Appendix D
Groundwater Statistical Calculations Summary

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-01S					LB-01D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	14	14	Non	5.05	M(8.9)	6	6	Non	6.37	M(6.7)
Nitrate (mg/L)	14	14	Normal	4.31	5.71	6	6	Normal	5.50	5.82
TDS (mg/L)	14	14	Lognormal	188.92	229.74	6	6	Lognormal	178.67	237.27
Metals (mg/L)										
Iron (dissolved)	14	7	Non	0.55	M(1.62)	6	1	NC	NC	M(0.07)
Manganese (dissolved)	14	3	NC	NC	M(0.203)	6	1	NC	NC	M(0.006)
VOCs (µg/L)										
1,1-Dichloroethene	15	0	NC	NC	All ND	6	0	NC	NC	All ND
1,4-Dichlorobenzene	15	0	NC	NC	All ND	6	0	NC	NC	All ND
Tetrachloroethene	15	0	NC	NC	All ND	6	0	NC	NC	All ND
Trichloroethene	15	0	NC	NC	All ND	6	0	NC	NC	All ND
Vinyl Chloride	15	0	NC	NC	All ND	6	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-3S					LB-03D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	5	5	Non	2.66	M(2.8)	6	6	Non	3.20	M(3.3)
Nitrate (mg/L)	5	5	Lognormal	2.92	3.60	6	6	Non	4.28	M(4.4)
TDS (mg/L)	5	5	Non	152.20	M(163)	6	6	Non	152.83	M(169)
Metals (mg/L)										
Iron (dissolved)	5	2	NC	NC	M(4.59)	6	0	NC	NC	All ND
Manganese (dissolved)	5	1	NC	NC	M(0.07)	6	0	NC	NC	All ND
VOCs (µg/L)										
1,1-Dichloroethene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
1,4-Dichlorobenzene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
Tetrachloroethene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
Trichloroethene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
Vinyl Chloride	5	0	NC	NC	All ND	6	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-04SR (background)					LB-04D (background)				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	4	4	Lognormal	5.60	12.71	4	4	Non	2.48	M(2.7)
Nitrate (mg/L)	4	4	Lognormal	9.33	21.48	4	4	Lognormal	5.33	7.06
TDS (mg/L)	4	4	Lognormal	197.75	234.91	4	4	Lognormal	134.50	150.68
Metals (mg/L)										
Iron (dissolved)	4	2	Non	0.421	M(0.439)	4	0	NC	NC	All ND
Manganese (dissolved)	4	2	Non	0.026	M(0.040)	4	0	NC	NC	All ND
VOCs (µg/L)										
1,1-Dichloroethene	4	0	NC	NC	All ND	4	0	NC	NC	All ND
1,4-Dichlorobenzene	4	0	NC	NC	All ND	4	0	NC	NC	All ND
Tetrachloroethene	4	0	NC	NC	All ND	4	0	NC	NC	All ND
Trichloroethene	4	0	NC	NC	All ND	4	0	NC	NC	All ND
Vinyl Chloride	4	0	NC	NC	All ND	4	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-05S					LB-05D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	12	12	Lognormal	4.28	5.27	8	8	Non	15.86	M(18.0)
Nitrate (mg/L)	12	12	Lognormal	4.20	5.95	8	8	Non	0.78	M(1.1)
TDS (mg/L)	12	12	Lognormal	179.58	213.48	8	8	Lognormal	279.75	359.48
Metals (mg/L)										
Iron (dissolved)	12	6	Lognormal	2.67	10.17	8	2	NC	NC	M(0.08)
Manganese (dissolved)	12	1	NC	NC	M(0.407)	8	0	NC	NC	All ND
VOCs (µg/L)										
1,1-Dichloroethene	12	0	NC	NC	All ND	7	0	NC	NC	All ND
1,4-Dichlorobenzene	12	0	NC	NC	All ND	7	0	NC	NC	All ND
Tetrachloroethene	12	0	NC	NC	All ND	7	0	NC	NC	All ND
Trichloroethene	12	0	NC	NC	All ND	7	0	NC	NC	All ND
Vinyl Chloride	12	0	NC	NC	All ND	7	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-6S					LB-20S				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	10	10	Lognormal	8.18	14.61	5	5	Lognormal	4.70	12.57
Nitrate (mg/L)	10	10	Lognormal	2.25	3.52	5	1	NC	NC	M(0.2)
TDS (mg/L)	10	10	Non	243.90	M(328)	5	5	Lognormal	235.40	435.81
Metals (mg/L)										
Iron (dissolved)	10	2	NC	NC	M(0.30)	5	5	Lognormal	1.49	1.02
Manganese (dissolved)	10	3	NC	NC	M(.037)	5	5	Normal	1.10	2.64
VOCs (µg/L)										
1,1-Dichloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
1,4-Dichlorobenzene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Tetrachloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Trichloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Vinyl Chloride	10	0	NC	NC	All ND	5	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-10SR					LB-10DR				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	8	8	Non	7.13	M(14.3)	5	5	Lognormal	27.66	32.28
Nitrate (mg/L)	8	8	Lognormal	3.16	8.30	5	5	Lognormal	0.74	0.97
TDS (mg/L)	8	8	Lognormal	252.63	581.07	5	5	Lognormal	400.80	563.07
Metals (mg/L)										
Iron (dissolved)	8	2	NC	NC	M(1.04)	5	1	Non	0.69	M(1.03)
Manganese (dissolved)	8	4	Non	0.52	M(2.05)	5	5	Lognormal	0.48	1.55
VOCs (µg/L)										
1,1-Dichloroethene	9	0	NC	NC	All ND	5	0	NC	NC	All ND
1,4-Dichlorobenzene	9	0	NC	NC	All ND	5	0	NC	NC	All ND
Tetrachloroethene	9	0	NC	NC	All ND	5	0	NC	NC	All ND
Trichloroethene	9	0	NC	NC	All ND	5	0	NC	NC	All ND
Vinyl Chloride	9	0	NC	NC	All ND	5	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-13I					LB-13D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	10	10	Lognormal	6.48	9.19	5	5	Lognormal	3.68	4.12
Nitrate (mg/L)	10	10	Lognormal	3.23	5.11	5	5	Lognormal	4.90	5.32
TDS (mg/L)	10	10	Lognormal	206.20	273.16	5	5	Non	158.40	M(190)
Metals (mg/L)										
Iron (dissolved)	10	3	NC	NC	M(0.09)	5	1	NC	NC	M(0.02)
Manganese (dissolved)	10	8	Non	0.01	M(0.028)	5	1	NC	NC	M(0.005)
VOCs (µg/L)										
1,1-Dichloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
1,4-Dichlorobenzene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Tetrachloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Trichloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Vinyl Chloride	10	0	NC	NC	All ND	5	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-17I					LB-17D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	5	5	Lognormal	21.04	26.11	6	6	Non	10.35	M(11.0)
Nitrate (mg/L)	5	1	NC	NC	M(0.2)	6	0	NC	NC	All ND
TDS (mg/L)	5	5	Lognormal	277.20	377.32	6	6	Lognormal	192.83	284.65
Metals (mg/L)										
Iron (dissolved)	5	5	Normal	10.27	13.26	6	6	Lognormal	0.08	0.11
Manganese (dissolved)	5	5	Normal	1.46	1.94	6	6	Lognormal	3.85	4.14
VOCs (µg/L)										
1,1-Dichloroethene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
1,4-Dichlorobenzene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
Tetrachloroethene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
Trichloroethene	5	0	NC	NC	All ND	6	0	NC	NC	All ND
Vinyl Chloride	5	0	NC	NC	All ND	6	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-26I					LB-26D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	10	10	Normal	7.32	10.17	5	5	Normal	4.00	4.49
Nitrate (mg/L)	10	10	Non	2.82	M(5.6)	5	5	Lognormal	5.06	5.46
TDS (mg/L)	10	10	Lognormal	198.80	230.65	5	5	Normal	171.00	202.34
Metals (mg/L)										
Iron (dissolved)	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Manganese (dissolved)	10	8	Non	0.01	M(0.011)	5	0	NC	NC	All ND
VOCs (µg/L)										
1,1-Dichloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
1,4-Dichlorobenzene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Tetrachloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Trichloroethene	10	0	NC	NC	All ND	5	0	NC	NC	All ND
Vinyl Chloride	10	0	NC	NC	All ND	5	0	NC	NC	All ND

Leichner Landfill
Groundwater Statistics - March 2004 through September 2008 Data[a]
95 Percent Upper Confidence Limits on the Mean

Parameter	LB-27I					LB-27D				
	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]	No. Analyses	No. Detected	Distribution[b]	Mean	UCL 95[c]
Inorganics										
Chloride (mg/L)	10	10	Lognormal	14.65	21.86	7	7	Lognormal	12.24	13.74
Nitrate (mg/L)	10	8	Lognormal	2.13	4.68	7	7	Non	2.87	M(3.4)
TDS (mg/L)	10	10	Normal	318.50	371.79	7	7	Non	254.00	M(364)
Metals (mg/L)										
Iron (dissolved)	10	1	NC	NC	M(0.04)	7	0	NC	NC	All ND
Manganese (dissolved)	10	10	Non	0.23	M(0.530)	7	2	NC	NC	M(0.285)
VOCs (µg/L)										
1,1-Dichloroethene	10	0	NC	NC	All ND	7	0	NC	NC	All ND
1,4-Dichlorobenzene	10	0	NC	NC	All ND	7	0	NC	NC	All ND
Tetrachloroethene	10	0	NC	NC	All ND	7	0	NC	NC	All ND
Trichloroethene	10	0	NC	NC	All ND	7	0	NC	NC	All ND
Vinyl Chloride	10	0	NC	NC	All ND	7	0	NC	NC	All ND

Notes:

NC = not calculated, more than 50% samples were non-detect; Non = neither normal nor lognormal distribution.

M = default to maximum value per Statistical Guidance for Ecology Site Managers for the following scenarios: (a) more than 50% non-detect values, (b) both normal and lognormal distributions were rejected by MTCAStat, and (c) UCL calculated using MTCAStat was higher than the maximum value of the data set.

[a] Replacement wells LB-10SR and LB-10DR installed in October 2004. Data available from March 2005 to present.

[b] Distribution was determined using MTCAStat 97 program and Statistical Guidance for Ecology Site Managers.

[c] UCL 95 was calculated using MTCAStat 97 program and Statistical Guidance for Ecology Site Managers.