

GOLETA SANITARY DISTRICT

BIOSOLIDS ANNUAL REPORT 2021



GOLETA SANITARY
Water Resource Recovery District

“Protecting Public Health and the Environment”

Submitted: February 2022

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BIOSOLIDS ANNUAL REPORT

I. GENERAL

1. **Name of Generator:** Goleta Sanitary District
2. **Permit No.:** CA 0048160
Order No.: R3-2017-0021
3. **Location:** 1 William Moffett Place
Goleta, CA 93117
4. **Mailing Address:** 1 William Moffett Place
Goleta, CA 93117
5. **Contact Person:** John Crisman, Operations
Manager
6. **Telephone:** (805) 967-4519
7. **Influent Flow:** 4.3 MGD 2021 Average Daily Flow
8. **Sludge Treatment Process:**

The Goleta Sanitary District (GSD) completed a major treatment plant upgrading project in December 2013. The main purpose of the construction project was to upgrade the partial secondary treatment portion of the facility to be able to treat 100% of the inflow to the full secondary level. The solids treatment portion of the facility was also upgraded as part of the project. Two of the five sludge drying beds were demolished to make room for a new solids handling building. The solids handling building contains two screw presses, two secondary sludge thickeners, pumping equipment, a chemical storage area, a screw conveyor for loading biosolids trucks and a sludge holding tank.

Settleable solids and floatable materials are skimmed from the three primary clarifiers and transferred to one of the three anaerobic digesters. Secondary solids are mechanically thickened also using polymer and fed to the anaerobic digesters. The raw sludge is digested in the three heated anaerobic digesters for an average of 36 days at an annual average temperature of 99.2°F (37.3°C). Anaerobic digestion decomposes organic material, which produces digester gas composed primarily of methane. The digester gas is circulated to the boilers where it is used as fuel to heat the sludge in the digesters.

Sludge from the digesters can be sent directly to the screw press or can be pumped into one of two stabilization basins (lagoons) where the sludge is allowed to settle and continue to decompose. As the stabilization basins fill, stabilized sludge is

dredged from the bottom of these basins and is dewatered by a screw press and thickened by the addition of polymer to enhance coagulation. During 2021, a centrifuge was also rented and utilized to dewater the stabilized basin sludge. The resultant sludge was compressed to an average of 17.9 percent solids. These methods are used to generate Class B biosolids.

9. Biosolids Distribution Programs:

A small amount of Class A exceptional quality (EQ) biosolids was produced by extended air drying in the sludge drying beds during 2019. Prior to distribution, this material was tested to ensure that it meets all requirements for Class A biosolids as stated in 40 CFR Part 503 Regulations. However, none of the biosolids were available to the local community for use as a soil amendment in home lawns and gardens during 2021. The small batch that remained on-site was distributed around the treatment plant property.

The District's Class B biosolids were hauled to Liberty Composting Inc. located at 12421 Holloway Road, Lost Hills, CA 93249. Copies of the agreement with Liberty Composting are available upon request. The annual biosolids report submitted by Liberty Composting Inc., is herewith incorporated by reference.

10. Summary

On November 10, 2017, the Goleta Sanitary District's current NPDES permit became effective. The Goleta Sanitary District operates under NPDES Permit No. CA0048160 and Waste Discharge Requirements (WDR) Order No. R3-2017-0021. These permits contain sludge-monitoring programs requiring the District to analyze its sludge for various constituents on either an annual or quarterly basis depending on the constituent. The District's NPDES permit also stipulates that the District's biosolids must meet all of the regulations contained in 40 CFR Part 503.

All of the District's quarterly and annual biosolids sampling involved collecting biosolids samples from the screw press and the centrifuge. Pollutants identified in Tables 2 and 3 of 40 CFR Part 503.13 are measured six times throughout the year while the other priority pollutants such as, grease and oils, PCBs, organochlorine pesticides, etc., are monitored annually, in October. Frequency requirements for vector attraction reduction and pathogen classification monitoring follow the criteria set forth in 40 CFR 503 Regulations.

All biosolids currently being produced and distributed by GSD are released in bulk form as "Pollutant Concentration (PC) Biosolids, Class B", and, as such, they meet 40 CFR Part 503 sections 503.12 and 503.14, General Requirements and Management Practices. During 2021, a total of 1419 dry metric tons of bulk biosolids were produced by the Goleta Sanitary District.

II. LAND APPLIED BIOSOLIDS

1. Volume:

From January 2021 to December 2021, the Goleta Sanitary District distributed a total of 1419 dry metric tons of biosolids. According to 40 CFR 503.8(b)(4) and Table E-12 *Amount of Biosolids and Frequency of Analysis* this amount of biosolids is required to be monitored quarterly.

Table 1 summarizes the total amount of biosolids in wet tonnage distributed on a monthly basis. The values in Table 1 are not reported on a dry weight basis, however the annual total in the final row is reported on a dry weight basis.

Table 1. Monthly Biosolids Distribution 2021, Wet Tons

Month	Liberty Composting Inc. Class B
January	622.91
February	584.22
March	780.80
April	655.20
May	788.84
June	826.73
July	716.00
August	768.43
September	774.30
October	758.08
November	785.03
December	679.91
Wet Ton Total	
8740	
Dry Metric Ton Total	
1419	

2. Priority Pollutants:

Based on the amount of biosolids distributed from January 2021 to December 2021 the District was required to monitor 503.13 priority pollutant concentrations at a frequency of once per quarter as stated in Table 1 of 40 CFR part 503.16, *Frequency of Monitoring-Land Application*. The priority pollutant monitoring occurred in February, April, June, August, October, and December which also fulfilled the sludge monitoring requirements of the District's NPDES permit.

Trace Metals

The results of the trace metal priority pollutants are tabulated in Table 2 and Table 3. Liberty Farms also had the biosolids from GSD analyzed trace metals and other constituents twice a year. Table 4 summarizes the Liberty Farms testing results. Not all metals were analyzed for all samples every quarter. An analysis that was not performed on a specific sample is denoted by the letters "NA". Samples listed as NA – not analyzed - are analyzed typically on an annual basis in October only. All laboratory results indicate that the District's biosolids meet all of the metal pollutant limits found in TABLE 4 of 503.13 for the "Exceptional Quality" and "Pollutant Concentration" designations.

Class B results in Table 2, Table 3 and Table 4 are reported in mg/kg – dry weight basis. Percent moisture at the time of sampling is also recorded. Laboratory reports will be provided upon request.

Table 2. PRIORITY POLLUTANTS BIOSOLIDS 2021, mg/dry Kg

POLLUTANT	POLLUTANT LIMITS Part 503 Table 3, Sec 503.13	February 2021 Combined Comp 2/8/2021	April 2021 Combined Comp 4/13/2021	June 2021 Combined Comp 6/28/2021	August 2021 Screw Press 8/18/2021
Antimony	NL	NA	NA	NA	NA
Arsenic	41	7.1	6.1	6.5	<8.1
Boron	NL	19	<12	14	<20
Beryllium	NL	NA	NA	NA	NA
Cadmium	39	<0.80	<0.74	<0.83	1.7
Chromium	* (1)	38	48	37	19
Copper	1,500	1,000	1,100	940	840
Lead	300	16	26	22	17
Mercury	17	0.94	1.3	1.1	3.7
Molybdenum ^{*(2)}	75	21	22	19	19
Nickel	420	30	53	38	22
Phosphorus	NL	28,000	38,000	30,000	21,000
Selenium	100	<5.3	<4.9	<5.5	<8.1
Silver	NL	5.3	15	9.7	2.1
Thallium	NL	NA	NA	NA	NA
Zinc	2,800	1,200	1,300	1,100	1,100
pH	NL	NA	NA	NA	NA
Oil & Grease	NL	NA	NA	NA	NA
% Moisture	NL	82.4	79.8	82.1	87.7
Nitrate	NL	<2.8	<2.5	<2.7	<4.0
Organic Nitrogen	NL	43,700	31,200	27,900	54,300
Kjeldahl Nitrogen	NL	51,000	38,000	36,000	62,000
Ammonia	NL	7,300	6,800	8,100	7,700

NL = No Limit. NA = Not Analyzed.

*(1) On October 25, 1995 the EPA amended Part 503 to delete chromium standards from Tables 1 through 4 of Subpart B, Land Application.

*(2) The EPA amended Part 503 on February 25, 1994 to delete temporarily the Table 3 molybdenum limits. However, the ceiling limit of 75 mg/Kg from Table 1 has been retained and must be met.

Table 3. PRIORITY POLLUTANTS BIOSOLIDS 2021 CONTINUED, mg/dry Kg

POLLUTANT	POLLUTANT LIMITS Part 503 Table 3, Sec 503.13	October 2021 Combined Sample 10/20/2021	December 2021 Combined Sample 12/10/2021
Antimony	NL	< 5.1	NA
Arsenic	41	4.7	8.4
Boron	NL	< 13	< 14
Beryllium	NL	< 0.24	NA
Cadmium	39	< 0.77	< 0.84
Chromium	* (1)	31	32
Copper	1,500	750	1,000
Lead	300	21	29
Mercury	17	0.75	0.99
Molybdenum ^{*(2)}	75	18	20
Nickel	420	35	51
Phosphorus	NL	19,000	44,000
Selenium	100	< 0.95	< 5.6
Silver	NL	11	17
Thallium	NL	< 0.48	NA
Zinc	2,800	1,000	1,200
pH	NL	7.79	NA
Oil & Grease	NL	42,200	NA
% Moisture	NL	81.5	83.5
Nitrate	NL	< 0.50	< 3.0
Organic Nitrogen	NL	31,500	36,800
Kjeldahl Nitrogen	NL	40,000	46,000
Ammonia	NL	8,500	9,200

NL = No Limit. NA = Not Analyzed.

- *(1) On October 25, 1995 the EPA amended Part 503 to delete chromium standards from Tables 1 through 4 of Subpart B, Land Application.
- *(2) The EPA amended Part 503 on February 25, 1994 to delete temporarily the Table 3 molybdenum limits. However, the ceiling limit of 75 mg/Kg from Table 1 has been retained and must be met.

Table 4. LIBERTY FARMS PRIORITY POLLUTANTS BIOSOLIDS RESULTS 2021, mg/dry Kg

POLLUTANT	POLLUTANT LIMITS Part 503 Table 3, Sec 503.13	January 2021 1/8/2021	July 2021 7/1/2021
Total Coliform (MPN/g)	NL	16,000,000	16,000,000
Antimony	NL	<12.0	<20.1
Arsenic	41	16.4	<16.8
Barium	NL	503	174
Beryllium	NL	<0.999	<1.68
Cadmium	39	3.38	<3.36
Chromium	* (1)	44.1	25.8
Chromium ⁶⁺	NL	<676	<55.3
Cobalt	NL	<4.00	15.8
Copper	1,500	1,060	23.0
Lead	300	30.2	<33.6
Mercury	17	1.25	<0.586
Molybdenum ^{*(2)}	75	15.5	<3.36
Nickel	420	44.6	22.7
Selenium	100	<20.0	<33.6
Silver	NL	11.1	<6.72
Thallium	NL	<20.0	<33.6
Vanadium	NL	18.8	49.3
Zinc	2,800	1,110	<67.2
pH	NL	7.9	8.6
TDS	NL	2,170	5,130
% Solids	NL	24.7	14.5
Nitrate	NL	<2.03	<3.46
Kjeldahl Nitrogen	NL	34,400	11,200

NL = No Limit. NA = Not Analyzed. *(1) & *(2) footnotes can be found below Table 2.

Organic Nitrogen

The biosolids were analyzed individually for both total kjeldahl nitrogen and ammonia nitrogen. *Standard Methods for the Examination of Water and Wastewater, 18th Edition*, Method 4500-N_{org} B states that "Should kjeldahl nitrogen and ammonia nitrogen be determined individually, "organic nitrogen" can be obtained by difference." The organic nitrogen concentrations that are summarized in Table 2 and Table 3 were determined in this manner.

Pesticides and Organics

As part of the annual October sampling requirement, biosolids samples were collected by District personnel and analyzed by OEC Environmental & Compliance Lab, for organochlorine pesticides and organic chemicals as defined by EPA methods 8081A, 8260B, 8270C. Of the over 150 compounds analyzed only one compound was detected. No limits for these compounds are specified by 40 CFR Part 503. The concentrations of the priority pollutants detected in this sample were reported on a dry weight basis and are summarized in Table 5 as well as the cyanide result. The laboratory reports will be provided upon request.

Table 5. DETECTED PARAMETERS, BIOSOLIDS, October 2021

Parameter, concentration unit	Concentration
Bis(2-ethylhexyl) phthalate, mg/kg	2.1
Cyanide, mg/kg	0.77

3. Class B

Bulk Distribution – Management Practices

The bulk biosolids were used by Liberty Composting, Inc. Liberty Composting operates a 162-acre composting facility located in Lost Hills, CA. Liberty Composting employs both windrow composting and aerated static pile composting for attainment of Class A sewage sludge in accordance with provisions of the Federal Part 503 Regulations – Standards for the Use or Disposal of Sewage Sludge, 503.32(a)(1), *Sewage Sludge Class A*.

Pathogen Classification

The bulk biosolids prepared at the Goleta Sanitary District for land application meet Class B requirements of 40 CFR Part 503.32(b)(3), Class B-Alternative 2. This alternative states that the Class B requirements can be met if the sewage sludge is treated in one of the Processes to Significantly Reduce Pathogens as described in Appendix B to Part 503-Pathogen Treatment Processes.

The sewage sludge at the Goleta Sanitary District is treated in anaerobic digesters in the absence of air for an average of approximately 36 days at 37.3 degrees Celsius. This process meets the mean cell residence time and temperature of 15 days at 35 to 55 degrees Celsius described in Appendix B to Part 503.

Class B - Vector Attraction Reduction

Biosolids prepared at the Goleta Sanitary District meet the vector attraction reduction requirement listed in 503.33(b)(1) which states that "the mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%." The fractional volatile solids reduction (FVSR) was calculated using the Van Kleeck Equation as found in EPA/625/R-92/013, "Control of Pathogens and Vector Attraction in Sewage Sludge, December 1992, p. 89. Results are summarized below in TABLE 6.

Table 6. VOLATILE SOLIDS REDUCTION

Screw Pressed Biosolids	Fractional Volatile Solids of Feed Sludge	Fractional Volatile Solids of Biosolids	Fractional Volatile Solids Reduction*	Percent Volatile Solids Reduction
2021 Averages	0.8331	0.7094	0.5109	51.1%

*FVSR is calculated using the Van Kleeck Equation as found in EPA/625/R-92/013, "Control of Pathogens and Vector Attraction in Sewage Sludge, December 1992, p. 89.

4. Certification Statement – Class B

"I certify, under penalty of law, that the information that will be used to determine compliance with the pathogen requirements in 503.32(b) and the vector attraction reduction requirement in 503.33(b)(1) was prepared under my direction and supervision in accordance with the system designed to ensure that qualified personnel properly gather and evaluate this information. I am aware that there are significant penalties for false certification including the possibility of fine and imprisonment."



John Crisman
Operations Manager
Goleta Sanitary District

2/7/2022
Date

APPENDIX A

Solids Flow Diagram

