

February 19, 2020

Mr. Darrin Gordon
General Manager
Lewes Board of Public Works
107 Franklin Avenue
Lewes, DE 19958

Subject: Lewes WWTF - 2019 Annual Report

Dear Mr. Gordon:

Attached is an Annual Summary of the Operations and Maintenance activities at the Board's lift stations and wastewater treatment plant for the calendar year 2019. In addition to the annual summary, we have attached contract required budget information, year-end regulatory submittals, QA-QC reports, influent/effluent reports and sludge removal. Please feel free to contact me at (302) 218-8534. Thank you.

Sincerely,



Paul S. Peris
Director of Production and Maintenance
White Marsh Environmental Systems, Inc.

- I. **Effluent Quality and Compliance** – Monthly Effluent results were submitted in 2019, below is the annual summary. Attached is the year-end EDMR submitted to DNREC.

Annual 2019 Permit Compliance					
Sample Data	Total Nitrogen	Total Phosphorus	BOD	TSS	Enterococcus
Number Exceedances:	0	0	0	0	2

- Maximum and Average Enterococcus exceeded in December 2019
- Influent Flow – 285,025,600
- Effluent Flow – 284,422,300

II. **Activities**

Lift Stations

- Point Watch SCADA system for monitoring Lift Station (LS) conditions and alarm notifications monitored daily by operations.
- The Station #19 Muffin Monster comminutor was repaired and Pump #1 was replaced.
- Evaluation of all system lift stations was completed in advance of the 2019 summer season.
- 35 work orders were completed in addition to scheduled preventive maintenance.
- Lift Station #3 pump #1 needs removal and reconditioning. Manufacturer was contacted to facilitate removal and reconditioning. Work to be completed in the 1st quarter 2020.

Main Plant

- Completed 65 work orders for maintenance in addition to scheduled preventive maintenance.
- Train number #4 membranes were manually cleaned in 2019. Trains #1, #3 and #4 had chemical recovery cleans performed in June, May and August respectively. Auto-scheduled Maintenance cleans were performed based on the manufacturers programmed PLC set-points.
- Replaced all air diffusers in both Aeration ditches.

- BPW has hired George, Miles and Buhr (GMB) to design additional drying beds.
- Aerobic Digester Kubota Membranes were found to be damaged. Replacement was approved by the BPW and scheduled for installation in first quarter 2020.
- Upgraded Drying Bed Lift Station pumps, piping, and controls.
- Electrical Main Breaker within the generator transfer switch was replaced by Cummings.
- Digester Blower #2 replaced with reconditioned unit.
- Replaced membrane blower with reconditioned unit.
- Reconditioned all 4 permeate pumps.
- DRBC Annual Reporting completed.
- Submitted Quarterly Storm Water Management Reports to DNREC.
- Assisted Tetra Tech in compiling data for completion Statewide Wastewater Plant Survey for DNREC.
- Continued monitoring of influent flows from Sussex County and impact upon Lewes plant operations. BPW is supplying influent reports from Sussex County. Recommend BPW request sampling data from Sussex County every month they pump to the BPW system.
- Hosted over 200 students from 2 elementary schools, Love Creek and Woodbridge Elementary.
- Odor complaints from lift station #4 led to the installation of an odor control device.
- Annual DNREC compliance inspection conducted on April 15th, 2019 with no violations.
- Annual Crane Inspection performed in March 2019 of gantry crane in membrane building.
- Monthly Eyewash and Fire Extinguisher inspections completed.

SAFETY INFORMATION

- One “near miss” incident. No injuries reported.
- One OSHA reportable workplace injury.
- Safety Training completed for all OSHA Subparts.
- 2020 Training Schedule is attached.

ADDITIONAL INFORMATION

- Facility experienced complete plant failure in December. A broken membrane module plugged the needle valve leading to the turbidity meter. Subsequently, mixed liquor filled the permeate tank and was back pulsed to the other membrane cassettes. WMES coordinated with the regulatory agencies and BPW working continuously from December 19th to December 28th to return the plant to service. Partially treated wastewater was discharged to the adjoining marsh.
- Total discharge to the marsh was 3.7 million gallons.
- Increased volume of bio solids sludge due to the addition of Sussex County flow has resulted in pumping and hauling liquid sludge. Installation of additional drying beds with covers is being investigated by BPW with GMB.
- PLC and HMI controls for the Zenon system experienced significant failures. BPW has contracted with Suez to replace and upgrade equipment in 2020.

2020 Approved Projects

- Upgrades and replacements of Zenon membrane modules with associated hardware. Included is a process change for aeration of membranes. Work is scheduled for completion in the 1st quarter of 2020.
- Replacement of leaking chemical lines scheduled for completion in the 1st quarter of 2020.
- Replacement of digester membranes scheduled for completion in the 1st quarter of 2020.

Recommended Capital-Expense Purchases

Please see the attached schedule.

Year: 2019 DRBC Annual Effluent Monitoring Report

Docket Holder: City of Lewes Board of Public Works Wastewater Treatment Plant

Docket Number: D-2012-011 CP-2

NPDES Number: DE 0021512

Outfall Number: NPDES 001

Docket Approval Date: 12/14/2016

Docket Expiration Date: 12/14/2021

DRBC Mail Control Slip Number (DRBC USE ONLY):

Date Form Edited: 12/16/2013

Docket holders should begin by entering the calendar year being reported. The docket holder's name should be the same as the one on the actual docket. Docket and NPDES permit numbers must be entered on the form, or the Annual Effluent Monitoring Report will not be associated with the docket and may result in a compliance issue.

Enter Monitoring Requirements from Docket	Units	Average Monthly Flow	Total Suspended Solids	Fecal Enterococcus	Ammonia - Nitrogen	BOD (5-day)		pH	Color	Total Dissolved Solids	Dissolved Oxygen	Total Phosphorous	Total Kjeldahl Nitrogen	Nitrate - Nitrogen	Total Nitrogen	CBOD20	Specific Conductivity	Acute Toxicity (laldoceran)	Acute Toxicity (fishhd minnow)	Chronic Toxicity (laldoceran)	Chronic Toxicity (fishhd minnow)
						mg/l	lb/d														
Monthly Average Effluent Limit (Winter-Spring)	mg/d	15	188	10	15	158	85%	6-9			2	25			8	100					
Monthly Average Effluent Limit (Summer-Fall)	mg/d	15	188	10	15	188	85%	6-9			2	25			8	100					
Monitor & Report Only											M & R										
Enter Monitoring Results	January	0.8899	<60	<4.35	<6.2	5.74	37.67	<2.40	<17.76	98.7	7.3	7.7	3.33	0.17	1.25	6.62	43.44	0.42	2.71	7.05	51.79
	February	0.9414	<75	<6.11	<2.5	0.26	1.77	<2.43	<19.59	98.9	7.3	7.6	6.0	0.17	1.33	1.05	7.15	0.96	6.53	2.01	15.78
	March	1.0168	<78	<6.82	<3	0.11	1.22	<2.40	<20.65	98.7	7.1	7.5	7.0	0.39	3.31	0.94	10.44	5.32	59.10	6.26	51.08
	April	0.8032	<71	<4.59	<3	0.12	0.85	<2.40	<15.99	98.7	7.3	7.6	4.67	0.54	3.58	0.73	5.15	2.62	18.51	3.35	22.41
	May	0.7581	<83	<5.50	<3	0.1	0.72	<2.40	<15.84	98.7	7.1	7.6	5.2	1.46	9.23	0.78	5.62	4.43	31.94	5.21	32.94
	June	0.7242	<63	<3.72	<3	0.12	0.63	<2.40	<14.66	98.7	7.3	7.7	5.52	0.73	4.41	0.74	3.91	2.41	12.75	3.15	19.02
	July	0.839	<60	<4.34	<3	0.12	0.63	<2.40	<17.09	98.7	7.4	8	3.1	1.87	14.61	0.5	3.91	3.55	27.73	4.05	31.84
	August	0.8460	<88	<6.59	<3	1.46	12.75	<2.40	<18.31	98.8	7.4	7.6	1.13	0.754	5.32	2.22	16.97	0.65	4.94	2.86	20.18
	September	0.6518	<75	<4.94	<3	1.07	6.64	<2.40	<13.62	98.6	7.5	7.8	1.78	0.88	5.46	1.88	11.66	0.53	3.91	2.41	14.95
	October	0.7122	<80	<4.65	<3	<0.5	<2.4	<2.40	<13.86	99.1	7.4	7.9	7.12	1.72	8.40	0.83	4.05	5.98	29.22	6.81	33.27
	November	0.7012	0.51	3.72	<3	0.058	0.33	<2.40	<13.86	99	7.4	7.9	7.79	1.49	8.40	0.679	3.83	4.85	27.34	5.53	31.17
	December	0.5074	<1.83	<8.95	19.5	0.132	0.684	<2.40	<13.74	98.7	7.0	8	6.12	0.201	1.04	0.639	3.31	1.3	6.74	1.94	10.05

Docket Holder Comments:

LEWES WWTF

NUTRIENT OFFSET REPORT

MONTH	Days	Average Monthly Flow MGD	Monthly Average TN mg/L	Total Monthly TN Discharged Lbs.	TN Based 16.9 lbs Manure Offset Required		Poultry Manure Relocated		Poultry Manure Offset Balance Lbs.	Monthly Average TP mg/L	Total Monthly TP Discharged Lbs.	TN Based 285 lbs Manure Offset Required Lbs.
					Lbs.	Lbs.	Tons	Lbs.				
Carry Over												
January	31	0.8809	7.05	1605.62	27135.02			2,712,733.35				
February	28	0.9414	2.01	441.87	7467.60			2,685,471.93		0.42	96.65	27261.32
March	31	1.0168	6.26	1845.65	27811.49			2,674,820.89		0.17	37.37	10651.04
April	30	0.8032	3.35	673.22	11377.39			2,645,601.39		0.39	102.52	29219.50
May	31	0.7462	5.21	1005.13	16986.64			2,614,673.55		0.54	108.52	30927.84
June	30	0.7242	3.15	570.76	9645.91			2,534,398.47		1.46	281.67	30275.07
July	31	0.8390	4.05	878.51	14846.75			2,496,700.89		0.73	132.27	37697.89
August	31	0.8460	2.86	625.55	10571.85			2,381,096.01		1.87	405.83	15604.98
September	30	0.6518	2.41	393.02	6642.10			2,334,094.23		0.76	164.92	17007.76
October	31	0.5843	6.81	1028.75	17385.91			2,293,193.67		0.88	143.51	40909.55
November	30	0.7012	5.53	970.18	16398.12			2,219,141.65		1.72	289.83	74052.92
December	31	0.5024	1.94	251.99	4258.59			2,144,640.95		1.49	261.41	45007.0
Year Balance								2,137,200.17		0.20	26.11	74407.8

Comments:


 Authorized Signatory

1/17/2020 _____
 DATE

**Lewes Board of Public Works
Capital and Expense Recommendations**

Budget Estimate Summary Sheet										Prepared By:	WMES	Date:	2/21/2020	
Lewes BPW										Submitted By:		Date:		
Production Structures										Approved (BPW):			Date:	
Budget Item	Work Order Description	2020 Estimate			2021 Future Cost Projection	2022 Future Cost Projection	2023 Future Cost Projection	2024 Future Cost Projection						
		Quantity	Unit Cost	Extended Cost										
1	Repair and maintenance of buildings	1	\$2,500	\$2,500	\$2,500									
2	Replace garage doors (Storage, Garage)	2	\$8,000	\$16,000										
3	Replace grating on membrane tanks	1	\$75,000	\$75,000										
4														
5														
6				\$0										
7				\$0										
8				\$0										
9				\$0										
Totals					\$93,500	\$2,500	\$0	\$0	\$0	\$0				

**Lewes Board of Public Works
Capital and Expense Recommendations**

Estimate Summary Sheet										Prepared By:	WMEs	Date:
										Submitted By:		Date:
										Approved (BPW):		Date:
Budget Item	Work Order Description	2020 Estimate			2021 Future Cost Projection	2022 Future Cost Projection	2023 Future Cost Projection	2024 Future Cost Projection				
		Quantity	Unit Cost	Extended Cost								
1	Recondition blowers (based on run hours per OM)	3	\$5,000	\$15,000	\$15,000							
2	Replace MCC/upgrade drives and PLC in headworks	1	\$150,000	\$150,000								
3	Recondition permeate pumps (based on run hours per OM)	1	\$2,500	\$2,500	\$2,500.00							
4	Purchase spare permeate pump	1	\$10,000	\$10,000								
5	Replace bucket in control room for RAS pump drives	2	\$20,000	\$40,000								
6				\$0								
7				\$0								
8				\$0								
9				\$0								
10				\$0								
11				\$0								
12				\$0								
13				\$0								
14				\$0								
15				\$0								
16				\$0								
17				\$0								
18				\$0								
Totals					\$217,500	\$17,500	\$0	\$0	\$0	\$0		

**Lewes Board of Public Works
Capital and Expense Recommendations**

Estimate Summary Sheet										WMES	Date:	2/21/2020
Lewes BPW										Prepared By:	Date:	
Water Treatment Equipment										Submitted By:	Date:	
										Approved (BPW):	Date:	
Budget Item	Work Order Description	2020 Estimate			2021 Future Cost Projection	2022 Future Cost Projection	2023 Future Cost Projection	2024 Future Cost Projection				
		Quantity	Unit Cost	Extended Cost								
1	Chemical pump spares	2	\$1,500	\$3,000	\$1,500	\$1,500						
2	Replace PLC on UV units	1	\$15,000	\$15,000								
3	Replacement of spare critical parts	10	\$150	\$1,500								
4	Inspect and recoat EQ tank	1	\$2,500	\$2,500	\$150,000							
5	Inspect concrete tank, oxidation ditch	1	\$0	\$0	\$5,500							
6	Install wye screen on RAS line	1	\$5,500	\$5,500								
7				\$0								
8				\$0								
9				\$0								
10				\$0								
11				\$0								
12				\$0								
13				\$0								
14				\$0								
15				\$0								
16				\$0								
17				\$0								
18				\$0								
19				\$0								
20				\$0								
Totals					\$27,500	\$157,000	\$1,500	\$0	\$0	\$0		

**Lewes Board of Public Works
Capital and Expense Recommendations**

Budget Estimate Summary Sheet									
Lewes BPW		Prepared By:	WMES	Date:	2/21/2020				
Power Equipment		Submitted By:		Date:					
		Approved (BPW):		Date:					
Budget Item	Work Order Description	Quantity	Unit Cost	Extended Cost	2021 Future Cost Projection	2022 Future Cost Projection	2023 Future Cost Projection	2024 Future Cost Projection	
1	Tracked Skid Steer	1	\$0	\$0	\$45,000.00				
2	Skid Steer Service and repairs	1	\$1,200	\$1,200					
3	Fork Lift service and repairs	1	\$1,200	\$1,200					
4				\$0					
5				\$0					
6				\$0					
				\$0					
Totals				\$2,400	\$45,000	\$0	\$0	\$0	

Percent Removals for BOD for Year 2019 - DRBC			
Month	Influent BOD mg/l	Effluent BOD mg/l	Percent

January	189.2	<2.40	98.7%
February	224	<2.43	98.9%
March	183	<2.40	98.7%
April	182	<2.40	98.7%
May	187	<2.40	98.7%
June	188	<2.40	98.7%
July	178.2	<2.40	98.7%
August	203	<2.40	98.8%
September	177	<2.40	98.6%
October	259	<2.40	99.1%
November	218.75	<2.40	99.0%
December	180	<2.40	98.7%
average	197.4	2.4	98.8%

City of Lewes

116 American Legion Road
 Lewes, DE 19958

Wastewater

001 Discharge
 BOD5
 SM5210B

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/9/2019	268167/268168	HJG3	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
2/7/2019	269650/269251	HM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
3/6/2019	271514/271515	HJG3	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
4/4/2019	273634/273635	HJG3	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
5/8/2019	275984/275985	ML	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
6/5/2019	277810/277811	HJG3	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
7/3/2019	160609-01/02	HM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
8/7/2019	1901998/01-02	HM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
9/4/2019	1903066-01/02	TM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
10/2/2019	1904134-01/02	TM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
11/6/2019	1905466/01-02	TM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
12/4/2019	1906437-01/02	MM	2.4	2.4	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!

STANDARD DEVIATION DATA

TOTAL of d2 0.0000
 Number of Duplicates 12.0000
 Standard Deviation +/- 0.0000

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 FCMF
 SM9222-D

Date	Sample Number	Analyst	Analysis (umhos/c m)	Dup Analysis (umhos/c m)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
9/4/2019	1903066-01/02	HM	10	10	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!

STANDARD DEVIATION DATA

TOTAL of d2 0.0000
 Number of Duplicates 1.0000
 Standard Deviation +/- #DIV/0!

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 FENT
 Enterolert

Date	Sample Number	Analyst	Analysis (umhos/c m)	Dup Analysis (umhos/c m)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/9/2019	268169/268170	RD	8	8	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
2/6/2019	269652/269653	MJM	6	5	-1.0000	1.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
3/6/2019	271516/271517	RD	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
4/5/2019	273636/273637	RD	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
5/8/2019	275986/275987	RD	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
6/5/2019	277812/277813	RD	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
7/3/2019	1900609-03/04	HJG	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
8/7/2019	1901998-03/04	RD	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
9/4/2019	1903066-03/04	HM	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
10/3/2019	1904134-03/04	RD	2	1	-1.0000	1.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
11/6/2019	1905466-03/04	RD	1	1	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
12/5/2019	1906437-03/04	RD	31	11	-20.1000	404.0100	N/A	#VALUE!	N/A	#VALUE!	#VALUE!

STANDARD DEVIATION DATA

TOTAL of d2 406.0100
 Number of Duplicates 12.0000
 Standard Deviation +/- 6.0754

Annual Quality Assurance Summary
 January 1, 2019 - December 31, 2019

Compiled By: SLB
 Envirocorp Labs
 Harrington, DE

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 Ammonia as N
 SM4500-NH3-G

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d2	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/11/2019	268167/268168	JMW	11.90	12.60	0.7000	0.4900	4.00	16.204	90.10%	-0.1702	0.0290
2/7/2019	269650/269651	CC	0.260	0.21	-0.0500	0.0025	1.00	1.218	100.80%	-0.0632	0.0040
3/7/2019	271514/271515	CC	0.110	0.110	0.0000	0.0000	1.00	1.237	112.70%	0.0558	0.0031
4/8/2019	273634/27635	CC	0.12	0.12	0.0000	0.0000	1.00	1.150	103.00%	-0.0412	0.0017
5/9/2019	275984/275985	CC	0.10	0.12	0.0200	0.0004	1.00	1.219	109.90%	0.0278	0.0008
6/6/2019	277810/277811	CC	0.12	0.14	0.0200	0.0004	1.00	1.270	113.00%	0.0588	0.0035
7/9/2019	190609-01/02	CC	0.13	0.13	0.0000	0.0000	1.00	1.274	114.40%	0.0728	0.0053
8/7/2019	1901998-01/02	CC	1.46	1.48	0.0200	0.0004	1.00	2.650	117.00%	0.0988	0.0098
9/8/2019	1903066-01/02	CK	1.07	1.06	-0.0100	0.0001	1.00	2.190	113.00%	0.0588	0.0035
10/3/2019	1904134-01/02	CK	0.05	0.05	0.0000	0.0000	1.00	1.200	115.00%	0.0788	0.0062
11/7/2019	1905466-01/02	CK	0.06	0.07	0.0130	0.0002	1.00	1.121	105.00%	-0.0212	0.000448
12/4/2019	1906437-01/02	CK	0.13	0.09	-0.0380	0.0014	1.00	1.009	91.50%	-0.1562	0.0244

STANDARD DEVIATION DATA

TOTAL of d2 0.4954
 Number of Duplicates 12.0000
 Standard Deviation +/- 0.2122

SPIKE RECOVERY DATA

Mean % Recovery (X) 1.071166667
 Mean Converted 107.1166667
 # of Data Points 12.0000
 SUM of Diff² = 0.0916
 Standard Deviation +/- 9.12

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 Nitrate-Nitrite as N
 EPA 300.0 or SM4500-NO3-H

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/9/2019	268167/268168	ML	0.37	0.40	0.0300	0.0009	2.00	2.288	94.40%	-0.0803	0.0064
2/7/2019	269650/269651	CC	0.96	0.87	-0.0900	0.0081	2.00	3.086	110.80%	0.0838	0.0070
3/7/2019	271514/271515	HJG	5.32	5.29	-0.0300	0.0009	2.00	7.328	101.90%	-0.0053	0.0000
4/4/2019	273634/274635	HJG	2.67	2.69	0.0200	0.0004	2.00	4.824	106.70%	0.0427	0.0018
5/9/2019	275984/275985	CC	4.43	4.42	-0.0100	0.0001	2.00	6.644	111.20%	0.0878	0.00770
6/6/2019	277810/277811	CC	2.47	2.42	-0.0510	0.0026	2.00	4.436	100.80%	-0.0163	0.0003
7/9/2001	1900609-01/02	CC	3.55	3.53	-0.0200	0.0004	2.00	5.600	103.50%	0.0107	0.0001
8/7/2019	1901998-01/02	CC	0.65	0.59	-0.0600	0.0036	2.00	2.630	102.00%	-0.0043	0.0000
9/8/2019	1903066-01/02	CK	0.53	0.51	-0.0240	0.0006	2.00	2.568	103.00%	0.0057	0.0000
10/3/2019	1904134-01/02	CK	5.980	5.980	0.0000	0.0000	2.00	7.820	92.00%	-0.1043	0.0109
11/7/2019	1905466-01/02	CK	4.85	4.66	-0.1900	0.0361	2.00	6.636	98.80%	-0.0363	0.00131
12/4/2019	1906437-01/02	CK	1.30	1.27	-0.0300	0.0009	2.00	3.350	104.00%	0.0157	0.0002

SPIKE RECOVERY DATA

TOTAL of d2	0.0546	Mean % Recovery (X)	1.02425
Number of Duplicates	12.0000	Mean Converted	102.425
Standard Deviation +/-	0.0704	# of Data Points	12.0000
		SUM of Diff ² =	0.0359
		Standard Deviation +/-	5.71

Annual Quality Assurance Summary
January 1, 2019 - December 31, 2019

Compiled By: SLB
Envirocorp Labs
Harrington, DE

City of Lewes
116 American Legion Road
Lewes, DE 19958

Wastewater
001 Discharge
TKN
SM4500-Norg-C

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/10/2019	268167/268168	CC	13.40	13.60	0.2000	0.0400	2.00	15.762	108.10%	0.0598	0.0036
2/7/2019	269650/269651	CC	1.05	0.94	-0.1100	0.0121	1.00	1.955	101.50%	-0.0063	0.0000
3/7/2019	271514/27515	CC	0.940	0.960	0.0200	0.0004	0.50	1.412	90.40%	-0.1173	0.0137
4/5/2019	271634/271635	JMW	0.78	0.60	-0.1800	0.0324	1.00	1.611	101.10%	-0.0103	0.0001
5/9/2019	275984/275985	CC	0.78	0.77	-0.0100	0.0001	1.00	1.718	94.80%	-0.0733	0.0054
6/6/2019	277810/277811	CC	0.74	0.75	0.0100	0.0001	0.50	1.249	99.80%	-0.0233	0.0005
7/5/2019	1900609-01/02	JMW	0.50	0.50	-0.0020	0.0000	0.50	0.985	97.40%	-0.0473	0.0022
8/8/2019	1901998-01/02	CK	2.220	2.190	-0.0300	0.0009	0.50	2.735	109.00%	0.0688	0.0047
9/5/2019	1903066-02/02	CK	1.88	1.85	-0.0300	0.0009	0.50	2.370	104.00%	0.0188	0.0004
10/3/2019	1904134-01/02	CK	0.83	0.82	-0.0100	0.0001	0.50	1.360	109.00%	0.0688	0.0047
11/7/2019	1905466-01/02	CK	0.679	0.674	-0.0050	0.0000	0.50	1.151	95.40%	-0.0673	0.0045
12/5/2019	1906437-01/02	CK	0.639	0.667	0.0280	0.0008	0.50	1.242	115.00%	0.1288	0.0166

STANDARD DEVIATION DATA

TOTAL of d2 0.0878
Number of Duplicates 12.0000
Standard Deviation +/- 0.0893

SPIKE RECOVERY DATA

Mean % Recovery (X) 1.02125
Mean Converted 102.125
of Data Points 12.0000
SUM of Diff² = 0.0565
Standard Deviation +/- 7.17

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 Total Nitrogen as N
 CALC

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/10/2019	268167/268168	CC	13.80	14.00	0.2000	0.0400	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
2/7/2019	269650/269651	CC	2.01	1.81	-0.2000	0.0400	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
3/8/2019	271514/271515	RLF	6.26	6.27	0.0100	0.0001	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
4/5/2019	273634/273635	RLF	3.45	3.29	-0.1600	0.0256	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
5/9/2019	275984/275985	CC	5.21	5.19	-0.0200	0.0004	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
6/6/2019	277810/277811	CC	3.15	3.17	0.0200	0.0004	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
7/9/2019	1900609-01/02	JMW	4.05	4.03	-0.0200	0.0004	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
8/8/2019	1901998-01/02	CK	2.86	2.78	-0.0800	0.0064	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
9/8/2019	1903066-01/02	CK	2.41	2.35	-0.0600	0.0036	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
10/3/2019	1904134-01/02	CK	6.81	6.80	-0.0100	0.0001	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
11/7/2019	1905466-01/02	CK	5.53	5.34	-0.1900	0.0361	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
12/5/2019	1906437-01/02	CK	1.94	1.94	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!

STANDARD DEVIATION DATA

TOTAL of d2 0.1531
 Number of Duplicates 12.0000
 Standard Deviation +/- 0.1180

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 Total Phosphorus as P
 SM4500-P-F

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/10/2019	268167/268168	CC	0.17	0.17	0.0000	0.0000	1.00	1.266	109.60%	0.0850	0.0072
2/7/2019	269650/269651	CC	0.17	0.15	-0.0200	0.0004	2.00	2.042	94.60%	-0.0650	0.0042
3/7/2019	271514/271515	CC	0.39	0.38	-0.0100	0.0001	2.00	2.400	101.00%	-0.0010	0.0000
4/5/2019	273634/273635	JMW	0.95	0.93	-0.0200	0.0004	2.00	2.908	98.90%	-0.0220	0.0005
5/9/2019	275984/275985	CC	1.46	1.45	-0.0100	0.0001	1.00	2.371	92.10%	-0.0900	0.0081
6/6/2019	277810/277811	CC	0.73	0.73	0.0000	0.0000	1.00	1.748	101.80%	0.0070	0.0000
7/5/2019	1900609-01/02	CC	1.87	1.91	0.0400	0.0016	1.00	2.870	96.00%	-0.0510	0.0026
8/8/2019	1901998-01/02	CK	0.75	0.75	-0.0060	0.0000	1.00	1.758	101.00%	-0.0010	0.0000
9/5/2019	1903066-01/02	CK	0.881	0.838	-0.0430	0.0018	1.00	1.998	116.00%	0.1490	0.0222
10/3/2019	1904134-01/02	CK	1.720	1.720	0.0000	0.0000	1.00	2.646	92.60%	-0.0850	0.0072
11/7/2019	1905466/01/02	CK	1.49	1.50	0.0100	0.0001	1.00	2.620	112.00%	0.1090	0.0119
12/5/2019	1906437-01/02	CK	0.201	0.182	-0.0190	0.0004	1.00	1.158	97.60%	-0.0350	0.0012

STANDARD DEVIATION DATA

TOTAL of d2 0.0049
 Number of Duplicates 12.0000
Standard Deviation +/- 0.0212

SPIKE RECOVERY DATA

Mean % Recovery (X) 1.011
 Mean Converted 101.1
 # of Data Points 12.0000
 SUM of Diff² = **0.0652**
Standard Deviation +/- 7.70

City of Lewes
 116 American Legion Road
 Lewes, DE 19958

Wastewater
 001 Discharge
 Total Susp. Solids
 SM2540D

Date	Sample Number	Analyst	Analysis (ppm)	Dup Analysis (ppm)	diff (d)	d ²	Spike Amount (ppm)	Spike Sample Result (ppm)	% Recovery	% Recovery Variance From Mean	Diff ²
1/10/2019	268167/268168	HJG3	1.0	1.0	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
2/8/2019	269650/269651	HM	0.5	1.8	1.3000	1.6900	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
3/7/2019	271514/271515	HJG3	1.0	1.0	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
4/8/2019	273634/273635	HM	0.5	0.5	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
5/3/2019	275500/275501	HM	0.5	0.5	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
5/9/2019	275984/275985	HJG3	1.0	1.0	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
6/6/2019	277810/277811	HJG3	1.0	1.0	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
7/8/2019	190060-01/02	HJG3	1.0	2.2	1.2000	1.4400	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
8/8/2019	1901998-01/02	HJG3	0.5	0.5	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
9/5/2019	1903066-01/02	HJG3	0.5	0.5	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
11/12/2019	1905466-01/02	HM	0.5	0.5	0.0000	0.0000	N/A	#VALUE!	N/A	#VALUE!	#VALUE!
12/8/2019	1906437-01/02	HJG3	3.2	2.8	-0.4000	0.1600	N/A	#VALUE!	N/A	#VALUE!	#VALUE!

STANDARD DEVIATION DATA

TOTAL of d2 3.2900
 Number of Duplicates 12.0000
 Standard Deviation +/- 0.5469

Lewes Wastewater Plant

Liquid Sludge Hauled for 2019

Month	Gallons	From	Hauler
January	61,000	Digester	CDI
February	90,500	Digester	CDI
March	111,000	Digester	CDI
April	106,000	Digester	CDI
May	83,000	Digester	CDI
June	44,300	Digester	CDI
July	14,000	Digester	CDI
August	10,000	Digester	CDI
September	104,700	Digester	CDI
October	0	Digester	CDI
November	14,000	Digester	CDI
December	47,400	Digester	CDI
Total	685,900		

TIDEWATER UTILITIES
MIDDLESEX WATER COMPANY

MEMORANDUM

January 14, 2020

TO: Paul Peris, Bruce Patrick, and Tom Amato
Cc: Robert Fullagar
FROM: Justin Illian
SUBJECT: 2020 Production/Maintenance Department Monthly Safety Meeting and Subpart Compliance Schedule Dates

The following is the schedule for monthly safety meetings and the subpart specific compliance certification completion.

<u>Month</u>	<u>Topic</u>
January 17 th	1910 Subpart J
February 14 th	1910 Subpart K
March 13 th	1910 Subpart Z
April 17 th	1910 Subpart I
May 15 th	1926 Subpart E
June 19 th	1910 Subpart P
July 17 th	1926 Subpart G
August 14 th	1910 Subpart S
September 18 th	1910 Subpart D
October 16 th	Rigging & Hoisting or Instructor's choice
November 13 th	Rigging & Hoisting or Instructor's choice
December 18 th	Safety Jeopardy

Safety meetings shall be comprised of:

- Delivery of the respective training module, use of examples based on past experience are encouraged in order to improve the training experience.
- Send a completed training roster (no missing signatures) to Natalie Azcona and placing a copy of the completed training roster in (N:\Safety\OSHA Safety Compliance Records (30 Year Record Retention Period) for the current year.
- Formal review of site specific operating procedures as required in support of compliance with the respective Subpart.
- Practical (hands-on) exercises in conjunction with the classroom training.

Subpart compliance in accordance with the schedule shall be achieved by completing the respective Subpart Certification sheet. Completed Subpart Certification sheet shall be emailed to the Vice President of Operations at MWC.

Lewes WWTP Year 2018 pH duplicate in house sample

Date	Initials	EFFLUENT E1	EFFLUENT E2	Deviation (E1 - E2)	D X D
1/7/2019	DBW	7.51	7.42	0.09	0.0081
1/14/2019	DBW	7.45	7.46	-0.01	0.0001
1/21/2019	RLG	7.57	7.46	0.11	0.0121
1/28/2019	DBW	7.34	7.34	0	0
2/4/2019	DBW	7.34	7.32	0.02	0.0004
2/11/2019	DBW	7.44	7.42	0.02	0.0004
2/18/2019	RLG	7.43	7.36	0.07	0.0049
2/25/2019	RLG	7.25	7.27	-0.02	0.0004
3/4/2019	DBW	7.24	7.25	-0.01	1E-04
3/11/2019	DBW	7.11	7.06	0.05	0.0025
3/18/2019	GL	7.3	7.37	-0.03	0.0009
3/25/2019	DBW	7.3	7.31	-0.01	0.0001
4/1/2019	DBW	7.44	7.42	0.02	0.0004
4/8/2019	DBW	7.44	7.44	0	0.0000
4/15/2019	DBW	7.31	7.28	0.03	0.0009
4/22/2019	GL	7.36	7.36	0	0
4/29/2019	RLG	7.32	0	7.32	53.5824
5/6/2019	DBW	7.34	7.33	0.01	1E-04
5/13/2019	DBW	7.17	7.17	0	0.0000
5/20/2019	DBW	7.36	7.35	0.01	0.0001
5/27/2019	DBW	7.5	7.5	0	0.0000
6/3/2019	DBW	7.56	7.56	0	0.0000
6/10/2019	DBW	7.52	7.52	0	0.0000
6/17/2019	DBW	7.53	7.51	0.02	0.0004
6/24/2019	DBW	7.49	7.48	0.01	0.0001
7/1/2019	DBW	7.62	7.61	0.01	0.0001
7/8/2019	DBW	7.51	7.5	0.01	0.0001
7/15/2019	DBW	7.54	7.54	0	0
7/22/2019	DBW	7.5	7.51	-0.01	1E-04
7/29/2019	DBW	7.58	7.5	0.08	0.0064
8/5/2019	DBW	7.51	7.48	0.03	0.0009
8/12/2019	DBW	7.44	7.42	0.02	0.0004
8/19/2019	DBW	7.54	7.53	0.01	1E-04
8/26/2019	DBW	7.55	7.51	0.04	0.0016
9/2/2019	DBW	7.57	7.55	0.02	0.0004
9/9/2019	DBW	7.56	7.54	0.02	0.0004
9/16/2019	DBW	7.55	7.51	0.04	0.0016
9/23/2019	DBW	7.67	7.67	0	0
9/30/2019	DBW	7.6	7.58	0.02	0.0004
10/7/2019	DBW	7.59	7.58	0.01	0.0001

10/14/2019	DBW	7.47	7.49	-0.02	0.0004
10/21/2019	DBW	7.53	7.52	0.01	0.0001
10/28/2019	DBW	7.43	7.43	0	0.0000
11/4/2019	DBW	7.4	7.55	-0.15	0.0225
11/11/2019	RLG	7.45	7.42	0.03	0.0009
11/18/2019	DBW	7.64	7.64	0	0
11/25/2019	DBW	7.58	7.52	0.06	0.0036
12/2/2019	DBW	7.04	7.46	-0.42	0.1764
12/9/2019	DBW	7.51	7.51	0	0.0000
12/16/2019	DBW	7.47	7.48	-0.01	0.0001
12/23/2019	DBW	7.41	7.41	0	0.0000
12/30/2019	DBW	7.56	7.56	0	0.0000
				0	0.0000
TOTAL					53.831
COUNT		52	52	53	53
STDEV					7.359492157