

Anne Arundel County - DPW
 Annapolis WRF Biosolids Lab Results: Martel Laboratories 2011

Parameter	Avg	Max	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia as N (%)	n/a	n/a	1		0		0.24		0.15					
Arsenic (mg/kg)	41	75	<5.0		<4.6		<5.0		<4.2					
Cadmium (mg/kg)	39	85	<5.0		<4.6		<5.0		<4.2					
Calcium Carbonate Equivalent (%)	n/a	n/a	32		16		3		36					
Copper (mg/kg)	1500	4300	160		210		160		120					
Iron (mg/kg)	n/a	n/a	29,000		29,000		33,000		37,000					
Lead (mg/kg)	300	840	24		17		26		8					
Mercury (mg/kg)	17	57	1.30		0.86		<0.42		<0.35					
Molybdenum (mg/kg)	report avg	75	<25		<23		<25		<21					
Nickel (mg/kg)	420	420	14		18		14		<8.4					
Nitrate Nitrogen (mg/kg)	n/a	n/a	25		<9.1		<10		63					
Percent Solids (%)	n/a	n/a	20		22		20		24					
PCBs (mg/kg)	n/a	n/a	<0.25	<0.23	<0.23	<0.05	<0.25	<0.05	<0.21					
pH	n/a	n/a	11.87		12.29		12.25		12.12					
Potassium (mg/kg)	n/a	n/a	2,800		3,600		3,100		3,600					
Selenium (mg/kg)	100	100	<10		<9.1		<10		<8.4					
Total Kjeldahl Nitrogen (%)	n/a	n/a	4.40		3.90		4.20		3.10					
Total Nitrogen (%)	n/a	n/a	4.40		3.90		4.20		3.10					
Phosphorous (mg/kg)	n/a	n/a	12,000		14,000		12,000		14,000					
Total Volatile Solids (%)	n/a	n/a	13		14		12		12					
Zinc (mg/kg)	2800	7500	380		420		410		320					

Anne Arundel County - DPW
Annapolis WRF Biosolids Lab Results

	January	February	March	April	May	June	July	August	September	October	November	December
Thickener												
%Solids (avg)	2.90	2.80	2.30	2.20	1.60	1.80	1.80	2.10				
Sludge Cake												
%Solids (avg)	17.60	18.70	19.00	17.80	17.70	17.20	17.10	17.90				
Lime Cake												
%Solids (avg)												
Tanker Sludge												
%Solids (avg)	22.00	23.00	25.60	26.20	23.10	23.80	25.00	24.90				
Tanker Wet #												
(total)	2,508,200	2,417,020	3,058,120	2,735,220	2,484,476	2,806,262	3,067,040	2,510,054				
Tanker Dry Tons												
(total)	276	278	390	355	285	331	383	313				
Filtrate SS mg/L												
(avg)	555	428	906	639	980	1,149	1,249	970				
WRF Effluent												
Flow MGD (avg)	7.55	7.86	8.54	8.42	8.60	8.25	8.56	8.97				
MLSS (mg/L)												
avg	3,274	3,755	4,028	4,119	4,583	4,900	3,480	3,276				
Total N (mg/L)	6.60	9.00	5.80	5.10	3.90	5.60	7.80	5.70				
Total P (mg/L)	0.30	0.20	0.40	0.50	0.30	0.60	0.70	0.30				

Anne Arundel County - DPW
 Broadneck WRF Biosolids Lab Results: Martel Laboratories 2011

Parameter	Avg	Max	Jan	Feb	Mar	Ap	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia as N (%)	n/a	n/a	0.26		0.22		0.25		0.24					
Arsenic (mg/kg)	41	75	<5.9		<5.6		<5.9		<5.6					
Cadmium (mg/kg)	39	85	<5.9		<5.6		6.80		13.00					
Calcium														
Carbonate Equivalent (%)	n/a	n/a	147.06		34.00		25.30		21.00					
Copper (mg/kg)	1500	4300	210		165.00		110.00		220.00					
Iron (mg/kg)	n/a	n/a	84,000		77,000		81,000		110,000					
Lead (mg/kg)	300	840	11		9.70		13.00		<5.6					
Mercury (mg/kg)	17	57	1.4		<440		0.59		1.10					
Molybdenum (mg/kg)	report avg	75	<29		<28		<29		<28					
Nickel (mg/kg)	420	420	24		27.00		28.00		20					
Nitrate Nitrogen (mg/kg)	n/a	n/a	<12		<11		<12		72					
Percent Solids (%)	n/a	n/a	17		18.00		17.00		18					
PCBs (mg/kg)	n/a	n/a	n/a		0.00		<0.29							
pH	n/a	n/a	12.25		12.41		12.19		12.09					
Potassium (mg/kg)	n/a	n/a	3,000		2,800		2,700		2,000					
Selenium (mg/kg)	100	100	<12		<11		<12		<11					
Total Kjeldahl Nitrogen (%)	n/a	n/a	4.6		3.90		3.90		3.6					
Total Nitrogen (%)	n/a	n/a	4.6		3.90		3.90		3.6					
Phosphorous (mg/kg)	n/a	n/a	15,000		14,000		15,000		22,000					
Total Volatile Solids (%)	n/a	n/a	25		8.00		9.00		8.6					
Zinc (mg/kg)	2800	7500	430		410.00		440.00		470					

Anne Arundel County - DPW

Broadneck WRF Biosolids Lab Results

	January	February	March	April	May	June	July	August	September	October	November	December
Thickener												
%Solids (avg)	2.8	3.3	2.9	2.7	2.4	2.2	2.1	2				
Sludge Cake												
%Solids (avg)												
Lime Cake												
%Solids (avg)												
Tanker Sludge												
%Solids (avg)	17.4	17.2	16.8	17.6	18.5	17.7	18.4	19.4				
Tanker Wet #												
(total)	1,633,260	1,687,060	1,859,340	1,690,400	1,659,889	1,842,240	1,476,540	1,104,100				
Tanker Dry Tons												
(total)	142.2	143.8	155.6	148.9		162.8	131.8	107.6				
Filtrate SS mg/L												
(avg)	399	546	491	648	632	335	342	976				
WRF Effluent												
Flow MGD (avg)	4.56	4.97	5.34	5.1	5.14	4.93	4.76	4.81				
MLSS (mg/L)												
avg	5443	5057	5208	5131	4502	4719	4327	3717				
Total N (mg/L)												
	2.6	1.8	1.7	1.7	1.7	1.2	3.5	2.7				
Total P (mg/L)												
	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3				

Anne Arundel County - DPW
 Broadwater WRF Biosolids Lab Results: Martel Laboratories 2011

Parameter	Avg	Max	Jan	Feb	Mar	Ap	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia as N (%)	n/a	n/a		0.029			0.08							
Arsenic (mg/kg)	41	75		<1			<3.0							
Cadmium (mg/kg)	39	85		<1			3.20							
Calcium														
Carbonate Equivalent (%)	n/a	n/a		11.40			25.10							
Copper (mg/kg)	1500	4300		27.30			150.00							
Iron (mg/kg)	n/a	n/a		109,000.00			48,000.00							
Lead (mg/kg)	300	840		5.72			16.00							
Mercury (mg/kg)	17	57		89.00			<0.25							
Molybdenum (mg/kg)	report avg	75		<5			<15							
Nickel (mg/kg)	420	420		8.21			31.00							
Nitrate Nitrogen (mg/kg)	n/a	n/a		<2			<6.1							
Percent Solids (%)	n/a	n/a		32.00			33.00							
PCBs (mg/kg)	n/a	n/a					<0.15							
pH	n/a	n/a		11.57			12.27							
Potassium (mg/kg)	n/a	n/a		462.00			1,500.00							
Selenium (mg/kg)	100	100		<2			<6.1							
Total Kjeldahl Nitrogen (%)	n/a	n/a		1.00			2.80							
Total Nitrogen (%)	n/a	n/a		1.00			2.80							
Phosphorous (mg/kg)	n/a	n/a		4,200.00			8,200.00							
Total Volatile Solids (%)	n/a	n/a		22.00			17.00							
Zinc (mg/kg)	2800	7500		120.00			440.00							

Anne Arundel County - DPW

Broadwater WRF Biosolids Lab Results

	January	February	March	April	May	June	July	August	September	October	November	December
Thickener												
%Solids (avg)	3.9	3.6	4.5	5.4	3.2	4.4	4	3				
Sludge Cake												
%Solids (avg)												
Lime Cake												
%Solids (avg)												
Tanker Sludge												
%Solids (avg)	28.1	34.1	32	30.9	26.9	29	35.6	32.3				
Tanker Wet #												
(total)	227,899	192,020	278,200	198,100	274,318	223,020	96,440	199,080				
Tanker Dry Tons												
(total)	32.1	32.6	43.6	30.1	36.1	31.3	16.8	32.1				
Filtrate SS mg/L												
(avg)												
WRF Effluent												
Flow MGD (avg)	0.925	1.175	1.521	1.338	1.174	0.853	0.752	0.858				
MLSS (mg/L)												
avg	3177	3334	3727	3794	2891	2524	2148	2673				
Total N (mg/L)												
Total P (mg/L)												
	7.5	8	9.1	6.3	5.4	3.8	4	5.6				
	0.2	0.2	0.3	0.3	0.3	0.1	0.1	0.2				

Anne Arundel County - DPW
 Cox Creek WRF Biosolids Lab Results: Martel Laboratories 2011

Parameter	Avg	Max	Jan	Feb	Mar	Ap	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia as N (%)	n/a	n/a	0.24		0.12		0.20		0.11					
Arsenic (mg/kg)	41	75	<4.2		<3.6		<3.3		<2.7					
Cadmium (mg/kg)	39	85	<4.2		<3.6		<3.3		<2.7					
Calcium														
Carbonate Equivalent (%)	n/a	n/a	25		29.00		25.30		47.00					
Copper (mg/kg)	1500	4300	82		110.00		130.00		88.00					
Iron (mg/kg)	n/a	n/a	31,000		14,500		14,000		11,000					
Lead (mg/kg)	300	840	7.2		8.40		9.20		3.10					
Mercury (mg/kg)	17	57	0.71		0.57		0.47		0.45					
Molybdenum (mg/kg)	report avg	75	<21		<18		<17		<13					
Nickel (mg/kg)	420	420	11		10.00		10.00		<5.3					
Nitrate Nitrogen (mg/kg)	n/a	n/a	<8.3		<7.1		<6.7		<5.3					
Percent Solids (%)	n/a	n/a	24		28.00		30.00		37.6					
PCBs (mg/kg)	n/a	n/a	<0.21	<0.19	<0.18	<0.05	<0.17	<0.05	0.82					
pH	n/a	n/a	12.37		12.42		12.33		12.35					
Potassium (mg/kg)	n/a	n/a	2,700		2,700		2,200		1,900					
Selenium (mg/kg)	100	100	<8.3		<7.1		<6.7		<5.3					
Total Kjeldahl Nitrogen (%)	n/a	n/a	3.9		3.40		0.33		2.7					
Total Nitrogen (%)	n/a	n/a	3.9		3.40		3.30		2.7					
Phosphorous (mg/kg)	n/a	n/a	15,000		9,600		9,000		4,500					
Total Volatile Solids (%)	n/a	n/a	16		16.00		17.00		13					
Zinc (mg/kg)	2800	7500	300		300.00		320.00		300					

Anne Arundel County - DPW

Cox Creek WRF Biosolids Lab Results

	January	February	March	April	May	June	July	August	September	October	November	December
Thickener												
%Solids (avg)	3.58	3.63	3.57	3.47	3.16	3.09	3.33	4.02				
Sludge Cake												
%Solids (avg)	23.08	25.51	26.42	27.49	28.22	25.98		25.68				
Lime Cake												
%Solids (avg)												
Tanker Sludge												
%Solids (avg)	27.30	24.70	28.50	33.10	30.30	31.00	26.30	32.50				
Tanker Wet #	3,564,380	3,215,320	3,631,700	2,889,720	3,060,178	2,849,720	3,374,200	2,566,430				
Tanker Dry Tons												
(total)	486	396.37	517.01	478.36	463.58	441.99	431.99	416.92				
Filtrate SS mg/L												
(avg)			72	82	19							
WRF Effluent												
Flow MGD (avg)	9.73	10.62	11.53	10.77	10.5	9.74	9.52	10.97				
MLSS (mg/L)												
avg	4,081	4,560	3,980	4,541	4,684	4,525	4,975	3,951				
Total N (mg/L)	10.2	8.6	9.2	8.4	7.9	9.2	9.2	9.6				
Total P (mg/L)	0.4	0.7	0.9	0.9	0.9	1	0.7	0.6				

Anne Arundel County - DPW
 Patuxent WRF Biosolids Lab Results: Martel Laboratories 2011

Parameter	Avg	Max	Jan	Feb	Mar	Ap	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia as N (%)	n/a	n/a	0.28		0.57		0.22		0.19					
Arsenic (mg/kg)	41	75	<5.0		<4.8		<4.6		<4.7					
Cadmium (mg/kg)	39	85	<5.0		<4.8		<4.6		<4.7					
Calcium														
Carbonate Equivalent (%)	n/a	n/a	6		22.00		27.10		37.00					
Copper (mg/kg)	1500	4300	110		130.00		110.00		110.00					
Iron (mg/kg)	n/a	n/a	36,000		29,000		32,000		34,000					
Lead (mg/kg)	300	840	19		20.00		22.00		8.70					
Mercury (mg/kg)	17	57	1.3		0.71		0.50		0.85					
Molybdenum (mg/kg)	report avg	75	<25		<24		<23		<24					
Nickel (mg/kg)	420	420	16		19.00		17.00		12					
Nitrate Nitrogen (mg/kg)	n/a	n/a	10		<9.5		<9.1		<9.5					
Percent Solids (%)	n/a	n/a	20		21.00		22.00		21					
PCBs (mg/kg)	n/a	n/a					<0.23							
pH	n/a	n/a	12.31		12.37		12.33		12.23					
Potassium (mg/kg)	n/a	n/a	4,400		5,200		4,000		3,300					
Selenium (mg/kg)	100	100	<10		<9.5		<9.1		<9.5					
Total Kjeldahl Nitrogen (%)	n/a	n/a	4.8		4.80		5.00		4.5					
Total Nitrogen (%)	n/a	n/a	4.8		4.80		5.00		4.5					
Phosphorous (mg/kg)	n/a	n/a	16,000		14,000		15,000		16,000					
Total Volatile Solids (%)	n/a	n/a	12		12.00		12.00		11					
Zinc (mg/kg)	2800	7500	300		290.00		330.00		370					

Anne Arundel County - DPW
 Patuxent WRF Biosolids Lab Results

	January	February	March	April	May	June	July	August	September	October	November	December
Thickener												
%Solids (avg)	2.7	2.7	2.5	2.3	2.1	2.1	2	1.9				
Sludge Cake												
%Solids (avg)												
Lime Cake												
%Solids (avg)												
Tanker Sludge												
%Solids (avg)	19.7	21.7	21.9	21.3	20.9	21	19.7	19.5				
Tanker Wet #												
(total)	2,353,980	1,963,400	1,659,640	1,690,360	1,825,500	1,890,660	1,412,980	1,322,360				
Tanker Dry Tons												
(total)	231.4	214.2	182.1	179.9	191	198	139.9	128.6				
Filtrate SS mg/L												
(avg)	582	432	335	448	720	414	373	420				
WRF Effluent												
Flow MGD (avg)	5.03	5.25	5.54	5.28	5.15	4.82	4.79	5.02				
MLSS (mg/L)												
avg	4,168	3,496	3,751	4,085	3,989	3,459	3,150	3,358				
Total N (mg/L)	2.4	1.9	3.1	1.7	2.5	1.4	1.4	1.2				
Total P (mg/L)	0.05	0.1	0.2	0.1	0.1	0.1	0.2	0.2				

Anne Arundel County - DPW
 MD City WRF Biosolids Lab Results: Martel Laboratories 2011

Parameter	Avg	Max	Jan	Feb	Mar	Ap	May	June	July	Aug	Sept	Oct	Nov	Dec
Ammonia as N (%)	n/a	n/a		0.28			0.18							
Arsenic (mg/kg)	41	75		<5.9			<3.8							
Cadmium (mg/kg)	39	85		<5.9			<3.8							
Calcium														
Carbonate Equivalent (%)	n/a	n/a		16.50			58.30							
Copper (mg/kg)	1500	4300		160.00			140.00							
Iron (mg/kg)	n/a	n/a		49,000.00			25,000.00							
Lead (mg/kg)	300	840		20.00			11.00							
Mercury (mg/kg)	17	57		<0.49			<0.31							
Molybdenum (mg/kg)	report avg	75		<29			<19							
Nickel (mg/kg)	420	420		<12			8.50							
Nitrate Nitrogen (mg/kg)	n/a	n/a		<12			<7.7							
Percent Solids (%)	n/a	n/a		17.00			26.00							
PCBs (mg/kg)	n/a	n/a		n/a			<0.19							
pH	n/a	n/a		12.35			12.49							
Potassium (mg/kg)	n/a	n/a		3,900.00			2,600.00							
Selenium (mg/kg)	100	100		<12			<7.7							
Total Kjeldahl Nitrogen (%)	n/a	n/a		5.50			3.00							
Total Nitrogen (%)	n/a	n/a		5.50			3.00							
Phosphorous (mg/kg)	n/a	n/a		16,000.00			12,000.00							
Total Volatile Solids (%)	n/a	n/a		11.00			7.00							
Zinc (mg/kg)	2800	7500		350.00			230.00							

Anne Arundel County - DPW
MD City WRF Biosolids Lab Results

	January	February	March	April	May	June	July	August	September	October	November	December
Thickener												
%Solids (avg)	5.2	6.1	6.7	6.4	5.3	2.4	2.4	2.6				
Sludge Cake			21.9									
%Solids (avg)												
Lime Cake												
%Solids (avg)												
Tanker Sludge												
%Solids (avg)	24.8	21.4	21.9	27.7	26.1	27.2	26.7	26.9				
Tanker Wet #												
(total)	964,150	706,760	391,253	416,860	570,540	527,510	411,080	409,900				
Tanker Dry Tons												
(total)	116.3	76.5	43	56.7	70.2	71.8	55.1	56.1				
Filtrate SS mg/L												
(avg)	321	370	307	239	199	347	373	512				
WRF Effluent												
Flow MGD (avg)	1.01	1.02	1.06	1.06	1.05	1.02	1.08	1.06				
MLSS (mg/L)												
avg	4151	3158	2987	3655	3390	2651	2353	2313				
Total N (mg/L)	4.4	4.9	5.7	4	3	4	4.9	5.1				
Total P (mg/L)	0.08	0.1	0.1	0.1	0.1	0.1	0.1	0.1				