Water & Sewer Department

CITY OF FREEPORT,
314 WEST STEPHENSON STREET, SUITE 010
FREEPORT, ILLINOIS 61032
TELEPHONE: (815) 233 – 0111

July 12, 2018

Illinois Environmental Protection Agency
Bureau of Water
Compliance Assurance Section #19
1021 North Grand Avenue East
P.O. Box 19276
Springfield, Illinois 62794-9276

Re: City of Freeport - Land Application of Sewage Sludge

Enclosed please find the second quarter sludge solids analysis of 2018 for the City of Freeport's Land Application of Sewage Sludge Permit (#2015-SC-60136). All of the parameters that need monitoring under SPECIAL CONDITION 4 of our permit as well as the Federal 503 Sludge Regulations have been included in the report. All of the sludge processed through Freeport's wastewater treatment plant is piled in a storage building until it can be hauled to agricultural land by SYNAGRO. Analytical data provided in the report was supplied by the Freeport Water & Sewer Department's lab, by the City's contract lab, Suburban Laboratories of Geneva, Illinois and by SYNAGRO's contract lab (also Suburban Laboratories).

Please note that no radium data was collected this quarter since our new sludge permit only requires that the radium samples be collected and reported to IEPA and IEMA on an annual basis.

Please feel free to contact me at (815) 232-6017 if you have any questions.

Sincerely,

Scott Curran
Lab Manager

cc: Tom Kopanski, Director of Utility Operations
Aaron Pennington, Lead Operator
Freeport Water & Sewer Department

Erik Goldman, SYNAGRO

2nd Quarter

FREEPORT WATER AND SEWER DEPARTMENT
SLUDGE SOLIDS ANALYSIS

2018

Sampling Locations: Anaerobically Digested Sludge - Belt filter press feed (HT) or cake.
Sampling Date: Synagro (syn) most Metals & Nutrients - Sludge cake sample taken on 6-08-18 (15.3% TS).
Freeport Water & Sewer Department (fws) Metals & Cyanide - Sludge cake sample taken on 4-23-18 (14.9% TS).
Suburban Laboratories (sub) Metals, Phenols - Sludge cake sample taken on 4-23-18 (14.9% TS).
Volatile Acids, pH (fws) - Belt filter press feed sample on 4-23-18.
Fecal Coliform (fws) - Geometric mean of seven samples in a two week period.

Misc. Parameters (fws):	
Ave. Percent Total Solids (BFP. Feed)	3.4%
Ave. Percent Total Solids (Cake)	17.0%
Average Volatile Solids Out (Cake) (%)	59.4%
Average Volatile Solids In (Wt. Calc.) (%)	72.8%
Volatile Acids (PPM)	122
pH (pH units)	7.27
Ave. Vector Attraction Reduction (%)	43.7%
Pathogen Density (Fecal Coliform)	46,983

	mg/kg wet sludge	mg/kg dry sludge	% dry sludge
Nutrients (syn):			
Ammonia Nitrogen as N	2,662	17,400	1.7%
Organic Nitrogen as N (calc.)	6,258	40,900	4.1%
Total Keldjahl Nitrogen as N	8,920	58,300	5.8%
Phosphorus	2,632	17,200	1.7%
Potassium	214	1,400	0.1%

	quarterly average mg/kg dry sludge	quarterly maximum mg/kg dry sludge
Average & Maximum Metals, etc.:		
Arsenic (syn/sub)	<1.14	<1.15
Anitmony (sub)	<1.50	<1.50
Barium (sub)	469	469
Beryllium (sub)	0.209	0.209
Cadmium (syn/fws)	2.45	3.0
Chromium (syn/fws)	45.9	48.0
Copper (syn/fws)	456	474
Cyanide (total) (fws)	<6.25	<6.25
Iron (fws)	11,840	11,840
Lead (syn/sub/fws)	39.9	64.0
Manganese (syn/fws)	2,020	2,830
Mercury (syn/sub)	0.85	0.90
Molybdenum (syn/sub)	7.55	9.04
Nickel (syn/fws)	86	89.0
Phenols (sub)	13.50	13.50
Selenium (syn/sub)	10.2	10.3
Thallium (sub)	<1.00	<1.00
Silver (fws)	<3	<3
Zinc (syn/fws)	732	832

	pCi/g dry sludge
Radium:	
Radium 226 (sub)	-
Radium 228 (sub)	-
Combined Radium (sub)	-

Calculations:

$$\text{ppm wet sludge} = \text{ppm dry sludge} \times \frac{\%\ \text{total solids}}{100}$$

$$\text{percent vector reduction} = \frac{\text{In - Out}}{\text{In - (In x Out)}}$$

$$\text{fecal coliform density (dry weight basis)} = \frac{\text{CFU/ml x 1ml/1gram}}{\%\ \text{total solids}}$$

Note: (fws) indicates parameters run by the Freeport Water & Sewer Department Lab.
(syn) indicates parameters run by Synagro's contract lab (Suburban Laboratories).
(sub) indicates paramters run by Suburban Laboratories (Freeport's contract lab).

The average volatile solids in figure is a weighted calculation that includes both the primary and WAS volatile solids entering the digesters.

2nd Quarter 2018

Freeport Wastewater Treatment Plant
Volatile Solids Reduction

7/10/2018

							WAS TO GBT						DIGESTER FEED			DIGESTED SLUDGE		VSS REDUCTION		QUARTERLY AVE	
	PSD FLOW,		TS,	TS,	TVSS,	TVSS,	FLOW,	WAS SOLIDS,		WAS,	WAS TVSS,	WAS TVSS,	TS,	TVSS,	WEIGHTED	TO BFP	CAKE	TO BFP	CAKE	TO BFP	CAKE
MONTH	GPD	MGD	%	TON/DAY	%	TON/DAY	MGD	mg/L	%	TON/DAY	%	TON/DAY	TON/DAY	TON/DAY	TVSS, %	TVSS, %	TVSS, %	%	%	%	%
Jan-18	8,838	0.009	4.3	1.57	80.0%	1.25	0.041	7,210	0.72	1.23	82.9%	1.02	2.80	2.27	81.3%	67.0%	66.8%	53.2%	53.7%		
Feb-18	13,312	0.013	4.1	2.25	73.0%	1.64	0.042	7,346	0.73	1.29	73.8%	0.95	3.53	2.59	73.3%	64.0%	61.9%	35.2%	40.8%	50.4%	54.6%
Mar-18	11,005	0.011	3.5	1.58	79.5%	1.26	0.051	7,763	0.78	1.65	75.4%	1.24	3.23	2.50	77.4%	56.0%	51.1%	62.9%	69.5%		
Apr-18	9,139	0.009	4.0	1.51	80.0%	1.20	0.053	6,340	0.63	1.40	82.4%	1.15	2.91	2.36	81.2%	62.0%	61.2%	62.1%	63.4%		
May-18	12,052	0.010	4.7	1.95	76.0%	1.48	0.059	6,459	0.65	1.59	80.7%	1.28	3.54	2.76	78.1%	61.0%	60.6%	56.2%	56.9%	39.6%	43.7%
Jun-18 *	7,884	0.008	5.8	1.89	60.5%	1.14	0.056	9,248	0.92	2.16	57.9%	1.25	4.05	2.39	59.1%	59.0%	56.3%	0.5%	10.9%		
Jul-18																					
Aug-18																					
Sep-18																					
Oct-18																					
Nov-18																					
Dec-18																					

Note *: The volatile solids reduction in June was much lower than previous months due to a significant inflow problem from the Pecatonica River (which happens to be much lower in volatile solids). A manhole located in the flood plain had its cover bumped off during some recent flooding.

2nd Quarter

FREEPORT WATER AND SEWER DEPARTMENT
2018 ANNUAL SLUDGE MONITORING DATA

7/10/2018

Laboratory Name	Sample Date	Sample Type	Percent Total Solids	Arsenic mg/kg-dry	Antimony mg/kg-dry	Barium mg/kg-dry	Beryllium mg/kg-dry	Cadmium mg/kg-dry	Chromium mg/kg-dry	Copper mg/kg-dry	Cyanide mg/kg-dry	Iron mg/kg-dry
Suburban Labs - Synagro		Grab										
Freeport Water & Sewer Lab		Grab										
Suburban Labs - FWASD	4-23-18	Grab	14.9%	**1.15**	**1.50**	469	0.209					
Freeport Water & Sewer Lab	4-23-18	Grab	14.9%					**3.00**	48	474	**6.25**	11,840
Suburban Labs - Synagro	6-08-18	Grab	15.3%	**1.12**				1.90	43.7	437		
Suburban Labs - Synagro		Grab										
Freeport Water & Sewer Lab		Grab										
Suburban Labs - Synagro		Grab										
Freeport Water & Sewer Lab		Grab										
Suburban Labs - FWASD		Grab										
Minimum	Annual	-	14.9%	**1.12**	**1.50**	469	0.209	1.90	43.7	437	**6.25**	11,840
Average	Annual	-	15.0%	**1.14**	**1.50**	469	0.209	2.45	45.9	456	**6.25**	11,840
Maximum	Annual	-	15.3%	**1.15**	**1.50**	469	0.209	**3.00**	48.0	474	**6.25**	11,840

Laboratory Name	Sample Date	Sample Type	Lead mg/kg-dry	Manganese mg/kg-dry	Mercury mg/kg-dry	Molybdenum mg/kg-dry	Nickel mg/kg-dry	Phenols mg/kg-dry	Selenium mg/kg-dry	Thallium mg/kg-dry	Silver mg/kg-dry	Zinc mg/kg-dry
Suburban Labs - Synagro		Grab										
Freeport Water & Sewer Lab		Grab										
Suburban Labs - FWASD	4-23-18	Grab	26.7		0.795	6.06		**13.5**	10.1	**1.00**		
Freeport Water & Sewer Lab	4-23-18	Grab	64	2830			89				**3.00**	832
Suburban Labs - Synagro	6-08-18	Grab	29.0	1210	0.900	9.04	82.2		10.3			632
Suburban Labs - Synagro		Grab										
Freeport Water & Sewer Lab		Grab										
Suburban Labs - Synagro		Grab										
Freeport Water & Sewer Lab		Grab										
Suburban Labs - FWASD		Grab										
Minimum	Annual	-	26.7	1210	0.795	6.06	82.2	**13.5**	10.1	**1.00**	**3.00**	632
Average	Annual	-	39.9	2020	0.85	7.55	86	**13.5**	10.2	**1.00**	**3.00**	732
Maximum	Annual	-	64.0	2830	0.90	9.04	89	**13.5**	10.3	**1.00**	**3.00**	832

Note: Bold data indicates parameter not detected.

2ND QUARTER

FREEPORT WATER AND SEWER DEPARTMENT
SLUDGE SOLIDS TESTING

2018

FECAL COLIFORM - SLUDGE ANALYSIS

DATE	% TS	FECAL/100 ML (wet)	CFU/gram TS (dry wt)
5-15-18	2.70%	77,143	28,571
5-16-18	2.50%	242,500	97,000
5-17-18	2.90%	182,500	62,931
5-18-18	3.00%	120,000	40,000
5-21-18	3.40%	140,000	41,176
5-22-18	3.30%	63,333	19,192
5-23-18	2.70%	247,500	91,667

AVERAGE:	54,362
GEOMETRIC MEAN:	46,983

VECTOR ATTRACTION REDUCTION

MONTH	BFP. FEED SLUDGE %TS	DIGESTER FEED WEIGHTED AVE CALC. %VS	BFP CAKE SLUDGE %VS	BFP CAKE SLUDGE %TS
APRIL	3.1%	81.2%	61.2%	15.8%
MAY	3.8%	78.1%	60.6%	16.0%
JUNE	3.3%	59.1%	56.3%	19.1%
QUARTERLY AVE.	3.4%	72.8%	59.4%	17.0%

Percent Vetor Reduction:	45.4%

Calc. Percent Vetor Reduction:	43.7%