Table 3.7.4-2: Completeness - Solids

Parameter	Laboratory	Number Qualified	Number Rejected	% qualified	% rejected	Total Analyzed	% Completeness
Solids Total	Aquatic	0	0	0.00%	0.00%	29	100.00%
Soluble Salts (1:2)	A&L	0	0	0.00%	0.00%	440	100.00%
Staphylococcus	A&L	0	0	0.00%	0.00%	41	100.00%
Staphylococcus aureus	A&L	0	0	0.00%	0.00%	25	100.00%
Staphylococcus aureus	EML	0	0	0.00%	0.00%	156	100.00%
Staphylococcus aureus	FoodProtech	0	0	0.00%	0.00%	12	100.00%
Sulfate (Water Soluble)	A&L	2	0	0.94%	0.00%	212	100.00%
TOC	A&L	0	0	0.00%	0.00%	3	100.00%
Total Aluminum	A&L	26	0	5.71%	0.00%	455	100.00%
Total Antimony	A&L	72	0	19.83%	0.00%	363	100.00%
Total Arsenic	A&L	128	0	26.23%	0.00%	488	100.00%
Total Arsenic	Aquatic	0	0	0.00%	0.00%	14	100.00%
Total Barium	A&L	12	0	3.31%	0.00%	363	100.00%
Total Beryllium	A&L	15	0	4.13%	0.00%	363	100.00%
Total Cadmium	A&L	9	0	2.48%	0.00%	363	100.00%
Total Calcium	A&L	15	0	4.13%	0.00%	363	100.00%
Total Chromium	A&L	18	0	4.96%	0.00%	363	100.00%
Total Cobalt	A&L	24	0	6.61%	0.00%	363	100.00%
Total Coliform	A&L	0	0	0.00%	0.00%	54	100.00%
Total Coliform	EML	0	0	0.00%	0.00%	156	100.00%
Total Copper	A&L	68	0	13.93%	0.00%	488	100.00%
Total Copper	Aquatic	0	0	0.00%	0.00%	14	100.00%
Total Iron	A&L	22	0	6.06%	0.00%	363	100.00%
Total Kjeldahl Nitrogen	A&L	0	0	0.00%	0.00%	10	100.00%
Total Lead	A&L	16	0	4.41%	0.00%	363	100.00%
Total Magnesium	A&L	18	0	4.96%	0.00%	363	100.00%
Total Manganese	A&L	28	0	7.71%	0.00%	363	100.00%
Total Mercury	A&L	19	0	5.25%	0.00%	362	100.00%
Total Molybdenum	A&L	49	0	13.96%	0.00%	351	100.00%
Total Nickel	A&L	18	0	4.96%	0.00%	363	100.00%
Total P (4500PF)	Aquatic	0	0	0.00%	0.00%	29	100.00%
Total P (6010)	A&L	90	0	97.83%	0.00%	92	100.00%
Total P (6020)	A&L	2	0	0.50%	0.00%	398	100.00%
Total Potassium	A&L	7	0	1.93%	0.00%	363	100.00%
Total Selenium	A&L	53	0	14.60%	0.00%	363	100.00%
Total Silver	A&L	13	0	3.58%	0.00%	363	100.00%
Total Sodium	A&L	38	0	10.47%	0.00%	363	100.00%
Total Thallium	A&L	9	0	2.48%	0.00%	363	100.00%
Total Vanadium	A&L	22	0	6.06%	0.00%	363	100.00%
Total Zinc	A&L	63	0	12.91%	0.00%	488	100.00%
Total Zinc	Aquatic	0	0	0.00%	0.00%	14	100.00%
Totals		**1293**	**293**	**7.57%**	**1.72%**	**17073**	**98.3%**

Table 3.9-1: Summary of CDM Analytical Methods vs. CRA Analytical Methods

CDM			CRA		
Parameter	**Method**	**Lab**	**Parameter**	**Method**	**Lab**
Metal Analyses					
Aluminum	3050A/6020	A&L	Aluminum	3050A/6010B	APPL
Antimony	3050A/6020	A&L	Antimony	3050A/6010B	APPL
Arsenic	3050A/6020	A&L	Arsenic	3050A/6010B	APPL
Barium	3050A/6020	A&L	Barium	3050A/6010B	APPL
Beryllium	3050A/6020	A&L	Beryllium	3050A/6010B	APPL
Cadmium	3050A/6020	A&L	Cadmium	3050A/6010B	APPL
Calcium	3050A/6020	A&L	Calcium	3050A/6010B	APPL
Chromium	3050A/6020	A&L	Chromium	3050A/6010B	APPL
Cobalt	3050A/6020	A&L	Cobalt	3050A/6010B	APPL
Copper	3050A/6020	A&L	Copper	3050A/6010B	APPL
Iron	3050A/6020	A&L	Iron	3050A/6010B	APPL
Lead	3050A/6020	A&L	Lead	3050A/6010B	APPL
Magnesium	3050A/6020	A&L	Magnesium	3050A/6010B	APPL
Manganese	3050A/6020	A&L	Manganese	3050A/6010B	APPL
Mercury	3050A/6020	A&L	Mercury	3050A/6010B	APPL
Molybdenum	3050A/6020	A&L	Molybdenum	3050A/6010B	APPL
Nickel	3050A/6020	A&L	Nickel	3050A/6010B	APPL
Phosphorus	3050A/6020	A&L	Phosphorus	3050A/6010B	APPL
Potassium	3050A/6020	A&L	Potassium	3050A/6010B	APPL
Selenium	3050A/6020	A&L	Selenium	3050A/6010B	APPL
Silver	3050A/6020	A&L	Silver	3050A/6010B	APPL
Sodium	3050A/6020	A&L	Sodium	3050A/6010B	APPL
Thallium	3050A/6020	A&L	Thallium	3050A/6010B	APPL
Vanadium	3050A/6020	A&L	Vanadium	3050A/6010B	APPL
Zinc	3050A/6020	A&L	Zinc	3050A/6010B	APPL
Phosphorus Analyses					
Phosphorus	Mehlich P	A&L	Phosphorus	6010/M3-P	APPL
			Phosphorus	6010/DIWE	APPL
Wet Chemistry - Waters					
TKN	EPA 351.3	A&L	TKN	EPA 351.3	APPL
TOC	EPA 415.1	A&L	TOC	EPA 415.1	APPL
Chloride	EPA 300.0	A&L	Chloride	EPA 300.0	APPL
Nitrate as N	EPA 300.0	A&L	Nitrate as N	EPA 300.0	APPL
Nitrate + Nitrite as N	EPA 300.0	A&L	Nitrate + Nitrite as N	EPA 300.0	APPL
Sulfate	EPA 300.0	A&L	Sulfate	EPA 300.0	APPL
Ammonia as N	EPA 350.3	A&L	Ammonia as N	EPA 350.3	APPL
Conductivity	EPA 120.1	A&L	Conductivity	EPA 120.1	APPL
pH	EPA 150.1	A&L	pH	EPA 150.1	APPL
Dissolved total phosphorous	EPA 365.2	A&L			
Dissolved ortho phosphorous	EPA 365.2	A&L			
Total ortho phosphorous	EPA 365.2	A&L	Ortho Phosphate P	EPA 300.0	APPL
Total phosphorous	EPA 365.2	A&L	Phosphate as P	SM4500PB5	APPL
Total Dissolved P	EPA 365.1	Aquatic			
Soluble Reactive P	EPA 365.1	Aquatic	Ortho Phosphate P	EPA 300.0	APPL
Total P	EPA 365.1	Aquatic	Phosphate as P	SM4500PB5	APPL

Table 3.9-1: Summary of CDM Analytical Methods vs. CRA Analytical Methods

CDM			CRA		
Wet Chemistry - Soils					
			TOC	Walkley Black	Servi-Tech
Ammonium, Water soluble	Soluble Nutrients	A&L	Ammonia as N	EPA 350.1	APPL
Chloride	Soluble Nutrients	A&L	Chloride	EPA 300.0	APPL
Nitrate as N	Soluble Nutrients	A&L	Nitrate as N	EPA 300.0	APPL
			Nitrite	EPA 300.0	APPL
			Ortho Phosphate P	EPA 300.0	APPL
Sulfate	Soluble Nutrients	A&L	Sulfate	EPA 300.0	APPL
Phosphorus, water soluble	Soluble Nutrients	A&L			
Nitrogen, Total (Inorganic + Organic)	Soil Total N	A&L			
Soluble Salts	Soluble Salts 1:2	A&L	Specific Conductance	SM2510B	APPL
pH	Soil pH 1:1	A&L	pH	EPA 9045C	APPL
Bacteria					
Total Coliform	SM-9221B	EML	Total Coliform	SM-9221B	GAP
E_ coli	SM-9221F	EML	E_ coli	SM-9221F	GAP
Fecal Coliform	SM-9221E	EML	Fecal Coliform	SM-9221E	GAP
Enterococcus Group	SM-9230B	EML	Enterococcus Group	SM-9230B	GAP
Staphylococcus aureus	BAM-12	EML	Staphylococcus aureus		GAP
Salmonella species	BAM-5	EML	Salmonella species		GAP
Campylobacter species	BAM-7	EML	Campylobacter species		GAP

Table 3.9-2: Aqueous CDM to CRA RPD

Parameter	Total Number of Samples	Number of RPD observations	Min RPD	Max RPD	Average RPD	CDM Detection Limit (norm)	CRA Detection Limit (norm)
Ammonia Nitrogen	10	10	10	164	139	0.1	0.01
Campylobacter species	1	1	199	199	199	2	2
Chloride	10	10	0	30	13		
Conductivity	2	2	26	35	30		
Dissolved Aluminum	10	10	0	133	68	0.1	0.1
Dissolved Antimony	10	10	86	164	150	0.001	0.005
Dissolved Arsenic	10	10	22	164	146	0.001	0.005
Dissolved Barium	10	10	1	20	12		0.005
Dissolved Beryllium	10	10	67	120	109	0.001	0.002
Dissolved Cadmium	10	10	133	164	161	0.001	0.005
Dissolved Calcium	10	10	3	23	10		0.029
Dissolved Chromium	10	10	86	164	140	0.001	0.005
Dissolved Cobalt	10	10	100	164	154	0.001	0.005
Dissolved Copper	10	10	1	164	106	0.001	0.1
Dissolved Iron	10	10	0	132	20	0.1	0.05
Dissolved Lead	10	10	91	143	132	0.001	0.003
Dissolved Magnesium	10	10	0	29	14		2.5
Dissolved Manganese	10	10	2	164	74	0.001	0.13
Dissolved Mercury	10	10	0	133	67	0.0002	0.0006
Dissolved Molybdenum	10	10	0	120	18	0.005	0.005
Dissolved Nickel	10	10	6	164	119	0.001	0.005
Dissolved Potassium	10	10	2	21	13		14
Dissolved Selenium	10	10	151	179	163	0.001	0.008
Dissolved Silver	10	10	0	67	60	0.001	0.001
Dissolved Sodium	10	10	2	26	7		7.5
Dissolved Thallium	10	10	133	164	161	0.001	0.005
Dissolved Vanadium	10	10	0	67	13	0.01	0.005
Dissolved Zinc	10	10	86	200	157	0.005	0.05
E. coli	10	10	0	164	55	2	
Enterococcus Group	10	10	0	199	140	2	
Fecal Coliform	10	10	0	143	46	2	
Nitrite + Nitrate (as N)	1	1	2	2	2	1	
pH	6	6	0	11	7		
Salmonella species	10	10	67	200	107	2	
Soluble Reactive P (4500PF)	10	10	6	199	161	0.001	0.2
Staphylococcus aureus	10	10	58	200	149	1.19	
TOC	10	10	27	171	132	1	
Total Aluminum	10	10	0	122	63	0.1	0.1

Table 3.9-2: Aqueous CDM to CRA RPD

Parameter	Total Number of Samples	Number of RPD observations	Min RPD	Max RPD	Average RPD	CDM Detection Limit (norm)	CRA Detection Limit (norm)
Total Antimony	10	10	133	164	156	0.001	0.005
Total Arsenic	10	10	22	164	142	0.001	
Total Barium	10	10	1	15	8		
Total Beryllium	10	10	3	120	100	0.001	
Total Cadmium	10	10	164	164	164	0.001	
Total Calcium	10	10	1	29	11		
Total Chromium	10	10	50	164	116	0.001	
Total Cobalt	10	10	18	164	134	0.001	0.005
Total Coliform	10	10	0	196	96	2	
Total Copper	10	10	17	180	93	0.001	
Total Dissolved P (6020)	10	10	11	164	81	0.01	
Total Iron	10	10	0	138	42	0.1	
Total Kjeldahl Nitrogen	10	10	18	146	88		0.6
Total Lead	10	10	46	164	140	0.001	
Total Magnesium	10	10	10	22	16		
Total Manganese	10	10	2	133	64	0.001	0.007
Total Mercury	10	10	0	133	53	0.0002	0.0005
Total Molybdenum	10	10	0	132	62	0.005	0.005
Total Nickel	10	10	5	164	104	0.001	
Total P (4500PF)	10	10	8	183	123	0.002	
Total P (6020)	10	10	1	133	65	0.01	
Total Potassium	10	10	3	62	17		
Total Selenium	10	10	143	171	161	0.001	0.007
Total Silver	10	10	67	67	67	0.001	
Total Sodium	10	10	1	20	11		
Total Sulfate (SO4)	10	10	1	43	17		
Total Thallium	10	10	164	164	164	0.001	
Total Vanadium	10	10	0	131	36	0.01	0.005
Total Zinc	10	10	8	200	111	0.005	0.05

Table 3.9-3: Solid CDM to CRA RPD

Parameter	Total Number of Samples	Number of RPD observations	Min RPD	Max RPD	Average RPD	CDM Detection Limit (norm)	CRA Detection Limit (norm)
%Clay	12	12	0	100	40		
%Sand	11	11	4	120	71		
%Silt	11	11	13	111	75		
Ammonium (Water Soluble)	54	54	0	190	85	10	8
Campylobacter species	11	11	143	196	161	0.2	
Chloride (Water Soluble)	55	55	0	180	73	20	22
Conductivity	1	1	13	13	13		
E. coli	58	58	0	200	133	0.18	
Enterococcus Group	58	58	10	200	143	0.18	
Fecal Coliform	58	58	0	200	134	0.18	
Nitrate-N (Water Soluble)	55	55	11	200	146	10	24
Organic Matter	115	115	0	200	42		
pH	122	122	0	38	6		
Phosphorus (Mehlich 3)	172	172	1	199	48	5	3.0
Salmonella species	58	58	36	200	151	0.18	
Soluble Salts (1:2)	118	118	3	168	53		
Staphylococcus aureus	58	58	148	200	161	0.18	
Sulfate (Water Soluble)	55	55	4	170	92	36	22
Total Aluminum	118	118	0	109	18		
Total Antimony	55	55	0	164	66	0.5	0.5
Total Arsenic	118	118	8	173	69	0.5	
Total Barium	55	55	3	96	20		
Total Beryllium	55	55	1	123	26	0.5	0.3
Total Cadmium	54	54	0	153	82	0.5	0.5
Total Calcium	55	55	0	133	19		
Total Chromium	55	55	3	122	36		
Total Cobalt	55	55	2	119	37		
Total Coliform	58	58	4	200	166	0.18	
Total Copper	118	118	5	120	43		
Total Iron	55	55	7	162	44		
Total Lead	55	55	0	94	21	0.5	1.15
Total Magnesium	55	55	1	121	20		
Total Manganese	55	55	0	111	24		
Total Mercury	55	55	6	199	94	0.01	0.1
Total Molybdenum	55	55	2	131	33	2.5	0.69
Total Nickel	55	55	1	107	31		
Total P (6020)	118	118	0	170	15		

Table 3.9-3: Solid CDM to CRA RPD

Parameter	Total Number of Samples	Number of RPD observations	Min RPD	Max RPD	Average RPD	CDM Detection Limit (norm)	CRA Detection Limit (norm)
Total Potassium	55	55	2	96	16		
Total Selenium	55	55	0	162	77	0.5	1
Total Silver	55	55	86	86	86	0.5	
Total Sodium	55	55	1	183	65	50	142
Total Thallium	55	55	120	169	152	0.5	2
Total Vanadium	55	55	6	168	58	5	
Total Zinc	118	118	3	139	44		27

Table 3.10-1 Total vs. Dissolved Metals

Element	Total Number of Pairs Compared	Count of Pairs where Dissolved > Total	% Dissolved > Total
Copper	744	273	36.7
Zinc	744	207	27.8
Vanadium	644	47	7.3
Thalium	644	47	7.3
Sodium	644	360	55.9
Silver	644	4	0.62
Selenium	644	18	2.8
Potassium	644	219	34.0
Nickle	644	154	23.9
Molybdenum	551	90	16.3
Manganese	644	30	4.7
Magnesium	644	246	38.2
Iron	644	14	2.2
Cobalt	644	26	4.0
Chromium	644	39	6.1
Calcium	644	272	42.2
Cadmium	644	11	1.7
Berylium	644	1	0.16
Barium	644	83	12.9
Arsenic	744	53	7.1
Aluminum	644	3	0.47
Antimony	644	11	1.7
Lead	644	14	2.2
Mercury	639	7	1.1
Barium	644	83	12.9

Table 3.10-2: Total versus Dissolved for Copper and Zinc

MatrixID	StudyID	COPPER						ZINC					
		Count of Sample Pairs where Dissolved > Total	Count of Sample Pairs of Dissolved-Total	% Dissolved > Total	Sample Count of Copper > 2x Det. Limit	Sample Count of Copper > 5x Det. Limit	Sample Count of RPD < 20 for Copper	Count of Sample Pairs where Dissolved > Total	Count of Sample Pairs of Dissolved-Total	% Dissolved > Total	Sample Count of Zinc > 2x Det. Limit	Sample Count of Zinc > 5x Det. Limit	Sample Count of RPD < 20 for Zinc
Surface Water	Edge of Field Sampling	36	94	38%	31	19	11	16	94	17%	11	7	2
Groundwater	Geoprobe Sampling	1	18	6%	1	1	0	0	18	0%	0	0	0
Groundwater	Groundwater Sampling	23	62	37%	21	11	2	21	62	34%	14	4	9
Surface Water	High Flow Surface Water Sampling	135	237	57%	93	17	2	94	237	40%	55	14	17
Surface Water	Litter and Soil Sampling	1	4	25%	0	0	0	0	4	0%	0	0	0
Surface Water	Raw Water Intake Sampling	0	1	0%	0	0	0	0	1	0%	0	0	0
Surface Water	River Water Sampling	60	144	42%	23	6	0	33	144	23%	8	1	8
Surface Water	Spring Sampling	8	51	16%	3	0	0	11	51	22%	8	1	8
Surface Water	Synoptic Sampling	1	1	100%	1	1	0	0	1	0%	0	0	0
Surface Water	Tenkiller Water Sampling	3	127	2%	0	0	0	29	127	23%	6	1	0
Surface Water	WWTP Sampling	5	5	100%	0	0	0	3	5	60%	0	0	1
TOTALS		**273**	**744**	**37%**	**173**	**55**	**15**	**207**	**744**	**28%**	**102**	**28**	**45**

Table 3-11.1-1: Aqueous PE Results

Sample ID	Laboratory ID	Test ID	Parameter	Results (mg/L)	Certified Value (mg/L)	Lower Control Limit (mg/L)	Upper Control Limit (mg/L)
HFS01C	Aquatic	SM4500-PF	Soluble Reactive P (4500PF)	4.58	6.76	4.54	8.88
HFS01C	Aquatic	SM4500-PF	Total Dissolved P (4500PF)	4.84	6.76	4.54	8.88
HFS01C	Aquatic	EPA-365.1	Total P (4500PF)	7.84	6.76	4.54	8.88
P135-525	A&L	SM-4500-NH3D-TKN	Total Kjeldahl Nitrogen	75.6	70.1	47.1	91.9
P136-500	A&L	SW-6020	Total Aluminum	2.14	1.76	1.44	2.16
P136-500	A&L	SW-6020	Total Antimony	0.59	0.539	0.378	0.649
P136-500	A&L	SW-6020	Total Arsenic	0.18	0.168	0.137	0.199
P136-500	A&L	SW-6020	Total Barium	1.55	1.43	1.24	1.61
P136-500	A&L	SW-6020	Total Beryllium	0.55	0.497	0.422	0.561
P136-500	A&L	SW-6020	Total Cadmium	0.62	0.568	0.485	0.645
P136-500	A&L	SW-6020	Total Chromium	0.55	0.519	0.452	0.587
P136-500	A&L	SW-6020	Total Cobalt	0.308	0.311	0.272	0.349
P136-500	A&L	SW-6020	Total Copper	0.76	0.703	0.633	0.773
P136-500	A&L	SW-6020	Total Iron	**0.835**	0.66	0.582	0.748
P136-500	A&L	SW-6020	Total Lead	0.72	0.642	0.56	0.721
P136-500	A&L	SW-6020	Total Manganese	0.58	0.539	0.483	0.599
P136-500	A&L	SW-6020	Total Molybdenum	0.291	0.279	0.234	0.321
P136-500	A&L	SW-6020	Total Nickel	1.22	1.13	1.02	1.26
P136-500	A&L	SW-6020	Total Selenium	0.89	0.816	0.648	0.945
P136-500	A&L	SW-6020	Total Silver	0.5	0.467	0.401	0.535
P136-500	A&L	SW-6020	Total Thallium	0.81	0.732	0.601	0.87
P136-500	A&L	SW-6020	Total Vanadium	0.67	0.72	0.31	0.805
P136-500	A&L	SW-6020	Total Zinc	1.7	1.56	1.34	1.79
P138-505	A&L	SM-4500-NH3D	Ammonia Nitrogen	9.5	13.1	7.4	16.3
P138-505	A&L	SM-4500-NO3E	Nitrite + Nitrate (as N)	**29.1**	22.3	18.2	25.9
P139-525	A&L	SM-4500-NH3D-TKN	Total Kjeldahl Nitrogen	20.1	22.3	14.7	28.7
P140-500	A&L	SW-6020	Total Aluminum	1.71	1.5	1.22	1.76
P140-500	A&L	SW-6020	Total Antimony	0.115	0.115	0.07	0.143
P140-500	A&L	SW-6020	Total Arsenic	0.505	0.504	0.422	0.591
P140-500	A&L	SW-6020	Total Barium	0.648	0.649	0.563	0.732
P140-500	A&L	SW-6020	Total Beryllium	0.75	0.722	0.641	0.815
P140-500	A&L	SW-6020	Total Cadmium	0.58	0.577	0.492	0.655
P140-500	A&L	SW-6020	Total Chromium	0.272	0.285	0.247	0.323
P140-500	A&L	SW-6020	Total Cobalt	0.178	0.191	0.167	0.215
P140-500	A&L	SW-6020	Total Copper	0.744	0.741	0.667	0.815
P140-500	A&L	SW-6020	Total Iron	**2.02**	1.77	1.57	1.99
P140-500	A&L	SW-6020	Total Lead	0.185	0.178	0.15	0.206
P140-500	A&L	SW-6020	Total Manganese	1.09	1.07	0.961	1.19
P140-500	A&L	SW-6020	Total Molybdenum	0.273	0.282	0.237	0.325

Table 3-11.1-1: Aqueous PE Results

Sample ID	Laboratory ID	Test ID	Parameter	Results (mg/L)	Certified Value (mg/L)	Lower Control Limit (mg/L)	Upper Control Limit (mg/L)
P140-500	A&L	SW-6020	Total Nickel	0.552	0.557	0.501	0.624
P140-500	A&L	SW-6020	Total Selenium	0.93	0.925	0.735	1.07
P140-500	A&L	SW-6020	Total Silver	0.365	0.363	0.311	0.416
P140-500	A&L	SW-6020	Total Thallium	0.55	0.531	0.428	0.637
P140-500	A&L	SW-6020	Total Vanadium	0.286	0.282	0.247	0.316
P140-500	A&L	SW-6020	Total Zinc	0.429	0.426	0.365	0.493
P140-505	A&L	SM-4500-NH3D	Ammonia Nitrogen	2.52	2.88	2.03	3.81
P140-505	A&L	SM-4500-NO3E	Nitrite + Nitrate (as N)	34.5	30.1	24.5	35
RS-999-042307-1	Aquatic	SM18 4500PF	Soluble Reactive P (4500PF)	3.29	3.46	2.98	3.97
RS-999-042307-1	Aquatic	SM18 4500PF	Total Dissolved P (4500PF)	3.54	3.46	2.98	3.97
RS-999-042307-1	Aquatic	SM18 4500PF	Total P (4500PF)	3.64	3.46	2.98	3.97
RS-999-042307-2	Aquatic	SM18 4500PF	Soluble Reactive P (4500PF)	3.17	3.21	2.75	3.81
RS-999-042307-2	Aquatic	SM18 4500PF	Total Dissolved P (4500PF)	3.36	3.21	2.75	3.81
RS-999-042307-2	Aquatic	SM18 4500PF	Total P (4500PF)	3.45	3.21	2.75	3.81
RS-999-042307-3	Aquatic	SM18 4500PF	Soluble Reactive P (4500PF)	3.08	2.91	2.53	3.47
RS-999-042307-3	Aquatic	SM18 4500PF	Total Dissolved P (4500PF)	3.12	2.91	2.53	3.47
RS-999-042307-3	Aquatic	SM18 4500PF	Total P (4500PF)	3.16	2.91	2.53	3.47

Table 3.11.1-2: Soil and Litter PE Results

Sample ID	Test ID	Parameter	Result	Units	Flag	Certified Value	Lower Control Limit	Upper Control Limit
FAC-03-P1	SW-6020	Total Aluminum	5820	mg/Kg		6890	3310	10500
FAC-03-P1	SW-6020	Total Antimony	6.27	mg/Kg	J	24.9	Det. limit	55.4
FAC-03-P1	SW-6020	Total Arsenic	63	mg/Kg		89.6	63	115
FAC-03-P1	SW-6020	Total Barium	241	mg/Kg		258	208	308
FAC-03-P1	SW-6020	Total Beryllium	59.1	mg/Kg		61.9	50.5	73.3
FAC-03-P1	SW-6020	Total Cadmium	67.4	mg/Kg		71.5	58.7	84.3
FAC-03-P1	SW-6020	Total Calcium	**2300**	mg/Kg		3740	3020	4460
FAC-03-P1	SW-6020	Total Chromium	64.4	mg/Kg		82.4	64.1	99.3
FAC-03-P1	SW-6020	Total Cobalt	88.5	mg/Kg		115	86.1	144
FAC-03-P1	SW-6020	Total Copper	**47.8**	mg/Kg		67.6	54.5	80.5
FAC-03-P1	SW-6020	Total Iron	**6580**	mg/Kg		12300	6800	17800
FAC-03-P1	SW-6020	Total Lead	113	mg/Kg		122	95.9	148
FAC-03-P1	SW-6020	Total Magnesium	1820	mg/Kg	J	2150	1640	2660
FAC-03-P1	SW-6020	Total Manganese	**165**	mg/Kg		212	174	250
FAC-03-P1	SW-6020	Total Molybdenum	**32.7**	mg/Kg	J	47.4	36.4	58.4
FAC-03-P1	SW-6020	Total Nickel	69.7	mg/Kg		85.5	69	102
FAC-03-P1	SW-6020	Total Potassium	1680	mg/Kg		2340	1650	3030
FAC-03-P1	SW-6020	Total Selenium	89.9	mg/Kg	J	127	83.2	171
FAC-03-P1	SW-6020	Total Silver	57.7	mg/Kg		104	Det. limit	215
FAC-03-P1	SW-6020	Total Sodium	180	mg/Kg		200	137	263
FAC-03-P1	SW-6020	Total Thallium	120	mg/Kg		139	107	171
FAC-03-P1	SW-6020	Total Vanadium	79.7	mg/Kg		98.8	73.8	124
FAC-03-P1	SW-6020	Total Zinc	**194**	mg/Kg		290	231	349
FAC-03-P1	SW-7471A	Total Mercury	1.93	mg/Kg		2.32	1.58	3.06
FAC-03-P2	Soil Ammonia	Nitrogen Ammonia	328	mg/Kg		234	104	364
FAC-03-P2	SOIL TKN	Total Kjeldahl Nitrogen	**1860**	mg/Kg		1100	652	1540
FAC-03-P2	SW-6020	Total P (6020)	**759**	mg/Kg		1710	851	2570
FAC-03-P2	SW-9060	TOC	**697**	mg/L		8840	4350	13300
CL3-03-P1	SW-6020	Total Aluminum	7550	mg/Kg		7590	4390	10800
CL3-03-P1	SW-6020	Total Antimony	3.81	mg/Kg		77.5	Det. limit	173
CL3-03-P1	SW-6020	Total Arsenic	76.6	mg/Kg		80.9	64.5	97.3
CL3-03-P1	SW-6020	Total Barium	150	mg/Kg		156	128	184
CL3-03-P1	SW-6020	Total Beryllium	152	mg/Kg		143	117	169
CL3-03-P1	SW-6020	Total Cadmium	245	mg/Kg		233	188	277
CL3-03-P1	SW-6020	Total Calcium	4090	mg/Kg		4320	3420	5220
CL3-03-P1	SW-6020	Total Chromium	52.4	mg/Kg		60.8	47.7	73.8
CL3-03-P1	SW-6020	Total Cobalt	61.4	mg/Kg		68.6	56.1	81.1
CL3-03-P1	SW-6020	Total Copper	114	mg/Kg		131	108	154

Table 3.11.1-2: Soil and Litter PE Results

Sample ID	Test ID	Parameter	Result	Units	Flag	Certified Value	Lower Control Limit	Upper Control Limit
CL3-03-P1	SW-6020	Total Iron	10100	mg/Kg		14400	7420	21400
CL3-03-P1	SW-6020	Total Lead	80.3	mg/Kg		76.8	61.9	91.8
CL3-03-P1	SW-6020	Total Magnesium	2100	mg/Kg		2220	1710	2730
CL3-03-P1	SW-6020	Total Manganese	270	mg/Kg		304	243	365
CL3-03-P1	SW-6020	Total Nickel	44.5	mg/Kg		49.6	40.4	58.8
CL3-03-P1	SW-6020	Total Potassium	2450	mg/Kg		2380	1700	3060
CL3-03-P1	SW-6020	Total Selenium	84	mg/Kg		82.9	62.6	103
CL3-03-P1	SW-6020	Total Silver	**29.8**	mg/Kg		80	49	111
CL3-03-P1	SW-6020	Total Sodium	464	mg/Kg		456	254	658
CL3-03-P1	SW-6020	Total Thallium	157	mg/Kg		158	119	197
CL3-03-P1	SW-6020	Total Vanadium	54.8	mg/Kg		72.4	51.7	93
CL3-03-P1	SW-6020	Total Zinc	102	mg/Kg		116	90.5	141
CL3-03-P1	SW-7471A	Total Mercury	4.29	mg/Kg		3.6	2.45	4.75
CL3-03-P2	EPA-351.3 TKN	Total Kjeldahl Nitrogen	1700	mg/Kg		1140	652	1730
CL3-03-P2	MEHLICH 3	Phosphorus (Mehlich 3)	**1646**	mg/Kg		680	373	987
CL3-03-P2	Soil Ammonia	Nitrogen Ammoniacal	195	mg/Kg		291	148	434
CL3-03-P2	WALKLEY -BLACK	TOC	4.38	%		8850	4480	13200
LAL1-A-10	SW-6020	Total Aluminum	7560	mg/Kg		7890	4560	11200
LAL1-A-10	SW-6020	Total Antimony	72.5	mg/Kg		105	Det. limit	234
LAL1-A-10	SW-6020	Total Arsenic	**109**	mg/Kg		142	113	171
LAL1-A-10	SW-6020	Total Barium	240	mg/Kg		224	184	264
LAL1-A-10	SW-6020	Total Beryllium	44.4	mg/Kg		40.6	33.3	47.9
LAL1-A-10	SW-6020	Total Cadmium	71.3	mg/Kg		64.5	52.6	76.4
LAL1-A-10	SW-6020	Total Calcium	3330	mg/Kg		3600	2850	4350
LAL1-A-10	SW-6020	Total Chromium	82.6	mg/Kg		86.5	67.9	105
LAL1-A-10	SW-6020	Total Cobalt	53.7	mg/Kg		63.6	52	75.2
LAL1-A-10	SW-6020	Total Copper	**51.8**	mg/Kg		68.6	56.5	80.7
LAL1-A-10	SW-6020	Total Iron	14000	mg/Kg		13600	7640	19600
LAL1-A-10	SW-6020	Total Lead	100	mg/Kg		93.6	75.4	112
LAL1-A-10	SW-6020	Total Magnesium	2400	mg/Kg		2500	1930	3070
LAL1-A-10	SW-6020	Total Manganese	473	mg/Kg		501	400	602
LAL1-A-10	SW-6020	Mercury	**0.0421**	mg/Kg		2.8	1.91	3.7
LAL1-A-10	SW-6020	Total Molybdenum	**36.5**	mg/Kg		39	30.9	47.1
LAL1-A-10	SW-6020	Total Nickel	57.2	mg/Kg		68.4	55.8	81
LAL1-A-10	SW-6020	Total Potassium	3080	mg/Kg		3300	2350	4250
LAL1-A-10	SW-6020	Total Selenium	106	mg/Kg		124	93.7	154
LAL1-A-10	SW-6020	Total Silver	95.2	mg/Kg		171	105	237
LAL1-A-10	SW-6020	Total Sodium	842	mg/Kg		899	500	1300
LAL1-A-10	SW-6020	Total Thallium	117	mg/Kg		110	83.1	137

Table 3.11.1-2: Soil and Litter PE Results

Sample ID	Test ID	Parameter	Result	Units	Flag	Certified Value	Lower Control Limit	Upper Control Limit
LAL1-A-10	SW-6020	Total Vanadium	78.3	mg/Kg		82.4	61.6	103
LAL1-A-10	SW-6020	Total Zinc	236	mg/Kg		296	235	357
LAL1-A-10	SW-6020	Total P (6020)	731	mg/Kg		726	580.8	871.2
LAL1-A-10	SOIL AMMONIA -N	Nitrogen Ammoniacal	**22**	mg/Kg		550	279	821
LAL1-A-10	SOIL TKN	Total Kjeldahl Nitrogen	**846**	mg/Kg		1490	852	2130
LAL1-A-10	WALKLEY -BLACK	TOC	9300	mg/Kg		9080	4600	13600
SD-001-P	SW-6010B	Total Aluminum	8090	mg/Kg		7730	4470	11000
SD-001-P	SW-6010B	Total Antimony	46.5	mg/Kg		60.6	Det. limit	135
SD-001-P	SW-6010B	Total Arsenic	260	mg/Kg		257	205	309
SD-001-P	SW-6010B	Total Barium	**384**	mg/Kg		472	387	557
SD-001-P	SW-6010B	Total Beryllium	86.5	mg/Kg		88.4	72.5	104
SD-001-P	SW-6010B	Total Cadmium	110	mg/Kg		117	95.4	139
SD-001-P	SW-6010B	Total Calcium	2894	mg/Kg		3640	2880	4400
SD-001-P	SW-6010B	Total Chromium	63.1	mg/Kg		72.8	57.2	88.4
SD-001-P	SW-6010B	Total Cobalt	**66.6**	mg/Kg		82.5	67.5	97.5
SD-001-P	SW-6010B	Total Copper	83.5	mg/Kg		100	82.6	118
SD-001-P	SW-6010B	Total Iron	20249	mg/Kg		14500	7340	21600
SD-001-P	SW-6010B	Total Lead	163.4	mg/Kg		166	134	198
SD-001-P	SW-6010B	Total Manganese	308.6	mg/Kg		374	299	449
SD-001-P	SW-6010B	Total Molybdenum	76.8	mg/Kg		82.7	65.6	99.8
SD-001-P	SW-6010B	Total Nickel	**80.7**	mg/Kg		103	84	122
SD-001-P	SW-6010B	Total P (6020)	801	mg/Kg		726	580.8	871.2
SD-001-P	SW-6010B	Total Potassium	2213	mg/Kg		2410	1720	3100
SD-001-P	SW-6010B	Total Selenium	167	mg/Kg		173	131	215
SD-001-P	SW-6010B	Total Silver	**30.2**	mg/Kg		123	75.3	171
SD-001-P	SW-6010B	Total Sodium	463	mg/Kg		574	319	829
SD-001-P	SW-6010B	Total Thallium	190	mg/Kg		194	147	241
SD-001-P	SW-6010B	Total Vanadium	120	mg/Kg		138	103	173
SD-001-P	SW-6010B	Total Zinc	162	mg/Kg		201	159	242
SD-001-P	SW-6020	Total Aluminum	7647	mg/Kg		7730	4470	11000
SD-001-P	SW-6020	Total Antimony	30.1	mg/Kg		60.6	Det. limit	135
SD-001-P	SW-6020	Total Arsenic	250	mg/Kg		257	205	309
SD-001-P	SW-6020	Total Barium	431	mg/Kg		472	387	557
SD-001-P	SW-6020	Total Beryllium	92.9	mg/Kg		88.4	72.5	104
SD-001-P	SW-6020	Total Cadmium	115	mg/Kg		117	95.4	139
SD-001-P	SW-6020	Total Calcium	3411	mg/Kg		3640	2880	4400
SD-001-P	SW-6020	Total Chromium	66.5	mg/Kg		72.8	57.2	88.4
SD-001-P	SW-6020	Total Cobalt	72.4	mg/Kg		82.5	67.5	97.5

Table 3.11.1-2: Soil and Litter PE Results

Sample ID	Test ID	Parameter	Result	Units	Flag	Certified Value	Lower Control Limit	Upper Control Limit
SD-001-P	SW-6020	Total Copper	95.1	mg/Kg		100	82.6	118
SD-001-P	SW-6020	Total Iron	18402	mg/Kg		14500	7340	21600
SD-001-P	SW-6020	Total Lead	170	mg/Kg		166	134	198
SD-001-P	SW-6020	Total Manganese	374	mg/Kg		374	299	449
SD-001-P	SW-6020	Total Molybdenum	77.7	mg/Kg		82.7	65.6	99.8
SD-001-P	SW-6020	Total Nickel	99.4	mg/Kg		103	84	122
SD-001-P	SW-6020	Total P (6020)	749	mg/Kg		726	580.8	871.2
SD-001-P	SW-6020	Total Potassium	2341	mg/Kg		2410	1720	3100
SD-001-P	SW-6020	Total Selenium	169	mg/Kg		173	131	215
SD-001-P	SW-6020	Total Silver	**29.1**	mg/Kg		123	75.3	171
SD-001-P	SW-6020	Total Sodium	579	mg/Kg		574	319	829
SD-001-P	SW-6020	Total Thallium	198	mg/Kg		194	147	241
SD-001-P	SW-6020	Total Vanadium	133	mg/Kg		138	103	173
SD-001-P	SW-6020	Total Zinc	195	mg/Kg		201	159	242
SD-001-P	SW-7471A	Total Mercury	4.19	mg/Kg		4.18	2.85	5.52
SD-002-P	SOIL AMMONIA -N	Nitrogen Ammoniacal	398	mg/Kg		391	174	608
SD-002-P	SOIL TKN	Total Kjeldahl Nitrogen	2183	mg/Kg		2183	1270	764
SD-002-P	SW-6010B	Total P (6020)	1049	mg/Kg		750	373	1130
SD-002-P	SW-6020	Total P (6020)	921	mg/Kg		750	373	1130
SD-002-P	WALKLEY -BLACK	TOC	0.8	%		8670	4270	13100

Table 3.11.2-1: Average RPD for Selected Parameters in Soil and Poultry Waste

Matrix	Parameter	RPD
Soil	Aluminum	8
	Arsenic	13
	Total P	5
	Copper	4
	Zinc	9
	Matter	60
	Soluble Salts	23
	Ammonium	16
	Chloride	11
	Nitrate	12
	Phosphorus (Water Souble)	15
	Sulfate	18
	Nitrogen	11
	Phosphorus (Mehlich 3)	42
	Staphylococcus aureus	NC
	Salmonella Species	NC
	Total Coliform	150
	Fecal Coliform	113
	E. coli	89
	Enterococcus Group	135
Poultry Waste	Aluminum	78
	Arsenic	25
	Total P	4
	Copper	2
	Zinc	64
	Organic Matter	8
	Soluble Salts	14
	Ammonium	167
	Chloride	6
	Nitrate	NC
	Phosphorus (Water Souble)	14
	Sulfate	2
	Nitrogen	27
	Phosphorus (Mehlich 3)	4
	Staphylococcus aureus	NC
	Salmonella species	NC
	Campylobacter species	NC
	Total Coliform	81
	Fecal Coliform	94
	E. coli	104
	Enterococcus Group	79

NC – Not calculated because one or both results are below detection limits

Table 3.11.2-2: Average RPD for Selected Parameters in Water

Parameter	RPD	Number of Duplicate Pairs
Dissolved Aluminum	12	5
Dissolved Antimony	NC	0
Dissolved Arsenic	3	7
Dissolved Barium	2	26
Dissolved Beryllium	NC	0
Dissolved Cadmium	NC	0
Dissolved Calcium	4	26
Dissolved Chromium	0	5
Dissolved Cobalt	0	2
Dissolved Copper	15	13
Dissolved Iron	11	5
Dissolved Lead	NC	0
Dissolved Magnesium	2	26
Dissolved Manganese	6	18
Dissolved Mercury	NC	0
Dissolved Molybdenum	7	2
Dissolved Nickel	0	11
Dissolved Potassium	5	26
Dissolved Selenium	0	2
Dissolved Silver	NC	0
Dissolved Sodium	3	26
Dissolved Thallium	NC	0
Dissolved Vanadium	28	4
Dissolved Zinc	24	10
Total Aluminum	50	12
Total Antimony	NC	0
Total Arsenic	21	14
Total Barium	11	26
Total Beryllium	NC	0
Total Cadmium	NC	0
Total Calcium	6	26
Total Chromium	50	8
Total Cobalt	82	2
Total Coliform	89	12
Total Copper	34	12
Total Iron	53	13
Total Lead	64	3
Total Magnesium	9	26
Total Manganese	33	24
Total Mercury	NC	0
Total Molybdenum	46	3
Total Nickel	26	13
Total Potassium	10	26
Total Selenium	0	4
Total Silver	NC	0
Total Sodium	3	26

Table 3.11.2-2: Average RPD for Selected Parameters in Water

Parameter	RPD	Number of Duplicate Pairs
Total Thallium	NC	0
Total Vanadium	3	3
Total Zinc	38	10
Dissolved Ortho P (365.2)	28	6
Soluble Reactive P (4500PF)	12	58
Total Dissolved P (365.2)	31	7
Total Dissolved P (4500PF)	13	64
Total Dissolved P (6010)	6	6
Total Dissolved P (6020)	12	19
Total ortho P (365.2)	16	6
Total P (365.2)	15	7
Total P (4500PF)	12	63
Total P (6010)	8	6
Total P (6020)	21	25
Alkalinity (as CaCO3)	8	26
Ammonia Nitrogen	22	6
Chloride	1	25
Chlorophyll a, corrected	16	35
Chlorophyll a, uncorrected	13	35
COD (Chemical Oxygen Demand)	20	3
Conductivity	10	9
DOC	9	7
Nitrite + Nitrate (as N)	5	41
pH (1:1)	2	16
TOC	8	38
Total Dissolved Solids	12	41
Total Kjeldahl Nitrogen	45	42
Total Sulfate (SO4)	5	24
Total Suspended Solids	50	32
Turbidity	14	11
TTHMFP as CHCl3	9	9
Campylobacter species	NC	0
Coliforms	40	2
E. coli	63	9
Enterococci	67	14
Fecal Coliform	69	13
Salmonella species	73	3
Staphylococcus aureus	41	3
17a-estradiol	NC	0
17b-estradiol	24	3
Estriol	NC	0
Estrone	NC	0

NC – Not calculated because one or both results are below detection limits

Table 3.11.2-3: %RSD range for Selected Parameters

Parameter	%RSD Range	Method Reference
Copper	9 - 25	SW-848 method 6020
Zinc	14 - 42	SW-848 method 6020
Arsenic	12 - 23	SW-848 method 6020
Aluminum	11 - 39	SW-848 method 6020
TOC	3.93 - 8.32	EPA method 415.1

Table 3.11.3-1 Decontamination Rinsate Blank Results

Parameter	Units	LAL-14D	LAL-15C	LAL-16B	LAL-17D
Alkalinity (as CaCO3)	mg/L	<4	<4	8	<4
Ammonia Nitrogen	mg/L	<0.1	<0.1	<0.1	<0.1
Chloride	mg/L	<1	<1	<1	<1
Dissolved Aluminum	mg/L	<0.1	<0.1	<0.1	<0.1
Dissolved Antimony	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Barium	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Calcium	mg/L	<0.1	**0.246**	**0.17**	**0.122**
Dissolved Chromium	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Copper	mg/L	<0.001	0.001	<0.001	<0.001
Dissolved Iron	mg/L	<0.1	<0.1	<0.1	<0.1
Dissolved Lead	mg/L	<0.001	<0.001	<0.001	0.013
Dissolved Magnesium	mg/L	<0.1	<0.1	<0.1	<0.1
Dissolved Manganese	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Dissolved Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005
Dissolved Nickel	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Potassium	mg/L	<0.1	<0.1	<0.1	<0.1
Dissolved Selenium	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Silver	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Sodium	mg/L	<0.1	**0.238**	**0.125**	<0.1
Dissolved Thallium	mg/L	<0.001	<0.001	<0.001	<0.001
Dissolved Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01
Dissolved Zinc	mg/L	<0.005	<0.005	<0.005	<0.005
Nitrite + Nitrate (as N)	mg/L	0	<0.1	**5.45**	<0.1
pH (1:1)	s.u.	7.6	7.7	6.9	5.4
TOC	mg/L	<1	<1	<1	<1
Total Aluminum	mg/L	<0.1	<0.1	<0.1	<0.1
Total Antimony	mg/L	<0.001	<0.001	<0.001	<0.001
Total Arsenic	mg/L	<0.001	<0.001	<0.001	<0.001
Total Barium	mg/L	<0.001	<0.001	<0.001	<0.001
Total Beryllium	mg/L	<0.001	<0.001	<0.001	<0.001
Total Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001
Total Calcium	mg/L	<0.1	<0.1	<0.1	<0.1
Total Chromium	mg/L	<0.001	<0.001	**0.002**	**0.002**
Total Cobalt	mg/L	<0.001	<0.001	<0.001	<0.001
Total Copper	mg/L	<0.001	<0.001	<0.001	<0.001
Total Dissolved P (6020)	mg/L	**0.023**	**0.023**	**0.017**	**0.011**
Total Dissolved Solids	mg/L	<7 U	<9 U	**198 J**	**7 J**
Total Iron	mg/L	<0.1	<0.1	<0.1	<0.1
Total Kjeldahl Nitrogen	mg/L	**2.5**	**2.8**	**2.5**	**2.5**

Table 3.11.3-1 Decontamination Rinsate Blank Results

Parameter	Units	LAL-14D	LAL-15C	LAL-16B	LAL-17D
Total Lead	mg/L	<0.001	**0.002**	<0.001	**0.008**
Total Magnesium	mg/L	<0.1	<0.1	<0.1	<0.1
Total Manganese	mg/L	<0.001	<0.001	<0.001	<0.001
Total Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Total Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005
Total Nickel	mg/L	<0.001	<0.001	<0.001	<0.001
Total P (6020)	mg/L	<0.01	**0.013**	**0.013**	<0.01
Total Potassium	mg/L	<0.1	<0.1	<0.1	<0.1
Total Selenium	mg/L	<0.001	<0.001	<0.001	<0.001
Total Silver	mg/L	<0.001	<0.001	<0.001	<0.001
Total Sodium	mg/L	<0.1	<0.1	<0.1	<0.1
Total Sulfate (SO4)	mg/L	<1	<1	<1	<1
Total Suspended Solids	mg/L	0	**2**	**18**	**14**
Total Thallium	mg/L	<0.001	<0.001	<0.001	<0.001
Total Vanadium	mg/L	<0.01	<0.01	<0.01	<0.01
Total Zinc	mg/L	<0.005	<0.005	<0.005	<0.005
Soluble Reactive P (4500PF)	mg/L	<0.001	<0.001	<0.001	<0.001
Total Dissolved P (4500PF)	mg/L	**0.00232**	<0.002	<0.002	<0.002
Total P (4500PF)	mg/L	**0.00272**	**0.00213**	<0.002	<0.002
E. coli	MPN*/100ml	<2	<2	<2	<2
Enterococcus Group	MPN*/100ml	<2	<2	<2	<2
Fecal Coliform	MPN*/100ml	<2	<2	<2	<2
Salmonella species	MPN*/100ml	<2	<2	<2	<2
Staphylococcus aureus	MPN*/100ml	<1.1	<1.1	<1.1	<1.1
Total Coliform	MPN*/100ml	<2	<2	<2	<2
17a-estradiol	ng/L	na	<1	na	na
17b-estradiol	ng/L	na	<1	na	na
Estriol	ng/L	na	<1	na	na
Estrone	ng/L	na	<1	na	na

Table 3.11.4-1: Comparison of Field versus Laboratory Phosphorus Results

Sample ID	Sampling Program	Field Measured Phosphate (PO_4)	Field Measured Phosphate (Converted to P)	Laboratory (Aquatic Research) Total P (4500PF)	RPD
SN-CAN-UP1-A	Synoptic River Sampling	0.04	0.013	0.018	34
SN-SGR-UP1	Synoptic River Sampling	0.09	0.029	0.037	23
SN-BldCl-03-A	Synoptic River Sampling	0.09	0.029	0.042	35
SN-RS780-A	Synoptic River Sampling	0.02	0.007	0.045	149
SN-MUD-TPUP-A	Synoptic River Sampling	0.03	0.010	0.053	138
SN-ILR07-A	Synoptic River Sampling	0.18	0.059	0.077	27
SN-RS776-A	Synoptic River Sampling	0.16	0.052	0.086	49
SN-OSAGE-DN1A	Synoptic River Sampling	0.15	0.049	0.099	68
SN-RS-728-A	Synoptic River Sampling	0.36	0.117	0.124	5
SN-RS50-A	Synoptic River Sampling	0.35	0.114	0.127	11
SN-SPRING-DN1	Synoptic River Sampling	0.39	0.127	0.164	25
SN-OSAGE-TP-A	Synoptic River Sampling	0.13	0.042	0.226	137
SN-SPRING-TP	Synoptic River Sampling	0.51	0.166	0.232	33
SN-CAN-DNTP-A	Synoptic River Sampling	0.61	0.199	0.315	45
SN-CAN-TP-A	Synoptic River Sampling	0.94	0.307	0.489	46
SN-SBC2-A	Synoptic River Sampling	1.93	0.630	0.650	3
SN-SBC-DNLG-A	Synoptic River Sampling	1.79	0.584	0.763	27
SN-MUD-DS1-A	Synoptic River Sampling	4.8	1.566	1.488	5
SN-SGR-TP	Synoptic River Sampling	7.1	2.316	2.477	7
SN-SGR-DNTP	Synoptic River Sampling	9.4	3.067	3.233	5
SN-SBC-DSCG-A	Synoptic River Sampling	12.4	4.046	4.289	6
RS-365	2007 Spring	0.02	0.007	0.011	51
RS-770	2007 Spring	0.05	0.016	0.023	34
RS-160	2007 Spring	0.1	0.033	0.034	4
RS-578	2007 Spring	0.09	0.029	0.039	28
RS-433	2007 Spring	0.1	0.033	0.051	44
RS-348	2007 Spring	0.29	0.095	0.094	1
RS-25	2007 Spring	0.18	0.059	0.111	62
RS-421	2007 Spring	0.65	0.212	0.224	5
RS-9008	2006 Summer	0.06	0.020	0.006	111
RS-401	2006 Summer	0.06	0.020	0.006	106
RS-662	2006 Summer	0.12	0.039	0.007	137
RS-10004	2006 Summer	0.03	0.010	0.008	25
RS-286	2006 Summer	0.04	0.013	0.009	41
RS-10013	2006 Summer	0.05	0.016	0.009	58
RS-368	2006 Summer	0.04	0.013	0.010	26
RS-443	2006 Summer	0.06	0.020	0.010	65
RS-10005	2006 Summer	0.01	0.003	0.010	102
RS-10014	2006 Summer	0.07	0.023	0.012	62
RS-753	2006 Summer	0.04	0.013	0.016	20
RS-772	2006 Summer	0.07	0.023	0.017	30
RS-646	2006 Summer	0.1	0.033	0.018	58
RS-22	2006 Summer	0.08	0.026	0.018	36
RS-536	2006 Summer	0.06	0.020	0.019	3
RS-604	2006 Summer	0	0.000	0.021	200
RS-7198000	2006 Summer	0.04	0.013	0.021	47
RS-365	2006 Summer	0.02	0.007	0.022	109
HFS-28A	2006 Summer	0.08	0.026	0.022	16

Table 3.11.4-1: Comparison of Field versus Laboratory Phosphorus Results

Sample ID	Sampling Program	Field Measured Phosphate (PO_4)	Field Measured Phosphate (Converted to P)	Laboratory (Aquatic Research) Total P (4500PF)	RPD
HFS-30	2006 Summer	0.07	0.023	0.023	1
RS-548	2006 Summer	0.11	0.036	0.023	42
RS-343	2006 Summer	0.11	0.036	0.024	40
RS-696	2006 Summer	0.02	0.007	0.025	117
RS-360	2006 Summer	0.05	0.016	0.025	42
RS-657	2006 Summer	0.12	0.039	0.025	44
RS-361	2006 Summer	0.05	0.016	0.027	49
RS-10003	2006 Summer	0.05	0.016	0.027	50
RS-301	2006 Summer	0.04	0.013	0.027	70
RS-649	2006 Summer	0.09	0.029	0.029	3
RS-124	2006 Summer	-0.01	-0.003	0.029	251
RS-234	2006 Summer	0.02	0.007	0.029	127
RS-351	2006 Summer	0.08	0.026	0.029	11
RS-706	2006 Summer	0.11	0.036	0.030	17
RS-795	2006 Summer	0.13	0.042	0.030	33
RS-257	2006 Summer	0	0.000	0.031	200
RS-86	2006 Summer	0.08	0.026	0.031	17
RS-637	2006 Summer	0.2	0.065	0.033	66
RS-27	2006 Summer	0.08	0.026	0.034	25
RS-335	2006 Summer	0.05	0.016	0.034	70
RS-518	2006 Summer	0.06	0.020	0.035	57
RS-9002	2006 Summer	0.14	0.046	0.035	26
RS-770	2006 Summer	0.15	0.049	0.035	32
RS-133	2006 Summer	0.08	0.026	0.036	32
RS-329	2006 Summer	0.17	0.055	0.036	42
RS-661	2006 Summer	0.16	0.052	0.037	34
HFS-29	2006 Summer	0.1	0.033	0.038	16
RS-55	2006 Summer	0.16	0.052	0.039	30
RS-65	2006 Summer	0.11	0.036	0.039	8
RS-123	2006 Summer	0	0.000	0.039	200
RS-786	2006 Summer	0.15	0.049	0.040	20
RS-409	2006 Summer	0.17	0.055	0.040	32
RS-371	2006 Summer	0.08	0.026	0.040	43
RS-756	2006 Summer	0.17	0.055	0.041	30
RS-205	2006 Summer	0.08	0.026	0.043	50
RS-150	2006 Summer	0.19	0.062	0.044	34
RS-667	2006 Summer	0.17	0.055	0.045	21
RS-59	2006 Summer	0.2	0.065	0.045	37
RS-102	2006 Summer	0.15	0.049	0.045	8
RS-126	2006 Summer	0.03	0.010	0.045	129
RS-538	2006 Summer	0.19	0.062	0.045	32
RS-334	2006 Summer	0.11	0.036	0.046	24
RS-147	2006 Summer	0.19	0.062	0.047	28
RS-367	2006 Summer	0.17	0.055	0.048	14
RS-163	2006 Summer	0.24	0.078	0.049	45
RS-160	2006 Summer	0.23	0.075	0.051	39
RS-379	2006 Summer	0.1	0.033	0.051	43
HFS2-BF2-01	2006 Summer	0.16	0.052	0.051	2
RS-312	2006 Summer	0.21	0.069	0.051	29

Table 3.11.4-1: Comparison of Field versus Laboratory Phosphorus Results

Sample ID	Sampling Program	Field Measured Phosphate (PO_4)	Field Measured Phosphate (Converted to P)	Laboratory (Aquatic Research) Total P (4500PF)	RPD
RS-442	2006 Summer	0.21	0.069	0.052	27
RS-701	2006 Summer	0.14	0.046	0.052	13
RS-327	2006 Summer	0.07	0.023	0.053	79
RS-36	2006 Summer	0.15	0.049	0.053	8
RS-104	2006 Summer	0.12	0.039	0.054	32
RS-32	2006 Summer	0.15	0.049	0.055	12
RS-630	2006 Summer	0.18	0.059	0.055	7
RS-625	2006 Summer	0.22	0.072	0.056	25
RS-10008	2006 Summer	0.19	0.062	0.057	9
RS-514	2006 Summer	0.21	0.069	0.057	18
RS-19	2006 Summer	0.06	0.020	0.058	98
RS-260	2006 Summer	0.11	0.036	0.059	49
RS-391	2006 Summer	0.25	0.082	0.062	27
RS-137	2006 Summer	0.29	0.095	0.062	42
RS-682	2006 Summer	0.24	0.078	0.062	23
RS-623	2006 Summer	0.24	0.078	0.066	16
RS-9007	2006 Summer	0.11	0.036	0.067	60
RS-704	2006 Summer	0.24	0.078	0.067	15
RS-9009	2006 Summer	0.1	0.033	0.069	72
HFS23-BF2-01	2006 Summer	0.08	0.026	0.070	91
RS-117	2006 Summer	0.1	0.033	0.071	74
RS-578	2006 Summer	0.33	0.108	0.074	37
HFS5-BF2-01	2006 Summer	0.18	0.059	0.081	32
RS-386	2006 Summer	0.41	0.134	0.081	49
RS-654	2006 Summer	0.27	0.088	0.086	2
RS-43	2006 Summer	0.19	0.062	0.088	35
RS-342	2006 Summer	0.14	0.046	0.095	70
RS-621	2006 Summer	0.21	0.069	0.097	34
RS-609	2006 Summer	0.28	0.091	0.098	7
RS-348	2006 Summer	0.27	0.088	0.100	12
RS-577	2006 Summer	0.28	0.091	0.100	9
RS-72	2006 Summer	0.24	0.078	0.102	26
RS-148	2006 Summer	0.07	0.023	0.106	129
RS-433	2006 Summer	0.3	0.098	0.108	10
RS-57	2006 Summer	0.21	0.069	0.108	45
RS-7194800	2006 Summer	0.31	0.101	0.110	8
RS-139	2006 Summer	0.34	0.111	0.118	6
RS-340	2006 Summer	0.32	0.104	0.120	14
RS-574	2006 Summer	0.43	0.140	0.122	14
RS-757	2006 Summer	0.54	0.176	0.122	36
RS-258	2006 Summer	0.02	0.007	0.129	181
RS-180	2006 Summer	0.38	0.124	0.129	4
RS-53	2006 Summer	0.31	0.101	0.139	32
HFS-14	2006 Summer	0.35	0.114	0.141	21
RS-382	2006 Summer	0.21	0.069	0.145	72
RS-97	2006 Summer	0.31	0.101	0.146	36
RS-29	2006 Summer	0.44	0.144	0.159	10
RS-218	2006 Summer	0.39	0.127	0.162	24
RS-233	2006 Summer	0.49	0.160	0.166	4

Table 3.11.4-1: Comparison of Field versus Laboratory Phosphorus Results

Sample ID	Sampling Program	Field Measured Phosphate (PO_4)	Field Measured Phosphate (Converted to P)	Laboratory (Aquatic Research) Total P (4500PF)	RPD
RS-313	2006 Summer	0.54	0.176	0.167	5
RS-7195430	2006 Summer	0.54	0.176	0.167	5
RS-31	2006 Summer	0.49	0.160	0.173	8
RS-134	2006 Summer	0.31	0.101	0.174	53
RS-243	2006 Summer	0.01	0.003	0.180	193
RS-727	2006 Summer	0.52	0.170	0.185	9
HFS-20	2006 Summer	0.35	0.114	0.187	48
RS-256	2006 Summer	0.01	0.003	0.187	193
RS-780	2006 Summer	0.54	0.176	0.189	7
RS-421	2006 Summer	0.69	0.225	0.204	10
RS-47	2006 Summer	0.65	0.212	0.212	0
RS-790	2006 Summer	0.38	0.124	0.240	64
RS-7	2006 Summer	0.65	0.212	0.243	13
RS-347	2006 Summer	0.71	0.232	0.249	7
RS-28	2006 Summer	0.71	0.232	0.250	8
RS-50	2006 Summer	0.74	0.241	0.259	7
RS-350	2006 Summer	0.8	0.261	0.265	2
RS-25	2006 Summer	0.74	0.241	0.266	10
RS-5	2006 Summer	0.69	0.225	0.267	17
RS-109	2006 Summer	0.7	0.228	0.273	18
RS-75	2006 Summer	0.96	0.313	0.302	4
RS-121	2006 Summer	0.91	0.297	0.305	3
RS-119	2006 Summer	1.09	0.356	0.358	1
RS-122	2006 Summer	1.09	0.356	0.362	2
RS-120	2006 Summer	1.22	0.398	0.413	4
RS-793	2006 Summer	1.09	0.356	0.470	28
RS-390	2006 Summer	0.62	0.202	0.475	81
RS-902	2006 Summer	1.51	0.493	0.492	0
RS-564	2006 Summer	0.58	0.189	0.510	92
RS-246	2006 Summer	1.29	0.421	0.511	19
RS-728	2006 Summer	1.47	0.480	0.519	8
RS-349	2006 Summer	1.74	0.568	0.577	2
RS-9005	2006 Summer	0.33	0.108	0.592	138
RS-345	2006 Summer	1.86	0.607	0.624	3
RS-901	2006 Summer	1.99	0.649	0.661	2
RS-399	2006 Summer	0.81	0.264	1.050	120
HFS22-BF2-01*	2006 Summer	6.7	2.186	1.932	12
HFS-04*	2006 Summer	6.1	1.990	2.014	1
RS-9006*	2006 Summer	7.6	2.480	2.081	17
RS-9001*	2006 Summer	6.1	1.990	2.158	8
RS-245*	2006 Summer	18	5.873	7.710	27

* - Field P result from high concentration test kit

Table 3.12-1: Potential

Parameter	Documented RPD (%)	Calculated Low RPD (%)	Calculated High RPD (%)	Calculated Average RPD (%)
Phosphorus (Mehlich 3) (mg/Kg)	42	0.002	0.778	0.107
Total P (6020) (mg/Kg)	5	0.010	0.223	0.083
Total Arsenic (mg/Kg)	13	0.010	0.270	0.081
Total Copper (mg/Kg)	4	0.007	0.356	0.096
Total Zinc (mg/Kg)	9	0.011	0.345	0.093
Nitrogen Total (Inorganic + Organic) (mg/Kg)	11	0.010	1.008	0.112
Organic Matter (mg/Kg)	60	0.011	0.378	0.093
Fecal Coliform	113	-	-	-

Table 3.12-2: Measured Bacteria Concentrations

Sample ID	Depth (inches)	Fecal Coliform (MPN/gram)	E Coli (MPN/gram)	Enterococcus (MPN/gram)
LAL-05B	0-2	2.4	2.4	1.4
LAL-11C	0-2	180	14	54000
LAL-12D	0-2	40	40	12000
LAL-15B	0-2	2000	2000	1800
LAL-16C	0-2	27000	240	9400
LAL-17A	0-2	27000	<0.18	240
LAL-20C	0-2	2	2	20
LAL-21B	0-2	24	24	33

Table 6.4-1: Chemical and Bacterial Composition of Poultry Waste and Cattle Manure (Solids)

Parameter	Units ID	Poultry Waste												Cattle Manure										
														Fresh			Dry							
		Number of Samples	CDM Average	CDM Median	Literature Average (1)	Literature Average (3)	Literature Median (3)	Literature Average (4)	Literature (2)	Literature Average (5)	Literature Average (7)	Literature Average (9)	Literature Average (10)	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Literature (2)	Literature Average (4)	Literature Average (5)	Literature Average (6)	Literature Average (8)
Estriol	ng/g	15	5.87	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17a-estradiol	ng/g	15	3.18	3.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Estrone	ng/g	15	13.2	8.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17b-estradiol	ng/g	15	3.01	3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campylobacter species	MPN*/gram	2	0.126	0.126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E. coli	MPN*/gram	16	40400	3860	-	-	-	-	-	-	0 (non-compost)	-	-	4	806000	795000	4	171000	111000	-	-	-	-	>300,000
Enterococcus Group	MPN*/gram	16	107000	137000	-	-	-	-	-	-	-	-	-	4	201000	56100	4	152000	72600	-	-	-	-	>300,000
Total Coliform	MPN*/gram	16	47500	11800	-	-	-	-	-	-	0 (non-compost)	646000	-	4	806000	795000	4	202000	169000	-	-	-	-	-
Staphylococcus aureus	MPN*/gram	16	0.11	0.111	-	-	-	-	-	-	0 (non-compost)	7.94E+12	-	4	0.604	0.596	4	0.29	0.293	-	-	-	-	-
Salmonella species	MPN*/gram	16	0.232	0.112	-	-	-	-	-	-	0 (non-compost)	10	-	4	0.604	0.596	4	0.29	0.293	-	-	-	-	-
Fecal Coliform	MPN*/gram	16	46900	7610	-	-	-	-	-	-	-	-	-	4	806000	795000	4	171000	111000	-	-	-	-	>300,000
Organic Matter	%	16	73.2	74.3	-	-	-	-	-	-	-	-	-	5	86.3	86.4	5	86.6	88.7	-	-	-	-	-
Solids Total	%	16	81.6	81.1	-	-	-	-	-	-	-	-	-	5	24.8	15.9	5	31.6	28	-	-	-	-	-
Moisture	%	16	18.4	19	-	-	-	-	-	-	-	-	-	5	75.2	84.2	5	68.4	72	-	14.7	-	-	-
Total Molybdenum	mg/Kg	10	3.56	3.48	6	-		-	-	-	-	-	4.03	5	3	2.82	5	1.49	0.977	-	-	-	-	-
Total Barium	mg/Kg	16	48.8	45.5	-	21.6	21	-	-	-	-	-	19.1	5	82.2	97.4	5	91.9	90.2	-	-	-	-	-
Total Cadmium	mg/Kg	16	0.307	0.308	3	0.252	0.232	-	-	-	-	4.9	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total P (6020)	mg/Kg	16	20100	19600	22400	17100	17900	13600	12800	16000	21000	6000	15700	5	5920	5940	5	2690	2630	16000	10800	4940	9000	-
Nitrogen Total (Inorganic + Organic)	mg/Kg	16	30000	37700	34500	-	-	-	-	-	-	34000	37200	5	30600	37400	5	30000	26100	-	-	-	-	-
Ammonium (Water Soluble)	mg/Kg	16	1700	1400	-	-	-	-	-	-	-	-	-	5	808	938	5	215	161	-	-	-	-	-
Total Mercury	mg/Kg	16	0.00561	0.00396	-	-	-	-	-	-	-	-	-	5	0.0826	0.0231	5	0.0153	0.0105	-	-	-	-	-
Phosphorus (Mehlich 3)	mg/Kg	16	5410	4320	-	-	-	-	-	-	-	-	-	5	3280	3230	5	1610	1380	-	-	-	-	-
Total Beryllium	mg/Kg	16	0.307	0.308	-	-	-	-	-	-	-	-	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Chromium	mg/Kg	16	7.33	6.67	-	-	-	-	-	-	-	-	22.5	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Phosphorus (Water Soluble)	mg/Kg	16	1440	796	-	-	-	-	-	-	-	-	-	5	3020	2350	5	950	754	-	-	-	-	-
Sulfate (Water Soluble)	mg/Kg	16	4410	4310	-	-	-	-	-	-	-	-	-	5	569	361	5	69.9	39.1	-	-	-	-	-
Total Aluminum	mg/Kg	16	1930	1350	1180	3170	2370	-	-	473	3960	-	727	5	493	562	5	562	514	-	-	1530	1440	-
Total Antimony	mg/Kg	16	0.307	0.308	-	-	-	-	-	-	-	-	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Arsenic	mg/Kg	16	18.7	21	43	15.7	14.8	-	-	-	-	-	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Chloride (Water Soluble)	mg/Kg	16	3880	4130	-	-	-	-	-	-	-	-	-	5	3190	3080	5	305	113	-	-	-	-	-
Total Iron	mg/Kg	16	1100	732	1100	2190	1910	-	-	860	3860	-	-	5	525	584	5	509	493	-	918	1150	2030	-
Total Calcium	mg/Kg	16	34400	35100	-	22400	22200	18600	-	20600	30000	-	21200	5	9010	8420	5	6960	6560	-	16500	15900	19600	-
Total Nickel	mg/Kg	16	14	13.3	15	11.1	10.8	-	-	-	-	-	-	5	1.86	1.86	5	0.822	0.893	-	-	-	-	-
Total Cobalt	mg/Kg	16	1.81	1.69	6	-	-	-	-	-	-	-	2.47	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Copper	mg/Kg	16	417	430	748	479	414	-	-	-	557	-	565	5	14	14.2	5	10.5	9.45	-	-	-	40	-
Nitrate-N (Water Soluble)	mg/Kg	16	248	11.8	-	-	-	-	-	-	-	-	-	5	28.4	31.9	5	16.4	17.9	-	-	-	-	-
Total Manganese	mg/Kg	16	1490	754	956	449	460	-	-	-	6300	-	688	5	342	350	5	348	346	-	224	-	154	-

Table 6.4-1: Chemical and Bacterial Composition of Poultry Waste and Cattle Manure (Solids)

Parameter	Units ID	Poultry Waste												Cattle Manure										
														Fresh			Dry							
		Number of Samples	CDM Average	CDM Median	Literature Average (1)	Literature Average (3)	Literature Median (3)	Literature Average (4)	Literature (2)	Literature Average (5)	Literature Average (7)	Literature Average (9)	Literature Average (10)	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Literature (2)	Literature Average (4)	Literature Average (5)	Literature Average (6)	Literature Average (8)
Total Lead	mg/Kg	16	1.82	1.33	11	2.06	1.78	-	-	-	-	-	13	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Magnesium	mg/Kg	16	5900	6760	6570	7160	7170	6820	-	6470	-	-	4700	5	4820	5010	5	2830	2340	-	5760	6851	6000	-
Total Selenium	mg/Kg	16	1.2	1.31	-	1.18	1.13	-	-	-	-	-	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Potassium	mg/Kg	16	30700	29100	26400	33000	35800	18200	15000	-	30000	13000	23400	5	9270	9060	5	1950	2230	35000	24700	-	7300	-
Total Vanadium	mg/Kg	16	17.6	6.27	-	-	-	-	-	-	-	-	-	5	7.11	7.96	5	4.11	4.46	-	-	-	-	-
Total Thallium	mg/Kg	16	0.307	0.308	-	-	-	-	-	-	-	-	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Sodium	mg/Kg	16	8090	7510	7840	10800	11300	6820	-	-	8200	-	-	5	1210	1380	5	159	97.7	-	3530	-	10	-
Total Silver	mg/Kg	16	8.23	0.308	-	-	-	-	-	-	-	-	-	5	1.42	1.59	5	0.822	0.893	-	-	-	-	-
Total Zinc	mg/Kg	16	506	469	718	373	376	-	-	-	484	154	517	5	74.1	78	5	72.9	68	-	-	-	127	-
Soluble Salts (1:2)	mmhos/cm	16	11.8	12.2	-	-	-	-	-	-	-	-	-	5	3.85	3.28	5	2.18	0.89	-	-	-	-	-
pH (1:1)	s.u.	10	7.93	8.05	-	-	-	-	-	-	-	5.9	-	5	7.44	7.6	5	7.58	7.6	-	7	-	-	-
Brevibacteria 16S rRNA	Copies/g	9	1.1E+09	1.03E+09	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	-	-	-	-	-

(-) samples were not analyzed for the parameter of interest for the sample of interest
Non-detects treated as 1/2 the detection limit

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Table 6.4-2a: Chemical and Bacterial Compounds of Poultry and Cattle Wastes (Water)

Parameter	Units	POULTRY									CATTLE																	
		Edge of Field			SPLP Leach						Edge of Field			Cattle Impacted Spring			SPLP Leach on Fresh Manure						SPLP Leach on Dry Manure					
					4:1 Ratio			20:1 Ratio									4:1 Ratio			20:1 Ratio			4:1 Ratio			20:1 Ratio		
		Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median
17a-estradiol	ng/L	43	2.48	0.5	-	-	-	2	273	273	2	0.05	0.05	1	0.5	0.5	-	-	-	3	113	0.05	-	-	-	1	0.05	0.05
17b-estradiol	ng/L	43	2.49	2.11	-	-	-	2	0.05	0.05	2	0.05	0.05	1	0.5	0.5	-	-	-	3	0.05	0.05	-	-	-	1	0.05	0.05
Alkalinity (as CaCO3)	mg/L	67	110	60	1	3680	3680	2	1610	1610	2	25	25	2	188	188	1	735	735	5	302	291	1	493	493	5	152	145
Ammonia Nitrogen	mg/L	66	4.26	0.369	-	-	-	-	-	-	2	0.145	0.145	2	0.0695	0.0695	-	-	-	-	-	-	-	-	-	-	-	-
Brevibacteria 16S rRNA	Copies/L	38	5310000	73700	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Campylobacter species	MPN*/100ml or cfu/100mL	60	29.6	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride	mg/L	67	22.3	5.08	1	1840	1840	2	402	402	2	3.62	3.62	2	51.9	51.9	1	50	50	5	27.1	31.7	1	50	50	5	10	10
Conductivity	mmhos/cm	43	0.196	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Aluminum	mg/L	81	0.334	0.159	1	0.5	0.5	2	1.23	1.23	2	0.05	0.05	2	0.05	0.05	1	1.15	1.15	5	0.5	0.5	1	0.5	0.5	5	0.5	0.5
Dissolved Antimony	mg/L	81	0.00362	0.001	1	0.005	0.005	2	0.005	0.005	2	0.0005	0.0005	2	0.0005	0.0005	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Arsenic	mg/L	91	0.823	0.005	1	1.44	1.44	2	0.238	0.238	2	0.00175	0.00175	2	0.003	0.003	1	0.012	0.012	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Barium	mg/L	83	0.0573	0.037	1	0.495	0.495	2	0.202	0.202	2	0.017	0.017	2	0.208	0.208	1	0.481	0.481	5	0.198	0.196	1	0.242	0.242	5	0.145	0.131
Dissolved Beryllium	mg/L	81	0.00119	0.0005	1	0.005	0.005	2	0.005	0.005	2	0.0005	0.0005	2	0.0005	0.0005	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Cadmium	mg/L	81	0.00147	0.0005	1	0.005	0.005	2	0.005	0.005	2	0.0005	0.0005	2	0.0005	0.0005	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Calcium	mg/L	83	37.2	22	1	106	106	2	45.4	45.4	2	5.75	5.75	2	101	101	1	84.7	84.7	5	46.1	48.5	1	76.9	76.9	5	34.4	34.6
Dissolved Chromium	mg/L	83	0.00809	0.0025	1	0.059	0.059	2	0.037	0.037	2	0.00118	0.00118	2	0.00125	0.00125	1	0.005	0.005	5	0.005	0.005	1	0.033	0.033	5	0.005	0.005
Dissolved Cobalt	mg/L	81	0.153	0.001	1	0.118	0.118	2	0.0265	0.0265	2	0.0005	0.0005	2	0.00175	0.00175	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Copper	mg/L	91	0.123	0.0125	1	10.4	10.4	2	4.54	4.54	2	0.0378	0.0378	2	0.0065	0.0065	1	0.082	0.082	5	0.0242	0.025	1	0.039	0.039	5	0.0172	0.018
Dissolved Iron	mg/L	82	0.607	0.175	1	16.6	16.6	2	7.47	7.47	2	0.097	0.097	2	0.05	0.05	1	1.32	1.32	5	0.5	0.5	1	0.5	0.5	5	0.5	0.5
Dissolved Lead	mg/L	81	0.00259	0.003	1	0.016	0.016	2	0.005	0.005	2	0.0005	0.0005	2	0.00675	0.00675	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Magnesium	mg/L	83	6.17	2.46	1	141	141	2	59.7	59.7	2	1.96	1.96	2	14.8	14.8	1	64	64	5	28.1	28.3	1	63.6	63.6	5	20	20.2
Dissolved Manganese	mg/L	83	0.254	0.03	1	5.04	5.04	2	1.54	1.54	2	0.00401	0.00401	2	0.0605	0.0605	1	1.52	1.52	5	0.773	0.886	1	0.815	0.815	5	0.304	0.297
Dissolved Molybdenum	mg/L	69	0.0159	0.0025	1	0.186	0.186	2	0.115	0.115	2	0.0005	0.0005	2	0.0025	0.0025	1	0.012	0.012	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Nickel	mg/L	82	0.0123	0.005	1	0.785	0.785	2	0.235	0.235	2	0.00084	0.00084	2	0.0065	0.0065	1	0.025	0.025	5	0.0076	0.005	1	0.038	0.038	5	0.005	0.005
Dissolved Ortho P (365.2)	mg/L	35	0.304	0.043	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Potassium	mg/L	83	41.8	7.13	1	3070	3070	2	976	976	2	7.59	7.59	2	51.1	51.1	1	415	415	5	73.1	64	1	105	105	5	19	9.23
Dissolved Selenium	mg/L	81	0.0035	0.001	1	0.07	0.07	2	0.0165	0.0165	2	0.0005	0.0005	2	0.0005	0.0005	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Silver	mg/L	81	0.00223	0.0005	1	0.005	0.005	2	0.005	0.005	2	0.0005	0.0005	2	0.0005	0.0005	1	0.005	0.005	5	0.005	0.005	1	0.005	0.005	5	0.005	0.005
Dissolved Sodium	mg/L	83	19.3	3.75	1	802	802	2	295	295	2	1.91	1.91	2	36.8	36.8	1	37	37	5	42	37.8	1	64	64	5	8.86	4.62
Dissolved Titanium	mg/L	1	0.0005	0.0005	-	-	-	-	-	-	-	-	-	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Dissolved Vanadium	mg/L	81	0.0118	0.005	1	0.42	0.42	2	0.34	0.34	2	0.0025	0.0025	2	0.005	0.005	1	0.367	0.367	5	0.308	0.308	1	0.348	0.348	5	0.344	0.357
Dissolved Zinc	mg/L	91	0.0811	0.023	1	13.8	13.8	2	2.57	2.57	2	0.0312	0.0312	2	0.00675	0.00675	1	0.316	0.316	5	0.119	0.089	1	0.129	0.129	5	0.0994	0.073
`E. coli	MPN*/100ml or cfu/100mL	67	88300	5950	1	>12000	>12000	2	>12000	>12000	2	>12000	>12000	2	820	820	1	>12000	>12000	5	>12000	>12000	1	>12000	>12000	5	7350	>12000
Enterococcus Group	ng/L	67	122000	11000	1	5400	5400	2	8000	8000	2	>12000	>12000	2	6020	6020	1	>12000	>12000	5	8320	7600	1	>12000	>12000	5	5440	2400
Estriol	ng/L	43	32.6	0.5	-	-	-	2	0.05	0.05	2	0.05	0.05	1	0.5	0.5	-	-	-	3	0.05	0.05	-	-	-	1	0.05	0.05

Table 6.4-2a: Chemical and Bacterial Compounds of Poultry and Cattle Wastes (Water)

Parameter	Units	POULTRY									CATTLE																	
		Edge of Field			SPLP Leach						Edge of Field			Cattle Impacted Spring			SPLP Leach on Fresh Manure						SPLP Leach on Dry Manure					
					4:1 Ratio			20:1 Ratio									4:1 Ratio			20:1 Ratio			4:1 Ratio			20:1 Ratio		
		Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median
Estrone	ng/L	43	5.26	0.5	-	-	-	2	0.05	0.05	2	0.05	0.05	1	0.5	0.5	-	-	-	3	64.7	0.05	-	-	-	1	0.05	0.05
Fecal Coliform	MPN*/100ml or cfu/100mL	68	89900	5000	1	>12000	>12000	2	>12000	>12000	2	>12000	>12000	2	670	670	1	>12000	>12000	5	>12000	>12000	1	>12000	>12000	5	7350	>12000
Nitrite + Nitrate (as N)	mg/L	69	1.63	1.21	-	-	-	2	1	1	2	0.197	0.197	2	33.4	33.4	-	-	-	5	1	1	-	-	-	5	1	1
pH (1:1)	s.u.	67	6.82	6.7	1	7.3	7.3	2	7.45	7.45	2	6.5	6.5	2	6.35	6.35	1	7.7	7.7	5	7.34	7.4	1	7.8	7.8	5	7.28	7.2
Salmonella species	MPN*/100ml or cfu/100mL	68	2.3	1	-	-	-	2	1	1	2	1	1	2	1	1	1	1	1	5	1	1	1	1	1	5	1	1
Soluble Reactive P (4500PF)	mg/L	46	3.66	0.529	1	487	487	2	131	131	2	0.553	0.553	2	2.94	2.94	2	132	65.9	4	30.5	32.8	2	33.7	33.7	4	26.2	25.2
Staphylococcus aureus	MPN*/100ml or cfu/100mL	67	11	1	-	-	-	2	1.5	1.5	2	0.825	0.825	2	0.55	0.55	1	1.5	1.5	4	1.76	1.25	-	-	-	6	10.3	1
TOC	mg/L	71	57.8	10	1	13.5	13.5	2	10.2	10.2	2	11.7	11.7	2	11.4	11.4	1	12.6	12.6	5	50.7	3.34	1	4.62	4.62	5	13.8	6.95
Total Aluminum	mg/L	83	9.14	4.09	-	-	-	-	-	-	2	2.76	2.76	2	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Total Antimony	mg/L	81	0.00354	0.002	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Total Arsenic	mg/L	91	0.0171	0.005	-	-	-	-	-	-	2	0.00282	0.00282	2	0.0035	0.0035	-	-	-	-	-	-	-	-	-	-	-	-
Total Barium	mg/L	83	0.174	0.086	-	-	-	-	-	-	2	0.0621	0.0621	2	0.209	0.209	-	-	-	-	-	-	-	-	-	-	-	-
Total Beryllium	mg/L	81	0.00149	0.0005	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Total Cadmium	mg/L	81	0.00149	0.0005	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Total Calcium	mg/L	83	64.5	26.3	-	-	-	-	-	-	2	5.99	5.99	2	80.8	80.8	-	-	-	-	-	-	-	-	-	-	-	-
Total Chromium	mg/L	82	0.0218	0.008	-	-	-	-	-	-	2	0.00132	0.00132	2	0.00125	0.00125	-	-	-	-	-	-	-	-	-	-	-	-
Total Cobalt	mg/L	82	0.00973	0.005	-	-	-	-	-	-	2	0.00118	0.00118	2	0.00175	0.00175	-	-	-	-	-	-	-	-	-	-	-	-
Total Coliform	MPN*/100ml or cfu/100mL	68	220000	30000	1	>12000	>12000	2	>12000	>12000	2	>12000	>12000	2	6900	6900	1	>12000	>12000	5	>12000	>12000	1	>12000	>12000	5	7790	>12000
Total Copper	mg/L	91	0.16	0.014	-	-	-	-	-	-	2	0.00306	0.00306	2	0.006	0.006	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved P (365.2)	mg/L	38	0.568	0.183	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved P (4500PF)	mg/L	46	4.68	0.582	1	596	596	2	165	165	2	0.607	0.607	2	3.09	3.09	2	148	73.9	4	37.9	38.5	2	37.4	37.4	4	28.3	27.8
Total Dissolved P (6010)	mg/L	45	1.37	0.737	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Dissolved P (6020)	mg/L	46	5.92	0.788	1	443	443	2	134	134	2	0.523	0.523	2	2.7	2.7	1	83	83	5	27.4	27.2	1	43.1	43.1	5	19.8	19
Total Dissolved Solids	mg/L	65	401	224	1	20900	20900	2	5580	5580	2	98	98	2	590	590	1	3330	3330	5	918	965	1	1630	1630	5	407	290
Total Iron	mg/L	83	11.9	5.69	-	-	-	-	-	-	2	2.45	2.45	2	0.122	0.122	-	-	-	-	-	-	-	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	79	24.2	3.6	-	-	-	2	603	603	2	4.19	4.19	2	2.1	2.1	-	-	-	5	45.2	42.5	-	-	-	5	45.5	27.5
Total Lead	mg/L	83	0.0172	0.008	-	-	-	-	-	-	2	0.00348	0.00348	2	0.00425	0.00425	-	-	-	-	-	-	-	-	-	-	-	-
Total Magnesium	mg/L	83	6.95	3.1	-	-	-	-	-	-	2	2.19	2.19	2	12.3	12.3	-	-	-	-	-	-	-	-	-	-	-	-
Total Manganese	mg/L	83	0.661	0.24	-	-	-	-	-	-	2	0.197	0.197	2	0.107	0.107	-	-	-	-	-	-	-	-	-	-	-	-
Total Mercury	mg/L	81	0.000115	0.0001	-	-	-	-	-	-	2	0.0001	0.0001	2	0.0001	0.0001	-	-	-	-	-	-	-	-	-	-	-	-
Total Molybdenum	mg/L	54	0.00403	0.0025	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0025	0.0025	-	-	-	-	-	-	-	-	-	-	-	-
Total Nickel	mg/L	83	0.0179	0.008	-	-	-	-	-	-	2	0.00241	0.00241	2	0.0065	0.0065	-	-	-	-	-	-	-	-	-	-	-	-
Total ortho P (365.2)	mg/L	35	2.29	1.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total P (365.2)	mg/L	21	2.13	0.305	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total P (4500PF)	mg/L	46	7.81	1.12	-	-	-	-	-	-	2	1.1	1.1	2	3.2	3.2	-	-	-	-	-	-	-	-	-	-	-	-
Total P (6010)	mg/L	45	5.17	2.29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total P (6020)	mg/L	46	40.6	1.07	-	-	-	-	-	-	2	0.827	0.827	2	2.82	2.82	-	-	-	-	-	-	-	-	-	-	-	-

Table 6.4-2a: Chemical and Bacterial Compounds of Poultry and Cattle Wastes (Water)

Parameter	Units	POULTRY									CATTLE																	
		Edge of Field			SPLP Leach						Edge of Field			Cattle Impacted Spring			SPLP Leach on Fresh Manure						SPLP Leach on Dry Manure					
					4:1 Ratio			20:1 Ratio									4:1 Ratio			20:1 Ratio			4:1 Ratio			20:1 Ratio		
		Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median
Total Potassium	mg/L	83	46.2	8.89	-	-	-	-	-	-	2	8.34	8.34	2	28.3	28.3	-	-	-	-	-	-	-	-	-	-	-	-
Total Selenium	mg/L	81	0.0035	0.001	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Total Silver	mg/L	81	0.0022	0.0005	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Total Sodium	mg/L	83	19.1	3.24	-	-	-	-	-	-	2	1.42	1.42	2	31.4	31.4	-	-	-	-	-	-	-	-	-	-	-	-
Total Sulfate (SO4)	mg/L	67	20.4	9.8	-	-	-	2	384	384	2	3.34	3.34	2	34.1	34.1	-	-	-	5	10	10	-	-	-	5	10	10
Total Suspended Solids	mg/L	65	266	113	-	-	-	-	-	-	2	153	153	2	7	7	-	-	-	-	-	-	-	-	-	-	-	-
Total Thallium	mg/L	81	0.006	0.0005	-	-	-	-	-	-	2	0.0005	0.0005	2	0.0005	0.0005	-	-	-	-	-	-	-	-	-	-	-	-
Total Vanadium	mg/L	83	0.029	0.005	-	-	-	-	-	-	2	0.00805	0.00805	2	0.0085	0.0085	-	-	-	-	-	-	-	-	-	-	-	-
Total Zinc	mg/L	91	0.154	0.045	-	-	-	-	-	-	2	0.0198	0.0198	2	0.00575	0.00575	-	-	-	-	-	-	-	-	-	-	-	-

(-) samples were not analyzed for the parameter of interest for the sample of interest
Non-detects treated as 1/2 the detection limit

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Table 6.4-2b: Chemical and Bacterial Compounds of Poultry and Wastewater Treatment Plant Wastes (Water)

Parameter	Units	Poultry									Wastewater Treatment Plant					
		Edge of Field			SPLP Leach											
					4:1 Ratio			20:1 Ratio			Direct Discharge			Impacted Surface Water		
		Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median
17a-estradiol	ng/L	43	2.48	0.5	-	-	-	2	273	273	-	-	-	16	1.25	0.5
17b-estradiol	ng/L	43	2.49	2.11	-	-	-	2	0.05	0.05	-	-	-	16	1.07	0.5
Alkalinity (as CaCO3)	mg/L	67	110	60	1	3680	3680	2	1610	1610	3	75.3	69	25	100	104
Ammonia Nitrogen	mg/L	66	4.26	0.369	-	-	-	-	-	-	3	0.95	0.05	24	0.0565	0.05
Brevibacteria 16S rRNA	Copies/L	38	5310000	73700	-	-	-	-	-	-	-	-	-	12	6590	-
Campylobacter species	MPN*/100ml or cfu/100mL	60	29.6	1	-	-	-	-	-	-	-	-	-	9	0.561	0.561
Chloride	mg/L	67	22.3	5.08	1	1840	1840	2	402	402	3	46.9	42.7	25	48.1	49.1
Conductivity	mmhos/cm	43	0.196	0.15	-	-	-	-	-	-	-	-	-	11	0.422	0.422
Dissolved Aluminum	mg/L	81	0.334	0.159	1	0.5	0.5	2	1.23	1.23	3	0.05	0.05	25	0.0479	0.05
Dissolved Antimony	mg/L	81	0.00362	0.001	1	0.005	0.005	2	0.005	0.005	3	0.0005	0.0005	25	0.000574	0.0005
Dissolved Arsenic	mg/L	91	0.823	0.005	1	1.44	1.44	2	0.238	0.238	3	0.00131	0.0013	25	0.00136	0.00118
Dissolved Barium	mg/L	83	0.0573	0.037	1	0.495	0.495	2	0.202	0.202	3	0.00852	0.0079	25	0.0389	0.039
Dissolved Beryllium	mg/L	81	0.00119	0.0005	1	0.005	0.005	2	0.005	0.005	3	0.0005	0.0005	25	0.0005	0.0005
Dissolved Boron	mg/L	1	0.021	0.021	-	-	-	-	-	-	-	-	-	2	0.101	0.101
Dissolved Cadmium	mg/L	81	0.00147	0.0005	1	0.005	0.005	2	0.005	0.005	3	0.0005	0.0005	25	0.000508	0.0005
Dissolved Calcium	mg/L	83	37.2	22	1	106	106	2	45.4	45.4	3	36.1	35.9	25	48.1	51.5
Dissolved Chromium	mg/L	83	0.00809	0.0025	1	0.059	0.059	2	0.037	0.037	3	0.193	0.00456	25	0.00642	0.001
Dissolved Cobalt	mg/L	81	0.153	0.001	1	0.118	0.118	2	0.0265	0.0265	3	0.00733	0.0005	25	0.00109	0.0005
Dissolved Copper	mg/L	91	0.123	0.0125	1	10.4	10.4	2	4.54	4.54	3	0.0302	0.0205	25	0.00386	0.003
Dissolved Iron	mg/L	82	0.607	0.175	1	16.6	16.6	2	7.47	7.47	3	1.33	0.165	25	0.0902	0.05
Dissolved Lead	mg/L	81	0.00259	0.003	1	0.016	0.016	2	0.005	0.005	3	0.0005	0.0005	25	0.000549	0.0005
Dissolved Magnesium	mg/L	83	6.17	2.46	1	141	141	2	59.7	59.7	3	2.53	2.53	25	2.64	2.65
Dissolved Manganese	mg/L	83	0.254	0.03	1	5.04	5.04	2	1.54	1.54	3	0.113	0.0836	25	0.00624	0.005
Dissolved Mercury	mg/L	79	0.000104	0.0001	-	-	-	-	-	-	3	0.0000001	0.0000001	25	0.0000846	0.0001
Dissolved Molybdenum	mg/L	69	0.0159	0.0025	1	0.186	0.186	2	0.115	0.115	3	0.00478	0.0053	25	0.00369	0.0025
Dissolved Nickel	mg/L	82	0.0123	0.005	1	0.785	0.785	2	0.235	0.235	3	0.166	0.00716	25	0.00695	0.004
Dissolved Ortho P (365.2)	mg/L	35	0.304	0.043	-	-	-	-	-	-	-	-	-	9	0.436	0.436
Dissolved Potassium	mg/L	83	41.8	7.13	1	3070	3070	2	976	976	3	10.7	10.8	25	12.8	11.1
Dissolved Selenium	mg/L	81	0.0035	0.001	1	0.07	0.07	2	0.0165	0.0165	3	0.0005	0.0005	25	0.000613	0.0005
Dissolved Silver	mg/L	81	0.00223	0.0005	1	0.005	0.005	2	0.005	0.005	3	0.0005	0.0005	25	0.000533	0.0005
Dissolved Sodium	mg/L	83	19.3	3.75	1	802	802	2	295	295	3	42.9	45	25	48.3	42.7
Dissolved Strontium	mg/L	1	0.0005	0.0005	-	-	-	-	-	-	-	-	-	2	0.0005	0.0005
Dissolved Thallium	mg/L	81	0.006	0.0005	1	0.005	0.005	2	0.005	0.005	3	0.0005	0.0005	25	0.000657	0.0005
Dissolved Titanium	mg/L	1	0.0005	0.0005	-	-	-	-	-	-	-	-	-	2	0.0005	0.0005
Dissolved Vanadium	mg/L	81	0.0118	0.005	1	0.42	0.42	2	0.34	0.34	3	0.103	0.00798	25	0.0101	0.005
Dissolved Zinc	mg/L	91	0.0811	0.023	1	13.8	13.8	2	2.57	2.57	3	0.0276	0.0308	25	0.0174	0.015
E. coli	MPN*/100ml or cfu/100mL	67	88300	5950	1	12000	12000	2	12000	12000	2	9.5	9.5	21	1080	95.5
Enterococcus Group	ng/L	67	122000	11000	1	5400	5400	2	8000	8000	2	4.5	4.5	21	652	180
Estriol	ng/L	43	32.6	0.5	-	-	-	2	0.05	0.05	-	-	-	16	12.5	0.5

Table 6.4-2b: Chemical and Bacterial Compounds of Poultry and Wastewater Treatment Plant Wastes (Water)

Parameter	Units	Poultry									Wastewater Treatment Plant					
		Edge of Field			SPLP Leach											
					4:1 Ratio			20:1 Ratio			Direct Discharge			Impacted Surface Water		
		Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median
Estrone	ng/L	43	5.26	0.5	-	-	-	2	0.05	0.05	-	-	-	16	14.5	11.3
Fecal Coliform	MPN*/100ml or cfu/100mL	68	89900	5000	1	12000	12000	2	12000	12000	2	70	70	21	1400	240
Nitrite + Nitrate (as N)	mg/L	69	1.63	1.21	-	-	-	2	1	1	3	3.47	3.23	26	3.95	3.46
pH (1:1)	s.u.	67	6.82	6.7	1	7.3	7.3	2	7.45	7.45	3	7	7	24	7.45	7.4
Salmonella species	MPN*/100ml or cfu/100mL	68	2.3	1	-	-	-	2	1	1	2	1	1	21	2.87	1
Soluble Reactive P (4500PF)	mg/L	46	3.66	0.529	1	487	487	2	131	131	3	0.916	0.0442	23	0.524	0.298
Staphylococcus aureus	MPN*/100ml or cfu/100mL	67	11	1	-	-	-	2	1.5	1.5	2	0.55	0.55	21	44.2	0.55
TOC	mg/L	71	57.8	10	1	13.5	13.5	2	10.2	10.2	3	5.32	5.31	26	3.67	3.44
Total Aluminum	mg/L	83	9.14	4.09	-	-	-	-	-	-	3	0.05	0.05	25	0.109	0.063
Total Antimony	mg/L	81	0.00354	0.002	-	-	-	-	-	-	3	0.0005	0.0005	25	0.000574	0.0005
Total Arsenic	mg/L	91	0.0171	0.005	-	-	-	-	-	-	3	0.0012	0.00123	25	0.00145	0.00129
Total Barium	mg/L	83	0.174	0.086	-	-	-	-	-	-	3	0.00969	0.0126	25	0.0402	0.04
Total Beryllium	mg/L	81	0.00149	0.0005	-	-	-	-	-	-	3	0.0005	0.0005	25	0.0005	0.0005
Total Cadmium	mg/L	81	0.00149	0.0005	-	-	-	-	-	-	3	0.0005	0.0005	25	0.000508	0.0005
Total Calcium	mg/L	83	64.5	26.3	-	-	-	-	-	-	3	33.2	33.6	25	47.2	52
Total Chromium	mg/L	82	0.0218	0.008	-	-	-	-	-	-	3	0.0018	0.00111	25	0.00121	0.00121
Total Cobalt	mg/L	82	0.00973	0.005	-	-	-	-	-	-	3	0.0055	0.0005	25	0.000997	0.0005
Total Coliform	MPN*/100ml or cfu/100mL	68	220000	30000	1	12000	12000	2	12000	12000	2	9800	9800	17	3950	2400
Total Copper	mg/L	91	0.16	0.014	-	-	-	-	-	-	3	0.00249	0.00212	25	0.00156	0.002
Total Dissolved P (365.2)	mg/L	38	0.568	0.183	-	-	-	-	-	-	-	-	-	9	0.494	0.494
Total Dissolved P (4500PF)	mg/L	46	4.68	0.582	1	596	596	2	165	165	3	1.01	0.0732	23	0.568	0.312
Total Dissolved P (6010)	mg/L	45	1.37	0.737	-	-	-	-	-	-	-	-	-	3	1.93	1.93
Total Dissolved P (6020)	mg/L	46	5.92	0.788	1	443	443	2	134	134	3	0.935	0.0681	22	0.575	0.315
Total Dissolved Solids	mg/L	65	401	224	1	20900	20900	2	5580	5580	3	274	273	25	302	298
Total Iron	mg/L	83	11.9	5.69	-	-	-	-	-	-	3	0.175	0.05	25	0.118	0.05
Total Kjeldahl Nitrogen	mg/L	79	24.2	3.6	-	-	-	2	603	603	3	6.34	5.22	26	2.02	1.98
Total Lead	mg/L	83	0.0172	0.008	-	-	-	-	-	-	3	0.0005	0.0005	25	0.000555	0.0005
Total Magnesium	mg/L	83	6.95	3.1	-	-	-	-	-	-	3	2.51	2.43	25	2.66	2.62
Total Manganese	mg/L	83	0.661	0.24	-	-	-	-	-	-	3	0.0545	0.0518	25	0.0139	0.014
Total Mercury	mg/L	81	0.000115	0.0001	-	-	-	-	-	-	3	0.0001	0.0001	25	0.0001	0.0001
Total Molybdenum	mg/L	54	0.00403	0.0025	-	-	-	-	-	-	3	0.00309	0.00269	25	0.00331	0.0025
Total Nickel	mg/L	83	0.0179	0.008	-	-	-	-	-	-	3	0.0034	0.00197	25	0.00417	0.004
Total ortho P (365.2)	mg/L	35	2.29	1.06	-	-	-	-	-	-	-	-	-	9	0.454	0.454
Total P (365.2)	mg/L	21	2.13	0.305	-	-	-	-	-	-	-	-	-	9	0.602	0.602
Total P (4500PF)	mg/L	46	7.81	1.12	-	-	-	-	-	-	3	1.23	0.231	23	0.594	0.341
Total P (6010)	mg/L	45	5.17	2.29	-	-	-	-	-	-	-	-	-	3	1.97	1.97
Total P (6020)	mg/L	46	40.6	1.07	-	-	-	-	-	-	3	1.06	0.164	22	0.606	0.341
Total Potassium	mg/L	83	46.2	8.89	-	-	-	-	-	-	3	10.9	11	25	12.5	11.9
Total Selenium	mg/L	81	0.0035	0.001	-	-	-	-	-	-	3	0.0005	0.0005	25	0.000613	0.0005

Table 6.4-2b: Chemical and Bacterial Compounds of Poultry and Wastewater Treatment Plant Wastes (Water)

Parameter	Units	Poultry									Wastewater Treatment Plant					
		Edge of Field			SPLP Leach						Direct Discharge			Impacted Surface Water		
					4:1 Ratio			20:1 Ratio								
		Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median	Number of Samples	CDM Average	CDM Median
Total Silver	mg/L	81	0.0022	0.0005	-	-	-	-	-	-	3	0.0005	0.0005	25	0.000533	0.0005
Total Sodium	mg/L	83	19.1	3.24	-	-	-	-	-	-	3	43.5	46.2	25	48.6	42.5
Total Sulfate (SO4)	mg/L	67	20.4	9.8	-	-	-	2	384	384	3	55.4	44.5	25	51.2	43
Total Suspended Solids	mg/L	65	266	113	-	-	-	-	-	-	3	4.67	3	25	4.07	4
Total Thallium	mg/L	81	0.006	0.0005	-	-	-	-	-	-	3	0.0005	0.0005	25	0.000659	0.0005
Total Vanadium	mg/L	83	0.029	0.005	-	-	-	-	-	-	3	0.00547	0.00541	25	0.036	0.027
Total Zinc	mg/L	91	0.154	0.045	-	-	-	-	-	-	3	0.0238	0.0251	25	0.0187	0.012

(-) samples were not analyzed for the parameter of interest for the sample of interest
Non-detects treated as 1/2 the detection limit

Table 6.4-3: Comparison: Poultry Waste and Cattle Manure

Parameter	Units	Poultry Waste	Fresh Cattle Manure	Dry Cattle Manure
		CDM Average	Factor	Factor
Estriol	ng/g	5.87	n.v.	n.v.
17a-estradiol	ng/g	3.18	n.v.	n.v.
Estrone	ng/g	13.2	n.v.	n.v.
17b-estradiol	ng/g	3.01	n.v.	n.v.
Campylobacter species	MPN*/gram	0.126	n.v.	n.v.
E. coli	MPN*/gram	40400	0.0501	0.236
Enterococcus Group	MPN*/gram	107000	0.532	0.704
Total Coliform	MPN*/gram	47500	0.0589	0.235
Staphylococcus aureus	MPN*/gram	0.11	0.182	0.379
Salmonella species	MPN*/gram	0.232	0.384	0.8
Fecal Coliform	MPN*/gram	46900	0.0582	0.274
Organic Matter	%	73.2	0.848	0.845
Solids Total	%	81.6	3.29	2.58
Moisture	%	18.4	0.245	0.269
Total Molybdenum	mg/kg	3.56	1.19	2.39
Total Barium	mg/kg	48.8	0.594	0.531
Total Cadmium	mg/kg	0.307	0.216	0.373
Total P (6020)	mg/kg	20100	3.4	7.47
Nitrogen Total (Inorganic + Organic)	mg/kg	30000	0.98	1
Ammonium (Water Soluble)	mg/kg	1700	2.1	7.91
Total Mercury	mg/kg	0.00561	0.0679	0.367
Phosphorus (Mehlich 3)	mg/kg	5410	1.65	3.36
Total Beryllium	mg/kg	0.307	0.216	0.373
Total Chromium	mg/kg	7.33	5.16	8.92
Phosphorus (Water Soluble)	mg/kg	1440	0.477	1.52
Sulfate (Water Soluble)	mg/kg	4410	7.75	63.1
Total Aluminum	mg/kg	1930	3.91	3.43
Total Antimony	mg/kg	0.307	0.216	0.373
Total Arsenic	mg/kg	18.7	13.2	22.7
Chloride (Water Soluble)	mg/kg	3880	1.22	12.7
Total Iron	mg/kg	1100	2.1	2.16
Total Calcium	mg/kg	34400	3.82	4.94
Total Nickel	mg/kg	14	7.53	17
Total Cobalt	mg/kg	1.81	1.27	2.2
Total Copper	mg/kg	417	29.8	39.7
Nitrate-N (Water Soluble)	mg/kg	248	8.73	15.1
Total Manganese	mg/kg	1490	4.36	4.28
Total Lead	mg/kg	1.82	1.28	2.21
Total Magnesium	mg/kg	5900	1.22	2.08
Total Selenium	mg/kg	1.2	0.845	1.46

Table 6.4-3: Comparison: Poultry Waste and Cattle Manure

Parameter	Units	Poultry Waste	Fresh Cattle Manure	Dry Cattle Manure
		CDM Average	Factor	Factor
Total Potassium	mg/kg	30700	3.31	15.7
Total Vanadium	mg/kg	17.6	2.48	4.28
Total Thallium	mg/kg	0.307	0.216	0.373
Total Sodium	mg/kg	8090	6.69	50.9
Total Silver	mg/kg	8.23	5.8	10
Total Zinc	mg/kg	506	6.83	6.94
Soluble Salts (1:2)	mmhos/cm	11.8	3.06	5.41
pH (1:1)	s.u.	7.93	1.07	1.05
Brevibacteria 16S rRNA	Copies/g	1100000000	n.v.	n.v.

n.v: non value: samples were not analyzed for the parameter of interest for the sample of interest.
Non-detects treated as 1/2 the detection limit

Table 6.4-4: Comparison: Synthetic Leachates - Poultry Waste and Cattle Manure

Parameter	Units	Poultry Waste 20:1	Fresh Cattle Manure SPLP 20:1	Dry Cattle Manure SPLP 20:1
		CDM Average	Factor	Factor
17a-estradiol	ng/L	272.525	2.42	5450
17b-estradiol	ng/L	0.05	1	1
Estriol	ng/L	0.05	1	1
Estrone	ng/L	0.05	0.000773	1
Alkalinity (as CaCO3)	mg/L	1610	5.33	10.6
Chloride	mg/L	22.3	8.34	22.6
Dissolved Aluminum	mg/L	1.23	2.46	2.46
Dissolved Antimony	mg/L	0.005	1	1
Dissolved Arsenic	mg/L	0.238	47.6	47.6
Dissolved Barium	mg/L	0.202	1.02	1.39
Dissolved Beryllium	mg/L	0.005	1	1
Dissolved Cadmium	mg/L	0.005	1	1
Dissolved Calcium	mg/L	45.4	0.985	1.32
Dissolved Chromium	mg/L	0.037	7.4	7.4
Dissolved Cobalt	mg/L	0.0265	5.3	5.3
Dissolved Copper	mg/L	4.54	188	264
Dissolved Iron	mg/L	7.47	14.9	14.9
Dissolved Lead	mg/L	0.005	1	1
Dissolved Magnesium	mg/L	59.7	2.12	2.99
Dissolved Manganese	mg/L	1.54	1.99	5.07
Dissolved Molybdenum	mg/L	0.115	23	23
Dissolved Nickel	mg/L	0.235	30.9	47
Dissolved Potassium	mg/L	976	13.4	51.4
Dissolved Selenium	mg/L	0.0165	3.3	3.3
Dissolved Silver	mg/L	0.005	1	1
Dissolved Sodium	mg/L	295	7.02	33.3
Dissolved Thallium	mg/L	0.005	1	1
Dissolved Vanadium	mg/L	0.34	1.1	0.988
Dissolved Zinc	mg/L	2.57	21.6	25.9
E. coli	MPN*/100ml	12000	1	1.63
Enterococcus Group	MPN*/100ml	8000	0.962	1.47
Fecal Coliform	MPN*/100ml	12000	1	1.63
Nitrite + Nitrate (as N)	mg/L	1	1	1
pH (1:1)	s.u.	7.45	1.01	1.02
Salmonella species	MPN*/100ml	1	1	1
Soluble Reactive P (4500PF)	mg/L	131	4.3	5
Staphylococcus aureus	MPN*/100ml	1.5	0.852	0.146
TOC	mg/L	10.2	0.201	0.739
Total Coliform	MPN*/100ml	12000	1	1.54
Total Dissolved P (4500PF)	mg/L	165	4.35	5.83
Total Dissolved P (6020)	mg/L	134	4.89	6.77
Total Dissolved Solids	mg/L	5580	6.08	13.7
Total Kjeldahl Nitrogen	mg/L	603	13.3	13.3
Total Sulfate (SO4)	mg/L	384	38.4	38.4

Table 6.4-5: Comparison: EOF, Cattle Impacted Springs and WWTP

Parameter	Units	Poultry EOF	Cattle EOF	Cattle Impacted Springs	WWTP Discharge	WWTP Impacted Surface Water
		CDM Average	Factor	Factor	Factor	Factor
17a-estradiol	ng/L	2.48	49.6	4.96	n.v.	1.98
17b-estradiol	ng/L	2.49	49.8	4.98	n.v.	2.33
Alkalinity (as CaCO3)	mg/L	110	4.4	0.585	1.46	1.1
Ammonia Nitrogen	mg/L	4.26	29.4	61.3	4.48	75.4
Brevibacteria 16S rRNA	Copies/L	5310000	n.v.	n.v.	n.v.	806
Campylobacter species	MPN*/100ml or cfu/100mL	29.6	n.v.	n.v.	n.v.	52.8
Chloride	mg/L	22.3	6.16	0.43	0.475	0.464
Conductivity	mmhos/cm	0.196	n.v.	n.v.	n.v.	0.464
Dissolved Aluminum	mg/L	0.334	6.68	6.68	6.68	6.97
Dissolved Antimony	mg/L	0.00362	7.24	7.24	7.24	6.31
Dissolved Arsenic	mg/L	0.823	470	274	628	605
Dissolved Barium	mg/L	0.0573	3.37	0.275	6.73	1.47
Dissolved Beryllium	mg/L	0.00119	2.38	2.38	2.38	2.38
Dissolved Boron	mg/L	0.021	n.v.	n.v.	n.v.	0.208
Dissolved Cadmium	mg/L	0.00147	2.94	2.94	2.94	2.89
Dissolved Calcium	mg/L	37.2	6.47	0.368	1.03	0.773
Dissolved Chromium	mg/L	0.00809	6.86	6.47	0.0419	1.26
Dissolved Cobalt	mg/L	0.153	306	87.4	20.9	140
Dissolved Copper	mg/L	0.123	3.25	18.9	4.07	31.9
Dissolved Iron	mg/L	0.607	6.26	12.1	0.456	6.73
Dissolved Lead	mg/L	0.00259	5.18	0.384	5.18	4.72
Dissolved Magnesium	mg/L	6.17	3.15	0.417	2.44	2.34
Dissolved Manganese	mg/L	0.254	63.3	4.2	2.25	40.7
Dissolved Mercury	mg/L	0.000104	1040	1.04	1040	1.23
Dissolved Molybdenum	mg/L	0.0159	31.8	6.36	3.33	4.31
Dissolved Nickel	mg/L	0.0123	14.6	1.89	0.0741	1.77
Dissolved Ortho P (365.2)	mg/L	0.304	n.v.	n.v.	n.v.	0.697
Dissolved Potassium	mg/L	41.8	5.51	0.818	3.91	3.27
Dissolved Selenium	mg/L	0.0035	7	7	7	5.71
Dissolved Silver	mg/L	0.00223	4.46	4.46	4.46	4.18
Dissolved Sodium	mg/L	19.3	10.1	0.524	0.45	0.4

Table 6.4-5: Comparison: EOF, Cattle Impacted Springs and WWTP

Parameter	Units	Poultry EOF	Cattle EOF	Cattle Impacted Springs	WWTP Discharge	WWTP Impacted Surface Water
		CDM Average	Factor	Factor	Factor	Factor
Dissolved Strontium	mg/L	0.0005	n.v.	n.v.	n.v.	1
Dissolved Thallium	mg/L	0.006	12	12	12	9.13
Dissolved Titanium	mg/L	0.0005	n.v.	n.v.	n.v.	1
Dissolved Vanadium	mg/L	0.0118	4.72	2.36	0.115	1.17
Dissolved Zinc	mg/L	0.0811	2.60	12.0	2.94	4.66
E. coli	MPN*/100ml or cfu/100mL	88300	7.36	108	9290	81.8
Enterococcus Group	ng/L	122000	10.2	20.3	27100	187
Estriol	ng/L	32.6	652	65.2	n.v.	2.61
Estrone	ng/L	5.26	105	10.5	n.v.	0.363
Fecal Coliform	MPN*/100ml or cfu/100mL	89900	7.49	134	1280	64.2
Nitrite + Nitrate (as N)	mg/L	1.63	8.27	0.0488	0.47	0.413
pH (1:1)	s.u.	6.82	1.05	1.07	0.974	0.915
Salmonella species	MPN*/100ml	2.3	2.3	2.3	2.3	0.801
Soluble Reactive P (4500PF)	mg/L	3.66	6.62	1.24	4	6.98
Staphylococcus aureus	MPN*/100ml or cfu/100mL	11	13.3	20	20	0.249
TOC	mg/L	57.8	4.94	5.07	10.9	15.7
Total Aluminum	mg/L	9.14	3.31	183	183	83.9
Total Antimony	mg/L	0.00354	7.08	7.08	7.08	6.17
Total Arsenic	mg/L	0.0171	6.06	4.89	14.3	11.8
Total Barium	mg/L	0.174	2.8	0.833	18	4.33
Total Beryllium	mg/L	0.00149	2.98	2.98	2.98	2.98
Total Cadmium	mg/L	0.00149	2.98	2.98	2.98	2.93
Total Calcium	mg/L	64.5	10.8	0.798	1.94	1.37
Total Chromium	mg/L	0.0218	16.5	17.4	12.1	18
Total Cobalt	mg/L	0.00973	8.25	5.56	1.77	9.76
Total Coliform	MPN*/100ml or cfu/100mL	220000	18.3	31.9	22.4	55.7
Total Copper	mg/L	0.16	52.3	26.7	64.3	103
Total Dissolved P (365.2)	mg/L	0.568	n.v.	n.v.	n.v.	1.15
Total Dissolved P (4500PF)	mg/L	4.68	7.71	1.51	4.63	8.24
Total Dissolved P (6010)	mg/L	1.37	n.v.	n.v.	n.v.	0.71
Total Dissolved P (6020)	mg/L	5.92	11.3	2.19	6.33	10.3

Table 6.4-5: Comparison: EOF, Cattle Impacted Springs and WWTP

Parameter	Units	Poultry EOF	Cattle EOF	Cattle Impacted Springs	WWTP Discharge	WWTP Impacted Surface Water
		CDM Average	Factor	Factor	Factor	Factor
Total Dissolved Solids	mg/L	401	4.09	0.68	1.46	1.33
Total Iron	mg/L	11.9	4.86	97.5	68	101
Total Kjeldahl Nitrogen	mg/L	24.2	5.78	11.5	3.82	12
Total Lead	mg/L	0.0172	4.94	4.05	34.4	31
Total Magnesium	mg/L	6.95	3.17	0.565	2.77	2.61
Total Manganese	mg/L	0.661	3.36	6.18	12.1	47.6
Total Molybdenum	mg/L	0.00403	8.06	1.61	1.3	1.22
Total Nickel	mg/L	0.0179	7.43	2.75	5.26	4.29
Total ortho P (365.2)	mg/L	2.29	n.v.	n.v.	n.v.	5.04
Total P (365.2)	mg/L	2.13	n.v.	n.v.	n.v.	3.54
Total P (4500PF)	mg/L	7.81	7.1	2.44	6.35	13.1
Total P (6010)	mg/L	5.17	n.v.	n.v.	n.v.	2.62
Total P (6020)	mg/L	40.6	49.1	14.4	38.3	67
Total Potassium	mg/L	46.2	5.54	1.63	4.24	3.7
Total Selenium	mg/L	0.0035	7	7	7	5.71
Total Silver	mg/L	0.0022	4.4	4.4	4.4	4.13
Total Sodium	mg/L	19.1	13.5	0.608	0.439	0.393
Total Sulfate (SO4)	mg/L	20.4	6.11	0.598	0.368	0.398
Total Suspended Solids	mg/L	266	1.74	38	57	65.4
Total Thallium	mg/L	0.006	12	12	12	9.1
Total Vanadium	mg/L	0.029	3.6	3.41	5.3	0.806
Total Zinc	mg/L	0.154	7.78	26.8	6.47	8.24

n.v: non value: samples were not analyzed for the parameter of interest for the sample of interest.
Non-detects treated as 1/2 the detection limit

Table 6.4.6 Discharge Volumes

WWTP	Flow (mgd)
Springdale	12.4
Siloam Springs	2.68
Fayetteville-Noland	5.18
Rogers	5.71
Lincoln	0.44
Prairie Grove	0.32
Tahlequah	2.65
Stillwell	0.81
Westville	0.14
Gentry	0.44

Table 6.4-7a: Potential Masses in Leachates

Parameter	Units	Poultry-Greatest Leachable Concentration			Fresh Manure-Greatest Leachable Concentration		Dry Manure-Greatest Leachable Concentration	
		20:1 Ratio			20:1 Ratio		20:1 Ratio	
		Number of Samples	Low limit	High limit	Number of Samples	Averag	Number of Samples	Average
17a-estradiol	kg	2	2.37E+06	3.34E+06	3	9.80E+05	1	4.34E+02
17b-estradiol	kg	2	4.34E+02	6.12E+02	3	4.34E+02	1	4.34E+02
Alkalinity (as CaCO3)	kg	2	1.40E+10	1.97E+10	5	1.93E+09	5	9.70E+08
Chloride	kg	2	3.49E+09	4.92E+09	5	1.73E+08	5	6.38E+07
Dissolved Aluminum	kg	2	1.07E+07	1.51E+07	5	3.19E+06	5	3.19E+06
Dissolved Antimony	kg	2	4.34E+04	6.12E+04	5	3.19E+04	5	3.19E+04
Dissolved Arsenic	kg	2	2.06E+06	2.91E+06	5	3.19E+04	5	3.19E+04
Dissolved Barium	kg	2	1.75E+06	2.47E+06	5	1.26E+06	5	9.25E+05
Dissolved Beryllium	kg	2	4.34E+04	6.12E+04	5	3.19E+04	5	3.19E+04
Dissolved Cadmium	kg	2	4.34E+04	6.12E+04	5	3.19E+04	5	3.19E+04
Dissolved Calcium	kg	2	3.94E+08	5.56E+08	5	2.94E+08	5	2.19E+08
Dissolved Chromium	kg	2	3.21E+05	4.53E+05	5	3.19E+04	5	3.19E+04
Dissolved Cobalt	kg	2	2.30E+05	3.25E+05	5	3.19E+04	5	3.19E+04
Dissolved Copper	kg	2	3.94E+07	5.56E+07	5	1.54E+05	5	1.10E+05
Dissolved Iron	kg	2	6.48E+07	9.15E+07	5	3.19E+06	5	3.19E+06
Dissolved Lead	kg	2	4.34E+04	6.12E+04	5	3.19E+04	5	3.19E+04
Dissolved Magnesium	kg	2	5.18E+08	7.31E+08	5	1.79E+08	5	1.28E+08
Dissolved Manganese	kg	2	1.34E+07	1.89E+07	5	4.93E+06	5	1.94E+06
Dissolved Molybdenum	kg	2	9.97E+05	1.41E+06	5	3.19E+04	5	3.19E+04
Dissolved Nickel	kg	2	2.04E+06	2.88E+06	5	4.85E+04	5	3.19E+04
Dissolved Potassium	kg	2	8.46E+09	1.20E+10	5	4.66E+08	5	1.21E+08
Dissolved Selenium	kg	2	1.43E+05	2.02E+05	5	3.19E+04	5	3.19E+04
Dissolved Silver	kg	2	4.34E+04	6.12E+04	5	3.19E+04	5	3.19E+04
Dissolved Sodium	kg	2	2.56E+09	3.61E+09	5	2.68E+08	5	5.65E+07
Dissolved Thallium	kg	2	4.34E+04	6.12E+04	5	3.19E+04	5	3.19E+04

Table 6.4-7a: Potential Masses in Leachates

Parameter	Units	Poultry-Greatest Leachable Concentration			Fresh Manure-Greatest Leachable Concentration		Dry Manure-Greatest Leachable Concentration	
		20:1 Ratio			20:1 Ratio		20:1 Ratio	
		Number of Samples	Low limit	High limit	Number of Samples	Averag	Number of Samples	Average
Dissolved Vanadium	kg	2	2.95E+06	4.16E+06	5	1.97E+06	5	2.19E+06
Dissolved Zinc	kg	2	2.23E+07	3.15E+07	5	7.59E+05	5	6.34E+05
E. coli	MPN* or cfu	2	1.04E+15	1.47E+15	5	1.04E+15	5	6.37E+14
Enterococcus Group	kg	2	6.94E+07	9.80E+07	5	7.21E+07	5	4.72E+07
Estriol	kg	2	4.34E+02	6.12E+02	3	4.34E+02	1	4.34E+02
Estrone	kg	2	4.34E+02	6.12E+02	3	5.61E+05	1	4.34E+02
Fecal Coliform	MPN* or cfu	2	1.04E+15	1.47E+15	5	1.04E+15	5	6.37E+14
Nitrite + Nitrate (as N)	kg	2	8.67E+06	1.22E+07	5	6.38E+06	5	6.38E+06
Salmonella species	MPN* or cfu	2	8.67E+10	1.22E+11	5	8.67E+10	5	8.67E+10
Soluble Reactive P (4500PF)	kg	2	1.14E+09	1.60E+09	4	1.95E+08	4	1.67E+08
Staphylococcus aureus	MPN* or cfu	2	1.30E+11	1.84E+11	4	1.53E+11	6	8.93E+11
TOC	kg	2	8.84E+07	1.25E+08	5	3.23E+08	5	8.80E+07
Total Coliform	MPN* or cfu	2	1.04E+15	1.47E+15	5	1.04E+15	5	6.75E+14
Total Dissolved P (4500PF)	kg	2	1.43E+09	2.02E+09	4	2.42E+08	4	1.81E+08
Total Dissolved P (6020)	kg	2	1.16E+09	1.64E+09	5	1.75E+08	5	1.26E+08
Total Dissolved Solids	kg	2	4.84E+10	6.83E+10	5	5.86E+09	5	2.60E+09
Total Kjeldahl Nitrogen	kg	2	5.23E+09	7.39E+09	5	2.88E+08	5	2.90E+08
Total Sulfate (SO4)	kg	2	3.33E+09	4.70E+09	5	6.38E+07	5	6.38E+07

Non-detects treated as 1/2 the detection limit

Table 6.4-7b: Comparison of Potential Masses in Leachates

Parameter	Units	Poultry-Greatest Leachable Concentration			Fresh Manure-Greatest Leachable Concentration			Dry Manure-Greatest Leachable Concentration		
		20:1 Ratio			20:1 Ratio			20:1 Ratio		
		Number of Samples	Low Limit	High Limit	Number of Samples	Low Limit Factor	High Limit Factor	Number of Samples	Low Limit Factor	High Limit Factor
17a-estradiol	kg	2	2.37E+06	3.34E+06	3	2.42	3.41	1	5460	7710
17b-estradiol	kg	2	4.34E+02	6.12E+02	3	1	1.41	1	1	1.41
Alkalinity (as CaCO3)	kg	2	1.40E+10	1.97E+10	5	7.25	10.2	5	14.4	20.3
Chloride	kg	2	3.49E+09	4.92E+09	5	20.2	28.5	5	54.6	77.2
Dissolved Aluminum	kg	2	1.07E+07	1.51E+07	5	3.34	4.72	5	3.34	4.72
Dissolved Antimony	kg	2	4.34E+04	6.12E+04	5	1.36	1.92	5	1.36	1.92
Dissolved Arsenic	kg	2	2.06E+06	2.91E+06	5	64.7	91.4	5	64.7	91.4
Dissolved Barium	kg	2	1.75E+06	2.47E+06	5	1.39	1.96	5	1.89	2.67
Dissolved Beryllium	kg	2	4.34E+04	6.12E+04	5	1.36	1.92	5	1.36	1.92
Dissolved Cadmium	kg	2	4.34E+04	6.12E+04	5	1.36	1.92	5	1.36	1.92
Dissolved Calcium	kg	2	3.94E+08	5.56E+08	5	1.34	1.89	5	1.79	2.53
Dissolved Chromium	kg	2	3.21E+05	4.53E+05	5	10.1	14.2	5	10.1	14.2
Dissolved Cobalt	kg	2	2.30E+05	3.25E+05	5	7.2	10.2	5	7.2	10.2
Dissolved Copper	kg	2	3.94E+07	5.56E+07	5	255	360	5	359	507
Dissolved Iron	kg	2	6.48E+07	9.15E+07	5	20.3	28.7	5	20.3	28.7
Dissolved Lead	kg	2	4.34E+04	6.12E+04	5	1.36	1.92	5	1.36	1.92
Dissolved Magnesium	kg	2	5.18E+08	7.31E+08	5	2.89	4.08	5	4.06	5.73
Dissolved Manganese	kg	2	1.34E+07	1.89E+07	5	2.71	3.82	5	6.89	9.72
Dissolved Molybdenum	kg	2	9.97E+05	1.41E+06	5	31.3	44.2	5	31.3	44.2
Dissolved Nickel	kg	2	2.04E+06	2.88E+06	5	42	59.4	5	63.9	90.2
Dissolved Potassium	kg	2	8.46E+09	1.20E+10	5	18.1	25.6	5	69.8	98.6
Dissolved Selenium	kg	2	1.43E+05	2.02E+05	5	4.49	6.33	5	4.49	6.33
Dissolved Silver	kg	2	4.34E+04	6.12E+04	5	1.36	1.92	5	1.36	1.92
Dissolved Sodium	kg	2	2.56E+09	3.61E+09	5	9.55	13.5	5	45.3	63.9

Table 6.4-7b: Comparison of Potential Masses in Leachates

Parameter	Units	Poultry-Greatest Leachable Concentration			Fresh Manure-Greatest Leachable Concentration			Dry Manure-Greatest Leachable Concentration		
		20:1 Ratio			20:1 Ratio			20:1 Ratio		
		Number of Samples	Low Limit	High Limit	Number of Samples	Low Limit Factor	High Limit Factor	Number of Samples	Low Limit Factor	High Limit Factor
Dissolved Thallium	kg	2	4.34E+04	6.12E+04	5	1.36	1.92	5	1.36	1.92
Dissolved Vanadium	kg	2	2.95E+06	4.16E+06	5	1.5	2.12	5	1.34	1.9
Dissolved Zinc	kg	2	2.23E+07	3.15E+07	5	29.4	41.5	5	35.1	49.6
E. coli	MPN* or cfu	2	1.04E+15	1.47E+15	5	1	1.41	5	1.63	2.31
Enterococcus Group	kg	2	6.94E+07	9.80E+07	5	0.962	1.36	5	1.47	2.08
Estriol	kg	2	4.34E+02	6.12E+02	3	1	1.41	1	1	1.41
Estrone	kg	2	4.34E+02	6.12E+02	3	0.000773	0.00109	1	1	1.41
Fecal Coliform	MPN* or cfu	2	1.04E+15	1.47E+15	5	1	1.41	5	1.63	2.31
Nitrite + Nitrate (as N)	kg	2	8.67E+06	1.22E+07	5	1.36	1.92	5	1.36	1.92
Salmonella species	MPN* or cfu	2	8.67E+10	1.22E+11	5	1	1.41	5	1	1.41
Soluble Reactive P (4500PF)	kg	2	1.14E+09	1.60E+09	4	5.84	8.25	4	6.8	9.6
Staphylococcus aureus	MPN* or cfu	2	1.30E+11	1.84E+11	4	0.852	1.2	6	0.146	0.206
TOC	kg	2	8.84E+07	1.25E+08	5	0.273	0.386	5	1	1.42
Total Coliform	MPN* or cfu	2	1.04E+15	1.47E+15	5	1	1.41	5	1.54	2.18
Total Dissolved P (4500PF)	kg	2	1.43E+09	2.02E+09	4	5.92	8.36	4	7.92	11.2
Total Dissolved P (6020)	kg	2	1.16E+09	1.64E+09	5	6.65	9.39	5	9.2	13
Total Dissolved Solids	kg	2	4.84E+10	6.83E+10	5	8.26	11.7	5	18.6	26.3
Total Kjeldahl Nitrogen	kg	2	5.23E+09	7.39E+09	5	18.1	25.6	5	18	25.4
Total Sulfate (SO4)	kg	2	3.33E+09	4.70E+09	5	52.2	73.7	5	52.2	73.7

Non-detects treated as 1/2 the detection limit

Table 6.5-1: Average Concentrations by Environmental Component (Surface Water)

Parameter	Units	EOF	Small Tributaries		Surface Water		USGS		Tenkiller Lake	Reference
			High	Base	High	Base	High	Base		
Phosphorus (T)[1]	mg/L	8.14	0.312	0.337	0.119	0.147	0.176	0.163	0.0378	0.0138
TOC	mg/L	58.7	4.25	2.26	2.31	2.22	4.65	1.66	2.15	2.26
Copper (T)	ug/L	180	2.5	1.3	1.5	1.3	1.6	0.9	1.4	0.5[2]
Zinc (T)	ug/L	165	15.4	11.2	8.3	10.1	4.7	1.2	4.1	2.5[2]
Potassium (T)	mg/L	48	4.28	4.32	3.73	4.58	4.01	3.83	2.96	1.61
Enterococcus Group	MPN/100 mL	126000	21700	548	844	606	4480	108	5.07	83.5
Fecal Coliform	MPN/100 mL	89900	3210	3010	1060	824	2510	161	44.7	25.3
E. coli	MPN/100 mL	89700	3300	182	658	464	2530	99.5	3.74	16.1
Coliforms	MPN/100 mL	220000	7910	4080	3080	2330	14300	1090	92.9	262
TKN	mg/L	24.4	3.31	2.09	2.78	1.62	0.477*	0.25*	2.18	1.38
Aluminum (T)	mg/L	9.5	0.314	0.113	0.691	0.0879	0.483	0.0492	0.124	0.0767
Iron (T)	mg/L	12.2	0.333	0.184	0.969	0.131	0.675	0.0664	0.202	0.0646
Estrone	ng/L	7.67	3.33	6.25	2.48	2.59	1.91	1.34	1.27	1.42
Sodium (T)	mg/L	19.9	9.15	11	7.96	13.6	10.9	12.1	6.71	4.24
Alkalinity (as $CaCO_3$)	mg/L	112	98.5	135	83.4	107	87.3	106	76.3	145
Calcium (T)	mg/L	64.8	43.1	53.2	39	50	40.8	44.6	30.9	39.6
Arsenic (T)	ug/L	19.6	1.5	2.1	0.9	1.5	0.8	0.6	2.7	0.9
Magnesium (T)	mg/L	7.15	2.5	2.56	2.09	2.36	1.98	1.98	1.88	1.47
Total Dissolved Solids	mg/L	405	213	205	151	179	163	178	130	123

1 - Method 4500PF

2 - Non-detects treated as 1/2 the detection limit

3 - Following USGS method

Table 6.5-2: Average Concentrations by Environmental Components (Groundwater)

Parameter	Units	EOF	Groundwater	Groundwater	Groundwater
			Geoprobe	Springs	Well
Phosphorus (T)[1]	mg/L	8.9	71.3	0.217	0.0203
TOC	mg/L	61.9	2.34	1.58	0.606
Copper (T)	ug/L	188	109	1.6	19.5
Zinc (T)	ug/L	171	456	4.6	37
Potassium (T)	mg/L	50.1	15.6	2.99	1.73
Enterococcus Group	MPN/100 mL	133000	1370	657	251
Fecal Coliform	MPN/100 mL	95300	1350	344	40.9
E. coli	MPN/100 mL	95400	1310	353	4.81
Coliforms	MPN/100 mL	233000	2510	1730	456
TKN	mg/L	25.6	10.3	2.17	2.03
Aluminum (T)	mg/L	9.81	196	0.137	0.296
Iron (T)	mg/L	12.5	248	0.248	0.365
Estrone	ng/L	8.23	0.5[2]	0.645	0.5[2]
Sodium (T)	mg/L	20.7	5.92	5.6	12.9
Alkalinity (as $CaCO_3$)	mg/L	111	91.4	122	129
Calcium (T)	mg/L	51	88	52.6	65.8
Arsenic (T)	ug/L	20.2	81.7	2.5	0.8
Magnesium (T)	mg/L	7.34	16.7	2.1	3.61
Total Dissolved Solids	mg/L	422	300	187	240

1 - Method 4500PF

2 - Non-detects treated as 1/2 the detection limit

Table 6.5-3: Average Concentration by Environmental Component (Solids)

Parameter	Units	Poultry Waste	Soil 0-2" with Poultry Waste Application	River Sediments	Tenkiller Lake Sediments	Reference Soil 0-2"
Phosphorus (T)[1]	mg/kg	20100	1050	522	967	311
Organic Matter	%	73	3.2	1.81	1.44	3.05
Copper (T)	ug/kg	417000	28200	11400	12900	5590
Zinc (T)	ug/kg	496000	45300	53900	61200	23400
Potassium (T)	mg/kg	30700	798	654	78.2	526
Arsenic (T)	ug/kg	18600	3320	7530	7520	2640
Calcium (T)	mg/kg	34300	2920	9130	10200	1150
Estrone	ng/g	12.1	0.45	8.43	n.v.	0.753
E. coli	MPN*/gram	42000	116	561	n.v.	37.2
Enterococcus Group	MPN*/gram	103000	7020	422	n.v.	1.32
Fecal Coliform	MPN*/gram	48600	3670	7030	n.v.	37.3
Coliforms	MPN*/gram	49100	35800	9520	n.v.	256
Nitrogen (T)	mg/kg	30300	3730	4130	6180	2330
Soluble Salts	mmhos/cm	11.7	0.381	0.367	0.563	0.258
Sodium (T)	mg/kg	8080	46.6	30.3	1540	25.4
Magnesium (T)	mg/kg	6670	683	591	1200	575
Sulfate (SO4)	mg/kg	4400	52.2	38.2	847	92.2
Phosphorus (water soluble)	mg/kg	1440	71.4	49	78.4	9.09

1 - Method 6020

n.v: non value: samples were not analyzed for the parameter of interest for the sample of interest.

Table 6.9-1: Potential Total Phosphorus Predictor Variables

Variable	Description	Rationale
Total House Density (THD)	density (houses per mi^2) of all identified poultry houses, including inactive houses, in sub-basin	poultry waste is spread on fields in vicinity of poultry houses *(expected positive correlation)*
Active House Density (AHD)	density (houses per mi^2) of all identified active poultry houses in sub-basin	""
THD – 1 mile buffered	density (houses per mi^2) of all identified poultry houses in sub-basin plus 1 mile perimeter buffer	tributary water quality may be impacted by poultry houses a short distance outside of sub-basin (waste transported from a house outside the basin to a field inside the basin) *(expected positive correlation)*
AHD – 1 mile buffered	density (houses per mi^2) of all identified active poultry houses in sub-basin plus 1 mile perimeter buffer	""
THD – 2 mile buffered	density (houses per mi^2) of all identified poultry houses in sub-basin plus 2 mile perimeter buffer	approximately 60% of poultry waste is spread on fields within 2 miles of poultry house (Fisher) *(expected positive correlation)*
AHD – 2 mile buffered	density (houses per mi^2) of all identified active poultry houses in sub-basin plus 2 mile perimeter buffer	""
SCS CN	Soil Conservation Service Curve Number	sub-basins with varying runoff potential may differ in their impact on receiving stream water quality
Septic Tank Density	estimated density (tanks per mi^2) of septic tanks in sub-basin	leaching from septic tanks may carry a significant phosphorus load *(expected positive correlation)*
% Pasture	percent of pasture in sub-basin	amount of pasture in a sub-basin can serve as a surrogate for agricultural activity which may be a good predictor of stream phosphorus concentration *(expected positive correlation)*
% Riparian Buffer	percent of stream length in sub-basin that is buffered by forest	riparian buffers can filter nutrients from runoff prior to entering streams *(expected negative correlation)*
Median Distance to Chicken Houses	median of distances (mi) from poultry houses in the sub-basin to the sampling site	poultry houses closer to the stream may have a greater impact on water quality than those further away *(expected negative correlation)*

Table 6.9-2: Regression Analysis Results Summary[1]

	2005 Baseflow	2005 Highflow	2006 Baseflow	2006 Highflow	2005 – 06 Baseflow	2005 – 06 Highflow
THD	0.66	0.65	0.14	0.65	0.76	0.68
AHD	0.34	0.43	0.26	0.47	0.58	0.47
THD – 1 mi	0.31	0.32	0.39	0.32	0.65	0.3
AHD – 1 mi	0.15	0.18	0.49	0.19	0.5	0.19
THD – 2 mi	0.52	0.42	0.27	0.37	0.73	0.33
AHD – 2 mi	0.54	0.43	0.28	0.35	0.74	0.33
SCS CN	0.11	0.06	0.14	0.43	0.23	0.25
Septic Tanks	0.38	0.08	0.15	0.58	0.37	0.39
% Pasture	0.13	0.03	0.09	0.01	0.12	0.03
% Rip. Buff.	0.06	0.03	0.49	0.21	0.18	0.13
Med. Dist. CH	0.19	q	-0.25	0.01	0.04	0.001

1: statistically significant correlations ($p \leq 0.05$) indicated by yellow highlighting

Table 6.11-1 References Using PCA for Environmental Evaluations
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Table 6.11-1b Excerpts from Selected References

Reference: 1
"Multivariate Statistical Assessment of the Pollution sources along the stream of Kamchia River, Bulgaria"

"PCA of each sampling site was performed in order to identify emitting sources and compare them to really existing industries and anthropogenic waste inlets along the stream. In table 2 the results of the PCA carried out are presented along with the location of real emitters in the vicinity of each sampling site. The source identification by PCA is performed using the Varimax rotation mode of PCA. As statistically significant, loadings higher then 0.70 are taken into account (Malinowski, 1991).

Each latent factor (PC) is presented in the table with the correlated variables (statistically significant factor loadings), with its conditional name and percentage of explained variance.

It might be seen that each sampling region offers its specific pattern of pollution. The identification of polluting sources by PCA reveals that in some cases the correlation between the water parameters varies from site to site indicating in one case a certain latent factor, in another case – quite different. This is no surprise as the water quality at the different sites also differs due to the variability of the emitters. A very important and specific validation of the PCA models for any sampling site is not only the percentage of the explained total variance (over 75% at almost all sites) but the very exact coincidence between the latent factors and the real emitters in the vicinity of the sites. Thus, the approach applied offers a simple opportunity for source identification and apportioning.

Conclusion
The study carried out makes it possible to gain specific information about polluting sources along the stream of Kamchia River. The known industrial wastes (from metallurgy, food production, wineries, domestic inorganic and organic inlets to the river flow, etc.) as well as natural sources are additionally recognized and apportioned by the use of principal components analysis."

Mihailov, G.; V. Simeonov; N. Nikolov; G. Mirinchev. 2005. "Multivariate Statistical Assessment of the Pollution Sources Along the Stream of Kamchia River, Bulgaria." *Water Sciences and Technology*. V 51, n 11, pp. 37-43. IWA Publishing.

Reference: 2
"Chemometric Analysis of Hydro-Chemical Data of an Alluvial River- A Case Study"

"The second PC accounting for 15.2% of total variance showed high positive loadings on dissolved oxygen, moderate loadings on pH and negative loadings on BOD and COD, whereas, the third PC capturing 10.8% of variance was negatively correlated with fecal and streptococcus coliforms. Both these PCs represent anthropogenic pollution sources and can be explained that high levels of dissolved organic matter consume large amounts of oxygen."

"PCA performed on complete data matrix yielded 6-significant PCs explaining 71% of the data variance. The first PC mainly contained variables having origin in hydro geometrical processes, whereas, second and third PCs correlated anthropogenic pollution indicator variables."

Singh, Kunwar P.; Amrita Malik; Vinod K. Singh. 2006. "Chemometric Analysis of Hydro-chemical Data of an Alluvial River – A Case Study." *Water, Air, and Soil Pollution*. V 170, n 1-4, pp 383-404. Kluwer Academic Publishers. February.

Reference: 3
"Assessment of the surface water quality in Northern Greece"

"PCA is a powerful pattern recognition technique that attempts to explain the variance of a large dataset of intercorrelated variables with a smaller set of independent variables (principal components) [20]. PCA was employed on our dataset to compare the compositional patterns between the examined water systems and to identify the factors that influence each one.

Six principal components were obtained with eigenvalues > 1 summing almost 90% of the total variance in the water dataset (Table 2). The first PC, accounting for 22.1% of the total variance was correlated with COD. BOD_5, TON, TP and PO^{3-}_4. This "organic" factor may be interrupted as representing influences from point sources such as municipal and industrial effluents. The second PC, accounting for 19.8% of the total variance was correlated primarily with water soluble N-species, NO^-_2, NH^+_4 and NO^-_3 and secondarily with PO^{3-}_4 or TP. This "nutrient" factor represents influences from non-point sources such as agricultural runoff and atmospheric deposition."

Simeonov, V.; J. A. Stratis; C. Samara; G. Zachariadis; D. Voutsa; A. Anthemidis; M. Sofoniou; Th. Kouimtzis. 2003. "Assessment of the Surface Water Quality in Northern Greece." *Water Research*. V 37, pp. 4119-4124.

Reference: 4
"Polychlorinated Biphenyls in Narragansett Bay Surface Sediments"

"Principal component analysis (PCA) of the surface sediment PCBs separated the Taunton River samples from the rest of the samples. This result suggests that this river has a different PCB composition and sources than the other areas investigated. It also showed that this river has a limited influence on other bay stations as the adjacent samples downstream did not have the same chemical signature."

Hartmann, Paul C.; James G. Quinn; Robert W. Cairns; John W. King. 2004. "Polychlorinated Biphenyls in Narragansett Bay Surface Sediments. *Chemosphere*. V 57, n 1, pp. 9-20. Elsevier Ltd. October.

Table 6.11-2 Comparison of IRW Study to Published Literature

Paper	Rivers	Watershed size (sq.mi.)	No. of Sampling Locations	No. of Samples	Yr of sampling	No. of Parameters used in PCA	No. of Data points	No. of Major Sources Identified	No. of meaningful PCs	% variance explained by Meaningful PCs	% variance explained by PC1
Singh et al	Gomti (India)	9,900	10	1080	3	20	21,600	6	6	71	25.3
Mihailov et al	Kamchia (Bulgaria)	2,060	16	1000	5 to 10	11	900	6	4	75	?
Hartmann et al	Tauton, Seekonk, Providence (RI)	500	41	82	2	24	1,968	2	2	36	20.5
Simeonov et al	Aliakmon, Loudias, Gallikos, Axios (Greece)	3,200	25	900	3	22	22,350	4	6	90	22
IRW	Illinois, Baron, Caney	1,645	279	621	2.5	25	14,700	2	2	56	38

Table 6.11-4a Parameters Not Retained (water)

ParamID	Action-Reason	ParamID	Action-Reason
Specific Conductance	Not Retained - Insufficient Percent Complete	Dissolved Boron	Not Retained - Insufficient Percent Complete
Turbidity	Not Retained - Insufficient Percent Complete	Dissolved Strontium	Not Retained - Insufficient Percent Complete
Conductivity	Not Retained - Insufficient Percent Complete	Dissolved Titanium	Not Retained - Insufficient Percent Complete
Water Temperature	Not Retained - Insufficient Percent Complete	Pheophytin a	Not Retained - Insufficient Percent Complete
DO	Not Retained - Insufficient Percent Complete	Phytoplankton Biomass - Ash Free Dry Mass	Not Retained - Insufficient Percent Complete
Barometric pressure	Not Retained - Insufficient Percent Complete	Sample purpose, code	Not Retained - Insufficient Percent Complete
Turbidity - White Light	Not Retained - Insufficient Percent Complete	Biomass/chlorophyll ratio	Not Retained - Insufficient Percent Complete
Gage height	Not Retained - Insufficient Percent Complete	Phytoplankton Biomass - Ash Weight	Not Retained - Insufficient Percent Complete
Discharge	Not Retained - Insufficient Percent Complete	Phytoplankton Biomass - Dry Weight	Not Retained - Insufficient Percent Complete
Air Temperature	Not Retained - Insufficient Percent Complete	1,2,3,4-Tetrachlorobenzene	Not Retained - Insufficient Percent Complete
Total P (6010)	Not Retained - Inaccurate Data	1,2,4,5-Tetrachlorobenzene	Not Retained - Insufficient Percent Complete
Total Dissolved P (6010)	Not Retained - Inaccurate Data	1,2,4-Trichlorobenzene	Not Retained - Insufficient Percent Complete
Turbidity - IR LEE Light	Not Retained - Insufficient Percent Complete	1,2-Dichlorobenzene	Not Retained - Insufficient Percent Complete
COD (Chemical Oxygen Demand)	Not Retained - Insufficient Percent Complete	1,3-Dichlorobenzene	Not Retained - Insufficient Percent Complete
TTHMFP as CHCl3	Not Retained - Insufficient Percent Complete	1,4-Dichlorobenzene	Not Retained - Insufficient Percent Complete
Sampling method, code	Not Retained - Insufficient Percent Complete	2,3,4,6-Tetrachlorophenol	Not Retained - Insufficient Percent Complete
Sampler type, code	Not Retained - Insufficient Percent Complete	2,4,5-Trichlorophenol	Not Retained - Insufficient Percent Complete
Suspended sediment <0.063 mm	Not Retained - Insufficient Percent Complete	2,4,6-Trichlorophenol	Not Retained - Insufficient Percent Complete
Suspended sediment concentration	Not Retained - Insufficient Percent Complete	2,4-Dichlorophenol	Not Retained - Insufficient Percent Complete
Agency analyzing sample, code	Not Retained - Insufficient Percent Complete	2,4-Dimethylphenol	Not Retained - Insufficient Percent Complete
Bromodichloromethane	Not Retained - Insufficient Percent Complete	2,4-Dinitrophenol	Not Retained - Insufficient Percent Complete
Bromoform	Not Retained - Insufficient Percent Complete	2,4-Dinitrotoluene	Not Retained - Insufficient Percent Complete
Chloroform	Not Retained - Insufficient Percent Complete	2,6-Dichlorophenol	Not Retained - Insufficient Percent Complete
Dibromochloromethane	Not Retained - Insufficient Percent Complete	2,6-Dinitrotoluene	Not Retained - Insufficient Percent Complete
Dissolved oxygen (%)	Not Retained - Insufficient Percent Complete	2-Chloronaphthalene	Not Retained - Insufficient Percent Complete
Bromochloroacetic Acid	Not Retained - Insufficient Percent Complete	2-Chlorophenol	Not Retained - Insufficient Percent Complete

Dibromoacetic Acid	Not Retained - Insufficient Percent Complete	2-Methylnaphthalene	Not Retained - Insufficient Percent Complete
Dichloroacetic Acid	Not Retained - Insufficient Percent Complete	2-Methylphenol	Not Retained - Insufficient Percent Complete
Monobromoacetic Acid	Not Retained - Insufficient Percent Complete	2-Nitroaniline	Not Retained - Insufficient Percent Complete
Monochloroacetic Acid	Not Retained - Insufficient Percent Complete	2-Nitrophenol	Not Retained - Insufficient Percent Complete
Trichloroacetic Acid	Not Retained - Insufficient Percent Complete	3&4-Methylphenol	Not Retained - Insufficient Percent Complete
TTHM as CHCl3	Not Retained - Insufficient Percent Complete	3,3'-Dichlorobenzidine	Not Retained - Insufficient Percent Complete
Hardness (as CaCO3)	Not Retained - Insufficient Percent Complete	3,3'-Dimethylbenzidine	Not Retained - Insufficient Percent Complete
Noncarbonate hardness (as CaCO3) - filtered	Not Retained - Insufficient Percent Complete	3-Nitroaniline	Not Retained - Insufficient Percent Complete
Sodium adsorption ratio	Not Retained - Insufficient Percent Complete	4,6-Dinitro-2-methylphenol	Not Retained - Insufficient Percent Complete
Sodium fraction of cations	Not Retained - Insufficient Percent Complete	4-Bromophenyl phenyl ether	Not Retained - Insufficient Percent Complete
Drainage area, square miles	Not Retained - Insufficient Percent Complete	4-Chloro-3-methylphenol	Not Retained - Insufficient Percent Complete
Brevibacteria 16S rRNA	Not Retained - Insufficient Percent Complete	4-Chloroaniline	Not Retained - Insufficient Percent Complete
Altitude of land surface, feet	Not Retained - Insufficient Percent Complete	4-Chlorophenyl phenyl ether	Not Retained - Insufficient Percent Complete
Chlorophyll a	Not Retained - Insufficient Percent Complete	4-Nitroaniline	Not Retained - Insufficient Percent Complete
Microcystin	Not Retained - Insufficient Percent Complete	4-Nitrophenol	Not Retained - Insufficient Percent Complete
Suspended sediment discharge	Not Retained - Insufficient Percent Complete	Acenaphthene	Not Retained - Insufficient Percent Complete
Sample splitter type, field, code	Not Retained - Insufficient Percent Complete	Acenaphthylene	Not Retained - Insufficient Percent Complete
Acetophenone	Not Retained - Insufficient Percent Complete	Fluoranthene	Not Retained - Insufficient Percent Complete
ANC as CaCO3	Not Retained - Insufficient Percent Complete	Fluorene	Not Retained - Insufficient Percent Complete
Aniline	Not Retained - Insufficient Percent Complete	Hexachlorobenzene	Not Retained - Insufficient Percent Complete
Anthracene	Not Retained - Insufficient Percent Complete	Hexachlorobutadiene	Not Retained - Insufficient Percent Complete
Benzidine	Not Retained - Insufficient Percent Complete	Hexachlorocyclopentadiene	Not Retained - Insufficient Percent Complete
Benzo(a)anthracene	Not Retained - Insufficient Percent Complete	Hexachloroethane	Not Retained - Insufficient Percent Complete
Benzo(a)pyrene	Not Retained - Insufficient Percent Complete	Isophorone	Not Retained - Insufficient Percent Complete
Benzo(b)fluoranthene	Not Retained - Insufficient Percent Complete	Indeno(1,2,3-cd)pyrene	Not Retained - Insufficient Percent Complete
Benzo(g,h,i)perylene	Not Retained - Insufficient Percent Complete	Loss on ignition	Not Retained - Insufficient Percent Complete
Benzo(k)fluoranthene	Not Retained - Insufficient Percent Complete	Naphthalene	Not Retained - Insufficient Percent Complete
Benzoic acid	Not Retained - Insufficient Percent Complete	Nitrobenzene	Not Retained - Insufficient Percent Complete

Benzyl alcohol	Not Retained - Insufficient Percent Complete	N-Nitrosodiethylamine	Not Retained - Insufficient Percent Complete
Bis(2-chloroethoxy)methane	Not Retained - Insufficient Percent Complete	N-Nitrosodimethylamine	Not Retained - Insufficient Percent Complete
Bis(2-chloroethyl)ether	Not Retained - Insufficient Percent Complete	N-Nitroso-di-n-butylamine	Not Retained - Insufficient Percent Complete
Bis(2-chloroisopropyl)ether	Not Retained - Insufficient Percent Complete	N-Nitrosodi-n-propylamine	Not Retained - Insufficient Percent Complete
Bis(2-ethylhexyl)phthalate	Not Retained - Insufficient Percent Complete	N-Nitrosodiphenylamine	Not Retained - Insufficient Percent Complete
Butyl benzyl phthalate	Not Retained - Insufficient Percent Complete	Noncarbonate hardness (as CaCO3) - unfiltered	Not Retained - Insufficient Percent Complete
Carbazole	Not Retained - Insufficient Percent Complete	Pentachlorophenol	Not Retained - Insufficient Percent Complete
Chrysene	Not Retained - Insufficient Percent Complete	Phenanthrene	Not Retained - Insufficient Percent Complete
Dibenz(a,h)anthracene	Not Retained - Insufficient Percent Complete	Phenol	Not Retained - Insufficient Percent Complete
Dibenzofuran	Not Retained - Insufficient Percent Complete	Pyrene	Not Retained - Insufficient Percent Complete
Diethyl phthalate	Not Retained - Insufficient Percent Complete	Pyridine	Not Retained - Insufficient Percent Complete
Dimethyl phthalate	Not Retained - Insufficient Percent Complete	Total Residue	Not Retained - Insufficient Percent Complete
Di-n-butyl phthalate	Not Retained - Insufficient Percent Complete	Residue on evap.	Not Retained - Insufficient Percent Complete
Di-n-octyl phthalate	Not Retained - Insufficient Percent Complete	Chlorophyll a, corrected	Not Retained - Not Applicable
Fecal Streptococci	Not Retained - Insufficient Percent Complete	Total Suspended Solids	Not Retained - Not Applicable

Table 6.11-4b Parameters Not Retained (solids)

ParamID	Action-Reason
Salmonella species	Not Retained - Insufficient Percent Complete
17b-estradiol-d3	Not Retained - Insufficient Percent Complete
17b-estradiol	Not Retained - Insufficient Percent Complete
Estriol	Not Retained - Insufficient Percent Complete
Estrone	Not Retained - Insufficient Percent Complete
17a-estradiol	Not Retained - Insufficient Percent Complete
10-Day % Survival	Not Retained - Insufficient Percent Complete
28-Day % Survival	Not Retained - Insufficient Percent Complete
Average Dry Weight	Not Retained - Not Applicable
Brevibacteria 16S rRNA	Not Retained - Insufficient Percent Complete
AL BOUND P	Not Retained - Insufficient Percent Complete
CA BOUND P	Not Retained - Insufficient Percent Complete
FE BOUND P	Not Retained - Insufficient Percent Complete
LOOSLY BOUND P	Not Retained - Insufficient Percent Complete
Total Kjeldahl Nitrogen	Not Retained - Insufficient Percent Complete
Soil Classification	Not Retained - Not Applicable
Total P (6010)	Not Retained - Inaccurate Data
Solids Total	Not Retained - Not Applicable
Moisture	Not Retained - Not Applicable

Table 6.11-5 Percent Detection and Retained Parameters (water)

ParamID or EDA_Variable	Percent Detection	Action - Primary Reason
P_T	95.62	Retained for PCA
P_TD	94.36	Retained for PCA
P_SOL_REAC	86.80	Retained for PCA
NO2_NO3	79.09	Retained for PCA
TOC	84.53	Retained for PCA
TKN	92.20	Retained for PCA
TDS	99.65	Retained for PCA
Dissolved Beryllium	0.12	Not Retained - Insufficient Percent Detection
Dissolved Silver	0.24	Not Retained - Insufficient Percent Detection
Dissolved Thallium	0.48	Not Retained - Insufficient Percent Detection
Dissolved Cadmium	6.59	Not Retained - Insufficient Percent Detection
Dissolved Antimony	11.98	Not Retained - Insufficient Percent Detection
Dissolved Lead	15.09	Not Retained - Insufficient Percent Detection
Dissolved Selenium	23.71	Not Retained - Insufficient Percent Detection
Dissolved Vanadium	28.02	Not Retained - Insufficient Percent Detection
Dissolved Chromium	19.57	Not Retained - Insufficient Percent Detection
Dissolved Cobalt	28.21	Not Retained - Insufficient Percent Detection
Staphylococcus aureus	14.21	Not Retained - Insufficient Percent Detection
Ammonia Nitrogen	48.98	Not Retained - Redundant with TKN
Total Silver	2.67	Not Retained - Insufficient Percent Detection
Total Thallium	3.05	Not Retained - Insufficient Percent Detection
Total Beryllium	7.37	Not Retained - Insufficient Percent Detection
Total Antimony	11.69	Not Retained - Insufficient Percent Detection
Total Cadmium	12.83	Not Retained - Insufficient Percent Detection
Total Lead	35.62	Not Retained - Insufficient Percent Detection
Total Selenium	27.84	Not Retained - Insufficient Percent Detection
Total Cobalt	28.99	Not Retained - Insufficient Percent Detection
Dissolved Molybdenum	25.19	Not Retained - Insufficient Percent Detection
Dissolved Mercury	2.21	Not Retained - Insufficient Percent Detection
Total Chromium	35.51	Not Retained - Insufficient Percent Detection
Total Vanadium	27.08	Not Retained - Insufficient Percent Detection
Total Mercury	6.08	Not Retained - Insufficient Percent Detection
Salmonella species	12.18	Not Retained - Insufficient Percent Detection
AS_D	39.61	Retained for PCA
ZN_D	64.59	Retained for PCA
CU_D	61.17	Retained for PCA
Total Molybdenum	29.11	Not Retained - Insufficient Percent Detection
AS_T	45.63	Retained for PCA
CU_T	54.93	Retained for PCA
ZN_T	55.04	Retained for PCA
COLIFORMS	94.88	Retained for PCA
ALKALINITY	99.76	Retained for PCA
Estriol	4.72	Not Retained - Insufficient Percent Detection
17a-estradiol	5.67	Not Retained - Insufficient Percent Detection
Estrone	15.91	Not Retained - Insufficient Percent Detection
17b-estradiol	19.84	Not Retained - Insufficient Percent Detection

ENTERO	86.14	Retained for PCA
AL_D	30.78	Retained for PCA
BA_D	99.64	Retained for PCA
CA_D	100.00	Retained for PCA
FE_D	31.98	Retained for PCA
K_D	99.52	Retained for PCA
MG_D	99.88	Retained for PCA
MN_D	77.49	Retained for PCA
NA_D	99.88	Retained for PCA
NI_D	57.33	Retained for PCA
CL	96.84	Retained for PCA
FECAL	87.67	Retained for PCA
AL_T	58.73	Retained for PCA
BA_T	99.75	Retained for PCA
CA_T	100.00	Retained for PCA
FE_T	65.09	Retained for PCA
K_T	99.88	Retained for PCA
MG_T	99.88	Retained for PCA
MN_T	88.78	Retained for PCA
NA_T	100.00	Retained for PCA
NI_T	62.78	Retained for PCA
SO4	98.83	Retained for PCA
PH	100.00	Retained for PCA
ECOLI	84.18	Retained for PCA

Table 6.11-6 Percent Detections and Parameter Retained (solid)

ParamID or EDA_Variable	Percent Detection	Action - Primary Reason
AS_T	97.17	Retained for PCA
CU_T	100.00	Retained for PCA
ZN_T	100.00	Retained for PCA
OM	100.00	Retained for PCA
AL_T	99.58	Retained for PCA
NITROGEN	93.60	Retained for PCA
SALTS	100.00	Retained for PCA
P_T	100.00	Retained for PCA
PH	100.00	Retained for PCA
P_MEHLICH	99.74	Retained for PCA
BA_T	100.00	Retained for PCA
BE_T	52.88	Retained for PCA
CA_T	100.00	Retained for PCA
CO_T	95.81	Retained for PCA
CR_T	97.12	Retained for PCA
FE_T	100.00	Retained for PCA
HG_T	73.56	Retained for PCA
K_T	100.00	Retained for PCA
MG_T	100.00	Retained for PCA
MN_T	99.74	Retained for PCA
NA_T	40.58	Retained for PCA
NI_T	97.64	Retained for PCA
PB_T	95.03	Retained for PCA
V_T	95.55	Retained for PCA
Total Antimony	9.79	Not Retained - Insufficient Percent Detection
Total Cadmium	16.32	Not Retained - Insufficient Percent Detection
Total Selenium	19.88	Not Retained - Insufficient Percent Detection
Total Silver	4.45	Not Retained - Insufficient Percent Detection
Total Thallium	2.97	Not Retained - Insufficient Percent Detection
Total Molybdenum	27.22	Not Retained - Insufficient Percent Detection
CLAY	100.00	Retained for PCA
SAND	98.01	Retained for PCA
SILT	95.22	Retained for PCA
COLIFORMS	91.77	Retained for PCA
P_WS	73.73	Retained for PCA
STAPH	30.43	Retained for PCA
NH4_WS	68.72	Retained for PCA
SO4_WS	82.46	Retained for PCA
FECAL	82.44	Retained for PCA
ENTERO	88.41	Retained for PCA
ECOLI	75.00	Retained for PCA

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0428_SW_1	Edge of Field Lake - Tenkiller SPLP SPLP – (Cattle only) SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	583	26/20	Surface Water Run - Total Metals (using >20 variable threshold)
0428_SW_2	Edge of Field Lake - Tenkiller SPLP SPLP - (Cattle only) SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	617	26/20	Sensitivity - Same as SW_1 using Dissolved Metals

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0427_SW_3	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	573	26/20	Surface water without SPLP (using >20 variable threshold)
0427_SW_4	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	607	26/20	Sensitivity - Same as SW_2 without SPLP
0427_SW_5	Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	508	26/20	Investigative - Same as SW_3 without EOF

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0427_SW_6	Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	542	26/20	Sensitivity - Same as SW_4 without EOF
0428_SW_7	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream – Small Trib – BFC SW Stream – Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	589	24/17	Sensitivity - Same as SW_3 with one P variable
0428_SW_8	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	607	24/17	Sensitivity - Same as SW_4 with one P variable

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0428_SW_9	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	605	23/17	Sensitivity - Same as SW_3 with one bacteria variable (ECOLI)
0428_SW_10	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	641	23/17	Sensitivity - Same as SW_4 with one bacteria variable (ECOLI)

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0428_SW_11	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	605	23/17	Sensitivity - Same as SW_3 with one bacteria variable (ENTERO)
0428_SW_12	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	641	23/17	Sensitivity - Same as SW_4 with one bacteria variable (ENTERO)

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0428_SW_13	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	616	21/14	Sensitivity - Same as SW_3 with one P and one bacteria variable (ENTERO)
0428_SW_14	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	641	21/14	Sensitivity - Same as SW_4 with one P and one bacteria variable (ENTERO)

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0428_SW_15	Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	267	26/26	Investigative - Same as SW_3 with no missing data allowed
0428_SW_16	GW Geoprobe GW Spring GW Well Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	366	26/26	Investigative - Same as SW_15 with GW added

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0428_SW_17	GW Geoprobe GW Spring GW Well Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	699	26/20	Surface and Ground water run same as SW_3 with ground water (using >= 20 variable threshold)
0502_SW_18	SW - Edge of Field SPLP SPLP – (Cattle and Poultry)	66	26/26	Investigative - EOF and SPLP only with no missing data allowed
0502_SW_19	SW - Edge of Field SPLP SPLP – (Cattle only)	64	26/26	Sensitivity - Same as SW_18 with two FAC samples removed
0502_SW_20	SW - Edge of Field	65	26/20	Investigative - EOF only
0502_SW_21	SW - Edge of Field	61	14/11	Investigative - Same as SW_20 with variables based on CP chemistry

Table 6.11-7a: Summary of PCA Run (Water)

Solids Run No.	Summary of Groups Selected	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0504_SW_22	GW Spring Edge of Field Lake - Tenkiller SW Stream - BFC SW Forest SW Stream - HFC SW Stream - Small Trib – BFC SW Stream - Small Trib – HFC SW Stream PA-BFC SW Stream PA- HFC SW Stream NA SW Stream - Synoptic SW Stream - USGS - BFC SW Stream - USGS - HFC SW Stream - WWTP	622	26/20	Investigative - Same as SW_3 with Springs added.

Table 6.11-7b: Summary of PCA Run (Solids)

Solids Run No.	Summary of Groups	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0502_SD_1	Cow manure, Poultry Waste, Poultry Waste Plus Soil (FAC06), Lake Sediment - Small IRW Reservoirs, Lake Sediment- Lake Tenkiller Grab, Stream Sediment, Surface Soil (0-2")	203	32/26	Solids run (using > 26 variable threshold)
0502_SD_2	Cow Manure, Poultry Waste, Poultry Waste-Plus Soil (FAC06), Sediment-Lake-Small IRW Reservoirs, Sediment-Lake-Tenkiller Grab, Sediment Stream, Surface Soil (0-2")	82	32/32	Sensitivity - Same as SD_1 with no missing data allowed
0501_SD_3	Sediment-Lake-Small IRW Reservoirs. Sediment-Lake-Tenkiller Grab, Sediment Stream, Surface Soil (0-2")	173	32/26	Investigative - Same as SD_1 without Poultry Waste and Cow Manure
0501_SD_4	Sediment-Lake-Small IRW Reservoirs. Sediment-Lake-Tenkiller Grab, Sediment Stream, Surface Soil (0-2")	61	32/32	Sensitivity - Same as SD_2 without Poultry Waste and Cow Manure
0501_SD_5	Sediment-Lake-Tenkiller Core	88	23/18	Investigative - Tenkiller Core samples only
0501_SD_6	Cow manure, Poultry Waste, Poultry Waste Plus Soil (FAC06), Lake Sediment - Small IRW Reservoirs, Lake Sediment- Lake Tenkiller Grab, Lake Sediment – Lake Tenkiller Core, Stream Sediment, Surface Soil (0-2")	299	23/18	Investigative - Same as SD_1 with Core samples
0501_SD_7	Cow Manure, Poultry Waste, Poultry Waste-Plus Soil (FAC06), Sediment-Lake-Small IRW Reservoirs, Sediment-Lake-Tenkiller Grab, Lake Sediment – Lake Tenkiller Core Sediment Stream, Surface Soil (0-2")	274	23/23	Sensitivity - Same as SD_6 with no missing values allowed

Table 6.11-7b: Summary of PCA Run (Solids)

Solids Run No.	Summary of Groups	Total Samples	No. of Parameters/ Parameter of Threshold	Purpose
0502_SD_8	Cow Manure, Poultry Waste, Poultry Waste-Plus Soil (FAC06), Sediment-Lake-Small IRW Reservoirs, Sediment-Lake-Tenkiller Grab, Lake Sediment – Lake Tenkiller Core Sediment Stream, Surface Soil (0-2")	288	32/23	Sensitivity - Combination of SD_1 and SD_6

Table 6.11-11 Largest PC2 Scores and Locations

Sample ID	PC2 Score	Location
RBS-0000345:8/11/2006:SW:S:0:-	8.088	downgradient of Springdale
RBS-0000121:8/10/2006:SW:S:0:-	7.898	downgradient of Springdale
HFS-04:8/1/2006:SW:S:-:BF2	7.617	downgradient of Siloam Springs
HFS-04:9/28/2005:SW:S:-:-	7.289	downgradient of Siloam Springs
HFS-04:6/15/2006:SW:S:-:BF1	7.025	downgradient of Siloam Springs
RBS-0000075:8/10/2006:SW:S:0:-	6.999	downgradient of Springdale and Rogers
HFS-04:8/27/2005:SW:S:-:BF2	6.831	downgradient of Siloam Springs
RBS-0000349:8/11/2006:SW:S:0:-	6.468	downgradient of Springdale
SiloamWWTP:3/31/2008:SW:S:-:-	6.356	Siloam Springs Discharge
HFS-04:7/13/2005:SW:S:-:BF1	6.255	downgradient of Siloam Springs
HFS-05:5/10/2006:SW:S:-:EVENTA	6.233	not downgradient of WWTP
HFS-04:3/10/2006:SW:S:-:-	6.175	downgradient of Siloam Springs
HFS-04:4/4/2006:SW:S:-:-	6.161	downgradient of Siloam Springs
HFS-04:6/22/2005:SW:S:-:A	6.045	downgradient of Siloam Springs
HFS-04:4/26/2006:SW:S:-:-	6.010	downgradient of Siloam Springs
HFS-04:3/10/2006:SW:S:-:PEAK	6.000	downgradient of Siloam Springs
SpringdaleWWTP:3/31/2008:SW:S:-:-	5.946	Springdale WWTP Discharge
RBS-0000031:8/16/2006:SW:S:0:-	5.889	downgradient of Fayetteville
RBS-0000350:8/16/2006:SW:S:0:-	5.876	downgradient of Springdale and Rogers
HFS-04:4/8/2006:SW:S:-:-	5.840	downgradient of Siloam Springs
HFS-04:8/20/2005:SW:S:-:B	5.838	downgradient of Siloam Springs
RBS-0000901:8/9/2006:SW:S:0:-	5.771	downgradient of Siloam Springs
BS-HF04:5/1/2007:SW:S:0:-	5.742	downgradient of Siloam Springs
HFS-04:8/20/2005:SW:S:-:A	5.686	downgradient of Siloam Springs
HFS-22:8/1/2006:SW:S:1:BF2	5.628	downgradient of Lincoln
HFS-22:8/28/2005:SW:S:-:BF2	5.586	downgradient of Lincoln
RBS-0000120:8/9/2006:SW:S:0:-	5.507	downgradient of Rogers
HFS-22:4/27/2006:SW:S:-:PEAK	5.435	downgradient of Lincoln
HFS-04:6/22/2005:SW:S:-:B	5.299	downgradient of Siloam Springs
RS-75:5/8/2007:SW:S:0:-	5.254	downgradient of Springdale and Rogers
HFS-22:4/27/2006:SW:S:-:-	5.236	downgradient of Lincoln
HFS-22:5/10/2006:SW:S:-:EVENTA	5.144	downgradient of Lincoln
HFS-04:5/6/2006:SW:S:-:-	5.143	downgradient of Siloam Springs
HFS-22:6/7/2005:SW:S:-:-	5.105	downgradient of Lincoln
SN-SBC2:4/25/2007:SW:S:0:-	5.093	downgradient of Westville
RogersWWTP:4/1/2008:SW:S:-:-	5.073	Rogers WWTP discharge
HFS-22:3/22/2006:SW:S:-:PEAK	5.062	downgradient of Lincoln
RBS-0000109:8/9/2006:SW:S:0:-	5.053	downgradient of Lincoln
HFS-22:6/15/2006:SW:S:-:BF1	5.024	downgradient of Lincoln
HFS-22:6/15/2005:SW:S:-:A	5.017	downgradient of Lincoln
RS-72:5/21/2007:SW:S:0:-	5.001	downgradient of Fayetteville
HFS-22:4/4/2006:SW:S:-:PEAK	4.975	downgradient of Lincoln
HFS-04:5/9/2006:SW:S:-:EVENTA	4.969	downgradient of Siloam Springs
BS-HF22:8/24/2005:SW:S:-:-	4.947	downgradient of Lincoln

Table 6.11-11 Largest PC2 Scores and Locations

Sample ID	PC2 Score	Location
HFS-22:7/12/2005:SW:S:-:BF1	4.923	downgradient of Lincoln
HFS-22:6/15/2005:SW:S:-:B	4.884	downgradient of Lincoln
RBS-0000225:8/11/2006:SW:S:0:-	4.852	not downgradient or WWTP
BS-HF22:5/2/2007:SW:S:0:-	4.844	downgradient of Lincoln
HFS-05:3/22/2006:SW:S:-:PEAK	4.843	not downgradient or WWTP
HFS-22:3/22/2006:SW:S:-:-	4.839	downgradient of Lincoln
RS-122:5/3/2007:SW:S:0:-	4.820	downgradient of Rogers
HFS-22:4/4/2006:SW:S:-:-	4.820	downgradient of Lincoln
USGS-07195500:3/10/2006:SW:S:-:-	4.819	not immediately downgradient of WWTP
RBS-0000246:8/9/2006:SW:S:0:-	4.815	downgradient of Prairie Grove
HFS-04:5/25/2005:SW:S:-:1	4.807	downgradient of Siloam Springs

Table 6.11-8: Chemical and Bacterial Composition for PCA Parameters (Poultry Waste and Cattle Manure)

Parameter	PCA Variable ID	Units	Poultry Waste	Fresh Cattle Manure	Dry Cattle Manure
			CDM Average	CDM Average	CDM Average
Total Sodium	NA_T	mg/Kg	8090	1210	159
Total Potassium	K_T	mg/Kg	30700	9270	1950
Mehlich 3 Phosphorus	P_MEHLICH	mg/Kg	5410	3280	1610
Total P (6020)	P_T	mg/Kg	20100	5920	2690
Soluble Salts	SALTS	mmhos/cm	11.8	3.85	2.18
Organic Matter	OM	%	73.2	86.3	86.6
Total Magnesium	MG_T	mg/Kg	5900	4820	2830
Water Soluble Phosphorus	P_WS	mg/Kg	1440	3020	950
Enterococcus	ENTERO	MPN*/gram	107000	201000	152000
Water Soluble Ammonium	NH4_WS	mg/Kg	1700	808	215
Total Zinc	ZN_T	mg/Kg	506	74.1	72.9
Water Soluble Sulfate	SO4_WS	mg/Kg	4410	569	69.9
E. coli	ECOLI	MPN*/gram	40400	806000	171000
Total Calcium	CA_T	mg/Kg	34400	9010	6960
Total Copper	CU_T	mg/Kg	417	14	10.5
Total Nitrogen	NITROGEN	mg/Kg	30000	30600	30000
Fecal Coliform	FECAL	MPN*/gram	46900	806000	171000
Total Coliform	COLIFORMS	MPN*/gram	47500	806000	202000
pH	PH	s.u.	7.93	7.44	7.58
Total Manganese	MN_T	mg/Kg	1490	342	348
Total Arsenic	AS_T	mg/Kg	18.7	1.42	0.822
Total Barium	BA_T	mg/Kg	48.8	82.2	91.9
Total Nickel	NI_T	mg/Kg	14	1.86	0.822
Total Beryllium	BE_T	mg/Kg	0.307	1.42	0.822
Total Mercury	HG_T	mg/Kg	0.00561	0.0826	0.0153
Staphylococcus	STAPH	MPN*/gram	0.11	0.604	0.29
Total Vanadium	V_T	mg/Kg	17.6	7.11	4.11
Total Aluminum	AL_T	mg/Kg	1930	493	562
Total Chromium	CR_T	mg/Kg	7.33	1.42	0.822
Total Cobalt	CO_T	mg/Kg	1.81	1.42	0.822
Total Lead	PB_T	mg/Kg	1.82	1.42	0.822
Total Iron	FE_T	mg/Kg	1100	525	509