Biosolid Analysis

Year 2017

Source	Depoe Bay	**Lab analysis #**		**Date**	8/9/2017	Sample#1
File No.						Sample#2
Phone No.						
Contact		Brady Wiedner				

	Sample #1		Sample #2				Ave
Date of Sample	9/8/2017						
% Total Solids	1.9						1.90
% Volatile Solids	77						77.00
pH	7.2						7.20
TKN	4.8						4.80
NH3	5						5.00
NO3	1.1						1.100
Phosphorus	0.74						0.74
Potassium	31.1						31.10
Arsenic	3.28						3.28
Cadmium	1.28						1.28
Chromium*	8.34						8.34
Copper	316						316.00
Lead	20.8						20.80
Mercury	0.326						0.33
Molybdenum*	3.53						3.53
Nickel	8.14						8.14
Selenium*	0	3.18					1.59
Zinc	707						707.00
Silver	1.06						1.06

Nutrient and metals analysis are an average of representative sampling events taken over the year 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		0.85	Replace the 1 with the appropriate decimal
Liquid Biosolid	1	0.5	Dewater (10-50%) and Liquid
% Total Solids	1.70		
% Volatile Solids	77.00		

PATHOGEN REDUCTION

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

Fecal Coliform org.-100ml/1 dry gr. 11 <2,000,000 /dry gr. Total Solids

VECTOR ATTRACTION REDUCTION (DIGESTION METHOD)

Volatile Solids Reduction Method 1 Cite 503.33 Option

sour

0.9

2017

Source Depoe Bay

File No. 0

Anaerobic D.	0	0.2	Replace the 1 with the appropriate decimal
Aerobic D.	0.3	0.3	Replace the 1 with the appropriate decimal
Drying Bed	0	0.15	Replace the 1 with the appropriate decimal
Gal/yr	575,000		

* Note If cake biosolids are generated then use total cubic yards instead of total gallons

Pounds Equation lb. TS/yr. = %TS x 8.34 x gal/yr.

# of 10 yd^3 Dump Trucks 0

Dry TS US ton/yr.	40.76	
lb. TS/yr.	81,523.50	
Total US tons	40.76	

0.00	Cubic yards hauled
0.00	Total US tons
0.00	lbs.
0.00	

* Note biosolid cake conversion is 0.65 ton/ yd^3

Conversion
US-> Metric tons multiply by 1.11 **Total Metric tons** 36.69
Metric -> US tons multiply by 0.9

NUTRIENT ANALYSIS

	%	mg/kg dry-wt.	
Total Organic	-0.2	-2000	**Organic N = (%TKN-%NH4)**
TKN	4.80	48000	**Inorganic N = (%NH4 + %NO3)**
NH4	5.00	50000	
NO3	1.10	11000	
Phosphorus	0.74	7400	
Potassium	31.10	311000	

	mg/kg dry-wt.	lb. / yr.	lb./ac-yr.	kg/ha
Phosphorus	7,400.00	603.27	17.24	19.30
Potassium	311,000.00	25353.81	724.39	811.32

pH 7.20

2009
Source Depoe Bay
File No. 0

NITROGEN	mg/kg dry-wt.	lb. / yr.	lb./ac-yr.	kg/ha
Total Organic	-0.20	0.00	0.00	0.00
TKN	4.80	0.00	111.80	125.22
NH4	5.00	0.00	0.00	0.00
NO3	1.10	896.76	25.62	28.70
lb. mineralized organic N/dry ton			0.00	
lb. inorganic N/dry ton			0.63	
Total lb. available N/ ton			0.63	
Total lb. available N/yr		897		

NUTRIENT LOADING

Crop nitrogen loading rate N lb./acre	100	112	**kg/ha**
Total acres land applied for year.	35		

Number dry tons land applied per acre	1.16	2.61	**metric ton/ha**	
lb. Nitrogen per dry ton	22.00			
Total lb. Org-N produced per year	0.00			
Total lb. NH4 produced per year	0.00			
Total lb. NO3 produced per year	896.76		#DIV/0!	**lb. N / yd^3**
Total lb. Available N per year	896.76		0.00	**lb. N / gallon**
Min. number of acres required per year (Nitrogen)	8.97			

BIOSOLID METALS ANALYSIS AND CALCULATIONS

Sample calculation:
[([(5.0 mg As/1000000 mg TS X 140000 lb. Total Solids) = 0.07 lb. As/yr.
(((5.0 mg As/ 1000000 mg TS) x 140000 lb. TS) / 52 ac = 0.013 lb. As/ac-yr.
(EPA cumulative loading 41 total lb. As/ac / 0.013 lb. As/ac/yr.) = 2719.3 yr. site life for As
(0.013 lb. As/ac-yr.) x 1.12 conversion factor = 0.015 kg/ha-yr.
(2.6 tons biosolid is equivalent to a loading rate of 100 lb. total available N/ac) .

Metal Analysis	**mg/kg dry-wt.**
Arsenic	3.28
Cadmium	1.28
Chromium	8.34
Copper	316.00
Lead	20.80
Mercury	0.33
Molybdenum	3.53
Nickel	8.14
Selenium	1.59
Zinc	707.00
Silver	1.06

Biosolid	**Ceiling Limits**	**Ceiling Limits**

Metals	concentratior mg/kg	503.13 Table 1 Conc. mg/kg	503.13 Table 1 metal lb./ton biosolid	Yearly lb. Metal per ton biosolids	Yearly Loading lb./ac-yr.	Yearly Loading kg/yr.
Arsenic	3.28	75	0.150	0.26740	0.00764	0.009
Cadmium	1.28	85	0.170	0.10435	0.00298	0.003
Chromium	8.34	1200	2.400	0.67991	0.01943	0.022
Copper	316	4300	8.600	25.76143	0.73604	0.824
Lead	20.8	840	1.680	1.69569	0.04845	0.054
Mercury	0.326	57	0.114	0.02658	0.00076	0.001
Molybdenum	3.53	75	0.150	0.28778	0.00822	0.009
Nickel	8.14	420	0.840	0.66360	0.01896	0.021
Selenium	1.59	100	0.200	0.12962	0.00370	0.004
Zinc	707	7500	15.000	57.63711	1.64677	1.844

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 40 CFR 503.13 Table 2 mg/ha	40 CFR 503.13 Table 2 metal lb./ac biosolid	Yearly lb. Metal per ton biosolids	Biosolid Loading lb./ac-yr.	Biosolid Loading kg/ha-yr.
Arsenic	3.28	41	45.920	0.459	0.0131	0.015
Cadmium	1.28	39	43.680	0.179	0.0051	0.006
Chromium	8.34	1200	1344.000	1.168	0.0334	0.037
Copper	316	1500	1680.000	44.240	1.2640	1.416
Lead	20.8	300	336.000	2.912	0.0832	0.093
Mercury	0.326	17	19.040	0.046	0.0013	0.001
Molybdenum	3.53	75	84.000	0.494	0.0141	0.016
Nickel	8.14	420	470.400	1.140	0.0326	0.036
Selenium	1.59	100	112.000	0.223	0.0064	0.007
Zinc	707	2800	3136.000	98.980	2.8280	3.167

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

	2009
Source	Depoe Bay
File No.	0

Metals	Biosolid Analysis mg/kg	Pollutant Conc. Limits Table 3 mg/ha	Table 3 lb. Metal per /ac biosolid	Loading lb./ac-yr.	Loading kg/ha-yr.	Site Life in years
Arsenic	3.28	41	45.920	0.0076	0.009	4792
Cadmium	1.28	39	43.680	0.0030	0.003	11679
Chromium	8.34	1200	1344.000	0.0194	0.022	55155
Copper	316	1500	1680.000	0.7360	0.824	1820
Lead	20.8	300	336.000	0.0484	0.054	5529
Mercury	0.326	17	19.040	0.0008	0.001	19989
Molybdenum	3.53	75	84.000	0.0082	0.009	8144
Nickel	8.14	420	470.400	0.0190	0.021	19778
Selenium	1.59	100	112.000	0.0037	0.004	24108
Zinc	707	2800	3136.000	1.6468	1.844	1518

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.