Pass	TI
Sr-90	Veg	2.37E+02	1.00E+02	.42	No	TI
Cs-137	Veg	2.46E+01	3.00E+01	1.22	Pass	TI
H-3	Water	9.70E+01	9.90E+01	1.02	Yes	EL
Co-60	Water	4.53E+01	4.90E+01	1.08	Yes	EL
Sr-90	Water	1.03E+00	1.30E+00	1.26	Pass	EL
Cs-134	Water	4.24E+01	4.40E+01	1.04	Yes	EL
Cs-137	Water	5.08E+01	5.60E+01	1.10	Yes	EL
Pu-238	Water	4.94E-01	5.00E-01	1.01	Yes	TI
Pu-239	Water	8.28E-01	7.20E-01	.87	Yes	TI
Am-241	Water	4.40E-01	3.70E-01	.84	Yes	TI
U(μ g)	Water	1.17E-02	1.10E-02	.94	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 ratio within warning limits of 0.8 to 1.2; **Pass** indicates a ratio within control limits of 0.5 to 1.5 but outside warning limits; **No** indicates a ratio 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 39**

Isotope	Matrix	Actual	Reported	Ratio	Accept ?	Analyzed by
Co-60	Air	2.05E+01	1.80E+01	.88	Yes	TI
Sr-90	Air	7.62E-01	1.20E+00	1.57	No	TI
Cs-134	Air	1.22E+01	1.10E+01	.90	Yes	TI
Cs-137	Air	1.88E+01	1.70E+01	.90	Yes	TI
Pu-238	Air	1.29E-01	1.40E-01	1.09	Yes	TI
Pu-239	Air	8.00E-02	9.60E-02	1.20	Yes	TI
Am-241	Air	6.54E-02	9.30E-02	1.42	Pass	TI
U-234	Air	6.50E-02	1.10E-01	1.69	No	TI
U-238	Air	6.50E-02	8.50E-02	1.31	Pass	TI
U(μg)	Air	5.41E+00	2.00E-01	.04	No	TI
K-40	Soil	2.86E+01	7.40E+01	2.59	No	TI
Sr-90	Soil	5.40E+00	4.80E+00	.89	Yes	TI
Cs-137	Soil	1.14E+01	1.40E+01	1.23	Pass	TI
Pu-239	Soil	1.52E+00	1.20E+00	.79	Pass	TI
Am-241	Soil	2.48E-01	3.60E+00	14.52	No	TI
U-234	Soil	2.48E+01	3.50E+00	.14	No	TI
U-238	Soil	2.55E+01	3.60E+00	.14	No	TI
U(μg)	Soil	1.97E+00	7.10E+00	3.60	No	TI
K-40	Veg	8.42E+02	9.60E+02	1.14	Yes	TI
Sr-90	Veg	2.21E+02	1.80E+01	.08	No	TI
Cs-137	Veg	8.92E+01	1.20E+02	1.35	Pass	TI
H-3	Water	2.70E+02	2.50E+02	.93	Yes	EL
Co-60	Water	9.96E+01	8.60E+01	.86	Yes	EL
Sr-90	Water	2.52E+00	3.40E+00	1.35	Pass	EL
Cs-134	Water	5.61E+01	4.40E+01	.78	Pass	EL
Cs-137	Water	7.55E+01	6.30E+01	.83	Yes	EL
Pu-238	Water	1.14E+00	1.20E+03	1,052.63	No	TI
Pu-239	Water	3.38E-01	3.40E+03	10,059.17	No	TI
Am-241	Water	1.39E+00	1.50E+02	107.91	No	TI
U(μg)	Water	8.42E-02	8.30E-02	.99	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 ratio within warning limits of 0.8 to 1.2; **Pass** indicates a ratio within control limits of 0.5 to 1.5 but outside warning limits; **No** indicates a ratio 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 1993)	Alpha	Water	95.0	97.67	Yes	EL
	Ra-226	Water	24.9	19.00	Yes	TI
	Ra-228	Water	19.0	22.33	Yes	TI
	U(Nat)	Water	28.9	32.33	Yes	TI
PE-B (April 1993)	Beta	Water	177.0	160.00	Yes	EL
	Sr-89	Water	41.0	35.67	Yes	TI
	Sr-90	Water	29.0	27.67	Yes	TI
	Co-60	Water	39.0	36.67	Yes	EL
	Cs-134	Water	27.0	23.00	Yes	EL
	Cs-137	Water	32.0	28.33	Yes	EL
PE-A (Oct 1993)	Alpha	Water	40.0	48.67	Yes	EL
	Ra-226	Water	9.9	9.63	Yes	TI
	Ra-228	Water	12.5	15.00	Yes	TI
	U(Nat)	Water	15.1	15.00	Yes	TI
PE-B (Oct 1993)	Beta	Water	58.0	57.33	Yes	EL
	Sr-89	Water	15.0	14.00	Yes	TI
	Sr-90	Water	10.0	10.33	Yes	TI
	Co-60	Water	10.0	10.33	Yes	EL
	Cs-134	Water	12.0	7.33	Yes	EL
	Cs-137	Water	10.0	9.00	Yes	EL
GAM (June 1993)	Co-60	Water	15.0	15.67	Yes	EL
	Cs-134	Water	5.0	7.00	Yes	EL
	Cs-137	Water	5.0	5.00	Yes	EL
GAM (Nov 1993)	Co-60	Water	30.0	27.33	Yes	EL
	Cs-134	Water	59.0	43.00	No	EL
	Cs-137	Water	40.0	38.33	Yes	EL

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

Samples analyzed by the Environmental Laboratory (EL) or Teledyne Isotopes (TI), 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.

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 - 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
TRW (June 1993)	H-3	Water	9,844.0	8,875.67	Yes	EL
TRW (Nov 1993)	H-3	Water	7,398.0	7,496.00	Yes	EL
AF (Aug 1993)	Alpha	Filter	19.0	21.67	Yes	EL
	Beta	Filter	47.0	53.33	Pass	EL
	Cs-137	Filter	9.0	8.00	Yes	EL
Milk (Sept 1993)	Sr-89	Milk	30.0	24.33	Yes	TI
	Sr-90	Milk	25.0	23.33	Yes	TI
	I-131	Milk	120.0	130.00	Yes	TI
	Cs-137	Milk	49.0	54.33	Yes	TI
	Total K	Milk	1,679.0	1,633.33	Yes	TI
ABW (July 1993)	Alpha	Water	15.0	14.00	Yes	EL
	Beta	Water	43.0	37.67	Yes	EL
ABW (Oct 1993)	Alpha	Water	20.0	13.67	Pass	EL
	Beta	Water	15.0	18.67	Yes	EL

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

Samples analyzed by the Environmental Laboratory (EL) or Teledyne Isotopes (TI), 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.

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.

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**Comparison of Water Quality Parameters in Crosscheck Samples
between the West Valley Demonstration Project and the U.S. Environmental
Protection Agency 1993 Discharge Monitoring Report Quality Assurance
Program #13 for the National Pollutant Discharge Elimination System (NPDES)**

Analyte	Units	Actual (EPA)	Reported (WVNS)	Accept ?	Analyzed by
Aluminum	µg/L	1,100	1,300	Pass	Recra
Arsenic	µg/L	280	294	Yes	Recra
Beryllium	µg/L	63.0	64.5	Yes	Recra
Cadmium	µg/L	8.12	8.00	Yes	Recra
Chromium	µg/L	62.0	61.6	Yes	Recra
Cobalt	µg/L	480	502	Yes	Recra
Copper	µg/L	62.0	65.2	Yes	Recra
Iron	µg/L	3,800	3970	Yes	Recra
Lead	µg/L	79.2	79.6	Yes	Recra
Manganese	µg/L	2,200	2,270	Yes	Recra
Mercury	µg/L	.983	1.020	Yes	Recra
Nickel	µg/L	130	155	No	Recra
Selenium	µg/L	23.0	21.5	Yes	Recra
Vanadium	µg/L	8,000	8,040	Yes	Recra
Zinc	µg/L	1,100	1,130	Yes	Recra
pH	SU	8.70	8.78	Yes	EL
Total Suspended Solids	mg/L	43.2	31.5	No	EL
Oil and Grease	mg/L	15.0	13.7	Yes	Recra
Ammonia-N	mg/L	5.50	5.57	Yes	EL
Nitrate-N	mg/L	34.0	34.4	Yes	Recra
Kjeldahl-N	mg/L	9.30	8.94	Yes	Recra
Total K	mg/L	3.20	2.61	Yes	Recra
Total Organic Carbon	mg/L	8.61	9.00	Yes	EL
BOD-5	mg/L	14.0	8.46	Pass	EL
Cyanide	mg/L	.250	.242	Yes	Recra
Phenolics	mg/L	.0271	.0333	Yes	Recra
Total Residual Chlorine	mg/L	.729	.727	Yes	Recra

Analyses were conducted by Recra Environmental Inc. or the Environmental Laboratory (EL) as indicated in the table.

*Acceptance limits determined by the EPA: **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.*

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**Comparison of Water Quality Parameters in Crosscheck Samples
between the West Valley Demonstration Project
and the New York State Department of Health (NYSDOH) in 1993**

Analyte	Units	Actual (NYSDOH)	Reported (WVNS)	Accept ?	Analyzed by
BOD-5	mg/L	43.4	39.6	Yes	EL
		71.5	62.9	Yes	EL
		16.9	14.9	Yes	EL
		51.4	43.2	Yes	EL
Total Organic Carbon	mg/L	27.0	27.9	Yes	EL
		44.7	46.2	Yes	EL
		10.2	10.2	Yes	EL
		31.6	31.3	Yes	EL
Total Dissolved Solids	mg/L	344.0	341.0	Yes	EL
		150.0	149.0	Yes	EL
Total Suspended Solids	mg/L	33.2	33.3	Yes	EL
		74.2	72.7	Yes	EL
		18.6	18.0	Yes	EL
		76.8	78.3	Yes	EL
pH	SU	9.39	9.38	Yes	EL
		4.80	4.69	No	EL
		2.57	2.60	Yes	EL
		7.42	7.41	Yes	EL
NH₃-N	mg/L	4.57	4.79	Yes	EL
		6.67	7.09	Yes	EL
		1.72	1.69	Yes	EL
		3.93	3.89	Yes	EL

Samples analyzed by the Environmental Laboratory (EL). Analysis for total dissolved solids added in 1993.

*Acceptance 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 1993**

NRC TLD#	WVDP TLD#	NRC mR/90 days	WVDP mR/Qtr	WVDP/NRC Ratio
1st Quarter 1993				
2	22	Missing	16.3	NA
3	5	14.0	15.1	1.08
4	7	14.4	14.8	1.03
5	9	Missing	14.8	NA
7	14	14.0	16.6	1.19
8	15	13.0	14.3	1.10
9	25	27.8	26.4	.95
11	24	979.0	1,066.4	1.09
2nd Quarter 1993				
2	22	18.4	19.5	NA
3	5	15.4	20.2	1.31
4	7	16.4	19.5	1.19
5	9	20.2	19.3	.96
7	14	Missing	21.3	NA
8	15	16.7	19.0	1.14
9	25	32.8	32.8	1.00
11	24	925.0	1,125.9	1.22
3rd Quarter 1993				
2	22	Missing	20.7	NA
3	5	17.6	23.7	1.35
4	7	16.7	18.8	1.13
5	9	16.9	19.5	1.15
7	14	18.7	22.4	1.20
8	15	17.0	19.3	1.14
9	25	30.1	32.7	1.09
11	24	936.0	991.8	1.06
4th Quarter 1993				
2	22	NR	25.9	NA
3	5	NR	24.6	NA
4	7	NR	22.7	NA
5	9	NR	23.0	NA
7	14	NR	25.7	NA
8	15	NR	24.8	NA
9	25	NR	37.7	NA
11	24	NR	1,160.9	NA

The data are evaluated and co-located TLDs with ratios outside the control limits of 0.5 to 1.5 are investigated to determine the discrepancy.

"Missing" indicates that a TLD was no longer in place at the time of collection. NR - Not reported; NA - Not available.

Results for 4th quarter NRC TLDs were not available at the time this report was prepared.