RENERGY

Farmer:	Piper
Site ID:	DEQ-02-05
First Year of Application	2016

Date of Application	
Season	Date
2016	8/23/2016

Facility Name:	Emerald BioEnergy
NPDES #:	4IN00204*AD
NANI Month/Year:	August-16

	Concentration (mg/kg) Dry Weight Basis	Concentration (lb/1000 gal) Liquid Application Basis	Pollutant Concentrations (monthly average limits) mg/kg	Ceiling Concentrations (maximum sample limits) mg/kg
Arsenic	5	0.0029	41	75
Cadmium	2	0.0012	39	85
Copper	475	0.2793	1500	4300
Lead	12	0.0071	300	840
Mercury	0.03	0.0000	17	57
Molybdenum	12	0.0071	N/A	75
Nickel	22	0.0129	420	420
Selenium	4	0.0024	100	100
Zinc	837	0.4921	2800	7500
Total Kjeldahl Nitrogen	86,800	51.0358	N/A	N/A
Ammonia Nitrogen	56,300	33.1027	N/A	N/A
Total Phosphorus	32,400	19.0502	N/A	N/A
Total Potassium	13,300	7.8200	N/A	N/A
Total Solids	7.05%			

Ton Conversion Factor	0.0005
Specific Weight (lb/gal)	8.34
Conversion to lb/ton	0.002
Conversion to lb/1000 gal	**0.000588**

Farmer:	Piper	Facility Name:	Emerald BioEnergy
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First Year of Application	2016	NANI Month/Year:	August-16

	Input (ppm)	lbs/1000 gal
TKN	86,800	***51.0***
Ammonia	56,300	***33.1***
Phosphorus	73,872	***43.4***
Potassium	15,960	***9.4***

Ton Conversion Factor	0.0005
Specific Weight (lb/gal)	8.34
Conversion to lb/ton	0.002
Percent Solids	7.05%
Conversion to lb/1000 gal	**0.000588**

Site Acreage:	30
Target Application Rate (gal/Acre)	10,000
Total Gallons Applied	299,204
Actual Application Rate (gal/Acre)	9,907
PAN (lbs/acre)	**381.25**
P (lbs/acre)	**430.31**
K (lbs/acre)	**92.97**
Total Dry Tons	**88.0**
Dry Ton per Acre	**2.9**

Plant Available Nitrogen

	lb/1000 gal
TKN	51.0
Ammonia	33.1
Organic	17.9

Surface Application*	
	lb/1000 gal
Ammonia	16.6
Organic**	5.4
PAN	**21.9**

*Assume 50% of Ammonia volatilizes during surface application

**Assume 30% of Organic Nitrogen is available for plant uptake

Injection***	
	lb/1000 gal
Ammonia	33.1
Organic	5.4
PAN	**38.5**

***For calculations assume 100% of ammonia is available for plant uptake. After application actual availability will be evaluated based on material's exposure to atmosphere after injection.

Estimation of availability will be no less than 85%.

Farmer:	Piper	Facility Name:	Emerald BioEnergy
Site ID:	DEQ-02-05	NPDES #:	4IN00204*AD
First Year of Application	2016	NANI Month/Year:	March-14

Site Acreage:	30
Target Application Rate (gal/Acre)	10,000
Total Gallons Applied	299,204
Actual Application Rate (gal/Acre)	9,907

	Concentration (mg/kg) Dry Weight Basis	Concentration (lb/1000 gal) Liquid Application Basis
Arsenic	5	0.0029
Cadmium	2	0.0012
Copper	475	0.2793
Lead	12	0.0071
Mercury	0.03	0.0000
Molybdenum	12	0.0071
Nickel	22	0.0129
Selenium	4	0.0024
Zinc	837	0.4921
Total Solids	7.05%	

Ton Conversion Factor	0.0005
Specific Weight (lb/gal)	8.34
Conversion to lb/ton	0.002
Conversion to lb/1000 gal	**0.000588**

	Metals Loading lb/acre	Federal Site Lifetime Limits (lb/Acre)	Estimated Site Lifetime (years)
Arsenic	0.029	36.6	1257
Cadmium	0.012	34.8	2987
Copper	2.767	1338.6	484
Lead	0.070	267.7	3830
Mercury	0.000	15.2	86977
Molybdenum	0.070	16.1	230
Nickel	0.128	374.8	2925
Selenium	0.023	89.2	3828
Zinc	4.876	2498.7	512

OEPA Applied Annual Metals Loading Records

Year of Application	Season of Application	NANI Used	Applied Arsenic (lbs/ac)	Applied Cadmium (lbs/ac)	Applied Copper (lbs/ac)	Applied Lead (lbs/ac)	Applied Mercury (lbs/ac)	Applied Molybdenum (lbs/ac)	Applied Nickel (lbs/ac)	Applied Selenium (lbs/ac)	Applied Zinc (lbs/ac)
2014	Spring	Mar-14	0.004	0.002	0.405	0.100	0.000	0.030	0.034	0.002	0.978
2015											
2016	Summer	Aug-16	0.029	0.012	2.767	0.07	0	0.07	0.128	0.023	4.876
2017											
2018											
2019											
2020											
2021											
2022											
To Date Metals Loading Sum (lbs/ac):			0.033	0.014	3.172	0.170	0.000	0.100	0.162	0.025	5.854
Remaining Metals Loading Capacity (lbs/ac):			36.567	34.786	1335.428	267.530	15.200	16.000	374.638	89.175	2492.846
Cummulative Metals Limit (lbs/ac):			36.60	34.80	1338.60	267.70	15.20	16.10	374.80	89.20	2498.70
Estimated Site Lifetime (Years):			1261	2899	483	3822	#DIV/0!	229	2927	3877	511

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Site ID:	DEQ-02-05	NPDES #:	4IN00204*AD
First Year of Application	2016	NANI Month/Year:	August-16

	lbs/ac	$/ac	Total Savings
PAN	381.25	$ 209.69	$ 6,332.52
P2O5	430.31	$ 258.18	$ 7,797.14
K2O	92.97	$ 55.78	$ 1,684.57

Site Acreage	30.2
Savings per Acre	**$ 523.65**
Overall Savings	**$ 15,814.23**

Assumptions and Constants

$ per pound of N = $0.55
$ per pound of P = $0.60
$ per pound of K = $0.60