

January 27, 2015

From: Greg Paul
Op2Myz, L.L.C.
3315 Peace St.
La Crosse, WI 54601

To: Jason Treat
Antioch WWTP
620 11th W.
Antioch, IL 60002

Proposal for Optimizing Antioch Wastewater Treatment Plant's (WWTP) Biological Nutrient Removal (BNR) System

STATEMENT OF WORK

Introduction/Background

1. Antioch WWTP's has a 1.0 mg/l effluent total phosphorus (TP) discharge limit
2. The city believes the next discharge permit will require optimization of its BNR system
3. It anticipates a requirement to study the feasibility of a potential future effluent TP limit of 0.5 mg/l.

Objectives

Work with Antioch's staff using operational adjustments and minimal equipment/controls modifications to improve the performance of the Biological Nutrient Removal (BNR) system. The definition of "improve the performance" is improving the consistency and reliability of the system output and pushing the biological system to achieve its maximum orthophosphorus (PO₄-P) removal rate.

1. Evaluate/benchmark the present limited BNR system performance
2. Use phased alternative operational strategies to optimize biological environments improving BNR performance
3. Optimize system performance using existing infrastructure and equipment, minimizing capital
4. Develop operational controls to reduce the side stream nitrate levels
5. Examine the potential benefits of controlling high strength TP side streams with alum
6. Examine the potential benefits of offsetting the high strength nutrient side stream loadings with QLF's supplemental carbon
7. Assist Antioch's staff to determine the economics of objectives #4 & 5.
8. Identify and track the essential fractions of phosphorus effluent

This study is meant to help the staff understand and realize the full potential of its existing facility for removing phosphorus.

Scope of Work

Op2Myz, L.L.C. (Op2Myz) works hand in hand with the plant staff to reach the objectives stated above. It provides operator mentoring, using remote process analyses and where necessary, onsite sampling/testing. An integral part of this process is working together uncovering essential operational changes which will result in an optimized BNR system. *Op2Myz utilizes the most efficient and cost effective methods possible to achieve this goal including using all affordable technology for communicating with the plant staff, phone, email, texting and web conferencing in order to minimize onsite visits reducing travel and overall project costs.*

This is a 12 month project. It is anticipated that most of the work will take place in the first six months with less in the second 6 months. This will depend on how quickly the BNR system can be stabilized. See Attachment #1 for more scope detail and cost estimates. This project is structured such that Antioch's staff works together with Op2Myz by taking samples and providing on site testing. Op2Myz will provide ongoing discussion and feedback during the project as well as compiling and analyzing data. At the end of the project Op2Myz will provide Antioch with a report of the results. There will be regular remote communication between plant staff and Op2Myz during this entire study.

Op2Myz Cost Estimate and Invoicing

Study Cost Estimate – Not to Exceed \$1,458, see Attachment #1, Scope – Detail & Cost Estimate. Also see attachment #2 for List of Possible Equipment-Infrastructure Alternations.

Invoicing will be based on time, materials on or off site and mileage to and from the work site. See the Fee Schedule below. The invoicing will not exceed the estimate.

Op2Myz will submit invoices once per month for any completed services. Payment for these services will be to Op2Myz no later than the 30th day of each month after the invoice is sent and this agreement remains in force. Any travel expenses related to onsite visits will be invoiced separately.

Op2Myz, L.L.C. Fee Schedule

Onsite Work \$60.00/hour

Offsite work (Emails/reports/phone calls/web conferencing) - \$60.00/hour

Mileage rate to/from onsite work - \$0.56/mile

Op2Myz, L.L.C. will provide:

1. Contact information
2. Portable self-contained lab with PO₄-P and NO₃-N test kits and portable ORP and pH meters, if assistance with onsite testing is necessary.
3. Appointments for onsite visits, any routine phone call meetings or web conference meetings which will be setup in advance.

Op2Myz, L.L.C. will NOT provide:

1. Any engineering services.
2. Any equipment

Antioch will provide:

1. ORP meter, blanket finder, onsite lab capable of analyzing NO₃-N, PO₄-P, TP, Dissolved TP and ammonia (Hach methods).
2. Staff to measure ORP in various locations, measure final clarifier blankets, sample at various process locations and test for numerous parameters.
3. Time to regularly communicate and provide data/information remotely to Op2Myz via email, text, phone, web conferencing and etc.
4. All necessary data for BNR assessment and access to design drawings as needed.
5. Access to staff and resources as needed to complete the work and assist operators in making decisions to reach the study's objectives listed above.
6. Alum and QLF EnhanceBio^{P+N}© for treating nutrients in the side streams.
7. Lab contracting services to analyze effluent for fractions of phosphorus.

Our Philosophy

Op2Myz is owned and run by an operator, bringing an operator's perspective to WWTPs as they optimize, troubleshoot, learn and plan.

The Approach to Reaching Objectives

The mentoring approach Op2Myz takes with operators during a project includes sharing information learned from; experience, other operators and reading/research. When approaching a project, Op2Myz first collects information through discussion, observation and then if necessary, sampling and testing. Then we bring possible options to the table for discussion. We review the purpose of proposed changes and through discussion confirm the changes are feasible and make any necessary adjustments to proposed changes.

When an operator is in the process of analyzing and planning operational changes Op2Myz views itself as an additional source of information and experience to aid the operator. We at Op2Myz believe we are learning every day from operators and they from us.

Op2Myz's View of Operational Changes

In most cases without knowing it, operators are using a process similar to what is called continual improvement when making decisions on how to control their biological treatment processes.

1. Before making operational changes, analyze the system.
2. Make a plan to improve the system performance based on experience and knowledge.
3. Implement the plan.
4. System is checked for improved or decreased performance.
5. If actions taken adversely affect the system performance the system is set back to its original point and the results of the actions are recorded and become part of the operator's experience and knowledge.
6. Go back to step 1, if actions taken result in improvements proceed to step 7.
7. If the actions taken result in improved performance versus a decrease in performance the action is also recorded and becomes part of the operator's experience and knowledge. Mission is accomplished. Now if you need additional improved performance you are back at step 1.

These steps taken by the operator are incremental in nature so the impact on system performance and ultimately the treatment process discharge are minimal. Op2Myz mentoring services assist the operator in this process by providing additional knowledge and experience for the operator to draw from when making the operational decisions. Op2Myz provides the information and recommendation and the operator makes the choices and decisions.

Reference and Information Sharing

Reference

Antioch WWTP agrees to be listed on Op2Myz website as a WWTP who has used its services - Yes No

Antioch WWTP agrees to supply verbal references for Op2Myz to its potential customers - Yes No

Antioch WWTP agrees to allow Op2Myz to use its name in marketing literature - Yes No

Information Sharing

Antioch WWTP agrees that Op2Myz may use information for this project as an example given in formal presentations with credit given to Antioch WWTP - Yes No

QUALIFICATIONS

My past experience in the field of wastewater and specifically biological nutrient removal (BNR) will help provide the knowledge necessary to work with Antioch WWTP in optimizing their BNR system.

My experience includes;

1. 36 years wastewater treatment experience. 31 years at LaCrosse Wastewater Utility (20 million gallon per day facility) with 16 years in operations, lab, process control and the remaining 15 years as superintendent.
2. 19 years of personally operating biological nutrient removal systems.
3. 3.5 years of assessing more than 34 nutrient removal systems in Wisconsin, Illinois, Minnesota, Arkansas and Virginia and working with operators of these systems to improve their performance as part of my responsibilities working for QLF a supplier of supplemental carbon used to drive both the biological phosphorus and nitrogen removal reaction.
4. Possess a grade 4 Wisconsin wastewater treatment plant operator certification.

Consulting Services Agreement

This Consulting Services Agreement (hereinafter "Agreement") dated 2/11/15 entered into by and between OP2MYZ, L.L.C. (hereinafter "OP2MYZ") having offices located at 3315 Peace Street, LaCrosse, Wisconsin and Antioch Wastewater Plant having offices located at 620 11th W, Antioch, IL 60002 (hereinafter "Client"). This Agreement, together with the attached Statement of Work (hereinafter "SOW") contains all the terms and conditions in which OP2MYZ may perform consulting services for Client and supersedes any additional or contradictory terms and conditions referenced in any Client purchase order or other writing. There are no other agreements of any kind or nature in writing or oral by or between Client and OP2MYZ.

STATEMENT OF WORK

Each consulting project performed under this Agreement will be memorialized in writing in an SOW. Each SOW constitutes a separate contract that will be effective upon execution by an authorized representative of OP2MYZ and Client. Should there be any conflict between this Agreement and a SOW, this Agreement will take precedence.

CHANGE ORDERS

This Agreement or any SOW can only be modified by a written amendment signed by each party's authorized representative and embodied in a Change Order. OP2MYZ will promptly communicate any time and material changes in the project or its timing to client. If Client requests changes during performance of a SOW, OP2MYZ will provide Client with a Change Order proposal addressing any increase or change in the nature, cost or timing of the Services. The Change Order shall only become effective once signed by and authorized representative of each party.

PAYMENT

OP2MYZ shall prepare an Invoice for Services rendered and preapproved Expenses every month for the Services identified in the applicable SOW ("Services"). Expenses include hotel and travel, mailing and fax costs and if applicable testing fees. Invoices are due on receipt unless otherwise agreed to in writing. Client shall be responsible for paying a finance charge of 1.5% per month or the highest amount allowed by law, on all past due amounts. OP2MYZ is not obligated to continue to provide Services if Client fails to make timely payments of undisputed invoices.

COMMUNICATION AND OTHER RESPONSIBILITIES

Client shall appoint a project leader who shall be responsible for interfacing with OP2MYZ. This person shall be available as a resource in person and or by telephone to respond to make decisions on behalf of Client, to answer questions, provide records or other requested materials or otherwise assist OP2MYZ in undertaking its' tasks. Client shall make available applicable and necessary books, records, test files, and provide space available for OP2MYZ to work. Client shall comply with all applicable laws, codes, regulations and ordinances regarding worker and workplace safety. If applicable Client shall allow OP2MYZ to connect to Client's wireless network and use land line telephones. Client shall make OP2MYZ aware of any onsite safety or health risks. OP2MYZ shall likewise comply with all applicable laws relating to the provision of Services and while on site shall observe any of Client's safety, security and confidentiality policies provided in advance to OP2MYZ.

PROJECT DELAYS & FORCE MAJEURE

OP2MYZ is not responsible for any project or other delays caused by the Client or a third party's failure to timely cooperate or make agreed to resources available. Neither party is responsible for delays caused by Act(s) of God, war, insurrection, terrorism, flood, labor shortage or other causes outside the reasonable control of that party,

LIMITED WARRANTY/DISCLAIMER OF WARRANTIES

Each party hereby represents and warrants: (a) that it has full power and authority to enter into this Agreement and in performing its obligations herein it is not in conflict with any other understanding, whether oral or written, to which it is a party or by which it may be bound. OP2MYZ represents and warrants that it has the requisite experience and education to perform the Services, that all such Services will be performed in a thorough and professional manner in conformance with all applicable professional standards.

OP2MYZ MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED AND SPECIFICALLY DISCLAIMS ANY IMPLIED REPRESENTATIONS, WARRANTIES OR CONDITIONS, INCLUDING WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR SATISFACTORY QUALITY.

INSURANCE/INDEMNITY

Client will indemnify, defend, and hold harmless OP2MYZ, its officers, directors, employees and insurers from and against any and all losses, costs, liabilities, damages, and/or expenses (including, without limitation, reasonable attorneys' fees) in connection with any claim, suit, action, judgment, or other proceeding brought against OP2MYZ by a third party to the extent based on or arising from (i) physical injury or property damage occasioned by the Client's negligence or willful misconduct, or (ii) any breach of a material obligation contained in this Agreement; or (iii) act or omission by Client that infringes any patent, copyright, trademark, trade secret or other intellectual property interest of any third party.

During the term of this Agreement, Op2Myz shall obtain and maintain Worker's Compensation Insurance in the amount required by applicable state law. Commercial General Liability Insurance covering product liability, premises-operations, products and completed operations, personal injury, advertising injury, contractual liability including Op2Myz's indemnity and other obligations under this Agreement, in an amount no less than One Million Dollars (\$1,000,000.00) per occurrence and Errors and Omissions coverage each in an amount no less than One Million Dollars (\$1,000,000.00) per occurrence.

LIMITATION OF LIABILITY

NEITHER PARTY, NOR ANY OF ITS AFFILIATES, WILL BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, LOST PROFITS, BUSINESS INTERRUPTIONS, LOSS OF BUSINESS INFORMATION OR CONSEQUENTIAL DAMAGES, OF ANY KIND EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR SUCH DAMAGES WERE REASONABLY FORESEEABLE. OP2MYZ'S total aggregate liability pursuant to this Agreement to Client is capped at and may not exceed the amount paid by Client to OP2MYZ in the six months preceding the date the claim arose.

TERMINATION

Either party may terminate this Agreement following written notice and a reasonable opportunity to cure with Reasonable Cause. Reasonable Cause includes, but is not limited to, a material breach of the contract, or a failure to pay undisputed invoices for services rendered within thirty (30) days of receipt. Upon termination for any reason, OP2MYZ shall be paid all fees earned and expenses paid to the point of termination.

INDEPENDENT CONTRACTOR

OP2MYZ represents warrants and agrees that it is an independent contractor having its own established place of business, holds a federal employer tax number, offers services to third parties and meets all requirements necessary to be classified, for all governmental purposes, as an independent contractor and not as an agent and/or employee of Client. Client will have no responsibility to provide fringe benefits or to withhold taxes normally withheld from an employee's pay on behalf of OP2MYZ's employees or agents.

TAXES

Fees and expenses under this Agreement are exclusive of all taxes including state and local use, sales, property and similar taxes. Client agrees to pay any such applicable taxes except those based on the net income of OP2MYZ.

ASSIGNMENT

Neither party may assign its rights and/or obligations under this Agreement without the other party's prior written consent.

WAIVER

Either party's failure to insist on the strict performance of any term of this Agreement or failure to take advantage of any of its rights hereunder will not operate to excuse performance or waive any such right at any future time.

SEVERABILITY

If any provision of this Agreement or any SOW is deemed invalid or unenforceable, the remaining provisions will not be affected. In such event, the invalid or unenforceable provision will be replaced by a mutually acceptable provision that comes closest to the original intent of the parties.

GOVERNING LAW

The laws of the State of Wisconsin will govern this Agreement. Each party agrees that any action that it brings will be exclusively venue in LaCrosse, Wisconsin Circuit Court or appropriate federal court for the Western District of Wisconsin.

SURVIVAL

The following provisions will survive termination of this Agreement for any reason: Indemnification and Limitation of Liability.

COUNTERPARTS

This Agreement may be executed in counterpart originals, and the counterpart originals together shall constitute the original of this Agreement. Facsimile or PDF copy signatures shall be treated as original signatures for this purpose.

OP2MYZ, L.L.C.

By: 

Name: GREG PAUL

Title: PRINCIPAL

Date: 2-11-15

CLIENT

By: 

Name: DENNIS HEIMERL

Title: DIRECTOR OF PUBLIC WORKS

Date: 2/11/15

Antioch Detail and Cost Estimate

1-27-15 Greg Paul/Op2Myz, LLC



Overall Study Philosophy

Each BNR facility is designed uniquely and requires controlled operational experimentation to establish the system abilities. Maximums BNR performance will be established through experimental use of the available operational treatment plant control parameters. These control parameters are sludge age, RAS rate, D.O. setpoints, possible supplement carbon addition, alum addition together with side stream enhanced treatment.

In all these tasks Op2Myz, LLC will be assisting the staff optimize their BNR system.

Item	Description	Hrs.
1	Benchmark BNR system and establish method to share essential data to track system performances as changes are made. WHY - Know what the BNR system performance was before starting and then devised method of tracking and sharing data effectively through the study	2.0
2	Developing operational control practices to minimize or eliminate secondary P-Release in the final clarifiers. WHY -Reduces the need for chemical treatment and so both final clarifiers can run during the winter. a.) Explore options of using aeration tank D.O. levels and ORP and/or D.O. levels in final clarifier as control parameters to prevent P-Release in clarifiers b.) Optimize RAS flow rate c.) Beware of secondary P-Release throughout project	2.0
3	Explore the use of dissolved oxygen levels within the BNR and develop Standard Operating Procedure (SOP) for control. This task overlaps with #2. WHY -Need to understand the role D.O. plays in ammonia removal, D.O. carryover into BNR's anaerobic (AN) zone and secondary P-Release.	2.0
4	Through experimentation and discussion look at the value of developing an SOP for routine ORP monitoring throughout the plant to use as method to monitoring the biological health for each treatment processes. WHY -Help ensure the system stay healthy and have an early warning system to alert staff to unseen process changes which can cause problems if left unchecked.	2.0
5	Develop ways to minimize the nitrate (NO ₃ -N) and the PO ₄ -P in the recycle flow within the treatment plant. WHY -Lbs. of recycle NO ₃ -N and PO ₄ -P are very high and inhibit the BNR from working correctly. These recycle flows have a very negative impact on the BNR system and controlling their impact is key to providing a stable operation of the BNR system. a.) Develop and implement a strategy for using operational practices to reduce NO ₃ -N production in the aerobic digesters. b.) Develop and implement a strategy for using operational practices to reduce PO ₄ -P production in the aerobic digesters. c.) Evaluate the use of alum to control the PO ₄ -P in the recycles flow from aerobic digesters and belt press. d.) If necessary evaluate need for QLF EnhacneBioP+N as supplemental carbon and evaluate efficiency vs. (or along with) alum.	4.0

Antioch Detail and Cost Estimate

1-27-15 Greg Paul/Op2Myz, LLC



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In all these tasks Op2Myz, LLC will be assisting the staff optimize their BNR system.

Item	Description	Hrs.
6	Benchmark/Track effluent fractions of phosphorus - may need contact lab services WHY -To understand where the treatment of phosphorus needs to be.	1.0
7	Bring all information and data into a final report	5.0
8	Final meeting at plant.	2.0

Cost per week for labor (not including i trip)
 $\$1200/52 \text{ weeks} = \$23.08/\text{wk. or } \$100/\text{mo.}$
 Will be using web conferencing to reduce travel costs
 It is estimated most of the hours may happen in the first six months and less in the last 6.

Total Hours	20
Op2Myz, LLC hourly rate	\$60
Subtotal total for time spent on study	\$1,200
Driving (1 trip - 460 miles \$0.56/mi)	\$258
Total Estimated Cost	\$1,458

NOTE: The time estimated for each line item may vary, some may take less time to complete and will be invoiced for only the time spent. Others may take longer than estimated and be invoiced for more than estimated. But the total cost of the study will not exceed the Total Estimated Cost.

Antioch WWTP

List of Possible Equipment/Infrastructure Alternations

1-27-15, Greg Paul Op2Myz, LLC

Possible Equipment Alternations During Study

Timers on the aerobic digester blowers – approximately \$300 for each blower

This study will explore all listed tasks for BNR optimization. The present BNR and its configuration may not allow for the desired level of PO₄-P removal. If after completing the optimization study and better performance is required, this is a list of projects that will give the staff more operational control of its BNR system.

Possible Future Equipment/Infrastructure Alternations – Not included in this Study

1. Seal off or reduce the size of the underflow openings between 2 anaerobic zones and the outlet from the second anaerobic zone into the aerobic zone. This is to promote and better control inline fermentation.
2. Install light weight baffle walls in aeration basin to improve PO₄-P uptake.
3. Install new mixer method in anaerobic zones
4. Extend chemical feed to belt filter press and/or headworks buildings
5. Stationary ORP meters in at least one of the train's first anaerobic zone

These tasks may require engineering service which Op2Myz, LLC does not provide.

When all and any of these improvements are made Op2Myz, LLC would provide a proposal to assist in optimizing the operations.