

Appendix J

Summary of Quality Assurance Crosscheck Analyses



Validating Data

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Table J-1
Comparison of Radiological Results With Known Results of Crosscheck
Samples From the DOE Environmental Measurements Laboratory (EML)
Quality Assessment Program (QAP) 54; EML-613 QAP 0103; June 2001

Analyte	Matrix	Units	Actual	Reported	Ratio	Accept?	Analyzed by:
Co-60	Air filter	Bq/filter	1.94E+01	1.91E+01	0.984	Yes	ELAB
Cs-134	Air filter	Bq/filter	2.83E+00	2.61E+00	0.922	Yes	ELAB
Cs-137	Air filter	Bq/filter	8.76E+00	8.71E+00	0.994	Yes	ELAB
Gross Alpha	Air filter	Bq/filter	3.97E+00	3.17E+00	0.798	Pass	ELAB
Gross Beta	Air filter	Bq/filter	2.58E+00	3.09E+00	1.198	Yes	ELAB
Mn-54	Air filter	Bq/filter	6.52E+00	7.36E+00	1.129	Yes	ELAB
Am-241	Air filter	Bq/filter	4.86E-01	5.19E-01	1.068	Yes	GEL
Co-60	Air filter	Bq/filter	1.94E+01	1.93E+01	0.993	Yes	GEL
Cs-134	Air filter	Bq/filter	2.83E+00	2.62E+00	0.926	Yes	GEL
Cs-137	Air filter	Bq/filter	8.76E+00	8.86E+00	1.011	Yes	GEL
Gross Alpha	Air filter	Bq/filter	3.97E+00	3.59E+00	0.904	Yes	GEL
Gross Beta	Air filter	Bq/filter	2.58E+00	2.68E+00	1.039	Yes	GEL
Mn-54	Air filter	Bq/filter	6.52E+00	6.55E+00	1.005	Yes	GEL
Pu-238	Air filter	Bq/filter	2.15E-01	2.12E-01	0.986	Yes	GEL
Pu-239	Air filter	Bq/filter	1.36E-01	1.39E-01	1.022	Yes	GEL
Sr-90	Air filter	Bq/filter	7.10E+00	8.90E+00	1.254	Yes	GEL
U-234	Air filter	Bq/filter	4.60E-02	5.90E-02	1.283	Yes	GEL
U-238	Air filter	Bq/filter	4.60E-02	3.70E-02	0.804	Pass	GEL
U (total)	Air filter	µg/filter	3.70E+00	2.89E+00	0.781	Pass	GEL
Ac-228	Soil	Bq/kg	4.27E+01	4.18E+01	0.979	Yes	GEL
Am-241	Soil	Bq/kg	1.48E+01	1.42E+01	0.959	Yes	GEL
Bi-212	Soil	Bq/kg	4.20E+01	2.45E+01	0.583	Yes	GEL
Bi-214	Soil	Bq/kg	3.26E+01	2.66E+01	0.816	Pass	GEL
Cs-137	Soil	Bq/kg	1.74E+03	1.84E+03	1.055	Yes	GEL
K-40	Soil	Bq/kg	4.68E+02	5.19E+02	1.109	Yes	GEL
Pb-212	Soil	Bq/kg	4.15E+01	4.43E+01	1.067	Yes	GEL
Pb-214	Soil	Bq/kg	3.43E+01	3.11E+01	0.907	Yes	GEL
Pu-239	Soil	Bq/kg	2.56E+01	2.68E+01	1.047	Yes	GEL
Sr-90	Soil	Bq/kg	6.90E+01	6.66E+01	0.965	Yes	GEL
Th-234	Soil	Bq/kg	4.66E+01	6.09E+01	1.307	Yes	GEL
U-234	Soil	Bq/kg	4.36E+01	3.36E+01	0.771	Pass	GEL
U-238	Soil	Bq/kg	4.61E+01	3.48E+01	0.775	Pass	GEL
U (total)	Soil	µg/g	3.73E+00	2.60E+00	0.697	Yes	GEL

Acceptance is based on the reported-to-actual ratio, assigned statistically on a case-by-case basis. **Yes** indicates a ratio within warning limits. **Pass** indicates a ratio within control limits but outside warning limits. **No** indicates a ratio outside control limits. Samples were analyzed by either the WVDP Environmental Laboratory (ELAB) or General Engineering Laboratory (GEL).

Table J-1 (concluded)
**Comparison of Radiological Results With Known Results of Crosscheck
Samples From the DOE Environmental Measurements Laboratory (EML)
Quality Assessment Program (QAP) 54; EML-613 QAP 0103; June 2001**

Analyte	Matrix	Units	Actual	Reported	Ratio	Accept?	Analyzed by:
Am-241	Veg	Bq/kg	6.17E+00	5.81E+00	0.942	Yes	GEL
Cm-244	Veg	Bq/kg	3.69E+00	3.85E+00	1.043	Yes	GEL
Co-60	Veg	Bq/kg	3.04E+01	3.17E+01	1.043	Yes	GEL
Cs-137	Veg	Bq/kg	8.42E+02	8.99E+02	1.068	Yes	GEL
K-40	Veg	Bq/kg	6.03E+02	6.88E+02	1.141	Yes	GEL
Pu-239	Veg	Bq/kg	9.58E+00	9.23E+00	0.963	Yes	GEL
Sr-90	Veg	Bq/kg	1.33E+03	1.16E+03	0.869	Yes	GEL
Co-60	Water	Bq/L	9.82E+01	1.02E+02	1.036	Yes	ELAB
Cs-137	Water	Bq/L	7.30E+01	7.40E+01	1.014	Yes	ELAB
Gross Alpha	Water	Bq/L	1.90E+03	1.95E+03	1.025	Yes	ELAB
Gross Beta	Water	Bq/L	1.30E+03	1.68E+03	1.297	Yes	ELAB
H-3	Water	Bq/L	7.93E+01	8.63E+01	1.088	Yes	ELAB
Sr-90	Water	Bq/L	4.40E+00	4.48E+00	1.018	Yes	ELAB
Am-241	Water	Bq/L	1.67E+00	1.57E+00	0.940	Yes	GEL
Co-60	Water	Bq/L	9.82E+01	1.03E+02	1.049	Yes	GEL
Cs-137	Water	Bq/L	7.30E+01	7.61E+01	1.042	Yes	GEL
Gross Alpha	Water	Bq/L	1.90E+03	2.08E+03	1.093	Yes	GEL
Gross Beta	Water	Bq/L	1.30E+03	1.35E+03	1.039	Yes	GEL
H-3	Water	Bq/L	7.93E+01	7.64E+01	0.963	Yes	GEL
Pu-238	Water	Bq/L	1.58E+00	1.72E+00	1.089	Yes	GEL
Pu-239	Water	Bq/L	1.64E+00	1.75E+00	1.067	Yes	GEL
Sr-90	Water	Bq/L	4.40E+00	4.36E+00	0.991	Yes	GEL
U-234	Water	Bq/L	1.04E+00	8.95E-01	0.861	Pass	GEL
U-238	Water	Bq/L	1.04E+00	9.04E-01	0.869	Pass	GEL
U (total)	Water	µg/mL	8.00E-02	7.50E-02	0.935	Yes	GEL

Note: EML did not list acceptance limits for µg of uranium; acceptance criteria for Bq of uranium were applied to these ratios.

Acceptance is based on the reported-to-actual ratio, assigned statistically on a case-by-case basis. **Yes** indicates a ratio within warning limits. **Pass** indicates a ratio within control limits but outside warning limits. **No** indicates a ratio outside control limits. Samples were analyzed by either the WVDP Environmental Laboratory (ELAB) or General Engineering Laboratory (GEL).

Table J-2
Comparison of Radiological Results With Known Results of Crosscheck
Samples From the DOE Environmental Measurements Laboratory (EML)
Quality Assessment Program (QAP) 55; EML-615 QAP 0109; December 2001

Analyte	Matrix	Units	Actual	Reported	Ratio	Accept?	Analyzed by:
Co-60	Air filter	Bq/filter	1.75E+01	1.65E+01	0.945	Yes	ELAB
Co-60	Air filter	Bq/filter	1.75E+01	1.77E+01	1.010	Yes	ELAB
Cs-134	Air filter	Bq/filter	1.30E+01	1.21E+01	0.933	Yes	ELAB
Cs-134	Air filter	Bq/filter	1.30E+01	1.16E+01	0.893	Yes	ELAB
Cs-137	Air filter	Bq/filter	1.71E+01	1.64E+01	0.957	Yes	ELAB
Cs-137	Air filter	Bq/filter	1.71E+01	1.72E+01	1.003	Yes	ELAB
Gross Alpha	Air filter	Bq/filter	5.36E+00	3.98E+00	0.742	Pass	ELAB
Gross Alpha	Air filter	Bq/filter	5.36E+00	3.96E+00	0.739	Pass	ELAB
Gross Beta	Air filter	Bq/filter	1.28E+01	1.10E+01	0.864	Pass	ELAB
Gross Beta	Air filter	Bq/filter	1.28E+01	1.09E+01	0.851	Pass	ELAB
Mn-54	Air filter	Bq/filter	8.12E+01	9.16E+01	1.129	Yes	ELAB
Mn-54	Air filter	Bq/filter	8.12E+01	8.71E+01	1.073	Yes	ELAB
Am-241	Air filter	Bq/filter	8.80E-02	1.05E-01	1.193	Yes	GEL
Co-60	Air filter	Bq/filter	1.75E+01	1.76E+01	1.006	Yes	GEL
Cs-134	Air filter	Bq/filter	1.30E+01	1.17E+01	0.903	Yes	GEL
Cs-137	Air filter	Bq/filter	1.71E+01	1.73E+01	1.012	Yes	GEL
Gross Alpha	Air filter	Bq/filter	5.36E+00	5.15E+00	0.960	Yes	GEL
Gross Beta	Air filter	Bq/filter	1.28E+01	1.01E+01	0.794	Pass	GEL
Mn-54	Air filter	Bq/filter	8.12E+01	8.05E+01	0.992	Yes	GEL
Pu-238	Air filter	Bq/filter	7.10E-02	6.60E-02	0.930	Yes	GEL
Pu-239	Air filter	Bq/filter	2.29E-01	2.34E-01	1.021	Yes	GEL
Sr-90	Air filter	Bq/filter	3.48E+00	3.55E+00	1.020	Yes	GEL
U-234	Air filter	Bq/filter	1.08E-01	1.09E-01	1.007	Yes	GEL
U-238	Air filter	Bq/filter	1.09E-01	1.06E-01	0.970	Yes	GEL
U (total)	Air filter	µg/filter	8.84E+00	8.30E+00	0.938	Yes	GEL
Am-241	Soil	Bq/kg	4.43E+00	4.92E+00	1.110	Yes	GEL
Cs-137	Soil	Bq/kg	6.12E+02	6.55E+02	1.070	Yes	GEL
K-40	Soil	Bq/kg	6.23E+02	6.98E+02	1.120	Yes	GEL
Pu-239	Soil	Bq/kg	8.95E+00	8.94E+00	0.999	Yes	GEL
Sr-90	Soil	Bq/kg	3.06E+01	2.33E+01	0.762	Pass	GEL
U-234	Soil	Bq/kg	9.22E+01	7.91E+01	0.858	Pass	GEL
U-238	Soil	Bq/kg	9.83E+01	8.39E+01	0.853	Yes	GEL
U (total)	Soil	µg/g	7.95E+00	5.65E+00	0.711	Yes	GEL

Acceptance is based on the reported-to-actual ratio, assigned statistically on a case-by-case basis. **Yes** indicates a ratio within warning limits. **Pass** indicates a ratio within control limits but outside warning limits. **No** indicates a ratio outside control limits. Samples were analyzed by either the WVDP Environmental Laboratory (ELAB) or General Engineering Laboratory (GEL).

Table J-2 (concluded)
Comparison of Radiological Results With Known Results of Crosscheck
Samples From the DOE Environmental Measurements Laboratory (EML)
Quality Assessment Program (QAP) 55; EML-615 QAP 0109; December 2001

Analyte	Matrix	Units	Actual	Reported	Ratio	Accept?	Analyzed by:
Am-241	Veg	Bq/kg	6.92E+00	7.60E+00	1.099	Yes	GEL
Cm-244	Veg	Bq/kg	4.31E+00	4.48E+00	1.040	Yes	GEL
Co-60	Veg	Bq/kg	3.53E+01	3.81E+01	1.079	Yes	GEL
Cs-137	Veg	Bq/kg	1.03E+03	1.12E+03	1.091	Yes	GEL
K-40	Veg	Bq/kg	8.99E+02	1.05E+03	1.166	Yes	GEL
Pu-239	Veg	Bq/kg	1.10E+01	9.71E+00	0.881	Yes	GEL
Sr-90	Veg	Bq/kg	1.61E+03	1.57E+03	0.975	Yes	GEL
Co-60	Water	Bq/L	2.09E+02	2.16E+02	1.032	Yes	ELAB
Cs-137	Water	Bq/L	4.51E+01	4.81E+01	1.066	Yes	ELAB
Gross Alpha	Water	Bq/L	1.15E+03	1.23E+03	1.073	Yes	ELAB
Gross Beta	Water	Bq/L	7.97E+03	8.20E+03	1.028	Yes	ELAB
H-3	Water	Bq/L	2.07E+02	2.23E+02	1.076	Yes	ELAB
Sr-90	Water	Bq/L	3.73E+00	3.68E+00	0.987	Yes	ELAB
Am-241	Water	Bq/L	7.60E-01	7.78E-01	1.024	Yes	GEL
Co-60	Water	Bq/L	2.09E+02	2.16E+02	1.035	Yes	GEL
Cs-137	Water	Bq/L	4.51E+01	4.76E+01	1.055	Yes	GEL
Gross Alpha	Water	Bq/L	1.15E+03	1.31E+03	1.139	Pass	GEL
Gross Beta	Water	Bq/L	7.97E+03	8.35E+03	1.048	Yes	GEL
H-3	Water	Bq/L	2.07E+02	2.23E+02	1.075	Yes	GEL
Ni-63	Water	Bq/L	4.53E+01	5.30E+01	1.171	Pass	GEL
Pu-238	Water	Bq/L	1.09E+00	1.07E+00	0.981	Yes	GEL
Pu-239	Water	Bq/L	1.63E+00	1.72E+00	1.059	Yes	GEL
Sr-90	Water	Bq/L	3.73E+00	3.93E+00	1.054	Yes	GEL
U-234	Water	Bq/L	1.17E+00	1.02E+00	0.877	Pass	GEL
U-238	Water	Bq/L	1.17E+00	9.79E-01	0.837	Pass	GEL
U (total)	Water	µg/mL	9.40E-02	8.20E-02	0.871	Pass	GEL

Acceptance is based on the reported-to-actual ratio, assigned statistically on a case-by-case basis. **Yes** indicates a ratio within warning limits. **Pass** indicates a ratio within control limits but outside warning limits. **No** indicates a ratio outside control limits. Samples were analyzed by either the WVDP Environmental Laboratory (ELAB) or General Engineering Laboratory (GEL).

Table J-3
Comparison of Results From Crosscheck Samples Analyzed for Water Quality Parameters as Part of the EPA's 2001 Discharge Monitoring Report - Quality Assurance (DMR-QA) Study 21 for the National Pollutant Discharge Elimination System (NPDES)

Analyte	Units	Actual	Reported	Accept?	Analyzed by:
Aluminum	µg/L	1,020	1,060	Yes	STL
Ammonia (as Nitrogen)	mg/L	14.5	14.0	Yes	STL
Arsenic	µg/L	709	708	Yes	STL
Biochemical oxygen demand	mg/L	45.3	68.4	No	STL
Cadmium	µg/L	209	205	Yes	STL
Chlorine, total residual	mg/L	1.23	1.23	Yes	WVNS
Chromium	µg/L	309	315	Yes	STL
Cobalt	µg/L	246	251	Yes	STL
Copper	µg/L	338	334	Yes	STL
Cyanide, total	mg/L	0.193	0.158	Yes	STL
Grease and oil (Gravimetric)	mg/L	26.0	19.2	Yes	STL
Iron	µg/L	457	456	Yes	STL
Lead	µg/L	198	199	Yes	STL
Manganese	µg/L	651	657	Yes	STL
Mercury	µg/L	2.13	1.98	Yes	STL
Nickel	µg/L	808	824	Yes	STL
Nitrate (as Nitrogen)	mg/L	2.58	2.84	Yes	STL
pH	SU	8.36	8.38	Yes	WVNS
Phenolics, total	mg/L	0.372	0.30	Yes	STL
Selenium	µg/L	597	597	Yes	STL
Suspended solids, total	mg/L	68.2	66.0	Yes	STL
Vanadium	µg/L	439	449	Yes	STL
Zinc	µg/L	971	983	Yes	STL

Samples provided by Environmental Research Associates (ERA).

Analyses were conducted by Severn Trent Laboratories (STL) or WVNSCO, as indicated.

Acceptance limits are determined by ERA or NYSDOH, as applicable. Yes indicates a ratio within warning limits. Pass indicates a ratio within control limits but outside warning limits. No indicates a ratio outside control limits.

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