

PHOSPHORUS OPTIMIZATION REPORT WORKSHEET

Facility Name:

Isle La Plume WWTF, 905 Joseph Houska Dr, La Crosse, WI 54601

WPDES Permit #:WI-0029581-09-0

PART 1 – BACKGROUND INFORMATION

(A) Briefly describe wastewater treatment facility processes and operations and the means of treating phosphorus, including any chemicals used. Attach a flow schematic which shows the point(s) of chemical addition for TP control. Include both liquid and solids treatment trains.

The Sanitary Sewer Utility for the City of La Crosse operates the Isle La Plume Wastewater Treatment Facility (WWTF). This WWTF is a regional facility that receives wastewater from the City of La Crosse along with the contract Wisconsin communities/areas of the City of Onalaska, the Town of Campbell, and two sanitary districts that include parts of the Town of Shelby as well as the City of La Crescent, Minnesota.

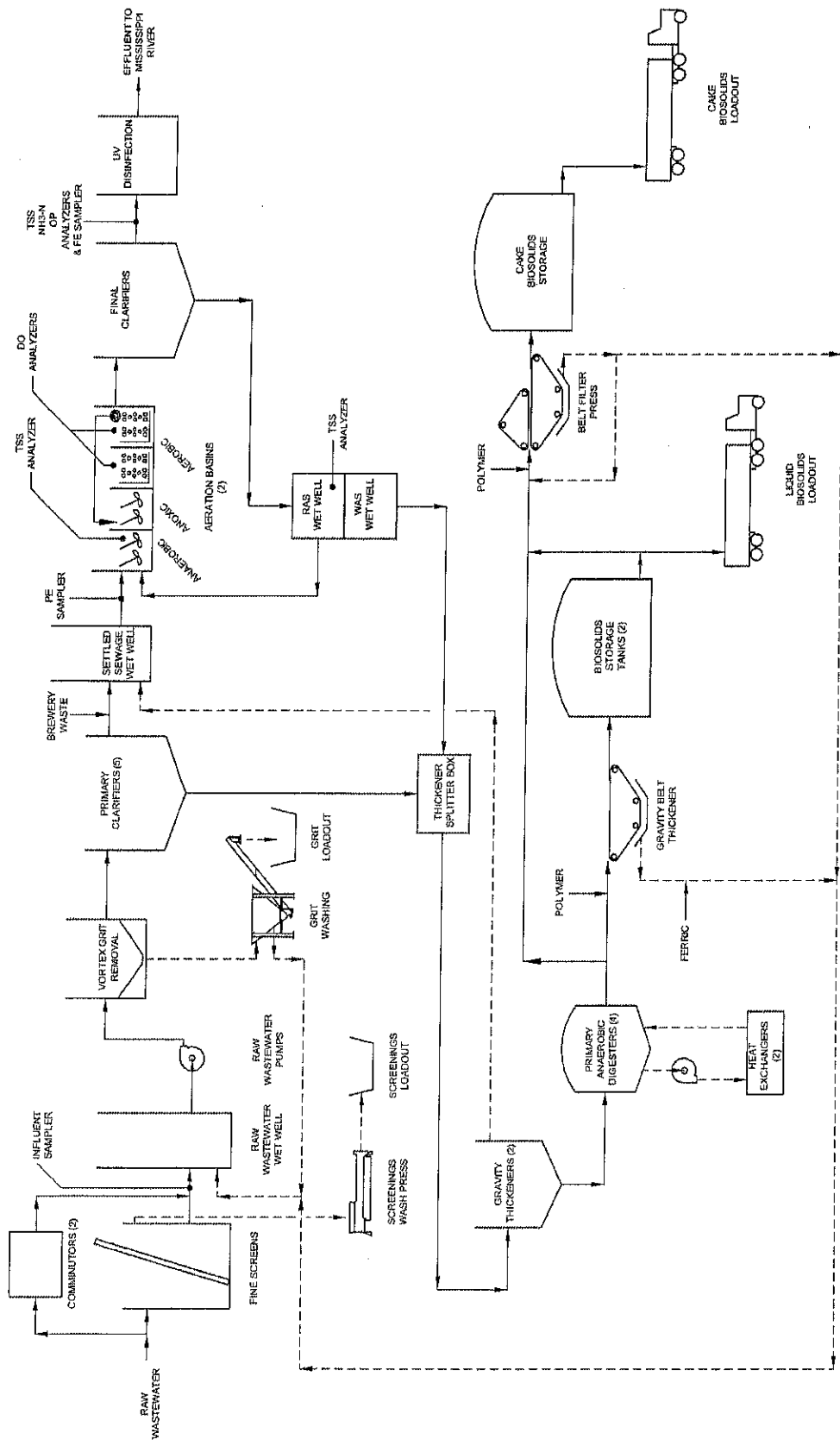
The Isle La Plume WWTF is rated for an average day design capacity of 20 million gallons per day (MGD). The plant's liquid treatment train consists of fine screening, grit removal, primary clarification, nitrifying activated sludge with biological phosphorus removal, secondary clarification, and ultraviolet disinfection. The solids handling treatment train includes gravity thickening for primary sludge and waste activated sludge (WAS) and thickened sludge stabilization utilizing anaerobic digestion. The digested sludge (biosolids) are processed either by gravity belt thickening with liquid biosolids storage or by belt filter pressing, with dewatered biosolids deposited directly into biosolids hauling trucks.

The figure on the following page presents the plant process flow diagram.

The plant operates under WPDES Permit No. WI-0029581-09-0, which includes a phosphorus compliance schedule that culminates in the following water quality based effluent limits (WQBELs) for total phosphorus (TP) on January 1, 2025:

- 0.1 mg/L on a 6-month average basis
- 0.3 mg/L on a monthly average basis

Unless otherwise noted the discussion that follows is focused on the 0.1 mg/L effluent TP limit, as it is really the key WQBEL that must be consistently achieved to ensure overall compliance.



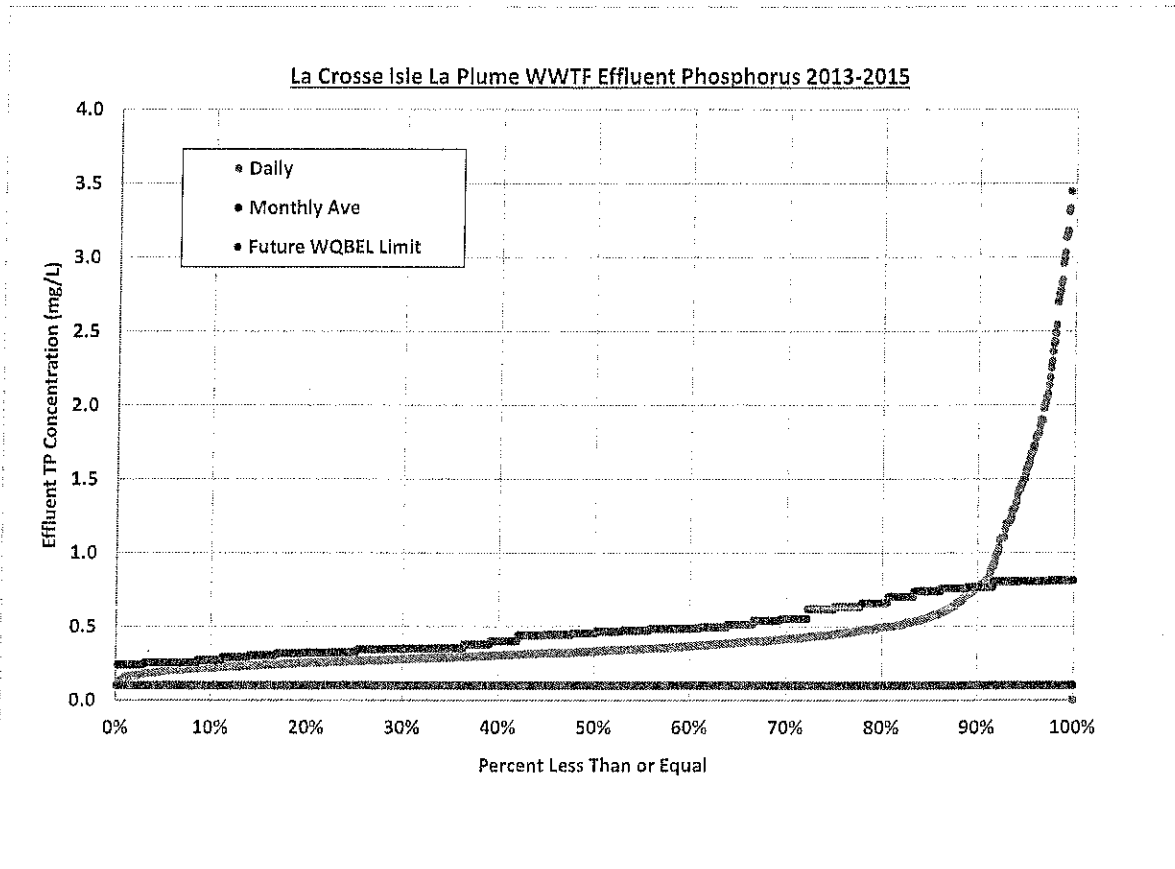
(B) Baseline Year (Data):

Baseline data for January 2013 through December 2015 are listed in the table below.

Date	Inf Q Monthly Ave (MGD)	Inf TP Monthly Ave (mg/L)	Inf TP Monthly Ave (ppd)	Eff Q Monthly Ave (MGD)	Eff TP Monthly Ave (mg/L)	Eff TP Monthly Ave (ppd)
January-13	8.88	6.1	456.3	8.35	0.70	48.1
February-13	9.28	6.1	475.4	8.79	0.49	35.7
March-13	9.33	5.4	418.6	9.02	0.47	35.3
April-13	10.65	4.7	414.1	10.30	0.63	53.0
May-13	10.65	4.7	414.1	10.30	0.63	53.0
June-13	12.61	4.8	504.0	11.80	0.77	75.5
July-13	11.78	5.6	544.4	10.93	0.74	69.2
August-13	10.00	6.2	520.1	9.41	0.80	62.9
September-13	9.53	6.9	552.2	9.37	0.76	58.4
October-13	9.12	8.0	607.0	9.17	0.81	59.9
November-13	8.94	7.6	566.7	8.72	0.26	18.9
December-13	8.71	8.2	599.3	8.42	0.25	18.0
January-14	8.97	7.2	539.5	8.73	0.32	23.5
February-14	9.65	6.8	543.3	9.42	0.27	21.4
March-14	9.47	6.5	515.6	9.24	0.29	22.4
April-14	10.69	5.8	515.7	10.56	0.44	39.2
May-14	14.33	4.4	528.8	13.84	0.38	44.5
June-14	14.71	4.8	579.7	14.08	0.62	73.2
July-14	14.79	5.1	616.3	13.83	0.49	53.1
August-14	10.62	6.7	599.6	9.49	0.32	25.9
September-14	10.29	6.5	554.0	9.84	0.81	65.4
October-14	9.44	6.8	537.8	9.10	0.40	30.3
November-14	9.22	7.8	601.3	8.45	0.49	34.5
December-14	9.26	7.8	605.8	8.57	0.66	46.7
January-15	9.39	7.3	575.1	8.89	0.34	25.7
February-15	9.61	8.3	670.2	9.26	0.46	35.5
March-15	9.46	8.6	677.9	9.18	0.54	41.8
April-15	9.33	8.1	633.0	9.24	0.51	40.3
May-15	9.65	7.9	634.9	9.34	0.55	43.8
June-15	10.77	7.3	659.4	10.15	0.35	29.8
July-15	10.57	6.7	590.8	9.53	0.32	25.6
August-15	9.89	7.3	614.5	9.10	0.44	34.2
September-15	9.94	7.2	594.1	9.18	0.30	23.3
October-15	9.09	6.7	509.4	8.66	0.24	17.5
November-15	9.42	7.0	547.7	8.70	0.35	25.8
December-15	9.84	6.6	547.3	9.02	0.35	26.9

WWTF performance discussion:

The table on the preceding page shows the facility has never approached meeting the future 0.1 mg/L WQBEL limit on a monthly average basis, although the 0.3 mg/L limit has been achieved on a few months during the period of record. The figure below adds significant perspective, however, in the facility's past performance as it relates to the future limit.



As can be seen, the figure again shows that, on a monthly average basis, the facility has never been close to complying with the 0.1 mg/L limit, and in fact has achieved compliance with this limit on less than 5 days during the 3-year period of record. In addition, over 80% of the time the monthly average has exceeded the 0.3 mg/L limit.

The resulting conclusion is that while optimization of the existing facilities, as discussed in the following sections, may help lower effluent phosphorus they alone will not achieve compliance with the WQBEL limits and as a result significant new constructed improvements to the plant will be required.

(C) Possible Contributors: For municipalities, list all possible industries, other commercial buildings and hauled in wastes that could be introducing phosphorus into the collection system.

The City of La Crosse has made contact with all 32 users on the list below. The ten users highlighted are part of the city's pretreatment program and are regularly monitored. The city is and has been working with these ten users to minimize phosphorus discharged to the WWTF. The sources with an asterisk (*) utilize pretreatment systems.

No.	Name Source	Type of Process	Already Contacted	Response Received	Likely High Strength Contributor?
1	Allstate Peterbuilt	Vehicle Washing	Yes	No	No
2	Aramark Uniform & Career Apparel, LLC*	Other-Industrial Laundry	Yes	Yes	No
3	Bakalars Sausage Co. Inc.	Meat & Poultry Processing/Packing	Yes	Yes	No
4	Ballweg Auto	Vehicle Washing	Yes	No	No
5	Bethany-Lutheran Homes - Bethany Riverside Campus	Hospitals/Nursing Homes	Yes	Yes	No
6	Bethany-Lutheran Homes - Food Service	Hospitals/Nursing Homes	Yes	Yes	No
7	Chart Energy & Chemical *	Metal Treatment/Metal Phosphatizing	Yes	Yes	No
8	City Brewery *	Beverage Producer	Yes	Yes	Yes
9	Crown Cork & Seal *	Metal Finishing/Machine Shops	Yes	Yes	No
10	Dahl Automotive	Vehicle Washing	Yes	No	No
11	DeBauche Truck & Diesel	Vehicle Washing	Yes	Yes	No
12	Festival Foods	Meat & Poultry Processing/Packing	Yes	No	No
13	Great Lakes Cheese	Dairy Processing (Milk & Cheese)	Yes	Yes	Yes
14	Gundersen Health System, Gundersen Lutheran Medical Center - LaCrosse & Onalaska Facilities	Hospitals/Nursing Homes	Yes	Yes	No
15	Hillview Health Care Center	Hospitals/Nursing Homes	Yes	Yes	No
16	Kwik Trip	Other-Bakery	Yes	Yes	No
17	Kwik Trip	Vehicle Washing	Yes	Yes	No
18	Kwik Trip Dairy	Dairy Processing (Milk & Cheese)	Yes	Yes	Yes
19	La Crosse County	Other - Offices/Law Enforcement	Yes	Yes	No
20	La Crosse Fire Department	Vehicle Washing	Yes	Yes	No
21	La Crosse Municipal Service Center	Vehicle Washing	Yes	Yes	No
22	La Crosse Municipal Transit	Vehicle Washing	Yes	Yes	No
23	Mayo Clinic Health System-Franciscan Healthcare - LaCrosse & Onalaska Facilities	Hospitals/Nursing Homes	Yes	Yes	No
24	Onalaska School District	Schools	Yes	Yes	No
25	S & S Cycle *	Metal Finishing/Machine Shops	Yes	Yes	No
26	School District of La Crosse	Schools	Yes	Yes	No
27	The Trane Company (Ingersoll-Rand) *	Metal Finishing/Machine Shops	Yes	Yes	No
28	University of Wisconsin - La Crosse	Schools	Yes	Yes	No
29	Viterbo University	Schools	Yes	Yes	No
30	Western Technical College	Schools	Yes	No	No
31	Wisconsin Kenworth - La Crosse	Vehicle Washing	Yes	Yes	No
32	WIS-PAK *	Beverage Producer	Yes	Yes	No

The average total mass of phosphorus received at the WWTF is 561 pounds per day (ppd). Of the above sources, the approximate mass contribution of the major industrial/commercial contributors is:

- City Brewery: 79 ppd
- Kwik Trip Dairy: 16 ppd
- Great Lakes Cheese: 11 ppd

The City sent out surveys to 34 users in October, 2015 and received 32 responses. The following 3 of the 32 responses were expecting significant changes in production or chemicals used which could impact their wastewater phosphorus content.

- Chart Energy & Chemical is expecting a down turn in production
- Kwik Trip Bakery is reviewing production cycles in an effort to reduce the number of times per day the equipment needs cleaning. Reduced daily cleaning frequencies could reduce phosphorus chemical usage and discharge.
- The Trane Company (Ingersoll-Rand) is currently evaluating alternative non-phosphate chemicals in various manufacturing processes.

The other 29 users responding anticipated no change and/or no potential for optimization is expected to the type of process, chemicals used, or products containing phosphorus.

Water supply: What are the phosphorus levels within your water supply? Does the water utility add phosphorus for corrosion control or iron and manganese sequestration?

The average total phosphorus concentration in the City's public water system is 0.127 mg/L based on data from 2016 sampling survey.

The City of La Crosse has a public water supply system, which does add phosphorus-based chemicals to the water system for iron/manganese sequestration. Staff has and continues to work closely with the chemical supplier to ensure the chemical feed is optimized. When the chemical feed system was set up the dose for each well was optimized. Optimization was achieved by discovering the lowest dosage necessary for reliably achieving continuous sequestration of manganese. Chemical dosage rates are periodically checked using data from the SCADA system. As a result the City believes this chemical addition has been optimized and there are no additional opportunities for phosphorus source minimization related to the City water supply. The City will continue to minimize phosphorus addition to the water supply, if possible, while ensuring adequate corrosion protection and iron/manganese sequestration are being achieved.

PART 2A – OPTIMIZATION ACTION PLANS

Optimization Action:

Previous Optimization Activities – The City has made significant efforts over the past several years to optimize the plant’s phosphorus removal performance. Table 2.A.1 on the following page provides brief documentation of those activities.

Briefly describe optimization action plan:

See Table 2.A.1 – La Crosse Previous/Ongoing Phosphorus Optimization Activities on following page.

Anticipated Time Frame for Optimization Action Plan:

See table on following page.

Overall Optimization Action Plan Time Frame:

Optimization activities completed before permit requirement .

Overall Completion Date:

See table on following page.

Outcome hoping for:

Outcomes hoped for/achieved are shown in the table on the following page.

Anticipated reduction and/or comments:

See last column of table on following page.

Table 2.A.1 – La Crosse Previous/Ongoing Phosphorus Optimization Activities

No.	Briefly Describe Optimization Action Plan	Outcome Hoped For	Date Complete	Comments/Results/Findings
1	Installed effluent inline phosphorus analyzer	Track effluent phosphorus 24 hrs./day to better understand the true characteristic of the effluent and work at understanding the impacts internal treatment processes have on the EBPR performance	Feb 2010	This addition was very valuable because it has and continues to give the operators real-time system performance data which helps to understand the impact of operational changes as well as impact of industrial loadings. Seeing this real-time data provides one of the best ways to effectively & efficiently optimize phosphorus removal both biological and chemical treatment processes. This equipment is still in service and still providing valuable data.
2	Installed PLC based Sludge Retention Time (SRT) controller. This required installed MLSS/RAS TSS inline probes.	Continually monitoring and controlled SRT with automatic wasting to maintain a SRT set point. The goal is achieving a steady EBPR performance through maintain a steady SRT.	Feb 2010	Outcome was successful, achieved steady SRT which makes the EBPR performance more steady. This system literally controls SRT hourly. La Crosse has numerous large industrial contributors with varying BOD and P loadings. By automating the SRT control the system automatically responds to the these changing conditions in an effective way. The equipment/system is still operational and continues to provide the service it was designed for.
3	Installed an effluent ammonia inline probe	Goal is to maintain an ammonia residual concentration just above detention levels. SRT control is adjusted to achieve within the specific effluent ammonia operating range.	Feb 2010	Focusing in on the ammonia removal performance is another way of measuring the TRUE biological age of the EBPR system. Having an ammonia inline probe has helped continuously track the system's ammonia removal performance and in turn the EBPR performance.
4	1st application of supplemental carbon (QLF) Initial trial	Improve EBPR performance by improving the BOD:TP ratio and by providing biomass with essential nutrient requirements	Jun 2010	Two months trial of continuous QLF feed – successfully took effluent total phosphorus (TP) from an average of 0.68 mg/l (previous 2 month before study) to 0.26 mg/l and reduced the effluent TP standard deviation significantly. QLF has a BOD/COD concentration of 800,000 to 900,000 mg/l so it took only 105 to 110 gpd addition to achieve this performance
5	2nd application of QLF - Dosing Study	Discover the most effective dose of QLF	Oct-Nov 2010	Different dosing levels were trialed. Both effluent TP & soluble reactive phosphorus (SRP) reflected the QLF dosing levels with the lowest values at the highest dosing and vice versa. At the highest doses trend line showed SRP an approximate average of 0.012 mg/l. 28% of the SRP registered below 0.01 mg/l with the lowest value being 0.003 mg/l
6	Surveyed effluent for different fractions of P	Determine which fractions are being removed with QLF addition and to what degree.	Oct 2010 to Mar 2011	Goal was to better understand which fractions of P were impacted by the addition of QLF. This trial went from Jan-2011 to Mar-2011. It appeared the fraction most affected by QLF addition was SRP. It was found that most of the SRP can be removed by addition of QLF.
7	Change runtime of Gravity Belt Thickener (GBT) which thickens anaerobically digested sludge from a 10-12 hrs./day to a 24 hrs./day	Reducing filtrate side stream phosphorus and ammonia impact on EBPR system	Jan 2011	With the installation of the inline effluent P analyzer we found GBT thickening of anaerobically digested sludge operation impacted effluent P quality during certain hours of the day. The EBPR system was being shock loaded with P and N for 10 hours/day when GBT ran. The change improved the EBPR system performance

Table 2.A.1 – La Crosse Previous/Ongoing Phosphorus Optimization Activities (Cont.)

No.	Briefly Describe Optimization Action Plan	Outcome Hoped For	Date Complete	Comments/Results/Findings
8	3rd application of QLF - Duplicate specific dose	Confirm similar removal rate with dosing 80 to 100 gpd QLF	Jan-Mar 2011	With a higher SRT approximately 9 days and QLF feed of 90's gpd their was a steady eff. sRP 0.015 mg/l with a min. of 0.008 mg/l and max of 0.024 mg/l. Toward end of study SRT was reduced and it was discovered that this reduction appeared to impact the sRP removal rate. Similar sRP removal rate was confirmed and it was discovered higher SRTs are more effective at sRP removal
9	4rd application of QLF - Check for PAO Improvement	During QLF feeding periods expect to see increase in number of PAOs organisms in the EBPR sludge	Sep 2011	Partnered with UW-L microbiology for counting PAOs, did confirm increase in PAOs during QLF feeding time periods
10	5th application of QLF - Supplement carbon during Thanksgiving Holiday period when brewery loading is low	Maintain EBPR system performance	Nov 2011	Was partially successful. Equipment and feeding issues
11	6th application of QLF - Supplement loss of brewery weekends loadings	Expect to reduce or eliminate the end of weekend or beginning of week eff. sRP spike	Jan 2012 to Sep 2013	This practice was successful
12	Installed new aeration tank blowers and diffuser system and D.O. probes/controls	Effective and efficient control of D.O. in the EBPR system	Apr 2012	Installation complete and D.O. control is much more effective and the system more efficient.
13	ChemScan/QLF/City partnered to trial an auto carbon feed system.	Goal of system is to achieve a more constant anaerobic zone P-release level and in turn a more constant EBPR performance.	Sep 2012	This system used a dual inline sRP analyzer to measure the P in the influent to the EBPR system and the anaerobic zone. PLC calculated P-release continuously in anaerobic zone and then feeds QLF based on measured P-release. The trial was successful but short. An additional trial of the system is planned.
14	Limited trial of ferric addition to aeration basin discharge	Understand how low the eff. TP can be driven.	Oct 2012	Limited trial time and other operational trial difficult resulted in not finding out what the maximum performance levels and chemical dosing information. This trial will be redone in future
15	7th application of QLF - Trial new formulation	Explore QLF product variation in an attempt to improve performance with using less product	Mar 2013 to Aug 2013	Trial new formation - did not success, difficulties due to higher than normal final clarifier blanket, abandon trial. The new product potentially over produced VFAs and aggravated existing filament issue. SVI was high when trial was started and stayed high until SRT was reduced to between 3 & 4 days for about a week wasting out a fair amount of sludge
16	Install inline ORP probes/meter in the anaerobic zone	Better document and understand anaerobic zone performance	Jul 2013	Inline monitoring has helped the operator know the TRUE state of the anaerobic zone 24/7. Knowing the ORP level continuously assists with inline fermentation listed in #18 below. This addition is still in operation.

Table 2.A.1 – La Crosse Previous/Ongoing Phosphorus Optimization Activities (Cont.)

No.	Briefly Describe Optimization Action Plan	Outcome Hoped For	Date Complete	Comments/Results/Findings
17	Application of supplemental carbon - Use high strength brewery waste from locate brewery	Improve EBPR performance by providing a better BOD:TP ratio	Sep 2013 to Present	This practice has been successful. The feed/storage system has also been upgraded and optimized a number of times during this time period
18	Explore the use of inline fermentation in the first anaerobic zones in each of the two system trains	Create a more PURE anaerobic condition in the anaerobic zone through mixer ON/OFF cycling. If successful the ORP will be reduced	Nov 2013	Cycling mixers ON/OFF created inline fermentation within the anaerobic zone. This fermentation helped reduce ORP. This has helped the EBPR system perform more consistently under regular loading conditions and also during lower BOD loading conditions. This process is still being used and optimization of this operation is ongoing.
19	Trial of ferric addition to gravity thickener sludge influent	The goal is to lower the EBPR influent phosphorus concentration thereby improving the BOD:TP ratio to see if it will improve EBPR system performance	Nov 2013	Trial was run for a very short period, limited by weather and other operational factors and ended with no clear performance data. Would need to revisit this activity

PART 2B – OPTIMIZATION ACTION PLANS

Optimization Action:

Work With Significant Phosphorus Contributors (Industries/Commercial Businesses) to Minimize P Discharges to Collection System

Briefly describe optimization action plan:

Identify and meet with significant phosphorus contributors to explore ways to minimize phosphorus discharges to the collection system and plant.

Anticipated Time Frame for Optimization Action Plan:

Main Item to Complete	Date Start	Date Complete
City Brewery	8/1/2016	12/31/2018
Kwik Trip Dairy	8/1/2016	12/31/2018
Great Lakes Cheese	8/1/2016	12/31/2018

Overall Optimization Action Plan Time Frame: 29 months

Overall Completion Date: December 31, 2018

Outcome hoping for:

Minimize phosphorus discharges to plant and thereby reduce the mass of phosphorus that has to be removed via the wastewater treatment facilities.

Anticipated reduction and/or comments:

All of these industries either have phosphorus ingredients and/or phosphorus cleaning agents which are an essential part of keeping their facility and equipment clean and sanitary to meet FDA regulations. It may be difficult to remove phosphorus ingredients and find substitutions for their cleaning chemicals. Any reductions may be difficult for the utility to quantify, however working with these industries will increase their awareness of phosphorus issues and can only be of future benefit.

PART 2C – OPTIMIZATION ACTION PLANS

Optimization Action:

Increase/Enhance Nutrient Monitoring (ENM)

Briefly describe optimization action plan:

Increase understanding of nitrogen and phosphorus forms and fates through the treatment train to help determine effective methods to minimize treat and remove nutrients from the wastewater streams.

Anticipated activities include:

See Table 2.C.1 Nutrient Monitoring Activities on the following page for more detail.

Anticipated Time Frame for Optimization Action Plan: *31 months*

Overall Optimization Action Plan Time Frame: *June 2016 to December 2018*

Overall Completion Date: December 2018

Outcome hoping for: *See table on the following page for detail.*

Anticipated reduction and/or comments:

The anticipated reduction is undetermined. The outputs from this action plan can be used to identify, implement, and measure the effectiveness of other action items

Table 2.C.1 – Nutrient Monitoring Activities

Briefly describe optimization action plan	Planned Start Date	Planned Finish Date	Outcome Hoping For/Comments
ENM 1A: Increase monitoring of Gravity Thickener (GT) Overflow (O/F) and GBT Filtrate for nutrient content for limited survey duration.	6/27/16	9/1/16	This will be the second week long daily monitoring of the GT - O/F and the GBT Filtrate. Purpose was to get another 5-7 day snapshot of these to recycle side stream locations.
ENM 1B: Continue with limited monitoring of Gravity Thickener Overflow and GBT Filtrate with regard to nutrient content.	10/1/16	12/31/17	Base on the data collected in ENM 1A and the previous 7 day monitoring in Fall 2015 determine appropriate sampling frequency (weekly or monthly, etc.) for the GT and then implement the ongoing sampling schedule
ENM 2: Perform additional special sampling of P species occurring throughout WWTP flow train.	6/27/16	9/1/16	This will be the second week long daily plant wide sampling/testing for P species. During 1st sampling, in Fall 2015 one digester was down for rehab. So there was only 3 digesters in operation. Checking for potential P species differences plant wide.
ENM 3: Perform alkalinity profile through liquid treatment train to assess issues that could affect BNR.	7/1/17	9/1/17	Answer the question will added alkalinity help the BNR function more efficiently?
ENM 4: Assess plant lab staff capabilities/needs to conduct future nutrient study related analyses in-house.	10/1/16	12/1/16	Evaluate the skill of lab staff and time availability for additional lab work related to P optimization. Then decide if utility is going to utilize the in-house lab for additional optimization sampling/testing
ENM 5: Increase P/N Monitoring of Major Contributors and Contracted Communities	1/1/17	12/31/18	Make a plan for phosphorus/nitrogen sampling/testing and implement
ENM 6: Get familiar with New Inline Dual P & NO ₃ -N Analyzer	8/1/16	12/1/16	Become familiar and setup new P-analyzer and become familiar with what it takes to move and use this unit at multiple locations with in the plant during the P optimization understand study
ENM 7: Perform Routine Nitrate Concentration Characterization of Anoxic Zone Effluent	9/1/17	12/1/17	Routinely measure NO ₃ -N in AX zones to get baseline and routine values
ENM 8: Perform Routine sCOD sampling/testing of tail of AX zones	12/1/16	2/1/17	See how much of the soluble COD is being tied up in the AN & AX zones and not carrying over into the AB zone

PART 2D – OPTIMIZATION ACTION PLANS

Optimization Action:

Pilot Test Supplemental Ferric Feed (SFF) to Enhance/Complement Plant P Removal Performance:

- SFF 1A: Establish Efficiency & Costs of Ferric Addition to GBT Filtrate
- SFF 1B: Optimize Ferric Feed to GBT Filtrate for P Removal
- SFF 2: Feed Ferric to Gravity Thickeners
- SFF 3: Feed Ferric to Gravity Thickener Overflow

Briefly describe optimization action plan:

See Table 2.D.1 – Pilot Test Supplemental Ferric Feed *below for more detail.*

Anticipated Time Frame for Optimization Action Plan: 27 month

Overall Optimization Action Plan Time Frame: October 2016 to November 2018

Overall Completion Date: November 2018

Outcome hoping for: See table below for more detail.

Anticipated reduction and/or comments:

The anticipated reduction is undetermined. The outputs from this action plan can be used to identify, implement, and measure the effectiveness of other action items.

Table 2.D.1 – Pilot Test Supplemental Ferric Feed

Briefly describe optimization action plan	Planned Start Date	Planned Finish Date	Outcome Hoping For/Comments
SFF 1A: Establish Efficiency & Costs of Ferric Addition to GBT Filtrate	2/1/18	5/1/18	Document the quantity, cost & efficiency of real life ferric dosing in GBT filtrate
SFF 1B: Optimize Ferric Feed to GBT Filtrate for P Removal	10/3/16	9/30/16	Auto feed ferric to GBT filtrate to attempt to maintain a more steady pri. Eff. TP
SFF 2: Feed Ferric to Gravity Thickeners	5/1/18	8/1/18	Discover effectiveness of feeding ferric to the influent of the gravity thickeners
SFF 3: Feed Ferric to Gravity Thickener Overflow	8/1/18	11/1/18	Discover effectiveness of feeding ferric to overflow the influent of the gravity thickeners

PART 2E – OPTIMIZATION ACTION PLANS

Optimization Action:

Pilot Controlling High Strength Waste Feed (OCF) Using New Inline P Analyzer

Briefly describe optimization action plan:

Automate supplemental carbon feed to match the biological demand. Demand will be measured by comparing inline measures of soluble reactive phosphorus in both the EBPR influent and anaerobic zone to establish the real-time phosphorus release in the anaerobic zone. High strength brewery waste and/or combination brewery waste and QLF will be used as the supplemental carbon

Anticipated Time Frame for Optimization Action Plan: *3 months*

Overall Optimization Action Plan Time Frame: *August 2016 to March 2017*

Overall Completion Date: *March 2017*

Outcome hoping for: *Stabilize Bio-P reaction in anaerobic zone and in turn the aerobic zone*

Anticipated reduction and/or comments:

The anticipated reduction is undetermined. The goal is to reduce the soluble reactive phosphorus as close to the limits of detention as possible.

PART 3 – OPTIMIZATION APPROVAL

Facility Name: La Crosse, WI – Isle La Plume WWTF

WPDES Permit #: WI-0029581-09-0

Name and Contact Information of Person Preparing Report:

Name: MARK JOHNSON & JARED GREENO

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Telephone #: 608-789-7588 / 608-789-7522

OPTIMIZATION ACTION PLANS

Action Item

Proposed Date of Completion

A) Previous Optimization Activities

Ongoing

B) Work With Major Contributors to Minimize P Discharges

December 2018

C) Increase/Enhance Nutrient Monitoring

December 2018

D) Pilot Test Ferric Feed to Control Sidestream P Loadings

November 2018

E) Pilot Controlling Supplemental Carbon Feed

March 2017

NOTE – C) and D) are divided into smaller segments with completion time tables, see document for detail.

These activities are not expected to bring the plant into compliance with the permit limit by January 1, 2018. Rather they are intended to help the WWTP identify those actions which, if permanently implemented (possibly as part of major facility upgrades), will minimize effluent TP as part of an overall plan aimed at achieving compliance with the WQBEL limits by the January 1, 2025 compliance achievement date in the plant's WPDES permit phosphorus compliance schedule.

For DNR use only	
<input type="checkbox"/>	Complete
<input type="checkbox"/>	Not Complete
<input type="checkbox"/>	Requesting More Information?
Comments:	

Submitted for Approval by: _____ (signed) Date of Submittal: _____

MARK E. JOHNSON _____ (printed)
Authorized Permit Representative

Approved by: _____
DNR Wastewater Engineer or Designee

Date of Approval: _____