

**Biosolid Analysis Year** 2017

**Source** Waldport **Lab analysis #** 1706266 **Date** 6/19/2017  
**File No.** 107816 **Neilson Lab**  
**Phone No.** 541-563-2325  
**Contact** Jason McAdoo  
Tyson Arrant

Nutrient and metals analysis are a representative sampling taken for the year's biosolids are land applied. Nutrient and metal concentrations are determined from the current year's representative solids analysis. Site loading rates for nutrients and metal must be adjusted based on current analysis to meet authorized site loading rates.

**COLOR KEY**

requires entered value  
calculated value  
replace 1 with coefficient from selection

**SOLIDS ANALYSIS**

Cake Biosolid	1	0.85	Replace the 1 with the appropriate decimal
Liquid Biosolid	0.5	0.5	Dewater (10-50%) and Liquid
% Total Solids	2.3		
% Volatile Solids	1		

**PATHOGEN REDUCTION**

Class A Biosolid		Put X next to Class A if true
Class B Biosolid	X	Put X next to Class B if true
b2alternative 1		Cite 503.32 Alternative

**Fecal Coliform** Yes <2,000,000 /dry gr. Total Solids  
org.-100ml/1 dry gr.

**VECTOR ATTRACTION REDUCTION (DIGESTION METHOD)**

**Volatile Solids Reduction Method** b1 Cite 503.33 Option

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**VOLATILE SOLIDS REDUCTION (DIGESTION METHOD)**

Volatile Solids Reduction Method Cite 503.33 option

Anaerobic D.	0.2	0.2	Replace the 1 with the appropriate decimal
Aerobic D.	1	0.3	Replace the 1 with the appropriate decimal
Drying Bed	1	0.15	Replace the 1 with the appropriate decimal
Gal/yr.	1		

\* Note If cake biosolids are generated then is total cubic yards instead of total gallons  
 Note biosolid cake conversion is 0.65 ton/ yd<sup>3</sup>

Dry TS US ton/yr.	300000.00	lb. TS/yr. = %TS x 8.34 x gal/yr.	0	Cubic yards hauled
lb. TS/yr.	57546		0	Total US tons
Total US tons	29		0	

**Conversion**

US-> Metric tons multiply by 1.11  
 Metric -> US tons multiply by 0.9  
 Total Metric tons 25.90

**NUTRIENT ANALYSIS**

	mg/kg	mg/kg dry-wt.		
Total Organic	6.89	68900	Organic N = Total N - (NO3+NH3)	
TKN	6.9	69000	Organic N = (%TKN-%NH4)	
NH3	0.01	100	Inorganic N = (%NH4 + %NO3)	
NO3	0.41	4100		
Phosphorus	1.9	19000		
Potassium	2.1	21000		
	mg/kg dry-wt.	lb. / yr.	lb./ac-yr.	kg/ha
Phosphorus	19000	1093	49.69882	55.66268
Potassium	21000	1208	54.93027	61.52191

pH 6.8

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NITROGEN	mg/kg dry-wt.	lb. / yr.	lb./ac-yr.	kg/ha
Total Organic	68900	793	36	40
TKN	69000	794	180	202
NH3	100	1	0	0
NO3	4100	47	11	12
lb. mineralized organic N/dry ton			28	
lb. inorganic N/dry ton			0	
Total lb. available N/dry ton			27.937	

**NUTRIENT LOADING**

Crop nitrogen loading rate N lb./acre 100 112 kg/ha  
 Total acres land applied for year. 22

Number dry tons land applied per acre 1 3 metric ton/ha  
 lb. Available Nitrogen per dry ton 0.00  
 Total lb. Org-N produced per year 793  
 Total lb. NH4 produced per year 1  
 Total lb. NO3 produced per year 47 #DIV/0! lb. N / yd<sup>3</sup>  
 Total lb. Available N per year 841 841.32 lb. N / gallon  
 Min. number of acres required per year (Nitro) 8

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### BIOSOLID METALS ANALYSIS AND CALCULATIONS

Sample calculation:

$[(5.0 \text{ mg As} / 1000000 \text{ mg TS} \times 140000 \text{ lb. Total Solids}) = 0.07 \text{ lb. As/yr.}]$

$(((5.0 \text{ mg As} / 1000000 \text{ mg TS}) \times 140000 \text{ lb. TS}) / 52 \text{ ac}) = 0.013 \text{ lb. As/ac-yr.}]$

$(\text{EPA cumulative loading } 41 \text{ total lb. As/ac} / 0.013 \text{ lb. As/ac/yr.}) = 2719.3 \text{ yr. site life for As}$

$(0.013 \text{ lb. As/ac-yr.}) \times 1.12 \text{ conversion factor} = 0.015 \text{ kg/ha-yr.}]$

$(2.6 \text{ tons biosolid is equivalent to a loading rate of } 100 \text{ lb. total available N/ac}) .$

Metal Analysis	mg/kg dry-wt.
<i>Arsenic</i>	6.6
<i>Cadmium</i>	4.62
<i>Chromium</i>	0
<i>Copper</i>	337
<i>Lead</i>	71.2
<i>Mercury</i>	1.08
<i>Molybdenum</i>	9
<i>Nickel</i>	26.5
<i>Selenium</i>	8.7
<i>Zinc</i>	952

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Metals	Biosolid concentration	Ceiling Limits 503.13	Ceiling Limits 503.13	Yearly	Yearly	Yearly
	mg/kg	Table 1 Conc. mg/kg	Table 1 metal lb./ton biosolid	lb. Metal per ton biosolids	Loading lb./ac-yr.	Loading kg/yr.
<i>Arsenic</i>	7	75	0.150	0.37980	0.01726	0.019
<i>Cadmium</i>	5	85	0.170	0.26586	0.01208	0.014
<i>Chromium</i>	0	1200	2.400	0.00000	0.00000	0.000
<i>Copper</i>	337	4300	8.600	19.39300	0.88150	0.987
<i>Lead</i>	71	840	1.680	4.09728	0.18624	0.209
<i>Mercury</i>	1	57	0.114	0.06215	0.00282	0.003
<i>Molybdenum</i>	9	75	0.150	0.51791	0.02354	0.026
<i>Nickel</i>	27	420	0.840	1.52497	0.06932	0.078
<i>Selenium</i>	9	100	0.200	0.50065	0.02276	0.025
<i>Zinc</i>	952	7500	15.000	54.78379	2.49017	2.789

There is no Ceiling limit for Chromium, table value is a past limit that is no longer valid, used here for loading calculations only.

Metals	Analysis Biosolid conc. mg/kg	Cumulative Pollutant Limits		Yearly lb. Metal per ton biosolids	Biosolid Loading lb./ac-yr.	Biosolid Loading kg/ha-yr.
		CFR 503.13 Table 2 mg/ha	40 CFR 503.13 Table 2 metal lb./ac biosolid			
<i>Arsenic</i>	6.6	41	45.920	0.924	0.0420	0.047
<i>Cadmium</i>	4.62	39	43.680	0.647	0.0294	0.033
<i>Chromium</i>	0	1200	1344.000	0.000	0.0000	0.000
<i>Copper</i>	337	1500	1680.000	47.180	2.1445	2.402
<i>Lead</i>	71.2	300	336.000	9.968	0.4531	0.507
<i>Mercury</i>	1.08	17	19.040	0.151	0.0069	0.008
<i>Molybdenum</i>	9	75	84.000	1.260	0.0573	0.064
<i>Nickel</i>	26.5	420	470.400	3.710	0.1686	0.189
<i>Selenium</i>	8.7	100	112.000	1.218	0.0554	0.062
<i>Zinc</i>	952	2800	3136.000	133.280	6.0582	6.785

There are no limits for Chromium or Molybdenum under Table 2, Mo concentration comes from Table 1. Ceiling Limit.

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Metals	Biosolid Analysis mg/kg	Pollutant	Table 3		Loading kg/ha-yr.	Site Life in years
		Conc. Limits Table 3 mg/ha	lb. Metal per /ac biosolid	Loading lb./ac-yr.		
<i>Arsenic</i>	6.6	41	45.920	0.017	0.019	2120
<i>Cadmium</i>	4.62	39	43.680	0.012	0.014	2881
<i>Chromium</i>	0	1200	1344.000	0.000	0.000	#DIV/0!
<i>Copper</i>	337	1500	1680.000	0.882	0.987	1519
<i>Lead</i>	71.2	300	336.000	0.186	0.209	1438
<i>Mercury</i>	1.08	17	19.040	0.003	0.003	5373
<i>Molybdenum</i>	9	75	84.000	0.024	0.026	2845
<i>Nickel</i>	26.5	420	470.400	0.069	0.078	5410
<i>Selenium</i>	8.7	100	112.000	0.023	0.025	3923
<i>Zinc</i>	952	2800	3136.000	2.490	2.789	1004

There are no limits for Chromium or Molybdenum under Table 3, Mo concentration comes from Table 1. Ceiling Limit.

**40 CFR 503.13 Tables 1-4.**

**T1, Ceiling loading, bulk biosolids sold or given away, bag or container, can not exceed pollutant concentration Table 1.**

**T2, Cumulative Loading, has to meet Table 1 and 2 limits, no lawn/garden Class A no ability to tract.**

**T3, Pollutant Concentration , bulk biosolid land applied on agriculture land, forest, public contact site or reclamation site has to meet Tables 1 &3.**

**T4, Annual Pollutant loading Rate, for land application of Class A biosolid given away in bag or container, has to meet Table 1 & 4.**