

CORNWELL
ENGINEERING GROUP

Proposal for Benton Harbor Corrosion Optimization Study

Submitted to The City of Benton Harbor

May 2021

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CORNWELL
ENGINEERING GROUP

May 10, 2021

Kimberly Thompson
City Clerk
City of Benton Harbor
200 E. Wall Street
Benton Harbor, MI 49022

RE: Benton Harbor Corrosion Optimization Study Proposal
Due May 13, 2021

Dear Ms. Thompson,

Cornwell Engineering Group, Inc. (Cornwell) is pleased to submit this proposal in response to your solicitation for the Corrosion Optimization Study for the City of Benton Harbor. Our nationally-recognized expertise in lead and copper research, regulation, analysis, optimization and design will be of significant benefit in assisting Benton Harbor to economically and effectively identify and implement optimized corrosion control.

Based on the City's intent to maximize use of demonstrative field work as well as the need to control costs, we propose relying on recent advances in lead solubility studies initially in lieu of pipe scale analysis and pipe loop testing. Our experience will allow us to combine advanced solubility results as described in the proposal with a "desktop study" to reach a valid optimization recommendation. We are also prepared to conduct scale analysis with our in-house experience and capabilities, bench loop studies and pilot loop studies should funds be available.

Please contact David Cornwell at 757-873-1214 or dcornwell@cornwellinc.com if you should have any questions or wish to discuss this proposal further.

Regards,

Cornwell Engineering Group, Inc.

Everett Skipper, P.E.
Senior Vice-President

/ams

712 gum rock court - newport news, virginia 23606 - (757) 873-1534 - fax: (757) 873-2392

City of Benton Harbor
200 E Wall Street
Benton Harbor, MI 49022
Phone: (269) 927-8400

BENTON HARBOR
Port of Opportunities

Proposal Form

Submitted by:

Firm: Cornwell Engineering Group, Inc.

Address: 712 Gum Rock Court, Newport News, Virginia 23606

Telephone: (757) 873-1534 Email: eskipper@cornwellinc.com

Signed by: Everett P. Skipper, P.E.
Printed Name

Title: Senior Vice-President

Signature: _____ Date: May 10, 2021

Accepted by the City of Benton Harbor:

Name: _____
Printed Name

Title: City Clerk

Signature: _____ Date: _____

City Commission Approval Date: _____

City of Benton Harbor
200 E Wall Street
Benton Harbor, MI 49022
Phone: (269) 927-8400

BENTON HARBOR
Port of Opportunities

City of Benton Harbor
Addendum # 1

Project Name: Benton Harbor Corrosion Optimization Study

Date: May 3, 2021

The following items are changes to and/or clarifications to the above reference project. The Bidder will acknowledge receipt of this Addendum in the appropriate space provided below and include this Addendum with their submitted proposal.

1. All proposals must be delivered by May 13 at 10:00 am to:

   City of Benton Harbor
   Attn: City Clerk, Kimberly Thompson
   200 E. Wall Street
   Benton Harbor, MI 49022

   No electronic copies will be accepted. Electronic copies of the proposal may be requested during the proposal evaluation period after May 13th.

2. The proposal selection criteria will be based on the following categories:

   - Qualifications of the Firm 40 points
   - Qualifications of the Staff 10 points
   - Project Understanding 50 points

3. The current proposal holder list has been attached to this addendum.

4. For the purposes of this requested RFP, the City of Benton Harbor does not currently have capacity to assist with harvesting of pipes for potential pipe loops, or construction funding to install pipe loops with sampling and monitoring. These services may be reference and estimated within the study of the selected consultant.

Please acknowledge receipt of this addendum by signing below and attaching to submitted proposal.

May 10, 2021
DATE

Cornwell Engineering Group, Inc.
BIDDING FIRM



AUTHORIZED REPRESENTATIVE

A EXPERIENCE, EXPERTISE, AND QUALIFICATIONS

FIRM BACKGROUND AND EXPERIENCE – CORNWELL ENGINEERING GROUP (CORNWELL)

Cornwell is a full-service consulting firm headquartered in Newport News, Virginia. Established in 1985 Cornwell is a licensed engineering firm in Michigan. Dr. Cornwell, Mr. Brown, and Mr. Wagner have coordinated with utility clients in various states, including Michigan and other states in the Great Lakes area, on corrosion control evaluation and treatment projects.

Cornwell provides consulting engineering services throughout the country and internationally from our offices in Virginia. Cornwell is a recognized leader in water engineering, providing services in areas of plant troubleshooting, regulatory compliance assistance, master planning, rehabilitation studies, expansion plans, laboratory treatability studies, laboratory analytical services, pilot plant treatment studies, full-service design (including 3-D computer aided design), construction administration, and start-up services.

Cornwell has assisted utilities across the U.S. with regulatory compliance and planning for future regulations. Our personnel have worked through various AWWA and EPA groups to help in the regulatory development process. We serve on EPA Peer Review Committees, including the committee that developed Best Available Technologies (BAT) for the 1986 SDWA Amendments. We have been active throughout the process of developing the DBP Rules (Stage 1 and 2 DBPR), SWTR (LT2ESWTR and predecessors), cVOC Rule, LCR and LCRR. We were the prime contractor and advisor to AWWA during review and comment period for the LCR revisions (LCRR). More background on CCT and assistance to AWWA during LCRR review is described below.

The Cornwell main office in Newport News includes an in-house laboratory, plus 4,000 SF of process space certified by TNI/VELAP and the states of Virginia, North Carolina, New York, South Carolina, West Virginia, and Michigan. As a TNI-certified laboratory, we can request reciprocal certification in most states, as needed. Currently, and for the past 14+ years, the Cornwell Laboratory has been the compliance laboratory for all TTHM and HAA5 compliance samples generated by drinking water facilities in South Carolina. The Cornwell Laboratory is certified for other DBPR constituents including TOC/DOC, SUVA, and UV-254.



The laboratory can analyze pH, alkalinity, free chlorine residual, and orthophosphate residual. The laboratory can analyze lead, copper, and other metals, and is certified by Virginia VELAP and in Michigan for lead and copper in drinking and waste water.

Laboratory personnel assist in the completion of pipe scale analyses. Personnel maintain and preserve the pipes until ready for analysis. When ready, they clean the pipe exterior and split the pipes with a metal bandsaw. They then prepare the scales for analyses by carefully taking the layers off the pipes. All steps of the process are captured in pictures

and labeled. The final prepared samples are then separated for ICP-MS analyses and identification work.

COMPANY REPUTATION

Cornwell is assisting AWWA in evaluating the current state of knowledge with respect to lead and copper corrosion and providing technical assistance to AWWA in support of the LCR-LTR regulatory negotiation process.

Cornwell has developed an excellent reputation for completing projects which meet the budgetary requirements and time constraints of our clients. Cost control is an active part of our projects from planning through design and into construction. Our reputation has been earned by development of quality designs, strict adherence to our QA/QC program, and the involvement of our staff in the construction administration process.

CORROSION CONTROL KNOWLEDGE

Cornwell and its founder David Cornwell have been at the forefront of corrosion issues for nearly 40 years. Dr. Cornwell studied under Ed Singley, considered by many as the father of water system corrosion control, whose work is still widely cited in literature related to lead, copper, and iron corrosion. Dr. Cornwell's first assignment after graduating was to solve copper pinhole leaks that were occurring throughout a new high rise in Tampa. Investigations revealed a combination of poor workmanship on the pipe installation and electrical grounding as the cause.

Dr. Cornwell's second assignment was in Jacksonville where massive red water problems persisted. He spent a month on-site taking water samples and conducting loop studies. A major problem was traced to over-oxygenation caused by excessive aeration for hydrogen sulfide (H_2S removal). Dr. Cornwell worked with staff to reduce the oxygen content as a short-term measure, which immediately reduced most of the red water complaints. Later, H_2S removal strategy modifications and water quality changes were implemented for long-term control.

Since that time, we have remained active in all aspects of corrosion control including in plant piping and materials, distribution system corrosion and biofilm control, and tank corrosion. In the early years of Cornwell, these efforts focused more on traditional iron and copper corrosion issues, helping cities throughout the US. Our work in corrosion control extended as far as Oklahoma, which was some of the firm's first work out of the mid-Atlantic area. In the 1990s the emphasis changed to addressing the Lead and Copper Rule (LCR). While not ignoring traditional corrosion issues, our attention turned to helping utilities comply with the LCR including paper studies/models, coupon studies and pipe loops.

Cornwell was part of the NDWAC technical team advising EPA on LCR (LCRR) changes and was engaged by AWWA to assist in Rule comments and assessment

EPA is revising the LCR; calling the new rule the Lead and Copper Rule Revisions (LCRR). The National Drinking Water Advisory Council was asked to form a working group (WG) to advise EPA in a stakeholder type format on the structure of a new rule. There were two technical advisors to the WG group—Michael Schock from EPA and David Cornwell from Cornwell. Dr. Cornwell and Cornwell

personnel have been actively providing technical information to the LCR workgroup and have prepared several Journal AWWA papers such as:

- Strategies for Assessing Optimized Corrosion Control Treatment of Lead and Copper[1] - this paper describes the three most commonly used strategies for complying with the optimized corrosion control treatment (OCCT) requirement of the LCR. Interviews with state regulators in charge of OCCT compliance were documented and pre- and post-LCR lead and copper data were reviewed to determine the effectiveness of the three OCCT strategies. A decision tree for selecting OCCT strategy based on water quality is presented.
- Controlling Lead and Copper Rule Water Quality Parameters[2] - this paper reviews data from six water systems for the three major water quality parameters most relevant to lead and copper corrosion: pH, alkalinity, and orthophosphate dose. The data were statistically analyzed to determine the ability of each utility to maintain these water quality parameters within the target range specified in that system's OCCT compliance plan.
- High-Velocity Household and Service Line Flushing Following LSL Replacement[3] - this paper describes a project by Cornwell to evaluate different flushing strategies to remove particulate lead following partial lead service line (LSL) replacements. Different flushing schema were implemented by three utilities, and the resulting total and dissolved lead levels were compared over time.
- Copper Survey Data Analysis[4] – this project includes the analysis data collected by AWWA from utilities across the U.S. via SurveyMonkey. These data included water quality parameters such as pH, alkalinity, and orthophosphate dose. The goal of the project is to assess the prevalence of water quality conditions that are conducive to copper corrosion, as defined by the proposed criteria in the LT-LCR. Initial data suggest that water quality conditions conducive to copper corrosion are more widespread than previously anticipated, which suggests that the proposed criteria for water that is corrosive to copper may need to be modified to reflect actual prevalence of copper corrosion in water systems.
- David Cornwell from Cornwell and Darren Lytle from EPA were co-editors of a special issue of the Journal – AWWA (October 2018, Vol. 110, No. 10) focusing on distribution systems and corrosion control.

In addition to these Journal AWWA publications, Cornwell has prepared or is currently preparing additional LCR-related papers documenting the following work performed by Cornwell on behalf

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[1] Brown, R.A.; McTigue, N.E.; and Cornwell, D.A. 2013. "Strategies for assessing optimized corrosion control treatment of lead and copper." *Journal AWWA*, 105:5:62.

[2] Cornwell, D.A.; Brown, R.A.; and McTigue, NE., 2015. "Controlling Lead and Copper Rule Water Quality Parameters." *Journal AWWA*, 107:2:E86.

[3] Brown, R.A. and Cornwell, D.A. 2015. "High-Velocity Household and Service Line Flushing Following LSL Replacement." *Journal AWWA*, 107:3:E140.

[4] Roth, D.K.; Cornwell, D.A.; Brown, R.A.; and Via, S.H., 2016. "Copper Corrosion Under the Lead and Copper Rule Long-Term Revisions." *Journal AWWA*, 108:4:56-61.

of AWWA and/or the Water Research Foundation (WRF) to provide additional information to the LT-LCR workgroup:

- LCR Sampling Project[5] - LCR compliance samples are currently collected from a set of locations with characteristics defined by the LCR. Utilities with LSLs must have 50 percent of their pool from LSL locations. The LT-LCR may change this by defining different requirements for systems with LSLs, including a new definition of Tier 1 sites. Sites with LSLs may also require a modified sampling protocol. This project documents the impact that will result from these, and other, proposed LCR sampling modifications.
- Service Line and Premise Plumbing Flushing Project (WRF 4584) – This study expands on previous work investigating the removal of particulate lead from service lines and premise plumbing using high-velocity flushing (HVF). The focus of the work was to optimize in-home tap flushing (HVF) following service line disturbance to reduce "at the tap" lead concentrations.
- Full Lead Service Line Replacement (FLSLR) Guidance (WRF 4713) – The impact of two HVF methods, "all taps at once" versus "one tap at a time", was evaluated. Field studies were conducted at 102 houses in 12 water systems, as in WRF 4584, via use of sequential (profile) sampling before FLSLR, after FLSLR but prior to HVF, and after HVF (1, 30, 60 days). The field study also included sampling during HVF as well as composite sampling before and after the combined effects of FLSLR and HVF. The goal of the project was to provide guidance for water systems on best practices before, during, and after FLSLR based on findings from the field studies as well as information collected from field studies at 16 water systems regarding FLSLR practices (SOPs), training materials for staff, educational materials for customers, and experiences with providing home water filters to customers.

As a result of the work described above, Cornwell has a level of familiarity with both the existing LCR and the LCRR that is unmatched by other consultants. We look forward to applying this knowledge to assist the City of Benton Harbor (the City) in corrosion control and treatment issues.



Cornwell responds to the Flint Water Crisis!

The City of Flint, Michigan has had numerous water quality challenges following a switch in source waters in April 2014. Much of the focus has been on elevated lead levels at customers' taps. Cornwell is a key member of the project team that was selected by the City of Flint, with

[5] Cornwell, D. and R. Brown. 2015. Evaluation of Lead Sampling Strategies. Water Research Foundation. Denver, Colorado.

support from the Michigan Department of Environmental Quality and USEPA, to develop a Distribution System Optimization Plan for the City to follow to improve performance and restore customer confidence.



As part of this effort, Cornwell led the assessment of the current CCT practices and developed procedures to improve the City's CCT. This work also included coupon studies and corrosion studies using harvested pipe loops to identify the most appropriate corrosion control program capable of accommodating blending from neighboring systems.

CORNWELL LEAD AND COPPER CORROSION PUBLICATIONS

Cornwell staff have been deeply involved in corrosion control issues for many years. Our team regularly presents findings from this work in nationally-distributed publications and reports. As evidence of this experience, we have listed some of our publications most relevant to LCRR and corrosion control treatment. All those listed have been peer-reviewed unless otherwise noted.

Lead in Treatment Chemicals

- Brown, R., D. Cornwell, and M. MacPhee. 2004. Trace Contaminants in Water Treatment Chemicals: Sources and Fate. Jour. AWWA, 96(12):111-125.
- MacPhee, M., D. Cornwell, and R. Brown. 2002. Trace Contaminants in Water Treatment Chemicals (Project #2600). Denver, CO.: AwwaRF and AWWA.

Full Lead Service Line Replacement Guidance

- Brown, R., et al. 2021. Full Lead Service Line Replacement Guidance (Project #4713). Denver CO: WRF.
- Brown, R., D. Cornwell, and N. McTigue. 2015. Controlling Lead in Drinking Water (Project #4409). Denver, CO: WRF

High Velocity, In-Home, Flushing

- Brown, R., and D. Cornwell 2015. High-Velocity Household Service Line Flushing Following LSL Replacement. 2015. *Jour. AWWA*. 107:3:E140-E151.
- Cornwell, D., R. Brown, and M. Schmelling 2018. *Evaluation of Flushing to Reduce Lead Levels (Project #4584)*. Denver, CO: WRF.
- WRF 4713 above.

CCT

- Brown, R., N. McTigue, and D. Cornwell. 2013. Strategies for assessing optimized corrosion control treatment of lead and copper. *Jour. AWWA,* 105(5):62-75.
- Cornwell, D., R. Brown, and N. McTigue. 2015. Controlling Lead and Copper Rule Water Quality Parameters. *Jour. AWWA*. 107:2: E86-E96

- Brown, R., D. Cornwell, and N. McTigue. 2015. *Controlling Lead in Drinking Water (Project #4409).* Denver, CO: WRF
- Brown, R., D. Cornwell, and N. McTigue. 2015. *Lead and Copper Corrosion Control Case Studies (separate resource as part of Project #4409).* Denver, CO: WRF
- Roth, D., J. Wagner, and D. Cornwell. 2018. Impacts of Source Water Blending on Lead Release." Jour. AWWA, 110 (10): 15-25.

Lead and Copper Sampling

- WRF 4584 above
- D. Cornwell and R. Brown. 2015. Evaluation of Lead Sampling Strategies (Project 4569). Denver, CO: WRF.

National Surveys Related to LCRR

- Cornwell, D., R. Brown, and S. Via. 2016. National Survey of Lead Service Line Occurrence. *Jour. AWWA*. 108 (4): E182-E191.
- Roth, D., D. Cornwell, R. Brown, and S. Via 2016. Copper Corrosion under the Lead and Copper Rule Long-Term Revisions. *Jour. AWWA.* 108:4:56-61.
- LeGouellec, Y., and D. Cornwell 2007. Installation, Condition Assessment, and Reliability of Service Lines, AwwaRF (2007).

Laboratory Lead and Copper Solubility Testing Procedures

- Cornwell, D., and J. Wagner. 2019. "Coupon Procedures for Evaluating Lead and Copper Solubility." *Jour AWWA,* 111 (10):12-24.

Corrosion Special Issue

- Cornwell, D., and D. Lytle [Eds]. 2018 Special Issue – Distribution systems and corrosion control, *Jour. AWWA*. 110:10.

Cornwell has conducted three inter-related Water Research Foundation (WRF) studies regarding collection of sequential profile samples at homes with LSLs, principally focusing on profile samples before and after the use of high velocity whole house flushing (HVF) following partial and full LSL replacements (LSLRs). WRF 4569 (Cornwell and Brown 2015) evaluated different methods for sampling of homes and compared these results to peak from profile sampling. A 2nd study evaluated lead in profile sampling before and after partial and full LSLRs (WRF 4584 – Cornwell et al. 2018). Findings from this study and a previous AWWA funded study (Brown and Cornwell 2015) were the basis for the HVF provisions in the AWWA LSLR Standard (C810-17). Another study (WRF 4713 – Brown et al. 2021) provides Full LSLR Guidance, including water system experiences and recommended practices and procedures for LSLR, HVF, water system staff training, and customer communication. The WRF 4713 FLSLR Guidance Manual includes studies evaluating two HVF methods following Full LSLRs.

Cornwell staff are involved in three other lead related projects that are just starting or are on-going that are particularly relevant to this Michigan work. (see links provided, where available):

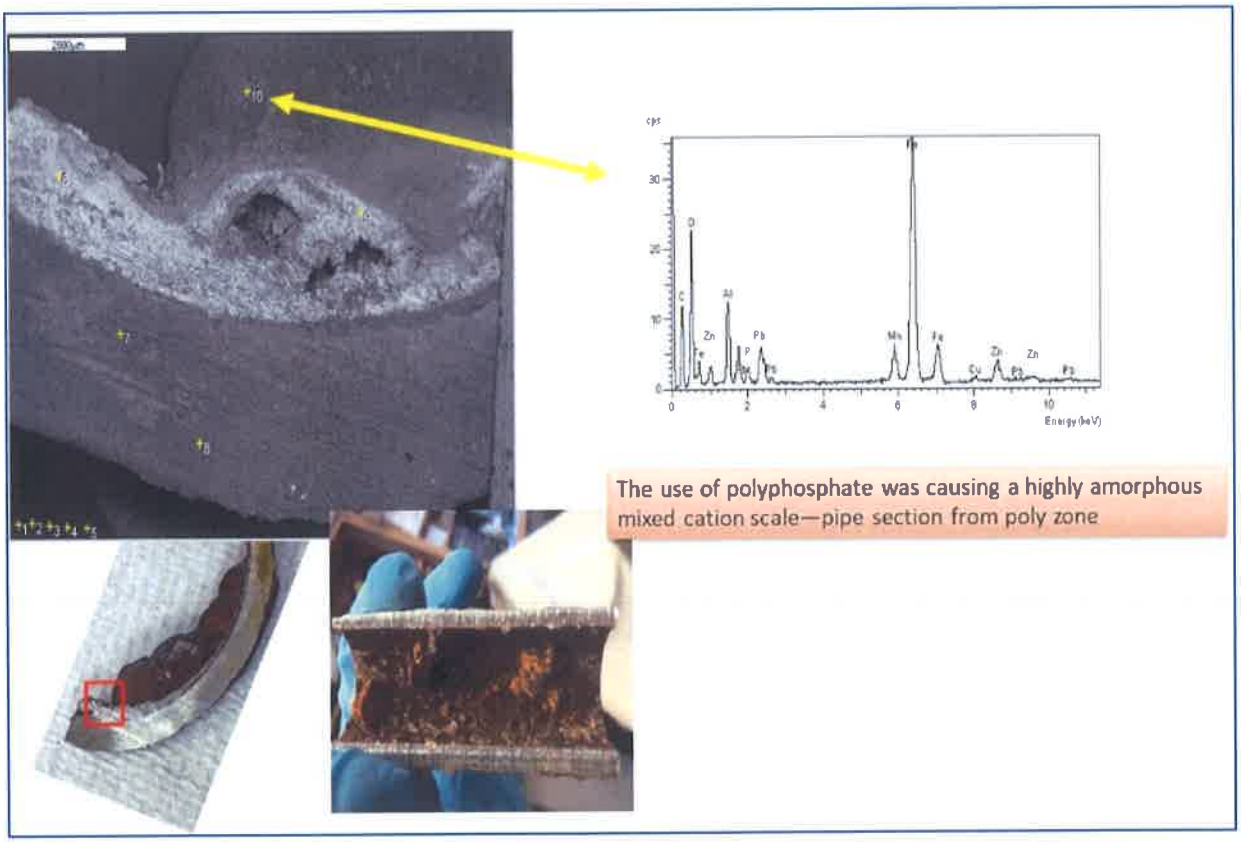
- WRF 4965 - Development of a Community-Based Lead Risk and Mitigation Model

(https://www.waterrf.org/system/files/resource/2019-08/ScopeOfWork_4965.pdf)

- WRF 5032 - Analysis of Corrosion Control Treatment for Lead and Copper Control (https://www.waterrf.org/system/files/resource/2020-04/SOW-5032.pdf)
- WRF 5081 – Guidance for Using Pipe Loops to Inform Lead and Copper Corrosion Control Treatment Decisions (recently awarded)

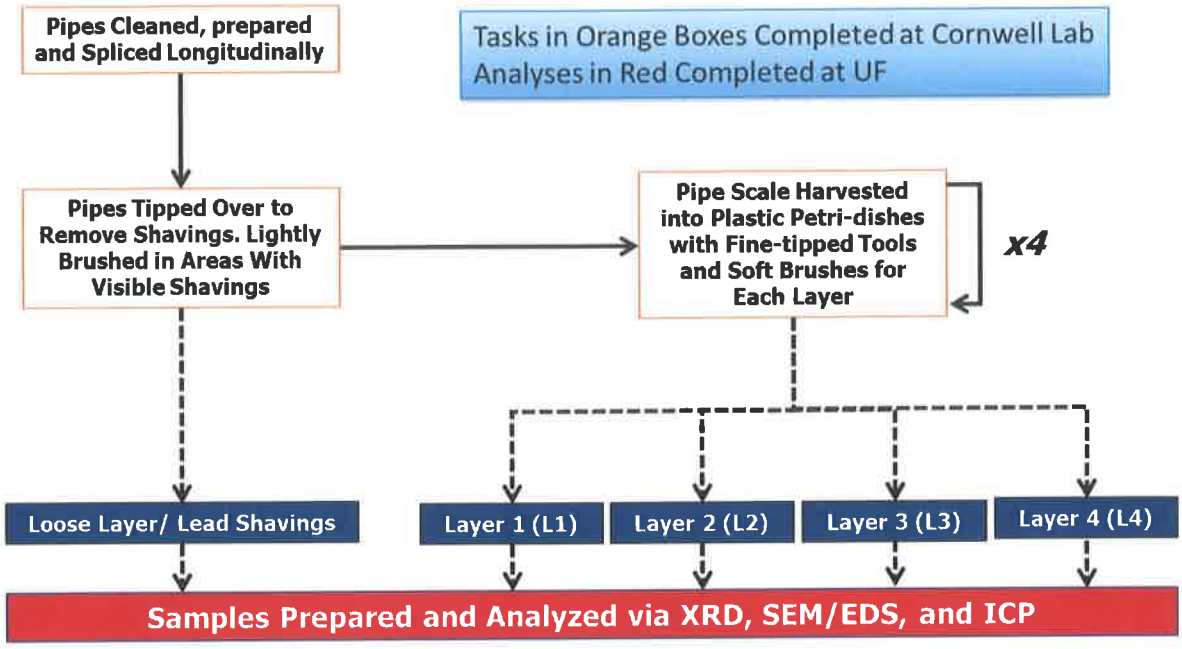
CORNWELL EXPERIENCE WITH SCALE ANALYSIS

Analyzing scales on distribution system piping has been a technique for many years that is useful in assessing corrosion control and corrosion mechanisms. Some of the very first reports of pipe scale analysis were by Dr. Ed Singley at the University of Florida (UF) in the 1970s. The use of pipe scale analysis to assist in lead pipe corrosion assessment was primarily developed by EPA in Cincinnati. Analyzing pipe scales relative to lead and copper corrosion was proven to be valuable. In many cases, scale analysis was shown to be invaluable to understand the pipe deposits and the potential impacts of changing water quality or CCT. Unfortunately, even though the importance of scale analysis has been clearly demonstrated, availability of suitably trained experts to conduct the analysis has been very limited. There are commercial metallurgy laboratories that have the equipment to conduct the testing. Unfortunately, those laboratories often do not have the experience in the lead and copper corrosion arena to realize the importance of proper preparation of the scales or how to appropriately interpret the results.



As a result of the lack of capacity to conduct these analyses, and due to all the corrosion studies and research that Cornwell was conducting, we sought ways to contribute to the furthering of

the use of pipe scale analysis. In 2016 Dr. Cornwell was asked to join the faculty at UF. He spent time locating appropriate campus research facilities and gained agreement to be able to utilize the equipment. Several training sessions and mock testing was completed. In 2017 testing of actual pipes began. Since that time the techniques have been refined and optimized based on our experience. The figure below shows the path followed for analyses.



After the pipes are harvested following Cornwell procedures, they are sent to the Cornwell Laboratory. At Cornwell, the pipes are preserved until ready for analyses. At that time the pipes are split and documented. The scales are then carefully separated into layers that reflect different colors or texture. This is the most time-consuming part of the analyses and can take a few days. However, separating the scales into layers is critical to understanding the corrosion products and potential lead solubility and stability. All this preparation work is completed at Cornwell so as to provide oversight of this critical step.

After the preparation work has been completed the scales are delivered to UF where the analysis is coordinated. First, XRD and ICP analyses are completed. At that time, Cornwell reviews all results and accepts them or requests additional testing. Following completion of those tests the SEM/EDS analyses are scheduled and generally Dr. Cornwell travels to UF to oversee that testing since on-site decisions need to be made as to the areas to analyze, elements to analyze, and magnification to employ. After all tests are completed, Cornwell personnel do the actual interpretation of the results and relate them to CCT.

Since the start of working with utilities and others on scale analysis, we have received samples and consulted on scale analysis literally from coast to coast. We have analyzed and advised on scales from harvested lead pipes, copper pipes, galvanized pipes, and many types of faucets and fixtures.

Recent Pipe Scale Analysis City/Water System	Lead	Galvanized	Copper	Brass	Chrome
Washington, DC Buildings			●	●	●
ECWA, NY	●				
Flint, MI	●				
Grand Rapids, MI	●				
GLWA, MI	●				
Green Bay, WI	●				
Newport News, VA	●	●			
Portland Water Bureau, OR	●		●	●	●
PVWC, NJ	●	●			
Philadelphia, PA	●				
Aqua IL	●		●		
Elgin, IL	●				
ILAWC (Wash. Estates, IL)			●		
Joliet, IL	●				

CORNWELL EXPERIENCE WITH DEMONSTRATION TESTING









Cornwell has experience with demonstration studies of various configurations. The above photos depict some of the laboratory lead or copper solubility studies previously conducted with metal coupons (Pb, Cu, mild steel, brass), galvanic modules of Cu pipe with Pb solder, and new and harvested pipes (Cu, Pb, Cu pipe with Pb solder). These have included coupons immersed in water contained in a jar or an HDPE bottle, as well as new or harvest pipe with water added inside the pipe segment and sealed at both ends. In either of these situations, the laboratory studies included regular preparation of test water (pH, chlorine or chloramine residual, orthophosphate/polyphosphate/blend), collection of stagnating test water, and preparation of new test water for the next immersion period. Cornwell solubility studies typically require 4 to 8 weeks (i.e., 8 to 16 sampling events). The results are evaluated to determine normalized lead or copper data (µg/L per day).

Lead Solubility Studies

Cornwell has been researching and perfecting lead solubility studies since the 1980s. That work culminated in our publishing "Coupon Procedures for Evaluating Lead and Copper Solubility." *Jour AWWA,* 111 (10):12-24. However, we have continued to perfect those testing procedures. Cornwell has modified lead solubility testing from the methods of the past to focus on the impact of different water composition (i.e., different treatment additives, doses, target pH, chlorine residual type (chloramine vs free chlorine) and target concentration, chloride: sulfate ratios, etc.).

We have presented at numerous conferences on the best procedures for conducting these studies.



Cornwell lead solubility studies have evaluated conversion from free chlorine (HOCl) to chloramines (NH_2Cl), conversion from NH2Cl to HOCl, pH adjustment, evaluation of alternative CCT and sequestration strategies (polyphosphate, orthophosphate, and blended phosphate), evaluation of new water sources (e.g., GW to imported treated surface water), evaluation of blending multiple treated water sources, and the CCT impact of adding anionic exchange (AIX) treatment (e.g., AIX for removal of perfluorinated compounds in GW).The matrix below shows our lead solubility study experience.

Harvested Pipe Flow through Studies

Cornwell has conducted, or are currently conducting, pilot scale pipe harvested pipe studies (sometimes referred to as loop studies) to evaluate and select conditions (pH, orthophosphate/polyphosphate product, and dose) for Pb

and Cu CCT. The actual design and operation of the units is critical to obtaining defensible data. We have been working to perfect the design and operations and in fact we were recently awarded the WRF research project for the "Guidance for Using Pipe Loops to Inform Lead and Copper Corrosion Control Treatment Decisions". We have designed and developed loops for Flint, Genesee County and GLWA in Michigan. In GLWA we will be in charge of overseeing operation of up to ten pipe loops.

Although studies with pilot pipe loops can be useful for CCT evaluations, they are very expensive to set up and operate and can take two or more years to reach conclusions. Cornwell has researched and developed bench-scale harvested pipe flow through systems that are much simpler to operate and faster to obtain results. These have been developed, approved by state, and successfully implemented. The matrix below shows out pilot and bench loop study experience.

Cornwell has researched and developed bench-scale harvested pipe flow through systems that are much simpler to operate and faster to obtain results that pilot systems.

Recent Cornwell Corrosion Control Studies

The table below summarizes recent corrosion control evaluation conducted by Cornwell for US water systems in the past 5 years, not including research studies conducted for AWWA and WRF.

Example Recent Cornwell CCT Projects

Lead and Copper Corrosion Evaluations	Type of Study					
Location	Desktop	Lead/Copper Solubility	Laboratory	Bench Loop Study	Pilot Loop Study	Scale Analysis
Bristol/Neshaminy	●	●				
Hatboro		●				
North Hills			●			
Shenango	●		●			
Uchlawn		●				
Waymart			●			
Kankakee	●	●				●
NMU	●					
Peotone		●		●	●	●
University Park	●	●		●		●
PVWC (NJ)	●	●				●
RWSA (VA)	●	●				
JCSA (VA)	●	●				
Flint (MI)		●			●	●
Genesee County (MI)					●	
GLWA (MI)					●	●
Grand Rapids (MI)	●	●			●	●
Portland (OR)	●	●				●
Joliet (IL)	●	●		●		●
DC Buildings	●					●
Elgin	●	●		●		●
Lockport City					●	●
Lockport Township				●		●
Philadelphia			●			●

Example Cornwell Corrosion Control Treatment Projects

Project descriptions demonstrating Cornwell experience relative to the scope of work are as follows:

Client	Project Studies	Location
Flint	Harvested Pipe Scale Analysis, Coupons, Flow-Through Harvested Lead Pipe, Pipe Loop	Flint, MI
Grand Rapids	Desktop Study, (Lead solubility Study, Pilot Loop Study and Scale Analysis	Grand Rapids, MI
GLWA	Comprehensive Corrosion Control (Pipe Loops)	Detroit, MI
Aqua IL	Optimal Corrosion Control Studies: LCR Sampling Plan Development, Lead Solubility Studies, Scale Analysis, Pilot Loop Studies, Bench-Scale Loop Studies and "Special Studies" for USEPA and IEPA (faucet filter, sequential profile sampling, aerator screen assay, lead solder harvesting, etc.)	Kankakee, IL
PVWC	Desktop, Lead Solubility Study, and Scale Analysis	Clifton, NJ



Optimal Corrosion Control Including Scale Analysis, Lead Solubility and Loop Studies

Flint, Michigan

CLIENT

CITY OF FLINT
FLINT, MICHIGAN

SERVICES

CORROSION CONTROL STUDY (CCS)
BENCH-SCALE LABORATORY TESTS
LOOP STUDIES
SCALE ANALYSIS

REFERENCE

JOHN YOUNG
609.605.1415
J.YOUNG109@COMCAST.NET

KEY PERSONNEL

DAVID CORNWELL, Ph.D., P.E., BCEE
JACOB WAGNER

YEAR COMPLETED

ACTIVE



The water quality issues experienced by the City of Flint over the past few years have been well-documented in the national media. Cornwell is a key member of the project team that was selected to provide the guidance, planning, and training needed to enable the City to provide high-quality drinking water to its customers. Cornwell is the lead consultant responsible for the Corrosion Control Evaluation. This evaluation includes both coupon testing to screen for CCT effectiveness with different source water blends, and pipe loop testing to confirm the coupon study findings. Cornwell assisted in developing a Distribution System Optimization Plan that restores customer confidence and enhances the City's water distribution system O&M practices.

The project assessed the current distribution system practices and CCT as compared to industry best practices (i.e., AWWA Partnership for Safe Water Distribution System Optimization Program), as well as identified associated gaps, developed a water system asset management program, and conducted an assessment of the human and financial resources needed to implement the recommended prioritized list of capital and operational improvements for the City.

The project also included updating the current version of the City's water distribution hydraulic model to reflect more recent GIS data and calibrating the model based on field testing results followed by extensive distribution hydraulic model analysis to optimize distribution system operations. To identify the most appropriate corrosion control program, the team conducted coupon studies and recently completed harvested pipe loop studies for the following scenarios:

- Optimization of the remedial corrosion control strategy implemented following the return to GLWA water after the crisis.
- Long-term corrosion control strategy focusing on galvanized pipe and brass fixtures.

Pipe loop testing included harvested lead and galvanized piping and brass fixtures. The rigs were operated five days per week by an on-site engineering team member and monthly progress updates were shared with the City. Cornwell also performed scale analyses on the lead service lines extracted from the distribution system. Based on study results, CCT and water quality parameter recommendations were made. Recommendations included retaining current CCT requirements (orthophosphate dose and pH) until all lead service lines (LSLs) are removed, at which point orthophosphate dose could be slowly reduced with intermediate monitoring and verification testing.



Lead Solubility, Pilot Loop, and Scale Analysis

Grand Rapids, Michigan

CLIENT

CITY OF GRAND RAPIDS
GRAND RAPIDS, MICHIGAN

SERVICES

CORROSION CONTROL STUDY (CCS)
DESKTOP EVALUATION
BENCH-SCALE LABORATORY TESTS
SCALE ANALYSIS

REFERENCE

WAYNE JERNBERT
ASSISTANT WATER SYSTEM MANAGER
WJERNBERT@GRAND-RAPIDS.MI.US

KEY PERSONNEL

DAVID CORNWELL, Ph.D., P.E., BCEE
JACOB WAGNER

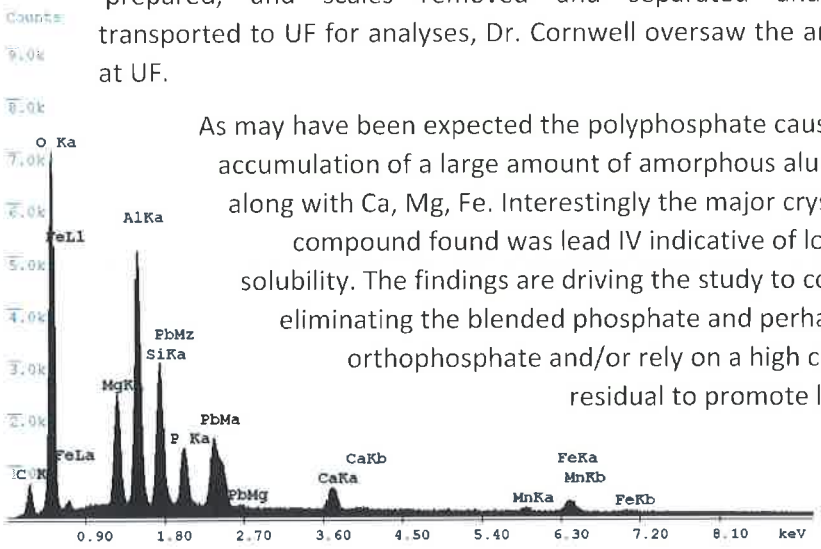
YEAR COMPLETED

ACTIVE

The City of Grand Rapids (City) serves a total population of approximately 280,000 and Lake Michigan is the exclusive source water for the City. A blended orthophosphate and polyphosphate product has been dosed to treated water since 1995 for corrosion reduction and metal sequestration. The City has maintained consistent compliance with Lead and Copper Rule (LCR) 90th percentile action levels since 1997, despite the prevalence of lead service lines in the system. In the 2017 sanitary survey for the City, MDEQ revisited water quality parameter designations and recommended the City ensure corrosion control treatment (CCT) was optimized.

Cornwell was retained as subconsultant to Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) to assist with a corrosion control study (CCS) for the City. The primary objective of the CCS was to evaluate current conditions in the City distribution system and to provide recommendations based on findings. The CCS consisted of a desktop evaluation, scale analysis and bench-scale laboratory coupon testing.

Due to the use of a blended phosphate that contained a high percentage of polyphosphate, it was important to conduct lead pipe sale analysis to determine the current pipe conditions especially if a change to orthophosphate was contemplated. Two lead pipes were harvested under Cornwell direction and sent to Cornwell Lab for analyses. The pipes were prepared, and scales removed and separated and then transported to UF for analyses, Dr. Cornwell oversaw the analyses at UF.



As may have been expected the polyphosphate caused the accumulation of a large amount of amorphous aluminum along with Ca, Mg, Fe. Interestingly the major crystalline compound found was lead IV indicative of low lead solubility. The findings are driving the study to consider eliminating the blended phosphate and perhaps use orthophosphate and/or rely on a high chlorine residual to promote lead IV.

CORNWELL ENGINEERING GROUP



Scale analysis and Loop Studies

Great Lakes Water Authority

CLIENT

GREAT LAKES WATER AUTHORITY
DETROIT, MICHIGAN

SERVICES

CORROSION CONTROL STUDY (CCS)
PIPE LOOP DESIGN AND STUDY
SCALE ANALYSIS
CCT SPECIFICATION

KEY PERSONNEL

DAVID CORNWELL, Ph.D., P.E., BCEE
JACOB WAGNER
RICHARD BROWN, P.E.
NANCY MCTIGUE

YEAR COMPLETED

ACTIVE

GLWA has five surface water treatment plans and serves over 1 million customers. GLWA was required by the State to do an overall system plan for corrosion optimization. Cornwell was selected as part of a team to develop the final recommendations for optimized corrosion. Several of GLWA's member communities have exceeded the LCR AL.

Cornwell serves as an overall advisor for the project but specifically is managing the following tasks:

- Designing and locating the pipe loop systems
- Developing pipe loop operations procedures and study plan
- Operation and management of the pipe loops
- Scale analysis of lead pipes
- Final CCT recommendation

Cornwell is assisting with test material harvesting, high-level rig design assistance, rig installation oversight, and review of existing water quality data. There will be pipe loops designed, built, and operated at 10 locations. A loop is planned to be located at each of the five WTPs and five more in strategic sections of the community distribution systems. At each location testing will be done on lead lines, new copper, galvanized service lines, copper/lead solder, and brass. Each site will have 4 rigs containing 10 test materials each. In all there are 400 test materials being evaluated. Cornwell is managing the team of operators to maintain the loops and collect all data.

Cornwell is also undertaking the conduct of scale analysis on 80 lead service lines that will be harvested from throughout the distribution systems. Each pipe will be carefully preserved, divided, and have the scale layers separated and removed. The scales will be analyzed by ICP-MS, XRD, and SEM-EPMA/WDS/EDS. Cornwell will oversee all analysis and interpret the results. The results will be used to better understand the differences in the state of the pipes in the different parts of the distribution system and help lead the CCT determinations.

Finally, after all testing is completed over a 3- to 4-year period, Cornwell will work with the Team to develop the final CCT strategy for GLWA.



Optimal Corrosion Control Including Scale Analysis and Loop Studies

Kankakee, Illinois

CLIENT

AQUA ILLINOIS
KANKAKEE, ILLINOIS

SERVICES

CORROSION CONTROL STUDY (CCS)
BENCH-SCALE LABORATORY TESTS
LOOP STUDIES
SCALE ANALYSIS

REFERENCE

CRAIG BLANCHETTE
PRESIDENT – AQUA ILLINOIS
CLBLANCHETTE@AQUAAMERICA.COM

KEY PERSONNEL

DAVID CORNWELL, Ph.D., P.E., BCEE
JACOB WAGNER
RICHARD BROWN, P.E.
NANCY MCTIGUE

YEAR COMPLETED

ACTIVE

Aqua Illinois had an LCR action level exceedance in one system. Cornwell was consulted, and within 24 hours Cornwell initiated a change in corrosion inhibitors after a Saturday approval from IEPA. Since that time Cornwell has been, and continues to conduct many lab and field studies to bring the lead levels down. Throughout this process Cornwell has worked closely with Region 5 EPA ORD in Cincinnati and IEPA almost on a weekly basis. Specific testing has included laboratory optimization lead solubility studies, laboratory harvested pipe studies, scale analysis, isotope analysis, specialized field studies on water use, sequential sampling, flushing, and home observations. To date testing has shown that the product selected by Cornwell on an emergency basis is proving to be optimal.

To better understand pipe conditions, several lead pipes are being analyzed for their scale characteristics. To date, Cornwell has analyzed four copper/lead solder pipes harvested from the distribution system as well as conducted isotope analysis on the source of the lead. Isotopes have confirmed that the lead is coming primarily from the old lead solder. Scale analysis has shown the lead to be loosely bound in the scales on the copper pipes and associated with iron and calcium deposits.

Aqua is switching another Aqua system's water source. That system has lead pipes and Cornwell has done extensive lab coupon studies and lab harvested pipe studies to evaluate impacts of the switch. We designed pipe loops, developed an operating SOP, and are overseeing all aspects of the loop studies. This is also being closely coordinated with IEPA and EPA.

Finally, we are working on a third water system transitioning off of Chicago water onto another Lake Michigan source. In that case Cornwell was able to get IEPA approval for the switch based on a desktop study.

CORNWELL ENGINEERING GROUP



Lead Solubility and Scale Analysis

Clifton, New Jersey

CLIENT

PASSAIC VALLEY WATER COMMISSION (PVWC)
CLIFTON, NEW JERSEY

SERVICES

CORROSION CONTROL STUDY (CCS)
DESKTOP EVALUATION
BENCH-SCALE LABORATORY TESTS
SCALE ANALYSIS

REFERENCE

JOE BELLA
EXECUTIVE DIRECTOR

KEY PERSONNEL

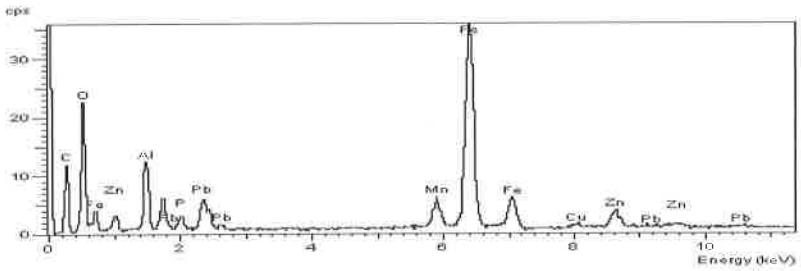
DAVID CORNWELL, Ph.D., P.E., BCEE
JACOB WAGNER
RICHARD BROWN, P.E.
NANCY MCTIGUE

YEAR COMPLETED

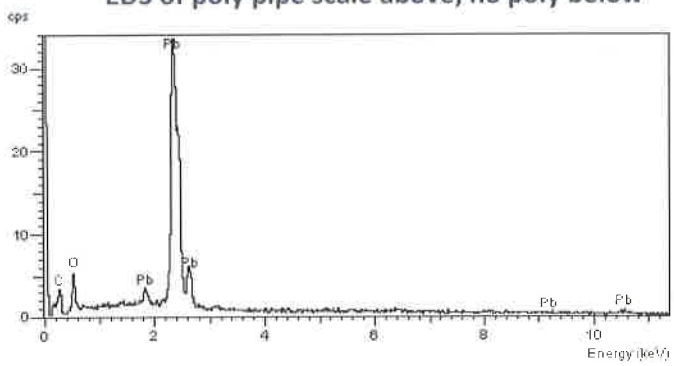
ACTIVE

CCT at PVWC is complicated by the fact that uncovered reservoirs are still present in the distribution system. Consequently, orthophosphate corrosion inhibitors cannot be added prior to these reservoirs or else the added phosphorus will stimulate algal growth in the reservoirs. Another complication is the potential for iron corrosion, which PVWC has addressed in the past through use of polyphosphate sequestering agents which was fed downstream of the reservoirs. However, PVWC was failing the LCR AL and had high lead in both the poly and non-polyphosphate parts of the system. In an effort to evaluating switching the polyphosphate zone to orthophosphate coupon studies and pipe scale analyses was performed.

The scale analyses were complicated in that the pipes are steel pipes with a lead liner as shown in the photo. Therefore, scales had a lot of iron that had broken through the lead liner. EDS analysis showed the pipe scale in the area with a polyphosphate had a loose layer of amorphous aluminum, iron, zinc and lead which was not present on the pipe that had not been exposed to polyphosphate. Based on the coupon results coupled with the scale analysis the polyphosphate zone was switched to orthophosphate which very quickly reduced the lead levels.



EDS of poly pipe scale above; no poly below



CORNWELL ENGINEERING GROUP

KEY PROJECT TEAM MEMBERS

Listed below are short summaries of experiences of project team members, and following that is a description of Cornwell Engineering Group experiences with CCT-related projects. Resumes for Cornwell staff participants in this project are included at the end of this proposal. Note that the Cornwell Engineering Group was renamed in 2017 and was formerly known as Environmental Engineering & Technology, Inc.

Dr. Cornwell (and Dr. Schock for USEPA) were the only two experts participating with the NDWAC technical team advising EPA on the LCR revisions.

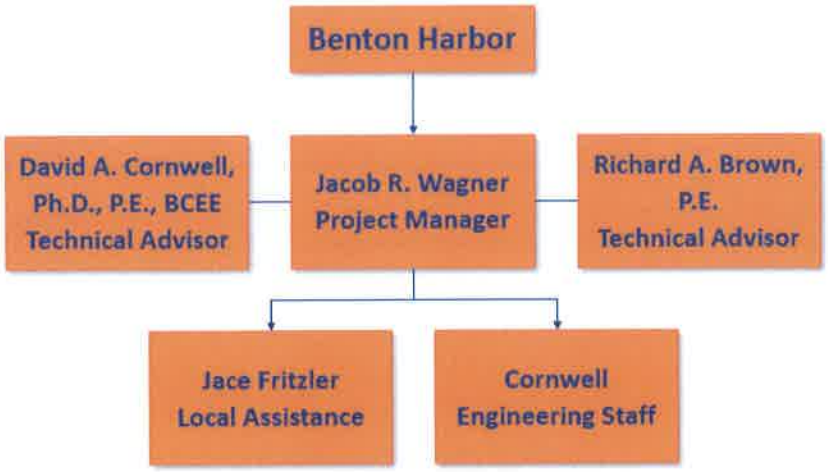
Cornwell Engineering Group (Cornwell)

David A. Cornwell, Ph.D., P.E., BCEE - is President and Founder of Cornwell and works out of the Newport News office. He will serve as a Technical Advisor, providing technical review of historical data and findings from this study. He will also provide knowledge of requirements from the LCRR.

He has directed Cornwell projects for water systems in Aqua IL/PA/NC/OH, Philadelphia (PA), PVWC (NJ), Flint (MI), Grand Rapid (MI), Rivanna Water and Sewer Authority (VA), GLWA (MI), Joliet (IL), Portland (OR), Cincinnati (OH), and others. He and Mr. Brown have drafted written corrosion-related correspondence to state regulators prepared by Cornwell for utility clients in various states.

Richard Brown, P.E. - Mr. Brown is a Vice President and is Cornwell's Water Treatment Manager. He has conducted detailed regulatory assessments and process optimization studies for many utilities throughout the country, including individual water treatment plants ranging in size from <1 to >300 mgd and entire systems (source water intakes, treatment plants, and distribution systems). Regulatory compliance assistance at with respect to current and future state or federal drinknig water regulations, including Stage 1 and 2 DBPR, Surface Water Treatment Rule, Groundwater Rule, and rules on arsenic, radionuclides, lead & copper, and others. He has directed or participated lead/copper projects for the Water Research Foundation (WRF 4409, 4569, 4584, 4713) and for public water systems clients (e.g., Aqua (IL, PA, OH, NC), RWSA, PVWC, JCSA, Joliet). He will participate as Technical Advisor and resource for this effort working from Newport News (VA).

Jacob Wagner - Mr. Wagner has performed CCT desktop data analysis evaluations, including review and assessment of water system operations and compliance data. He has performed and



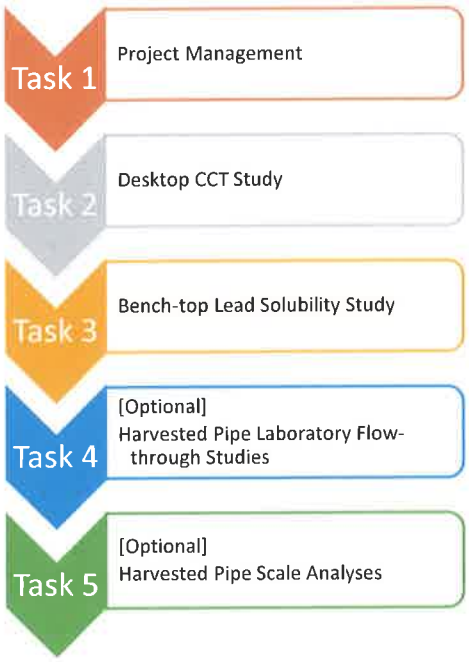
Project Organizational Chart

overseen bench-top lead solubility studies and harvested material flow through studies. He has also assisted with pilot-scale pipe loop CCT studies and analyzed study data. Tasks have included selection of materials, procurement of materials, plumbing and instrumentation layout, calculation of chemical feed and storage requirements, preparation of data collection log forms, review of project data, and statistical evaluation of results. These have included lead and copper corrosion control studies conducted by Cornwell during the last four years (as described in this proposal). He will be the Project Manager, overseeing work on the desktop study tasks and overseeing demonstration testing tasks while directing fellow Cornwell engineering staff as necessary. Engineering staff will work out of the Newport News (VA) office and will work primarily on desktop data analysis and demonstration testing. He oversaw the Flint pilot loop studies and is overseeing the Grand Rapids and GLWA projects, including work with Jace Fritzler from the Cornwell team.

Jace Fritzler - Mr. Fritzler has worked closely with Dr. Cornwell and Mr. Wagner to setup, operate, monitor, and evaluate pipe loop, flow through, and coupon studies conducted at Flint and GLWA. He will provide local (Michigan) support for the project in Benton Harbor, including overseeing harvesting of pipes, if needed.

BENTON HARBOR CCT BACKGROUND

The City of Benton Harbor, MI (the City) exceeded the lead action level (AL) in October 2018, as described in the RFP. Since that time, two corrosion inhibitor products have been utilized in an attempt to reduce 90th percentile lead levels. First, a 70/30 orthophosphate-polyphosphate blend was dosed targeting 1.5 mg/L as PO_4 (orthophosphate-portion) from March 2019 to February 21, 2020. Since February 21, 2020, a 90/10 orthophosphate-polyphosphate blend has been dosed targeting 3.0 mg/L as PO4 (orthophosphate-portion). Further study was determined to assess optimal corrosion control treatment (OCCT). Dr. Cornwell was brought in with EGLE to recommend the change to the 90/10 product and had discussions with the City on the change.



PROJECT UNDERSTANDING AND OBJECTIVES

The City currently utilizes a phosphate-based product for CCT, with total phosphate content comprised of 90 percent orthophosphate and 10 percent polyphosphate. This project will take a comprehensive approach to accomplishing the following objectives:

1. Determine the product, dose, and target pH for optimal control of lead release in the system. This will include the current blended phosphate, and at least one product with 100% orthophosphate.
2. Cornwell studies to date indicate pH is an important variable for lead corrosion control with orthophosphate, especially in systems like the City without current pH adjustment chemicals. So, the suitability of neutralized products like sodium orthophosphate (similar to the sodium orthophosphate component of the current blended phosphate product) will be compared to the combined addition of a more acidic orthophosphate product (phosphoric acid or zinc orthophosphate).
3. Recommend the optimal product, dose, and target pH, and whether an additional pH adjustment chemical is recommended.
4. Assess pH variability in the distribution system (seasonal and spatial).
5. Evaluate any potential impact of the current disinfectant residual type and dose on current CCT for the City.

We understand the need to address these questions with a very limited budget. We understand in the range of $50,000 is available. Ideally some combination of scale analysis and harvested pipe study would be utilized. Cornwell has developed a modified harvested pipe test in the laboratory we call "bench harvested pipe flow through studies" or just "bench loop studies" that

are a modified form of more traditional pilot loop studies. These "flow through tests" have been reviewed and approved by state regulators as a less expensive, more rapidly completed, less costly alternative to harvested pipe loop studies. Cornwell has successfully used either coupon or "flow through tests", without using pipe loop studies, to gain state approval and full-scale implementation of modified CCT practices. These efforts are typically supplemented by harvested pipe scale analyses to evaluate conditions prior to a CCT change, and to verify the pipe scale responses after an implemented CCT change.

Approach and limitations for the study.

The information provided in the RFP and pre-proposal meeting indicated to Cornwell that harvested pipe laboratory flow through studies would be ideal to answer questions posed in the objectives at the beginning of this section.

However, item 4 in Addendum #1 to this RFP, indicated that the City "does not currently have capacity to assist with harvesting pipes for potential pipe loops". Harvested pipe laboratory flow through studies would not require additional funds or only minimal additional funds if the City did have the capacity to assist with harvesting pipes and provided harvested materials for this study. In this case the harvested pipe flow through studies could replace the bench scale solubility study. Addendum #1 indicated the City does not have this capacity at this time. Therefore, both the harvested pipe scale analyses and laboratory flow through studies are proposed as optional, but recommended, tasks should additional funds become available for this project.

While we can certainly locate contractors and assist in harvesting pipes but that cannot be done along with the other work for a $50,000 budget. National estimates we prepared for AWWA indicate utility total costs at about $9,000/FLSLR. Some lower estimates are in the range of $5,000. If we want pipes from say three representative houses that could be as much as $15,000 to 30,000. If those funds can be available, we would alter our approach, but now we are proposing lead solubility studies.

Due to a budget of $50,000, we cannot harvest lead lines and are recommending solubility studies.
Should that change, we can alter our approach to harvested pipe flow through studies.

Assuming harvested pipes are not available, the objectives above will be evaluated utilizing desktop study data analyses and bench-top lead solubility studies. In this case lead solubility studies are an excellent standalone method for answering these questions. *The City is not likely to utilize any CCT method at this point other than orthophosphate*. And, since the City has already been using orthophosphate simply changing the dose or product or slightly change pH will have minimal impact on scales. Lead solubility studies provide a comparison of lead solubility under different test conditions. Cornwell has been researching and perfecting lead solubility studies since the 1980s. That work culminated in our publishing "Coupon Procedures for Evaluating Lead and Copper Solubility." *Jour AWWA,* 111 (10):12-24. However, we have continued to perfect those testing procedures. Cornwell has modified lead solubility testing from the methods of the past to focus on the impact of different water composition (i.e., different treatment additives,

doses, target pH, chlorine residual type (chloramine vs free chlorine) and target concentration, chloride: sulfate ratios, etc.). The Cornwell bench-scale solubility tests have evolved over time, even since the recent Cornwell and Wagner (2019) article, though the basics are still the same:

A. Finished water from the water system is prepared under different conditions (pH, orthophosphate dose, chlorine residual, etc.).
B. Prepared waters are exposed to lead metal strips ("coupons").
C. Water is changed about twice a week until the experimental lead solubility stabilizes (typically 6 to 8 weeks).

Harvested scale analyses could provide further important information regarding current CCT conditions. If scale analyses are completed for pipes throughout the distribution system, any differences between scales can also be assessed. These analyses help develop an understanding of CCT and how potential changes in water quality could theoretically impact actual pipe scales. Any differences between actual scale composition and expected scale composition can also be evaluated.

TASK 1 – PROJECT MANAGEMENT

Kick-Off Meeting

Cornwell will attend a kick-off meeting with EGLE and the City. This meeting is expected to be virtual, with David Cornwell, Richard Brown, and Jacob Wagner from Cornwell in attendance.

Bi-Monthly Progress Update Meetings

As outlined in the RFP, Cornwell will be prepared for up to ten (10) meetings to discuss project progress with EGLE and the City. These meetings will take place every other month and are currently expected to be virtual slideshow format. Some key meetings can eventually be in person if desired.

This section describes our detail task description to complete the work. This evolves from the understanding of a ~$50,000 budget and no harvested pipes. This will be modified if more funds are available.

TASK 2 – DESKTOP CCT STUDY
RFP SCOPE ITEM # 1, 2, 3, 7, AND 8

Request Data, Identify "Data Gaps", and Review Available CCT Reports

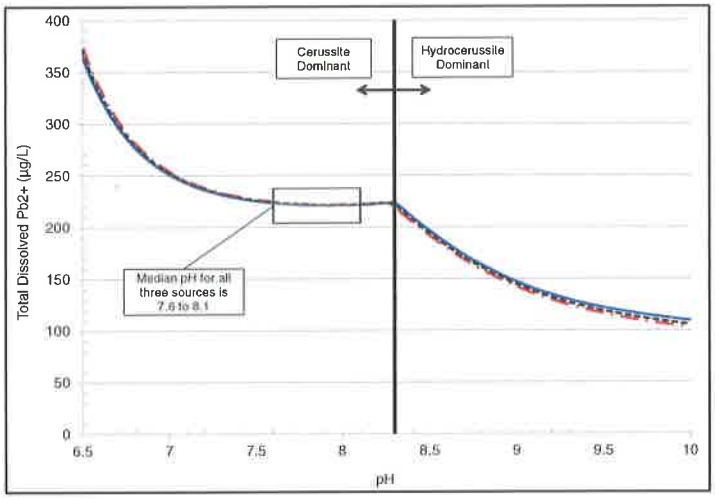
Cornwell will develop an information request for available historical water quality data, CCT reports, and other information. Data gaps will be identified during this initial compilation of data, as well as during subsequent steps below.

Evaluate Historical Water Quality Data

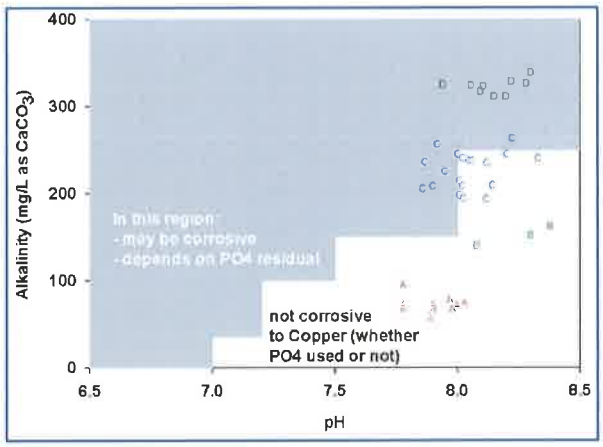
Cornwell will evaluate water quality data, system characteristics, and corrosion control treatment (CCT) practices via review of the following:

- Historical lead and copper data, and a copy of the LCR sampling plan (with addresses)
  - This will be primarily LCR data, but any additional non-LCR lead, copper, iron, manganese, etc. data from sentinel homes or sequential profile sampling will be evaluated (if available)

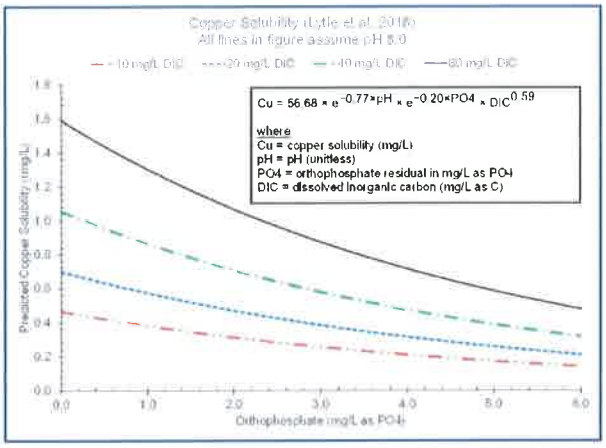
- Operating data for the treatment facility
  - production (flow rate),
  - chemical doses (e.g., alum, sodium hypochlorite, blended phosphates, etc.)
  - pH throughout the treatment facility (e.g., raw, finished, and intermediate, if available)
- Any available reports on current and past Benton Harbor CCT practices
- Water quality variability for treated water at the entry point and within the distribution system. In addition to lead and copper data discussed above, water quality parameters (WQPs) to be evaluated include historical data (as available) for the following:
  - Field measurements: pH, water temperature, free chlorine residual and other TCR/RTCR data
  - Laboratory analyses: alkalinity, orthophosphate residual, total and calcium hardness, iron, manganese, sulfate, chloride, conductivity and/or TDS.
  - Calculated parameters: dissolved inorganic carbon (DIC), Larson-Skold Index (LSK), Langelier Solubility Index (LSI), calcium carbonate precipitation potential (CCPP), chloride to sulfate mass ratio (CSMR), Theoretical lead and copper solubility (see inserted images for VisualMINTEQ (lead), Lytle et al. 2018 (copper), and NDWAC (copper)).
  - Customer information: household water use, house age, location of LSLs, customer complaints (e.g., "red water' or similar taste, odor, color complaints).
  - Water system and local plumbing codes: date when lead plumbing banned, if prior to USEPA federal ban in 1986, plus any additional requirements, preferences, or bans of one or more plumbing material types for service lines or premise plumbing.



VisualMINTEQ – Theoretical Lead Solubility



NDWAC (2015a&b) – Copper Corrosion Susceptibility



Lytle et al. 2018 – Experimental Copper Solubility

This information will be evaluated using comparative graphs of water quality, calculations characterizing water quality (literature indexes, predictors of theoretical lead and copper solubility, calculated constituents (e.g., DIC)), control charts (as needed), and an evaluation of the locations of different characteristics of interest in the distribution system (e.g., areas with older houses, location of LSLs, areas of historically high or low free chlorine residual, locations with high or low water use), etc. Seasonal data trends will be included in the evaluation, as well as spatial variation of the data throughout the distribution system if addresses (or maps or GIS shapefiles) can be provided. These data will be compared to available information from LCR monitoring, water use data, DSMI findings, etc. (see below).

Evaluation of Distribution System Materials, Single-Family Home Water Use Trends, and Analogous Water System(s)

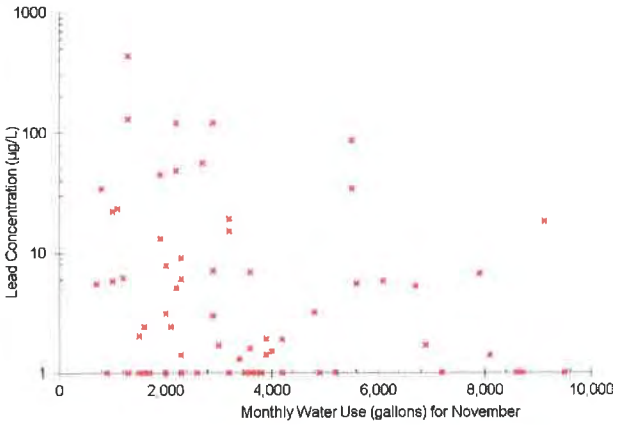
Cornwell will use supplemental data, as available, to inform and bolster the water quality and historic lead and copper data analyses:

- The latest Distribution System Materials Inventory (DSMI) will be utilized to describe current service line materials information, which will in turn be correlated to distribution system water quality sampling data (if possible). It is also possible the DSMI could be used to either confirm or identify material types for historic lead and copper sampling, depending on the type of information that are obtained from the previous sampling site codes described in the RFP. If the optional tasks for harvested pipe laboratory flow through studies (Task 4) and scale analyses (Task 5) and are approved for this project, the DSMI will assist with targeting and coordination of pipe harvesting efforts.
- Cornwell will evaluate nearby water systems with similar treatment and system characteristics and relate available information to other

Research by Cornwell indicates that the 1st or 5th L may not identify the peak lead at a house, nor will the 5th L always represent water from inside the service line. So, profile sampling may be a useful tool in the Benton Harbor evaluation to identify houses with high lead not found using 1st and 5th L

desktop analysis tasks as described above. We already work with Grand Rapids which uses the same source and we have evaluated Chicago data from across the Lake. The analogous water system(s) will be compared to the City with regards to similarity of CCT situation, lead and copper compliance levels, and apparent CCT efficacy.

- If data is available, the desktop analysis will incorporate an analysis of single-family home water use trends. Water use trends can be compared to distribution system water quality data, historic lead and copper data, and potentially harvested material scale analyses (if desired). In Cornwell's experience to date, high water use does not always correlate to low lead, and vice-versa (see insert with data from a system with 16 of 57 locations >10 µg/L – no LSLs, all 1st L). Another complication is that a house with low water use may have high lead, but not in the 1st or 5th L. Water in contact with the service line is expected to have higher lead than water in the 1st L (though this is not the case in all houses – Brown et al. 2021). The 5th L sample is generally more representative of water that has been stagnating within the LSL prior to sampling (though this is not always the case[6]).



High water use does not always result in low tap water lead, and low water use does not always result in high lead (even in a system with "high lead' – 16 of 57 >10 µg/L lead)

TASK 3 – BENCHTOP LEAD SOLUBILITY STUDY
RFP SCOPE ITEM # 5

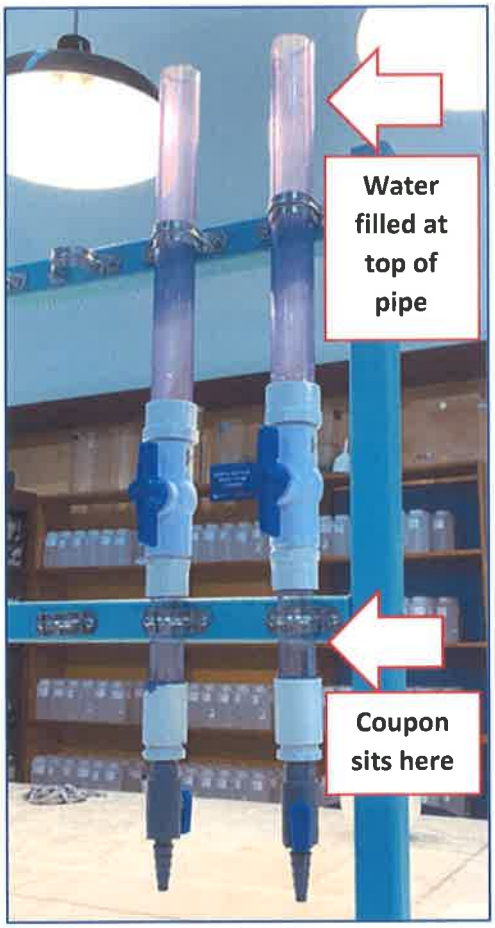
As indicated, we propose to conduct a lead solubility study with the funds available. We will use our newest techniques that:

- Greatly reduce water requirements –less water shipping
- Create a totally sealed environment minimizing air exposure
- Coupons are never removed and reinserted into jars thus preventing disturbance and air exposure
- Water is changed every weekday rather than only twice a week
- Lead sample are taken after overnight stagnation similar to the LCR

Cornwell has extensive experience conducting bench-scale lead solubility studies, as described in Section A of this proposal. These studies are ideal for screening of different orthophosphate doses and products to provide relatively quick answers regarding lead metal solubility. Aside from

[6] In 84 houses that reported data in studies by Cornwell (WRF 4569, 4584, and 4713), the calculated volume for plumbing inside the house (prior to the service line) was >5 L in 20% of houses, and in another ~20% the calculated combined volume inside the house and in the service line was <5 L. Consequently, the 5th L in these houses represented water from the service line in about 60% of the houses studied.

the length of the test, another benefit to benchtop lead solubility studies is the ability to test a wider range of water quality conditions as compared to more in-depth testing procedures, such as pipe rig studies. Finished water would be sent to Cornwell for testing (without corrosion inhibitor), and Cornwell staff would adjust the water quality as necessary to target pre-determined test conditions.



Example Lead Solubility Apparatus

Objectives

Cornwell will conduct a lead solubility study to evaluate the relative lead release of finished water from the treatment plant. The objective of this study will be to evaluate the current blended phosphate (90/10 orthophosphate-polyphosphate blend) and dose versus other dosages of the same blended product, as well as various doses of orthophosphate alone. The 90/10 product does not lower the pH appreciably and phosphoric acid will. Using phosphoric acid may move the pH more into the ideal range. Test conditions will be determined throughout the course of the desktop study (Task 2) and agreed upon by the City and EGLE.

Water Preparation and Experimental Set-Up

Cornwell will coordinate with the City to send buckets of finished water Cornwell in Newport News, VA. Cornwell engineering staff will regularly prepare water according to test conditions and exchange water exposed to a lead metal strip, or "coupon". Water will be prepared by adjusting pH, disinfectant residual, and by dosage of the appropriate corrosion inhibitor and dose. Stagnation lead samples will be collected twice per week and analyzed for total lead by Cornwell.

Each metal coupon utilized for testing will be placed in a test apparatus built from PVC pipe, fittings, and manual ball valves. The coupon will be in the bottom-most chamber of the pipe apparatus and will always be immersed in water throughout the test. The goal of this apparatus design is to eliminate the coupon from being exposed to air. As mentioned previously, two of the stagnating samples will be collected per week and analyzed for total lead.

Comparison to Previous Cornwell Methodologies

The previous Cornwell methodology (described in: Cornwell and Wagner, JAWWA, Oct. 2019), required the coupon to be manually switched from previously stagnating water to freshly prepared water. The methodology proposed here is similar to the referenced methodology in that water is prepared twice per week and samples are collected twice per week. However, one key difference in the methodology described here is the one-day stagnation period for collected samples instead of the previous three-to-four-day stagnation period. Another difference, as

described previously, is the methodology proposed here eliminates the need to manually move the metal coupon and expose it to air.

DELIVERABLES

The final deliverable will include a memorandum summarizing and comparing the desktop study findings and bench solubility study results. This memorandum will describe conclusions from the studies and recommend next steps. Topics which will be incorporated in the memorandum include:

1. What additional studies are determined to be required prior to recommending optimal corrosion control treatment (OCCT)?
2. If sufficient information and data to recommend OCCT, what is the recommended OCCT for the City of Benton Harbor, MI?

Additionally, a final virtual meeting will be attended to present results and recommendations to the City and EGLE. The format of this presentation will be a virtual slideshow and this meeting will be attended by Cornwell staff.

OPTIONAL RECOMMENDED ADDITIONAL WORK ITEMS

These items require additional allocated funds for distribution pipe harvesting and testing

Task 4– Harvested Pipe Laboratory Flow Through Studies



Harvested pipe laboratory flow through studies provide insight into relative lead release of actual pipe scales when exposed to water test conditions. This test procedure was developed, and is continually being improved, by Cornwell to produce data to provide similar data to a typical pilot pipe rig study with respect to potential scale impacts due to water quality changes.

This study procedure has many benefits when compared to pipe rig studies:

- Water is prepared according to test conditions by Cornwell Staff on-site in Newport News, VA.
  - This eliminates the need for chemical feed pumps, siting of pipe rigs, and pipe rig operation considerations.
- Testing additional treatment conditions, orthophosphate doses, and switching testing phases are all relatively easier than in a pilot pipe rig study.
  - Harvested pipe flow through studies can be performed as a stand-alone study or as a screening study for pipe rig studies in the future, if those are desired and more funds for this project are available for a second phase.

Harvested Pipe Laboratory Flow Through testing can provide valuable information regarding potential pipe scale impacts to changing water chemistry

Experimental Set-up

Additional testing will be performed in the laboratory to assess relative lead release of harvested pipe materials. Similar to the proposed lead solubility studies, prepared water will sit above the test pipe and flow by gravity into the pipe, exchanging the stagnant water in the pipe, according to a predetermined schedule. The number of flows per week can be adjusted as necessary to ensure water representativeness to test conditions and to ensure disinfection residual is maintained. Flow through timing is controlled by a timer and solenoid valve similar to a pilot study.

Test Conditions and Water Preparation

Testing will be completed in two phases: 1) Stabilization and 2) CCT Testing. During the Stabilization phase, all harvested pipes will equilibrate on the current water and CCT methodology to develop a baseline. After pipes are stabilized, pipes will be switched to different corrosion control products and doses which will be determined following the lead solubility study, Task 3, and agreed upon by the City and EGLE.

Water preparation will be identical to the lead solubility studies, Task 3: the water pH will be adjusted as necessary, disinfectant will be dosed to achieve close to a set target residual, and the appropriate corrosion inhibitor and dose will be applied to the water. During the Stabilization phase, all waters will be dosed with the 90/10 orthophosphate-polyphosphate blend targeting 3.0 mg/L as PO_4. After stabilization, water will be prepared according the testing conditions developed based on the lead solubility studies and agreed upon by the City and EGLE. Assuming pipes are harvested, the first stabilization phase could occur concurrently with the lead solubility study.

TASK 5 – PIPE SCALE ANALYSIS
RFP SCOPE ITEM # 4

Harvested pipes will be horizontally split, pipe scales will be extracted in "layers" based on scale color and texture change, and extracted scales will be analyzed using several types of methods to characterize the scale. Lead service lines (LSLs) will be prioritized for scale analysis unless findings from the lead and copper data analysis in Task 2 shows data indicating high lead release from other materials in the system.

Characterizing and understanding existing scale is important to understand how lead is being controlled in water systems **without** lead issues, and how scale structure and composition is contributing to lead release in systems **with** lead issues.

Pipe Harvesting

Cornwell can procure a contractor if desired and oversee harvesting with our Michigan employee Jace Fritzler. We will provide a protocol for lead pipe harvesting, preparation, and packaging to be implemented.

Receipt and Preparation of Harvested Pipe Specimens

After delivery of the pipes to the Cornwell Laboratory, we will split open the pipes for observation. The pipes will be observed under a stereo microscope and pictures taken to document findings. The scales will be removed by layer type and again pictures will be taken for documentation.

Conduct elemental analysis of scales by ICP

Analyses will be conducted for: a) lead, b) iron, c) calcium, d) manganese, e) aluminum and f) phosphorus.

XRD and SEM analysis

We will analyze the samples to look for compounds and elemental associations.



Example Pipe Scale from a Midwestern Utility

Understanding existing scale characteristics prior to a CCT adjustment can identify how to manage and maintain the existing scale during the transition to the planned and implemented CCT change

Interpretation and report

The results will be interpreted, and assessments made regarding possible impacts on CCT. The findings will be incorporated into the final deliverable.

C PROPOSED SCHEDULE

The RFP indicated the anticipated start date for the project would be June 2021. The proposed schedule is shown below, with several key assumptions. The Desktop Study tasks will occur mostly concurrently with the lead solubility study. However, some data analysis will be required prior to finalizing test conditions. If the scale analysis and harvested pipe laboratory flow through studies are desired, these tasks would have some overlap with the lead solubility study or the harvested pipe studies could replace the lead solubility studies.

The lead solubility study is expected to take between six and eight weeks after study start, but this time is dependent on stabilization of results. The harvested pipe flow through study is dependent on stabilization of lead results as well but are also dependent on material harvesting efforts. The harvested pipe flow through studies, if desired, are expected to take approximately 6 months.

The schedule below assumes all optional recommended tasks will be completed and a final report is prepared at the end of the study, under Task 2, which includes findings from each task.

Assuming we complete only the base scope of a desktop and lead solubility study that will take about 4 to 5 months to complete.



D RESUMES

Resumes are included for David Cornwell, Richard Brown, and Jacob Wagner.

David A. Cornwell, Ph.D., P.E., BCEE

President

Dr. Cornwell has managed many water treatment studies, designs and construction projects that have included evaluating water supplies, appropriate treatment technologies, filtration methods, various filtration media, and disinfection techniques. He has more than 75 publications and was principal investigator on numerous AwwaRF projects and was awarded the AWWA A. P. Black Research Award. He has conducted many corrosion control and OCCT studies for utilities.

PROFESSIONAL HIGHLIGHTS

Dr. Cornwell has been a technical advisor to AWWA during past negotiations with USEPA for IESWTR, Stage 1 DBPR, ICR, LT2ESWTR, and Stage 2 DBPR, FBRR, the effluent guidelines rule and the development of the carcinogenic VOC rule, the current Lead and Copper Rule, and LT2ESWTR revisions. Dr. Cornwell has worked closely with the LCR TAW on the upcoming revisions to that rule and helped prepare AWWA comments to EPA on the proposal. He also served as a technical expert to the NDWAC WG developing the LCR proposed revisions. During recent events he serves as a spokesman to many media outlets on lead issues. He has managed WRF and AWWA WITAF funded Lead and Copper Rule projects investigating OCCT, LSL replacement practices, and flushing after to LSL replacement. These have been summarized in AWWA ACE and WQTC presentations, WRF and AWWA webcasts as well as AWWA Journal publications:

"How Have We Done in Reducing Lead in Water Since the LCR?" Jour. AWWA, 110 (10): 30-37. (2018)

"Impacts of Source Water Blending on Lead Release. Jour." AWWA, 110 (10): 15-25. (2018)

"Copper Corrosion Under the LCR Long-Term Revisions." Jour. AWWA, 108 (4): 56-61. (2016)

"National Survey of Lead Service Line Occurrence." Jour. AWWA, 108 (4): E182-E191. (2016)

AWWA Webinar Program: Lead and Copper Rule: Potential Revisions and Steps Utilities Can Take to Prepare Wednesday, May 25, 2016.

WRF Lead and Copper Rule: Potential Regulatory Changes, Corrosion Chemistry, and Stakeholder Communication April 21, 2016.

How Many Lead Service Lines Are There and What are Implications of Different Monitoring Strategies? AWWA Annual Conference, Chicago (2016)

High-Velocity Home Flushing to Reduce Lead Levels, AWWA Annual Conference, Chicago (2016)



Dr. Cornwell was a technical advisor to AWWA during past negotiations with USEPA for the effluent guidelines rule and the current development of the carcinogenic VOC rule, the current Lead and Copper Rule, and LT2ESWTR revisions.

Areas of Specialty

- Lead and cooper rule
- Water supply studies
- Treatment technologies
- Disinfection techniques

Location

- Newport News, VA

Years of Experience

- 40+

Education

- Ph.D., Environmental Engineering
- MSE, Environmental Engineering
- BSIE, Industrial and Systems Engineering

License/Registration

- Professional Engineer, – VA, 19 other states
- Board Certified Environmental Engineer

Contact information

- 712 Gum Rock Court
- 757.873.1214
- |dcornwell@cornwellinc.com

High-Velocity Household Flushing Following LSL Replacement. Jour. AWWA, 107:3 (2015).
"Controlling Lead and Copper Rule Water Quality Parameters." Jour. AWWA, 107 (2): E86-E96. (2015).
LSL Flushing and CCCT Case Studies. In Proc. of AWWA WQTC, Toronto, ON. (2012)
"Strategies for Assessing Optimized Corrosion Control Treatment." Jour. AWWA. 105 (5): 62-75. (2013)

CURRENT PROJECT EXPERIENCE

Project Officer. Water Distribution System Optimization Plan, Flint, Michigan. CEG is part of a three firm team to develop a distribution system optimization plan. Dr. Cornwell and CEG were selected by EPA and Michigan EGLE to assess the City's corrosion control treatment (CCT) practices and to develop optimal CCT. Cornwell evaluated the historical data and is conducting bench-scale and pipe loops to determine CCT for the future Flint. There are 32 materials being evaluated in eight pipe rigs testing lead lines, galvanized lines, and brass fixtures. Cornwell is overseeing all aspects of the study including rig design, on-site operations, analytical and lead analysis, data review, and recommendations. The study is closely coordinated with EGLE and EPA.

Lead & Copper Rule Planning, Philadelphia, Pennsylvania. In light of the new NDWAC recommendations as well as recent events, Philadelphia Water Department retained Dr. Cornwell to lead a series of workshops with PWD staff on upcoming rule changes and best practices related to lead and copper revisions. The goal was to develop PWD action plans and set a 3-year program for them to better assess lead issues and move toward implementing NDWAC recommendations.

Lead & Copper CCT Development, Genesee County Drain Commissioner, Michigan. Retained to design and oversee a pipe loop study for GCDC. The SOP was developed with data collection procedures and logging sheets. The design of four pipe rigs each containing five materials for evaluation was completed and the rigs were constructed by GCDC. Harvested materials tested include lead lines, brass fixtures and copper with lead solder.

Corrosion Control and Treatment Assistance, Aqua America. As one of the larger private utilities in the US, Aqua America looked to evaluate its lead CCT practices in light of recent events. Cornwell is conducting detail CCT studies to evaluate the treatment changes and select proper CCT methods to employ at each location. Over 20 locations are under evaluation.

Lead & Copper CCT Development, Grand Rapids, Michigan. Cornwell is evaluating current CCT and recommending if any revisions are warranted. A desktop study, scale analysis, and coupon study has been completed. Due to findings of lead IV in the sales as well as amorphous aluminum it was recommended to use caution in transitioning off a blended phosphate and on to an orthophosphate. Additional coupon testing is underway and several more lead pipes will be harvested for scale analysis.

Richard A. Brown, P.E.

Vice-President

Mr. Brown has assessed regulatory compliance status for a number of utilities of various sizes (<1 to 320 mgd) in numerous states Regulatory compliance was evaluated with respect to current and future state or federal regulations, including Stage 1 and 2 DBPR, Surface Water Treatment Rule, Groundwater Rule, and rules on arsenic, radionuclides, lead & copper, and others.



Mr. Brown completed WRF and AWWA WITAF projects, prepared several AWWA Journal articles and WRF reports, and provided assistance to AWWA and to the workgroup (WG) assigned by the National Drinking Water Advisory Council (NDWAC) to evaluate the structure and content of a new rule.

PROFESSIONAL HIGHLIGHTS

Mr. Brown has been a technical advisor to American Water Works Association (AWWA) and various US drinking water utilities during negotiations with USEPA regarding the Microbial/Disinfection By-Products Rules, including the Stage 2 Disinfectants/Disinfection By-Products Rule (DBPR) and Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). He is engaged in at least a dozen projects with AWWA, WRF, and individual water systems on aspects of the LCR Long-Term Revisions.

PUBLICATIONS

"Full Lead Service Line Replacement (FLSLR) Guidance (WRF 4713). Denver, CO: WRF. (final review – expected publication 2021)

"Evaluation of Flushing to Reduce Lead Levels", WaterRF Webcast. (August 2018)

"Evaluation of Lead Sampling Strategies." WaterRF Webcast. (October 2015)

Evaluation of Flushing to Remove Lead Levels (RFP 4584). Denver, CO: WaterRF. (2018)

"Copper Corrosion Under the Lead and Copper Rule Long-Term Revisions." Jour. AWWA. 108 (4): 56-61. (2016)

"National Survey of Lead Service Line Occurrence." Jour. AWWA. 108 (4): E182-E191. (2016)

"High-Velocity Household Service Line Flushing Following LSL Replacement." Jour. AWWA. 107 (3): E140-E151. (2015)

Controlling Lead in Drinking Water (RFP 4409). Denver, CO: WaterRF. (2015)

Evaluation of Lead Sampling Strategies (RFP 4569). Denver, CO: WaterRF. (2015)

"Strategies for Assessing Optimized Corrosion Control Treatment of Lead and Copper." Jour. AWWA. 105 (5): 62-75. (2013)

"Controlling Lead and Copper Rule Water Quality Parameters." Jour. AWWA, 107 (2): E86-E96. (2015)

Areas of Specialty

- Regulatory compliance
- Treatment techniques
- Corrosion control studies

Location

- Long Beach, CA

Years of Experience

- 37

Education

- MSEE, Environmental Engineering
- BSCE, Civil/Environmental Engineering

License/Registration

- Professional Engineer – CA, NC, NM, VA

Contact information

- 712 Gum Rock Court
- 757.873.1534 x224
- |rbrown@cornwellinc.com

CURRENT PROJECT EXPERIENCE

Corrosion Control Evaluations and LCR Compliance Assistance for Drinking Water Systems: Rivanna Water and Sewer Authority, Virginia; Passaic Valley Water Commission, New Jersey; James City Service Authority, Virginia; City of Grand Rapids, Michigan; Aqua America, Pennsylvania, Illinois, and North Carolina. Corrosion control and LCR compliance assistance was provided for 5 distribution systems (DS) supplied by the Rivanna Water and Sewer Authority (VA), one DS supplied by the Passaic Valley Water Commission (NJ), one DS operated by the James City Service Authority (JCSA), one DS operated by the City of Grand Rapids (MI), and multiple systems operated by Aqua America (~10 in PA, 28 in IL, 3 in NC). These included groundwater and surface water systems, systems with proposed water source changes (e.g., local groundwater replaced with purchased surface water) or treatment changes (e.g., ion exchange treatment for groundwater sources).

Corrosion control evaluations typically were initiated by desktop studies summarizing WQP, free chlorine residual, LCR compliance data, pipe material characteristics, and other characteristics of the system and its water quality in order to identify any CCT concerns. Coupon studies were recommended as a next step by most of these desktop studies, including evaluations of changes in pH, free chlorine to chloramines (and vice versa), source water switch, treatment change (e.g., addition of ion exchange), or addition of orthophosphate. Changes recommended from these studies were successfully developed and implemented to control lead and copper corrosion.

Full Lead Service Line Replacement (FLSLR) Guidance, Water Research Foundation. The objective of WRF 4713 is to provide guidance and information to the participating public water systems (PWS) regarding recommended practices before, during, and after a replacement in order to reduce customer lead exposure. To achieve this objective, the project tasks include field studies, case studies, development of a FLSLR Guidance Toolbox, and development of outreach materials (report, webcasts, videos, templates for various materials (SOPs, infographics, door hangers, etc.). Field studies with high velocity, whole-house flushing (HVF), were conducted at over 100 household locations following FLSLR.

CCT Evaluations, AWWA Government Affairs. To provide technical support to the AWWA Government Affairs office throughout the development of the Lead and Copper Rule (LCR) Long-Term Revisions, Mr. Brown led a comprehensive evaluation of utility experiences in implementing optimal corrosion control treatment (CCT) under the existing LCR. Mr. Brown interviewed corrosion experts to capture their perspective of CCT. Interviews with state regulators in charge of CCT compliance were documented and pre- and post-LCR lead and copper data were reviewed to determine the effectiveness of the three CCT strategies. Several case studies were also conducted to obtain information on how utilities have implemented CCT under the LCR. Findings from this project were published.

Jacob R. Wagner, EIT

Process Lead

Mr. Wagner has performed pilot-scale pipe loop CCT study tasks, specifically related to study planning, design, operational assistance, and data analysis. Tasks have included selection of materials, procurement of materials, plumbing and instrumentation layout, calculation of chemical feed and storage requirements, preparation of data collection log forms, review of project data, and statistical evaluation of results.

PROFESSIONAL HIGHLIGHTS

Mr. Wagner has performed bench-scale laboratory metal coupon tests to evaluate drinking water corrosion control alternatives for different water systems. This has included tests for surface water and groundwater systems, including systems with seasonal blends of both. These evaluations have assessed the impact of water quality differences on CCT, such as the disinfectant type (free chlorine vs. chloramines), pH, and corrosion control alternative utilized (polyphosphate vs. orthophosphate vs. blended phosphate vs. pH/alkalinity control alone). Bench-scale testing tasks have included the chemical preparation of waters according to test conditions, development of data sheets, collection of samples, preparation of graphical and tabular summaries of data, and review and assessment of study results. Water preparation included adjustment of pH and disinfectant residuals, as well as the dilution and dosage of corrosion inhibitor products to meet target concentrations. He also developed data files for interpretation of study results and prepared summary reports and memorandums.

PUBLICATIONS

"Coupon Procedures for Evaluating Lead and Copper Solubility." Jour. AWWA, 111 (10): 12-24. (2019)

"Impacts of Source Water Blending on Lead Release." Jour. AWWA, 110 (10): 15-25. (2018)



Mr. Wagner has assisted with many Corrosion Control Treatment projects including assessments and evaluations at the pilot-scale, bench, and desktop levels.

Areas of Specialty

- Pipe rig studies
- Desktop studies
- Coupon studies

Location

- Newport News, VA

Years of Experience

- 4

Education

- BS, Environmental Engineering

Designation

- Engineer in Training, – VA

Contact information

- 712 Gum Rock Court
- 757.873.1534 x223
  jwagner@cornwellinc.com

CURRENT PROJECT EXPERIENCE

Water Distribution System Optimization Plan, Flint, Michigan. Mr. Wagner has assisted with the planning and implementation of the pilot-scale pipe rig study for Flint. He was involved with preparation tasks for the rigs including selecting the necessary materials and supplies, determining phosphate feed equipment and dose rates, developing data forms and electronic data files, and writing operating procedures. Mr. Wagner interacted with on-site pilot rig operation staff regularly to ensure the rigs are operating normally, supply stock was sufficient, and assisted with the flow of information. Mr. Wagner reviewed data from the pilot rigs and relayed information to the Project Manager and operator. He also assisted with final data analysis, including statistical evaluation of data generated from the pilot rig studies.

Corrosion Control and Treatment Assistance, Aqua America. Mr. Wagner has assisted with the design and start-up of lead service line pipe rigs for Peotone, Illinois. This study is currently ongoing and Mr. Wagner reviews project data as it is received and advises project team members as necessary. He has assisted with the physical harvesting of pipe scale layers for analysis from pipes collected from the Peotone system. Additionally, he reviews data and operations for bench-scale studies currently being conducted for Peotone.

Lead & Copper CCT Development, Grand Rapids, Michigan. As part of a comprehensive CCT desktop study, Mr. Wagner analyzed monthly operating data from the surface water treatment plant supplying Grand Rapids. He reviewed previous CCT studies and utilized available data to assess seasonal and spatial water quality variability. Additionally, he utilized chemical equilibrium software and typical water quality to model theoretical lead solubility. To supplement the water quality analysis, bench-top coupon studies were performed by Cornwell Engineering Group, and Mr. Wagner assisted with the coupon study preparations, operations, and data review. He developed final deliverables alongside Project Managers to effectively relay project findings.

Comprehensive Corrosion Control Optimization Study, Great Lakes Water Authority, Michigan. Mr. Wagner is part of the team to assist GLWA with optimization of CCT through pilot-scale studies and pipe scale analysis. He is anticipated to assist with the pipe scale harvesting and pipe loop study design. The scale analyses and loop studies are scheduled to begin in 2020 and 2021, respectively.

Lead & Copper CCT Development, Genesee County Drain Commissioner, Michigan. Mr. Wagner assisted with the design of pilot-scale CCT pipe rigs for GCDC. These rigs were built by GCDC and Mr. Wagner traveled on-site to review a constructed rig.

CORNWELL
ENGINEERING GROUP

To: **Ernest Sarkipato, EGLE**

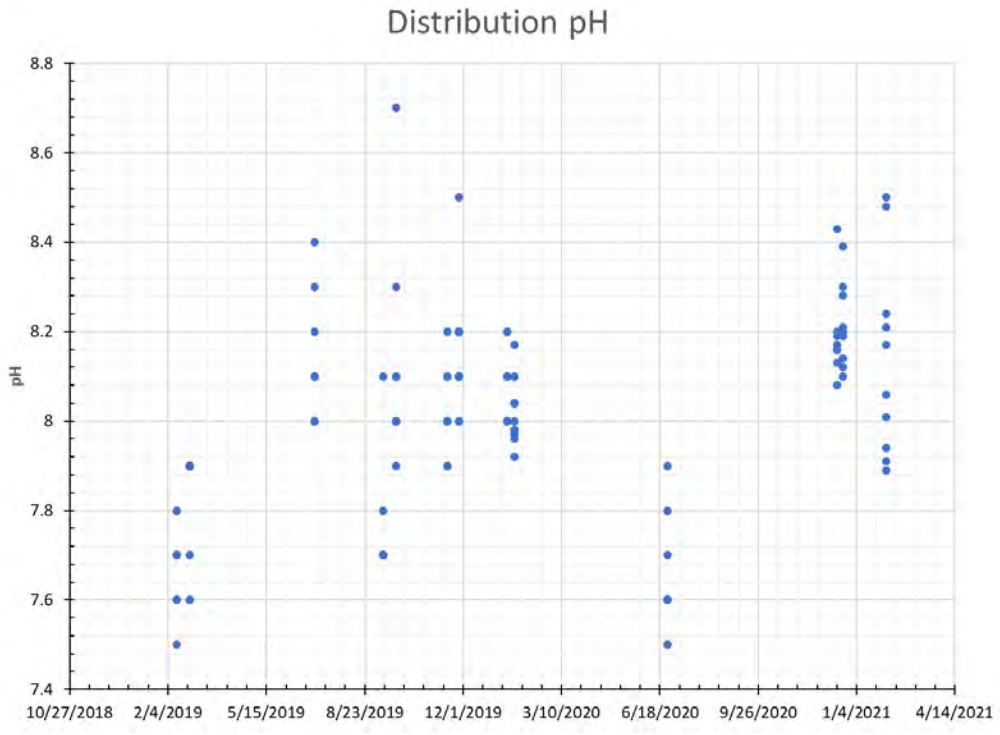
From: **David Cornwell**

Date: **September 16, 2021**

Subject: **Benton Harbor Corrosion Test Plan**

Based on recent discussions, Cornwell Engineering Group (Cornwell) proposes to assist the City of Benton Harbor with specific lead and copper corrosion control testing. The purpose of this investigation is to determine the effectiveness of the current corrosion control product and dose as compared to altering the pH and dose and as compared to a straight orthophosphate product.

The graph below shows the relative spread of the distribution pH samples provided by EGLE from their WQP data, which was used to determine the pH values to be tested. Many of the data points are "stacked" and appear hidden because certain dates had samples with equal pH. We are concerned about the large amount of time the pH is above 8, especially when it gets to pH 8.2 and above. We recognize that the WTP does not have pH control. Since the current 90/10 product is neutralized, it does not lower the pH. We therefore plan to also test phosphoric acid as it will help lower the pH.



712 gum rock court - newport news, virginia 23606 - (757) 873-1534 - fax: (757) 873-2392

All testing will be done using coupon procedures similar to those specified in Cornwell and Wagner 2019, although we have improved the setup since that paper. Two inhibitors at three doses will be evaluated. The 90/10 will be tested at pH 8.2 to simulate the high pH condition and at pH 7.8 for a more ideal range. Orthophosphate doses for the 90/10 will be set at 2, 3, and 4 mg/L o-PO_4. With the phosphoric acid, we will titrate the water starting at pH 8.2, add H_3PO_4 and then monitor pH. The goal is to bring the pH into a better range for orthophosphate, roughly below 7.8 or at least 7.9. We suspect the target pH range may take 3 to 4 mg/L o-PO_4. From that testing we will select proper doses. Therefore the 90/10 will be tested at two pH values and the phosphoric acid tested at a floating pH. That will allow both the evaluation of using a pH control chemical versus using phosphoric acid to lower pH.

Equilibration Water	CCP	Dose (mg/L as PO_4)	Replicates at pH = 7.8	Replicates at pH = 8.2
	PO_4	pH float	2	
	PO_4	pH float	2	
	PO_4	pH float	2	
	90/10 Phosphate	2	2	2
	90/10 Phosphate	3	2	2
	90/10 Phosphate	4	2	2

Overall, we have assessed the data for proper test conditions and will conduct the solubility testing, hold a PowerPoint web meeting, and prepare a final report. We will also be available for progress updates. We will have someone go to the WTP and collect the necessary water for our study prior to phosphate addition and then send it to our lab. All lead analyses are included in our $50,000 fee.

As an optional service, we will conduct pipe scale analysis. The pricing does not really follow a per pipe cost, but as an example, 2 pipes would be $11,600. This assumes the City harvests the lead pipes. We will have someone come to the site and pick up the pipes, preserve them and ship them to our lab. We can also observe and oversee the harvesting if given warning as to when to be on site. We will provide harvesting protocols to the City. Analysis includes carefully separating the scales into layers using a stereomicroscope to record and take pictures of the layers. Analytical analysis included XRD, SEM/EDS and SEM/WDS. The final deliverable will be a PowerPoint web meeting.

From:	Sarkipato, Ernest (EGLE)
To:	emitchell@bhcity.us; Abul Ahmed; Kimberly Thompson; Darold Harlan; Rob Jones FVOps; Matthew Johnson; David A. Cornwell
Cc:	Walstrom, Kimberly (EGLE); Oswald, Eric (EGLE); Bolf, Michael (EGLE); Nelson, Maureen (EGLE)
Subject:	Benton Harbor ACO update letter
Date:	Tuesday, September 28, 2021 3:22:00 PM
Attachments:	00600 BH Amended ACO Exhibit A Update 9-14-21 ES.pdf 00600 City of Benton Harbor ACO Update Sept 2021 ES ALC Comment.pdf

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All,

Please find an ACO update letter attached. This may have already reached you via hard copy.

Thank you,

Ernie Sarkipato, P.E.
Distribution Engineering Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

FIRST AMENDED ADMINISTRATIVE CONSENT ORDER

DWEHD Order No. AACO-399-07-2019

EXHIBIT A

In the matter of the first amended administrative consent order between the City of Benton Harbor and the State of Michigan Department of Environment, Great Lakes, and Energy, below are listed compliance activities that have been completed and are shown for record of completion.

2.1 (a) Submit to the DWMAD a completed rate study from a qualified professional consultant. (This requirement was completed with the Asset Management Plan, dated December 2017, however, the second portion of 2.1 in the original ACO, requiring the City of submit an implementation rate increase plan was not completed).

COMPLETION DATE: December 31, 2017

(b) Not later than December 31, 2020, the City shall begin implementation of a rate adjustment plan for the City of Benton Harbor, in accordance with the findings in the City's asset management program and rate study. The rate adjustment plan shall ensure rates are sufficient to operate and maintain the water system in compliance with Act 399.

COMPLETION DATE: May 18, 2020

2.2 Upgrade the water plant supervisory and data acquisition (SCADA) system to allow for storage and easy access to required regulatory data including turbidity and chlorine, alarming for regulatory minimum levels, and potentially automation of some water plant operations, no later than April 1, 2019.

COMPLETION DATE: August 12, 2019

2.3 Install metering capabilities on the finished water (completed as part of corrosion control treatment project).

COMPLETION DATE: August 12, 2019

2.4 Make necessary improvements to the water treatment facility in order to have a functioning and reliable continuous chlorine analyzer on the finished water tap no later than April 1, 2019.

COMPLETION DATE: August 12, 2019

2.5 Obtain an adequately licensed operator in charge, solely dedicated to the water distribution system, no later than April 1, 2019.

COMPLETION DATE: May 7, 2019

2.6 Submit a proposal for optimal corrosion control treatment or a corrosion control study to the DWMAD no later than April 31, 2019.

COMPLETION DATE: Treatment installed as of March 25, 2019. Corrosion control study insufficient as of June 2020, see First Amended ACO item 2.17.

2.7 **Not later than September 30, 2020,** the City shall formally adopt a consistent and equitable rate collection program to minimize the number of unpaid bills and streamline the collections process.

COMPLETION DATE: September 29, 2020

2.8 **Not later than August 15, 2020,** the City shall submit the current cross connection program to the DWEHD for review. The DWEHD's review and comments on the current program will assist the City in completing the Capacity Study in paragraph 2.14.

COMPLETION DATE: August 15, 2020

No later than three (3) months following the completion of the Capacity Study, an updated cross connection program must be submitted to the DWEHD for review to address any implementation changes as a result of the study.

COMPLETION DATE: not yet completed

2.9 Install necessary modifications at the water treatment plant to inject coagulant chemical at a DWMAD-approved rapid mix location, and develop a standard operating procedure for feeding coagulant, no later than June 1, 2019.

COMPLETION DATE: August 9, 2019

2.13 **Not later than August 31, 2020,** the City shall repair filter to waste valves at the water plant, and train operators on their use.

COMPLETION DATE: August 31, 2021

2.14 **Not later than September 30, 2020,** The City shall submit to the DWEHD, for review and approval, a project scope for completion of a technical, managerial, and financial capacity study.

COMPLETION DATE: September 25, 2020

Not later than six (6) months following approval of the project scope, the City shall submit a completed Capacity Study for DWEHD approval.

COMPLETION DATE: Pending DWEHD written notification of approval of study scope

2.17 **Not later than September 30, 2020,** the City shall have a qualified third-party consultant submit to the DWEHD, for review and approval, a corrosion control optimization study scope and completion schedule, in accordance with the February 13, 2020, letter the

DWEHD issued to the City.

COMPLETION DATE: July 28, 2020, but this plan was found to be insufficient.

Not later than sixty (60) days following DWEHD approval of the corrosion control optimization study scope and completion schedule, the City shall secure a signed contract for the corrosion control optimization study.

COMPLETION DATE: Pending DWEHD written notification of approval of study scope submitted by Cornwell Engineering on September 16, 2021.

STATE OF MICHIGAN
DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY
GRAND RAPIDS DISTRICT OFFICE

GRETCHEN WHITMER
GOVERNOR

LIESL EICHLER CLARK
DIRECTOR

September 20, 2021

VIA EMAIL AND U.S. MAIL

Mr. Ellis Mitchell, City Manager
City of Benton Harbor
200 Wall Street
Benton Harbor, Michigan 49022

WSSN: **00600**

Dear Mr. Mitchell:

SUBJECT: City of Benton Harbor Amended Administrative Consent Order (AACO)
AACO-399-07-2019 Item Completion; Filter to Waste Valves

The Department of Environment, Great Lakes, and Energy (EGLE), Drinking Water and Environmental Health Division (DWEHD) has noted progress by the City of Benton Harbor Water Supply (City) to meet specific requirements of Section II – Compliance Schedule of the first amended Administrative Consent Order (AACO) entered on August 7, 2020. We have outlined the requirements in the Paragraphs from the AACO that have been met below as well as in the attached Exhibit A.

Paragraph 2.13 – Filter To Waste (FTW) Valves
Initially, the AACO required the City to repair FTW valves and train operators on their use no later than December 31, 2020. The City quickly completed repairs on FTW Valves 9 -12, but Filters 5 – 8 require more extensive repairs which will need further budgetary considerations. DWEHD granted an extension request to the City to allow development of standard operating procedures (SOPs) for all filters by August 31, 2021, and train operators on the new SOPs.

This requirement is met as of August 31, 2021, by submittal of the SOP for filters with working FTW valves, and also a separate SOP for filters with non-working FTW valves. Fleis and Vandenbrink has also submitted documentation of distribution to all shift operators.

Paragraph 2.14 – Technical, Managerial, and Financial Capacity (TMF) Study
An initial deadline to submit a project scope not later than September 30, 2020 was met, although the start of the project was delayed. The City has now engaged with Fleis and Vandenbrink to conduct the TMF Study, and develop an implementation plan according to the AACO requirements. Citing delays in funding, the City requested an extension to the deadlines in the AACO. *The City's request for extension of the deadline to* ***complete the TMF study by February 7, 2022 is hereby approved****.* Please note, additional ACO items are triggered by the completion of the TMF study, namely Paragraphs 2.8, 2.10 (a) and (b), 2.15 (a) and (b).

Paragraph 2.17 – Corrosion Control Optimization (CCO) Study
An initial deadline of the AACO to submit a CCO study scope and completion schedule by September 30, 2020 was met by submitting a plan from Elhorn Engineering on July 28, 2020, but found to be unacceptable by EGLE. Additional funding was sought to conduct a study by an independent third party with a record of successful completion of corrosion studies. The City advertised for bids and received proposals in May of 2021. A winning bid was selected, and the City secured a signed contract with Cornwell Engineering Group (Cornwell) as of July 27, 2021.

At this time, Cornwell is reviewing existing data and will be submitting a detailed work plan as soon as feasible.

If you have any questions regarding the filter to waste valve requirement, or other deadlines set forth in the AACO, please contact me at 616-307-0261; or by email at SarkipatoE@Michigan.gov

Sincerely,



Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division

Enclosure

cc/enc: Mayor Marcus Muhammad, City of Benton Harbor
Ms. Kimberly Thompson, City of Benton Harbor
Mr. Abul Ahmed, Fleis & Vanderbrink Operations
Mr. Darold Harlan, Fleis & Vanderbrink Operations
Mr. Eric Oswald, EGLE
Mr. Mike Bolf, EGLE
Ms. Maureen Nelson, EGLE

From:	Sarkipato, Ernest (EGLE)
To:	Jason Marquardt; David A. Cornwell
Cc:	Abul Ahmed; Darold Harlan; rjones@fv-operations.com
Subject:	Corrosion Study contacts and data dump #1
Date:	Wednesday, September 1, 2021 7:57:00 AM
Attachments:	Benton Harbor 2018 to 2021 MOR Tracker Data.xlsx Benton Harbor LC_WQP Data Tracker_DRAFT.xlsx LCR sample plan attachment 2021.xlsx

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Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,
-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

Benton Harbor

2018	WSSN	Pumpage	Coag	Turbidity (NTU)			Fluoride		
MONTH	600	MGD	Dose	Raw	CFE	% > 0.3 CFE	Plt Tp	Dist	Cl App
Jan	**Total**	32.963							
Date Rec'd:	**Max**	1.274	1.97	20.7	0.24	0	0.29	0.26	3.83
	Min	0.876	1.21	1.5	0.06		0.22	0.18	2.34
2/9/2018	**Ave**	1.063	1.51	6.11	0.08		0.26	0.2	3.17
Feb	**Total**	30.260							
Date Rec'd:	**Max**	1.355	1.8	20.6	0.84	3.5	0.32	0.27	4.07
	Min	0.943	1.37	3	0.06		0.27	0.04	2.49
3/6/2018	**Ave**	1.081	1.55	7.5	0.1		0.3	0.2	3.09
Mar	**Total**	30.053							
Date Rec'd:	**Max**	1.129	1.8	57.2	0.13	0	0.92	0.72	3.76
	Min	0.827	1.47	2	0.06		0	0.45	3.06
4/10/2018	**Ave**	0.969	1.58	10.93	0.09		0.74	0.63	3.26
Apr	**Total**	28.731							
Date Rec'd:	**Max**	1.098	1.63	31.4	0.13	0	0.9	0.82	4.66
	Min	0.705	1.13	1.1	0.07		0.58	0.67	2.8
5/11/2018	**Ave**	0.958	1.54	8.53	0.08		0.74	0.74	3.87
May	**Total**	29.977							
Date Rec'd:	**Max**	1.099	2.08	17.2	0.12	0	0.96	0.7	4.2
	Min	0.817	1.47	1.5	0.06		0	0.63	3.2
6/11/2018	**Ave**	0.967	1.59	4.4	0.08		0.68	0.67	3.61
Jun	**Total**	31.178							
Date Rec'd:	**Max**	1.176	1.73	11	0.09	0	0.81	0.55	4.91
	Min	0.847	1.5	1.2	0.06		0	0.52	3.42
7/9/2018	**Ave**	1.039	1.56	2.76	0.07		0.58	0.54	3.88
Jul	**Total**	35.571							
Date Rec'd:	**Max**	1.710	1.72	11.6	0.12	0	0.76	0.67	26.51
	Min	0.965	1.28	0.76	0.06		0.37	0.58	8.53
8/10/2018	**Ave**	1.147	1.51	2.51	0.07		0.59	0.63	12.39
Aug	**Total**	38.370							
Date Rec'd:	**Max**	1.270	1.76	8.3	0.1	0	0.74	0.66	26.42
	Min	0.990	0.43	1	0.06		0	0.54	2.43
9/8/2018	**Ave**	1.238	1.54	2.27	0.07		0.62	0.6	16.9
Sep	**Total**	32.103							
Date Rec'd:	**Max**	1.304	1.53	19.5	0.09	0	1.01	0.68	25.2
	Min	0.904	1.69	0.63	0.05		0.56	0.57	8.08
10/8/2018	**Ave**	1.070	1.29	3.17	0.07		0.7	0.61	13.12
Oct	**Total**	30.281							
Date Rec'd:	**Max**	1.172	1.73	9.5	0.09	0	0.74	0.68	18.97
	Min	0.817	1.48	2.1	0.06		0.53	0.58	11.43
11/9/208	**Ave**	0.977	1.54	5.24	0.07		0.64	0.63	14.15
Nov	**Total**	29.652							
Date Rec'd:	**Max**	1.083	1.98	5.17	0.11	0	0.78	0.7	19.88
	Min	0.830	1.37	8.8	0.06		0.51	0.61	10.47

12/9/2018	**Ave**	0.988	1.54	2.1	0.08		0.68	0.66	13.09
Dec	**Total**	31.368							
Date Rec'd:	**Max**	1.152	2.04	13.4	0.12	0	0.8	0.62	42.7
	Min	0.887	0.82	4.7	0.06		0.42	0.52	10.09
1/10/2019	**Ave**	1.012	1.57	9.12	0.07		0.63	0.57	14.4
Totals	**Ave**	1.04247808	0	0	0	0	0	0	0
	Max	1.7095	2.08	57.2	0.84	3.5	1.01	0.82	42.7
	Min	0.705	0.43	0.63	0.05	0	0	0.04	2.34
	Total	380.5045							

Free Chlorine		pH		Alkalinity		Chloride	Other		Langelier
Plt Tap	Dist	Raw	Plt Tap	Raw	Plt Tap	Plt Tap	Ca	Res	Index
2.26	1.28	8.2	8.0	146	123	69	51		
1.47	0.39	7.8	7.5	104	104	23	42		
	0.9	8.0	7.8	122	116	21	47		
2.09	1.26	8.2	8.0	162	136		54		
1.27	0.32	7.8	7.7	112	106		31		
	0.95	8.0	7.9	126	119		47		
1.96	1.57	8.2	8.1	153	123	28	58		
1.23	0.78	7.9	7.6	104	99	21	38		
	1.12	8.0	7.8	117	107	23	44		
1.99	1.37	8.2	8.1	153	129	72	54		
1.28	0.54	7.9	7.7	114	116	24	40		
	0.95	8.1	7.9	131	131	24	48		
1.99	1.2	8.3	8.1	132	121	23	54		
1.38	0.27	7.9	7.7	102	98	23	36		
	0.73	8.1	7.9	116	109	23	43		
1.79	1.36	8.4	8.2	116	108	23	45		
1.2	0.34	8.0	7.7	102	85	22	31		
	0.75	8.2	8.0	107	101	22	38		
1.93	0.99	8.4	8.2	127	116	22	43		
1.04	0.45	8.0	7.7	102	98	21	32		
1.46	0.56	8.2	8.0	109	104	21	38		
2.02	1.06	8.4	8.2	126	116	25	42		
1.26	0.23	8.0	7.9	107	101	21	34		
1.62	0.65	8.1	8.1	113	108	23	38		
2.43	1.28	8.3	8.2	133	116	27	46		
1.29	0.47	7.7	7.5	104	98	20	35		
1.75	0.86	8.0	7.9	111	104	22	40		
2.08	1.23	8.3	8.1	146	131	27	51		
0.84	0.38	7.9	7.7	106	104	20	38		
1.49	0.74	8.1	8.0	117	112	22	42		
2.25	1.69	8.2	8.1	147	126	25	55		
1.46	0.32	7.9	7.7	104	102	21	35		

1.73	1.04	8.0	7.9	119	111	22	44		
2.47	1.3	8.1	8.0	173	133	26	57		
1.39	0.23	7.8	7.6	112	114	24	42		
1.85	0.88	7.9	7.9	131	122	25	47		
0	0	0.0	0.0	0	0		0	0	0
2.47	1.69	8.4	8.2	173	136		58	0	0
0.84	0.23	7.7	7.5	102	85		31	0	0

Comments

why is the cl dose so high? Demand column says 40.84 for that day

* all units recorded in milligrams/liter unless otherwise noted

	Chloride	Sulfate	Ortho	Calcium	Conductivity	Alkalinity	pH	Temp
5/5 & 6/2	27	37	3.2					
	25.5	35	2.91					
	25.5	35	3.27					
	26.5	28	3.15					
	28.5	32	2.68					
	24.5	34	3.92					
	27	34	3.68					
	26	32	4.02					
	27	32	4.02					
	27	30	3.5					
Max	28.5	37.0	4.02	0.0	0.0	0.0	0.0	0.0
Min	24.5	28.0	2.68	0.0	0.0	0.0	0.0	0.0
Avg	26.5	32.9	3.44	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

6/23/2021	Raw IN225	126
5/25/2021	Raw IN225	122

	Chloride	Sulfate	Ortho	Calcium	Conductivity	Alkalinity	pH	Temp
2/3/2021	24	40	3.04	45	342	117	8.21	19.8
	25	49	2.85	38	201	114	8.48	18.2
	26	42	3.17	39	349	117	8.24	21.4
	25.5	42	2.78	37	342	121	7.89	15.3
	24.5	41	3.07	38	341	121	7.94	20.9
	23.5	39	2.79	33	344	119	8.5	24.1
	24	43	2.98	34	345	122	8.01	16.6
	25.5	48	3.15	34	387	119	8.06	17.6
	26	42	3.28	38	339	116	7.91	12.7
	30	41	3.06	37	348	121	8.17	14.8
Max	30.0	49.0	3.28	45.0	387.0	122.0	8.5	24.1
Min	23.5	39.0	2.78	33.0	201.0	114.0	7.9	12.7
Avg	25.4	42.7	3.02	37.3	333.8	118.7	8.1	18.1

4/6/2021	Raw IN225	142.0
3/30/2021	Raw IN225	154.0
1/13/2021	Raw IN225	132.0

	Chloride	Sulfate	Ortho	Calcium	Conductivity	Alkalinity	pH	Temp
12/21/2020	26.5	35	3.07	39	372	126	8.1	22.1
	25	34	2.56	36	355	132	8.39	22.9
	25	34	2.74	22	359	133	8.19	18.5
	24.5	33	2.92	30	360	125	8.12	23.6
	25.5	36	2.38	28	361	124	8.14	21.1
	26	39	2.84	39	361	128	8.28	16.5
	26	33	3.07	33	702	134	8.2	3.07
	24.5	39	3.08	40	352	126	8.3	18.2

	27.5	35	2.79	38	371	125	8.19	19.1
	27.5	44	2.88	20	371	126	8.21	20.3
Max	27.5	44.0	3.1	40.0	702.0	134.0	8.4	23.6
Min	24.5	33.0	2.4	20.0	352.0	124.0	8.1	3.1
Avg	25.8	36.2	2.8	32.5	396.4	127.9	8.2	18.5

	Chloride	Sulfate	Ortho	Calcium	Conductivity	Alkalinity	pH	Temp
12/15/2020	28	43	3.03	42	255	131	8.16	17.8
	28	35	2.86	55	380	127	8.17	24
	26	33	2.87	66	362	125	8.43	18.6
	27.5	37	2.58	49	367	124	8.08	17.7
	27.5	28	3.17	56	363	121	8.08	24
	24	33	2.87	49	374	130	8.16	21
	27.5	37	2.88	64	356	131	8.13	17.6
	28.6	31	2.78	45	367	132	8.2	20
	28	35	3.19	41	390	127	8.19	18.8
	26.4	33	2.93	69	358	123	8.16	19
Max	28.6	43.0	3.2	69.0	390.0	132.0	8.4	24.0
Min	24.0	28.0	2.6	41.0	255.0	121.0	8.1	17.6
Avg	27.2	34.5	2.9	53.6	357.2	127.1	8.2	19.9

	Chloride	Sulfate	Ortho	Calcium	Conductivity	Alkalinity	pH	Temp
6/26/2020	25.5	32.0	3.20	41.0	339.0	107.0	7.6	23.3
	26.5	33.0	2.94	38.0	339.0	105.0	7.6	23.3
	26.0	36.0	3.13	42.0	338.0	106.0	7.5	25.6
	24.5	33.0	2.49	43.0	348.0	108.0	7.9	26.6
	26.0	38.0	3.05	42.0	332.0	105.0	7.6	21.9
	23.5	33.0	2.65	42.0	349.0	106.0	7.7	25.7
	23.0	33.0	2.84	41.0	347.0	105.0	7.5	25.7
	22.5	36.0	3.06	39.0	345.0	104.0	7.8	29.1
	23.0	33.0	2.91	40.0	337.0	105.0	7.6	27.3
	25.5	33.0	2.91	40.0	336.0	105.0	7.6	23.1
Max	26.5	38.0	3.20	43.0	349.0	108.0	7.9	29.1
Min	22.5	32.0	2.49	38.0	332.0	104.0	7.5	21.9
Avg	24.6	34.0	2.92	40.8	341.0	105.6	7.6	25.2

3/19/2020	Raw IN225	138.0
2/27/2020	Raw IN225	121.0

	14.0	36.0	1.38	46.0	460.0	110.0	7.9	17.9
	15.5	38.0	1.59	45.0	558.0	109.0	8.1	21.3
	16.0	38.0	1.60	48.0	421.0	113.0	8.0	15.7
	15.5	37.0	1.68	48.0	412.0	113.0	8.0	16.5
1/22/2020	17.0	45.0	1.52	45.0	433.0	112.0	8.0	13.8

1/22/2020	13.0	38.0	1.74	46.0	429.0	114.0	8.2	17.6
	16.0	33.0	1.46	45.0	149.2	110.0	8.0	17.9
	15.0	42.0	1.43	43.0	593.0	110.0	8.0	18.4
	15.5	44.0	1.38	46.0	667.0	111.0	8.0	19.3
	14.0	37.0	1.73	46.0	454.0	112.0	8.0	11.0
Max	17.0	45.0	1.74	48.0	667.0	114.0	8.2	21.3
Min	13.0	33.0	1.38	43.0	149.2	109.0	7.9	11.0
Avg	15.2	38.8	1.55	45.8	457.6	111.4	8.0	16.9

1/22/2020 Raw IN225 129.0

1/15/2020	21.5	30.0	1.38	45.0	442.0	115.0	8.1	11.7
	25.5	27.0	1.69	46.0	445.0	116.0	8.1	20.8
	24.0	26.0	1.70	44.0	482.0	115.0	8.2	16.3
	23.5	32.0	1.56	47.0	448.0	114.0	8.0	9.2
	23.0	27.0	1.52	43.0	449.0	116.0	8.0	10.7
	23.5	35.0	1.54	42.0	440.0	118.0	8.1	16.2
	25.0	31.0	1.58	42.0	442.0	114.0	8.0	15.5
	23.5	32.0	1.61	46.0	469.0	118.0	8.1	20.4
	24.0	34.0	1.54	43.0	449.0	116.0	8.2	14.2
	23.5	33.0	1.35	42.0	442.0	115.0	8.0	15.1
Max	25.5	35.0	1.70	47.0	482.0	118.0	8.2	20.8
Min	21.5	26.0	1.35	42.0	440.0	114.0	8.0	9.2
Avg	23.7	30.7	1.55	44.0	450.8	115.7	8.1	15.0

12/17/2019 Raw IN225 120.0

11/27/2019	26.5	33.0		49.0	460.0	120.0	8.5	21.6
	24.0	38.0		50.0	446.0	125.0	8.2	16.3
	24.5	31.0		51.0	459.0	124.0	8.2	12.2
	24.0	29.0		51.0	453.0	121.0	8.1	15.4
	26.0	36.0		48.0	455.0	126.0	8.1	12.2
	27.0	33.0		47.0	452.0	122.0	8.0	15.4
	25.5	32.0		49.0	451.0	119.0	8.2	18.8
	25.0	31.0		49.0	457.0	123.0	8.1	18.5
	26.0	31.0		46.0	452.0	122.0	8.0	17.7
	27.0	34.0		47.0	524.0	124.0	8.2	16.2
Max	27.0	38.0		51.0	524.0	126.0	8.5	21.6
Min	24.0	29.0		46.0	446.0	119.0	8.0	12.2
Avg	25.6	32.8		48.7	460.9	122.6	8.2	16.4

11/15/2020	22.0	33.0	1.34	45.0	436.0	116.0	8.0	14.9
	27.5	33.0	1.52	42.0	438.0	116.0	8.1	18.7
	24.5	31.0	1.40	45.0	435.0	117.0	8.2	19.8
	24.5	32.0	1.25	43.0	429.0	114.0	7.9	17.3
	23.5	31.0	1.45	46.0	436.0	114.0	7.9	16.9

11/13/2020	24.0	31.0		45.0	310.0	117.0	8.0	18.5
	21.5	32.0		45.0	906.0	116.0	8.0	20.4
	17.0	32.0		46.0	438.0	116.0	8.0	18.0
	23.5	31.0		43.0	440.0	114.0	8.0	14.3
	24.5	33.0		46.0	437.0	115.0	8.1	15.3
Max	27.5	33.0	1.52	46.0	906.0	117.0	8.2	20.4
Min	17.0	31.0	1.25	42.0	310.0	114.0	7.9	14.3
Avg	23.3	31.9	1.39	44.6	470.5	115.5	8.0	17.4

11/8/2019	Raw IN225					115.0		
10/28/2019	Raw IN225					128.0		

	22.0	32.0	1.15	39.0	464.0	108.0	8.0	21.8
	24.0	34.0	1.34	38.0	4.3	105.0	8.1	20.1
	23.0	30.0	1.45	42.0	400.0	104.0	8.3	22.6
	26.0	33.0	1.15	38.0	397.0	102.0	7.9	23.5
9/24/2019	23.5	32.0	0.63	42.0	406.0	100.0	8.0	22.6
	24.0	28.0		38.0	398.0	100.0	8.0	23.9
	24.5	30.0		39.0	398.0	104.0	8.7	23.2
	23.5	31.0		39.0	396.0	105.0	8.0	21.6
	23.5	32.0		39.0	411.0	104.0	8.1	24.7
	24.5	35.0		46.0	401.0	106.0	8.0	22.3
Max	26.0	35.0	1.45	46.0	464.0	108.0	8.7	24.7
Min	22.0	28.0	0.63	38.0	4.3	100.0	7.9	20.1
Avg	23.9	31.7	1.14	40.0	367.5	103.8	8.1	22.6

9/24/2019	Raw IN225					110.0		

	23.0	31.0	1.33	38.0	453.0	102.0	7.7	26.4
	22.5	30.0	1.36	37.0	432.0	102.0	7.7	21.6
	22.0	28.0	1.27	36.0	429.0	106.0	7.7	21.1
	22.0	31.0	1.02	36.0	424.0	105.0	7.7	18.2
9/11/2019	22.5	31.0	1.26	38.0	418.0	104.0	7.7	24.0
	23.0	27.0		37.0	427.0	104.0	7.7	19.8
	23.0	33.0		37.0	428.0	103.0	8.1	22.0
	23.5	30.0		38.0	412.0	103.0	7.8	24.2
	23.0	26.0		36.0	418.0	103.0	7.7	20.7
	26.5	31.0		37.0	428.0	105.0	7.7	23.1
Max	26.5	33.0	1.36	38.0	453.0	106.0	8.1	26.4
Min	22.0	26.0	1.02	36.0	412.0	102.0	7.7	18.2
Avg	23.1	29.8	1.25	37.0	426.9	103.7	7.8	22.1

8/16/2019	Raw IN225					108.0		
7/25/2019	Raw IN225					107.0		

	21.0	26.0		39.0	393.0	101.0	8.2	21.9

	21.5	28.0	41.0	393.0	101.0	8.0	22.1
	21.0	27.0	45.0	387.0	102.0	8.0	21.0
	21.5	26.0	38.0	380.0	103.0	8.1	23.8
	22.0	31.0	41.0	391.0	102.0	8.1	23.2
7/3/2019	22.5	25.0	38.0	391.0	101.0	8.3	21.2
	22.0	26.0	42.0	399.0	101.0	8.4	24.4
	21.5	26.0	51.0	401.0	102.0	8.1	23.9
	22.0	24.0	49.0	392.0	102.0	8.1	20.7
	21.5	24.0	39.0	428.0	102.0	8.0	28.1
Max	22.5	31.0	51.0	428.0	103.0	8.4	28.1
Min	21.0	24.0	38.0	380.0	101.0	8.0	20.7
Avg	21.7	26.3	42.3	395.5	101.7	8.1	23.0

3/21/2019	Raw IN225	109.0
4/25/2019	Raw IN225	113.0
5/30/2019	Raw IN225	119.0
6/21/2019	Raw IN225	133.0

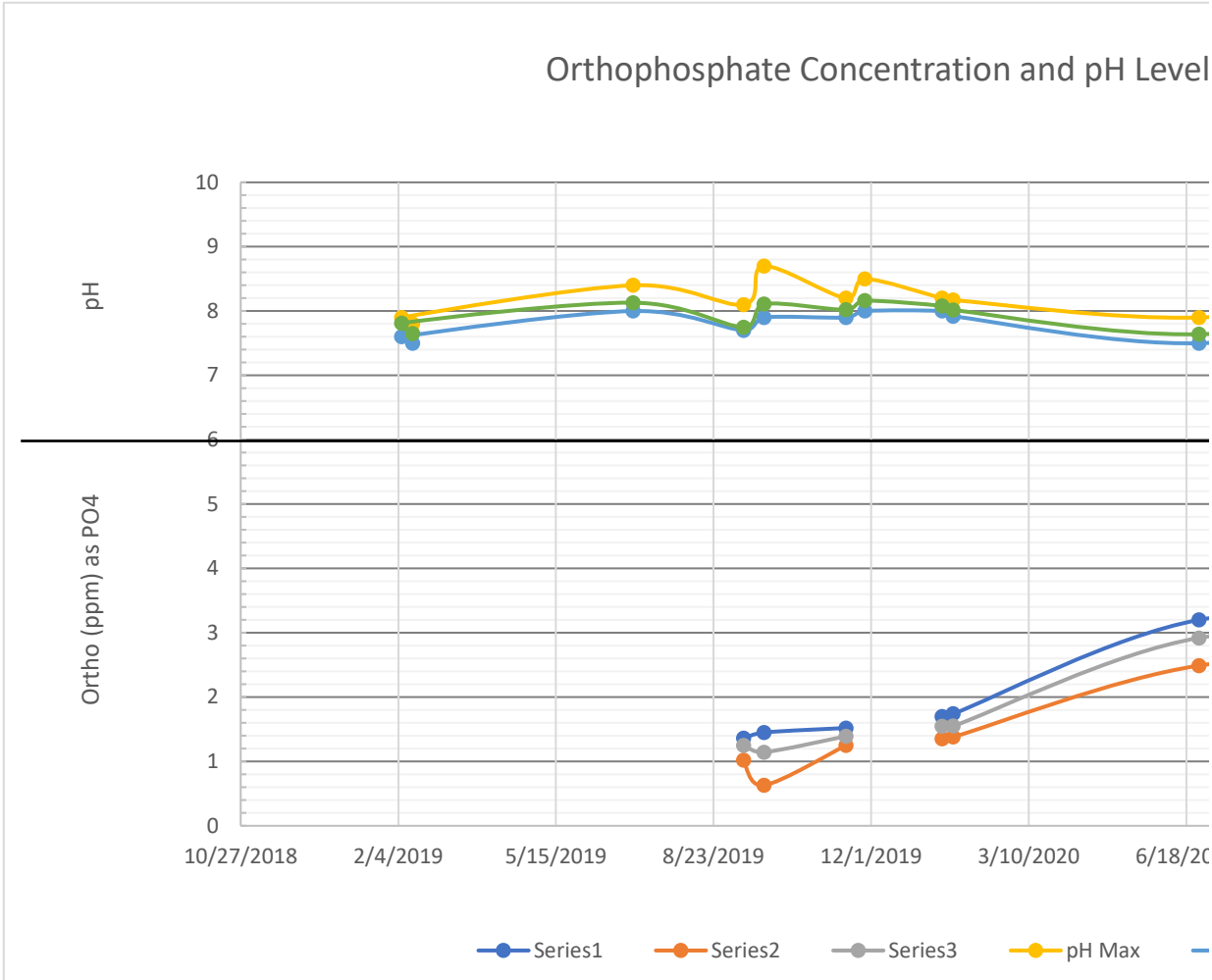
	23.5	34.0	45.0	381.0	125.0	7.7	13.1
	25.5	36.0	46.0	404.0	117.0	7.9	4.7
	25.0	37.0	46.0	359.0	123.0	7.9	11.3
	26.0	33.0	46.0	416.0	113.0	7.9	7.3
2/26/2019	32.0	39.0	44.0	395.0	124.0	7.9	4.1
	26.5	30.0	49.0	288.0	119.0	7.9	9.5
	25.5	30.0	48.0	361.0	112.0	7.6	3.8
	25.0	30.0	44.0	362.0	125.0	7.6	12.5
	24.5	24.0	51.0	374.0	123.0	7.9	7.2
Max	32.0	39.0	51.0	416.0	125.0	7.9	13.1
Min	23.5	24.0	44.0	288.0	112.0	7.6	3.8
Avg	25.9	32.6	46.6	371.1	120.1	7.8	8.2

2/26/2019	Raw IN225	108.0

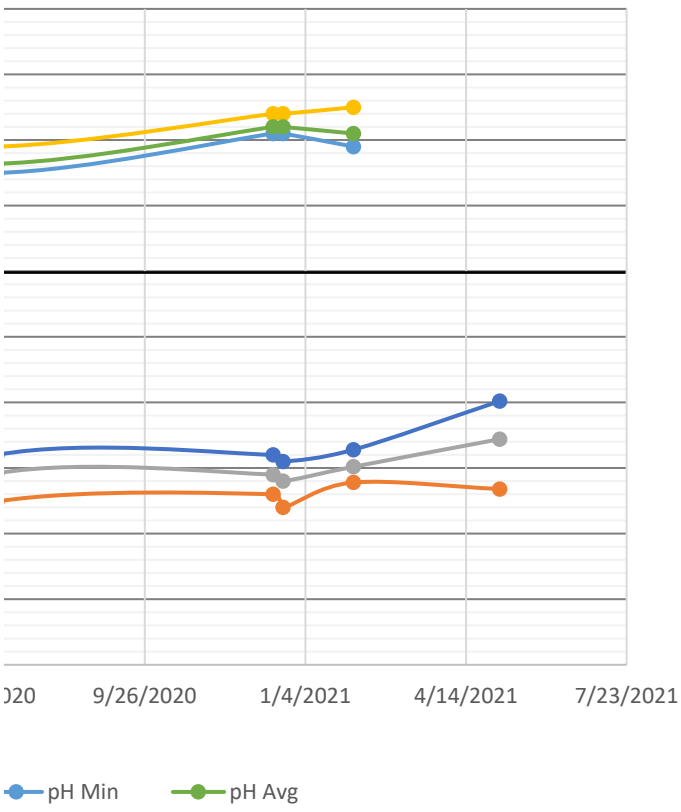
	22.0	31.0	50.0	368.0	112.0	7.6	8.3
	27.0	27.0	44.0	381.0	106.0	7.5	7.6
	23.0	29.0	42.0	356.0	107.0	7.7	11.9
	19.0	31.0	41.0	361.0	109.0	7.8	11.9
2/13/2019	21.5	31.0	46.0	367.0	110.0	7.7	13.0
	24.0	29.0	47.0	364.0	109.0	7.6	10.9
	22.0	28.0	46.0	371.0	109.0	7.7	10.9
	22.0	30.0	45.0	380.0	109.0	7.6	4.5
	23.0	29.0	46.0	379.0	110.0		14.0
Max	27.0	31.0	50.0	381.0	112.0	7.8	14.0
Min	19.0	27.0	41.0	356.0	106.0	7.5	4.5
Avg	22.6	29.4	45.2	369.7	109.0	7.7	10.3

Total	Chloride	Sulfate	Ortho	Calcium	Conductivity	Alkalinity	pH	Temp
Max	32.0	45.0	3.2	51.0	906.0	126.0	8.7	29.1
min	13.0	24.0	0.6	36.0	4.3	100.0	7.5	3.8
avg	22.9	31.8	1.6	43.5	411.2	110.9	7.9	17.7

	max	min	avg	max	min	avg
5/5/2021	4.02	2.68	3.44			
2/3/2021	3.28	2.78	3.02	8.5	7.9	8.1
12/21/2020	3.1	2.4	2.8	8.4	8.1	8.2
12/15/2020	3.2	2.6	2.9	8.4	8.1	8.2
6/26/20	3.2	2.5	2.9	7.9	7.5	7.6
1/22/20	1.7	1.4	1.6	8.2	7.9	8.0
1/15/20	1.7	1.4	1.5	8.2	8.0	8.1
11/27/19				8.5	8.0	8.2
11/15/19	1.5	1.3	1.4	8.2	7.9	8.0
9/24/19	1.5	0.6	1.1	8.7	7.9	8.1
9/11/19	1.4	1.0	1.2	8.1	7.7	7.8
7/3/19				8.4	8.0	8.1
2/6/19				7.9	7.6	7.8
2/13/19				7.8	7.5	7.7



ls Over Time



24
23.5
25.5
26
25
25.5
24
30
26
24.5

Lead Copper Sampling Site Plan
Benton Harbor WSSN 0600

SiteNo.	Address	Tier Level	Category	Structure Type	Service Line Material	Interior Plumbing Material	Site Validation Method
1	1022 HURD	1	A	SFR	Lead		Pilot Program
2	1047 HURD	1	A	SFR	Lead		Pilot Program
3	1057 MONROE	1	A	SFR	Lead		Pilot Program
4	1084 SALEM	1	A	SFR	Lead		Pilot Program
5	1088 OGDEN	1	A	SFR	Lead		Pilot Program
6	1118 BROADWAY	1	A	SFR	Lead		Pilot Program
7	1137 HURD	1	A	SFR	Lead		Pilot Program
8	1138 JENNINGS	1	A	SFR	Lead		Pilot Program
9	114 MCCORD	1	A	SFR	Lead		Pilot Program
10	1165 HANNAH	1	A	SFR	Lead		Pilot Program
11	1198 JENNINGS	1	A	SFR	Lead		Pilot Program
12	1251 SUPERIOR	1	A	SFR	Lead		Pilot Program
13	1267 SUPERIOR	1	A	SFR	Lead		Pilot Program
14	127 SEARLES	1	A	SFR	Lead		Pilot Program
15	1274 OGDEN	1	A	SFR	Lead		Pilot Program
16	140 BENTON	1	A	SFR	Lead		Pilot Program
17	141 SEELEY	1	A	SFR	Lead		Pilot Program
18	142 SEARLES	1	A	SFR	Lead		Pilot Program
19	150 PARKER	1	A	SFR	Lead		Pilot Program
20	191 SEARLES	1	A	SFR	Lead		Pilot Program
21	208 SEELEY	1	A	SFR	Lead		Pilot Program
22	261 SEARLES	1	A	SFR	Lead		Pilot Program
23	265 SEARLES	1	A	SFR	Lead		Pilot Program
24	277 HASTINGS	1	A	SFR	Lead		Pilot Program
25	366 MCCORD	1	A	SFR	Lead		Pilot Program
26	446 PACKARD	1	A	SFR	Lead		Pilot Program
27	463 FOSTER	1	A	SFR	Lead		Pilot Program
28	487 BRITAIN	1	A	SFR	Lead		Pilot Program

29	534 E MAIN	1	A	SFR	Lead		Pilot Program
30	566 TERRITORIAL	1	A	SFR	Lead		Pilot Program
31	582 PEARL	1	A	SFR	Lead		Pilot Program
32	596 CASS	1	A	SFR	Lead		Pilot Program
33	644 SUPERIOR	1	A	SFR	Lead		Pilot Program
34	663 THRESHER	1	A	SFR	Lead		Pilot Program
35	711 BUSS	1	A	SFR	Lead		Pilot Program
36	718 TERRITORIAL	1	A	SFR	Lead		Pilot Program
37	732 MCALISTER	1	A	SFR	Lead		Pilot Program
38	753 BROADWAY	1	A	SFR	Lead		Pilot Program
39	754 LAVETTE	1	A	SFR	Lead		Pilot Program
40	759 BUSS	1	A	SFR	Lead		Pilot Program
41	759 OGDEN	1	A	SFR	Lead		Pilot Program
42	776 MONROE	1	A	SFR	Lead		Pilot Program
43	789 THRESHER	1	A	SFR	Lead		Pilot Program
44	792 BRITAIN	1	A	SFR	Lead		Pilot Program
45	797 WAUCEDA	1	A	SFR	Lead		Pilot Program
46	806 LASALLE	1	A	SFR	Lead		Pilot Program
47	807 HIGH	1	A	SFR	Lead		Pilot Program
48	810 NATHANIEL WELLS	1	A	SFR	Lead		Pilot Program
49	815 PITKIN	1	A	SFR	Lead		Pilot Program
50	817 NATHANIEL WELLS	1	A	SFR	Lead		Pilot Program
51	830 BROADWAY	1	A	SFR	Lead		Pilot Program
52	831 BRITAIN	1	A	SFR	Lead		Pilot Program
53	836 HIGHLAND	1	A	SFR	Lead		Pilot Program
54	840 THRESHER	1	A	SFR	Lead		Pilot Program
55	846 BRITAIN	1	A	SFR	Lead		Pilot Program
56	846 EDGECUMBE	1	A	SFR	Lead		Pilot Program
57	846 MCALISTER	1	A	SFR	Lead		Pilot Program
58	853 VINEYARD	1	A	SFR	Lead		Pilot Program
59	860 PITKIN	1	A	SFR	Lead		Pilot Program
60	864 HIGHLAND	1	A	SFR	Lead		Pilot Program
61	868 MINERAL	1	A	SFR	Lead		Pilot Program
62	870 OGDEN	1	A	SFR	Lead		Pilot Program

63	875 MCGUIGAN	1	A	SFR	Lead		Pilot Program
64	932 SUPERIOR	1	A	SFR	Lead		Pilot Program
65	946 BISHOP	1	A	SFR	Lead		Pilot Program
66	964 MCALISTER	1	A	SFR	Lead		Pilot Program
67	1292 Bishop	1	A	SFR	Lead		Records/previous site
68	931 Monroe	1	A	SFR	Lead		Records/previous site
69	1129 Jennings	1	A	SFR	Lead		Records/previous site
70	1354 Bishop	1	A	SFR	Lead		Records/previous site
71	948 Ogden	1	A	SFR	Lead		Records/previous site
72	1133 Jennings	1	A	SFR	Lead		Records/previous site
73	1248 Broadway	1	A	SFR	Lead		Records/previous site
74	1026 Bishop	1	A	SFR	Lead		Records/previous site
75	1271 Pavone	1	A	SFR	Lead		Records/previous site
76	1259 Bishop	1	A	SFR	Lead		Records/previous site
77	285 Hastings	1	A	SFR	Lead		Records/previous site
78	1086 Superior	1	A	SFR	Lead		Records/previous site
79	174 Hastings	1	A	SFR	Lead		Records/previous site
80	649 Pipestone	1	A	SFR	Lead		Records/previous site
81	1112 Agard	1	A	SFR	Lead		Records/previous site
82	1053 Jennings	1	A	SFR	Lead		Records/previous site
83	1020 Bishop	1	A	SFR	Lead		Records/previous site
84	1251 Columbus	1	A	SFR	Lead		Records/previous site
85	142 Cross St.	1	A	SFR	Lead		Records/previous site
86	885 Mineral	1	A	SFR	Lead		Records/previous site
87	1110 Ogden	1	A	SFR	Lead		Records/previous site
88	781 Buss	1	A	SFR	Lead		Records/previous site
89	610 Superior	1	A	SFR	Lead		Records/previous site
90	1124 Colfax	1	A	SFR	Lead		Records/previous site
91	1016 LaVette	1	A	SFR	Lead		Records/previous site
92	1197 Agard	1	A	SFR	Lead		Records/previous site
93	999 Pearl St	1	A	SFR	Lead		Records/previous site
94	1178 Broadway	1	A	SFR	Lead		Records/previous site
95	857 Ogden	1	A	SFR	Lead		Records/previous site
96	141 Winan	1	A	SFR	Lead		Records/previous site

97	768 Broadway	1	A	SFR	Lead		Records/previous site
98	812 Lavette	1	A	SFR	Lead		Records/previous site
99	1264 Pavone	1	A	SFR	Lead		Records/previous site
100	166 Searles	1	A	SFR	Lead		Records/previous site
101	819 Vineyard	1	A	SFR	Lead		Records/previous site
102	1237 Columbus	1	A	SFR	Lead		Records/previous site
103	1115 Superior	1	A	SFR	Lead		Records/previous site
104	578 Edwards	1	A	SFR	Lead		Records/previous site
105	341 Brunson	1	A	SFR	Lead		Records/previous site
106	1011 Pearl St	1	A	SFR	Lead		Records/previous site
107	1191 Pavone	1	A	SFR	Lead		Records/previous site
108	1069 Hurd	1	A	SFR	Lead		Records/previous site
109	1225 Colfax	1	A	SFR	Lead		Records/previous site
110	1289 Bishop	1	A	SFR	Lead		Records/previous site
111	1291 Superior St	1	A	SFR	Lead		Records/previous site
112	1244 Jennings	1	A	SFR	Lead		Records/previous site
113	185 Parker Ave	1	A	SFR	Lead		Records/previous site
114	1161 Union St	1	A	SFR	Lead		Records/previous site
115	504 Territorial Rd	1	A	SFR	Lead		Records/previous site
116	552 Buena Vista	1	A	SFR	Lead		Records/previous site
117	1143 Union	1	A	SFR	Lead		Records/previous site
118	854 LaSalle St	1	A	SFR	Lead		Records/previous site
119	232 Hastings Ave	1	A	SFR	Lead		Records/previous site
120	201 Garfield	1	A	SFR	Lead		Records/previous site
121	400 John Street	1	A	SFR	Lead		Records/previous site
122	204 Garfield	1	A	SFR	Lead		Records/previous site
123	1043 Agard	1	A	SFR	Lead		Records/previous site
124	1037 Pearl	1	A	SFR	Lead		Records/previous site
125	582 Niles	1	A	SFR	Lead		Records/previous site
126	660 McGuigan	1	A	SFR	Lead		Records/previous site
127	1167 Broadway	1	A	SFR	Lead		Records/previous site
128	1066 Monroe	1	A	SFR	Lead		Records/previous site
129	855 Lavette	1	A	SFR	Lead		Records/previous site
130	565 Clay	1	A	SFR	Lead		Records/previous site

131	1212 Pearl St	1	A	SFR	Lead		Records/previous site
132	161 Kline	1	A	SFR	Lead		Records/previous site
133	538 Columbus	1	A	SFR	Lead		Records/previous site

From: Kline, Frances (EGLE)
To: Sarkipato, Ernest (EGLE)
Cc: Onan, Brandon (EGLE)
Subject: New FOIA request from Elin E120104
Date: Friday, September 24, 2021 10:48:35 AM

Hi Ernie, we received this new FOIA request from Elin. I assigned this FOIA to Brandon and cc'd him here so we are all start on the same page.

FOIA Request:

E120104-092321

Requester Company Name:	Safe Water Engineering, LLC
Requester Full Name:	Ms. Elin Betanzo
Describe the Record(s) Requested:	Please provide a copy of Cornwell Engineering's Benton Harbor Corrosion Optimization Study Proposal that was recommended for award by Abonmarche on June 28, 2021 (see attached) with any confidential information redacted. Please also provide a copy of the Benton Harbor Corrosion Optimization Study Plan that was prepared by Cornwell Engineering and implemented in the beginning of August (per communication from EGLE) along with any communications between EGLE, Benton Harbor, Abonmarche, F&V, and Cornwell Engineering regarding the scope and design of the study plan. Please include any modifications made to the plan in response to EGLE's review of the study plan.
Address of Requested Site:	200 E. Wall St.
City:	Benton Harbor
State:	MI
Zip Code:	49022
Select County:	Berrien

Please let me know if you have any questions.
Thanks,
Francie

From: David A. Cornwell
To: Sarkipato, Ernest (EGLE)
Subject: RE: Benton Harbor ACO update letter
Date: Tuesday, September 28, 2021 3:32:19 PM

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

Thanks for the update. Appreciate being in the loop

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Tuesday, September 28, 2021 3:23 PM
To: emitchell@bhcity.us; Abul Ahmed <aahmed@fv-operations.com>; Kimberly Thompson <kthompson@bhcity.us>; Darold Harlan <dharlan@fv-operations.com>; Sue J <rjones@fv-operations.com>; Matthew Johnson <mjohnson@fveng.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Walstrom, Kimberly (EGLE) <walstromK@michigan.gov>; Oswald, Eric (EGLE) <OswaldE1@michigan.gov>; Bolf, Michael (EGLE) <BOLFM@michigan.gov>; Nelson, Maureen (EGLE) <NelsonM2@michigan.gov>
Subject: Benton Harbor ACO update letter

All,

Please find an ACO update letter attached. This may have already reached you via hard copy.

Thank you,

Ernie Sarkipato, P.E.
Distribution Engineering Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

From: David A. Cornwell
To: Sarkipato, Ernest (EGLE)
Subject: RE: Corrosion Study plan
Date: Friday, September 24, 2021 12:06:02 PM

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I was talking to Darren Lytle about another issue and he mentioned BH filter issue. I told him we submitted a test plan.

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Friday, September 24, 2021 12:00 PM
To: David A. Cornwell <DCornwell@cornwellinc.com>
Subject: RE: Corrosion Study plan

Hi Dave,

EGLE will be reviewing internally and discussing. The draft work plan was also requested by EPA r5 and ORD, so they do have a copy. Not sure how they will be proposing to interface, but I appreciate the communication amongst all parties. I think the city/F&V also will be pushing some discussions in the near future.

Ernie Sarkipato, P.E.
Distribution Engineering Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Friday, September 24, 2021 11:53 AM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Subject: RE: Corrosion Study plan

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Any thoughts on the plan? I heard ORD might be coming in. I think there is a call at noon?

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Thursday, September 16, 2021 2:10 PM
To: David A. Cornwell <DCornwell@cornwellinc.com>
Subject: RE: Corrosion Study plan

OK. FYI epa region 5 and ORD might be interested in coming in on the tail end to "help". Just a heads up.

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Thursday, September 16, 2021 12:10 PM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Subject: RE: Corrosion Study plan

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Jason said he would facilitate—I will remind him

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Thursday, September 16, 2021 11:30 AM
To: David A. Cornwell <DCornwell@cornwellinc.com>
Subject: RE: Corrosion Study plan

Great! I will distribute and discuss at EGLE. I'm assuming you are sending this to the City separately, or would you like me to do that?

Ernie

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Thursday, September 16, 2021 11:01 AM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Subject: RE: Corrosion Study plan

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All, Please find a proposed test plan. Ernie, the City has not reviewed this yet but in the interest of time I have provided this to everyone. I know everyone is anxious to start.
We would be glad to have a call with all to discuss and welcome City and EGLE

comments
Dave

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Tuesday, September 14, 2021 12:29 PM
To: David A. Cornwell <DCornwell@cornwellinc.com>
Subject: RE: Corrosion Study plan

Thank you Dave; looking forward to it!

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Tuesday, September 14, 2021 12:14 PM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; Onan, Brandon (EGLE) <OnanB@michigan.gov>; Jason Marquardt <jmarquardt@abonmarche.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Catherine Winn <cwinn@fv-operations.com>
Subject: RE: Corrosion Study plan

CAUTION: This is an External email. Please send suspicious emails to abuse@michigan.gov

We have enough to develop a test plan
We think the pH is an issue. They operate around 8.2 a lot in the distribution system. Should have a plan tomorrow.

Sent from my Verizon, Samsung Galaxy smartphone

-------- Original message --------
From: "Sarkipato, Ernest (EGLE)" <SARKIPATOE@michigan.gov>
Date: 9/14/21 10:37 AM (GMT-05:00)
To: "David A. Cornwell" <DCornwell@cornwellinc.com>, "Onan, Brandon (EGLE)" <OnanB@michigan.gov>, Jason Marquardt <jmarquardt@abonmarche.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>, Catherine Winn <cwinn@fv-operations.com>
Subject: RE: Corrosion Study plan

Weekly bump on this, and please let us know if you have more information that is needed at this time.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist

Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

From: Sarkipato, Ernest (EGLE)
Sent: Tuesday, September 7, 2021 3:16 PM
To: David A. Cornwell <DCornwell@cornwellinc.com>; Onan, Brandon (EGLE) <OnanB@michigan.gov>; Jason Marquardt <jmarquardt@abonmarche.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Catherine Winn <cwinn@fv-operations.com>
Subject: RE: Corrosion Study plan

Good afternoon Dave,

Can you verify if the information request has been satisfied for Benton Harbor? We are happy to help in any way we can to move this initial piece forward.

Also, as a reminder we hope to get a more detailed outline of next steps for the study when you have wrapped your arms around the data side of things.

Best regards,

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

From: Sarkipato, Ernest (EGLE)
Sent: Thursday, September 2, 2021 3:11 PM
To: David A. Cornwell <DCornwell@cornwellinc.com>; Jason Marquardt <jmarquardt@abonmarche.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Catherine Winn <cwinn@fv-operations.com>
Subject: RE: Corrosion Study plan

Hi all,

Please find attached the diagram w/ chemical addition information.

Thanks to Abul and Catherine for working on this,

Ernie Sarkipato, P.E.

Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Thursday, August 19, 2021 10:37 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>
Cc: Daniel Bomzer <dbomzer@abonmarche.com>; Joelle Regovich <jregovich@abonmarche.com>; Brandon Vasher <bvasher@abonmarche.com>; Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Subject: RE: Corrosion Study plan

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Jason, here is our initial data request. I copied Ernie also because he said he may have some data we can use
Dave

From: Jason Marquardt <jmarquardt@abonmarche.com>
Sent: Wednesday, August 18, 2021 4:37 PM
To: David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Daniel Bomzer <dbomzer@abonmarche.com>; Joelle Regovich <jregovich@abonmarche.com>; Brandon Vasher <bvasher@abonmarche.com>
Subject: RE: Corrosion Study plan

Dave,

Please see my responses below in red.

Jason W. Marquardt, PE
Senior Project Manager
Abonmarche
D 269.926.4565
C 269.876.9304
O 269.927.2295 ext. 171
www.abonmarche.com

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Wednesday, August 18, 2021 10:21 AM

To: Jason Marquardt <jmarquardt@abonmarche.com>
Subject: RE: Corrosion Study plan

Jason, we had our call with BH and EGLE. Ernie suggested I work through you on a few items. I wanted to make sure you are ok with this. I was not provided a contact at BH to work through and instead directed to you. The immediate items are

1. A data request that I will prepare – we can help facilitate as much data transfer as we are able. Please let us know what is needed.
2. After reviewing data I am to prepare a test plan for the available funds as well as an option for scale analysis. This should come from the City to EGLE or I can submit it on behave of the City after they approve it. I guess the idea is I get it to you and you facilitate City approval and who submits. – if you can help prepare, we can help the facilitation with the City. We may need some guidance when ready to commit.
3. Do you have invoice info for us. – The easiest and efficient way to get your invoicing covered, is to submit it addressed to the City of Benton Harbor, Accounts Recievable, at their City Hall Address and email me a copy directly. I can push this forward to the proper personnel at the city and provide you a CC. This may be beneficial as well as we need to keep EPA updated every so often.

Thanks, Dave

From: Jason Marquardt <jmarquardt@abonmarche.com>
Sent: Wednesday, August 4, 2021 9:55 AM
To: David A. Cornwell <DCornwell@cornwellinc.com>
Subject: RE: Corrosion Study plan

I will say as of now it is. It was awarded through commission for that total amount. I would suggest discussing that with EGLE and the City at the beginning and keep me updated as to what adjustments may be needed.

In reality, if the study components go up, the amount of lead service replacements likely go down. We have just pout out our first bid package for LSRs schedule to be received on 8/26. By then we'll start to know contractor's pricing and availability to do the amount needed over the next several years.

Jason W. Marquardt, PE
Senior Project Manager
Abonmarche
D 269.926.4565
C 269.876.9304
O 269.927.2295 ext. 171
www.abonmarche.com

From: David A. Cornwell <DCornwell@cornwellinc.com>

Sent: Wednesday, August 4, 2021 9:44 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>
Subject: RE: Corrosion Study plan

Thanks. is the 50k set? That affects what we can do quite a bit
Dave

From: Jason Marquardt <jmarquardt@abonmarche.com>
Sent: Wednesday, August 4, 2021 9:27 AM
To: David A. Cornwell <DCornwell@cornwellinc.com>; Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; Darold Harlan <dharlan@fv-operations.com>; Sue J <rjones@fv-operations.com>; emitchell@bhcity.us; Catherine Winn <cwinn@fv-operations.com>; drice@bhcity.us; Lesia Osler <losler@bhcity.us>; Abul Ahmed <aahmed@fv-operations.com>
Cc: Bolf, Michael (EGLE) <BOLFM@michigan.gov>; Blair Selover <bselover@fv-operations.com>; rrice@bhcity.us; Onan, Brandon (EGLE) <OnanB@michigan.gov>; Jacob Wagner <JWagner@cornwellinc.com>; Richard Brown <RBrown@cornwellinc.com>; Joelle Regovich <jregovich@abonmarche.com>
Subject: RE: Corrosion Study plan

Dave,

I will not be able to meet on the 9th or 10th of next week as I'm off. However, I would encourage to proceed with setting up this initial kickoff meeting to get the study started. City/F&V can you confirm a date and time that works for you to do a virtual meeting with Cornwell?

I will prepare and sit in on any future meetings that I'm available for. I'll need to be involved as to the costs of the study and the reimbursement amounts on the EPA grant as we are coordinating that with the larger EPA project. We will also provide updates to the EPA per their reporting requirements and will discuss progress and any items that will require their attention when they arise.

Thanks,

Jason W. Marquardt, PE
Senior Project Manager
Abonmarche
D 269.926.4565
C 269.876.9304
O 269.927.2295 ext. 171
www.abonmarche.com

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Monday, August 2, 2021 8:00 AM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; Darold Harlan <dharlan@fv-

operations.com>; Sue J <rjones@fv-operations.com>; emitchell@bhcity.us; Jason Marquardt <jmarquardt@abonmarche.com>; Catherine Winn <cwinn@fv-operations.com>; drice@bhcity.us; Lesia Osler <losler@bhcity.us>; Abul Ahmed <aahmed@fv-operations.com>
Cc: Bolf, Michael (EGLE) <BOLFM@michigan.gov>; Blair Selover <bselover@fv-operations.com>; rrice@bhcity.us; Onan, Brandon (EGLE) <OnanB@michigan.gov>; Jacob Wagner <JWagner@cornwellinc.com>; Richard Brown <RBrown@cornwellinc.com>
Subject: RE: Corrosion Study plan

All,
I copied the whole list but I'm not sure who wants to be on these communications and at this point do not know our key contact at Benton Harbor. We received an award notice from Jason and he indicated he didn't know if a contract was needed.
It might be a good time though to set up a initial planning call for those that want to be involved. If Benton Harbor wants an internal team call first that is fine too and then we can have an official kick off with EGLE. I am tied up this week.
I was wondering about 9 or 10 next Tuesday the 10th. Please let me know the best way to proceed.
I can send out a zoom if key people can make that.
Dave

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Tuesday, July 27, 2021 1:25 PM
To: Darold Harlan <dharlan@fv-operations.com>; Sue J <rjones@fv-operations.com>; David A. Cornwell <DCornwell@cornwellinc.com>; emitchell@bhcity.us; Jason Marquardt <jmarquardt@abonmarche.com>; Catherine Winn <cwinn@fv-operations.com>; drice@bhcity.us; Lesia Osler <losler@bhcity.us>; Abul Ahmed <aahmed@fv-operations.com>
Cc: Bolf, Michael (EGLE) <BOLFM@michigan.gov>; Blair Selover <bselover@fv-operations.com>; rrice@bhcity.us; Onan, Brandon (EGLE) <OnanB@michigan.gov>
Subject: Corrosion Study plan

Good afternoon City of Benton Harbor officials, F&V representatives, Abonmarche, and Cornwell Engineering!

It has come to our attention the City has selected and approved the proposal from Cornwell Engineering to conduct a study of corrosion treatment optimization on the drinking water system. Congratulations, and thank you for your careful consideration in this important effort.

We have done another look through the proposal, attached. It looks like Task 1 includes a project kick-off meeting to include EGLE (page 23). Thank you in advance for the coordination, as we are working under an administrative consent agreement with the City for this and other items.

In light of that, we would like to request a work plan & schedule be submitted for the study that outlines specific activities and timelines. We would be eager to participate in any discussion, and understand the detailed plan submittal may be delayed until after the Task 1 project coordination meeting.

I'll plan on discussing this briefly in the weekly meeting this afternoon with (most of) you!

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

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From: Michael Sun
To: Darold L. Harlan; David A. Cornwell; Sarkipato, Ernest (EGLE); Jason Marquardt; Catherine Winn
Cc: Abul Ahmed; Sue J
Subject: Re: WTP Process Diagram
Date: Thursday, September 2, 2021 2:41:58 PM

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I will be filling in for Dave. Internet is down here so I'll be on late.

Get Outlook for iOS

From: Darold L. Harlan <dharlan@fv-operations.com>
Sent: Thursday, September 2, 2021 9:51:30 AM
To: David A. Cornwell <DCornwell@cornwellinc.com>; Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; Jason Marquardt <jmarquardt@abonmarche.com>; Catherine Winn <cwinn@fv-operations.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Robert Jones <rjones@fv-operations.com>; Michael Sun <MSun@cornwellinc.com>
Subject: RE: WTP Process Diagram

I may listen in, but think this is more for Abul and possibly Catherine.

Darold L. Harlan
Operations Specialist
F&V OPERATIONS AND RESOURCE MANAGEMENT, INC.
20 Hitzfield Street | Huntington | IN | 46750
O: 260-358-2313 C: 260-224-5578
www.fv-operations.com
Please consider the environment before printing this email.

From: David A. Cornwell <DCornwell@cornwellinc.com>
Sent: Thursday, September 2, 2021 9:47 AM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; Darold L. Harlan <dharlan@fv-operations.com>; Jason Marquardt <jmarquardt@abonmarche.com>; Catherine Winn <cwinn@fv-operations.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Robert Jones <rjones@fv-operations.com>; Michael Sun <MSun@cornwellinc.com>
Subject: RE: WTP Process Diagram

CAUTION: **EXTERNAL EMAIL** DO NOT click links or open attachments unless you recognize the sender and know the content is safe.

I have another call exactly at that time but I can have someone listen in if you do this time

-----Original Appointment-----
From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Thursday, September 2, 2021 9:38 AM
To: Darold L. Harlan; Jason Marquardt; David A. Cornwell; Catherine Winn
Cc: Abul Ahmed; Sue J
Subject: WTP Process Diagram
When: Thursday, September 2, 2021 2:30 PM-3:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Throwing out a time for later today for anyone that is available, as I'm off until Tuesday for a long holiday weekend.

Microsoft Teams meeting

Join on your computer or mobile app
Click here to join the meeting

Or call in (audio only)

+1 248-509-0316,,605968085# United States, Pontiac

Phone Conference ID: 605 968 085#
Find a local number | Reset PIN

Learn More | Meeting options

From: Darold L. Harlan <dharlan@fv-operations.com>
Sent: Thursday, September 2, 2021 9:36 AM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Sue J <rjones@fv-operations.com>
Subject: RE: WTP Process Diagram

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Ernie,

I have talked to Abul about this. I think it would be best if you, Catherine, and Abul had a quick call to discuss this. I will be on vacation after today, however I will be available by phone until next wed.

Thanks,

Darold L. Harlan
Operations Specialist
F&V OPERATIONS AND RESOURCE MANAGEMENT, INC.
20 Hitzfield Street | Huntington | IN | 46750
O: 260-358-2313 C: 260-224-5578
www.fv-operations.com
Please consider the environment before printing this email.

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Thursday, September 2, 2021 9:07 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold L. Harlan <dharlan@fv-operations.com>; Robert Jones <rjones@fv-operations.com>
Subject: RE: WTP Process Diagram

This is a great drawing. Abul/Darold/Rob: do you have the ability to highlight the commonly used chem feed locations to this diagram, with target feed rates and chemicals used? I have the software to do this if you want to get on a call to walk me through it.

Ernie

From: Jason Marquardt <jmarquardt@abonmarche.com>
Sent: Wednesday, September 1, 2021 4:00 PM
To: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; Sue J <rjones@fv-operations.com>
Subject: WTP Process Diagram

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Dave,

Is this something that would be useful from your spreadsheet request?

Jason W. Marquardt, PE
Senior Project Manager

Abonmarche
D 269.926.4565
C 269.876.9304
O 269.927.2295 ext. 171
www.abonmarche.com

From: Sarkipato, Ernest (EGLE) <SARKIPATOE@michigan.gov>
Sent: Wednesday, September 1, 2021 9:11 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; Sue J <rjones@fv-operations.com>
Subject: data dump #6

Final send from EGLE: attached are the records we have that (attempt) to tie address information to tap sample results. As you will see, the use of codes has been highly confusing and creates difficulty in trying to analyze data over time.

Last, one of these files summarizes the investigative sampling conducted by Michigan Department of Health and Human Services (DHHS) Drinking Water Unit.

Ernie

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:40 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #5

-8 MOR files should be attached for 2021.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:38 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #4

-13 MOR files should be attached for 2020.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:27 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #3

-14 MOR files should be attached for 2019.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:10 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #2

-12 MOR should be attached for 2018.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 7:58 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: Corrosion Study contacts and data dump #1

Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,
-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.

Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
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From:	Sarkipato, Ernest (EGLE)
To:	Jason Marquardt; David A. Cornwell
Cc:	Abul Ahmed; Darold Harlan; rjones@fv-operations.com
Subject:	data dump #2
Date:	Wednesday, September 1, 2021 8:09:00 AM
Attachments:	MI 0600 MOR Benton Harbor May 2018reduced.pdf MI 0600 Benton Harbor MOR April 2018reduced.pdf Benton Harbor MI 0600 MOR March 2018reduced.pdf MI 0600 Benton Harbor MOR July 2018reduced.pdf MI 0600 Benton Harbor MOR June 2018reduced.pdf MI 0600 Benton Harbor MOR Sept 2018reduced.pdf Benton Harbor MI0600 MOR Jan 2018.pdf Benton Harbor MI0600 MOR Nov 2018.pdf Benton Harbor MI0600 MOR Feb 2018reduced.pdf MI0600 Benton Harbor MOR Dec 2018reduced.pdf MI0600 Benton Harbor MOR Oct 2018reduced.pdf MI 0600 Benton Harbor MOR Aug 2018reduced.pdf

---

-12 MOR should be attached for 2018.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 7:58 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: Corrosion Study contacts and data dump #1

Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,
-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **May-18**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0994	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	221.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.97	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.96	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.79%	Percent of Treated Water

Chemical Data

Chlorine on hand:	53025	lb.	Est. supply:	368	days
Primary Coagulant (Alum (Al3+)) on hand:	85784	lb.	Est. supply:	227	days
Cost of All Chemicals per Million Gallons:	$64.18	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

Number of filter confluence samples > 0.3 NTU:	0	FILTERS
Number of filter confluence samples collected:	174	CFE
Percent of filter confluence samples > 0.3 NTU:	0%	
Number of filter confluence samples > 1 NTU	0	

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks: Laboratory Drying Oven Failed. Ordered new one. In the mean time, no glassware could be properly sterilized, so NO Standard Plate Counts were run for RAW or TAP.

WSSN 0600 City of Benton Harbor Month/Year May-18

COAGULATION PARAMETERS

	MIL.	ALUM	ALUM	TURBIDITY UNITS			FILTERED (CFE) NORTH		#	FILTERED (CFE) SOUTH		#	2-hrs Compliance Peroids	
D	GAL.	Dry	as Al3+	RAW		Applied								
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	Avg.	Max.	Samples	Avg.	Max.	Samples	#of	#of
T		Pounds							Taken			Taken	Periods	Periods
E		Add							North			South	>.30NTU	>.30NTU
													North	South
1	0.9221	257.00	1.47	3.10	4.80	0.26	0.07	0.08	3	0.07	0.07	3	0	0
2	1.0128	311.00	1.62	3.10	4.80	0.28	0.07	0.08	3	0.08	0.08	3	0	0
3	0.9402	288.00	1.61	2.40	2.40	0.24	0.07	0.08	3	0.10	0.12	3	0	0
4	1.0141	306.00	1.59	4.60	6.30	0.31	0.08	0.09	3	0.06	0.07	3	0	0
5	0.8900	278.00	1.64	7.80	10.00	0.30	0.08	0.08	3	0.07	0.07	3	0	0
6	0.8646	264.00	1.69	2.80	3.60	0.26	0.05	0.07	3	0.07	0.07	3	0	0
7	1.0037	312.00	1.64	3.60	7.40	0.25	0.07	0.07	3	0.07	0.08	3	0	0
8	0.9662	298.00	1.62	2.10	2.20	0.26	0.07	0.08	3	0.08	0.09	3	0	0
9	0.9521	292.00	1.61	8.00	17.20	0.26	0.07	0.08	3	0.08	0.08	3	0	0
10	0.9525	290.00	1.60	2.30	3.70	0.21	0.08	0.08	3	0.08	0.08	3	0	0
11	0.9765	293.00	1.58	1.90	2.40	0.20	0.07	0.08	3	0.07	0.08	3	0	0
12	1.0183	310.00	1.60	1.60	2.20	0.20	0.07	0.07	3	0.07	0.07	3	0	0
13	0.8296	247.00	1.57	2.10	3.80	0.18	0.07	0.08	3	0.06	0.07	3	0	0
14	0.9270	278.00	1.58	2.00	3.90	0.20	0.08	0.09	3	0.07	0.08	3	0	0
15	0.9301	281.00	1.59	1.30	2.00	0.18	0.09	0.11	3	0.07	0.08	3	0	0
16	0.9851	296.00	1.58	1.70	2.80	0.21	0.07	0.07	3	0.07	0.07	3	0	0
17	0.9395	280.00	1.57	5.80	13.30	0.18	0.07	0.07	3	0.07	0.08	3	0	0
18	0.9740	287.00	1.55	2.00	3.50	0.15	0.07	0.08	3	0.07	0.08	3	0	0
19	0.8764	258.00	1.55	1.50	1.90	0.16	0.08	0.09	3	0.07	0.08	3	0	0
20	0.9549	276.00	1.52	2.30	4.60	0.18	0.07	0.07	3	0.07	0.07	3	0	0
21	0.9627	278.00	1.52	2.10	4.30	0.19	0.08	0.08	3	0.08	0.09	3	0	0
22	1.0107	297.00	1.55	2.00	3.30	0.17	0.07	0.08	3	0.08	0.08	3	0	0
23	1.0707	318.00	1.56	1.40	1.60	0.24	0.07	0.07	3	0.07	0.08	3	0	0
24	0.8116	321.00	2.08	1.10	1.50	0.17	0.08	0.08	3	0.07	0.08	3	0	0
25	1.0994	320.00	1.53	2.40	4.90	0.19	0.07	0.08	3	0.08	0.09	3	0	0
26	0.9838	289.00	1.53	1.80	2.50	0.24	0.08	0.08	3	0.07	0.08	3	0	0
27	0.9927	291.00	1.54	2.00	3.30	0.20	0.08	0.08	3	0.07	0.08	3	0	0
28	1.0469	307.00	1.54	2.10	3.90	0.20	0.08	0.08	3	0.08	0.08	3	0	0
29	1.0532	309.00	1.54	1.30	2.20	0.20	0.08	0.08	3	0.08	0.08	3	0	0
30	0.9881	313.00	1.67	1.50	2.90	0.19	0.06	0.06	3	0.06	0.08	3	0	0
31	1.0273	309.00	1.58	1.80	3.20	0.15	0.07	0.08	3	0.07	0.08	3	0	0
Total	29.9768	9054.00						# N CFE take	93		# S CFE take	93	#N > .3	#S > .3
Avg.	0.9670	292.06	1.59	2.63	4.40	0.21	0.07	0.08	0.08	0.07	0.08		Total	Total
Max	1.0994	321.00	2.08	8.00	17.20	0.31	0.09	0.11	0.11	0.10	0.12	# > 0.3	0	0
Min.	0.8116	247.00	1.47	1.10	1.50	0.15	0.05	0.06	0.06	0.06	0.07	% Comp	1.00	1.00

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **May-18**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D		Fluoride		mg/l								New addition Total Chlorine Used				
A	Pounds	Applied				INTAKE		After Wetwell		FILTERED		Total NaOCl Use			TAP	
T	NaF	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E							mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	243	0.58	0.43	0.66				197	3.19	24	0.39	221	9.77	7.64	1.96	2.13
2	238	0.52	0.25	0.72				220	3.24	26	0.38	246	8.60	6.79	1.63	1.81
3	222	0.52	0.29	0.74				203	3.22	23	0.37	226	11.63	9.76	1.62	1.87
4	267	0.58	0.33	0.63				223	3.28	29	0.43	252	9.47	7.68	1.62	1.79
5	225	0.56	0.24	0.79				201	3.37	28	0.47	229	8.59	7.04	1.41	1.55
6	208	0.53	0.23	0.71				198	3.42	29	0.50	227	13.59	12.03	1.40	1.56
7	211	0.46	0.36	0.88				230	3.42	35	0.52	265	9.49	7.31	1.97	2.18
8	245	0.56	0.18	0.64				221	3.41	35	0.54	256	11.32	9.59	1.58	1.73
9	251	0.58	0.35	0.63	0.70			202	3.17	32	0.50	234	12.59	10.64	1.78	1.95
10	277	0.64	0.31	0.76				204	3.20	33	0.52	237	26.15	24.19	1.63	1.96
11	211	0.48	0.25	0.66				204	3.12	29	0.44	233	8.34	6.26	1.69	2.08
12	265	0.57	0.22	0.66				217	3.18	32	0.47	249	18.73	16.93	1.53	1.80
13	154	0.41	0.29	0.72				175	3.15	27	0.49	202	15.40	13.86	1.38	1.54
14	283	0.67	0.20	0.61				197	3.17	29	0.47	226	11.01	9.27	1.55	1.74
15	183	0.43	0.09	0.34				190	3.05	30	0.48	220	11.09	8.91	1.94	2.18
16	232	0.52	0.19	0.61				202	3.06	32	0.48	234	8.80	6.76	1.73	2.04
17	218	0.51	0.33	0.70				188	2.99	30	0.48	218	10.55	8.57	1.81	1.98
18	241	0.55	0.29	0.82	0.69			194	2.97	30	0.46	224	10.36	8.46	1.72	1.90
19	220	0.55	0.23	0.59				173	2.95	25	0.43	198	10.80	8.95	1.70	1.85
20	229	0.53	0.19	0.67				181	2.83	26	0.41	207	10.10	8.34	1.53	1.76
21	191	0.44	0.10	0.52	0.63			184	2.85	27	0.42	211	8.67	6.76	1.63	1.91
22	300	0.65	0.10	0.72				199	2.94	30	0.44	229	8.37	6.36	1.73	2.01
23	268	0.55	0.31	0.65	0.65			219	3.05	32	0.45	251	8.99	7.24	1.50	1.75
24	235	0.64	0.29	0.87				195	3.59	33	0.61	228	7.43	5.78	1.99	1.65
25	255	0.51	0.25	0.80				220	2.99	33	0.45	253	9.28	7.67	1.45	1.61
26	233	0.52	0.32	0.96				200	3.03	32	0.49	232	9.03	7.35	1.51	1.68
27	191	0.42	0.00	0.00				200	3.01	32	0.48	232	9.58	7.91	1.55	1.67
28	212	0.45	0.35	0.80				209	2.98	32	0.46	241	8.65	7.00	1.48	1.65
29	178	0.37	0.14	0.77				215	3.05	31	0.44	246	8.70	6.92	1.61	1.78
30	292	0.65	0.13	0.47				223	3.37	37	0.56	260	12.66	10.49	1.89	2.17
31	198	0.43	0.30	0.87				215	3.12	32	0.47	247	14.95	13.08	1.53	1.87
Tot.	7176							6299		935		7234				
Avg.	231.48	0.53	0.24	0.68	0.67			203.19	3.14	30.16	0.47	233.35	11.05	9.21	1.65	1.84
Max	300.00	0.67	0.43	0.96	0.70			230.00	3.59	37.00	0.61	265.00	26.15	24.19	1.99	2.18
Min.	154.00	0.37	0.00	0.00	0.63			173.00	2.83	23.00	0.37	198.00	7.43	5.78	1.38	1.54

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D	pH													
A														
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.0	168	158	125	115	43	43	39	38	17	16		
2	8.2	7.7	144	138	129	112	15	26	51	46	4	5		
3	8.3	7.9	172	156	128	117	44	39	49	46	12	10		
4	8.2	7.9	186	168	130	120	56	48	47	44	17	14		
5	7.9	8.0	182	166	132	117	50	49	45	43	17	14		
6	8.1	8.0	174	166	128	121	46	45	44	43	16	14		
7	8.2	8.0	154	152	124	118	30	34	47	49	9	7		
8	8.2	8.1	176	168	122	119	54	49	47	46	14	14		
9	8.1	7.9	166	162	119	117	47	45	44	43	14	13		
10	8.1	7.9	146	142	117	112	29	30	49	47	6	6		
11	8.2	7.9	146	136	114	112	32	24	55	54	2	1		
12	8.1	7.8	156	142	114	112	42	30	50	46	8	6		
13	8.1	7.7	154	152	110	109	44	43	45	45	10	10		
14	7.9	8.0	148	138	115	109	33	29	46	41	8	8		
15	8.0	8.0	140	124	102	106	38	18	40	40	8	6		
16	8.1	8.0	156	152	109	106	47	46	42	40	13	13		
17	8.0	8.0	156	150	110	106	46	44	41	39	13	13		
18	8.0	8.0	138	138	106	101	32	37	38	40	10	9	21.5	23.0
19	8.0	7.9	152	146	107	104	45	42	47	46	8	8		
20	8.0	7.9	152	148	114	103	38	45	50	49	7	6		
21	8.0	8.1	142	140	110	98	32	42	39	40	10	9		
22	7.9	8.0	146	148	110	101	36	47	40	38	11	10		
23	8.0	7.9	148	144	114	107	34	37	47	45	7	8		
24	8.0	7.9	164	154	114	107	50	47	42	40	14	13		
25	8.0	7.9	158	152	110	107	48	45	40	38	14	14		
26	8.1	8.0	158	154	111	108	47	46	42	40	14	13		
27	7.9	8.1	158	152	109	106	49	46	41	40	14	13		
28	8.1	7.9	152	146	114	104	38	42	38	37	14	13		
29	8.1	8.0	156	146	114	105	42	41	38	37	15	13		
30	7.9	8.0	144	152	106	103	38	49	37	36	12	15		
31	8.1	8.0	134	132	107	105	27	27	50	46	3	4	20.0	24.0
Avg.	8.1	7.9	156.4	149.7	115.6	109.4	40.8	40.3	44.0	42.5	11.3	10.5	21.5	23.0
Max	8.3	8.1	186.0	168.0	132.0	121.0	56.0	49.0	55.0	54.0	17.0	16.0	21.5	23.0
Min.	7.9	7.7	138.0	124.0	102.0	98.0	15.0	18.0	37.0	36.0	2.0	1.0	21.5	23.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	Plate Count		8	8				
2			1	A	Not used		10	11				
3			1	A	Drying Oven Failed		11	11				
4			1	A	Cannot Sterilize		11	10				
5			1	A	Glass Ware.		11	10				
6			1	A			11	11				
7			1	A			10	12				
8			1	A			10	11				
9			1	A			10	11				
10			1	A			13	13				
11			1	A			13	13				
12			1	A			10	9				
13			1	A			10	14				
14			1	A			11	13				
15			1	A			10	13				
16			1	A			9	11				
17			1	A			9	10				
18			1	A			10	12				
19			1	A			10	13				
20			1	A			10	12				
21			1	A			10	12				
22			1	A			11	10				
23			1	A			11	13				
24			1	A			11	11				
25			1	A			11	11				
26			1	A			12	11				
27			1	A			11	11				
28			1	A			11	12				
29			1	A			10	12				
30			1	A			10	14				
31			1	A	16	0	12	14				
AVG.			1	A	16	0	10	11				
Max					16	0	13	14				
Min					16	0	8	8				

City of Benton Harbor MI Disinfection Monitoring Report DMR May-18

DISTRIBUTION SYSTEM MONITORING WSSN 0600 May-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3	0.55		0.80	0.46	0.55		0.50			
4										
5										
6										
7										
8										
9	0.72		0.62	0.96	0.51		0.54			
10										
11										
12										
13										
14										
15										
16										
17										
18	0.96		0.98	0.67	0.80					
19										
20										
21						0.34	0.27			
22										
23	1.05		1.20	1.08	0.81		0.93			
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES – BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	21		
Total number of positive routine distribution samples	0600	0		
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals, mg/L	0600	0.73	1.20	0.27
Total number of check samples	0600			
Total number of positive check samples	0600			

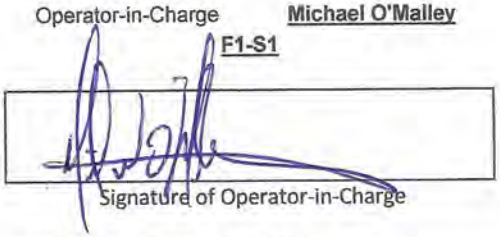
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **April-18**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0975	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	25.31	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.97	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.62	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.57%	Percent of Treated Water

Chemical Data

Chlorine on hand:	53025	lb.	Est. supply:	368	days
Primary Coagulant (Alum (Al3+)) on hand:	85784	lb.	Est. supply:	227	days
Cost of All Chemicals per Million Gallons:	$64.18	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

Number of filter confluence samples > 0.3 NTU:	0
Number of filter confluence samples collected:	174
Percent of filter confluence samples > 0.3 NTU:	0%
Number of filter confluence samples > 1 NTU	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks: We took delivery of Chlorine and Alum by the time this report was completed.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **April-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.92	0.41	0.78		0	0.00	184	3.90	32	0.68	216	3.64	2.20	1.28	1.44
2	0.48	0.40	0.90		0	0.00	225	3.25	35	0.51	260	4.74	3.02	1.55	1.72
3	0.74	0.36	0.83		0	0.00	249	3.39	39	0.53	288	4.09	2.29	1.63	1.80
4	0.50	0.28	0.67	0.67	0	0.00	230	3.41	34	0.50	264	4.10	2.36	1.39	1.74
5	0.52	0.27	0.66		0	0.00	251	3.49	35	0.49	286	4.98	2.97	1.80	2.01
6	0.35	0.31	0.67		0	0.00	239	3.46	33	0.48	272	4.83	2.63	1.99	2.20
7	0.43	0.25	0.64		0	0.00	203	3.31	29	0.47	232	3.92	2.11	1.66	1.81
8	0.46	0.24	0.65		0	0.00	169	3.21	21	0.40	190	3.72	2.01	1.51	1.71
9	0.47	0.21	0.69		0	0.00	246	3.36	36	0.49	282	3.96	2.08	1.71	1.88
10	0.55	0.23	0.64		0	0.00	211	3.32	25	0.39	236	3.84	2.21	1.46	1.63
11	0.47	0.30	0.69		0	0.00	211	3.53	33	0.55	244	4.23	2.62	1.44	1.61
12	0.47	0.33	0.70		0	0.00	246	3.68	30	0.45	276	4.26	2.53	1.57	1.73
13	0.48	0.31	0.62		0	0.00	214	3.52	34	0.56	248	4.22	2.55	1.50	1.67
14	0.45	0.14	0.58		0	0.00	178	3.23	23	0.42	201	3.84	2.01	1.67	1.83
15	0.59	0.29	0.76		0	0.00	202	3.14	30	0.47	232	3.73	1.78	1.76	1.95
16	0.64	0.11	0.81		0	0.00	146	2.48	19	0.32	165	2.95	1.19	1.60	1.76
17	0.36	0.30	0.71		0	0.00	223	3.28	36	0.53	259	3.93	2.04	1.70	1.89
18	0.61	0.35	0.68	0.82	0	0.00	215	3.30	39	0.60	254	4.03	2.58	1.29	1.45
19	0.77	0.43	0.86		0	0.00	222	3.39	50	0.76	272	4.28	2.83	1.29	1.45
20	0.64	0.21	0.72		0	0.00	211	3.15	44	0.66	255	3.93	2.00	1.77	1.93
21	0.54	0.37	0.87		0	0.00	211	3.23	48	0.73	259	4.09	2.46	1.46	1.63
22	0.57	0.38	0.88		0	0.00	197	3.18	37	0.60	234	3.91	2.01	1.73	1.90
23	0.62	0.34	0.88		0	0.00	227	3.40	41	0.61	268	4.14	2.61	1.34	1.53
24	0.60	0.37	0.86		0	0.00	233	3.52	41	0.62	274	4.28	2.61	1.49	1.67
25	0.50	0.30	0.81	0.73	0	0.00	226	3.34	37	0.55	263	9.24	7.79	1.28	1.45
26	0.61	0.30	0.82		0	0.00	226	3.40	39	0.59	265	10.16	8.39	1.60	1.77
27	0.51	0.32	0.79		0	0.00	198	3.38	27	0.46	225	13.87	12.28	1.36	1.59
28	0.54	0.24	0.75		0	0.00	231	3.39	32	0.47	263	10.59	8.94	1.44	1.65
29	0.00	0.31	0.74		0	0.00	168	3.25	25	0.48	193	8.36	6.64	1.56	1.72
30	0.63	0.42	0.62		0	0.00	231	3.22	37	0.52	268	8.79	6.80	1.81	1.99
31															
Tot.	16.05						6,239		989		7,444	158.64			
Avg.	0.53	0.30	0.74	0.74	0.00	0.00	214.10	3.34	34.03	0.53	248.13	5.29	3.55	1.55	1.74
Max	0.92	0.43	0.90	0.82	0.00	0.00	251.00	3.90	50.00	0.76	288.00	13.87	12.28	1.99	2.20
Min.	0.00	0.11	0.58	0.67	0.00	0.00	146.00	2.48	19.00	0.32	165.00	2.95	1.19	1.28	1.44
	4/4/2018	0.72	0.65	0.66	0.63	0.665	Average								

WSSN 0600 City of Benton Harbor Month/Year April-18

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS												
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.7050	182.00	1.36	0.92	1.10	0.26	3	0.07	0.08	3	0.08	0.08	6	0	0
2	1.0340	317.00	1.61	2.80	3.50	0.28	3	0.08	0.08	3	0.09	0.11	6	0	0
3	1.0975	330.00	1.58	1.80	2.30	0.34	3	0.08	0.09	3	0.10	0.11	6	0	0
4	1.0073	274.00	1.43	3.50	4.50	0.22	3	0.09	0.10	3	0.08	0.09	6	0	0
5	1.0731	319.00	1.56	5.10	5.90	0.34	3	0.07	0.08	3	0.07	0.08	6	0	0
6	1.0318	301.00	1.63	4.30	5.40	0.40	3	0.08	0.09	3	0.09	0.11	6	0	0
7	0.9147	256.00	1.47	4.60	5.00	0.37	3	0.08	0.08	3	0.08	0.09	6	0	0
8	0.7859	244.00	1.63	4.80	5.40	0.39	3	0.07	0.07	3	0.07	0.08	6	0	0
9	1.0924	331.00	1.59	4.90	5.40	0.47	3	0.08	0.09	3	0.11	0.13	6	0	0
10	0.9482	255.00	1.41	10.60	23.50	0.37	3	0.08	0.08	3	0.09	0.09	6	0	0
11	0.8919	275.00	1.62	8.60	18.50	0.34	3	0.07	0.08	3	0.08	0.11	6	0	0
12	0.9975	307.00	1.62	8.30	18.60	0.36	3	0.07	0.08	3	0.08	0.08	6	0	0
13	0.9076	251.00	1.46	12.60	31.40	0.29	3	0.07	0.07	3	0.08	0.09	6	0	0
14	0.8236	255.00	1.63	4.50	4.50	0.28	3	0.07	0.07	2	0.08	0.08	4	0	0
15	0.9597	274.00	1.50	4.80	6.40	0.31	3	0.07	0.08	3	0.08	0.09	6	0	0
16	0.8772	189.00	1.13	16.00	18.40	0.80	3	0.08	0.08	2	0.09	0.10	4	0	0
17	1.0154	294.00	1.52	7.70	7.90	0.63	3	0.09	0.09	3	0.09	0.09	6	0	0
18	0.9712	293.00	1.59	5.40	6.50	0.47	3	0.08	0.09	3	0.09	0.09	6	0	0
19	0.9788	262.00	1.41	5.60	6.90	0.31	3	0.07	0.07	3	0.08	0.08	6	0	0
20	0.9990	305.00	1.61	4.60	5.80	0.35	3	0.07	0.08	3	0.08	0.08	6	0	0
21	0.9757	295.00	1.59	4.90	7.40	0.46	3	0.07	0.08	3	0.08	0.09	6	0	0
22	0.9243	269.00	1.53	11.00	24.20	0.32	3	0.08	0.08	3	0.08	0.08	6	0	0
23	0.9979	285.00	1.50	2.60	3.30	0.41	3	0.08	0.09	3	0.09	0.09	6	0	0
24	0.9870	304.00	1.62	3.10	5.10	0.35	3	0.08	0.08	3	0.07	0.08	6	0	0
25	1.0109	306.00	1.59	4.00	4.60	0.43	3	0.07	0.08	3	0.08	0.09	6	0	0
26	0.9909	291.00	1.59	2.80	3.90	0.35	3	0.07	0.08	3	0.07	0.07	6	0	0
27	0.8742	263.00	1.58	4.10	5.60	0.27	3	0.07	0.09	3	0.08	0.08	6	0	0
28	1.0174	302.00	1.56	3.90	6.00	0.30	3	0.08	0.09	3	0.06	0.07	6	0	0
29	0.7706	234.00	1.60	3.80	5.50	0.22	3	0.08	0.08	2	0.06	0.06	4	0	0
30	1.0704	324.00	1.59	2.40	3.40	0.24	3	0.07	0.09	3	0.08	0.09	6	0	0
31															
Total	28.7311	8387.00					90			87			174	0	0
Avg.	0.9577	279.57	1.54	5.47	8.53	0.36	87	0.08	0.08		0.08		Total	Total	Total
Max	1.0975	331.00	1.63	16.00	31.40	0.80		0.09	0.10		0.11	0.13	6	0	0
Min.	0.7050	182.00	1.13	0.92	1.10	0.22		0.07	0.07		0.06				

WSSN 0600 | MONTH/YEAR | April-18 |

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.1	188	178	140	127	48	51	42	43	20	17		
2	8.0	8.0	174	170	120	125	54	45	42	40	17	17		
3	8.1	8.1	194	176	146	125	48	51	45	46	20	15		
4	8.1	7.8	152	156	117	125	35	31	55	53	4	6		
5	8.1	7.9	172	166	132	124	40	42	50	48	12	11		
6	8.1	7.9	166	142	136	123	30	19	56	53	6	3	24.0	25.5
7	7.9	7.9	168	166	136	123	32	43	55	51	8	9		
8	8.1	8.0	156	148	143	123	13	25	55	50	4	6		
9	8.2	7.8	198	180	143	120	55	60	53	50	16	14		
10	8.0	8.0	194	190	130	129	64	61	47	46	18	18		
11	8.0	7.9	188	184	134	129	54	55	47	46	17	17		
12	8.1	8.1	192	184	134	127	58	57	51	48	16	16		
13	8.1	8.0	170	188	117	128	53	60	46	51	14	15		
14	8.0	7.8	190	186	131	129	59	57	50	48	16	16		
15	8.2	7.8	164	160	128	127	36	33	48	46	11	11		
16	8.1	7.9	190	182	131	122	59	60	49	47	17	16		
17	8.1	7.8	202	168	153	126	49	42	63	51	11	10	19.0	23.0
18	8.1	7.9	194	188	133	124	61	64	46	48	19	17		
19	8.1	8.1	174	180	123	127	51	53	45	46	15	16		
20	8.1	8.0	182	172	132	116	50	56	46	45	16	15		
21	7.9	8.0	188	172	133	120	55	52	50	47	16	13		
22	8.0	8.0	194	188	136	124	58	64	53	51	15	15		
23	8.1	7.8	174	158	134	126	40	32	55	52	9	7		
24	8.0	7.9	166	166	133	127	33	39	53	51	8	9	20.5	23.0
25	8.1	7.9	178	170	136	128	42	42	51	45	13	14		
26	8.1	8.0	144	140	118	126	26	14	50	47	5	5		
27	8.1	7.7	156	166	122	127	34	39	52	54	6	8		
28	8.1	7.8	154	164	115	122	39	42	51	50	7	10		
29	8.1	7.9	152	158	114	118	38	40	44	46	10	11		
30	8.0	8.0	180	176	119	117	61	59	50	48	14	14		
Avg.	8.1	7.9	176.5	170.7	130.6	124.5	45.8	46.3	50.0	48.2	12.7	12.4	21.2	23.8
Max	8.2	8.1	202.0	190.0	153.0	129.0	64.0	64.0	63.0	54.0	20.0	18.0	63.5	71.5
Min.	7.9	7.7	144.0	140.0	114.0	116.0	13.0	14.0	42.0	40.0	4.0	3.0	21.2	23.8

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	0	1	5	5.5				
2			1	A	0	1	5	5.5				
3			1	A	0	0	5	5.5				
4			1	A	0	0	5	7.0				
5			1	A	0	0	5	8.0				
6			1	A	0	0	5	8.0				
7			1	A	0	0	5	8.0				
8			1	A	0	0	6	8.0				
9			1	A	0	1	5	5.5				
10			1	A	0	2	5	5.5				
11			1	A	0	0	6	5.5				
12			1	A	0	0	6	6.0				
13			1	A	0	0	6	6.0				
14			1	A	0	0	7	6.5				
15			1	A	0	0	6	9.0				
16			1	A	0	0	6	6.5				
17			1	A	0	0	7	9.0				
18			1	A	0	2	6	6.5				
19			1	A	0	1	6	6.5				
20			1	A	0	0	6	7.0				
21			1	A	0	0	7	6.5				
22			1	A	0	12	7	6.5				
23			1	A	0	9	8	10.0				
24			1	A	0	0	9	10.0				
25			1	A	31	0	8	9.0				
26			1	A	57	0	8	11.0				
27			1	A	102	0	8.0	12.0				
28			1	A	73	1	9.0	12.0				
29			1	A	67	0	8.7	8.5				
30			1	A	28	0	8.5	9.5				
31												
AVG.			1	A	12	1	6	8				
Max					102	12	9	12				
Min					0	0	5	6				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 April-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4	1.14		1.37	1.07	1.15		1.23			
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18	1.04		0.98	0.82	0.96		1.03			
19				0.81	0.70					
20										
21										
22										
23										
24										
25	0.54		0.90	0.88	0.60		0.96			
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	14		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.95	1.37	0.54
Total number of check samples	0600			
Total number of positive check samples	0600			

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley**

F1-S1

Signature of Operator-in-Charge

Month/Year **March-18**

F1-S2

Water Plant Classification

Berrien

County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1286	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	25.67	Hours/day no washes this month
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.96	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.97	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.00%	Percent of Treated Water

Chemical Data

Chlorine on hand:	17928	lb.	Est. supply:	268 days
Primary Coagulant (Alum (Al3+)) on hand:	61558	lb.	Est. supply:	78 days
Cost of All Chemicals per Million Gallons:	$64.83	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

Number of filter confluence samples > 0.3 NTU:	0	North	0	South
Number of filter confluence samples collected:	93	CFE	93	CFE
Percent of filter confluence samples > 0.3 NTU:	0%		0%	
Number of filter confluence samples > 1 NTU	0		0	

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO

If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO

If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES

If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO

If yes, indicate date(s) and duration on a separate sheet.

Remarks:

New Fluoride System on March 1, 2018

WSSN 0600 City of Benton Harbor Month/Year March-18

COAGULATION PARAMETERS

	MIL.	ALUM	ALUM	TURBIDITY UNITS			FILTERED (CFE) NORTH		#	FILTERED (CFE) SOUTH		#	2-hrs Compliance Peroids	
D	GAL.	Dry	as Al3+	RAW		Applied								
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	Avg.	Max.	Samples	Avg.	Max.	Samples	#of	#of
T		Pounds							Taken			Taken	Periods	Periods
E		Add							North			South	>.30NTU	>.30NTU
													North	South
1	1.1286	326.00	1.52	6.20	6.30	0.57	0.09	0.09	3	0.09	0.09	3	0	0
2	1.0333	299.00	1.52	4.70	5.10	0.40	0.07	0.08	3	0.08	0.09	3	0	0
3	0.9894	313.00	1.66	24.00	57.20	0.67	0.08	0.09	3	0.09	0.10	3	0	0
4	0.9367	270.00	1.52	7.70	12.70	0.67	0.11	0.12	3	0.12	0.13	3	0	0
5	0.9927	310.00	1.64	4.00	5.90	0.31	0.07	0.08	3	0.07	0.08	3	0	0
6	0.9668	296.00	1.69	3.60	5.10	0.31	0.06	0.07	3	0.08	0.08	3	0	0
7	1.0112	287.00	1.49	5.60	6.00	0.41	0.06	0.06	3	0.07	0.08	3	0	0
8	1.0003	289.00	1.52	8.10	10.10	0.58	0.07	0.08	3	0.06	0.07	3	0	0
9	1.0310	312.00	1.59	7.90	11.40	0.71	0.08	0.08	3	0.09	0.10	3	0	0
10	1.0178	295.00	1.52	6.70	11.10	0.79	0.08	0.09	3	0.08	0.09	3	0	0
11	0.9422	277.00	1.55	5.10	5.80	0.55	0.08	0.08	3	0.08	0.09	3	0	0
12	0.9758	295.00	1.59	7.00	10.40	0.41	0.08	0.08	3	0.09	0.10	3	0	0
13	0.9360	262.00	1.47	14.60	30.30	0.37	0.07	0.07	3	0.07	0.07	3	0	0
14	0.9883	338.00	1.80	6.60	7.80	0.34	0.08	0.08	3	0.08	0.09	3	0	0
15	1.0094	282.00	1.47	4.40	5.00	0.36	0.07	0.08	3	0.07	0.08	3	0	0
16	0.9793	284.00	1.53	4.50	5.10	0.45	0.06	0.07	3	0.07	0.08	3	0	0
17	0.8786	248.00	1.49	3.30	5.10	0.04	0.07	0.07	3	0.07	0.07	3	0	0
18	0.9632	291.00	1.59	3.90	4.50	0.36	0.70	0.08	3	0.08	0.09	3	0	0
19	0.9504	291.00	1.61	3.50	6.10	0.43	0.07	0.07	3	0.07	0.07	3	0	0
20	0.9741	284.00	1.53	3.90	4.20	0.37	0.07	0.07	3	0.08	0.09	3	0	0
21	0.9380	300.00	1.68	10.40	21.50	0.32	0.08	0.08	3	0.07	0.07	3	0	0
22	0.9374	268.00	1.50	4.10	5.40	0.28	0.08	0.10	3	0.09	0.10	3	0	0
23	0.9353	300.00	1.69	3.70	4.80	0.31	0.08	0.08	3	0.08	0.09	3	0	0
24	0.8733	277.00	1.67	12.50	31.70	0.33	0.07	0.08	3	0.08	0.08	3	0	0
25	0.8817	262.00	1.56	9.00	20.50	0.32	0.09	0.10	3	0.07	0.08	3	0	0
26	1.0121	283.00	1.56	1.70	2.00	0.36	0.08	0.09	3	0.07	0.08	3	0	0
27	0.9321	277.00	1.56	2.90	3.40	0.36	0.06	0.07	3	0.08	0.09	3	0	0
28	0.9764	302.00	1.63	2.90	4.00	0.40	0.07	0.07	3	0.09	0.10	3	0	0
29	1.0046	298.00	1.56	2.20	2.50	0.39	0.08	0.10	3	0.10	0.11	3	0	0
30	1.0303	324.00	1.65	2.20	2.70	0.37	0.07	0.07	3	0.09	0.09	3	0	0
31	0.8266	249.00	1.58	10.00	25.10	0.28	0.08	0.08	3	0.10	0.10	3	0	0
Total	30.0529	8989.00						# N CFE take	93		# S CFE take	93	#N > .3	#S > .3
Avg.	0.9694	289.97	1.58	6.35	10.93	0.41	0.10	0.08	0.08	0.08	0.09		Total	Total
Max	1.1286	338.00	1.80	24.00	57.20	0.79	0.70	0.12	0.12	0.12	0.13	# > 0.3	0	0
Min.	0.8266	248.00	1.47	1.70	2.00	0.04	0.06	0.06	0.06	0.06	0.07	% Comp	1.00	1.00

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **March-18**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D		Fluoride		mg/l												
A	Pounds	Applied				INTAKE		After Wetwell		FILTERED		Total NaOCl Use			TAP	
T	NaF	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E							mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	105	0.82	0.00	0.00				284	3.76	34	0.45	318	4.32	2.38	1.71	1.94
2	330	0.70	0.21	0.37				256	3.70	31	0.45	287	4.29	2.31	1.67	1.98
3	175	0.39	0.11	0.59				248	3.74	37	0.56	285	4.44	2.60	1.60	1.84
4	340	0.80	0.21	0.67	0.53			226	3.60	22	0.35	248	4.11	2.17	1.55	1.94
5	282	0.63	0.20	0.62				232	3.49	55	0.83	287	4.52	2.43	1.76	2.09
6	347	0.79	0.37	0.83	0.71			215	3.32	30	0.46	245	3.84	1.75	1.92	2.09
7	364	0.79	0.30	0.87				212	3.13	30	0.44	242	3.69	1.52	1.95	2.17
8	334	0.74	0.37	0.92	0.53			213	3.18	26	0.39	239	3.69	1.63	1.89	2.06
9	399	0.85	0.31	0.88	0.72			226	3.27	25	0.36	251	3.76	1.87	1.70	1.89
10	358	0.78	0.43	0.91				231	3.39	32	0.47	263	3.99	2.16	1.69	1.83
11	370	0.87	0.30	0.91				198	3.14	26	0.41	224	3.68	1.84	1.67	1.84
12	315	0.71	0.33	0.79				211	3.23	31	0.47	242	3.82	2.05	1.60	1.77
13	237	0.56	0.38	0.79				194	3.09	26	0.41	220	3.63	1.93	1.53	1.70
14	308	0.69	0.34	0.85	0.70			210	3.17	32	0.48	242	3.76	2.05	1.54	1.71
15	300	0.66	0.31	0.80				214	3.16	35	0.52	249	3.80	1.68	1.96	2.12
16	366	0.82	0.34	0.81				205	3.12	29	0.44	234	3.69	1.61	1.92	2.08
17	323	0.81	0.00	0.00				187	3.18	23	0.39	210	3.71	1.87	1.68	1.84
18	262	0.60	0.29	0.77				202	3.13	23	0.36	225	3.61	1.57	1.76	2.04
19	286	0.66	0.24	0.80				196	3.08	20	0.31	216	3.51	1.57	1.83	1.94
20	274	0.62	0.27	0.85				200	3.06	21	0.32	221	3.51	1.58	1.74	1.93
21	307	0.72	0.33	0.84				209	3.33	26	0.41	235	3.86	2.20	1.46	1.66
22	304	0.72	0.31	0.82	0.72			199	3.17	24	0.38	223	3.67	1.93	1.56	1.74
23	269	0.63	0.16	0.77				203	3.24	29	0.46	232	3.83	1.87	1.79	1.96
24	203	0.51	0.36	0.76				185	3.16	22	0.38	207	3.67	1.84	1.64	1.83
25	250	0.63	0.29	0.90				188	3.18	22	0.37	210	3.68	1.87	1.63	1.81
26	230	0.50	0.32	0.81				215	3.17	29	0.43	244	3.73	1.98	1.56	1.75
27	244	0.58	0.37	0.79				196	3.14	23	0.37	219	3.64	1.94	1.45	1.70
28	173	0.39	0.41	0.83	0.65			204	3.12	24	0.37	228	3.63	1.86	1.48	1.77
29	281	0.62	0.38	0.85	0.45			208	3.09	23	0.34	231	3.56	2.01	1.31	1.55
30	279	0.60	0.31	0.73				220	3.19	24	0.35	244	3.63	1.97	1.52	1.66
31	374	1.00	0.39	0.78				183	3.30	30	0.54	213	3.98	2.60	1.23	1.38
Tot.	8989							6570		864		7434				
Avg.	289.97	0.68	0.29	0.74	0.63			211.94	3.26	27.87	0.43	239.81	3.81	1.96	1.65	1.86
Max	399.00	1.00	0.43	0.92	0.72			284.00	3.76	55.00	0.83	318.00	4.52	2.60	1.96	2.17
Min.	105.00	0.39	0.00	0.00	0.45			183.00	3.06	20.00	0.31	207.00	3.51	1.52	1.23	1.38

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	7.9	7.8	144	140	109	103	35	37	46	46	7	6		
2	8.0	7.7	144	138	104	103	40	35	47	49	6	4		
3	8.0	7.8	162	154	114	103	48	51	46	45	11	10		
4	7.9	7.8	164	152	113	104	51	48	48	46	11	9		
5	8.0	7.8	166	158	106	106	60	52	42	40	15	14		
6	7.9	7.8	154	146	107	101	47	45	41	40	13	11		
7	7.9	7.6	142	138	106	101	36	37	45	42	7	8	19.5	21.0
8	8.0	7.7	164	150	118	101	46	49	59	46	4	9		
9	7.9	7.7	156	142	117	99	39	43	51	46	7	7		
10	8.0	7.7	158	148	119	109	39	39	45	42	11	11		
11	8.0	7.8	162	156	113	107	49	49	45	42	12	12		
12	7.9	7.8	156	154	114	114	42	40	14	38	8	14		
13	8.1	7.9	162	158	110	110	52	48	42	41	14	14		
14	7.9	8.0	168	162	110	108	58	54	42	41	15	15		
15	8.0	7.6	158	142	120	111	38	31	55	47	5	6	17.0	21.5
16	7.9	7.8	148	142	111	104	37	38	43	38	10	11		
17	8.0	7.8	148	144	108	106	40	38	46	43	8	9		
18	8.2	8.0	148	140	113	105	35	35	43	42	10	9		
19	8.2	7.9	162	134	140	103	22	31	55	46	6	4	19.0	21.5
20	8.1	7.7	148	134	124	105	24	29	51	47	5	4		
21	7.9	7.8	150	156	110	114	40	42	38	40	13	14		
22	8.1	7.9	160	156	113	110	47	46	42	40	14	14		
23	7.9	8.0	152	148	110	104	42	44	37	38	15	13		
24	8.1	7.8	158	154	111	106	47	48	38	38	16	14		
25	8.0	7.9	152	146	114	106	38	40	37	38	15	13	19.5	21.5
26	8.2	7.7	158	144	121	106	37	38	51	46	8	7		
27	8.1	7.8	184	136	153	106	31	30	50	43	15	14		
28	8.1	8.1	178	136	148	108	30	28	55	47	10	5		
29	8.2	8.0	190	158	152	121	38	37	57	49	12	9		
30	8.2	8.0	146	156	114	123	32	33	53	58	3	3	26.0	27.5
31	8.0	7.9	178	174	131	128	47	46	45	43	16	16		
Avg.	8.0	7.8	158.1	147.4	117.4	106.9	40.7	40.5	45.5	43.5	10.2	9.8	20.2	22.6
Max	8.2	8.1	190.0	162.0	153.0	123.0	60.0	54.0	59.0	58.0	16.0	15.0	26.0	27.5
Min.	7.9	7.6	142.0	134.0	104.0	99.0	22.0	28.0	14.0	38.0	3.0	3.0	17.0	21.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	134	0	3	3				
2			1	A	71	1	3	3				
3			1	A	128	0	3	3				
4			1	A	80	0	3	3				
5			1	A	77	0	3	3				
6			1	A	112	4	3	3				
7			1	A	110	0	3	3				
8			1	A	77	0	3	3				
9			1	A	119	0	3	3				
10			1	A	65	1	3	3				
11			1	A	92	0	3	3				
12			1	A	149	0	3	3				
13			1	A	175	1	3	3				
14			1	A	127	0	3	3				
15			1	A	152	0	3	3				
16			1	A	129	0	3	3				
17			1	A	80	0	3	3				
18			1	A	62	0	3	3				
19			1	A	91	0	3	3				
20			1	A	40	0	3	3				
21			1	A	38	0	3	3				
22			1	A	32	0	3	3				
23			1	A	59	0	3	3				
24			1	A	66	1	3	3				
25			1	A	69	0	3	3				
26			1	A	78	0	3	3				
27			1	A	73	0	3	3				
28			1	A	88	0	3	3				
29			1	A	92	1	3	3				
30			1	A	51	0	3	3				
31			1	A	62	0	3	3				
AVG.			1	A	90	0	3	3				
Max					175	4	3	3				
Min					32	0	3	3				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 March-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7	1.37		1.42	1.17	1.35		1.57			
8										
9										
10										
11										
12										
13										
14	0.78		1.06	0.82	0.89		1.05			
15										
16										
17										
18										
19										
20										
21										
22							0.86			
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	8		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.12	1.57	0.78
Total number of check samples	0600			
Total number of positive check samples	0600			

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** F1-S1

Signature of ~~Operator-in-Charge~~

Month/Year **July-18** F1-S2

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.7095	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	263.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.15	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.09	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.45%	Percent of Treated Water

Chemical Data

Chlorine on hand:	17423	lb.	Est. supply:	166 days
Primary Coagulant (Alum (Al3+)) on hand:	57984	lb.	Est. supply:	53 days
Cost of All Chemicals per Million Gallons:	$67.62	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks:

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **July-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.49	0.24	0.65		0	0.00	251	3.50	25	0.35	276	9.70	8.45	1.06	1.25
2	0.43	0.00	0.45		0	0.00	241	3.44	20	0.29	261	8.92	7.39	1.26	1.53
3	0.54	0.14	0.40		0	0.00	255	3.39	30	0.40	285	11.38	10.00	1.18	1.38
4	0.53	0.26	0.59		0	0.00	257	3.63	27	0.38	284	10.97	9.68	1.13	1.29
5	0.47	0.08	0.37		0	0.00	301	4.04	35	0.47	336	13.70	12.30	1.29	1.40
6	0.53	0.21	0.52	0.58	0	0.00	289	4.32	35	0.52	324	13.50	12.00	1.34	1.50
7	0.47	0.19	0.55		0	0.00	286	4.10	36	0.52	322	11.32	9.74	1.41	1.58
8	0.38	0.25	0.60		0	0.00	272	3.97	36	0.53	308	10.77	9.07	1.45	1.70
9	0.47	0.11	0.51		0	0.00	289	3.91	39	0.53	328	10.03	7.98	1.90	2.05
10	0.49	0.05	0.56		0	0.00	267	3.89	35	0.51	302	11.48	9.22	1.93	2.26
11	0.57	0.27	0.64	0.67	0	0.00	301	3.92	35	0.46	336	10.58	8.67	1.76	1.91
12	0.40	0.19	0.57		0	0.00	302	4.00	37	0.49	339	15.56	13.72	1.68	1.84
13	0.41	0.17	0.76		0	0.00	289	3.82	37	0.49	326	11.00	9.15	1.67	1.85
14	0.53	0.16	0.66		0	0.00	318	3.56	31	0.35	349	11.88	10.04	1.64	1.84
15	0.58	0.21	0.60		0	0.00	295	4.01	40	0.54	335	10.80	9.32	1.33	1.48
16	0.52	0.11	0.49		0	0.00	294	3.80	42	0.54	336	10.16	8.45	1.45	1.71
17	0.48	0.20	0.62		0	0.00	294	3.85	41	0.54	335	8.53	6.73	1.40	1.80
18	0.43	0.26	0.68		0	0.00	414	3.81	43	0.40	457	9.71	7.79	1.53	1.92
19	0.56	0.33	0.65		0	0.00	277	4.14	40	0.60	317	12.86	11.09	1.56	1.77
20	0.44	0.25	0.62		0	0.00	327	4.02	49	0.60	376	10.78	8.80	1.61	1.98
21	0.47	0.13	0.61		0	0.00	288	4.00	44	0.61	332	12.99	11.09	1.74	1.90
22	0.41	0.19	0.50		0	0.00	261	3.71	39	0.55	300	9.94	8.02	1.75	1.92
23	0.45	0.20	0.61		0	0.00	322	4.30	40	0.53	362	11.52	9.71	1.65	1.81
24	0.48	0.20	0.66		0	0.00	353	4.75	46	0.62	399	15.41	13.79	1.46	1.62
25	0.47	0.14	0.60	0.65	0	0.00	354	4.68	45	0.59	399	15.71	13.96	1.49	1.75
26	0.56	0.21	0.70		0	0.00	435	4.67	38	0.41	473	26.51	25.06	1.31	1.45
27	0.36	0.22	0.66		0	0.00	430	4.83	43	0.48	473	14.52	12.97	1.38	1.55
28	0.47	0.28	0.71		0	0.00	500	4.37	45	0.39	545	12.58	11.10	1.35	1.48
29	0.47	0.17	0.64		0	0.00	354	5.20	49	0.72	403	16.46	15.18	1.17	1.28
30	0.55	0.21	0.63		0	0.00	331	5.12	54	0.84	385	12.39	11.13	1.04	1.26
31	0.43	0.11	0.59		0	0.00	436	5.81	72	0.96	508	14.30	12.96	1.12	1.34
Tot.	14.39						9,632		1,203		11,111	385.97			
Avg.	0.48	0.19	0.59	0.63	0.00	0.00	314.90	4.09	38.53	0.51	353.43	12.39	10.72	1.46	1.67
Max	0.58	0.33	0.76	0.67	0.00	0.00	500.00	5.20	54.00	0.84	545.00	26.51	25.06	1.93	2.26
Min.	0.36	0.00	0.37	0.58	0.00	0.00	241.00	3.39	20.00	0.29	261.00	8.53	6.73	1.04	1.25

WSSN 0600 City of Benton Harbor Month/Year July-18

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS				FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
D	GAL.	Dry	as Al3+	RAW		Applied	#								
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0705	318.00	1.56	1.20	1.60	0.13	3	0.07	0.07	3	0.06	0.06	6	0	0
2	1.0454	254.00	1.28	1.30	2.10	0.28	3	0.08	0.09	3	0.09	0.12	6	0	0
3	1.1232	307.00	1.44	0.93	1.30	0.20	3	0.07	0.08	3	0.07	0.08	6	0	0
4	1.0577	308.00	1.53	0.80	1.00	0.15	3	0.06	0.06	3	0.06	0.06	6	0	0
5	1.1117	308.00	1.46	1.10	1.40	0.16	3	0.07	0.09	3	0.08	0.10	6	0	0
6	0.9986	283.00	1.62	4.40	11.60	0.24	3	0.07	0.08	3	0.08	0.09	6	0	0
7	1.0409	306.00	1.55	1.10	1.30	0.13	3	0.06	0.06	3	0.05	0.06	6	0	0
8	1.0220	300.00	1.54	0.78	1.00	0.12	3	0.06	0.06	3	0.06	0.06	6	0	0
9	1.1042	326.00	1.55	1.00	1.40	0.12	3	0.06	0.06	3	0.06	0.06	6	0	0
10	1.0243	302.00	1.55	0.88	1.20	0.13	3	0.06	0.07	3	0.06	0.07	6	0	0
11	1.1472	329.00	1.51	1.20	1.40	0.14	3	0.07	0.07	3	0.08	0.09	6	0	0
12	1.1258	327.00	1.53	1.20	1.70	0.15	3	0.07	0.07	3	0.06	0.06	6	0	0
13	1.1306	321.00	1.49	0.90	1.10	0.14	3	0.06	0.06	3	0.06	0.07	6	0	0
14	1.3321	435.00	1.72	3.40	3.70	0.23	3	0.06	0.06	3	0.08	0.09	6	0	0
15	1.0979	319.00	1.53	1.20	1.30	0.18	3	0.07	0.07	3	0.07	0.07	6	0	0
16	1.1559	328.00	1.49	0.61	0.76	0.12	3	0.06	0.06	3	0.06	0.06	6	0	0
17	1.1410	327.00	1.51	0.89	1.30	0.17	3	0.07	0.09	3	0.07	0.08	6	0	0
18	1.6218	435.00	1.41	2.50	3.30	0.19	3	0.06	0.07	3	0.07	0.08	6	0	0
19	0.9990	293.00	1.54	0.81	1.10	0.12	3	0.05	0.06	3	0.05	0.06	6	0	0
20	1.2139	348.00	1.51	0.96	1.30	0.13	3	0.07	0.09	3	0.07	0.08	6	0	0
21	1.0737	312.00	1.53	1.80	3.00	0.16	3	0.07	0.07	3	0.07	0.07	6	0	0
22	1.0504	278.00	1.39	3.30	4.50	0.17	3	0.06	0.07	3	0.06	0.06	6	0	0
23	1.1178	321.00	1.51	3.40	3.70	0.17	3	0.07	0.07	3	0.07	0.07	6	0	0
24	1.1098	319.00	1.51	2.60	2.90	0.17	3	0.06	0.07	3	0.07	0.07	6	0	0
25	1.1293	325.00	1.51	1.60	1.80	0.18	3	0.07	0.08	3	0.07	0.07	6	0	0
26	1.3895	423.00	1.51	5.00	5.70	0.22	3	0.07	0.07	3	0.07	0.07	6	0	0
27	1.3278	393.00	1.56	3.90	7.70	0.22	3	0.07	0.08	3	0.06	0.07	6	0	0
28	1.7095	441.00	1.36	4.00	4.10	0.25	3	0.08	0.09	3	0.08	0.08	6	0	0
29	1.0159	300.00	1.55	1.00	1.10	0.18	3	0.07	0.08	3	0.06	0.06	6	0	0
30	0.9645	281.00	1.53	1.00	1.10	0.19	3	0.07	0.08	3	0.08	0.09	6	0	0
31	1.1193	336.00	1.58	1.00	1.40	0.17	3	0.08	0.09	3	0.07	0.07	6	0	0
Total	35.5712	10203.00					93			93			186	0	0
Avg.	1.1475	329.13	1.51	1.80	2.51	0.17	93	0.07	0.07		0.07		Total	Total	Total
Max	1.7095	441.00	1.72	5.00	11.60	0.28		0.08	0.09		0.09	0.12	6	0	0
Min.	0.9645	254.00	1.28	0.61	0.76	0.12		0.05	0.06		0.05				

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.2	8.0	138	132	107	103	31	29	41	39	9	8		
2	8.0	8.0	134	142	104	98	30	44	40	38	8	11		
3	8.1	8.1	140	150	103	102	37	48	36	37	12	13		
4	8.2	7.8	142	132	108	104	34	28	43	39	8	8		
5	8.1	8.0	142	140	105	98	37	42	39	36	11	12		
6	8.1	8.1	138	146	104	100	34	46	38	33	10	16		
7	8.2	8.0	136	134	107	106	29	28	42	41	7	8		
8	8.1	8.1	134	130	104	99	30	31	43	40	6	7		
9	8.2	8.1	140	136	109	103	31	33	39	38	10	10		
10	8.1	8.0	158	126	106	100	52	26	42	33	13	11		
11	8.0	7.9	134	130	106	101	28	29	40	38	9	9		
12	8.2	8.0	148	144	106	103	42	41	39	38	12	12	18.5	21.5
13	8.2	8.0	148	142	112	102	36	40	34	40	15			
14	8.2	8.1	146	138	111	104	35	34	39	37	12	11		
15	8.2	8.1	150	140	114	104	36	36	35	34	15	13		
16	8.2	7.7	138	136	106	107	32	29	39	38	10	10	17.0	21.0
17	8.3	8.1	148	140	108	103	40	37	39	40	12	9		
18	8.1	8.0	154	148	102	101	52	47	35	37	16	13		
19	8.1	8.0	138	136	110	106	28	30	39	38	10	10		
20	8.1	8.1	150	148	105	98	45	50	35	32	15	16		
21	8.1	7.9	152	142	110	102	42	40	38	36	14	13	17.5	20.5
22	8.2	8.0	150	142	108	103	42	39	36	35	15	14		
23	8.1	8.1	154	142	113	103	41	39	37	36	15	13		
24	8.2	8.1	156	142	116	103	40	39	38	38	15	12		
25	8.2	8.1	142	152	109	103	33	49	40	36	10	14	17.0	21.0
26	8.3	8.2	144	146	108	112	36	34	42	39	9	12		
27	8.2	8.1	138	126	125	109	13	17	45	39	6	7		
28	8.4	8.2	144	136	127	114	17	22	45	38	8	10		
29	8.3	8.2	140	146	110	116	30	30	42	43	9	9		
30	8.2	8.1	152	148	110	115	42	33	40	43	12	9		
31	8.0	8.0	134	156	109	108	25	48	38	35	9	16		
Avg.	8.2	8.0	144.3	139.7	109.1	104.1	35.2	35.7	39.3	37.6	11.1	11.0	17.5	21.0
Max	8.4	8.2	158.0	152.0	127.0	116.0	52.0	50.0	45.0	43.0	16.0	16.0	18.5	21.5
Min.	8.0	7.7	134.0	126.0	102.0	98.0	13.0	17.0	34.0	32.0	6.0	7.0	17.0	20.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	22	1	20	18.0				
2			1	A	56	0	20	19.0				
3			1	A	42	0	21	20.0				
4			1	A	20	0	17	21.0				
5			1	A	34	0	23	20.0				
6			1	A	44	0	14	19.8				
7			1	A	30	0	10	20.0				
8			1	A	15	1	12	18.0				
9			1	A	13	1	13	17.0				
10			1	A	48	0	14	16.0				
11			1	A	24	1	12	14.0				
12			1	A	25	0	15	14.0				
13			1	A	66	0	17	14.5				
14			1	A	67	0	17	18.0				
15			1	A	33	0	16	16.5				
16			1	A	30	0	14	18.0				
17			1	A	60	0	18	17.0				
18			1	A	66	2	11	17.0				
19			1	A	278	3	11	17.0				
20			1	A	36	0	14	16.0				
21			1	A	41	0	15	13.5				
22			1	A	56	0	15	13.5				
23			1	A	54	1	17	14.5				
24			1	A	60	0	20	16.0				
25			1	A	31	0	22	18.0				
26			1	A	40	0	22	20.0				
27			1	A	30	0	22.0	23.0				
28			1	A	63	1	9.0	12.0				
29			1	A	75	0	8.7	8.5				
30			1	A	174	1	8.5	9.5				
31			1	A	305	1	21.0	22.0				
AVG.			1	A	63	0	16	17				
Max					305	3	23	23				
Min					13	0	9	9				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 July-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6	0.83	0.00	0.98	0.45	0.48		0.47			
7										
8										
9										
10										
11	0.42	0.00	0.99	0.73	0.84		0.79			
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25	0.67	0.00	0.79	0.33	0.65		0.70			
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.56	0.99	0.00
Total number of check samples	0600			
Total number of positive check samples	0600			

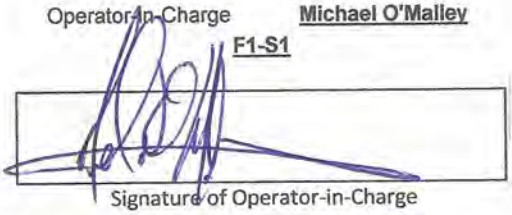
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **June-18**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1758	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	275.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.04	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.11	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.60%	Percent of Treated Water

Chemical Data

Chlorine on hand:	29795	lb.	Est. supply:	274	days
Primary Coagulant (Alum (Al3+)) on hand:	69501	lb.	Est. supply:	100	days
Cost of All Chemicals per Million Gallons:	$64.48	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks:

WSSN 0600 City of Benton Harbor Month/Year June-18

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0580	301.00	1.50	1.70	2.40	0.21	3	0.07	0.08	3	0.08	0.09	6	0	0
2	0.9962	295.00	1.56	6.40	8.10	0.19	3	0.07	0.07	3	0.07	0.07	6	0	0
3	0.8473	258.00	1.60	5.10	7.90	0.21	3	0.07	0.08	3	0.06	0.07	6	0	0
4	1.0101	294.00	1.53	2.10	2.70	0.20	3	0.06	0.07	3	0.06	0.06	6	0	0
5	1.0072	293.00	1.53	3.20	5.00	0.18	3	0.07	0.07	3	0.07	0.07	6	0	0
6	1.0172	297.00	1.52	2.20	2.50	0.17	3	0.06	0.06	3	0.06	0.06	6	0	0
7	1.1542	344.00	1.57	1.80	2.20	0.16	3	0.06	0.06	3	0.07	0.08	6	0	0
8	1.0949	332.00	1.60	1.50	1.60	0.16	3	0.07	0.08	3	0.07	0.08	6	0	0
9	1.0208	308.00	1.59	1.20	1.40	0.15	3	0.06	0.07	3	0.07	0.08	6	0	0
10	0.9521	287.00	1.59	2.40	5.10	0.13	3	0.06	0.07	3	0.05	0.06	6	0	0
11	0.9658	291.00	1.59	1.60	3.20	0.12	3	0.06	0.07	3	0.06	0.06	6	0	0
12	1.0264	308.00	1.58	1.20	1.70	0.14	3	0.06	0.06	3	0.06	0.07	6	0	0
13	1.0671	322.00	1.59	1.40	1.90	0.13	3	0.07	0.08	3	0.07	0.08	6	0	0
14	0.9449	276.00	1.54	1.50	2.40	0.16	3	0.06	0.06	3	0.07	0.08	6	0	0
15	1.1397	341.00	1.57	1.00	1.20	0.16	3	0.07	0.08	3	0.07	0.08	6	0	0
16	1.0190	307.00	1.59	2.00	3.90	0.11	3	0.08	0.09	3	0.06	0.06	6	0	0
17	1.1131	333.00	1.57	1.20	1.40	0.15	3	0.08	0.09	3	0.07	0.07	6	0	0
18	1.1128	322.00	1.52	1.20	1.60	0.14	3	0.07	0.08	3	0.07	0.08	6	0	0
19	1.0305	297.00	1.52	1.60	1.70	0.15	3	0.08	0.09	3	0.08	0.09	6	0	0
20	1.1758	339.00	1.52	1.10	1.30	0.16	3	0.07	0.08	3	0.07	0.08	6	0	0
21	1.1378	329.00	1.52	1.40	1.60	0.13	3	0.06	0.07	3	0.07	0.08	6	0	0
22	1.0396	300.00	1.52	0.97	1.30	0.14	3	0.07	0.08	3	0.06	0.07	6	0	0
23	1.0290	338.00	1.73	1.10	1.40	0.22	3	0.07	0.08	3	0.08	0.09	6	0	0
24	1.1059	319.00	1.52	1.10	1.30	0.17	3	0.07	0.07	3	0.07	0.08	6	0	0
25	1.0083	297.00	1.55	1.00	1.20	0.14	3	0.06	0.06	3	0.06	0.07	6	0	0
26	1.0509	311.00	1.55	0.80	1.30	0.14	3	0.06	0.07	3	0.07	0.08	6	0	0
27	0.9505	279.00	1.54	1.10	1.30	0.14	3	0.07	0.07	3	0.06	0.06	6	0	0
28	1.0173	298.00	1.54	1.10	1.40	0.13	3	0.07	0.09	3	0.08	0.09	6	0	0
29	1.0270	301.00	1.54	4.20	11.00	0.13	3	0.08	0.09	3	0.07	0.09	6	0	0
30	1.0581	311.00	1.55	1.30	1.70	0.14	3	0.07	0.07	3	0.06	0.06	6	0	0
31															
Total	31.1775	9228.00					90			90			180	0	0
Avg.	1.0393	307.60	1.56	1.85	2.76	0.15	90	0.07	0.07		0.07		Total	Total	Total
Max	1.1758	344.00	1.73	6.40	11.00	0.22		0.08	0.09		0.08	0.09	6	0	0
Min.	0.8473	258.00	1.50	0.80	1.20	0.11		0.06	0.06		0.05				

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **June-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	4.49	0.06	0.62				223	3.15	29	0.41	252	12.42	10.57	1.67	1.85
2	4.56	0.26	0.73				219	3.28	27	0.40	246	8.93	7.20	1.56	1.73
3	4.61	0.23	0.75				193	3.40	29	0.51	222	13.42	11.90	1.36	1.52
4	3.94	0.27	0.71				231	3.41	32	0.47	263	9.95	8.33	1.45	1.62
5	5.65	0.24	0.73				234	3.47	29	0.43	263	11.38	9.65	1.56	1.73
6	4.49	0.22	0.81	0.55			238	3.49	32	0.47	270	9.33	7.53	1.72	1.80
7	5.74	0.19	0.60				270	3.49	35	0.45	305	12.40	10.71	1.47	1.69
8	4.62	0.31	0.59				255	3.48	34	0.46	289	12.17	10.40	1.62	1.77
9	4.69	0.29	0.56				240	3.51	33	0.48	273	9.73	8.07	1.59	1.66
10	4.84	0.22	0.66				223	3.50	30	0.47	253	11.86	10.29	1.44	1.57
11	4.26	0.13	0.49				228	3.52	32	0.49	260	10.69	9.01	1.56	1.68
12	4.54	0.42	0.70				241	3.51	34	0.49	275	10.44	8.32	1.76	2.12
13	5.25	0.29	0.67				313	4.38	38	0.53	351	12.19	10.21	1.71	1.98
14	5.07	0.20	0.36				217	3.43	33	0.52	250	12.13	10.23	1.66	1.90
15	4.70	0.10	0.60				267	3.50	40	0.52	307	17.15	15.32	1.63	1.83
16	4.66	0.17	0.58				242	3.55	35	0.51	277	10.70	8.82	1.69	1.88
17	5.58	0.00	0.00				261	3.50	34	0.46	295	9.48	7.76	1.49	1.72
18	4.39	0.30	0.47				255	3.42	33	0.44	288	8.55	6.63	1.62	1.92
19	4.28	0.22	0.52	0.52			232	3.36	30	0.43	262	14.47	12.91	1.39	1.56
20	4.42	0.08	0.59				268	3.40	36	0.46	304	10.39	8.68	1.54	1.71
21	3.10	0.29	0.55				255	3.35	37	0.49	292	9.59	7.96	1.37	1.63
22	4.80	0.29	0.60				235	3.37	31	0.45	266	10.39	8.68	1.49	1.71
23	5.80	0.20	0.55				237	3.44	34	0.49	271	10.57	8.87	1.55	1.70
24	4.93	0.20	0.56				251	3.39	35	0.47	286	13.77	11.95	1.65	1.82
25	4.91	0.22	0.58				229	3.39	29	0.43	258	18.93	16.87	1.79	2.06
26	4.39	0.05	0.55				233	3.31	22	0.31	255	9.79	8.01	1.45	1.78
27	6.54	0.10	0.33	0.54			208	3.27	18	0.28	226	10.59	8.77	1.56	1.82
28	4.71	0.12	0.64				214	3.14	22	0.32	236	8.47	6.62	1.53	1.85
29	4.49	0.08	0.56				227	3.30	23	0.33	250	9.45	7.76	1.40	1.69
30	5.57	0.22	0.60				238	3.36	23	0.32	261	9.49	8.15	1.20	1.34
31															
Tot.	144.01						6,954		900		8,106	338.82			
Avg.	4.80	0.20	0.58	0.54			239.23	3.44	30.97	0.44	270.20	11.29	9.54	1.55	1.75
Max	6.54	0.42	0.81	0.55			313.00	4.38	40.00	0.53	351.00	18.93	16.87	1.79	2.12
Min.	3.10	0.00	0.00	0.52			193.00	3.14	18.00	0.28	222.00	8.47	6.62	1.20	1.34

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.2	8.1	156	146	111	103	45	43	40	38	14	12		
2	8.0	8.0	156	150	109	105	47	45	41	40	13	12		
3	8.1	8.0	150	144	108	103	42	41	38	37	13	13		
4	8.1	8.1	158	146	116	104	42	42	40	38	14	13		
5	8.2	8.1	152	144	109	103	43	41	38	37	14	13		
6	8.1	8.1	148	142	107	103	41	39	39	37	12	12		
7	8.1	7.7	134	130	105	99	29	31	46	42	4	6		
8	8.0	8.0	144	132	106	99	38	33	45	45	8	5		
9	8.2	7.8	136	132	105	105	31	27	46	45	5	5	20.0	22.5
10	8.2	8.0	140	128	108	103	32	25	47	45	5	4		
11	8.1	8.0	132	130	104	101	28	29	42	42	6	6		
12	8.0	8.1	134	136	105	93	29	43	43	33	6	13		
13	8.2	8.2	132	128	103	96	29	32	40	39	8	7		
14	8.3	8.1	146	144	112	96	34	48	34	31	14	16	19.5	21.5
15	8.2	8.1	142	148	106	98	36	50	32	34	11	8		
16	8.2	8.0	132	130	108	106	24	24	39	38	8	9		
17	8.1	7.8	142	138	106	103	36	35	43	40	8	9		
18	8.1	8.1	160	134	104	98	56	36	43	38	12	9		
19	8.2	8.1	154	142	109	105	45	37	40	38	13	11		
20	8.2	8.1	148	144	109	106	39	38	37	35	13	14	18.0	21.5
21	8.4	8.1	132	156	115	108	17	48	43	38	6	14		
22	8.2	8.0	142	144	102	85	40	59	39	34	11	14		
23	8.2	8.0	146	140	108	103	38	37	35	34	14	14		
24	8.2	8.1	148	140	108	100	40	40	36	35	14	13		
25	8.1	7.9	138	122	103	97	35	25	36	34	12	9	18.5	21.5
26	8.3	8.1	132	160	103	100	29	60	32	33	13	19		
27	8.1	7.9	164	140	105	98	59	42	38	44	17	7		
28	8.1	8.0	154	138	103	95	51	43	38	38	14	11		
29	8.1	8.0	160	132	105	96	55	36	38	37	15	9		
30	8.1	8.0	142	136	111	104	31	32	42	41	9	8		
Avg.	8.2	8.0	145.1	139.2	107.1	100.5	38.0	38.7	39.7	38.0	10.9	10.5	19.0	21.8
Max	8.4	8.2	164.0	160.0	116.0	108.0	59.0	60.0	47.0	45.0	17.0	19.0	20.0	22.5
Min.	8.0	7.7	132.0	122.0	102.0	85.0	17.0	24.0	32.0	31.0	4.0	4.0	18.0	21.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	51	0	15	16.5				
2			1	A	102	0	11	11.5				
3			1	A	143	0	15	17.0				
4			1	A	86	0	18	18.0				
5			1	A	60	1	18	14.5				
6			1	A	79	1	13	15.5				
7			1	A	67	0	14	17.0				
8			1	A	79	0	14	17.0				
9			1	A	33	0	13	17.0				
10			1	A	13	1	13	17.0				
11			1	A	20	0	14	16.0				
12			1	A	10	0	13	17.0				
13			1	A	12	1	14	15.0				
14			1	A	89	0	16	15.0				
15			1	A	125	1	15	16.0				
16			1	A	46	0	14	16.0				
17			1	A	15	0	16	17.0				
18			1	A	77	1	16	17.0				
19			1	A	21	1	16	16.0				
20			1	A	14	1	15	16.0				
21			1	A	56	1	18	17.0				
22			1	A	207	1	14	16.5				
23			1	A	64	1	12	15.5				
24			1	A	134	5	12	14.5				
25			1	A	14	0	14	16.0				
26			1	A	20	1	13	15.0				
27			1	A	38	2	14.0	15.0				
28			1	A	46	0	14.0	15.0				
29			1	A	60	0	18.0	16.0				
30			1	A	39	0	19.0	18.0				
AVG.			1	A	61	1	15	16				
Max					207	5	19	18				
Min					10	0	11	12				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 June-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6	0.64		0.57	0.66	0.62		0.56			
7										
8										
9										
10										
11										
12										
13										
14	1.01		1.36	0.85	1.05		1.00			
15										
16										
17										
18										
19	0.52		1.07	0.45	0.82		0.89			
20										
21										
22										
23										
24										
25										
26										
27	0.73		0.73	0.59	0.34		0.54			
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	20		
Total number of positive routine distribution samples	0600	0		
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.75	1.36	0.34
Total number of check samples	0600			
Total number of positive check samples	0600			

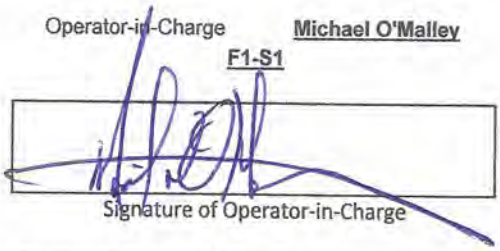
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **September-18**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.3039	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	257.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.07	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.06	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.81%	Percent of Treated Water

Chemical Data

Chlorine on hand:	10605	lb.	Est. supply:	143 days
Primary Coagulant (Alum (Al3+)) on hand:	45672	lb.	Est. supply:	35 days
Cost of All Chemicals per Million Gallons:	$68.94	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks:

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **September-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.41	0.27	0.64		0	0.00	441	6.23	70	0.99	511	18.55	16.78	1.64	1.77
2	0.43	0.30	0.64		0	0.00	403	6.10	67	1.01	470	20.65	18.54	1.93	2.11
3	0.43	0.21	0.66		0	0.00	406	6.04	69	1.03	475	19.83	17.97	1.74	1.86
4	0.55	0.25	0.68		0	0.00	413	6.02	68	0.99	481	25.20	23.55	1.49	1.65
5	0.49	0.19	0.73	0.59	0	0.00	474	6.34	74	0.99	548	16.37	14.37	1.82	2.00
6	0.43	0.19	0.60		0	0.00	527	6.03	73	0.84	600	20.29	18.42	1.70	1.87
7	0.48	0.35	0.68		0	0.00	339	4.74	67	0.94	406	13.41	11.43	1.80	1.98
8	0.54	0.29	0.77		0	0.00	313	4.25	70	0.95	383	12.24	9.79	2.27	2.45
9	0.56	0.27	0.74		0	0.00	253	4.18	57	0.94	310	13.89	12.06	1.66	1.83
10	0.49	0.33	1.01		0	0.00	307	4.54	67	0.99	374	15.69	13.32	2.13	2.37
11	0.46	0.34	0.65		0	0.00	283	3.89	48	0.66	331	10.99	8.44	2.32	2.55
12	0.42	0.40	0.66	0.57	0	0.00	276	3.67	44	0.59	320	9.85	7.65	2.02	2.20
13	0.50	0.40	0.73		0	0.00	275	3.53	40	0.51	315	15.74	13.48	2.03	2.26
14	0.40	0.32	0.67		0	0.00	269	3.46	38	0.49	307	8.65	6.54	1.87	2.11
15	0.51	0.28	0.64		0	0.00	265	3.54	37	0.49	302	11.07	8.98	1.91	2.09
16	0.58	0.30	0.72		0	0.00	264	3.61	35	0.48	299	9.63	7.54	1.91	2.09
17	0.55	0.25	0.74		0	0.00	237	3.31	32	0.45	269	8.53	6.36	1.98	2.17
18	0.55	0.20	0.74		0	0.00	241	3.21	31	0.41	272	8.53	6.43	1.93	2.10
19	0.43	0.40	0.82		0	0.00	223	3.24	21	0.31	244	12.21	10.54	1.47	1.67
20	0.35	0.27	0.70		0	0.00	224	3.20	23	0.33	247	9.22	7.70	1.41	1.52
21	0.47	0.35	0.70		0	0.00	240	3.28	37	0.51	277	17.03	15.04	1.82	1.99
22	0.41	0.32	0.65		0	0.00	240	3.29	23	0.32	263	8.08	6.43	1.48	1.65
23	0.56	0.29	0.68		0	0.00	252	3.38	31	0.42	283	8.66	7.03	1.47	1.63
24	0.56	0.26	0.65		0	0.00	273	3.55	39	0.51	312	8.92	7.47	1.29	1.45
25	0.58	0.24	0.67	0.68	0	0.00	280	3.78	45	0.61	325	10.18	8.48	1.53	1.70
26	0.48	0.25	0.74		0	0.00	256	3.70	45	0.65	301	11.96	10.23	1.56	1.73
27	0.66	0.10	0.56		0	0.00	266	4.01	43	0.65	309	11.33	9.54	1.61	1.79
28	0.47	0.23	0.72		0	0.00	279	4.09	49	0.72	328	12.57	11.04	1.37	1.53
29	0.35	0.25	0.75		0	0.00	247	3.81	44	0.68	291	11.39	9.50	1.71	1.89
30	0.42	0.24	0.68		0	0.00	247	3.80	43	0.66	290	12.85	11.02	1.67	1.83
31															
Tot.	14.50						8,572		1,360		10,443	393.51			
Avg.	0.48	0.28	0.70	0.61	0.00	0.00	300.43	4.19	47.67	0.67	348.10	13.12	11.19	1.75	1.93
Max	0.66	0.40	1.01	0.68	0.00	0.00	527.00	6.34	74.00	1.03	600.00	25.20	23.55	2.32	2.55
Min.	0.35	0.10	0.56	0.57	0.00	0.00	223.00	3.20	21.00	0.31	244.00	8.08	6.36	1.29	1.45

WSSN 0600 MONTH/YEAR **September-18**

CITY OF BENTON HARBOR CHEMICAL ANALYSES

D	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
A T E	Raw 29.	Tap 30.	Raw 31.	Tap 32.	Raw 33.	Tap 34.	Raw 35.	Tap 36.	Raw 37	Tap 38	Raw 39	Tap 40	Raw 41	Tap 42
1	8.0	7.8	146	142	106	104	40	38	41	40	11	10	23.0	26.5
2	7.9	8.0	144	138	104	105	40	33	44	39	8	10		
3	8.0	7.9	138	132	108	101	30	31	43	39	7	8		
4	8.0	7.8	144	146	105	105	39	41	42	39	10	12		
5	8.3	8.1	168	146	117	101	51	45	38	36	17	14		
6	8.2	8.0	150	146	110	105	40	41	36	35	15	14		
7	8.0	8.0	150	142	109	103	41	39	37	36	14	13		
8	8.1	8.1	152	148	108	104	44	44	37	35	15	15	18.0	20.5
9	8.1	8.0	150	142	108	101	42	41	37	36	14	13		
10	7.8	7.6	148	136	106	103	42	33	46	39	8	9	16.5	20.5
11	7.7	7.5	138	134	106	98	32	36	42	38	8	9		
12	7.7	7.7	142	138	104	99	38	39	41	39	10	10		
13	7.7	7.6	142	138	110	100	32	38	43	42	8	8		
14	7.9	7.7	144	140	105	99	39	41	38	37	12	12		
15	8.0	8.0	144	140	108	101	36	39	35	36	14	12		
16	8.2	7.9	146	138	108	99	38	39	36	35	14	12		
17	8.1	7.9	146	138	108	101	38	37	37	35	13	12		
18	8.2	7.9	146	140	107	102	39	38	36	35	14	13	17.5	19.5
19	8.1	7.7	136	138	108	102	28	36	39	38	9	10	19.0	21.5
20	8.1	7.9	144	136	109	105	35	31	41	39	10	9		
21	8.1	7.9	142	138	108	102	34	36	41	38	10	10		
22	8.1	7.9	142	134	110	103	32	31	42	38	9	9		
23	8.0	7.9	152	134	117	102	35	32	44	40	10	8		
24	8.1	8.0	152	148	109	106	43	42	38	37	14	14		
25	8.1	7.9	154	146	112	106	42	40	38	37	14	13		
26	8.2	8.1	162	152	118	104	44	48	40	39	15	13		
27	8.1	8.0	184	152	133	108	51	44	46	39	17	13	17.5	22.5
28	8.1	8.2	166	154	126	112	40	42	38	37	17	15		
29	8.2	7.9	136	146	118	116	18	30	41	42	8	10	19.0	22.0
30	8.1	7.9	148	138	109	116	39	22	43	42	10	3		
Avg.	8.0	7.9	148.5	141.3	110.5	103.8	38.1	37.6	40.0	37.9	11.8	11.1	18.6	21.9
Max	8.3	8.2	184.0	154.0	133.0	116.0	51.0	48.0	46.0	42.0	17.0	15.0	23.0	26.5
Min.	7.7	7.5	136.0	132.0	104.0	98.0	18.0	22.0	35.0	35.0	7.0	3.0	16.5	19.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	104	0	20	21.0				
2			1	A	78	0	15	20.0				
3			1	A	262	1	22	20.0				
4			1	A	137	1	21	19.0				
5			1	A	67	0	19	18.5				
6			1	A	53	0	19	19.0				
7			1	A	154	0	13	19.5				
8			1	A	110	0	13	18.0				
9			1	A	113	0	11	16.0				
10			1	A	81	0	10	17.0				
11			1	A	51	0	10	15.0				
12			1	A	36	0	11	15.0				
13			1	A	131	1	13	15.0				
14			1	A	16	2	15	14.0				
15			1	A	40	0	15	13.0				
16			1	A	71	0	14	13.5				
17			1	A	25	0	16	14.0				
18			1	A	34	0	15	14.5				
19			1	A	30	0	15	16.0				
20			1	A	49	0	15	17.0				
21			1	A	32	0	18	17.0				
22			1	A	158	0	19	17.0				
23			1	A	62	1	18	18.0				
24			1	A	85	0	17	17.0				
25			1	A	54	0	18	17.5				
26			1	A	73	0	19	18.5				
27			1	A	55	0	19.0	17.5				
28			1	A	74	0	9.0	12.0				
29			1	A	91	0	8.7	8.5				
30			1	A	90	0	8.5	9.5				
AVG.			1	A	81	0	15	16				
Max					262	2	22	21				
Min					16	0	9	9				

Bento Water Distribution Monthly Distribution Residual Monitoring and Bacteriological Report

DISTRIBUTION SYSTEM MONITORING WSSN 0600 September-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5	0.74		0.86	0.90	0.69		0.47			
6										
7										
8										
9										
10										
11										
12	0.87		1.28	1.10	1.01		1.19			
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25	0.72		0.89	0.67	0.69		0.86			
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	12		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.86	1.28	0.47
Total number of check samples	0600			
Total number of positive check samples	0600			

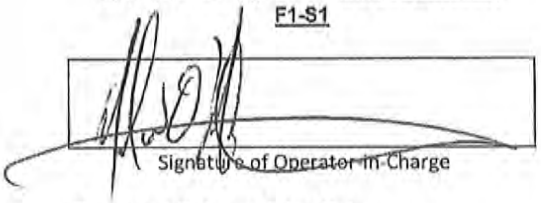
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: CITY OF BENTON HARBOR

WSSN:600

Operator-in-Charge Michael O'Malley

F1-S1



Signature of Operator-in-Charge

Month/Year January-18

F1-S2

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2735	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	27.67	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.06	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.98	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.68%	Percent of Treated Water

Chemical Data

Chlorine on hand:	22978	lb.	Est. supply:	110	days
Primary Coagulant (Alum (Al3+)) on hand:	69501	lb.	Est. supply:	333	days
Cost of All Chemicals per Million Gallons:	$57.73	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

Number of filter confluence samples > 0.3 NTU:	0
Number of filter confluence samples collected:	182
Percent of filter confluence samples > 0.3 NTU:	0%
Number of filter confluence samples > 1 NTU	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Remarks:

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **January-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l								New addition you like?				
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.00				0	0.00	199	2.71	29	0.39	228	3.29	1.34	1.78	1.95
2	0.00				0	0.00	200	2.80	32	0.45	232	3.25	1.23	1.78	2.02
3	0.00			0.18	0	0.00	209	2.76	34	0.45	243	3.40	1.44	1.81	1.96
4	0.00	0.22	0.26		0	0.00	205	2.74	27	0.36	232	3.10	1.07	1.89	2.03
5	0.00				0	0.00	213	2.59	26	0.32	239	3.06	0.84	2.00	2.22
6	0.00				0	0.00	179	2.90	28	0.45	207	3.45	1.61	1.68	1.84
7	0.00				0	0.00	186	2.68	30	0.43	216	3.20	1.24	1.80	1.96
8	0.00				0	0.00	195	2.78	32	0.46	227	3.34	1.46	1.72	1.88
9	0.00				0	0.00	212	2.57	28	0.34	240	3.42	1.27	1.98	2.15
10	0.00				0	0.00	206	2.76	34	0.46	240	3.26	1.08	2.01	2.18
11	0.00	0.26	0.22	0.18	0	0.00	217	2.54	26	0.30	243	3.07	1.01	1.83	2.06
12	0.00				0	0.00	191	2.70	20	0.28	211	3.07	0.97	1.83	2.10
13	0.00				0	0.00	195	2.71	19	0.26	214	3.06	1.10	1.76	1.96
14	0.00				0	0.00	196	2.72	20	0.28	216	3.07	0.94	1.93	2.13
15	0.00				0	0.00	164	2.79	9	0.15	173	3.03	1.13	1.61	1.90
16	0.00				0	0.00	209	2.83	24	0.32	233	3.24	1.24	1.84	2.00
17	0.00			0.18	0	0.00	235	3.35	26	0.37	261	3.83	1.86	1.80	1.97
18	0.00	0.25	0.28		0	0.00	190	2.90	22	0.34	212	3.34	1.45	1.72	1.89
19	0.00				0	0.00	156	2.60	18	0.30	174	2.89	0.97	1.75	1.92
20	0.00				0	0.00	165	2.53	19	0.29	184	2.99	0.81	1.88	2.18
21	0.00				0	0.00	179	2.48	21	0.29	200	3.51	1.33	1.88	2.18
22	0.00				0	0.00	142	2.09	11	0.16	153	2.34	0.38	1.76	1.96
23	0.00				0	0.00	193	2.48	14	0.18	207	2.74	0.85	1.64	1.89
24	0.00			0.26	0	0.00	180	2.57	19	0.27	199	2.93	1.30	1.47	1.63
25	0.00	0.28	0.29		0	0.00	191	2.52	34	0.45	225	2.93	1.03	1.74	1.90
26															
27	0.00				0	0.00	178	2.84	23	0.37	201	3.32	1.53	1.63	1.79
28	0.00				0	0.00	203	2.86	29	0.41	232	3.36	1.28	1.90	2.08
29	0.00				0	0.00	187	2.65	42	0.60	229	3.34	0.89	2.26	2.45
30	0.00				0	0.00	190	2.67	17	0.24	207	3.00	1.10	1.70	1.90
31	0.00				0	0.00	176	2.61	14	0.21	190	2.88	0.83	1.80	2.05
Tot.	0.00						5,755		721		6,468	94.73			
Avg.	0.00	0.25	0.26	0.20	0.00	0.00	191.90	2.69	24.59	0.34	216.48	3.17	1.16	1.81	2.00
Max	0.00	0.28	0.29	0.26	0.00	0.00	235.00	3.35	42.00	0.60	261.00	3.83	1.86	2.26	2.45
Min.	0.00	0.22	0.22	0.18	0.00	0.00	142.00	2.09	9.00	0.15	153.00	2.34	0.38	1.47	1.63

WSSN 0600 City of Benton Harbor Month/Year January-18

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS				FILTERED NORTH			FILTERED SOUTH		2 Hour Compliance Periods		
D	GAL.	Dry	as Al3+	RAW		Applied	#			#			# of	#of	#of
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	Periods	Periods	Periods
T		Pounds												>.30NTU	>.30NTU
E		Add													
														North	South
1	1.0981	315.00	1.51	5.50	7.50	0.45	3	0.05	0.06	3	0.06	0.06	6	0	0
2	1.0648	292.00	1.44	4.60	5.80	0.38	3	0.07	0.08	3	0.07	0.08	6	0	0
3	1.1295	352.00	1.64	3.30	4.70	0.32	3	0.06	0.06	3	0.07	0.07	6	0	0
4	1.1156	303.00	1.43	2.10	2.90	0.34	3	0.07	0.07	3	0.06	0.07	6	0	0
5	1.2284	346.00	1.48	4.10	5.10	0.40	3	0.07	0.08	3	0.07	0.08	6	0	0
6	0.9227	245.00	1.97	1.90	2.90	0.47	3	0.07	0.08	3	0.06	0.07	6	0	0
7	1.0369	318.00	1.61	1.30	1.80	0.25	3	0.06	0.08	3	0.07	0.08	6	0	0
8	1.0459	313.00	1.57	1.30	2.30	0.27	3	0.07	0.08	3	0.06	0.07	6	0	0
9	1.2291	354.00	1.52	2.20	3.50	0.21	3	0.06	0.07	3	0.06	0.06	6	0	0
10	1.1134	311.00	1.47	1.30	1.50	0.27	3	0.06	0.07	3	0.05	0.06	6	0	0
11	1.2735	338.00	1.40	2.10	4.20	0.28	3	0.07	0.07	3	0.08	0.08	6	0	0
12	1.0576	313.00	1.56	1.70	2.00	0.39	3	0.07	0.08	3	0.07	0.09	6	0	0
13	1.0739	319.00	1.56	3.10	4.00	0.26	3	0.06	0.07	3	0.06	0.08	6	0	0
14	1.0757	315.00	1.54	3.40	4.10	0.54	3	0.07	0.09	3	0.07	0.07	6	0	0
15	0.8760	248.00	1.49	2.50	2.80	0.82	3	0.08	0.08	2	0.08	0.08	4	0	0
16	1.1033	329.00	1.57	4.60	4.80	0.55	3	0.09	0.11	3	0.10	0.12	6	0	0
17	1.0468	287.00	1.44	3.80	4.30	0.45	3	0.06	0.07	3	0.06	0.08	6	0	0
18	0.9771	294.00	1.58	7.70	7.90	0.40	3	0.07	0.08	3	0.07	0.08	6	0	0
19	0.8970	264.00	1.55	7.40	9.50	0.47	3	0.06	0.07	3	0.05	0.06	6	0	0
20	0.9735	279.00	1.51	6.10	7.80	0.54	3	0.07	0.08	3	0.08	0.08	6	0	0
21	1.0786	295.00	1.44	3.40	4.10	0.48	3	0.06	0.07	3	0.07	0.07	6	0	0
22	1.0163	234.00	1.21	7.90	8.30	1.05	3	0.16	0.20	2	0.18	0.24	4	0	0
23	1.1598	333.00	1.51	6.60	12.40	1.25	3	0.08	0.08	3	0.08	0.08	6	0	0
24	1.0446	302.00	1.52	7.20	8.70	0.48	3	0.06	0.08	3	0.07	0.08	6	0	0
25	1.1320	313.00	1.45	6.50	7.90	0.45	3	0.06	0.07	3	0.06	0.07	6	0	0
26	1.0779	299.00	1.45	5.90	6.20	0.46	3	0.06	0.07	3	0.06	0.08	6	0	0
27	0.9341	271.00	1.53	11.90	20.70	0.68	3	0.06	0.07	3	0.08	0.09	6	0	0
28	1.0608	299.00	1.48	6.30	7.20	0.61	3	0.07	0.07	3	0.07	0.09	6	0	0
29	1.0526	310.00	1.55	7.00	7.40	0.38	3	0.06	0.07	3	0.08	0.09	6	0	0
30	1.0614	294.00	1.46	7.20	10.20	0.36	3	0.05	0.06	3	0.08	0.10	6	0	0
31	1.0056	263.00	1.38	6.50	6.80	0.53	3	0.07	0.08	3	0.08	0.09	6	0	0
Total	32.9625	9348.00					93			91			182	0	0
Avg.	1.0633	301.55	1.51	4.72	6.11	0.48	91	0.07	0.08		0.07		Total	Total	Total
Max	1.2735	354.00	1.97	11.90	20.70	1.25		0.16	0.20		0.18	0.24	6	0	0
Min.	0.8760	234.00	1.21	1.30	1.50	0.21		0.05	0.06		0.05				

WSSN 0600 | MONTH/YEAR | January-18 | PAGE 4

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D A T E	pH Raw 29.	pH Tap 30.	Raw 31.	Tap 32.	Raw 33.	Tap 34.	Raw 35.	Tap 36.	Raw 37	Tap 38	Raw 39	Tap 40	Raw 41	Tap 42
1	7.9	7.9	160	158	112	112	48	46	43	42	13	13		
2	7.8	7.6	164	154	122	116	42	38	57	51	5	6		
3	7.8	7.6	142	150	105	116	37	34	51	47	4	8		
4	7.9	7.5	186	164	144	114	42	50	59	51	10	9		
5	7.9	7.6	188	166	131	115	57	51	59	51	10	10		
6	8.0	7.9	172	162	127	119	45	43	44	42	15	14		
7	7.9	7.8	178	172	126	121	52	51	49	48	14	13		
8	7.9	8.0	174	184	111	119	63	65	45	47	15	16		
9	8.0	7.8	160	170	109	117	51	53	43	46	13	14		
10	8.0	7.7	172	160	119	110	53	50	46	43	14	13		
11	8.1	7.7	168	152	127	107	41	45	57	51	6	6	18.0	19.5
12	8.1	7.8	154	156	110	114	44	42	51	49	7	8		
13	8.0	7.8	152	156	104	113	48	43	52	51	5	7		
14	8.0	7.6	178	144	127	104	51	40	63	51	5	4		
15	8.0	7.7	168	156	117	108	51	48	57	50	6	8		
16	8.0	7.8	180	164	127	116	53	48	46	44	16	13		
17	7.9	7.8	182	170	129	122	53	48	50	46	14	14		
18	7.9	7.9	168	182	115	122	53	60	45	49	14	15		
19	8.0	7.9	164	170	116	122	48	48	42	46	14	14		
20	7.9	7.8	160	150	121	113	39	37	55	51	6	5		
21	8.1	8.0	162	154	126	112	36	42	51	47	9	9		
22	8.2	7.9	168	160	126	113	42	47	50	45	11	12		
23	8.1	7.8	164	150	128	116	36	34	59	51	4	5	21.5	23.0
24	8.1	8.0	176	180	121	120	55	60	42	45	17	17		
25	7.9	7.8	180	166	127	116	53	50	46	44	16	14		
26	8.0	7.9	208	168	146	116	62	52	55	45	17	14		
27	7.9	7.9	190	174	129	118	61	56	50	45	17	15		
28	8.0	8.0	186	182	121	123	65	59	50	48	15	15		
29	8.0	7.9	164	180	109	120	55	60	42	49	15	14		
30	7.9	7.6	148	150	116	118	32	32	46	46	8	8		
31	8.1	7.8	168	154	128	109	40	45	54	47	8	9	22.5	26.5
Avg.	8.0	7.8	170.5	163.5	121.6	115.7	48.9	47.7	50.2	47.4	11.2	11.1	19.8	21.3
Max	8.2	8.0	208.0	184.0	146.0	123.0	65.0	65.0	63.0	51.0	17.0	17.0	62.0	69.0
Min.	7.8	7.5	142.0	144.0	104.0	104.0	32.0	32.0	42.0	42.0	4.0	4.0	20.7	23.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	True		Cold	
A	Samples	P/A	Samples	P/A			'C	'C	Appar.		60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	0	1	2	3.0				
2			1	A	0	1	2	4.0				
3			1	A	0	0	2	5.0				
4			1	A	0	0	2	5.0				
5			1	A	0	0	2	4.0				
6			1	A	0	0	2	2.5				
7			1	A	0	0	2	2.5				
8			1	A	0	0	2	3.0				
9			1	A	0	1	2	2.5				
10			1	A	0	2	2	3.0				
11			1	A	0	0	3	9.0				
12			1	A	0	0	3	5.0				
13			1	A	0	0	3	5.0				
14			1	A	0	0	2	6.0				
15			1	A	0	0	2	2.0				
16			1	A	0	0	2	2.5				
17			1	A	0	0	2	2.5				
18			1	A	0	2	2	3.0				
19			1	A	0	1	2	3.0				
20			1	A	0	0	3	8.0				
21			1	A	0	0	2	5.0				
22			1	A	0	12	3	5.0				
23			1	A	0	9	3	5.0				
24			1	A	0	0	2	3.0				
25			1	A	31	0	2	2.5				
26			1	A	57	0	2	3.0				
27			1	A	102	0	3.0	3.5				
28			1	A	73	1	9.0	12.0				
29			1	A	67	0	8.7	8.5				
30			1	A	28	0	8.5	9.5				
31			1	A	0	0	2.0	6.0				
AVG.			1	A	12	1	3	5				
Max					102	12	9	12				
Min					0	0	2	2				

CITY OF BENTON HARBOR

DISTRIBUTION SYSTEM MONITORING

WSSN 0600 MONTH/YEAR January-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR									
	1	2	3	4	5	6	7			
1										
2										
3	1.28		0.84	0.77	0.73		0.49			
4										
5										
6										
7										
8										
9										
10										
11	1.20		1.07	1.19	1.11		0.68			
12										
13										
14										
15										
16										
17	0.39		1.03	0.98	1.06		0.99			
18										
19										
20										
21										
22										
23										
24	0.93			0.97			0.56			
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES – BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	18		
Total number of positive routine distribution samples	0600	0		
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.90	1.28	0.39
Total number of check samples	0600	0		
Total number of positive check samples	0600	0		

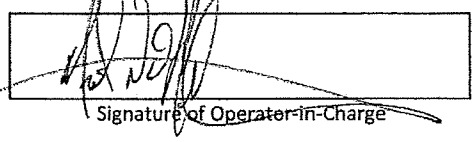
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **November-18**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0826	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	285.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.99	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.36	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.42%	Percent of Treated Water

Chemical Data

Chlorine on hand:	21715	lb.	Est. supply:	231	days
Primary Coagulant (Alum (Al3+)) on hand:	64735	lb.	Est. supply:	78	days
Cost of All Chemicals per Million Gallons:	$67.42	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks: Sorry report looks different - Printed at Home
12/9/18

COAGULATION PARAMETERS

DATE	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	Max.	Applied Avg.	# Samples	FILTERED NORTH Avg.	Max.	# Samples	FILTERED SOUTH Avg.	Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.9164	255.00	1.46	3.30	4.60	0.18	3	0.07	0.07	3	0.06	0.06	6	0	0
2	0.9843	292.00	1.56	4.50	6.50	0.20	3	0.07	0.07	3	0.06	0.06	6	0	0
3	0.8999	259.00	1.51	2.80	3.40	0.20	3	0.07	0.07	3	0.06	0.06	6	0	0
4	0.9796	290.00	1.56	5.10	8.50	0.19	3	0.07	0.07	3	0.06	0.06	6	0	0
5	0.8301	234.00	1.48	3.70	4.40	0.19	3	0.07	0.07	3	0.07	0.09	6	0	0
6	1.0590	317.00	1.57	3.40	4.10	0.27	3	0.08	0.08	3	0.07	0.07	6	0	0
7	1.0826	315.00	1.53	3.80	4.50	0.17	3	0.08	0.08	3	0.07	0.09	6	0	0
8	1.0486	312.00	1.57	3.70	5.00	0.15	3	0.08	0.08	3	0.06	0.07	6	0	0
9	0.9470	270.00	1.50	3.40	4.50	0.17	3	0.08	0.08	3	0.06	0.06	6	0	0
10	0.9883	298.00	1.59	7.10	8.80	0.21	3	0.07	0.08	3	0.07	0.08	6	0	0
11	0.8784	330.00	1.98	3.10	3.20	0.20	3	0.06	0.07	3	0.06	0.06	6	0	0
12	1.0405	308.00	1.56	5.30	7.80	0.26	3	0.07	0.07	3	0.06	0.06	6	0	0
13	1.0130	278.00	1.44	6.00	8.20	0.20	3	0.06	0.07	3	0.06	0.06	6	0	0
14	1.0179	299.00	1.55	5.60	7.80	0.23	3	0.07	0.08	3	0.06	0.07	6	0	0
15	1.0346	290.00	1.47	3.90	4.40	0.25	3	0.09	0.11	3	0.08	0.09	6	0	0
16	0.9650	279.00	1.52	4.00	5.00	0.26	3	0.07	0.08	3	0.07	0.08	6	0	0
17	0.9153	260.00	1.49	4.60	7.20	0.24	3	0.07	0.08	3	0.06	0.07	6	0	0
18	0.9458	276.00	1.54	2.40	3.20	0.25	3	0.07	0.09	3	0.08	0.09	6	0	0
19	1.0666	312.00	1.54	2.50	3.20	0.23	3	0.08	0.09	3	0.06	0.07	6	0	0
20	0.9785	279.00	1.50	2.50	2.60	0.19	3	0.07	0.07	3	0.07	0.08	6	0	0
21	1.0653	297.00	1.47	3.50	5.00	0.16	3	0.07	0.08	3	0.07	0.08	6	0	0
22	1.0285	324.00	1.66	2.00	2.40	0.15	3	0.06	0.07	3	0.07	0.07	6	0	0
23	0.9065	242.00	1.40	3.10	5.80	0.17	3	0.07	0.09	3	0.07	0.08	6	0	0
24	0.9827	304.00	1.63	2.00	2.10	0.19	3	0.07	0.08	3	0.09	0.10	6	0	0
25	0.8888	259.00	1.53	3.30	6.60	0.18	3	0.07	0.08	3	0.10	0.11	6	0	0
26	1.0724	304.00	1.53	3.30	5.90	0.17	3	0.06	0.07	3	0.08	0.10	6	0	0
27	0.9743	283.00	1.53	3.00	3.40	0.16	3	0.06	0.06	3	0.06	0.08	6	0	0
28	1.0363	297.00	1.51	4.60	8.10	0.22	3	0.07	0.09	3	0.08	0.09	6	0	0
29	1.0468	322.00	1.62	3.30	4.30	0.23	3	0.07	0.07	3	0.07	0.08	6	0	0
30	1.0590	276.00	1.37	3.60	4.60	0.25	3	0.07	0.07	3	0.07	0.07	6	0	0
Total	29.6520	8661.00					90			90			180	0	0
Avg.	0.9884	288.70	1.54	3.75	5.17	0.20	90	0.07	0.08		0.07		Total	Total	Total
Max	1.0826	330.00	1.98	7.10	8.80	0.27		0.09	0.11		0.10	0.11	6	0	0
Min.	0.8301	234.00	1.37	2.00	2.10	0.15		0.06	0.06		0.06				

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
			mg/l												
DATE	Fluoride Applied as Fmg/l	Raw	Tap	Dist.	INTAKE PPD	Free mg/l	SETTLED PPD	Free mg/l	FILTERED PPD	Free mg/l	Total NaOCl Use PPD	Free mg/l	Demand mg/L	TAP Free. mg/l	TAP Total mg/l
1	0.73	0.27	0.73		0	0.00	247	4.02	51	0.83	298	13.35	10.92	2.25	2.43
2	0.62	0.29	0.75		0	0.00	247	3.75	49	0.74	296	13.03	11.15	1.70	1.88
3	0.58	0.28	0.78		0	0.00	217	3.60	44	0.73	261	12.40	10.52	1.70	1.88
4	0.61	0.23	0.69		0	0.00	225	3.43	43	0.66	268	11.45	9.16	2.10	2.29
5	0.39	0.29	0.62		0	0.00	206	3.70	38	0.68	244	15.58	13.74	1.60	1.84
6	0.51	0.29	0.73		0	0.00	263	3.71	44	0.62	307	11.22	9.47	1.59	1.75
7	0.43	0.33	0.71		0	0.00	277	3.82	48	0.66	325	19.88	18.29	1.54	1.59
8	0.44	0.21	0.54		0	0.00	271	3.86	50	0.71	321	12.50	10.79	1.57	1.71
9	0.39	0.23	0.62		0	0.00	244	3.85	41	0.65	285	14.21	12.12	1.85	2.09
10	0.66	0.29	0.65		0	0.00	262	3.96	45	0.68	307	10.93	9.26	1.51	1.67
11	0.78	0.32	0.72		0	0.00	264	4.49	49	0.83	313	17.86	16.20	1.49	1.66
12	0.68	0.28	0.74		0	0.00	255	3.66	44	0.63	299	10.47	8.61	1.68	1.86
13	0.59	0.29	0.78		0	0.00	259	3.82	47	0.69	306	11.09	9.45	1.47	1.64
14	0.57	0.37	0.77		0	0.00	260	3.81	44	0.65	304	10.90	9.06	1.64	1.84
15	0.43	0.30	0.71		0	0.00	271	3.91	47	0.68	318	12.54	10.72	1.78	1.82
16	0.42	0.41	0.73	0.70	0	0.00	242	3.74	37	0.57	279	11.66	9.76	1.71	1.90
17	0.39	0.32	0.62		0	0.00	237	3.87	42	0.68	279	16.75	15.06	1.47	1.69
18	0.45	0.28	0.63		0	0.00	247	3.90	37	0.58	284	12.25	10.26	1.81	1.99
19	0.54	0.27	0.66		0	0.00	286	4.00	51	0.71	337	11.10	9.47	1.46	1.63
20	0.44	0.37	0.65		0	0.00	256	3.91	44	0.67	300	14.33	12.16	2.02	2.17
21	0.40	0.34	0.65		0	0.00	268	3.76	45	0.63	313	13.66	11.77	1.77	1.89
22	0.50	0.39	0.65		0	0.00	285	4.14	49	0.71	334	13.96	11.69	2.01	2.27
23	0.53	0.38	0.65		0	0.00	230	3.79	38	0.63	268	15.42	13.44	1.81	1.98
24	0.36	0.29	0.63		0	0.00	248	3.77	38	0.58	286	11.16	9.12	1.85	2.04
25	0.44	0.42	0.63		0	0.00	227	3.81	34	0.57	261	13.51	11.61	1.66	1.90
26	0.55	0.38	0.65		0	0.00	266	3.70	36	0.50	302	10.58	8.62	1.69	1.96
27	0.43	0.36	0.64		0	0.00	265	4.06	42	0.64	307	13.99	12.04	1.77	1.95
28	0.36	0.27	0.61		0	0.00	281	4.05	26	0.37	307	11.76	9.98	1.53	1.78
29	0.59	0.42	0.67	0.61	0	0.00	288	4.11	51	0.73	339	12.13	10.32	1.64	1.81
30	0.54	0.40	0.71		0	0.00	284	4.00	66	0.93	350	13.19	10.93	2.08	2.26
Tot.	15.33						7,431		1,269		8,998	392.85			
Avg.	0.51	0.32	0.68	0.66	0.00	0.00	255.93	3.87	44.00	0.67	299.93	13.09	11.19	1.73	1.91
Max	0.78	0.42	0.78	0.70	0.00	0.00	288.00	4.49	66.00	0.93	350.00	19.88	18.29	2.25	2.43
Min.	0.36	0.21	0.54	0.61	0.00	0.00	206.00	3.43	26.00	0.37	244.00	10.47	8.61	1.46	1.59

DATE	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	8.0	162	156	110	107	52	49	41	39	15	14		
2	8.0	8.0	150	142	112	105	38	37	36	35	12	13	18.5	21.0
3	8.0	8.0	152	144	110	103	42	41	38	37	14	13		
4	7.9	7.9	150	140	111	103	39	37	37	36	14	12		
5	8.0	7.9	194	152	143	104	51	48	62	47	10	8	23.0	24.5
6	7.9	8.0	184	174	126	103	58	71	49	47	15	14		
7	8.0	7.9	152	154	111	108	41	46	42	45	11	10		
8	8.1	8.1	164	160	118	112	46	48	47	46	11	11		
9	8.2	7.9	156	158	117	114	39	44	49	46	8	10		
10	8.0	7.9	164	154	118	110	46	44	42	40	15	13	19.0	21.5
11	7.9	8.0	172	162	112	108	60	54	46	43	14	13		
12	8.0	8.1	166	156	123	111	43	45	42	40	15	14		
13	8.1	7.9	178	174	118	112	60	62	46	44	16	16		
14	8.2	8.0	170	156	126	110	44	46	42	41	16	13		
15	8.0	7.8	172	166	122	114	50	52	57	55	7	7		
16	8.0	7.9	198	162	147	110	51	52	61	51	11	9	19.5	22.5
17	8.2	8.0	168	158	132	119	36	39	55	51	8	7		
18	8.0	7.9	184	166	135	123	49	43	49	51	15	9		
19	7.9	8.0	170	168	119	123	51	45	43	42	15	15		
20	8.0	7.8	160	174	119	126	41	48	45	49	12	13	19.5	22.0
21	8.1	8.0	158	168	109	120	49	48	47	50	10	11		
22	8.1	8.0	148	158	104	111	44	47	44	47	9	10		
23	8.1	8.0	152	154	115	119	37	35	46	44	9	11		
24	7.9	7.7	156	146	114	103	42	43	47	38	9	12		
25	8.0	7.8	162	148	121	102	41	46	47	42	11	10		
26	7.9	7.9	158	148	110	109	48	39	47	45	10	9	19.5	21.5
27	8.0	7.8	162	156	109	112	53	44	47	46	11	10		
28	8.1	7.7	168	154	117	110	51	44	53	49	9	8	19.5	21.0
29	7.9	7.9	168	156	126	113	42	43	41	40	16	14		
30	7.9	7.9	176	162	125	115	51	47	45	41	16	15		
Avg.	8.0	7.9	165.8	157.5	119.3	111.3	46.5	46.2	46.4	44.2	12.1	11.5	19.8	22.0
Max	8.2	8.1	198.0	174.0	147.0	126.0	60.0	71.0	62.0	55.0	16.0	16.0	23.0	24.5
Min.	7.9	7.7	148.0	140.0	104.0	102.0	36.0	35.0	36.0	35.0	7.0	7.0	18.5	21.0

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

DATE	RAW No. of Samples	RAW Colilert P/A	PLANT TAP No. of Samples	PLANT TAP Colilert P/A	Standard Plate Count Raw	Standard Plate Count Tap	Raw TEMP. 'C	Tap TEMP. 'C	COLOR ___True ___Appar. Raw	COLOR Tap	ODOR ___Cold ___60'C Raw	ODOR Tap
1			1	A	52	0	12	13.0				
2			1	A	79	0	12	13.0				
3			1	A	95	0	12	13.0				
4			1	A	103	0	12	12.5				
5			1	A	67	0	11	14.0				
6			1	A	103	2	12	12.5				
7			1	A	54	0	12	14.0				
8			1	A	54	1	12	14.0				
9			1	A	37	2	11	14.0				
10			1	A	44	0	11	12.0				
11			1	A	43	0	10	11.5				
12			1	A	124	0	9	12.0				
13			1	A	124	0	9	11.0				
14			1	A	80	0	9	10.5				
15			1	A	58	0	13	11.0				
16			1	A	81	0	8	13.0				
17			1	A	41	1	8	11.0				
18			1	A	37	0	9	12.0				
19			1	A	27	2	8	9.0				
20			1	A	20	0	8	11.0				
21			1	A	18	0	9	11.0				
22			1	A	18	0	8	11.0				
23			1	A	25	0	8	12.0				
24			1	A	24	0	8	11.0				
25			1	A	13	0	8	11.0				
26			1	A	28	0	8	11.0				
27			1	A	22	1	7.0	10.0				
28			1	A	102	5	9.0	12.0				
29			1	A	58	0	8.7	8.5				
30			1	A	54	0	8.5	9.5				
AVG.			1	A	56	0	10	12				
Max					124	5	13	14				
Min					13	0	7	9				

DISTRIBUTION SYSTEM MONITORING

WSSN 0600

NOV 2018

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DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7						0.32	0.93			
8										
9										
10										
11										
12										
13										
14										
15										
16	1.03		1.69	1.00	1.17		1.01			
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29	0.82		1.15	1.19	1.07		1.12			
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	12		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.04	1.69	0.32
Total number of check samples	0600			
Total number of positive check samples	0600			

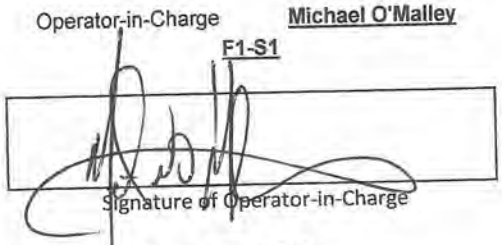
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **February-18**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.3549	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	27.81	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.08	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.26	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.82%	Percent of Treated Water

Chemical Data

Chlorine on hand:	17928	lb.	Est. supply:	279	days
Primary Coagulant (Alum (Al3+)) on hand:	61558	lb.	Est. supply:	81	days
Cost of All Chemicals per Million Gallons:	$62.01	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

Number of filter confluence samples > 0.3 NTU:	0
Number of filter confluence samples collected:	170
Percent of filter confluence samples > 0.3 NTU:	4%
Number of filter confluence samples > 1 NTU	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? Yes
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? Yes
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks:
Turbidity exceeded typical units during the Snow Melt and Rain Storm at the end of the operations Day Sunday 2/25/2018 and all day 2/26/2018. Many attempts to lower the filtered water turbidity done by the operators did get the turbidity down near the end of Monday and the Start of Tuesday. Fluoride Treatment will resume March 1, 2018. Jon B noted 1 IFE sample was > 1 NTU

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **February-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
											New addition you like?				
D	Fluoride		mg/l								Total NaOCl Use			TAP	
A	Applied				INTAKE		After Wetwell		FILTERED						
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1							180	2.49	7	0.10	187	2.66	0.64	1.84	2.02
2							181	2.56	13	0.18	194	2.83	0.91	1.69	1.92
3							166	2.62	31	0.49	197	3.22	0.95	2.09	2.27
4							197	2.64	14	0.19	211	2.91	0.88	1.85	2.03
5							201	2.77	22	0.30	223	2.99	1.24	1.57	1.75
6							215	2.89	29	0.39	244	3.53	1.94	1.42	1.59
7		0.26	0.27	0.04			180	2.65	20	0.29	200	3.09	1.50	1.41	1.59
8							202	2.68	21	0.28	223	3.04	1.42	1.56	1.62
9							197	3.05	27	0.42	224	3.59	2.00	1.42	1.59
10							203	3.21	27	0.43	230	3.76	2.02	1.42	1.74
11							200	3.00	30	0.45	230	3.56	1.81	1.59	1.75
12							227	3.12	29	0.40	256	3.57	1.77	1.63	1.80
13							246	3.37	35	0.48	281	3.85	2.30	1.39	1.55
14							232	3.20	48	0.66	280	4.10	2.38	1.55	1.72
15		0.34	0.32	0.24			226	2.98	29	0.38	255	3.60	1.62	1.81	1.98
16							230	3.09	26	0.35	256	3.17	1.07	1.90	2.10
17							213	3.10	28	0.41	241	3.73	1.92	1.64	1.81
18							242	2.67	25	0.28	267	4.03	2.14	1.79	1.89
19							231	3.14	25	0.34	256	3.59	1.81	1.66	1.78
20							231	3.15	25	0.34	256	3.60	1.64	1.72	1.96
21				0.27			237	3.26	26	0.36	263	3.62	1.91	1.54	1.71
22							220	3.09	29	0.41	249	3.71	2.05	1.49	1.66
23							217	2.95	30	0.41	247	3.26	1.24	1.85	2.02
24							220	2.99	33	0.45	253	4.09	1.87	2.03	2.22
25							254	3.64	31	0.44	285	4.40	2.37	1.84	2.03
26							302	4.05	33	0.44	335	8.50	7.01	1.29	1.49
27							304	4.07	34	0.46	338	5.33	3.84	1.27	1.49
28		0.30	0.30	0.23			304	3.99	30	0.39	334	4.53	2.68	1.63	1.85
29															
30															
31															
Tot.							6,078		750		7,015	105.86			
Avg.		0.30	0.30	0.20			223.50	3.09	27.04	0.38	250.54	3.78	1.96	1.64	1.82
Max		0.34	0.32	0.27			304.00	4.07	48.00	0.66	338.00	8.50	7.01	2.09	2.27
Min.		0.26	0.27	0.04			166.00	2.49	7.00	0.10	187.00	2.66	0.64	1.27	1.49

WSSN 0600 City of Benton Harbor

Month/Year ####### Feb 2018

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# sample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	1.0795	324.00	1.58	7.50	7.80	0.40	3	0.06	0.07	3	0.07	0.08	6	0	0
2	1.0560	311.00	1.55	6.50	7.00	0.46	3	0.06	0.06	3	0.07	0.08	6	0	0
3	0.9453	278.00	1.55	5.90	7.80	0.60	3	0.07	0.08	3	0.07	0.08	6	0	0
4	1.1139	328.00	1.55	8.70	11.10	0.60	3	0.08	0.10	3	0.07	0.09	6	0	0
5	1.0825	307.00	1.49	6.60	8.60	0.66	3	0.10	0.12	3	0.10	0.13	6	0	0
6	1.1094	321.00	1.46	6.60	9.80	0.60	3	0.07	0.08	3	0.08	0.08	6	0	0
7	1.0133	290.00	1.51	4.60	5.10	0.63	3	0.06	0.07	3	0.06	0.07	6	0	0
8	1.1269	324.00	1.51	4.00	4.90	0.56	3	0.08	0.09	3	0.06	0.07	6	0	0
9	0.9638	296.00	1.62	5.50	8.70	0.47	3	0.06	0.07	3	0.08	0.09	6	0	0
10	0.9432	322.00	1.80	4.00	4.80	0.57	3	0.07	0.07	3	0.08	0.08	6	0	0
11	0.9955	282.00	1.49	4.10	5.60	0.56	3	0.08	0.08	3	0.08	0.09	6	0	0
12	1.0866	330.00	1.60	3.50	4.40	0.51	3	0.08	0.09	3	0.08	0.10	6	0	0
13	1.0881	327.00	1.58	3.00	4.20	0.50	3	0.05	0.07	3	0.07	0.08	6	0	0
14	1.0815	312.00	1.52	2.90	4.20	0.41	3	0.07	0.07	3	0.06	0.06	6	0	0
15	1.1337	328.00	1.52	4.10	7.10	0.53	3	0.06	0.07	3	0.08	0.09	6	0	0
16	1.1115	337.00	1.60	4.90	5.90	0.38	3	0.06	0.06	3	0.07	0.08	6	0	0
17	1.0266	305.00	1.56	3.10	4.30	0.44	3	0.07	0.07	3	0.08	0.08	6	0	0
18	1.3549	354.00	1.37	5.80	8.60	0.65	3	0.08	0.09	3	0.09	0.10	6	0	0
19	1.0990	310.00	1.48	2.50	3.00	0.47	3	0.07	0.07	3	0.07	0.08	6	0	0
20	1.0959	316.00	1.52	3.90	5.00	0.47	3	0.07	0.08	3	0.08	0.09	6	0	0
21	1.0847	324.00	1.57	6.40	7.00	0.53	3	0.06	0.07	3	0.09	0.09	6	0	0
22	1.0621	308.00	1.53	3.90	6.60	0.37	3	0.06	0.06	3	0.07	0.07	6	0	0
23	1.0997	329.00	1.57	2.90	4.80	0.32	3	0.07	0.07	3	0.08	0.09	6	0	0
24	1.0999	323.00	1.55	11.20	14.60	0.67	3	0.07	0.07	3	0.08	0.08	6	0	0
25	1.0425	320.00	1.61	19.60	20.60	0.19	3	0.09	0.12	3	0.15	0.21	6	0	0
26	1.1120	332.00	1.61	10.50	17.50	2.30	3	0.47	0.68	4	0.54	0.84	8	3	3
27	1.1145	332.00	1.57	5.80	6.10	0.75	3	0.14	0.17	3	0.15	0.18	6	0	0
28	1.1372	337.00	1.56	4.80	5.00	0.72	3	0.11	0.11	3	0.11	0.11	6	0	0
29															
30															
31															
Total	30.2597	8907.00					84			85			170	3	3
Avg.	1.0807	318.11	1.55	5.81	7.50	0.58	85	0.09	0.10		0.10		Total	Total	Total
Max	1.3549	354.00	1.80	19.60	20.60	2.30		0.47	0.68		0.54	0.84	8	3	3
Min.	0.9432	278.00	1.37	2.50	3.00	0.19		0.05	0.06		0.06				

WSSN 0600 MONTH/YEAR **February-18**

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
DATE	pH													
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	7.9	154	150	114	107	40	43	49	45	8	9		
2	8.0	7.8	152	144	114	109	38	35	49	46	7	7		
3	8.1	7.8	170	160	127	115	43	45	42	43	16	13		
4	8.2	8.0	190	166	133	112	57	54	49	42	17	15		
5	8.0	7.8	176	166	122	117	54	49	45	42	16	15		
6	8.0	7.9	184	170	132	116	52	54	44	42	18	16		
7	7.8	7.7	178	164	139	119	39	45	59	51	8	9		
8	8.0	7.7	172	168	131	119	41	49	55	50	9	11		
9	7.9	7.9	186	176	130	124	56	52	50	45	15	16		
10	8.0	7.8	168	162	126	123	42	39	61	31	4	8		
11	8.0	7.9	224	178	162	128	62	50	58	49	19	14		
12	8.1	8.0	226	188	154	130	72	58	59	51	19	15		
13	8.0	7.9	194	186	138	136	56	50	51	49	17	16		
14	8.1	8.0	198	192	134	129	64	63	51	49	17	17		
15	8.1	8.0	182	192	126	134	56	58	47	51	16	16		
16	8.0	7.9	184	180	123	125	61	55	51	49	14	14		
17	8.0	7.7	176	170	126	124	50	46	61	54	6	9		
18	8.1	7.9	172	170	128	119	44	51	57	53	7	9		
19	8.0	7.7	184	162	133	124	51	38	55	51	12	8		
20	8.1	7.9	162	154	128	121	34	33	55	51	6	6		
21	8.2	8.0	184	174	118	123	66	51	42	43	19	16		
22	8.0	8.0	172	184	114	121	58	63	45	49	15	15		
23	8.0	7.8	166	160	117	113	49	47	45	44	13	12		
24	8.2	7.9	162	158	112	110	50	48	42	40	14	14		
25	8.0	7.9	174	168	112	111	62	57	47	45	14	14		
26	7.9	7.8	152	146	114	106	38	40	49	46	7	7		
27	7.9	7.9	160	150	115	112	45	38	51	50	8	6		
28	8.0	7.9	158	152	117	106	41	46	55	50	5	7		
Avg.	8.0	7.9	177.1	167.5	126.4	119.0	50.8	48.5	50.9	46.8	12.4	11.9		
Max	8.2	8.0	226.0	192.0	162.0	136.0	72.0	63.0	61.0	54.0	19.0	17.0		
Min.	7.8	7.7	152.0	144.0	112.0	106.0	34.0	33.0	42.0	31.0	4.0	6.0		

WSSN 0600 MONTH/YEAR February-18 PAGE 6

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

D A T E	RAW No. of Samples	RAW Colilert P/A	PLANT TAP No. of Samples	PLANT TAP Colilert P/A	Standard Plate Count Raw	Standard Plate Count Tap	Raw TEMP. 'C	Tap TEMP. 'C	COLOR ___True ___Appar. Raw	COLOR Tap	ODOR ___Cold ___60'C Raw	ODOR Tap
1			1	A	95	0	3	3				
2			1	A	91	1	3	3				
3			1	A	92	0	3	3				
4			1	A	61	0	3	3				
5			1	A	31	3	3	3				
6			1	A	53	0	3	3				
7			1	A	106	1	3	3				
8			1	A	84	0	3	3				
9			1	A	46	0	3	3				
10			1	A	39	0	3	3				
11			1	A	38	0	3	3				
12			1	A	57	0	3	3				
13			1	A	153	0	3	3				
14			1	A	28	0	3	3				
15			1	A	60	0	3	3				
16			1	A	50	0	3	3				
17			1	A	61	0	3	3				
18			1	A	52	0	3	3				
19			1	A	82	1	3	3				
20			1	A	203	2	3	3				
21			1	A	81	0	3	3				
22			1	A	185	0	3	3				
23			1	A	103	0	3	3				
24			1	A	131	3	3	3				
25			1	A	150	0	3	3				
26			1	A	175	0	4	4				
27			1	A	150	0	3	3				
28			1	A	161	0	3	3				
29												
30												
31												
AVG.			1	A	94	0	3	3				
Max					203	3	4	4				
Min					28	0	3	3				

Benton Harbor Water MI0600
Dist system Monitoring

Feb 2018
#########

DISTRIBUTION SYSTEM MONITORING

WSSN 0600

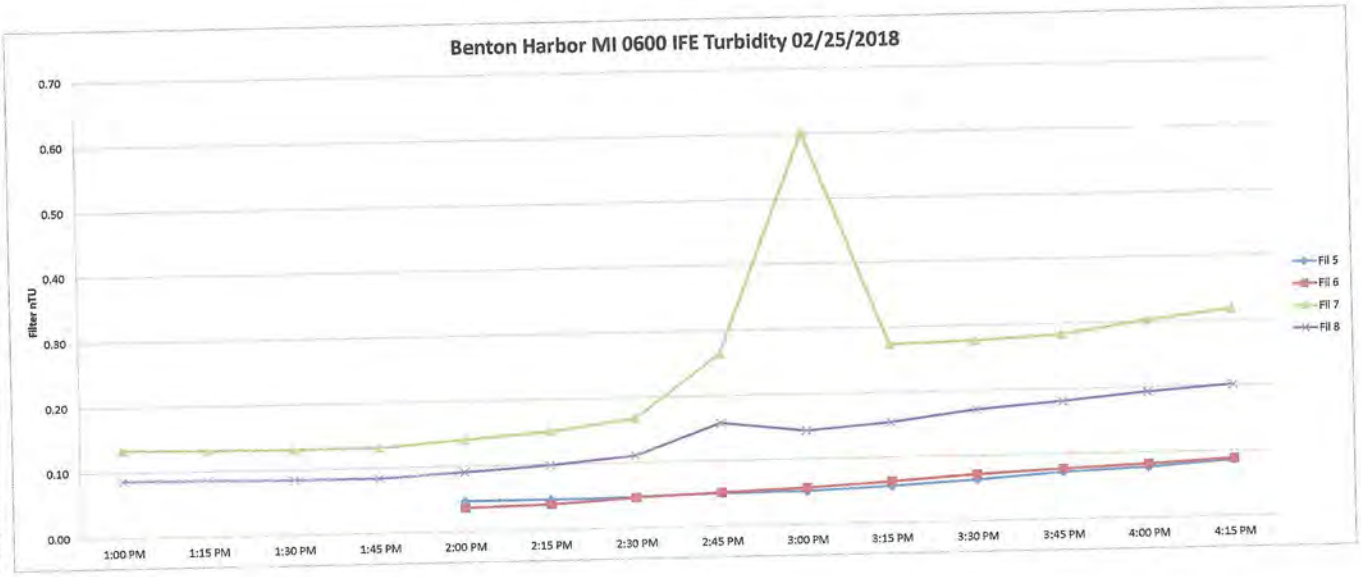
DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7	0.99		0.94	1.02	0.32		0.98			
8										
9										
10										
11										
12										
13										
14	0.68		1.05	0.85	0.77		0.90			
15										
16										
17										
18										
19										
20										
21	1.00		1.26	1.00	1.22		1.21			
22										
23										
24										
25										
26										
27										
28	1.17		1.11	1.03	0.77		0.71			
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	16	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max / Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.95	1.26 / 0.32
Total number of check samples	0600		
Total number of positive check samples	0600		

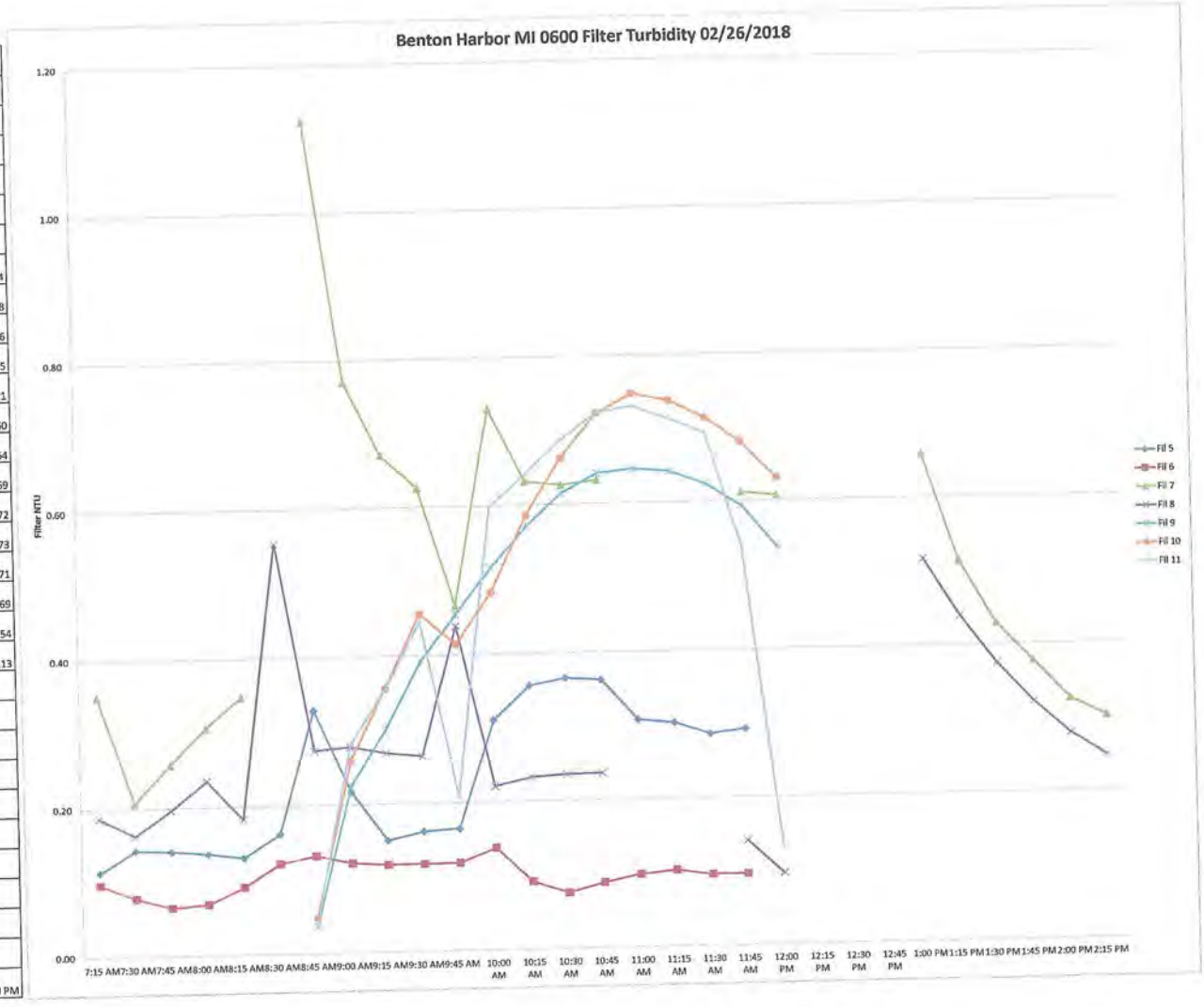
Benton Harbor MI 0600
Individual Filter Turbidity
February 25, 2018

DT	Fil 5	Fil 6	Fil 7	Fil 8	Raw	Plate Settler
1:00 PM			0.13	0.09	18.53	0.41
1:15 PM			0.13	0.09	18.88	0.41
1:30 PM			0.13	0.08	18.41	0.41
1:45 PM			0.13	0.08	17.55	0.41
2:00 PM	0.05	0.04	0.14	0.09	17.54	0.40
2:15 PM	0.05	0.04	0.15	0.10	17.83	0.40
2:30 PM	0.05	0.05	0.17	0.11	17.30	0.41
2:45 PM	0.05	0.05	0.26	0.16	17.07	0.41
3:00 PM	0.05	0.06	0.60	0.14	16.53	0.41
3:15 PM	0.06	0.06	0.27	0.15	16.62	0.41
3:30 PM	0.06	0.07	0.28	0.17	17.12	0.41
3:45 PM	0.07	0.08	0.28	0.18	17.31	0.40
4:00 PM	0.08	0.08	0.30	0.19	17.21	0.40
4:15 PM	0.09	0.09	0.32	0.20	17.30	0.41



Benton Harbor MI 0600
Individual Filter Turbidity
February 26, 2018

time	Fil 5	Fil 6	Fil 7	Fil 8	Fil 9	Fil 10	Fil 11
7:15 AM	0.11	0.10	0.35	0.19			
7:30 AM	0.14	0.08	0.21	0.16			
7:45 AM	0.14	0.07	0.26	0.20			
8:00 AM	0.14	0.07	0.31	0.24			
8:15 AM	0.13	0.09	0.35	0.18			
8:30 AM	0.16	0.12		0.55			
8:45 AM	0.33	0.13	1.12	0.27	0.04	0.05	0.04
9:00 AM	0.22	0.12	0.77	0.28	0.23	0.26	0.28
9:15 AM	0.15	0.12	0.67	0.27	0.30	0.36	0.36
9:30 AM	0.16	0.12	0.63	0.26	0.39	0.46	0.45
9:45 AM	0.17	0.12	0.47	0.44	0.45	0.41	0.21
10:00 AM	0.31	0.14	0.73	0.22	0.52	0.48	0.60
10:15 AM	0.36	0.09	0.63	0.23	0.57	0.59	0.64
10:30 AM	0.37	0.08	0.63	0.24	0.62	0.66	0.69
10:45 AM	0.36	0.09	0.63	0.24	0.64	0.72	0.72
11:00 AM	0.31	0.10			0.65	0.75	0.73
11:15 AM	0.30	0.10			0.64	0.74	0.71
11:30 AM	0.29	0.10			0.62	0.71	0.69
11:45 AM	0.29	0.10	0.61	0.14	0.59	0.68	0.54
12:00 PM			0.61	0.10	0.54	0.63	0.13
12:15 PM							
12:30 PM							
12:45 PM							
1:00 PM			0.66	0.52			
1:15 PM			0.51	0.44			
1:30 PM			0.43	0.37			
1:45 PM			0.38	0.32			
2:00 PM			0.33	0.28			
2:15 PM			0.30	0.25			
	Fil 5	Fil 6	Fil 7	Fil 8	Fil 9	Fil 10	Fil 11
Washes	12:00 PM	12:00 PM	11:00 AM	11:00 AM	1:00 PM	1:00 PM	12:30 PM



All 6 Filters in the plant were washed. Only filters 7 & 8 were re-started after Washing.

As you can see in the cover page of Feb's MOR: 170 CFE Turbidity Samples taken; 4 were > 0.3<1.0 which leaves 96% samples taken < 0.3 NTU

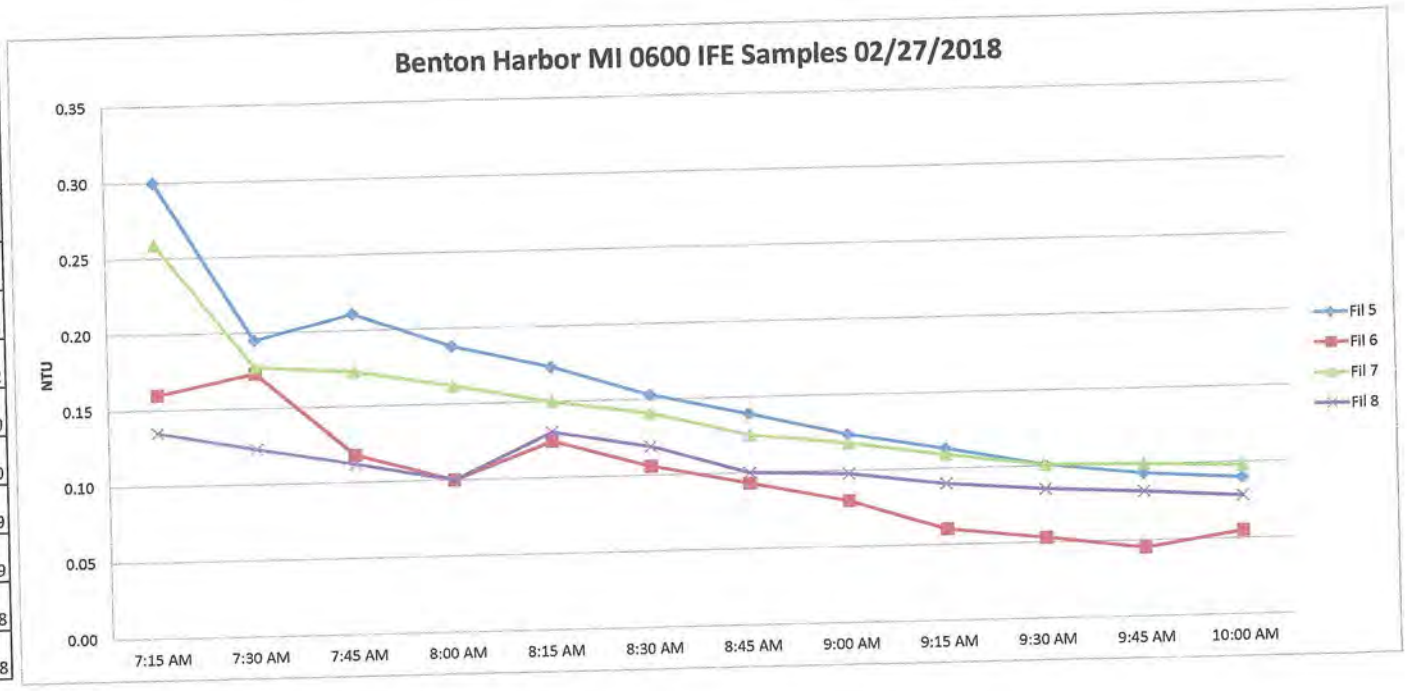
Those turbidiy values at the CFE were

North CFE Average 0.47 Maximum 0.68 # taken 4

South CFE Average 0.54 Maximum 0.84 # taken 4

Benton Harbor MI 0600
Individual Filter Turbidity
February 27, 2018

DT	Fil 5	Fil 6	Fil 7	Fil 8
7:15 AM	0.30	0.16	0.26	0.14
7:30 AM	0.20	0.17	0.18	0.12
7:45 AM	0.21	0.12	0.17	0.11
8:00 AM	0.19	0.10	0.16	0.10
8:15 AM	0.17	0.12	0.15	0.13
8:30 AM	0.15	0.11	0.14	0.12
8:45 AM	0.14	0.09	0.13	0.10
9:00 AM	0.12	0.08	0.12	0.10
9:15 AM	0.11	0.06	0.11	0.09
9:30 AM	0.10	0.05	0.10	0.09
9:45 AM	0.09	0.05	0.10	0.08
10:00 AM	0.09	0.06	0.10	0.08



MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** **F1-S1**

Signature of Operator-in-Charge

Month/Year **December-18** **F1-S2**

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1521	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	302.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.01	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.08	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.99%	Percent of Treated Water

Chemical Data

Chlorine on hand:	16160	lb.	Est. supply:	132 days
Primary Coagulant (Alum (Al3+)) on hand:	42495	lb.	Est. supply:	54 days
Cost of All Chemicals per Million Gallons:	$70.45	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks: Sent out 6th and last Public Notice of Violation this month.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **December-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.57	0.39	0.58		0	0.00	269	4.21	54	0.85	323	13.15	11.07	1.90	2.08
2	0.55	0.30	0.56		0	0.00	303	4.05	46	0.61	349	10.09	7.62	2.28	2.47
3	0.44	0.24	0.51		0	0.00	274	3.99	45	0.66	319	12.08	10.23	1.66	1.85
4	0.54	0.46	0.57		0	0.00	330	4.85	50	0.74	380	16.69	14.99	1.52	1.70
5	0.58	0.44	0.67		0	0.00	314	4.64	43	0.64	357	14.60	12.99	1.43	1.61
6	0.41	0.43	0.76		0	0.00	281	4.06	52	0.75	333	11.87	9.87	1.80	2.00
7	0.59	0.12	0.44		0	0.00	277	4.00	34	0.49	311	12.00	10.37	1.47	1.63
8	0.59	0.44	0.67		0	0.00	275	4.16	39	0.59	314	12.11	10.72	1.22	1.39
9	0.54	0.41	0.70		0	0.00	299	4.82	48	0.77	347	15.16	13.22	1.76	1.94
10	0.39	0.49	0.80		0	0.00	319	4.56	45	0.64	364	13.63	12.00	1.45	1.63
11	0.61	0.15	0.61		0	0.00	296	4.29	54	0.78	350	13.21	11.53	1.51	1.68
12	0.45	0.32	0.64	0.52	0	0.00	325	4.21	40	0.52	365	24.76	23.07	1.46	1.69
13	0.51	0.27	0.66		0	0.00	312	4.14	47	0.62	359	11.73	9.83	1.73	1.90
14	0.37	0.20	0.53		0	0.00	268	3.99	48	0.72	316	12.78	10.62	1.97	2.16
15	0.43	0.29	0.56		0	0.00	260	4.03	52	0.81	312	13.40	11.55	1.68	1.85
16	0.58	0.34	0.58		0	0.00	261	4.21	58	0.94	319	15.34	13.57	1.54	1.77
17	0.59	0.36	0.72		0	0.00	275	3.97	67	0.97	342	13.08	11.08	1.81	2.00
18	0.56	0.47	0.73		0	0.00	299	4.36	47	0.69	346	12.16	10.08	1.88	2.08
19	0.47	0.51	0.79	0.57	0	0.00	304	4.19	59	0.81	363	12.93	11.06	1.67	1.87
20	0.58	0.25	0.67		0	0.00	274	3.92	51	0.73	325	12.21	10.09	1.93	2.12
21	0.39	0.31	0.63		0	0.00	276	3.87	40	0.56	316	11.23	9.51	1.61	1.72
22	0.43	0.29	0.61		0	0.00	229	3.58	46	0.72	275	11.15	9.36	1.65	1.79
23	0.47	0.16	0.44		0	0.00	246	3.59	141	2.06	387	42.70	40.84	1.71	1.86
24	0.46	0.16	0.42		0	0.00	266	3.83	39	0.56	305	10.44	8.79	1.45	1.65
25	0.62	0.28	0.53		0	0.00	227	3.72	65	1.07	292	15.62	13.56	1.86	2.06
26	0.55	0.24	0.64	0.62	0	0.00	297	4.27	59	0.85	356	12.57	10.45	1.92	2.12
27	0.58	0.30	0.73		0	0.00	292	4.36	54	0.81	346	12.93	11.37	1.38	1.56
28	0.54	0.36	0.75		0	0.00	264	3.96	45	0.68	309	11.73	10.03	1.52	1.70
29	0.51	0.23	0.65		0	0.00	283	4.76	56	0.94	339	18.70	16.91	1.61	1.79
30	0.41	0.26	0.75		0	0.00	252	3.93	43	0.67	295	11.89	9.98	1.72	1.91
31	0.45	0.22	0.59		0	0.00	254	3.89	25	0.38	279	12.41	10.63	1.49	1.78
Tot.							8,432		1,538		10,293				
Avg.	0.51	0.32	0.63	0.57	0.00	0.00	281.57	4.15	52.23	0.77	333.80	14.40	12.55	1.67	1.85
Max	0.62	0.51	0.80	0.62	0.00	0.00	330.00	4.85	141.00	2.06	387.00	42.70	40.84	2.28	2.47
Min.	0.37	0.12	0.42	0.52	0.00	0.00	227.00	3.58	34.00	0.49	275.00	10.09	7.62	1.22	1.39

WSSN 0600 City of Benton Harbor Month/Year December-18

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS												
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9528	292.00	1.61	4.20	4.70	0.32	3	0.06	0.06	3	0.06	0.06	6	0	0
2	1.1172	334.00	1.57	6.20	12.70	0.29	3	0.06	0.07	3	0.07	0.07	6	0	0
3	1.0252	268.00	1.38	8.30	8.90	0.36	3	0.07	0.09	3	0.09	0.11	6	0	0
4	1.0154	289.00	1.50	6.80	8.70	0.47	3	0.07	0.08	3	0.11	0.12	6	0	0
5	1.0099	308.00	1.60	6.70	7.30	0.58	3	0.08	0.10	3	0.08	0.09	6	0	0
6	1.0344	291.00	1.57	7.50	9.30	0.48	3	0.09	0.09	3	0.08	0.10	6	0	0
7	1.0338	302.00	1.54	6.10	6.90	0.31	3	0.08	0.11	3	0.08	0.08	6	0	0
8	0.9862	298.00	1.59	6.20	7.60	0.36	3	0.07	0.07	3	0.06	0.07	6	0	0
9	0.9269	278.00	1.58	7.40	11.80	0.42	3	0.07	0.08	3	0.07	0.07	6	0	0
10	1.0452	314.00	1.58	5.70	7.40	0.46	3	0.08	0.09	3	0.08	0.07	6	0	0
11	1.0303	309.00	1.58	8.00	12.00	0.31	3	0.07	0.08	3	0.07	0.07	6	0	0
12	1.1521	308.00	1.41	5.20	5.70	0.36	3	0.07	0.08	3	0.08	0.09	6	0	0
13	1.1253	330.00	1.54	6.80	8.60	0.36	3	0.08	0.10	3	0.07	0.08	6	0	0
14	1.0021	284.00	1.49	5.90	8.90	0.44	3	0.07	0.08	3	0.07	0.08	6	0	0
15	0.9632	291.00	1.59	4.60	6.50	0.38	3	0.07	0.07	3	0.08	0.09	6	0	0
16	0.9258	269.00	1.53	5.60	9.00	0.29	3	0.08	0.09	3	0.07	0.08	6	0	0
17	1.0351	321.00	1.63	9.70	11.60	0.33	3	0.09	0.10	3	0.08	0.08	6	0	0
18	1.0238	309.00	1.59	6.80	9.90	0.35	3	0.07	0.08	3	0.07	0.08	6	0	0
19	1.0825	374.00	1.82	7.30	12.30	0.32	3	0.07	0.07	3	0.08	0.09	6	0	0
20	1.0447	362.00	1.82	6.00	9.80	0.29	3	0.06	0.07	3	0.06	0.07	6	0	0
21	1.0633	304.00	1.50	6.70	7.20	0.45	3	0.08	0.08	3	0.06	0.07	6	0	0
22	0.9539	281.00	1.55	7.60	13.10	0.24	3	0.07	0.07	3	0.07	0.08	6	0	0
23	1.0226	160.00	0.82	8.20	9.90	0.36	3	0.06	0.07	3	0.06	0.07	6	0	0
24	1.0365	402.00	2.04	8.00	8.20	0.37	3	0.06	0.07	3	0.07	0.07	6	0	0
25	0.9105	278.00	1.61	6.20	7.30	0.38	3	0.06	0.06	3	0.07	0.07	6	0	0
26	1.0372	340.00	1.61	7.40	10.80	0.36	3	0.07	0.08	3	0.06	0.07	6	0	0
27	1.0006	283.00	1.49	5.90	8.30	0.39	3	0.06	0.06	3	0.06	0.07	6	0	0
28	0.9944	322.00	1.70	5.90	8.70	0.33	3	0.06	0.07	3	0.06	0.06	6	0	0
29	0.8870	271.00	1.61	9.00	13.40	0.32	3	0.06	0.07	3	0.06	0.06	6	0	0
30	0.9561	309.00	1.70	7.00	7.80	0.27	3	0.06	0.06	3	0.06	0.07	6	0	0
31	0.9737	280.00	1.51	6.00	8.50	0.35	3	0.08	0.08	3	0.06	0.07	6	0	0
Total	31.3677	9361.00					93			93			186	0	0
Avg.	1.0119	301.97	1.57	6.74	9.12	0.36	93	0.07	0.08		0.07		Total	Total	Total
Max	1.1521	402.00	2.04	9.70	13.40	0.58		0.09	0.11		0.11	0.12	6	0	0
Min.	0.8870	160.00	0.82	4.20	4.70	0.24		0.06	0.06		0.06				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	8.0	180	168	127	116	53	52	50	46	14	13		
2	8.0	8.0	178	168	125	115	53	53	46	44	15	14		
3	7.8	7.8	184	164	134	123	50	41	55	46	11	12		
4	8.0	7.9	205	168	139	118	66	50	53	45	18	14		
5	8.0	8.0	190	180	142	129	48	51	46	48	18	15		
6	7.9	7.6	182	164	147	124	35	40	65	57	5	5		
7	7.9	7.9	158	164	119	132	39	32	46	50	10	10	22.5	24.0
8	7.9	7.8	188	176	131	116	57	60	51	49	15	13		
9	7.9	7.9	214	170	155	121	59	49	56	42	18	16		
10	8.0	7.9	196	172	146	123	50	49	46	44	19	15		
11	8.0	7.9	182	202	124	133	58	69	46	51	17	18	21.5	26.0
12	7.8	7.8	168	170	122	127	46	43	51	51	10	11		
13	7.8	7.7	164	168	119	120	45	48	53	52	8	9		
14	7.9	7.7	208	176	173	119	35	57	65	51	11	12	23.0	24.5
15	7.9	7.9	172	162	136	120	36	42	49	48	12	10		
16	8.0	8.0	158	178	119	131	39	47	46	47	11	14		
17	7.9	7.9	192	194	121	128	71	66	50	51	17	16		
18	7.8	7.9	170	174	120	121	50	53	42	44	16	16		
19	7.9	7.9	188	170	127	118	61	52	46	43	18	15		
20	7.9	8.0	180	170	130	117	50	53	46	46	16	14		
21	7.9	7.8	166	164	117	119	49	45	50	47	10	11		
22	8.0	7.9	148	146	116	114	32	32	46	45	8	8	22.0	23.5
23	8.0	7.9	182	164	143	114	39	50	54	51	12	9		
24	7.9	7.9	158	152	128	125	30	27	46	46	10	9		
25	8.1	8.0	176	164	141	122	35	42	50	46	13	12		
26	7.9	7.9	184	170	135	119	49	51	46	45	17	14		
27	8.0	8.0	184	170	136	123	48	47	46	46	17	14		
28	7.9	7.9	184	176	128	123	56	53	50	46	15	15	28.0	25.0
29	7.9	7.9	180	172	125	122	55	50	49	46	14	14		
30	8.0	8.0	168	182	112	122	56	60	45	49	14	15		
31	7.9	7.9	162	154	124	115	38	39	46	44	12	11	21.5	23.5
Avg.	7.9	7.9	179.6	170.6	131.2	121.8	48.3	48.8	49.7	47.4	13.6	12.8	23.4	24.6
Max	8.1	8.0	214.0	202.0	173.0	133.0	71.0	69.0	65.0	57.0	19.0	18.0	28.0	26.0
Min.	7.8	7.6	148.0	146.0	112.0	114.0	30.0	27.0	42.0	42.0	5.0	5.0	21.5	23.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	36	0	6	7.5				
2			1	A	60	1	6	7.5				
3			1	A	168	0	6	9.0				
4			1	A	98	4	5	6.5				
5			1	A	55	17	6	7.0				
6			1	A	154	2	6	9.0				
7			1	A	137	1	6	9.0				
8			1	A	81	1	5	6.5				
9			1	A	116	0	4	6.5				
10			1	A	90	1	5	6.5				
11			1	A	91	0	5	6.0				
12			1	A	69	0	5	8.0				
13			1	A	46	0	6	9.0				
14			1	A	34	0	6	8.0				
15			1	A	65	1	5	7.5				
16			1	A	41	1	5	8.0				
17			1	A	41	0	4	5.5				
18			1	A	58	0	4	5.0				
19			1	A	37	1	4	6.0				
20			1	A	47	0	4	5.5				
21			1	A	32	0	5	9.0				
22			1	A	48	0	5	8.0				
23			1	A	44	0	5	8.0				
24			1	A	103	1	4	7.0				
25			1	A	64	1	5	8.0				
26			1	A	65	1	5	5.5				
27			1	A	62	0	4.8	5.5				
28			1	A	142	0	9.0	12.0				
29			1	A	85	0	8.7	8.5				
30			1	A	49	0	8.5	9.5				
31			1	A	52	0	5.0	11.0				
AVG.			1	A	73	1	5	8				
Max					168	17	9	12				
Min					32	0	4	5				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 December-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1	1.30		1.05	0.70	1.11		1.08			
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12	0.58		1.14	1.13	0.91		1.00			
13										
14										
15										
16										
17										
18										
19	0.42		0.93	0.52	1.08		0.99			
20										
21										
22										
23										
24										
25										
26	0.23		1.12	0.44	0.66		1.17			
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	20		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	**0.88**	1.30	0.23
Total number of check samples	0600			
Total number of positive check samples	0600			

Benton Harbor Water Filtration Plant
601 Ridgeway
St. Joseph, Mi. 49085

MONTHLY REPORT | December-18

DISTRIBUTION:	MGD	
Total Gallons	11.1105	MG
Average Day	0.3702	MG
Maximum Day	0.5161	MG
Minimum Day	0.1353	MG

TREATMENT:		
Total Low Service MG	30.4149	MG
Wash Water Gals. MG	0.2970	MG
Wash Water %	0.98%	
Plant Use to Sanitary MG	0.0066	MG
Total Plant Use MG	1.2358	MG
Total Plant Use to Lagoon MG	1.2292	MG
Total Plant Use %	4.06%	

FILTRATION:		
Ave. Filter Run	302.3	hours
Ave. Filter Rate	1.81	gal/sqft/min

LABORATORY REPORT

Average of	*Raw*	*Tap*
Chlorides mg/L	23.1	24.4
Fluoride mg/L	0.31	0.63
Alkalinity mg/L	131	122
Hardness mg/L	179	170
pH	7.9	7.8
Calcium mg/L	50	47
Magnesium mg/L	14	13
Turbidity NTU	6.82	0.08
Temperature C	5.00	7.15
Temperature F	41.00	44.87
Color		

Chlorine Residual		*mg/L Free*
Mixing Basin		2.09
Applied		1.62
Tap		1.84
Distribution		0.82

Treatment Chemical Summary:

CHEMICAL	Applied mg/L ION	Total Lbs. chem.	Cost chem	Inventory (lbs.)	Days Supply
Alum (Al3+)	1.57	9,361	$1,282.46	42,495	132
Chlorine (Cl2) pre	14.33	9,361	$860.41	16,160	54
Chlorine (Cl2) post	4.14				
Fluoride (F2)	0.51	6,681	$25.92	1,900	213

Total Cost of all Chemicals			$2,142.87
Chemical Cost per Million Gallons Treated			$70.45
Chemical Cost per Million Gallons Delivered			

Remarks:

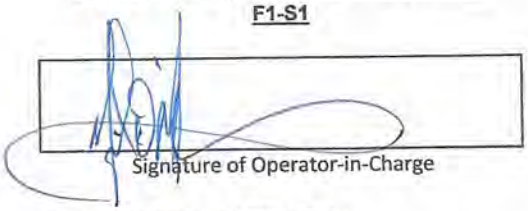
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley**

F1-S1



Signature of Operator-in-Charge

Month/Year **October-18**

F1-S2

Water Plant Classification

Berrien

County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1719	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	306.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.98	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.33	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.39%	Percent of Treated Water

Chemical Data

Chlorine on hand:	36360	lb.	Est. supply:	259 days
Primary Coagulant (Alum (Al3+)) on hand:	81416	lb.	Est. supply:	127 days
Cost of All Chemicals per Million Gallons:	$70.20	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO

If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO

If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES

If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO

If yes, indicate date(s) and duration on a separate sheet.

Remarks: Lead and Copper results come in early in October. The Lead Action Level is exceeded. 90th percentile value is 22 ppb. There were 8 samples out of 30 that exceeded 15ppb.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **October-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.53	0.18	0.54		0	0.00	236	3.75	41	0.65	277	11.64	9.79	1.71	1.85
2	0.45	0.26	0.64		0	0.00	281	3.84	51	0.70	332	11.54	9.67	1.74	1.87
3	0.47	0.24	0.58		0	0.00	266	4.06	47	0.72	313	11.93	10.35	1.43	1.58
4	0.42	0.12	0.59	0.58	0	0.00	275	4.21	45	0.69	320	12.20	10.61	1.33	1.59
5	0.47	0.12	0.58		0	0.00	267	4.09	47	0.72	314	13.00	11.28	1.55	1.72
6	0.45	0.20	0.57		0	0.00	245	3.83	9	0.14	254	11.80	10.33	1.19	1.47
7	0.49	0.18	0.65		0	0.00	210	3.84	10	0.18	220	13.83	12.46	1.19	1.37
8	0.61	0.28	0.67		0	0.00	299	4.22	99	1.40	398	14.56	12.71	1.69	1.85
9	0.54	0.19	0.67		0	0.00	280	4.16	13	0.19	293	11.43	9.96	1.22	1.47
10	0.44	0.27	0.70	0.68	0	0.00	267	4.19	24	0.38	291	11.86	10.62	1.11	1.24
11	0.35	0.30	0.74		0	0.00	305	4.55	24	0.36	329	13.44	12.30	0.84	1.14
12	0.42	0.24	0.66		0	0.00	338	4.77	26	0.37	364	13.74	12.62	1.00	1.12
13	0.61	0.26	0.64		0	0.00	257	4.38	34	0.58	291	15.68	14.50	1.03	1.18
14	0.48	0.25	0.63		0	0.00	273	4.53	35	0.58	308	16.19	14.74	1.29	1.45
15	0.59	0.14	0.56		0	0.00	300	4.43	46	0.68	346	12.51	11.06	1.28	1.45
16	0.59	0.06	0.66		0	0.00	281	4.15	52	0.77	333	13.68	12.32	1.21	1.36
17	0.54	0.25	0.72		0	0.00	290	4.64	44	0.70	334	15.04	13.26	1.61	1.78
18	0.59	0.26	0.72		0	0.00	295	4.61	50	0.78	345	15.95	14.35	1.44	1.60
19	0.66	0.21	0.71		0	0.00	299	4.54	56	0.85	355	13.87	12.14	1.58	1.73
20	0.59	0.11	0.70		0	0.00	296	4.51	56	0.85	352	15.65	13.66	1.82	1.99
21	0.46	0.44	0.74		0	0.00	251	4.41	45	0.79	296	17.77	16.15	1.45	1.62
22	0.68	0.31	0.71		0	0.00	307	4.59	55	0.82	362	14.72	13.05	1.50	1.67
23	0.58	0.21	0.68		0	0.00	276	4.35	48	0.76	324	13.96	12.06	1.73	1.90
24	0.61	0.21	0.65		0	0.00	300	4.37	58	0.84	358	13.48	11.48	1.82	2.00
25	0.62	0.23	0.60		0	0.00	274	4.20	49	0.75	323	12.33	10.45	1.71	1.88
26	0.72	0.23	0.53		0	0.00	270	4.30	56	0.89	326	18.97	17.25	1.57	1.72
27	0.31	0.20	0.61		0	0.00	323	4.11	64	0.82	387	18.73	16.58	1.96	2.15
28	0.44	0.23	0.54		0	0.00	249	4.11	47	0.78	296	14.57	12.81	1.68	1.76
29	0.33	0.17	0.59		0	0.00	275	4.10	54	0.81	329	12.79	10.73	1.88	2.06
30	0.42	0.29	0.63		0	0.00	250	4.08	51	0.83	301	17.54	15.29	2.08	2.25
31	0.61	0.28	0.65	0.59	0	0.00	299	4.05	57	0.77	356	12.94	10.97	1.80	1.97
Tot.	15.45						8,398		1,352		10,027	437.32			
Avg.	0.52	0.22	0.64	0.63	0.00	0.00	277.83	4.26	44.53	0.68	322.37	14.15	12.49	1.49	1.66
Max	0.72	0.44	0.74	0.68	0.00	0.00	338.00	4.77	99.00	1.40	398.00	18.97	17.25	2.08	2.25
Min.	0.31	0.06	0.53	0.58	0.00	0.00	210.00	3.75	9.00	0.14	220.00	11.43	9.67	0.84	1.12

WSSN 0600 City of Benton Harbor Month/Year #######

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	Max.	Applied Avg.	# ample	FILTERED NORTH Avg.	Max.	# Samples	FILTERED SOUTH Avg.	Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.9406	265.00	1.48	1.90	2.10	0.14	3	0.07	0.07	3	0.06	0.06	6	0	0
2	1.0921	320.00	1.54	2.10	2.30	0.13	3	0.06	0.06	3	0.06	0.06	6	0	0
3	0.9782	285.00	1.53	2.00	2.10	0.18	3	0.06	0.07	3	0.07	0.07	6	0	0
4	0.9752	284.00	1.53	4.20	5.10	0.21	3	0.06	0.07	3	0.06	0.07	6	0	0
5	0.9755	278.00	1.50	4.20	5.90	0.18	3	0.06	0.06	3	0.06	0.07	6	0	0
6	0.9537	277.00	1.53	2.60	2.70	0.14	3	0.07	0.08	3	0.06	0.06	6	0	0
7	0.8174	240.00	1.54	2.60	2.70	0.15	3	0.07	0.07	3	0.06	0.06	6	0	0
8	1.0580	309.00	1.54	3.20	3.40	0.20	3	0.08	0.09	3	0.07	0.07	6	0	0
9	1.0051	297.00	1.55	2.10	2.90	0.22	3	0.07	0.08	3	0.08	0.09	6	0	0
10	0.9518	281.00	1.55	2.00	2.10	0.19	3	0.06	0.06	3	0.07	0.07	6	0	0
11	1.0011	286.00	1.50	6.70	8.20	0.17	3	0.06	0.07	3	0.07	0.07	6	0	0
12	1.0581	299.00	1.49	5.00	5.20	0.17	3	0.05	0.06	3	0.07	0.07	6	0	0
13	0.8761	254.00	1.53	5.00	5.50	0.20	3	0.31	0.06	3	0.08	0.08	6	0	0
14	0.8988	264.00	1.55	5.10	5.30	0.19	3	0.06	0.06	3	0.07	0.07	6	0	0
15	1.0116	294.00	1.53	4.80	7.00	0.18	3	0.06	0.07	3	0.07	0.07	6	0	0
16	1.0109	294.00	1.53	3.80	4.30	0.21	3	0.06	0.07	3	0.07	0.07	6	0	0
17	0.9322	279.00	1.57	4.90	6.40	0.18	3	0.06	0.07	3	0.07	0.07	6	0	0
18	0.9547	287.00	1.58	6.20	7.80	0.22	3	0.06	0.07	3	0.06	0.07	6	0	0
19	0.9836	290.00	1.55	4.30	4.80	0.21	3	0.07	0.07	3	0.06	0.07	6	0	0
20	0.9792	290.00	1.56	5.10	6.30	0.21	3	0.07	0.07	3	0.07	0.07	6	0	0
21	0.8499	248.00	1.54	6.90	7.60	0.23	3	0.06	0.06	3	0.06	0.06	6	0	0
22	0.9988	294.00	1.55	7.00	8.50	0.26	3	0.06	0.07	3	0.06	0.06	6	0	0
23	0.9471	279.00	1.55	7.30	9.50	0.29	3	0.07	0.07	3	0.07	0.07	6	0	0
24	1.0258	296.00	1.52	6.30	8.50	0.23	3	0.07	0.07	3	0.06	0.06	6	0	0
25	0.9744	288.00	1.56	5.20	5.80	0.23	3	0.07	0.07	3	0.06	0.06	6	0	0
26	0.9372	287.00	1.56	4.80	5.70	0.26	3	0.06	0.06	3	0.06	0.06	6	0	0
27	1.1719	338.00	1.52	3.90	4.30	0.21	3	0.07	0.07	3	0.07	0.07	6	0	0
28	0.9047	259.00	1.51	2.90	3.00	0.16	3	0.07	0.07	3	0.07	0.08	6	0	0
29	1.0009	299.00	1.57	4.90	6.20	0.15	3	0.06	0.07	3	0.06	0.07	6	0	0
30	0.9138	269.00	1.55	4.90	5.20	0.17	3	0.07	0.07	3	0.07	0.08	6	0	0
31	1.1025	363.00	1.73	4.20	6.00	0.33	3	0.07	0.07	3	0.07	0.08	6	0	0
Total	30.2809	8893.00					93			93			186	0	0
Avg.	0.9768	286.87	1.54	4.39	5.24	0.20	93	0.07	0.07		0.07		Total	Total	Total
Max	1.1719	363.00	1.73	7.30	9.50	0.33		0.31	0.09		0.08	0.09	6	0	0
Min.	0.8174	240.00	1.48	1.90	2.10	0.13		0.05	0.06		0.06				

WSSN 0600 | MONTH/YEAR | October-18 |

CITY OF BENTON HARBOR CHEMICAL ANALYSES

D	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
A														
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	7.7	144	146	109	113	35	33	41	42	10	10		
2	8.1	7.8	144	136	113	109	31	27	46	41	7	8		
3	8.2	8.0	172	160	120	110	52	50	42	41	16	14	16.0	20.0
4	8.2	8.1	158	154	112	110	46	44	40	38	14	14		
5	8.0	8.1	152	160	109	115	43	45	38	41	14	14		
6	8.1	7.7	172	144	126	109	46	35	47	40	13	11		
7	8.1	7.8	158	148	117	109	41	39	46	42	10	10		
8	8.1	8.0	212	160	131	112	81	48	55	43	18	13		
9	8.0	7.9	192	154	146	114	46	40	59	47	11	9		
10	8.0	7.9	178	172	136	125	42	47	51	46	12	14	20.5	26.5
11	8.1	8.0	148	172	108	131	40	41	39	49	12	12		
12	8.1	7.9	158	174	111	129	47	45	43	51	12	12		
13	8.1	8.0	154	164	110	116	44	48	40	44	13	13		
14	7.9	7.9	168	162	116	114	52	48	45	43	14	13	18.0	22.0
15	8.1	8.0	166	160	113	112	53	48	46	44	13	15		
16	8.0	8.0	158	148	115	106	43	42	40	38	14	13		
17	8.1	8.0	160	154	114	108	46	46	41	40	14	13	18.5	23.0
18	8.1	8.0	162	150	116	105	46	45	41	39	15	13		
19	8.0	8.0	172	154	124	108	48	46	45	43	15	11		
20	8.1	8.1	160	152	117	110	43	42	41	40	14	13		
21	8.1	8.1	156	154	115	111	41	43	39	40	14	13		
22	8.1	8.0	164	154	118	111	46	43	42	40	14	13		
23	8.1	8.0	162	152	117	108	45	44	41	39	15	13	18.0	22.0
24	8.0	8.0	158	152	117	112	41	40	39	38	15	14		
25	8.0	8.0	158	152	113	110	45	42	41	39	14	13		
26	8.0	8.1	156	152	109	108	47	44	41	39	13	13		
27	8.0	7.8	144	146	108	109	36	37	41	42	10	10	17.0	21.0
28	8.1	7.9	144	146	108	107	36	39	42	44	9	9		
29	8.0	7.9	146	150	106	104	40	46	43	41	9	12		
30	8.3	7.9	162	138	135	104	27	34	43	40	13	9		
31	8.1	8.0	152	146	113	108	39	38	37	36	15	14		
Avg.	8.1	8.0	161.3	154.0	117.0	111.6	44.3	42.4	43.3	41.8	12.9	12.1	18.0	22.4
Max	8.3	8.1	212.0	174.0	146.0	131.0	81.0	50.0	59.0	51.0	18.0	15.0	20.5	26.5
Min.	7.9	7.7	144.0	136.0	106.0	104.0	27.0	27.0	38.0	38.0	7.0	8.0	16.0	20.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.	___True		___Cold	
A	Samples	P/A	Samples	P/A			'C	'C	___Appar.		___60'C	
T					Raw	Tap			Raw	Tap	Raw	Tap
E												
1			1	A	77	1	18	19.0				
2			1	A	42	0	18	19.0				
3			1	A	173	0	18	17.5				
4			1	A	101	0	19	18.0				
5			1	A	70	2	16	18.0				
6			1	A	164	1	18	19.0				
7			1	A	130	0	17	19.0				
8			1	A	30	0	17	17.0				
9			1	A	127	0	19	18.0				
10			1	A	83	0	19	21.0				
11			1	A	78	0	19	19.0				
12			1	A	126	1	18	19.0				
13			1	A	100	0	17	18.0				
14			1	A	79	0	17	17.5				
15			1	A	101	1	17	17.5				
16			1	A	61	0	16	17.0				
17			1	A	51	0	16	17.0				
18			1	A	66	0	15	16.5				
19			1	A	88	0	15	16.0				
20			1	A	81	0	15	15.5				
21			1	A	102	0	13	15.5				
22			1	A	170	0	13	15.0				
23			1	A	81	1	13	14.5				
24			1	A	16	0	13	14.0				
25			1	A	49	0	13	14.0				
26			1	A	85	5	12	13.5				
27			1	A	52	0	13.0	14.0				
28			1	A	69	0	9.0	12.0				
29			1	A	51	4	8.7	8.5				
30			1	A	21	2	8.5	9.5				
31			1	A	37	0	12.5	13.0				
AVG.			1	A	83	1	15	16				
Max					173	5	19	21				
Min					16	0	9	9				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 October-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4	0.76		0.86	0.53	0.79		0.88			
5										
6										
7										
8										
9										
10	0.38		0.63	0.57	0.86		1.23			
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31	0.59		0.62	0.96						

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	13	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.74	1.23 0.38
Total number of check samples	0600		
Total number of positive check samples	0600		

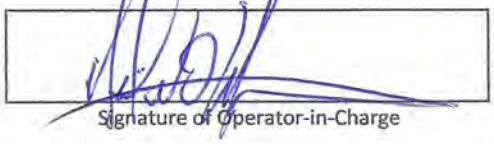
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **August-18**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	4.6851	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	269.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.88	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.00	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.64%	Percent of Treated Water

Chemical Data

Chlorine on hand:	7,575	lb.	Est. supply:	92	days
Primary Coagulant (Alum (Al3+)) on hand:	45,275	lb.	Est. supply:	22	days
Cost of All Chemicals per Million Gallons:	$81.83	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	92	89
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Remarks:

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **August-18**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		SETTLED		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.09	0.27	0.74		0	0.00	547	1.74	81	0.26	628	2.43	0.83	1.44	1.60
2	0.50	0.14	0.57		0	0.00	494	6.45	83	1.08	577	16.82	15.06	1.59	1.76
3	0.54	0.11	0.60	0.54	0	0.00	483	6.35	83	1.09	566	26.42	24.58	1.65	1.84
4	0.49	0.24	0.73		0	0.00	437	5.86	83	1.11	520	20.01	17.98	1.86	2.03
5	0.53	0.20	0.68		0	0.00	432	5.72	81	1.07	513	15.05	13.21	1.60	1.84
6	0.42	0.19	0.65		0	0.00	393	5.72	70	1.02	463	18.35	16.17	2.02	2.18
7	0.63	0.22	0.63		0	0.00	424	5.65	67	0.89	491	15.58	13.99	1.39	1.59
8	0.43	0.20	0.63	0.66	0	0.00	450	6.07	66	0.89	516	15.21	13.49	1.56	1.72
9	0.48	0.13	0.62		0	0.00	455	5.91	67	0.87	522	16.52	14.81	1.55	1.71
10	0.51	0.07	0.55		0	0.00	459	6.05	67	0.88	526	17.45	15.58	1.71	1.87
11	0.52	0.23	0.60		0	0.00	448	5.79	72	0.93	520	16.24	14.55	1.52	1.69
12	0.49	0.18	0.60		0	0.00	452	5.55	63	0.77	515	22.26	20.26	1.82	2.00
13	0.53	0.00	0.00		0	0.00	430	5.75	68	0.91	498	16.51	14.31	1.97	2.20
14	0.38	0.24	0.66		0	0.00	414	5.36	72	0.93	486	15.99	14.17	1.66	1.82
15	0.51	0.23	0.65	0.62	0	0.00	469	5.54	72	0.85	541	19.30	17.42	1.71	1.88
16	0.53	0.20	0.68		0	0.00	421	5.63	71	0.95	492	16.72	14.73	1.80	1.99
17	0.49	0.26	0.71		0	0.00	470	5.53	72	0.85	542	18.56	16.43	1.91	2.13
18	0.52	0.08	0.49		0	0.00	412	5.73	70	0.97	482	16.76	15.31	1.29	1.45
19	0.51	0.29	0.63		0	0.00	381	5.74	62	0.93	443	18.13	16.36	1.60	1.77
20	0.49	0.26	0.69		0	0.00	422	5.41	71	0.91	493	17.91	16.30	1.45	1.61
21	0.53	0.25	0.63	0.54	0	0.00	412	5.39	77	1.01	489	15.69	13.92	1.60	1.77
22	0.44	0.24	0.70	0.62	0	0.00	413	5.63	70	0.95	483	16.23	14.15	1.89	2.08
23	0.24	0.32	0.66		0	0.00	386	5.29	67	0.92	453	15.49	13.75	1.58	1.74
24	0.54	0.25	0.61		0	0.00	429	5.63	73	0.96	502	14.53	12.72	1.61	1.81
25	0.44	0.23	0.61		0	0.00	437	5.99	69	0.95	506	17.11	15.40	1.55	1.71
26	0.43	0.28	0.64		0	0.00	430	6.34	65	0.96	495	17.90	16.41	1.35	1.49
27	0.55	0.22	0.62		0	0.00	484	6.51	83	1.12	567	17.08	15.66	1.26	1.42
28	0.50	0.15	0.61		0	0.00	458	6.24	72	0.98	530	16.95	15.38	1.41	1.57
29	0.61	0.19	0.68		0	0.00	460	6.14	71	0.95	531	16.76	15.03	1.56	1.73
30	0.49	0.30	0.67		0	0.00	467	6.19	75	0.99	542	16.91	15.17	1.58	1.74
31	0.51	0.28	0.70		0	0.00	454	6.16	74	1.00	528	16.74	14.88	1.69	1.86
Tot.	14.37						13,176		2,156		15,960	523.63			
Avg.	0.48	0.21	0.62	0.60	0.00	0.00	442.30	5.70	72.10	0.93	514.40	16.90	15.10	1.62	1.79
Max	0.63	0.32	0.74	0.66	0.00	0.00	547.00	6.51	83.00	1.12	628.00	26.42	24.58	2.02	2.20
Min.	0.09	0.00	0.00	0.54	0.00	0.00	381.00	1.74	62.00	0.26	443.00	2.43	0.83	1.26	1.42

WSSN 0600 City of Benton Harbor Month/Year ######## August 2017

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS												
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	4.6851	381.00	0.43	2.20	2.90	0.21	3	0.06	0.07	3	0.08	0.08	6	0	0
2	1.1432	332.00	1.53	1.30	1.40	0.19	3	0.07	0.07	3	0.07	0.07	6	0	0
3	1.1361	336.00	1.56	1.40	1.50	0.22	3	0.08	0.08	3	0.07	0.08	6	0	0
4	1.1135	338.00	1.60	0.89	1.00	0.17	3	0.07	0.07	3	0.07	0.08	6	0	0
5	1.1271	342.00	1.60	1.20	1.30	0.16	3	0.06	0.06	3	0.07	0.08	6	0	0
6	1.0250	314.00	1.76	1.20	1.30	0.17	3	0.07	0.08	3	0.07	0.07	6	0	0
7	1.1200	340.00	1.60	0.99	1.10	0.16	3	0.06	0.06	3	0.06	0.07	6	0	0
8	1.1065	322.00	1.53	1.10	1.10	0.18	3	0.06	0.07	3	0.07	0.08	6	0	0
9	1.1485	323.00	1.48	1.30	1.50	0.17	3	0.07	0.07	3	0.06	0.06	6	0	0
10	1.1323	328.00	1.52	1.40	1.70	0.19	3	0.07	0.07	3	0.06	0.07	6	0	0
11	1.1546	328.00	1.49	1.20	1.30	0.18	3	0.06	0.07	3	0.07	0.08	6	0	0
12	1.2153	371.00	1.61	2.50	3.90	0.20	3	0.09	0.10	3	0.07	0.08	6	0	0
13	1.1167	338.00	1.59	1.20	1.40	0.14	3	0.06	0.07	3	0.06	0.07	6	0	0
14	1.1527	347.00	1.58	1.20	1.40	0.13	3	0.07	0.08	2	0.06	0.06	2	0	0
15	1.2642	381.00	1.59	2.10	3.30	0.20	3	0.07	0.08	3	0.08	0.08	6	0	0
16	1.1171	339.00	1.60	1.00	1.10	0.15	3	0.07	0.09	3	0.07	0.07	6	0	0
17	1.2684	384.00	1.59	1.40	2.00	0.14	3	0.06	0.06	3	0.07	0.08	6	0	0
18	1.0737	316.00	1.55	1.20	1.40	0.20	3	0.07	0.07	3	0.07	0.07	6	0	0
19	0.9902	288.00	1.53	1.60	2.10	0.16	3	0.06	0.07	3	0.07	0.07	6	0	0
20	1.1638	345.00	1.56	1.30	1.40	0.19	3	0.08	0.08	3	0.07	0.07	6	0	0
21	1.1407	341.00	1.57	1.10	1.30	0.17	3	0.07	0.07	3	0.06	0.07	6	0	0
22	1.0946	345.00	1.66	6.90	8.30	0.16	3	0.06	0.07	3	0.06	0.06	6	0	0
23	1.0892	322.00	1.56	4.70	5.00	0.15	3	0.06	0.06	3	0.06	0.06	6	0	0
24	1.1368	349.00	1.62	2.60	2.90	0.18	3	0.07	0.07	3	0.08	0.10	6	0	0
25	1.0898	331.00	1.60	2.30	2.50	0.18	3	0.06	0.07	3	0.07	0.07	6	0	0
26	1.0132	305.00	1.60	2.00	2.20	0.18	3	0.07	0.07	3	0.07	0.08	6	0	0
27	1.1097	342.00	1.62	2.20	2.80	0.20	3	0.07	0.08	3	0.08	0.09	6	0	0
28	1.0964	328.00	1.57	2.40	2.70	0.18	3	0.06	0.07	3	0.07	0.08	6	0	0
29	1.1178	330.00	1.55	2.00	2.50	0.18	3	0.06	0.07	3	0.07	0.08	6	0	0
30	1.1266	338.00	1.58	3.10	3.80	0.19	3	0.07	0.08	3	0.07	0.08	6	0	0
31	1.1008	338.00	1.62	1.70	2.30	0.17	3	0.06	0.06	3	0.06	0.06	6	0	0
Total	38.3696	10462.00					93			92			182	0	0
Avg.	1.2377	337.48	1.54	1.89	2.27	0.17	92	0.07	0.07		0.07		Total	Total	Total
Max	4.6851	384.00	1.76	6.90	8.30	0.22		0.09	0.10		0.08	0.10	6	0	0
Min.	0.9902	288.00	0.43	0.89	1.00	0.13		0.06	0.06		0.06				

WSSN 0600 MONTH/YEAR **August-18**

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness							
D	pH		as CaCO3		as CaCO3		as CaCO3		Calcium as Ca++		Magnesium as Mg++		Chloride as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.1	152	146	110	107	42	39	37	35	15	14		
2	8.1	8.2	162	144	126	106	36	38	35	34	18	14	19.2	20.8
3	8.2	8.0	166	148	126	108	40	40	39	36	17	14		
4	8.2	8.0	144	146	116	116	28	30	42	41	10	11	18.0	24.5
5	8.2	8.1	148	142	120	116	28	26	45	41	9	10		
6	8.4	8.0	150	144	126	114	24	30	41	38	12	12		
7	8.0	8.0	142	134	113	111	29	23	44	42	8	7		
8	8.2	8.0	158	152	110	108	48	44	41	40	11	13		
9	8.1	8.1	152	148	110	110	42	38	38	36	14	14		
10	8.2	8.1	158	146	119	108	39	38	36	34	17	15		
11	8.1	8.1	148	142	111	108	37	34	36	34	14	14		
12	8.2	8.1	152	146	112	111	40	35	36	34	15	15		
13	8.1	7.9	132	136	108	107	24	29	37	39	10	9	19.5	24.0
14	8.2	8.0	138	140	107	106	31	34	39	39	10	10		
15	8.3	8.1	154	146	111	106	43	40	38	37	14	13		
16	8.1	8.1	144	136	117	109	27	27	45	38	8	10		
17	8.3	8.1	136	140	107	107	29	33	42	40	8	10		
18	8.2	8.1	150	146	108	106	42	40	38	37	14	13		
19	8.0	8.0	150	142	108	103	42	39	37	35	14	13		
20	8.1	8.1	148	138	108	101	40	37	36	35	14	12		
21	8.1	8.1	148	138	109	101	39	37	37	35	14	12		
22	8.0	8.1	136	132	111	101	25	31	42	41	8	7	19.5	22.0
23	8.2	8.1	142	132	107	103	35	29	44	38	8	9		
24	8.1	7.9	142	128	123	101	19	27	45	38	7	8		
25	8.1	7.9	132	128	118	106	14	22	43	41	6	6		
26	8.2	8.2	142	144	111	113	31	31	43	42	8	10		
27	8.2	8.2	156	150	117	112	39	38	36	37	16	14		
28	8.1	8.1	162	154	110	111	52	43	39	38	16	15		
29	8.0	8.1	158	154	112	110	46	44	39	38	15	15		
30	8.1	8.1	154	150	111	108	43	42	38	37	14	14	19.5	22.0
31	8.1	8.1	156	152	108	108	48	44	42	41	13	12		
Avg.	8.1	8.1	148.5	142.4	113.4	107.8	35.1	34.6	39.6	37.7	12.1	11.8	19.1	22.7
Max	8.4	8.2	166.0	154.0	126.0	116.0	52.0	44.0	45.0	42.0	18.0	15.0	19.5	24.5
Min.	8.0	7.9	132.0	128.0	107.0	101.0	14.0	22.0	35.0	34.0	6.0	6.0	18.0	20.8

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

DATE	RAW No. of Samples	RAW Colilert P/A	PLANT TAP No. of Samples	PLANT TAP Colilert P/A	Standard Plate Count Raw	Standard Plate Count Tap	Raw TEMP. 'C	Tap TEMP. 'C	COLOR ___True ___Appar. Raw	COLOR Tap	ODOR ___Cold ___60'C Raw	ODOR Tap
1			1	A	396	0	21	21.5				
2			1	A	44	0	21	21.5				
3			1	A	35	1	23	21.5				
4			1	A	87	0	25	24.0				
5			1	A	167	0	23	23.0				
6			1	A	239	0	24	24.0				
7			1	A	600	1	23	23.0				
8			1	A	184	0	21	22.5				
9			1	A	167	0	23	22.5				
10			1	A	147	0	23	22.5				
11			1	A	101	0	21	22.5				
12			1	A	104	0	21	22.5				
13			1	A	151	0	20	23.0				
14			1	A	119	0	20	23.0				
15			1	A	155	0	23	21.0				
16			1	A	138	11	23	20.0				
17			1	A	144	1	20	22.0				
18			1	A	136	0	22	22.0				
19			1	A	88	0	14	21.5				
20			1	A	104	0	16	18.5				
21			1	A	79	0	20	18.0				
22			1	A	35	0	12	19.0				
23			1	A	40	0	13	20.0				
24			1	A	33	0	21	18.0				
25			1	A	89	0	21	18.0				
26			1	A	116	0	21	20.0				
27			1	A	71	0	21.7	20.5				
28			1	A	92	0	9.0	12.0				
29			1	A	56	0	8.7	8.5				
30			1	A	71	0	8.5	9.5				
31			1	A	85	2	16.5	21.0				
AVG.			1	A	131	1	19	20				
Max					600	11	25	24				
Min					33	0	9	9				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 August-18

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3	0.83		0.85	0.89	0.66		0.23			
4										
5										
6										
7										
8	0.56		0.81	0.69	0.35	0.26	0.73			
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22	1.01		1.06	0.45	0.60		0.45			
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	16		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.65	1.06	0.23
Total number of check samples	0600			
Total number of positive check samples	0600			

From: Sarkipato, Ernest (EGLE)
To: Jason Marquardt; David A. Cornwell
Cc: Abul Ahmed; Darold Harlan; rjones@fv-operations.com
Subject: data dump #3
Date: Wednesday, September 1, 2021 8:26:00 AM
Attachments: MI 0600 Benton Harbor MOR Nov 2019reduced.pdf
MI 0600 Benton Harbor MOR Dec 2019reduced.pdf
MI 0600 Benton Harbor MOR August 2019reduced.pdf
MI 0600 Benton Harbor July 19 MORreduced.pdf
MI 0600 Benton Harbor MOR January 2019reduced.pdf
MI0600 Benton Harbor MOR February 2019reduced.pdf
MI 0600 Benton Harbor Rev Nov 2019 MOR Opp mistake.pdf
MI0600 MOR Jan 2019 Cover page andTurbidity page Revisedreduced.pdf
MI 0600 Benton Harbor September 2019 MORreduced.pdf
MI 0600 Benton Harbor MOR May 2019reduced.pdf
MI 0600 Benton Harbor MOR March 2019reduced.pdf
MI 0600 Benton Harbor MOR October 2019reduced.pdf
MI 0600 Benton Harbor MOR April 2019reduced.pdf
MI 0600 Benton Harbor MOR June 2019reduced.pdf

-14 MOR files should be attached for 2019.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:10 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #2

-12 MOR should be attached for 2018.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 7:58 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: Corrosion Study contacts and data dump #1

Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,

-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley**

F1-S1

Signature of Operator-in-Charge

Month/Year **November-19**

F1-S2

Water Plant Classification

Berrien

County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0975	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	196.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.01	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.95	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.78%	Percent of Treated Water

Chemical Data

Chlorine on hand:	37875	lb.	Est. supply:	257 days
Primary Coagulant (Alum (Al3+)) on hand:	66324	lb.	Est. supply:	125 days
Cost of All Chemicals per Million Gallons:	$67.75	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Distribution	Total	27.6451	Avg	0.95333	Max	1.1354	Min	0.7336

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

WSSN 0600 City of Benton Harbor

Month/Year November-19

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# ample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.9525	314.00	1.73	12.30	18.30	0.62	3	0.06	0.08	3	0.06	0.07	6	0	0
2	0.7550	230.00	1.60	18.50	20.00	1.30	3	0.07	0.07	3	0.08	0.08	6	0	0
3	1.0825	352.00	1.71	17.10	25.50	1.20	3	0.08	0.09	3	0.08	0.10	6	0	0
4	0.9775	325.00	1.75	13.30	14.10	1.10	3	0.10	0.12	3	0.10	0.12	6	0	0
5	0.9975	349.00	1.84	11.20	13.90	1.10	3	0.07	0.08	3	0.10	0.11	6	0	0
6	1.0100	313.00	1.82	8.90	11.00	1.00	3	0.10	0.11	3	0.10	0.11	6	0	0
7	1.0275	323.00	1.65	9.60	11.80	0.92	3	0.09	0.10	3	0.12	0.13	6	0	0
8	0.9675	290.00	1.58	8.80	9.40	0.88	3	0.08	0.08	3	0.09	0.10	6	0	0
9	1.0075	305.00	1.59	10.90	19.30	1.10	3	0.09	0.10	3	0.11	0.13	6	0	0
10	0.8750	277.00	1.67	7.60	11.90	1.10	3	0.09	0.10	3	0.06	0.08	6	0	0
11	1.0075	312.00	1.63	5.80	7.00	0.84	3	0.07	0.07	3	0.07	0.08	6	0	0
12	0.9500	301.00	1.67	10.10	16.20	0.84	3	0.07	0.07	3	0.07	0.07	6	0	0
13	1.0275	321.00	1.64	13.00	15.50	1.60	3	0.08	0.10	3	0.06	0.08	6	0	0
14	1.0500	322.00	1.61	13.40	26.20	2.00	3	0.12	0.12	3	0.08	0.08	6	0	0
15	1.0650	323.00	1.60	10.90	15.70	1.40	3	0.10	0.12	3	0.07	0.07	6	0	0
16	1.0800	339.00	1.65	5.20	5.60	1.20	3	0.11	0.13	3	0.08	0.08	6	0	0
17	1.0375	326.00	1.65	5.50	7.60	1.20	3	0.14	0.15	3	0.08	0.09	6	0	0
18	1.0625	322.00	1.59	4.20	4.40	1.30	3	0.12	0.13	3	0.08	0.08	6	0	0
19	0.9250	287.00	1.63	7.20	13.80	0.97	3	0.10	0.12	3	0.08	0.08	6	0	0
20	1.0975	337.00	1.62	5.90	11.40	0.99	3	0.08	0.09	3	0.07	0.09	6	0	0
21	1.0775	326.00	1.59	3.60	4.30	1.00	3	0.10	0.14	3	0.08	0.08	6	0	0
22	1.0950	333.00	1.60	7.70	9.40	0.89	3	0.08	0.08	3	0.08	0.08	6	0	0
23	1.0650	308.00	1.52	6.00	7.40	0.87	3	0.06	0.07	3	0.08	0.08	6	0	0
24	0.9875	297.00	1.58	4.90	5.00	0.66	3	0.06	0.06	3	0.08	0.09	6	0	0
25	0.9975	300.00	1.58	4.00	5.40	0.59	3	0.06	0.07	3	0.07	0.07	6	0	0
26	1.0900	322.00	1.58	3.40	4.70	0.56	3	0.06	0.07	3	0.07	0.08	6	0	0
27	1.0425	318.00	1.60	4.70	5.90	1.00	3	0.07	0.08	3	0.07	0.08	6	0	0
28	0.9350	310.00	1.74	10.60	14.40	0.80	3	0.06	0.07	3	0.05	0.06	6	0	0
29	0.9250	276.00	1.57	27.90	33.70	2.30	3	0.07	0.07	3	0.07	0.08	6	0	0
30	0.9275	314.00	1.78	19.00	26.60	2.60	3	0.08	0.09	3	0.08	0.08	6	0	0
31														0	0
Total	30.0975	9372.00					90			90			180	0	0
Avg.	1.0033	312.40	1.65	9.71	13.18	1.13		0.08	0.09		0.08		Total	Total	Total
Max	1.0975	352.00	1.84	27.90	33.70	2.60		0.14	0.15		0.12	0.13	6	0	0
Min.	0.7550	230.00	1.52	3.40	4.30	0.56		0.06	0.06		0.05				

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **November-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.47	0.14	0.77		0	0.00	210	3.29	21	0.33	231	3.61	1.75	1.70	1.86
2	0.43	0.39	0.79		0	0.00	172	3.40	14	0.28	186	3.78	2.03	1.59	1.75
3	0.51	0.27	0.78		0	0.00	266	3.67	32	0.44	298	4.16	2.49	1.51	1.67
4	0.61	0.29	0.79		0	0.00	261	3.99	40	0.61	301	4.78	3.00	1.58	1.78
5	0.44	0.25	0.76		0	0.00	285	4.27	41	0.61	326	5.31	3.64	1.51	1.67
6	0.59	0.48	0.82	0.85	0	0.00	267	3.95	25	0.37	292	4.59	2.85	1.57	1.74
7	0.48	0.29	0.85		0	0.00	282	4.10	31	0.45	313	4.73	2.68	1.91	2.05
8	0.56	0.33	0.82		0	0.00	264	4.07	18	0.28	282	4.51	2.90	1.46	1.61
9	0.51	0.29	0.80		0	0.00	263	3.90	23	0.34	286	4.50	2.65	1.66	1.85
10	0.60	0.29	0.82		0	0.00	245	4.18	33	0.56	278	4.85	2.90	1.76	1.95
11	0.40	0.27	0.81		0	0.00	250	3.70	52	0.77	302	4.59	2.50	1.91	2.09
12	0.55	0.29	0.82	0.78	0	0.00	227	3.57	38	0.60	265	4.07	2.02	1.86	2.05
13	0.50	0.26	0.79		0	0.00	235	3.41	31	0.45	266	3.92	1.98	1.77	1.94
14	0.53	0.18	0.76		0	0.00	254	3.61	34	0.48	288	4.14	2.36	1.55	1.78
15	0.60	0.16	0.71		0	0.00	261	3.66	30	0.42	291	4.16	2.36	1.58	1.80
16	0.43	0.17	0.76		0	0.00	264	3.65	36	0.50	300	4.55	2.44	1.91	2.11
17	0.55	0.23	0.71		0	0.00	254	3.65	21	0.30	275	4.26	2.49	1.58	1.77
18	0.56	0.24	0.64		0	0.00	263	3.70	55	0.77	318	4.71	2.61	1.93	2.10
19	0.52	0.15	0.63		0	0.00	222	3.58	26	0.42	248	4.13	2.14	1.81	1.99
20	0.66	0.34	0.78	0.78	0	0.00	258	3.51	28	0.38	286	3.76	1.73	1.84	2.03
21	0.50	0.39	0.85		0	0.00	254	3.52	27	0.37	281	4.53	2.53	1.82	2.00
22	0.49	0.29	0.83		0	0.00	251	3.42	28	0.38	279	4.28	2.45	1.66	1.83
23	0.50	0.36	0.87		0	0.00	244	3.42	37	0.52	281	4.54	2.56	1.75	1.98
24	0.49	0.39	0.74		0	0.00	233	3.52	19	0.29	252	3.73	2.02	1.46	1.71
25	0.47	0.40	0.79		0	0.00	236	3.53	28	0.42	264	4.07	2.12	1.79	1.95
26	0.51	0.53	0.86		0	0.00	254	3.48	25	0.34	279	4.21	2.63	1.38	1.58
27	0.52	0.24	0.78		0	0.00	249	3.57	28	0.40	277	4.27	2.73	1.38	1.54
28	0.47	0.33	0.79		0	0.00	215	3.43	14	0.22	229	3.98	2.28	1.53	1.70
29	0.50	0.17	0.82		0	0.00	209	3.37	19	0.31	228	4.12	2.20	1.75	1.92
30	0.56	0.24	0.82		0	0.00	209	3.36	21	0.34	230	4.13	2.21	1.75	1.92
Tot.							7,147		854		8,232				
Avg.	0.52	0.29	0.79	0.80	0.00	0.00	245.23	3.65	29.17	0.43	274.40	4.30	2.44	1.68	1.86
Max	0.66	0.53	0.87	0.85	0.00	0.00	285.00	4.27	55.00	0.77	326.00	5.31	3.64	1.93	2.11
Min.	0.40	0.14	0.63	0.78	0.00	0.00	172.00	3.29	14.00	0.22	186.00	3.61	1.73	1.38	1.54

WSSN 0600

MONTH/YEAR: November-19

CITY OF BENTON HARBOR CHEMICAL ANALYSES

DAY	pH Raw	pH Tap	Total Hardness as CaCO3 mg/l Raw	Total Hardness as CaCO3 mg/l Tap	Total Alkalinity as CaCO3 mg/l Raw	Total Alkalinity as CaCO3 mg/l Tap	Non-Carb. Hardness as CaCO3 mg/l Raw	Non-Carb. Hardness as CaCO3 mg/l Tap	Calcium as Ca++ mg/l Raw	Calcium as Ca++ mg/l Tap	Magnesium as Mg++ mg/l Raw	Magnesium as Mg++ mg/l Tap	Chloride as Cl- mg/l Raw	Chloride as Cl- mg/l Tap
TEST	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	7.9	7.9	162	156	112	106	50	50	41	40	15	14	18.0	21.5
2	8.1	8.1	176	160	137	106	39	54	40	38	18	16		
3	8.1	8.1	196	178	131	111	65	67	54	49	15	14		
4	8.1	8.1	170	150	137	116	33	34	54	47	9	8	24.0	25.5
5	8.0	8.1	172	162	131	125	41	37	49	51	12	9		
6	8.1	7.8	186	178	123	119	63	59	45	43	18	17		
7	8.0	8.1	168	162	134	122	34	40	52	51	9	9		
8	8.1	8.1	144	146	115	119	29	27	45	46	8	8		
9	8.1	8.0	192	174	128	112	64	62	46	42	19	17		
10	8.0	8.0	184	166	138	114	46	52	44	42	18	15		
11	8.1	8.1	176	186	115	119	61	67	46	49	15	16		
12	8.0	8.1	176	180	113	114	63	66	46	49	15	14		
13	8.0	8.0	184	174	117	112	67	62	50	42	15	17		
14	8.2	7.9	182	152	154	121	28	31	63	52	6	5	23.5	24.0
15	8.1	7.9	148	158	116	119	32	39	51	52	5	7		
16	8.0	8.1	154	152	122	116	32	36	47	45	9	10		
17	8.1	8.1	168	160	129	121	39	39	51	49	10	9		
18	7.9	8.1	190	170	133	115	57	55	46	43	18	15		
19	8.0	8.1	172	176	122	120	50	56	45	48	15	16		
20	8.1	8.1	186	178	127	118	59	60	46	45	17	16		
21	8.0	8.1	196	180	138	117	58	63	51	46	17	16		
22	8.3	8.2	178	184	132	122	46	62	45	48	16	16	19.0	23.0
23	8.1	8.0	142	156	117	124	25	32	42	46	9	10		
24	8.1	8.1	162	158	122	121	40	37	47	46	11	10		
25	8.0	7.9	162	164	126	127	36	37	50	50	9	8	19.5	25.5
26	8.1	8.2	170	166	143	127	27	39	55	55	8	7		
27	8.1	8.1	198	178	138	120	60	58	51	46	17	15	19.0	23.5
28	8.0	8.1	176	188	111	120	65	68	49	51	13	15		
29	8.0	8.0	174	178	114	109	60	69	42	46	17	16		
30	7.9	8.0	170	174	115	107	55	67	41	45	17	15		
31														
Avg.	8.1	8.1	173.8	168.1	126.3	117.3	47.5	50.8	47.8	46.7	13.3	12.7	20.5	23.8
Max	8.3	8.2	198.0	188.0	154.0	127.0	67.0	69.0	63.0	55.0	19.0	17.0	24.0	25.5
Min.	7.9	7.8	142.0	146.0	111.0	106.0	25.0	27.0	40.0	38.0	5.0	5.0	18.0	21.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	75	0	11	12.5	0.9548	46	1.91	1.54
2			1	A	93	0	11	12.5	0.7336	50	2.68	1.45
3			1	A	119	0	11	12.0	1.0696	47	1.73	1.46
4			1	A	119	9	10	11.5	0.9394	45	1.87	1.37
5			1	A	108	0	10	12.0	0.9170	50	2.16	1.62
6	1.47	City Hall	1	A	102	0	10	10.5	0.9492	49	2.03	1.55
6	1.39	Wolfs	1	A	97	0	10	11.0	0.9884	51	2.02	1.54
6	1.58	Bait Shed	1	A	164	0	10	11.0	0.9338	53	2.24	1.48
6	1.57	Sunny Spot	1	A	95	1	8	10.0	0.9478	45	1.88	1.51
6	1.33	B & Z	1	A	102	0	8	9.5	0.8554	52	2.41	0.00
11			1	A	111	0	8	9.0	0.9828	51	2.03	1.48
12	1.52	City Hall	1	A	168	0	8	9.0	0.9716	36	1.45	1.47
12	1.34	Wolfs	1	A	109	1	7	8.5	1.0136	54	2.11	1.46
12	1.45	Bait Shed	1	A	152	0	7	9.0	1.0374	60	2.28	1.56
12	1.40	Sunny Spot	1	A	146	0	7	8.0	1.0430	54	2.05	1.56
12	1.25	B & Z	1	A	50	2	6	8.5	0.9842	58	2.32	1.47
17			1	A	74	4	7	8.0	0.9639	59	2.43	1.53
18			1	A	58	0	7	7.0	1.0080	56	2.21	1.50
19			1	A	79	0	6	6.5	0.8960	58	2.54	1.57
20	1.66	City Hall	1	A	86	0	6	7.0	1.1354	56	1.94	1.50
20	1.47	Wolfs	1	A	98	1	6	6.5	0.9268	57	2.44	1.41
20	1.51	Bait Shed	1	A	85	0	7	7.5	0.9730	19	0.79	1.47
20	1.45	Sunny Spot	1	A	98	0	7	8.0	0.9240	58	2.48	1.51
20	1.24	B & Z	1	A	72	0	7	8.0	1.0080	65	2.54	1.56
25			1	A	58	0	7	8.0	0.9688	39	1.60	1.45
26			1	A	45	12	7	8.0	0.9898	52	2.07	1.49
27			1	A	153	0	7.2	7.5	0.9688	50	2.05	1.47
28			1	A	163	0	9.0	12.0	0.8582	46	2.11	1.52
29			1	A	236	0	8.7	8.5	0.8260	44	2.11	1.52
30			1	A	95	0	8.5	9.5	0.8316	46	2.20	1.48
			1									
Totals									28.5999	1502.5		
AVG.	1.44		1	A	108	1	8	9	0.9533	50.1	2.10	1.45
Max	1.66				236	12		13	1.1354	64.6	2.68	1.62
Min	1.24				45	0	6	7	0.7336	19.4	0.79	0.00

MI 0600 Distribution Monitoring Report MI 0600 DMR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 November-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6	1.47		1.15	1.00	1.06		0.53			
7										
8										
9										
10										
11										
12	1.26		1.16	0.88	1.37		0.99			
13										
14										
15										
16										
17										
18										
19										
20	1.28		1.15	1.26	1.11		0.98			
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.11	1.47	0.53
Total number of check samples	0600			
Total number of positive check samples	0600			

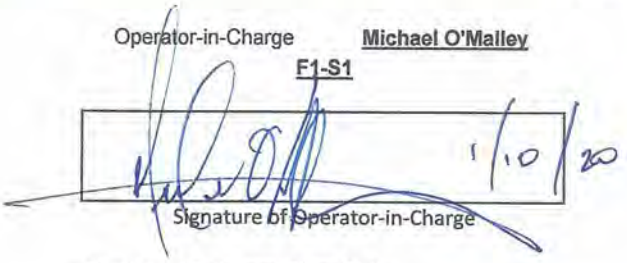
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **December-19**

F1-S1 **F1-S2**



Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1125	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	185.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.98	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.23	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.82%	Percent of Treated Water

Chemical Data

Chlorine on hand:	42420	lb.	Est. supply:	201	days
Primary Coagulant (Alum (Al3+)) on hand:	52027	lb.	Est. supply:	143	days
Cost of All Chemicals per Million Gallons:	$66.41	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	28.2086	Avg	0.9353806	Max	1.0808	Min	0.8288

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **December-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.58	0.32	0.85		0	0.00	202	3.37	16	0.27	218	4.13	2.35	1.62	1.78
2	0.69	0.29	0.79		0	0.00	242	3.44	13	0.18	255	3.85	2.13	1.56	1.72
3	0.54	0.20	0.86		0	0.00	258	3.55	25	0.34	283	4.27	2.52	1.63	1.75
4	0.55	0.37	0.88	0.73	0	0.00	238	3.82	26	0.42	264	4.22	2.40	1.69	1.82
5	0.48	0.19	0.79		0	0.00	262	3.91	32	0.48	294	4.45	2.65	1.69	1.80
6	0.58	0.25	0.81		0	0.00	289	3.88	29	0.39	318	4.98	3.18	1.66	1.80
7	0.53	0.30	0.79		0	0.00	238	3.94	29	0.48	267	4.81	2.86	1.81	1.95
8	0.54	0.25	0.81		0	0.00	262	3.90	28	0.42	290	4.65	2.67	1.85	1.98
9	0.47	0.26	0.80		0	0.00	242	3.91	21	0.34	263	4.24	2.42	1.65	1.82
10	0.54	0.32	0.82		0	0.00	258	3.98	28	0.43	286	4.31	2.35	1.78	1.96
11	0.52	0.23	0.75		0	0.00	278	3.91	36	0.51	314	4.67	2.77	1.80	1.90
12	0.55	0.32	0.80	0.73	0	0.00	278	3.93	34	0.48	312	4.55	2.62	1.64	1.93
13	0.48	0.39	0.84		0	0.00	288	3.91	35	0.47	323	4.46	2.41	1.73	2.05
14	0.51	0.32	0.85		0	0.00	245	3.92	29	0.46	274	4.37	2.62	1.50	1.75
15	0.60	0.29	0.79		0	0.00	270	3.92	29	0.42	299	4.83	3.01	1.51	1.82
16	0.48	0.37	0.82		0	0.00	249	4.04	33	0.54	282	4.28	2.35	1.76	1.93
17	0.55	0.31	0.80		0	0.00	272	3.83	28	0.39	300	4.53	2.82	1.54	1.71
18	0.53	0.22	0.75	0.75	0	0.00	227	3.63	24	0.38	251	4.25	2.31	1.77	1.94
19	0.44	0.29	0.80		0	0.00	264	3.60	49	0.67	313	4.75	2.00	2.55	2.75
20	0.40	0.33	0.79		0	0.00	215	3.61	20	0.34	235	4.04	2.07	1.79	1.97
21	0.23	0.34	0.78		0	0.00	231	3.78	27	0.44	258	4.54	2.73	1.66	1.81
22	0.49	0.31	0.69		0	0.00	236	3.70	22	0.34	258	4.25	2.41	1.46	1.84
23	0.64	0.22	0.72		0	0.00	220	3.69	17	0.29	237	3.78	1.93	1.68	1.85
24	0.47	0.33	0.75		0	0.00	247	3.67	19	0.28	266	4.03	2.06	1.73	1.97
25	0.46	0.15	0.61		0	0.00	225	3.70	20	0.33	245	4.41	2.34	1.88	2.07
26	0.41	0.09	0.63	0.61	0	0.00	219	3.35	31	0.47	250	4.20	1.95	2.08	2.25
27	0.56	0.17	0.63		0	0.00	198	3.17	20	0.32	218	3.44	1.19	2.05	2.25
28	0.59	0.10	0.69		0	0.00	185	3.00	17	0.28	202	3.24	1.25	1.82	1.99
29	0.60	0.27	0.72		0	0.00	194	3.01	27	0.42	221	3.66	1.29	2.19	2.37
30	0.42	0.27	0.78		0	0.00	212	3.25	26	0.40	238	3.71	1.81	1.67	1.90
31	0.47	0.31	0.77		0	0.00	205	3.13	23	0.35	228	3.88	1.94	1.68	1.94
Tot.				-			7,247		797		8,262				
Avg.	0.51	0.27	0.77	0.71	0.00	0.00	241.47	3.68	26.33	0.40	267.80	4.26	2.32	1.76	1.95
Max	0.69	0.39	0.88	0.75	0.00	0.00	289.00	4.04	49.00	0.67	323.00	4.98	3.18	2.55	2.75
Min.	0.23	0.09	0.61	0.61	0.00	0.00	185.00	3.00	13.00	0.18	202.00	3.24	1.19	1.46	1.71

WSSN 0600 City of Benton Harbor Month/Year December-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.8950	246.00	1.45	15.30	24.00	1.60	3	0.07	0.08	3	0.07	0.08	6	0	0
2	1.0500	306.00	1.53	23.70	31.60	2.40	3	0.07	0.07	3	0.07	0.08	6	0	0
3	1.0850	324.00	1.57	23.30	26.70	1.70	3	0.08	0.09	3	0.08	0.10	6	0	0
4	0.9300	287.00	1.62	14.50	15.40	2.60	3	0.09	0.10	3	0.10	0.13	6	0	0
5	1.0000	316.00	1.66	12.90	16.60	1.70	3	0.08	0.09	3	0.09	0.12	6	0	0
6	1.1125	344.00	1.49	10.70	14.30	1.80	3	0.09	0.09	3	0.08	0.10	6	0	0
7	0.9025	280.00	1.63	17.20	18.00	2.70	3	0.09	0.10	3	0.10	0.12	6	0	0
8	1.0025	309.00	1.62	11.60	13.90	2.40	3	0.08	0.10	3	0.07	0.08	6	0	0
9	0.9250	278.00	1.58	9.50	11.10	2.10	3	0.08	0.09	3	0.08	0.08	6	0	0
10	0.9675	300.00	1.63	8.80	9.00	1.30	3	0.07	0.08	3	0.08	0.09	6	0	0
11	1.0625	327.00	1.62	7.40	8.20	1.30	3	0.08	0.09	3	0.07	0.07	6	0	0
12	1.0550	329.00	1.64	5.80	7.00	1.40	3	0.08	0.09	3	0.07	0.08	6	0	0
13	1.1000	336.00	1.61	5.60	8.20	1.40	3	0.07	0.07	3	0.06	0.07	6	0	0
14	0.9325	279.00	1.57	3.50	4.30	0.99	3	0.08	0.09	3	0.08	0.09	6	0	0
15	1.0275	311.00	1.59	4.10	4.40	1.40	3	0.07	0.08	3	0.08	0.08	6	0	0
16	0.9200	291.00	1.66	4.70	8.80	1.20	3	0.09	0.10	3	0.10	0.11	6	0	0
17	1.0600	322.00	1.60	5.20	8.90	1.40	3	0.08	0.10	3	0.10	0.12	6	0	0
18	0.9325	196.00	1.11	6.20	10.00	1.60	3	0.11	0.13	3	0.13	0.14	6	0	0
19	1.0950	359.00	1.72	9.00	11.50	1.80	3	0.08	0.10	3	0.09	0.10	6	0	0
20	0.8900	303.00	1.79	10.40	17.50	2.20	3	0.09	0.11	3	0.09	0.09	6	0	0
21	0.9125	270.00	1.56	4.50	5.90	1.30	3	0.07	0.07	3	0.10	0.10	6	0	0
22	0.9525	296.00	1.64	2.30	2.40	1.10	3	0.08	0.10	3	0.13	0.13	6	0	0
23	0.8900	273.00	1.61	3.80	6.10	1.00	3	0.07	0.07	3	0.14	0.18	6	0	0
24	1.0050	309.00	1.62	3.20	4.70	1.10	3	0.07	0.08	3	0.14	0.17	6	0	0
25	0.9075	275.00	1.59	3.00	5.10	0.95	3	0.07	0.08	3	0.12	0.15	6	0	0
26	0.9750	299.00	1.59	5.20	12.10	0.84	3	0.08	0.08	3	0.16	0.19	6	0	0
27	0.9325	279.00	1.57	1.60	2.10	0.72	3	0.07	0.08	3	0.14	0.17	6	0	0
28	0.9200	283.00	1.62	12.20	30.80	0.83	3	0.07	0.09	3	0.12	0.13	6	0	0
29	0.9625	289.00	1.58	3.90	8.80	0.78	3	0.09	0.09	3	0.17	0.17	6	0	0
30	0.9750	294.00	1.59	4.80	7.40	0.84	3	0.08	0.11	3	0.18	0.19	6	0	0
31	0.9775	303.00	1.63	3.80	4.80	0.69	3	0.07	0.08	3	0.12	0.12	6	0	0
Total	30.3550	9213.00					93			93			186	0	0
Avg.	0.9792	297.19	1.59	8.31	11.60	1.46		0.08	0.09		0.10		Total	Total	Total
Max	1.1125	359.00	1.79	23.70	31.60	2.70		0.11	0.13		0.18	0.19	6	0	0
Min.	0.8900	196.00	1.11	1.60	2.10	0.69		0.07	0.07		0.06				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D	pH													
A														
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	8.0	156	160	111	105	45	55	40	43	14	13		
2	8.1	8.0	182	156	131	105	51	51	46	42	16	13	18.0	21.5
3	8.2	8.1	168	152	133	114	35	38	47	45	12	10		
4	8.2	8.1	178	158	132	111	46	47	57	47	9	10		
5	8.0	7.6	156	160	121	123	35	37	47	51	9	8		
6	8.2	8.2	160	162	121	121	39	41	47	51	10	9		
7	8.0	7.8	166	160	119	114	47	46	52	51	9	8		
8	8.2	8.1	172	158	140	117	32	41	55	47	9	10		
9	8.2	7.9	184	162	146	122	38	40	63	53	6	7		
10	8.1	8.0	146	150	114	126	32	24	44	48	9	7		
11	8.0	7.9	146	164	113	121	33	43	40	46	11	12		
12	8.2	7.9	176	164	129	118	47	46	58	57	8	5		
13	8.1	8.0	162	156	131	117	31	39	51	53	8	6	22.0	25.5
14	8.2	8.2	148	158	117	122	31	36	46	51	8	7		
15	8.2	8.1	178	160	142	122	36	38	59	52	7	7		
16	8.1	8.0	174	170	128	121	46	49	45	46	15	13		
17	8.0	8.0	176	180	120	123	56	57	45	48	16	15		
18	8.0	8.1	192	188	123	118	69	70	46	47	18	17		
19	8.0	8.0	204	172	135	117	69	55	54	46	17	14		
20	8.0	8.0	208	176	147	125	61	51	54	47	18	14	23.0	25.5
21	8.1	8.0	182	172	143	132	39	40	58	55	9	9		
22	8.2	8.2	152	156	121	133	31	23	47	51	8	7		
23	8.1	7.9	170	164	141	129	29	35	52	51	10	9	23.0	25.5
24	8.2	8.1	176	162	142	127	34	35	53	51	11	9		
25	8.0	8.0	184	176	127	121	57	55	46	45	17	16		
26	8.0	8.1	184	186	132	121	52	65	46	47	17	17		
27	8.0	8.1	180	174	124	122	56	52	44	42	17	17		
28	8.0	7.9	184	180	119	115	65	65	47	46	16	16		
29	8.0	8.1	178	168	132	116	46	52	45	43	16	15		
30	8.1	8.1	144	150	119	119	25	31	47	49	6	7	22.0	23.5
31	8.2	8.0	140	156	106	117	34	39	42	46	8	10		
Avg.	8.1	8.0	172.2	165.1	128.4	119.9	43.8	45.2	49.4	48.4	11.9	10.9	21.6	24.3
Max	8.2	8.2	208.0	188.0	147.0	133.0	69.0	70.0	63.0	57.0	18.0	17.0	23.0	25.5
Min.	8.0	7.6	144.0	150.0	111.0	105.0	25.0	23.0	40.0	42.0	6.0	5.0	18.0	21.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	115	0	7	8.0	0.7882	49	2.47	1.53
2			1	A	161	0	6	7.5	0.9898	50	2.00	1.54
3			1	A	150	1	7	8.0	0.9884	48	1.93	1.44
4	1.43	City Hall	1	A	165	0	7	8.0	0.9338	46	1.94	1.44
4	1.40	Wolfs	1	A	178	0	7	8.0	0.9870	48	1.91	1.48
4	1.40	Bait Shed	1	A	115	0	7	8.0	0.9534	37	1.54	1.56
4	1.59	Sunny Spot	1	A	142	0	6	8.0	0.8288	49	2.35	1.41
4	1.22	B & Z	1	A	119	0	6	8.0	0.9310	48	2.03	1.63
9			1	A	111	0	6	9.0	0.9268	50	2.12	1.56
10			1	A	87	0	6	7.0	0.9898	53	2.13	1.57
11			1	A	96	0	6	8.0	1.0038	59	2.31	1.51
12	2.49	City Hall	1	A	79	1	5	7.0	1.0234	63	2.45	1.49
12	1.46	Wolfs	1	A	64	0	5	7.0	1.0808	59	2.17	1.53
12	1.59	B & Z	1	A	26	0	5	7.0	0.9366	55	2.30	0.00
12	1.52	Bait Shed	1	A	49	1	4	7.0	0.9240	60	2.57	1.50
12	1.32	Sunny Spot	1	A	61	1	4	5.5	0.9828	58	2.33	1.54
17			1	A	113	0	4	5.5	0.9884	59	2.36	1.57
18	1.60	City Hall	1	A	139	1	5	5.0	0.8820	62	2.76	1.61
18	1.41	Wolfs	1	A	156	0	4	5.0	0.9828	21	0.84	1.44
18	1.52	Bait Shed	1	A	108	0	3	5.0	0.8694	50	2.26	1.62
18	1.52	Sunny Spot	1	A	101	0	4	6.0	0.8484	53	2.47	1.52
18	1.36	B & Z	1	A	146	1	4	6.0	0.9072	45	1.98	1.54
23			1	A	28	0	4	5.0	0.9366	48	2.01	1.47
24			1	A	61	2	4	6.0	0.9842	51	2.07	1.42
25			1	A	57	0	4	4.5	0.8302	49	2.32	1.53
26	1.31	City Hall	1	A	45	0	5	4.5	0.8890	53	2.35	1.68
26	1.30	Wolfs	1	A	41	0	4.7	5.0	0.9450	45	1.88	1.27
26	1.51	Bait Shed	1	A	72	0	5.5	5.5	0.9296	49	2.10	1.55
26	1.52	Sunny Spot	1	A	58	1	5.5	5.5	0.9002	50	2.18	1.61
26	1.30	B & Z	1	A	65	0	6.0	7.0	0.9576	47	1.94	1.47
31			1		46	0	5.0	6.0	0.8778	53	2.37	1.51
Totals									28.9968	1564.7		
AVG.	1.49		1	A	95	0	5	6	0.9354	50.5	2.13	1.47
Max	2.49				178	2	7	9	1.0808	63.3	2.76	1.68
Min	1.22				26	0	3	5	0.7882	20.9	0.84	0.00

DISTRIBUTION SYSTEM MONITORING WSSN 0600 December-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4	1.25		1.18	0.91			0.92			
5										
6										
7										
8										
9										
10										
11										
12	1.26		1.21	1.08	0.96		0.99			
13										
14										
15										
16										
17										
18	1.03		1.12	1.26	1.12		0.63			
19										
20										
21										
22										
23										
24										
25										
26	1.57		1.58	1.34	1.55		0.78			
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	19		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.14	1.58	0.63
Total number of check samples	0600			
Total number of positive check samples	0600			

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **August-19**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2133	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	251.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.10	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.89	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.35%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	244 days
Primary Coagulant (Alum (Al3+)) on hand:	102862	lb.	Est. supply:	119 days
Cost of All Chemicals per Million Gallons:	$76.21	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	0
Percent of filter confluence samples > 0.3 NTU:	0%	#DIV/0!
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	30.9438	Avg	1.0364258	Max	1.1536	Min	0.8373

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **August-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.56	0.44	0.65		0	0.00	352	4.74	38	0.51	390	4.91	3.33	1.40	1.58
2	0.62	0.35	0.71	0.71	0	0.00	337	4.72	37	0.52	374	5.53	3.67	1.68	1.86
3	0.56	0.35	0.82		0	0.00	373	4.71	24	0.30	397	5.14	3.16	1.84	1.98
4	0.47	0.38	0.75		0	0.00	353	4.92	24	0.33	377	5.32	3.41	1.70	1.91
5	0.52	0.29	0.76		0	0.00	384	4.90	37	0.47	421	6.00	3.95	1.82	2.05
6	0.43	0.26	0.82		0	0.00	384	4.98	29	0.38	413	7.36	5.22	1.98	2.14
7	0.54	0.29	0.74		0	0.00	368	5.05	58	0.80	426	5.90	3.79	1.90	2.11
8	0.55	0.22	0.67		0	0.00	378	5.11	41	0.55	419	5.99	4.06	1.84	1.93
9	0.53	0.14	0.62		0	0.00	284	3.94	71	0.99	355	5.23	3.09	1.96	2.14
10	0.56	0.23	0.62		0	0.00	450	5.54	84	1.03	534	8.21	5.85	2.19	2.36
11	0.62	0.20	0.61		0	0.00	376	5.31	46	0.65	422	5.73	4.05	1.50	1.68
12	0.57	0.09	0.47		0	0.00	385	5.31	37	0.51	422	5.95	4.27	1.56	1.68
13	0.42	0.11	0.52		0	0.00	400	5.32	37	0.49	437	5.68	4.01	1.55	1.67
14	0.44	0.17	0.49		0	0.00	408	5.34	32	0.42	440	6.32	4.38	1.77	1.94
15	0.41	0.26	0.72		0	0.00	421	5.35	29	0.37	450	6.34	4.41	1.81	1.93
16	0.49	0.26	0.70	0.75	0	0.00	385	5.30	22	0.30	407	6.42	4.63	1.69	1.79
17	0.56	0.20	0.74		0	0.00	384	5.33	35	0.49	419	5.92	4.00	1.74	1.92
18	0.64	0.22	0.80		0	0.00	372	5.51	37	0.55	409	6.22	4.26	1.78	1.96
19	0.54	0.22	0.75		0	0.00	403	5.51	72	0.98	475	6.32	4.31	1.80	2.01
20	0.53	0.26	0.74		0	0.00	421	5.99	68	0.97	489	6.83	5.24	1.42	1.59
21	0.48	0.16	0.70		0	0.00	449	5.88	56	0.73	505	7.68	5.85	1.67	1.83
22	0.57	0.36	0.77	0.87	0	0.00	440	5.83	50	0.66	490	7.17	5.50	1.48	1.67
23	0.54	0.42	0.59		0	0.00	448	5.88	39	0.51	487	6.37	4.81	1.36	1.56
24	0.41	0.26	0.57		0	0.00	423	5.82	39	0.54	462	7.19	5.20	1.84	1.99
25	0.57	0.31	0.62		0	0.00	420	5.77	42	0.58	462	7.43	5.46	1.80	1.97
26	0.52	0.37	0.69		0	0.00	401	5.53	43	0.59	444	6.44	4.28	1.98	2.16
27	0.54	0.30	0.77		0	0.00	402	5.53	33	0.45	435	6.11	4.02	1.91	2.09
28	0.50	0.26	0.65	0.65	0	0.00	401	5.52	38	0.52	439	7.22	4.99	2.04	2.23
29	0.56	0.23	0.73		0	0.00	392	5.47	34	0.47	426	5.92	3.73	2.00	2.19
30	0.68	0.18	0.67		0	0.00	399	5.43	37	0.50	436	5.93	4.01	1.72	1.92
31	0.57	0.22	0.62		0	0.00	392	5.49	19	0.27	411	6.45	4.49	1.82	1.96
Tot.							11,833		1,250		13,473				
Avg.	0.53	0.26	0.68	0.75	0.00	0.00	393.10	5.32	42.30	0.57	435.40	6.29	4.37	1.76	1.93
Max	0.68	0.44	0.82	0.87	0.00	0.00	450.00	5.99	84.00	1.03	534.00	8.21	5.85	2.19	2.36
Min.	0.41	0.09	0.47	0.65	0.00	0.00	284.00	3.94	22.00	0.30	355.00	4.91	3.09	1.36	1.56

WSSN 0600 City of Benton Harbor Month/Year August-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.1075	321.00	1.52	1.70	2.60	0.17	3	0.03	0.04	0	0.03	0.04	3	0	0
2	1.0650	327.00	1.62	1.10	1.20	0.16	3	0.04	0.04	0	0.03	0.03	3	0	0
3	1.1832	393.00	1.75	2.00	2.20	0.21	3	0.05	0.07	0	0.05	0.08	3	0	0
4	1.0700	320.00	1.57	1.10	1.30	0.15	3	0.02	0.02	0	0.02	0.02	3	0	0
5	1.1705	345.00	1.55	1.10	1.20	0.17	3	0.02	0.03	0	0.03	0.04	3	0	0
6	1.1500	344.00	1.58	1.10	1.30	0.16	3	0.05	0.08	0	0.06	0.09	3	0	0
7	1.0875	327.00	1.58	1.70	2.60	0.16	3	0.03	0.03	0	0.03	0.04	3	0	0
8	1.1050	317.00	1.51	2.40	3.40	0.28	3	0.03	0.04	0	0.03	0.03	3	0	0
9	1.0750	315.00	1.54	3.20	4.80	0.23	3	0.03	0.04	0	0.03	0.03	3	0	0
10	1.2133	382.00	1.66	3.40	5.80	0.21	3	0.04	0.04	0	0.03	0.04	3	0	0
11	1.0575	303.00	1.51	1.70	2.60	0.16	3	0.04	0.04	0	0.03	0.03	3	0	0
12	1.0825	325.00	1.58	0.99	1.10	0.14	3	0.02	0.02	0	0.03	0.03	3	0	0
13	1.1225	337.00	1.58	1.20	1.30	0.13	3	0.02	0.02	0	0.03	0.03	3	0	0
14	1.1400	340.00	1.57	1.70	1.80	0.17	3	0.02	0.03	0	0.02	0.03	3	0	0
15	1.1750	350.00	1.57	1.60	1.90	0.14	3	0.03	0.04	0	0.02	0.03	3	0	0
16	1.0850	320.00	1.55	1.50	1.50	0.16	3	0.03	0.03	0	0.03	0.03	3	0	0
17	1.0750	298.00	1.46	1.80	2.40	0.20	3	0.04	0.05	0	0.04	0.05	3	0	0
18	1.0075	278.00	1.45	1.90	2.30	0.21	3	0.05	0.07	0	0.06	0.08	3	0	0
19	1.0925	308.00	1.48	1.90	2.50	0.32	3	0.07	0.08	0	0.08	0.08	3	0	0
20	1.0500	316.00	1.58	1.80	2.00	0.25	3	0.07	0.08	0	0.08	0.08	3	0	0
21	1.1400	341.00	1.57	1.30	1.40	0.20	3	0.07	0.07	0	0.07	0.08	3	0	0
22	1.1275	332.00	1.55	1.70	2.00	0.21	3	0.07	0.08	0	0.07	0.08	3	0	0
23	1.1375	344.00	1.59	1.30	1.80	0.19	3	0.07	0.08	0	0.08	0.09	3	0	0
24	1.0850	323.00	1.57	0.69	0.72	0.15	3	0.07	0.07	0	0.08	0.09	3	0	0
25	1.0875	326.00	1.58	0.70	0.87	0.15	3	0.06	0.07	0	0.07	0.07	3	0	0
26	1.0825	316.00	1.58	0.99	1.50	0.18	3	0.07	0.09	0	0.08	0.08	3	0	0
27	1.0850	319.00	1.55	0.92	1.20	0.20	3	0.07	0.09	0	0.08	0.09	3	0	0
28	1.0850	317.00	1.54	1.30	1.40	0.17	3	0.07	0.07	0	0.08	0.08	3	0	0
29	1.0700	314.00	1.54	2.10	2.40	0.20	3	0.06	0.07	0	0.08	0.09	3	0	0
30	1.0975	336.00	1.61	2.20	2.70	0.21	3	0.07	0.07	0	0.08	0.08	3	0	0
31	1.0650	321.00	1.59	1.40	1.70	0.16	3	0.07	0.07	0	0.07	0.07	3	0	0
Total	34.1770	10155.00					93			0			93	0	0
Avg.	1.1025	327.58	1.56	1.60	2.05	0.19		0.05	0.06		0.05		Total	Total	Total
Max	1.2133	393.00	1.75	3.40	5.80	0.32		0.07	0.09		0.08	0.09	3	0	0
Min.	1.0075	278.00	1.45	0.69	0.72	0.13		0.02	0.02		0.02				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	8.1	154	146	108	103	46	43	38	36	15	14	20.5	24.0
2	7.9	8.0	158	152	112	103	46	49	38	36	16	15		
3	8.0	8.0	148	136	112	104	36	32	43	42	10	7		
4	8.3	8.1	138	132	112	105	26	27	42	42	8	7		
5	8.2	8.2	142	136	111	107	31	29	39	38	11	11		
6	8.2	8.1	138	134	112	106	26	28	40	42	9	7		
7	8.0	8.0	154	148	109	106	45	42	37	36	15	14		
8	8.2	8.1	166	154	122	105	44	49	42	37	15	15		
9	8.0	8.1	160	152	114	108	46	44	38	37	16	15		
10	8.1	8.1	156	148	113	108	43	40	38	36	15	14	19.0	24.5
11	8.0	8.1	154	148	113	109	41	39	37	35	15	15		
12	8.3	8.2	138	136	114	107	24	29	38	38	11	10	19.5	23.0
13	8.1	8.1	142	144	108	107	34	37	46	47	6	6		
14	8.2	8.0	156	148	110	107	46	41	38	36	15	14		
15	8.2	8.1	146	150	110	107	36	43	43	45	9	9		
16	8.1	8.1	142	140	108	107	34	33	40	41	10	9		
17	8.2	8.1	176	162	119	105	57	57	16	41	44	15		
18	8.1	8.2	166	152	119	107	47	45	42	38	15	14		
19	8.1	8.1	178	162	117	110	61	52	45	41	16	15	22.0	26.0
20	8.2	8.1	182	172	123	115	59	57	45	43	17	16		
21	8.2	7.9	152	164	118	122	34	42	43	46	11	12	23.0	25.5
22	8.3	8.2	168	156	129	116	39	40	43	42	15	13		
23	8.2	8.3	146	154	110	119	36	35	43	47	9	9		
24	8.2	8.2	146	152	106	109	40	43	43	44	9	10		
25	8.1	8.1	146	150	107	108	39	42	42	43	10	10		
26	8.1	8.0	162	152	107	103	55	49	38	37	16	15		
27	8.0	8.1	160	150	109	104	51	46	38	38	15	14		
28	7.9	8.0	160	150	112	105	48	45	39	38	15	14	19.5	23.5
29	8.1	8.0	160	152	112	105	48	47	41	40	14	13		
30	8.0	8.1	164	152	114	107	50	45	41	40	15	13		
31	8.3	8.2	150	148	111	110	39	38	43	43	10	10	17.5	21.5
Avg.	8.1	8.1	155.3	149.5	113.0	107.8	42.3	41.7	39.9	40.1	13.9	12.2	20.6	24.4
Max	8.3	8.3	182.0	172.0	129.0	122.0	61.0	57.0	46.0	47.0	44.0	16.0	23.0	26.0
Min.	7.9	7.9	138.0	132.0	106.0	103.0	24.0	27.0	16.0	35.0	6.0	6.0	19.0	23.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1	0.93		1	A	37	1	11	18.5	1.0648	45	1.65	0.93
2	1.09		1	A	38	0	11	16.5	1.0361	60	2.29	1.09
3	1.76		1	A	63	0	11	15.0	1.1908	54	1.78	1.76
4	1.81		1	A	36	0	12	14.0	1.0207	63	2.45	1.81
5	1.46		1	A	72	2	16	14.0	1.0793	53	1.94	1.46
6	1.37		1	A	57	0	20	14.0	0.8780	49	2.23	1.37
7	1.26	City Hall	1	A	35	1	15	16.5	1.1242	49	1.72	1.26
8	1.55	Wolfs	1	A	75	1	17	16.5	1.1085	50	1.80	1.55
9	1.38	Bait Shed	1	A	49	1	20	19.0	1.0720	47	1.73	1.38
10	1.13	Sunny Spot	1	A	57	7	19	19.5	1.0250	58	2.23	1.13
11	1.58	B&Z	1	A	79	5	21	20.0	1.1539	52	1.78	1.58
12	1.05		1	A	33	2	20	20.0	1.0956	59	2.13	1.05
13	1.68		1	A	82	0	18	21.0	1.2011	55	1.82	1.68
14	1.48		1	A	52	0	15	20.0	1.1027	58	2.06	1.48
15	1.31		1	A	73	1	17	19.0	1.1239	50	1.77	1.31
16	1.16	City Hall	1	A	151	1	16	18.0	0.9962	54	2.13	1.16
17	1.39	Wolfs	1	A	135	1	21	18.0	1.1031	50	1.80	1.39
18	1.53	Bait Shed	1	A	141	2	22	19.6	1.0346	52	2.00	1.53
19	1.70	Sunny Spot	1	A	90	0	23	21.0	1.1761	57	1.90	1.70
20	1.76	B&Z	1	A	63	3	23	22.5	1.1212	58	2.06	1.76
21	1.34		1	A	57	0	23	23.0	1.0327	54	2.07	1.34
22	1.48	City Hall	1	A	98	0	23	23.0	1.0599	57	2.11	1.48
23	1.20	Wolfs	1	A	58	1	13	23.0	1.2048	58	1.90	1.20
24	1.26	Bait Shed	1	A	79	1	11	19.0	1.0087	26	1.04	1.26
25	1.41	Sunny Spot	1	A	88	2	10	17.0	0.9760	64	2.59	1.41
26	1.36	B&Z	1	A	42	0	11	14.5	1.0714	44	1.62	1.36
27	2.28	City Hall	1	A	69	0	12.3	13.5	1.1192	44	1.54	2.28
28	1.47	Wolfs	1	A	99	0	9.0	12.0	0.9586	48	2.00	1.47
29	1.61	Bait Shed	1	A	95	0	8.7	8.5	1.1374	55	1.90	1.61
30	1.25	Sunny Spot	1	A	54	0	8.5	9.5	1.1473	46	1.57	1.25
31	1.67	B&Z	1	A	97	0	19.0	18.0	1.0019	48	1.88	1.67
Totals									33.4256	1614.6		
AVG.	1.46		1	A	74	1	16	18	1.0782	52.1	1.93	1.46
Max	2.28				151	7	23	23	1.2048	63.8	2.59	2.28
Min	1.05				33	0	9	9	0.8780	26.4	1.04	1.05

DISTRIBUTION SYSTEM MONITORING WSSN 0600 August-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7	0.86		1.15	0.70	1.25		0.92			
8										
9										
10										
11										
12										
13										
14										
15										
16	1.26		1.09	1.17	1.01		0.71			
17										
18										
19										
20										
21										
22	0.72		0.54	0.60	0.60		0.91			
23										
24										
25										
26										
27										
28	1.19		1.16	1.18	0.88		0.81			
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	20		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.94	1.26	0.54
Total number of check samples	0600			
Total number of positive check samples	0600			

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **July-19**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.5398	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	257.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.14	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.45	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.69%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	131	days
Primary Coagulant (Alum (Al3+)) on hand:	42495	lb.	Est. supply:	114	days
Cost of All Chemicals per Million Gallons:	$67.57	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	32.3742	Avg	1.0785645	Max	1.2337	Min	0.9288

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **July-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.55	0.30	0.72		0	0.00	244	3.49	57	0.81	301	4.23	2.45	1.59	1.78
2	0.39	0.29	0.75		0	0.00	247	3.38	30	0.41	277	3.51	1.76	1.57	1.75
3	0.55	0.30	0.80		0	0.00	248	3.38	30	0.41	278	4.09	2.28	1.63	1.81
4	0.56	0.37	0.82		0	0.00	243	3.34	54	0.74	297	4.35	1.09	3.05	3.26
5	0.00	0.34	0.69		0	0.00	229	3.29	27	0.39	256	3.94	2.11	1.63	1.83
6	0.00	0.30	0.70		0	0.00	222	3.40	19	0.29	241	3.27	1.55	1.52	1.72
7	0.00	0.49	0.60		0	0.00	241	3.27	14	0.19	255	3.92	2.31	1.43	1.61
8	0.00	0.34	0.53		0	0.00	252	3.29	19	0.25	271	3.39	1.66	1.57	1.73
9	0.00	0.41	0.52		0	0.00	254	3.33	19	0.25	273	4.15	2.47	1.51	1.68
10	0.00	0.26	0.37		0	0.00	237	3.30	40	0.56	277	3.70	2.04	1.47	1.66
11	0.40	0.28	0.39	0.71	0	0.00	245	3.37	21	0.29	266	3.28	1.75	1.36	1.53
12	0.51	0.30	0.58		0	0.00	290	3.81	32	0.42	322	4.87	3.02	1.69	1.85
13	0.58	0.24	0.66		0	0.00	248	3.36	51	0.69	299	4.14	1.28	2.65	2.86
14	0.32	0.24	0.74		0	0.00	249	3.50	30	0.42	279	3.99	2.31	1.51	1.68
15	0.20	0.32	0.74		0	0.00	266	3.59	24	0.32	290	4.39	2.95	1.32	1.44
16	0.17	0.44	0.63		0	0.00	288	3.73	22	0.28	310	4.48	3.13	1.25	1.35
17	0.54	0.52	0.57	0.61	0	0.00	312	3.94	33	0.42	345	4.17	2.75	1.30	1.42
18	0.47	0.51	0.66		0	0.00	323	4.10	38	0.48	361	4.90	3.36	1.41	1.54
19	0.00	0.23	0.73		0	0.00	342	4.01	35	0.41	377	4.71	3.16	1.38	1.55
20	0.42	0.25	0.69		0	0.00	357	4.56	62	0.79	419	5.55	3.95	1.42	1.60
21	0.00	0.30	0.82		0	0.00	282	3.98	84	1.19	366	4.67	3.15	1.35	1.52
22	0.51	0.31	0.69		0	0.00	314	4.19	108	1.44	422	5.58	3.77	1.63	1.81
23	0.00	0.39	0.73		0	0.00	361	4.42	87	1.07	448	6.35	3.99	2.16	2.36
24	0.52	0.34	0.77	0.72	0	0.00	323	4.34	81	1.09	404	5.90	3.45	2.19	2.45
25	0.00	0.27	0.76		0	0.00	338	4.34	82	1.05	420	5.32	2.60	2.51	2.72
26	0.52	0.33	0.81		0	0.00	350	4.31	49	0.60	399	5.80	3.81	1.80	1.99
27	0.49	0.29	0.71		0	0.00	326	4.32	56	0.74	382	5.59	2.98	2.37	2.61
28	0.51	0.24	0.63		0	0.00	332	4.29	0	0.00	332	5.34	3.68	1.49	1.66
29	0.48	0.26	0.62		0	0.00	337	3.27	35	0.34	372	5.12	3.56	1.39	1.56
30	0.47	0.26	0.55		0	0.00	415	4.96	31	0.37	446	5.71	4.18	1.36	1.53
31	0.37	0.29	0.59		0	0.00	336	4.72	21	0.30	357	5.03	3.42	1.43	1.61
Tot.							8,807		1,234		10,342				
Avg.	0.31	0.32	0.67	0.68	0.00	0.00	290.50	3.79	42.33	0.56	332.83	4.61	2.75	1.68	1.86
Max	0.58	0.52	0.82	0.72	0.00	0.00	415.00	4.96	108.00	1.44	448.00	6.35	4.18	3.05	3.26
Min.	0.00	0.23	0.37	0.61	0.00	0.00	222.00	3.27	0.00	0.00	241.00	3.27	1.09	1.25	1.35

WSSN 0600 City of Benton Harbor Month/Year July-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0450	311.00	1.57	2.20	4.20	0.25	3	0.04	0.04	3	0.04	0.04	6	0	0
2	1.0900	322.00	1.55	1.90	2.30	0.19	3	0.04	0.06	3	0.03	0.04	6	0	0
3	1.0950	323.00	1.55	1.90	2.80	0.18	3	0.04	0.04	3	0.03	0.03	6	0	0
4	1.0850	320.00	1.55	2.50	4.40	0.16	3	0.02	0.02	3	0.03	0.03	6	0	0
5	1.0375	303.00	1.54	1.70	2.70	0.17	3	0.03	0.03	3	0.03	0.04	6	0	0
6	0.9750	298.00	1.64	1.20	1.20	0.13	3	0.02	0.02	3	0.03	0.03	6	0	0
7	1.1000	323.00	1.54	6.20	7.60	0.18	3	0.02	0.02	3	0.02	0.03	6	0	0
8	1.1450	337.00	1.55	2.60	3.10	0.14	3	0.02	0.02	3	0.02	0.03	6	0	0
9	1.1400	340.00	1.57	2.70	3.00	0.14	3	0.02	0.02	3	0.02	0.03	6	0	0
10	1.0725	331.00	1.62	3.50	6.40	0.18	3	0.04	0.04	3	0.03	0.03	6	0	0
11	1.0850	323.00	1.57	3.10	4.50	0.17	3	0.03	0.04	3	0.03	0.04	6	0	0
12	1.1375	373.00	1.73	2.60	3.50	0.17	3	0.03	0.04	3	0.03	0.04	6	0	0
13	1.1025	317.00	1.51	2.70	3.50	0.16	3	0.02	0.02	3	0.03	0.04	6	0	0
14	1.0625	304.00	1.51	2.20	3.40	0.17	3	0.02	0.03	3	0.02	0.03	6	0	0
15	1.1050	309.00	1.47	2.20	3.20	0.14	3	0.02	0.02	3	0.03	0.04	6	0	0
16	1.1525	344.00	1.57	1.90	2.20	0.19	3	0.03	0.03	3	0.03	0.04	6	0	0
17	1.1825	351.00	1.56	1.70	2.00	0.20	3	0.02	0.02	3	0.04	0.05	6	0	0
18	1.1750	352.00	1.58	1.40	1.80	0.17	3	0.02	0.02	3	0.03	0.03	6	0	0
19	1.2746	415.00	1.71	2.90	5.50	0.22	3	0.03	0.03	3	0.03	0.03	6	0	0
20	1.1699	416.00	1.87	5.60	7.30	0.22	3	0.03	0.03	3	0.03	0.03	6	0	0
21	1.0575	291.00	1.45	1.50	2.00	0.18	3	0.03	0.04	3	0.03	0.04	6	0	0
22	1.1200	308.00	1.45	2.60	3.20	0.17	3	0.02	0.02	3	0.03	0.05	6	0	0
23	1.2182	440.00	1.90	6.30	7.50	0.21	3	0.03	0.03	3	0.04	0.04	6	0	0
24	1.1100	330.00	1.56	1.60	1.70	0.13	3	0.02	0.03	3	0.03	0.03	6	0	0
25	1.1625	347.00	1.57	1.70	1.90	0.18	3	0.03	0.04	3	0.03	0.04	6	0	0
26	1.2125	361.00	1.57	1.40	1.70	0.13	3	0.03	0.06	3	0.03	0.03	6	0	0
27	1.1275	337.00	1.57	1.50	1.50	0.14	3	0.02	0.02	3	0.03	0.03	6	0	0
28	1.1550	345.00	1.57	1.50	1.60	0.14	3	0.02	0.02	3	0.03	0.03	6	0	0
29	1.5398	324.00	1.11	1.70	1.90	0.18	3	0.03	0.04	3	0.04	0.04	6	0	0
30	1.2499	431.00	1.81	5.90	9.90	0.21	3	0.05	0.07	3	0.04	0.04	6	0	0
31	1.0625	318.00	1.57	2.50	3.10	0.13	3	0.04	0.04	3	0.03	0.03	6	0	0
Total	35.2474	10544.00					93			93			186	0	0
Avg.	1.1370	340.13	1.58	2.61	3.57	0.17		0.03	0.03		0.03		Total	Total	Total
Max	1.5398	440.00	1.90	6.30	9.90	0.25		0.05	0.07		0.04	0.05	6	0	0
Min.	0.9750	291.00	1.11	1.20	1.20	0.13		0.02	0.02		0.02				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness							
									Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	7.9	160	150	111	100	49	50	37	36	17	15		
2	8.0	8.1	152	148	108	102	44	46	40	42	13	11		
3	7.9	8.0	148	144	108	102	40	42	37	36	14	13	19.0	23.0
4	8.0	8.1	150	144	110	105	40	39	37	36	14	13		
5	8.0	8.0	154	146	109	101	45	45	36	35	16	14		
6	7.9	8.0	142	146	114	102	28	44	38	39	12	12		
7	8.1	7.9	138	136	107	104	31	32	39	41	10	8		
8	8.0	8.0	142	134	106	105	36	29	46	46	6	5	16.0	20.5
9	8.0	8.1	144	142	109	105	35	37	38	37	12	12		
10	8.0	8.1	150	144	109	103	41	41	38	38	14	12		
11	8.1	8.1	150	140	114	105	36	35	35	34	15	13		
12	8.1	8.1	150	142	109	102	41	40	37	36	14	13		
13	8.1	8.1	148	144	108	105	40	39	36	35	14	14		
14	8.1	8.1	154	142	114	102	40	40	37	35	15	13	19.5	22.5
15	8.2	8.2	144	142	105	109	39	33	37	39	13	11	18.5	21.5
16	8.3	8.2	146	136	104	104	42	32	41	38	11	10		
17	8.3	8.2	142	134	112	105	30	29	38	36	12	11		
18	8.1	8.2	134	138	113	107	21	31	42	43	7	7		
19	8.3	8.3	146	140	118	108	28	32	42	41	10	9		
20	8.1	8.0	154	152	111	111	43	41	38	37	15	15		
21	8.1	8.0	158	150	113	106	45	44	38	37	16	14	18.5	23.5
22	8.1	8.1	150	144	109	105	41	39	36	37	15	13		
23	8.0	8.1	154	146	111	105	43	41	37	36	15	14		
24	8.0	7.9	136	132	108	102	28	30	37	36	11	10	20.5	23.5
25	8.1	8.0	146	138	107	103	39	35	36	34	14	13		
26	8.1	7.8	136	130	108	102	28	28	38	41	10	7		
27	8.3	8.2	136	138	108	105	28	33	39	41	9	9		
28	8.2	8.2	138	134	112	105	26	29	39	35	10	11		
29	8.1	8.1	150	144	109	104	41	40	36	34	15	14		
30	8.2	8.2	160	146	114	101	46	45	37	35	17	15		
31	8.1	8.1	136	136	107	108	29	28	37	38	11	10		
Avg.	8.1	8.1	147.1	141.5	109.9	104.2	37.1	37.4	38.1	37.5	12.9	11.7	18.7	22.4
Max	8.3	8.3	160.0	152.0	118.0	111.0	49.0	50.0	46.0	46.0	17.0	15.0	20.5	23.5
Min.	7.9	7.8	134.0	130.0	104.0	100.0	21.0	28.0	35.0	34.0	6.0	5.0	16.0	20.5

DISTRIBUTION SYSTEM MONITORING WSSN 0600 July-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11	1.07		1.01	0.81	0.71		0.71			
12										
13										
14										
15										
16										
17	1.33		0.89	1.02	0.71		0.66			
18										
19										
20										
21										
22										
23										
24	1.04		1.05	1.00	0.58		0.94			
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	**0.90**	1.33	0.58
Total number of check samples	0600			
Total number of positive check samples	0600			

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	39	1	14	16.5	1.1126	51	1.80	1.23
2			1	A	54	1	15	15.5	1.2394	43	1.37	1.51
3			1	A	68	0	15	16.5	1.0664	45	1.68	1.28
4			1	A	52	1	13	16.0	1.0816	46	1.67	1.05
5			1	A	60	0	15	15.0	1.0202	42	1.64	
6			1	A	34	0	14	16.5	1.1568	39	1.34	1.11
7			1	A	31	1	12	12.0	0.9966	39	1.54	1.27
8			1	A	80	0	12	15.0	1.2567	46	1.46	0.93
9			1	A	60	0	13	14.0	1.0346	47	1.78	1.49
10			1	A	142	0	15	14.0	1.1580	48	1.64	1.26
11			1	A	44	1	18	15.0	1.2646	44	1.37	1.85
12			1	A	70	0	14	16.5	1.0404	49	1.86	1.24
13			1	A	30	0	15	15.5	1.1384	47	1.64	1.07
14			1	A	30	0	19	16.5	1.0943	56	2.03	1.12
15			1	A	20	0	16	18.0	1.0139	44	1.71	1.81
16			1	A	15	0	21	18.0	1.0866	33	1.20	1.23
17	1.22	ch	1	A	51	1	22	23.0	1.2972	35	1.07	0.39
18	1.12	ss	1	A	38	0	18	20.0	1.1643	65	2.22	1.42
19	1.10	bz	1	A	83	3	24	20.0	1.2436	52	1.64	1.83
20			1	A	24	0	21	22.0	1.1714	53	1.77	1.23
21			1	A	99	0	20	21.5	1.2308	50	1.59	1.44
22			1	A	61	0	12	21.0	1.1781	49	1.65	1.24
23			1	A	61	0	11	16.0	1.1181	20	0.71	0.61
24	1.40	ch	1	A	18	0	12	15.0	1.0750	13	0.48	1.48
25	1.22	w	1	A	66	0	13	14.0	1.2338	0	0.00	0.43
26	1.13	bs	1	A	52	0	15	14.0	1.0808	12	0.44	1.39
27	1.19	ss	1	A	29	1	19.0	15.0	1.0542	0	0.01	0.13
28	0.86	bz	1	A	43	0	9.0	12.0	0.9600	42	1.71	1.01
29			1	A	55	0	8.7	8.5	1.1489	42	1.45	
30			1	A	32	0	8.5	9.5	0.7089	45	2.53	0.88
31			1	A	159	3	19.0	21.0	1.1239	50	1.75	1.17
Totals									34.5501	1246.0		
AVG.	1.16		1	A	55	0	15	16	1.1145	40.2	1.43	1.17
Max	1.40				159	3	24	23	1.2972	65.4	2.53	1.85
Min	0.86				15	0	9	9	0.7089	0.1	0.00	0.13

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley**
F1-S1

Signature of Operator-in-Charge

Month/Year **January-19**
F1-S2

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.4059	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	273.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.06	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.40	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.39%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38380	lb.	Est. supply:	102 days
Primary Coagulant (Alum (Al3+)) on hand:	32566	lb.	Est. supply:	116 days
Cost of All Chemicals per Million Gallons:	$70.97	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	5
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	30.48468	Avg	1.0162826	Max	1.39556	Min	0.82812

Remarks: Data developed to re-determine Water Distributed to System Max days during water main break of 4" about 7 days.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **January-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.49	0.31	0.62		0	0.00	216	3.72	48	0.83	264	3.86	2.06	1.61	1.80
2	0.52	0.24	0.41		0	0.00	257	4.06	49	0.77	306	4.90	3.01	1.65	1.89
3	0.62	0.32	0.56		0	0.00	268	4.81	44	0.79	312	5.62	3.74	1.58	1.88
4	0.54	0.29	0.56		0	0.00	301	4.75	50	0.79	351	5.05	3.13	1.68	1.92
5	0.57	0.13	0.60		0	0.00	250	4.12	52	0.86	302	5.36	3.51	1.67	1.85
6	0.58	0.34	0.65		0	0.00	282	4.01	51	0.73	333	5.00	3.20	1.62	1.80
7	0.54	0.19	0.62		0	0.00	307	4.36	52	0.74	359	5.63	3.62	1.81	2.01
8	0.67	0.22	0.66		0	0.00	275	4.53	48	0.79	323	5.58	3.62	1.77	1.96
9	0.42	0.29	0.61	0.63	0	0.00	275	3.90	56	0.79	331	5.31	2.80	2.30	2.51
10	0.44	0.33	0.57		0	0.00	263	4.03	47	0.72	310	5.11	2.92	1.99	2.19
11	0.49	0.18	0.60		0	0.00	255	4.43	47	0.82	302	4.78	2.72	1.81	2.06
12	0.48	0.28	0.56		0	0.00	267	4.04	47	0.71	314	5.13	2.91	1.95	2.22
13	0.48	0.26	0.64		0	0.00	229	4.13	44	0.79	273	4.54	2.51	1.77	2.03
14	0.39	0.36	0.65		0	0.00	272	3.85	55	0.78	327	4.92	2.81	1.92	2.11
15	0.51	0.38	0.70		0	0.00	282	3.99	52	0.74	334	5.64	3.63	1.83	2.01
16	0.55	0.30	0.73		0	0.00	271	3.81	53	0.75	324	5.22	3.40	1.63	1.82
17	0.59	0.44	0.83		0	0.00	278	4.55	59	0.97	337	5.71	4.00	1.53	1.71
18	0.65	0.42	0.82		0	0.00	315	4.45	50	0.71	365	5.14	3.36	1.61	1.78
19	0.44	0.21	0.70		0	0.00	273	4.38	47	0.75	320	5.38	3.31	1.79	2.07
20	0.44	0.25	0.71		0	0.00	296	4.36	42	0.62	338	5.35	3.35	1.80	2.00
21	0.54	0.33	0.68		0	0.00	277	4.25	43	0.66	320	5.34	3.18	1.95	2.16
22	0.45	0.27	0.65		0	0.00	316	4.76	43	0.65	359	5.62	3.56	1.85	2.06
23	0.66	0.45	0.73	0.68	0	0.00	323	4.44	47	0.65	370	5.11	2.81	2.10	2.30
24	0.54	0.37	0.77		0	0.00	367	3.95	54	0.58	421	4.50	2.26	2.03	2.24
25	0.48	0.34	0.67		0	0.00	339	3.60	55	0.58	394	4.51	2.25	2.04	2.26
26	0.45	0.22	0.61		0	0.00	321	3.46	49	0.53	370	4.73	2.30	2.21	2.43
27	0.59	0.39	0.70		0	0.00	240	3.32	43	0.60	283	3.53	1.10	2.22	2.43
28	0.53	0.25	0.70		0	0.00	298	3.17	12	0.13	310	3.41	1.38	1.78	2.03
29	0.00	0.20	0.56	0.54	0	0.00	264	3.23	27	0.33	291	3.68	1.61	1.73	2.07
30	0.00	0.18	0.46		0	0.00	273	3.18	29	0.34	302	3.78	1.72	1.95	2.06
31	0.00	0.21	0.51		0	0.00	285	3.36	23	0.27	308	4.01	1.67	2.05	2.34
Tot.							8,519		1,370		10,153				
Avg.	0.49	0.29	0.64	0.62	0.00	0.00	281.67	4.06	46.50	0.68	328.17	4.91	2.86	1.84	2.06
Max	0.67	0.45	0.83	0.68	0.00	0.00	367.00	4.81	59.00	0.97	421.00	5.71	4.00	2.30	2.51
Min.	0.00	0.13	0.41	0.54	0.00	0.00	216.00	3.17	12.00	0.13	264.00	3.41	1.10	1.53	1.71

WSSN 0600 City of Benton Harbor Month/Year January-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS												
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.8675	289.00	1.75	6.90	7.40	0.30	3	0.06	0.07	3	0.06	0.07	6	0	0
2	0.9450	308.00	1.71	8.20	10.10	0.34	3	0.06	0.07	2	0.07	0.08	5	0	0
3	0.8312	270.00	1.71	7.50	7.70	0.79	3	0.08	0.09	0	0.07	0.07	3	0	0
4	0.9450	337.00	1.88	8.20	8.70	0.77	3	0.06	0.06	0	0.09	0.10	3	0	0
5	0.9051	293.00	1.70	9.00	14.10	0.66	3	0.08	0.08	0	0.07	0.07	3	0	0
6	1.0500	333.00	1.47	7.60	8.40	0.69	3	0.07	0.08	0	0.06	0.07	3	0	0
7	1.0500	341.00	1.71	7.10	8.50	0.64	3	0.08	0.10	0	0.07	0.07	3	0	0
8	0.9071	310.00	1.80	7.20	10.60	0.50	3	0.07	0.08	0	0.07	0.08	3	0	0
9	1.0519	299.00	1.50	7.20	7.70	0.42	3	0.08	0.08	0	0.06	0.07	3	0	0
10	0.9750	327.00	1.76	8.30	9.20	0.55	3	0.07	0.08	0	0.06	0.06	3	0	0
11	0.8600	268.00	1.64	7.30	7.90	0.63	3	0.07	0.08	0	0.07	0.09	3	0	0
12	0.9870	297.00	1.58	6.40	9.50	0.55	3	0.07	0.08	0	0.07	0.08	3	0	0
13	0.8280	277.00	1.76	6.40	9.50	0.42	3	0.06	0.06	0	0.06	0.07	3	0	0
14	1.0560	352.00	1.75	5.80	7.60	0.46	3	0.07	0.09	0	0.07	0.08	3	0	0
15	1.0550	321.00	1.60	7.00	9.10	0.81	3	0.07	0.07	0	0.07	0.08	3	0	0
16	1.0612	340.00	1.69	8.30	11.60	0.63	3	0.06	0.07	0	0.07	0.07	3	0	0
17	0.9114	295.00	1.70	5.00	5.50	0.48	3	0.07	0.08	0	0.08	0.09	3	0	0
18	1.0556	350.00	1.74	8.30	12.00	0.57	3	0.07	0.07	0	0.07	0.08	3	0	0
19	0.9300	252.00	1.43	7.40	7.50	0.66	3	0.07	0.09	0	0.07	0.07	3	0	0
20	1.0125	313.00	1.63	8.70	11.60	0.55	3	0.07	0.07	0	0.07	0.08	3	0	0
21	0.9720	303.00	1.64	6.60	6.90	0.59	3	0.07	0.07	0	0.07	0.08	3	0	0
22	0.9900	330.00	1.75	8.00	10.90	0.72	3	0.07	0.09	0	0.07	0.08	3	0	0
23	1.0858	324.00	1.57	10.00	18.50	0.66	3	0.07	0.08	0	0.08	0.09	3	0	0
24	1.3860	485.00	1.84	14.70	20.60	1.40	3	0.10	0.14	0	0.10	0.13	3	0	0
25	1.4059	341.00	1.28	12.40	12.70	0.13	3	0.07	0.08	0	0.08	0.09	3	0	0
26	1.3839	457.00	1.28	10.20	15.40	0.93	3	0.07	0.08	0	0.11	0.14	3	0	0
27	1.0777	353.00	1.72	7.00	8.30	0.60	3	0.07	0.07	0	0.09	0.12	3	0	0
28	1.4014	431.00	1.62	7.90	9.50	1.00	3	0.07	0.08	0	0.12	0.16	3	0	0
29	1.2195	384.00	1.66	13.10	15.50	1.00	3	0.07	0.07	0	0.18	0.29	3	0	0
30	1.2820	353.00	1.45	14.40	21.60	1.10	3	0.07	0.08	0	0.11	0.14	3	0	0
31	1.2678	356.00	1.48	5.70	6.60	1.50	3	0.06	0.07	0	0.11	0.15	3	0	0
Total	32.7565	10289.00					93			5			98	0	0
Avg.	1.0567	331.90	1.64	8.32	10.67	0.68	93	0.07	0.08		0.08		Total	Total	Total
Max	1.4059	485.00	1.88	14.70	21.60	1.50		0.10	0.14		0.18	0.29	6	0	0
Min.	0.8280	252.00	1.28	5.00	5.50	0.13		0.06	0.06		0.06				

WSSN 0600

MONTH/YEAR January-19

CITY OF BENTON HARBOR CHEMICAL ANALYSES

D	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
A														
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	7.9	7.9	170	174	113	119	57	55	51	46	11	15		
2	7.9	7.8	162	164	133	118	29	46	55	53	6	8		
3	8.1	8.0	178	154	129	121	49	33	55	50	10	7		
4	8.0	8.0	192	168	129	124	63	44	63	53	9	9		
5	8.0	8.0	186	178	125	118	61	60	46	43	17	17		
6	8.0	8.0	186	176	125	118	61	58	51	47	14	14		
7	7.9	7.9	180	168	127	116	53	52	43	42	17	16		
8	7.8	7.8	178	168	123	116	55	52	45	42	17	16	24.5	26.5
9	7.9	7.8	168	158	112	106	56	52	45	43	14	12		
10	7.9	7.9	168	160	122	113	46	47	43	44	15	12		
11	7.9	7.9	162	164	120	117	42	47	47	50	11	10		
12	8.1	7.7	172	164	132	116	40	48	47	45	13	13	17.0	21.0
13	7.9	7.9	148	154	111	114	37	40	47	46	7	9		
14	7.9	7.8	166	158	119	109	47	49	43	43	14	12		
15	7.9	7.8	210	160	145	107	65	53	55	42	18	14		
16	7.9	7.9	190	184	137	122	53	62	45	43	19	18		
17	7.9	7.7	184	180	116	123	68	57	44	45	18	17		
18	7.9	8.0	184	190	127	122	57	68	44	45	18	19	19.5	22.5
19	7.9	7.9	154	156	119	123	35	33	45	44	10	11	20.5	24.0
20	7.9	7.9	176	172	114	119	62	53	46	46	15	14		
21	7.8	7.8	168	170	112	117	56	53	47	49	12	12		
22	7.9	7.8	164	152	134	112	30	40	55	51	6	6		
23	7.8	7.7	180	166	132	115	48	51	50	45	14	13		
24	7.8	7.8	176	172	120	121	56	51	46	45	15	15		
25	8.0	7.9	174	168	124	118	50	50	45	43	15	15		
26	7.9	7.9	170	164	128	118	42	46	41	44	17	13		
27	8.0	7.9	184	168	127	117	57	51	45	42	17	16	21.5	24.0
28	7.9	7.9	158	156	118	114	40	42	47	46	10	10	23.0	24.5
29	7.9	7.8	172	162	127	121	45	41	51	46	11	12		
30	7.9	7.8	146	142	109	116	37	26	49	47	6	6		
31	7.9	7.7	148	152	119	109	29	43	49	49	6	7		
Avg.	7.9	7.9	173.5	165.7	123.6	117.0	49.9	48.7	47.9	45.7	13.2	12.7	21.0	23.8
Max	8.1	8.0	210.0	190.0	145.0	124.0	68.0	68.0	63.0	53.0	19.0	19.0	24.5	26.5
Min.	7.8	7.7	146.0	142.0	109.0	106.0	29.0	26.0	41.0	42.0	6.0	6.0	17.0	21.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

D	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	COLOR		ODOR	
A	No. of Samples	Colilert P/A	No. of Samples	Colilert P/A			TEMP.	TEMP.	___True		___Cold	
T							'C	'C	___Appar.		___60'C	
E					Raw	Tap			Raw	Tap	Raw	Tap
1			1	A	53	0	4	5.5				
2			1	A	93	0	5	8.0				
3			1	A	218	1	4	9.0				
4			1	A	156	0	5	8.0				
5			1	A	119	0	4	5.5				
6			1	A	114	0	5	5.5				
7			1	A	90	0	5	5.5				
8			1	A	82	0	5	5.5				
9			1	A	80	0	4	5.5				
10			1	A	67	0	4	5.5				
11			1	A	54	0	4	7.0				
12			1	A	56	0	4	7.0				
13			1	A	290	13	4	7.0				
14			1	A	110	0	3	4.5				
15			1	A	65	0	3	4.6				
16			1	A	85	0	4	4.5				
17			1	A	83	0	3	4.5				
18			1	A	58	0	3	4.5				
19			1	A	38	0	3	6.0				
20			1	A	34	20	3	6.0				
21			1	A	81	1	2	5.0				
22			1	A	341	2	2	4.5				
23			1	A	76	1	2	3.0				
24			1	A	77	0	2	2.5				
25			1	A	72	0	2	2.5				
26			1	A	61	0	2	2.5				
27			1	A	60	0	1.7	2.5				
28			1	A	46	0	9.0	12.0				
29			1	A	30	0	8.7	8.5				
30			1	A	55	0	8.5	9.5				
31			1	A	131	0	3.0	5.0				
AVG.			1	A	96	1	4	6				
Max					341	20	9	12				
Min					30	0	2	3				

DISTRIBUTION SYSTEM MONITORING

WSSN 0600

January-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7										
8										
9	1.21		1.34	1.01	0.89		1.10			
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23	1.17		1.41	1.72	1.27		0.72			
24										
25										
26										
27										
28										
29	0.93		1.23	1.36	1.45		1.39			
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max / Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.21	1.72 / 0.72
Total number of check samples	0600		
Total number of positive check samples	0600		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **Feburary 2019**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.7439	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	188.13	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.40	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.98	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.84%	Percent of Treated Water

Chemical Data

Chlorine on hand:	37370	lb.	Est. supply:	202 days
Primary Coagulant (Alum (Al3+)) on hand:	59573	lb.	Est. supply:	81 days
Cost of All Chemicals per Million Gallons:	$72.36	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	83	82
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO

If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO

If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO

If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES

If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO

If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	37.91904	Avg	1.3914114	Max	1.63784	Min	1.24444

Remarks: Data developed to re-determine Water Distributed to System
The Sodium Fluoride transfer pump broke late in January, took until March for parts to arrive.
During, February, analysis of F-ion was susspended for convience.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **Feburary 2019**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.00	0.32	0.31				306	3.89	49	0.62	355	5.09	2.59	2.29	2.50
2	0.00	0.27	0.28				293	3.01	38	0.39	331	3.68	1.16	2.31	2.52
3	0.00	0.36	0.38				271	2.71	28	0.28	299	3.44	0.86	2.36	2.58
4	0.00	0.32	0.29				310	2.95	41	0.39	351	3.81	1.63	1.97	2.18
5	0.00	0.36	0.36				328	3.44	17	0.18	345	3.71	1.80	1.71	1.91
6	0.00	0.30	0.36	0.40			298	2.65	24	0.21	322	3.29	1.34	1.68	1.95
7	0.00	0.30	0.35				285	3.04	24	0.26	309	3.23	1.00	1.83	2.23
8	0.00	0.31	0.36				289	2.93	29	0.29	318	3.38	1.15	2.02	2.23
9	0.00	0.27	0.32				308	2.79	19	0.17	327	3.11	1.16	1.73	1.95
10	0.00						331	3.05	32	0.29	363	4.04	2.27	1.50	1.77
11	0.00	0.38	0.29				370	3.17	88	0.75	458	4.36	1.79	2.35	2.57
12	0.00	0.40	0.35				291	2.84	27	0.26	318	3.33	1.23	1.87	2.10
13	0.00	0.42	0.37	0.35			270	2.57	24	0.23	294	3.23	1.14	1.87	2.09
14	0.00	0.27	0.30				311	3.11	64	0.64	375	3.81	1.34	2.22	2.47
15	0.00	0.35	0.33				358	3.87	21	0.23	379	4.13	2.23	1.71	1.90
16	0.00						334	3.66	27	0.30	361	4.15	2.19	1.70	1.96
17	0.00						300	3.06	15	0.15	315	3.78	1.79	1.74	1.99
18	0.00						298	3.51	28	0.33	326	3.22	1.12	1.81	2.10
19	0.00						297	3.32	17	0.19	314	3.01	1.13	1.64	1.88
20	0.00						356	3.95	19	0.21	375	3.42	1.64	1.61	1.78
21	0.00						345	3.85	19	0.21	364	3.70	1.99	1.53	1.71
22	0.00						349	3.77	20	0.22	369	3.78	1.94	1.67	1.84
23	0.00	0.33	0.33				350	4.04	47	0.54	397	4.48	2.68	1.61	1.80
24	0.00	0.44	0.37				289	3.94	35	0.48	324	3.82	1.91	1.71	1.91
25	0.00			0.21			301	3.78	28	0.35	329	3.59	1.54	1.82	2.05
26	0.00						289	3.66	26	0.33	315	3.57	1.42	1.96	2.15
27	0.00						278	3.57	24	0.31	302	3.22	1.02	2.06	2.20
28	0.00						262	4.03	16	0.25	278	3.26	1.41	1.55	1.85
Tot.	NaF Transfer Pump broken took a long time for 1 part						8,361		797		9,513				
Avg.	0.00	0.34	0.33	0.32			309.54	3.36	30.21	0.32	339.75	3.67	1.59	1.85	2.08
Max	0.00	0.44	0.38	0.40			370.00	4.04	88.00	0.75	458.00	5.09	2.68	2.36	2.58
Min.	0.00	0.27	0.28	0.21			262.00	2.57	15.00	0.15	278.00	3.01	0.86	1.50	1.71

WSSN 0600 City of Benton Harbor

Month/Year Feburary 2019

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# ample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	1.1746	346.00	1.55	2.40	3.20	0.57	3	0.08	0.08	3	0.16	0.22	6	0	0
2	1.4532	411.00	1.49	4.80	7.10	0.76	3	0.07	0.07	2	0.10	0.12	5	0	0
3	1.4920	402.00	1.42	10.60	22.90	0.54	3	0.07	0.07	3	0.11	0.12	6	0	0
4	1.5664	414.00	1.39	2.20	4.00	0.72	3	0.07	0.08	3	0.09	0.13	6	0	0
5	1.4216	415.00	1.54	3.30	5.10	0.60	3	0.08	0.08	3	0.12	0.15	6	0	0
6	1.6807	421.00	1.30	3.10	3.70	0.89	3	0.08	0.09	3	0.10	0.10	6	0	0
7	1.3994	533.00	2.00	2.70	3.40	0.56	3	0.09	0.11	3	0.07	0.09	6	0	0
8	1.4700	519.00	1.86	4.70	5.40	0.62	3	0.07	0.08	3	0.07	0.08	6	0	0
9	1.6452	516.00	1.65	10.00	10.40	2.60	3	0.08	0.10	3	0.09	0.10	6	0	0
10	1.6222	533.00	1.73	4.50	5.00	1.40	3	0.08	0.09	3	0.09	0.10	6	0	0
11	1.7439	731.00	2.21	5.60	7.30	0.82	3	0.07	0.08	3	0.08	0.09	6	0	0
12	1.5314	506.00	1.74	2.20	2.60	0.99	3	0.07	0.08	3	0.09	0.12	6	0	0
13	1.5653	453.00	1.52	10.00	12.80	1.00	3	0.07	0.09	3	0.06	0.07	6	0	0
14	1.4909	500.00	1.76	7.70	10.40	1.90	3	0.11	0.15	3	0.09	0.12	6	0	0
15	1.3825	518.00	1.97	8.50	9.80	1.60	3	0.07	0.08	3	0.08	0.08	6	0	0
16	1.3614	519.00	2.01	4.60	5.10	0.75	3	0.09	0.11	3	0.08	0.10	6	0	0
17	1.4645	960.00	3.45	3.90	4.80	2.90	3	0.11	0.16	3	0.12	0.18	6	0	0
18	1.2678	639.00	2.65	4.60	5.90	0.86	3	0.10	0.13	3	0.12	0.19	6	0	0
19	1.3371	575.00	2.26	4.70	5.50	0.74	3	0.06	0.07	3	0.07	0.07	6	0	0
20	1.3470	633.00	2.47	4.30	5.50	1.80	3	0.08	0.09	3	0.10	0.11	6	0	0
21	1.3383	482.00	1.89	5.50	5.90	1.50	3	0.06	0.07	3	0.08	0.09	6	0	0
22	1.3825	531.00	2.02	3.90	4.90	1.80	3	0.07	0.08	3	0.07	0.07	6	0	0
23	1.2936	523.00	2.13	4.70	9.40	1.10	3	0.09	0.10	3	0.08	0.08	6	0	0
24	1.0952	476.00	2.29	2.90	3.60	0.80	3	0.08	0.10	3	0.07	0.07	6	0	0
25	1.1893	508.00	2.25	12.60	13.30	0.87	3	0.07	0.09	3	0.07	0.07	6	0	0
26	1.1775	433.00	2.25	7.00	8.50	1.20	3	0.06	0.06	3	0.07	0.07	6	0	0
27	1.1613	400.00	1.81	6.90	7.50	1.30	3	0.07	0.07	3	0.07	0.08	6	0	0
28	0.9713	326.00	1.77	8.10	8.40	1.70	3	0.09	0.09	2	0.09	0.09	4	0	0
Total	39.0261	14223.00					84	Samples N		82	Samples S		165	0	0
Avg.	1.3938	507.96	1.94	5.57	7.19	1.17	83	0.08	0.09		0.09		Total	Total	Total
Max	1.7439	960.00	3.45	12.60	22.90	2.90		0.11	0.16		0.16	0.19	6	0	0
Min.	0.9713	326.00	1.30	2.20	2.60	0.54		0.06	0.06		0.06		4	0	0

WSSN 0600 MONTH/YEAR Feburary 2019 PAGE 4

CITY OF BENTON HARBOR CHEMICAL ANALYSES

D A T E	pH Raw 29.	pH Tap 30.	Total Hardness as CaCO3 mg/l Raw 31.	Total Hardness as CaCO3 mg/l Tap 32.	Total Alkalinity as CaCO3 mg/l Raw 33.	Total Alkalinity as CaCO3 mg/l Tap 34.	Non-Carb. Hardness as CaCO3 mg/l Raw 35.	Non-Carb. Hardness as CaCO3 mg/l Tap 36.	Calcium as Ca++ mg/l Raw 37	Calcium as Ca++ mg/l Tap 38	Magnesium as Mg++ mg/l Raw 39	Magnesium as Mg++ mg/l Tap 40	Chloride as Cl- mg/l Raw 41	Chloride as Cl- mg/l Tap 42
1	8.0	7.9	174	162	126	112	48	50	45	43	15	13		
2	7.8	7.7	168	170	115	119	53	51	41	42	16	16		
3	7.9	7.8	170	164	114	110	56	54	44	40	15	16		
4	7.9	7.8	190	166	137	112	53	54	47	42	17	15		
5	7.8	7.8	188	194	126	121	62	73	48	51	17	17		
6	7.9	7.8	148	144	114	117	34	27	47	46	7	7	14.5	18.0
7	7.9	7.9	160	148	111	112	49	36	50	47	9	7		
8	7.9	7.9	154	148	105	107	49	41	46	43	10	10		
9	8.0	7.7	182	148	132	103	50	45	62	45	7	9		
10	7.9	7.9	166	156	123	116	43	40	47	46	12	10		
11	7.9	7.9	176	172	114	113	62	59	45	41	15	17		
12	7.8	7.8	168	162	112	107	56	55	42	40	16	15		
13	7.8	7.7	160	152	114	105	46	47	40	41	15	12		
14	7.8	7.8	204	166	134	104	70	62	55	42	17	15		
15	7.8	7.9	180	168	131	117	49	51	48	42	15	16	23.0	26.5
16	7.9	7.8	150	172	117	129	33	43	50	51	6	11		
17	7.9	7.8	170	158	119	113	51	45	49	47	12	10		
18	7.9	7.9	164	156	120	109	44	47	47	48	11	8		
19	7.8	7.7	142	144	109	105	33	39	42	43	9	9	18.5	26.0
20	7.9	7.9	186	146	131	121	55	25	56	44	11	9		
21	7.9	7.9	168	178	124	131	44	47	55	61	8	6		
22	7.9	7.7	176	162	134	125	42	37	55	55	9	6		
23	8.0	8.0	186	170	132	125	54	45	48	44	16	15		
24	8.0	8.0	194	176	153	125	41	51	43	46	21	15	17.5	24.5
25	7.8	7.8	152	158	108	119	44	39	47	53	8	6	19.5	22.0
26	7.8	7.8	148	152	108	111	40	41	46	46	8	9		
27	8.2	8.0	168	148	114	111	54	37	46	43	13	10		
28	7.8	7.9	162	148	111	102	51	46	46	45	11	9		
Avg.	7.9	7.8	169.8	160.3	121.0	114.3	48.8	46.0	47.8	45.6	12.4	11.4	18.6	23.4
Max	8.2	8.0	204.0	194.0	153.0	131.0	70.0	73.0	62.0	61.0	21.0	17.0	23.0	26.5
Min.	7.8	7.7	142.0	144.0	105.0	102.0	33.0	25.0	40.0	40.0	6.0	6.0	14.5	18.0

WSSN 0600 MONTH/YEAR Feburary 2019 PAGE 6

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

DATE	RAW No. of Samples	RAW Colilert P/A	PLANT TAP No. of Samples	PLANT TAP Colilert P/A	Standard Plate Count Raw	Standard Plate Count Tap	Raw TEMP. 'C	Tap TEMP. 'C	COLOR ___True ___Appar. Raw	COLOR Tap	ODOR ___Cold ___60'C Raw	ODOR Tap
1			1	A	86	0	2	2.5				
2			1	A	49	0	2	2.0				
3			1	A	39	0	2	2.5				
4			1	A	48	2	2	2.5				
5			1	A	28	0	2	2.5				
6			1	A	33	0	3	4.0				
7			1	A	30	0	2	3.8				
8			1	A	27	0	2	3.3				
9			1	A	176	3	3	5.0				
10			1	A	551	2	2	4.0				
11			1	A	45	0	2	2.5				
12			1	A	47	0	2	2.5				
13			1	A	30	0	2	2.0				
14			1	A	65	0	2	2.5				
15			1	A	101	1	2	2.5				
16			1	A	118	0	2	5.0				
17			1	A	83	0	2	5.0				
18			1	A	45	0	2	4.0				
19			1	A	38	0	2	6.0				
20			1	A	63	0	2	4.0				
21			1	A	71	1	2	4.0				
22			1	A	71	1	2	4.0				
23			1	A	90	1	2	3.0				
24			1	A	90	0	3	3.5				
25			1	A	38	0	2	5.0				
26			1	A	54	0	2	5.0				
27			1	A	38	0	2.0	4.0				
28			1	A	24	0	9.0	12.0				
AVG.			1	A	78	0	2	4				
Max					551	3	9	12				
Min					24	0	2	2				

DISTRIBUTION SYSTEM MONITORING DMR WSSN 0600 Feburary 2019

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6	1.04		1.31	0.00	0.93		0.89			
7										
8										
9										
10										
11										
12										
13	0.90		1.02	0.65	1.21		2.05			
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25	1.13			0.93	1.08		1.28			
26			1.00				1.20			
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	16	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.04	2.05 0.00
Total number of check samples	0600		
Total number of positive check samples	0600		

MI 0600 Correction MOR NOV 2019

ORP & Meter ON

WSSN 0600 MONTH/YEAR November-19 PAGE 6

Modified Bact Page

BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

DATE	Ortho P System System Ortho P Residual mg/L	System Ortho P Residual Location	PLANT TAP No. of Samples	Colilert P/A	Standard Plate Count Raw	Tap	Raw TEMP. 'C	Tap TEMP. 'C	Distrubution flow and Corrosion Treatment High Lift To Distribution	Lbs PO4	PO4 Treatment mg/L	Ortho P Residual mg/L
1			1	A	75	0	11	12.5	0.9548	46	1.91	1.54
2			1	A	93	0	11	12.5	0.7336	50	2.68	1.45
3			1	A	119	0	11	12.0	1.0696	47	1.73	1.46
4			1	A	119	9	10	11.5	0.9394	45	1.87	1.37
5			1	A	108	0	10	12.0	0.9170	50	2.16	1.62
6	1.47	City Hall	1	A	102	0	10	10.5	0.9492	49	2.03	1.55
6	1.39	Wolfs	1	A	97	0	10	11.0	0.9884	51	2.02	1.54
6	1.58	Bait Shed	1	A	164	0	10	11.0	0.9338	53	2.24	1.48
6	1.57	Sunny Spot	1	A	95	1	8	10.0	0.9478	45	1.88	1.51
6	1.33	B & Z	1	A	102	0	8	9.5	0.8554	52	2.41	0.81
11			1	A	111	0	8	9.0	0.9828	51	2.03	1.48
12	1.52	City Hall	1	A	168	0	8	9.0	0.9716	36	1.45	1.47
12	1.34	Wolfs	1	A	109	1	7	8.5	1.0136	54	2.11	1.46
12	1.45	Bait Shed	1	A	152	0	7	9.0	1.0374	60	2.28	1.56
12	1.40	Sunny Spot	1	A	146	0	7	8.0	1.0430	54	2.05	1.56
12	1.25	B & Z	1	A	50	2	6	8.5	0.9842	58	2.32	1.47
17			1	A	74	4	7	8.0	0.9639	59	2.43	1.53
18			1	A	58	0	7	7.0	1.0080	56	2.21	1.50
19			1	A	79	0	6	6.5	0.8960	58	2.54	1.57
20	1.66	City Hall	1	A	86	0	6	7.0	1.1354	56	1.94	1.50
20	1.47	Wolfs	1	A	98	1	6	6.5	0.9268	57	2.44	1.41
20	1.51	Bait Shed	1	A	85	0	7	7.5	0.9730	19	0.79	1.47
20	1.45	Sunny Spot	1	A	98	0	7	8.0	0.9240	58	2.48	1.51
20	1.24	B & Z	1	A	72	0	7	8.0	1.0080	65	2.54	1.56
25			1	A	58	0	7	8.0	0.9688	39	1.60	1.45
26			1	A	45	12	7	8.0	0.9898	52	2.07	1.49
27			1	A	153	0	7.2	7.5	0.9688	50	2.05	1.47
28			1	A	163	0	9.0	12.0	0.8582	46	2.11	1.52
29			1	A	236	0	8.7	8.5	0.8260	44	2.11	1.52
30			1	A	95	0	8.5	9.5	0.8316	46	2.20	1.48
			0									
Totals									28.5999	1502.5		
AVG.	1.44		1	A	108	1	8	9	0.9533	50.1	2.10	1.47
Max	1.66				236	12		13	1.1354	64.6	2.68	1.62
Min	1.24				45	0	6	7	0.7336	19.4	0.79	0.81

TYPO was not included in original MOR Sorry Mike,

There was trouble w/ the ORP Barrel on Sunday 11/10/19

MI 0600 Benton Harbor Water MOR Cover sheet Revised 02/11/19

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: CITY OF BENTON HARBOR

WSSN:600

Operator-in-Charge **Michael O'Malley** F1-S1

Signature of Operator-in-Charge

Month/Year **January-19** F1-S2

Water Plant Classification

Berrien County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.4059	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	273.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.06	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.40	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.39%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38380	lb.	Est. supply:	102 days
Primary Coagulant (Alum (Al3+)) on hand:	32566	lb.	Est. supply:	116 days
Cost of All Chemicals per Million Gallons:	$70.97	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

← Revised to be correct

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	NO
Did POE disinfectant residual fall below 0.2 ppm during the month? **If yes**, indicate date(s) and duration on a separate sheet.	NO
Was minimum C*T credit achieved for the entire month? **If no**, indicate on a separate sheet the date(s) not achieved.	YES
Was continuous POE chlorine residual monitoring equipment off-line during the month? **If yes**, indicate date(s) and duration on a separate sheet.	NO

Distribution	Total	30.48468	Avg	1.0162826	Max	1.39556	Min	0.82812

Remarks: Data developed to re-determine Water Distributed to System Max days during water main break of 4" about 7 days.

MI 0600 Benton Harbor Water MOR Revised pg

Missed these

2/11/19

WSSN 0600 City of Benton Harbor

Month/Year January-19

COAGULATION PARAMETERS

DAY	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# Sample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.8675	289.00	1.75	6.90	7.40	0.30	3	0.06	0.07	3	0.06	0.07	6	0	0
2	0.9450	308.00	1.71	8.20	10.10	0.34	3	0.06	0.07	3	0.07	0.08	6	0	0
3	0.8312	270.00	1.71	7.50	7.70	0.79	3	0.08	0.09	3	0.07	0.07	6	0	0
4	0.9450	337.00	1.88	8.20	8.70	0.77	3	0.06	0.06	3	0.09	0.10	6	0	0
5	0.9051	293.00	1.70	9.00	14.10	0.66	3	0.08	0.08	3	0.07	0.07	6	0	0
6	1.0500	333.00	1.47	7.60	8.40	0.69	3	0.07	0.08	3	0.06	0.07	6	0	0
7	1.0500	341.00	1.71	7.10	8.50	0.64	3	0.08	0.10	3	0.07	0.07	6	0	0
8	0.9071	310.00	1.80	7.20	10.60	0.50	3	0.07	0.08	3	0.07	0.08	6	0	0
9	1.0519	299.00	1.50	7.20	7.70	0.42	3	0.08	0.08	3	0.06	0.07	6	0	0
10	0.9750	327.00	1.76	8.30	9.20	0.55	3	0.07	0.08	3	0.06	0.06	6	0	0
11	0.8600	268.00	1.64	7.30	7.90	0.63	3	0.07	0.08	3	0.07	0.09	6	0	0
12	0.9870	297.00	1.58	6.40	9.50	0.55	3	0.07	0.08	3	0.07	0.08	6	0	0
13	0.8280	277.00	1.76	6.40	9.50	0.42	3	0.06	0.06	3	0.06	0.07	6	0	0
14	1.0560	352.00	1.75	5.80	7.60	0.46	3	0.07	0.09	3	0.07	0.08	6	0	0
15	1.0550	321.00	1.60	7.00	9.10	0.81	3	0.07	0.07	3	0.07	0.08	6	0	0
16	1.0612	340.00	1.69	8.30	11.60	0.63	3	0.06	0.07	3	0.07	0.07	6	0	0
17	0.9114	295.00	1.70	5.00	5.50	0.48	3	0.07	0.08	3	0.08	0.09	6	0	0
18	1.0556	350.00	1.74	8.30	12.00	0.57	3	0.07	0.07	3	0.07	0.08	6	0	0
19	0.9300	252.00	1.43	7.40	7.50	0.66	3	0.07	0.09	3	0.07	0.07	6	0	0
20	1.0125	313.00	1.63	8.70	11.60	0.55	3	0.07	0.07	3	0.07	0.08	6	0	0
21	0.9720	303.00	1.64	6.60	6.90	0.59	3	0.07	0.07	3	0.07	0.08	6	0	0
22	0.9900	330.00	1.75	8.00	10.90	0.72	3	0.07	0.09	3	0.07	0.08	6	0	0
23	1.0858	324.00	1.57	10.00	18.50	0.66	3	0.07	0.08	3	0.08	0.09	6	0	0
24	1.3860	485.00	1.84	14.70	20.60	1.40	3	0.10	0.14	3	0.10	0.13	6	0	0
25	1.4059	341.00	1.28	12.40	12.70	0.13	3	0.07	0.08	3	0.08	0.09	6	0	0
26	1.3839	457.00	1.28	10.20	15.40	0.93	3	0.07	0.08	3	0.11	0.14	6	0	0
27	1.0777	353.00	1.72	7.00	8.30	0.60	3	0.07	0.07	3	0.09	0.12	6	0	0
28	1.4014	431.00	1.62	7.90	9.50	1.00	3	0.07	0.08	3	0.12	0.16	6	0	0
29	1.2195	384.00	1.66	13.10	15.50	1.00	3	0.07	0.07	3	0.18	0.29	6	0	0
30	1.2820	353.00	1.45	14.40	21.60	1.10	3	0.07	0.08	3	0.11	0.14	6	0	0
31	1.2678	356.00	1.48	5.70	6.60	1.50	3	0.06	0.07	3	0.11	0.15	6	0	0
Total	32.7565	10289.00					93			93			186	0	0
Avg.	1.0567	331.90	1.64	8.32	10.67	0.68	93	0.07	0.08		0.08		Total	Total	Total
Max	1.4059	485.00	1.88	14.70	21.60	1.50		0.10	0.14		0.18	0.29	6	0	0
Min.	0.8280	252.00	1.28	5.00	5.50	0.13		0.06	0.06		0.06				

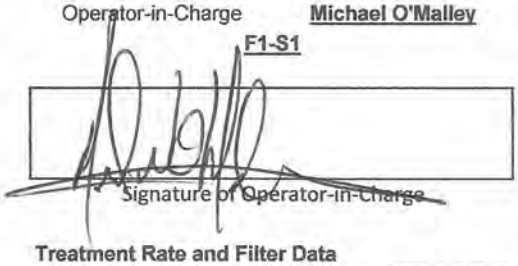
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **September-19**

F1-S1 **F1-S2**



Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2224	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	257.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.07	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.13	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.70%	Percent of Treated Water

Chemical Data

Chlorine on hand:	22220	lb.	Est. supply:	8731 days
Primary Coagulant (Alum (Al3+)) on hand:	3649411	lb.	Est. supply:	68 days
Cost of All Chemicals per Million Gallons:	$80.35	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	29.1331	Avg	0.9975833	Max	1.2046	Min	0.8386

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals. There was a Chlorine solution leak . It was fixed quickly and the post filter feed was increased as a safeguard. There was a question

Chlorine leak Appendix 1
Alum concern Appendix 2

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **September-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.55	0.22	0.59		0	0.00	353	5.61	12	0.19	365	6.86	5.23	1.50	1.63
2	0.62	0.26	0.62		0	0.00	359	5.60	10	0.16	369	6.57	4.92	1.50	1.65
3	0.51	0.29	0.57		0	0.00	413	5.62	16	0.22	429	6.25	4.44	1.67	1.81
4	0.58	0.15	0.63	0.63	0	0.00	409	5.61	28	0.38	437	6.28	4.35	1.75	1.93
5	0.66	0.32	0.75		0	0.00	415	5.66	46	0.63	461	6.17	4.31	1.68	1.86
6	0.55	0.32	0.75		0	0.00	414	5.62	42	0.57	456	6.62	4.60	1.84	2.02
7	0.53	0.28	0.73		0	0.00	456	5.57	49	0.60	505	7.00	4.87	1.94	2.13
8	0.54	0.31	0.61		0	0.00	393	5.59	32	0.45	425	6.36	4.55	1.64	1.81
9	0.53	0.36	0.77		0	0.00	399	5.52	48	0.66	447	5.54	3.67	1.70	1.87
10	0.56	0.33	0.82		0	0.00	414	5.42	22	0.29	436	6.41	4.38	1.81	2.03
11	0.60	0.38	0.83	0.67	0	0.00	389	5.52	15	0.21	404	6.20	4.31	1.72	1.89
12	0.56	0.31	0.88		0	0.00	418	5.53	14	0.19	432	5.89	4.15	1.58	1.74
13	0.66	0.31	0.84		0	0.00	426	5.49	20	0.26	446	6.07	4.36	1.57	1.71
14	0.54	0.19	0.75		0	0.00	396	5.63	42	0.60	438	7.18	5.37	1.63	1.81
15	0.43	0.22	0.74		0	0.00	376	4.84	75	0.97	451	7.14	5.39	1.57	1.75
16	0.56	0.22	0.69		0	0.00	401	5.50	31	0.43	432	6.65	4.97	1.50	1.68
17	0.69	0.15	0.62		0	0.00	370	5.52	69	1.03	439	6.90	5.36	1.37	1.54
18	0.47	0.19	0.61	0.69	0	0.00	418	5.66	35	0.47	453	6.73	4.90	1.67	1.83
19	0.60	0.23	0.65		0	0.00	410	5.64	18	0.25	428	6.81	5.35	1.27	1.46
20	0.64	0.31	0.61		0	0.00	391	5.84	31	0.46	422	6.59	4.70	1.64	1.89
21	0.57	0.30	0.52		0	0.00	451	5.88	36	0.47	487	7.01	5.35	1.52	1.66
22	0.57	0.25	0.51		0	0.00	380	5.91	30	0.47	410	7.04	5.11	1.72	1.93
23	0.69	0.28	0.59		0	0.00	438	5.94	44	0.60	482	6.88	5.20	1.51	1.68
24	0.53	0.18	0.68		0	0.00	410	5.97	33	0.48	443	6.68	4.96	1.54	1.72
25	0.61	0.18	0.60		0	0.00	426	5.92	40	0.56	466	7.93	6.31	1.42	1.62
26	0.57	0.29	0.74		0	0.00	418	5.93	52	0.74	470	6.38	4.61	1.59	1.77
27	0.58	0.27	0.83		0	0.00	421	5.78	72	0.99	493	6.69	4.91	1.61	1.78
28	0.52	0.23	0.71		0	0.00	399	6.14	47	0.72	446	6.92	5.41	1.42	1.51
29	0.55	0.24	0.79		0	0.00	412	6.17	44	0.66	456	7.11	5.62	1.32	1.49
30	0.47	0.31	0.67		0	0.00	442	6.14	53	0.74	495	7.29	5.50	1.62	1.79
31															
Tot.							11,864		1,094		13,323				
Avg.	0.57	0.26	0.69	0.66	0.00	0.00	407.23	5.69	36.87	0.51	444.10	6.67	4.90	1.59	1.77
Max	0.69	0.38	0.88	0.69	0.00	0.00	456.00	6.17	75.00	1.03	505.00	7.93	6.31	1.94	2.13
Min.	0.43	0.15	0.51	0.63	0.00	0.00	353.00	4.84	10.00	0.16	365.00	5.54	3.67	1.27	1.46

WSSN 0600 City of Benton Harbor Month/Year September-19

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# ample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.9400	282.00	1.58	0.99	1.10	0.17	3	0.07	0.08	3	0.07	0.08	6	0	0
2	0.9575	288.00	1.58	0.96	1.20	0.17	3	0.06	0.06	3	0.06	0.07	6	0	0
3	1.0975	331.00	1.59	0.86	0.97	0.17	3	0.06	0.07	3	0.06	0.06	6	0	0
4	1.0875	325.00	1.57	2.00	2.60	0.28	3	0.07	0.08	3	0.07	0.08	6	0	0
5	1.0950	324.00	1.56	1.80	1.90	0.22	3	0.07	0.07	3	0.06	0.07	6	0	0
6	1.1000	324.00	1.55	2.50	4.40	0.26	3	0.06	0.07	3	0.06	0.06	6	0	0
7	1.2224	405.00	1.74	7.20	10.10	0.27	3	0.08	0.08	3	0.06	0.07	6	0	0
8	1.0500	309.00	1.55	1.60	2.50	0.28	3	0.07	0.08	3	0.06	0.06	6	0	0
9	1.0800	317.00	1.54	1.70	2.10	0.22	3	0.07	0.08	3	0.07	0.07	6	0	0
10	1.1400	335.00	1.55	1.60	1.60	0.16	3	0.08	0.09	3	0.08	0.08	6	0	0
11	1.0525	314.00	1.57	2.00	2.10	0.19	3	0.08	0.09	3	0.07	0.08	6	0	0
12	1.1275	392.00	1.83	1.60	1.90	0.30	3	0.08	0.09	3	0.07	0.07	6	0	0
13	1.1575	332.00	1.51	1.40	1.50	0.29	3	0.07	0.08	3	0.07	0.09	6	0	0
14	1.0500	309.00	1.55	2.20	3.10	0.22	3	0.06	0.07	3	0.07	0.07	6	0	0
15	1.1600	297.00	1.35	1.90	2.00	0.19	3	0.07	0.07	3	0.07	0.07	6	0	0
16	1.0875	319.00	1.54	2.50	4.10	0.19	3	0.07	0.07	3	0.07	0.07	6	0	0
17	1.0000	296.00	1.56	1.90	3.30	0.17	3	0.07	0.08	3	0.06	0.07	6	0	0
18	1.1025	253.00	1.21	1.70	2.60	0.59	3	0.09	0.11	3	0.08	0.10	6	0	0
19	1.0850	552.00	2.68	1.50	2.10	0.28	3	0.08	0.10	3	0.09	0.14	6	0	0
20	1.0000	337.00	1.77	1.20	1.60	0.18	3	0.07	0.08	3	0.06	0.06	6	0	0
21	1.1450	345.00	1.59	1.00	1.40	0.17	3	0.06	0.06	3	0.06	0.06	6	0	0
22	0.9600	287.00	1.57	1.30	1.50	0.29	3	0.07	0.07	3	0.06	0.06	6	0	0
23	1.1000	206.00	0.99	1.50	1.70	0.33	3	0.08	0.08	3	0.07	0.07	6	0	0
24	1.0250	668.00	3.43	1.60	2.20	0.20	3	0.07	0.07	3	0.06	0.07	6	0	0
25	1.0750	457.00	2.24	2.80	3.30	0.19	3	0.06	0.07	3	0.07	0.07	6	0	0
26	1.0525	316.00	2.24	5.00	7.00	0.28	3	0.06	0.07	3	0.07	0.07	6	0	0
27	1.0875	284.00	1.37	3.10	4.60	0.26	3	0.07	0.08	3	0.07	0.08	6	0	0
28	0.9700	301.00	1.63	2.60	2.80	0.26	3	0.07	0.07	3	0.07	0.08	6	0	0
29	0.9975	288.00	1.52	3.40	3.90	0.25	3	0.06	0.06	3	0.08	0.08	6	0	0
30	1.0750	308.00	1.51	2.10	2.80	0.23	3	0.06	0.06	3	0.08	0.09	6	0	0
31															
Total	32.0799	10101.00					90			90			180	0	0
Avg.	1.0693	336.70	1.68	2.12	2.80	0.24		0.07	0.08		0.07		Total	Total	Total
Max	1.2224	668.00	3.43	7.20	10.10	0.59		0.09	0.11		0.09	0.14	6	0	0
Min.	0.9400	206.00	0.99	0.86	0.97	0.16		0.06	0.06		0.06				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D A T E	pH Raw 29.	pH Tap 30.	Raw 31.	Tap 32.	Raw 33.	Tap 34.	Raw 35.	Tap 36.	Raw 37	Tap 38	Raw 39	Tap 40	Raw 41	Tap 42
1	8.3	8.3	146	146	114	109	32	37	41	44	11	9		
2	8.1	8.0	146	148	107	105	39	43	43	44	9	9		
3	8.0	8.1	146	148	106	105	40	43	45	47	8	7		
4	8.2	8.1	164	156	111	102	53	54	42	41	14	13		
5	8.2	8.1	164	154	111	104	53	50	42	41	14	13	21.0	27.0
6	8.0	7.9	156	150	107	104	49	46	38	37	15	14		
7	8.1	8.1	162	154	107	103	55	51	42	40	14	13		
8	8.1	8.0	158	152	106	105	52	47	41	40	14	13		
9	8.0	8.1	158	152	107	103	51	49	42	40	13	13		
10	8.2	7.9	146	144	107	105	39	39	42	41	10	10		
11	8.0	8.2	150	146	113	101	37	45	43	42	10	10	21.5	23.0
12	8.0	8.2	146	146	110	106	36	40	45	46	8	8		
13	8.3	8.1	154	148	112	105	42	43	43	43	11	10		
14	8.2	8.1	160	150	115	106	45	44	40	39	12	13		
15	8.1	8.0	162	152	112	104	50	48	41	39	15	13		
16	8.0	8.1	164	158	110	106	54	52	41	40	15	14		
17	8.1	8.1	158	152	109	106	49	46	40	39	14	13		
18	8.1	8.2	158	150	110	105	48	45	40	39	14	13		
19	8.1	8.1	142	138	111	109	31	29	42	42	9	8	20.5	23.0
20	8.1	8.1	144	140	109	103	35	37	43	44	9	7		
21	8.1	8.1	136	136	106	103	30	33	46	42	5	7		
22	8.2	8.1	138	136	109	103	29	33	43	45	7	6		
23	8.1	8.2	154	148	113	101	41	47	39	38	14	13		
24	8.1	8.1	154	146	110	103	44	43	38	36	15	14		
25	8.2	8.2	154	148	113	104	41	44	38	38	14	13		
26	8.1	8.2	162	154	110	101	52	53	40	41	15	13		
27	8.1	8.2	170	152	110	104	60	48	51	42	11	12	19.0	23.5
28	8.2	8.1	154	148	121	105	33	43	46	41	10	11	20.5	22.0
29	8.3	8.2	150	148	117	108	33	40	42	42	11	10		
30	8.1	8.0	144	148	112	109	32	39	39	39	11	12		
31											0	0		
Avg.	8.1	8.1	153.3	148.3	110.5	104.6	42.8	43.7	41.9	41.1	11.7	11.1	20.5	23.7
Max	8.3	8.3	170.0	158.0	121.0	109.0	60.0	54.0	51.0	47.0	15.0	14.0	21.5	27.0
Min.	8.0	7.9	136.0	136.0	106.0	101.0	29.0	29.0	38.0	36.0	5.0	6.0	19.0	22.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	60	0	13	19.0	1.0238	37	1.43	1.56
2			1	A	37	1	13	18.0	0.8865	44	1.96	1.29
3			1	A	24	3	12	17.0	1.0817	54	1.98	1.29
4	1.36	city hall	1	A	21	0	17	14.0	0.9943	55	2.20	1.70
4	1.02	wolfs	1	A	48	0	17	16.0	1.1656	49	1.66	1.46
4	1.33	bait shed	1	A	29	0	13	16.0	1.0912	55	1.99	1.94
4	1.27	sunny spot	1	A	45	0	12	15.5	1.1261	45	1.58	0.52
4	1.26	b&z	1	A	60	0	12	14.5	1.0585	54	2.01	1.09
			1	A	30	1	11	13.5	1.2730	56	1.74	0.00
			1	A	48	0	12	14.0	1.0787	54	2.00	1.51
			1	A	41	0	16	14.0	1.0156	49	1.92	1.32
			1	A	55	1	17	15.0	1.1444	54	1.87	0.00
			1	A	60	2	14	16.0	1.1473	48	1.65	1.29
			1	A	27	0	17	15.0	0.9596	51	2.09	1.30
			1	A	74	0	19	16.0	0.9952	47	1.85	1.95
			1	A	38	0	19	16.5	1.0306	35	1.35	1.37
			1	A	60	0	17	18.0	1.0057	48	1.87	1.56
16	1.34	city hall	1	A	23	0	17	17.5	1.0690	39	1.43	1.31
16	1.15	wolfs	1	A	48	0	14	18.0	0.9875	59	2.37	1.51
16	1.45	bait shed	1	A	37	0	14	17.0	1.0058	30	1.19	1.27
16	1.15	sunny spot	1	A	26	2	16	17.0	1.0800	36	1.32	1.29
16	0.63	b&z	1	A	30	1	20	18.0	0.9173	45	1.96	1.31
			1	A	21	0	20	16.5	1.0953	41	1.47	1.25
			1	A	16	0	19	18.0	1.0518	43	1.61	1.14
			1	A	25	0	20	18.5	0.9259	46	1.96	1.32
			1	A	59	0	19	19.5	1.1624	49	1.66	1.82
			1	A	33	0	19.3	19.5	1.1624	41	1.39	1.51
			1	A	42	0	9.0	12.0	1.0097	43	1.68	1.36
			1	A	19	0	8.7	8.5	1.0162	47	1.82	1.45
			1	A	57	5	8.5	9.5	1.0758	67	2.47	1.12
Totals									31.6369	1419.5		
AVG.	1.20		1	A	39	1	15	16	1.0546	47.3	1.79	1.28
Max	1.45				74	5	20	20	1.2730	67.2	2.47	1.95
Min	0.63				16	0	9	9	0.8865	30.2	1.19	0.00

DISTRIBUTION SYSTEM MONITORING WSSN 0600 September-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4	1.05		1.01	0.46	0.67		0.60			
5										
6										
7										
8										
9										
10										
11	0.43		1.24	0.69	1.13		0.63			
12										
13										
14										
15										
16										
17										
18	0.72		0.47	0.51	0.32		0.40			
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.69	1.24	0.32
Total number of check samples	0600			
Total number of positive check samples	0600			

MI 0600 Benton Harbor DRINKING WATER treatment EMERGENCY REPORT 09 25 2019_ CI2

The Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the Administrative Rules promulgated thereunder (Act 399), Rule 2304 (2) requires that a written report be filed by the supply within ninety days after an emergency.

Please Complete and Return to :

Mr. Ernie Sarkipato
Grand Rapids District / Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
sarkipatoe@michigan.gov

Water Supply:	Benton Harbor Water Plant
WSSN:	0600
County:	Berrien
Address:	601 Ridgeway
City:	St. Joseph
State/Zip:	MI 49085
Report Prepared Date:	9/25/2019
Report Prepared By:	Mike O'Malley

Briefly describe the following. Attach additional pages as necessary.

1.	Discovery of the emergency

The operator Doug, found a liquid Chlorine leak in the feed room. Shut the plant down and came to get Mike O'Malley for help. 9/18/2019 12:30 pm

2.	Cause of the emergency

Peristaltic pump had a pin hole in it. This pump feeds to the Pre-treatment point.
May have reduced the amount of Chlorine going into treatment.

3.	Area of the system effected by the emergency

Chlorine feed room. No impact seen to the treated water.

4.	Duration of the emergency

15 minutes. About ½ inch on the floor.

5.	Procedures by which the public was notified
	Public was not notified. Spill contained in plant. Treatment water was stopped, and the post Chlorine treatment was increased, just in case.

6.	Corrective actions taken during the emergency
	Mike replaced the hose. Then Mike and the gang cleaned up the spill.
7.	Steps that will be taken by the supply to prevent future emergencies
	Spare hoses are kept in the Liquid Chlorine Feed Room for quick and routine replacement.

Appendix 2 pg 1-2

MI 0600 Benton Harbor DRINKING WATER treatment EMERGENCY REPORT 09 25 2019_Alum

The Michigan Safe Drinking Water Act, 1976 PA 399, as amended, and the Administrative Rules promulgated thereunder (Act 399), Rule 2304 (2) requires that a written report be filed by the supply within ninety days after an emergency.

Please Complete and Return to :

Mr. Ernie Sarkipato
Grand Rapids District / Drinking Water and Municipal Assistance
Michigan Department of Environmental Quality
sarkipatoe@michigan.gov

Water Supply:	Benton Harbor Water Plant
WSSN:	0600
County:	Berrien
Address:	601 Ridgeway
City:	St. Joseph
State/Zip:	MI 49085
Report Prepared Date:	9/25/2019
Report Prepared By:	Mike O'Malley

Briefly describe the following. Attach additional pages as necessary.

1.	Discovery of the emergency

The operator Doug, reported to me that the Alum Pump to the new Rapid Mixer was not working properly. He shut the plant down. 9/19/2019 2:00 pm.
This was a non-emergency. None of the water of concern ever went any further into the treatment sequence.

2.	Cause of the emergency

Alum pump failed

3.	Area of the system effected by the emergency

Plate Settler in the treatment train.

4.	Duration of the emergency
	Very short period of time maybe 2-hours, since last operator tour of plant. Treatment issues are caught quickly. 1st response is to shut plant down. This way it is contained within the plant and does NOT go to the Public Drinking Water Supply.

5.	Procedures by which the public was notified
	Public was not notified. I left a note for the operators advising them what action to take when they arrive for their shift in the morning.

6.	Corrective actions taken during the emergency
	Mike dumped a great deal of water in the treatment chain into the lagoon. I showed Doug how it is done and then let him go home. Denny and Doug at 7:00 am made up all of the water lost during dumping and filled it in with the right treatment and continued. No Turbidity issue was involved.
7.	Steps that will be taken by the supply to prevent future emergencies
	The alum pump is new. I will get it repaired or replaced by the supplier. The other alum pump works fine, operation continues with that pump.

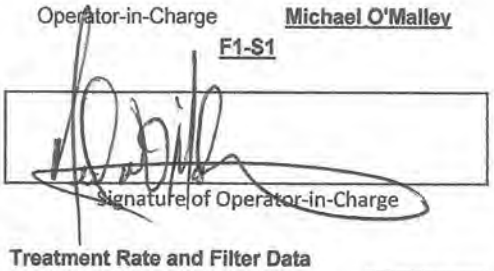
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **May-19**

F1-S1 **F1-S2**



Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.115	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	182.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.00	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.98	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.86%	Percent of Treated Water

Chemical Data

Chlorine on hand:	31815	lb.	Est. supply:	167	days
Primary Coagulant (Alum (Al3+)) on hand:	42495	lb.	Est. supply:	102	days
Cost of All Chemicals per Million Gallons:	$66.68	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Distribution	Total	28.25652	Avg	0.9396705	Max	1.181429	Min	0.797596

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
Calculated Distribution OPP 70/30 Carus 33% feed and residuals on Bacti/OPP Page

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **May-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.57	0.42	0.73	0.73	0	0.00	228	3.22	15	0.21	243	4.15	2.15	1.80	2.00
2	0.57	0.36	0.75		0	0.00	216	3.29	40	0.61	256	4.08	1.98	1.89	2.10
3	0.56	0.41	0.73		0	0.00	214	3.47	20	0.32	234	4.09	2.07	1.79	2.02
4	0.61	0.44	0.61		0	0.00	219	3.56	17	0.28	236	4.11	2.24	1.63	1.87
5	0.56	0.41	0.69		0	0.00	208	3.57	18	0.31	226	4.19	2.24	1.69	1.95
6	0.58	0.37	0.67		0	0.00	246	3.54	18	0.26	264	3.82	2.01	1.61	1.81
7	0.55	0.40	0.68		0	0.00	234	3.48	20	0.30	254	3.90	1.82	1.87	2.08
8	0.61	0.41	0.75	0.61	0	0.00	211	3.41	29	0.47	240	3.89	2.01	1.68	1.88
9	0.57	0.23	0.54		0	0.00	208	3.34	19	0.30	227	3.34	1.31	1.82	2.03
10	0.55	0.41	0.73		0	0.00	223	3.29	39	0.58	262	3.91	1.27	2.41	2.64
11	0.71	0.43	0.71		0	0.00	208	3.13	16	0.24	224	3.45	1.66	1.58	1.79
12	0.51	0.40	0.62		0	0.00	216	3.28	16	0.24	232	3.42	1.75	1.48	1.67
13	0.44	0.27	0.65		0	0.00	213	3.33	22	0.34	235	3.73	1.77	1.74	1.96
14	0.55	0.39	0.67		0	0.00	244	3.28	94	1.26	338	4.27	1.80	2.22	2.47
15	0.57	0.36	0.74		0	0.00	240	3.28	29	0.40	269	4.22	2.17	1.88	2.05
16	0.53	0.39	0.58	0.57	0	0.00	262	3.51	48	0.64	310	4.67	1.82	2.61	2.85
17	0.57	0.37	0.72		0	0.00	270	3.67	22	0.30	292	4.42	2.50	1.73	1.92
18	0.57	0.32	0.81		0	0.00	281	3.77	23	0.31	304	5.69	3.92	1.58	1.77
19	0.70	0.35	0.86		0	0.00	239	3.76	29	0.46	268	4.30	2.31	1.81	1.99
20	0.58	0.38	0.84		0	0.00	265	3.77	49	0.70	314	5.00	2.28	2.50	2.72
21	0.49	0.42	0.84		0	0.00	246	3.80	24	0.37	270	4.35	2.08	2.06	2.27
22	0.47	0.36	0.75		0	0.00	257	3.76	31	0.45	288	4.79	2.84	1.75	1.95
23	0.52	0.25	0.78	0.72	0	0.00	240	3.52	25	0.37	265	4.63	2.73	1.70	1.90
24	0.59	0.15	0.62		0	0.00	249	3.53	46	0.65	295	4.86	2.51	2.16	2.35
25	0.70	0.27	0.82		0	0.00	228	3.43	33	0.50	261	4.38	2.10	2.06	2.28
26	0.59	0.27	0.79		0	0.00	199	3.27	17	0.28	216	3.82	2.14	1.49	1.68
27	0.75	0.30	0.84		0	0.00	221	3.36	22	0.33	243	3.76	2.17	1.41	1.59
28	0.61	0.29	0.77		0	0.00	241	3.47	30	0.43	271	4.08	2.38	1.61	1.70
29	0.55	0.28	0.73	0.79	0	0.00	240	3.51	24	0.35	264	4.04	2.28	1.60	1.76
30	0.66	0.35	0.76	0.00	0	0.00	242	3.61	27	0.40	269	4.21	2.26	1.76	1.95
31	0.52	0.04	0.81		0	0.00	237	3.62	29	0.44	266	4.10	2.07	1.85	2.03
Tot.							7,017		876		8,136				
Avg.	0.58	0.35	0.73	0.57	0.00	0.00	233.60	3.47	28.73	0.42	262.33	4.19	2.15	1.83	2.03
Max	0.75	0.44	0.86	0.79	0.00	0.00	281.00	3.80	94.00	1.26	338.00	5.69	3.92	2.61	2.85
Min.	0.44	0.15	0.54	0.00	0.00	0.00	199.00	3.13	15.00	0.21	216.00	3.34	1.27	1.41	1.59

WSSN 0600 City of Benton Harbor Month/Year May-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0575	327.00	1.63	1.90	3.10	0.32	3	0.09	0.12	3	0.08	0.10	6	0	0
2	0.9800	307.00	1.65	2.90	3.30	0.34	3	0.07	0.07	3	0.07	0.08	6	0	0
3	0.9200	280.00	1.60	1.80	2.10	0.30	3	0.08	0.09	3	0.07	0.07	6	0	0
4	0.9175	281.00	1.61	1.90	3.50	0.22	3	0.07	0.07	3	0.07	0.08	6	0	0
5	0.8700	267.00	1.61	1.80	3.60	0.22	3	0.07	0.09	3	0.07	0.07	6	0	0
6	1.0375	328.00	1.35	1.30	1.50	0.30	3	0.08	0.10	3	0.08	0.09	6	0	0
7	1.0050	315.00	1.65	2.90	5.60	0.33	3	0.08	0.09	3	0.09	0.11	6	0	0
8	0.9250	293.00	1.67	1.30	1.50	0.30	3	0.09	0.11	3	0.06	0.07	6	0	0
9	0.9300	288.00	1.63	1.60	1.90	0.30	3	0.08	0.11	3	0.09	0.10	6	0	0
10	1.0125	318.00	1.65	2.20	3.90	0.31	3	0.07	0.09	3	0.09	0.11	6	0	0
11	0.9925	290.00	1.54	2.00	3.60	0.39	3	0.09	0.11	3	0.08	0.09	6	0	0
12	0.9825	309.00	1.65	1.80	3.00	0.26	3	0.07	0.09	3	0.07	0.08	6	0	0
13	0.9550	298.00	1.64	1.20	2.10	0.22	3	0.07	0.07	3	0.08	0.08	6	0	0
14	1.1100	343.00	1.63	1.10	1.40	0.24	3	0.07	0.08	3	0.07	0.08	6	0	0
15	1.0916	341.00	1.64	1.50	2.60	0.30	3	0.07	0.08	3	0.08	0.10	6	0	0
16	1.1150	409.00	1.93	2.10	2.80	0.36	3	0.08	0.08	3	0.08	0.08	6	0	0
17	1.0975	343.00	1.64	1.90	2.90	0.47	3	0.09	0.10	3	0.08	0.09	6	0	0
18	1.1118	342.00	1.62	2.20	2.40	0.35	3	0.08	0.08	3	0.08	0.08	6	0	0
19	0.9500	292.00	1.62	2.50	3.10	0.35	3	0.07	0.08	3	0.07	0.08	6	0	0
20	1.0500	330.00	1.65	2.50	3.00	0.33	3	0.07	0.09	3	0.07	0.07	6	0	0
21	0.9675	301.00	1.64	1.10	1.80	0.25	3	0.07	0.07	3	0.07	0.07	6	0	0
22	1.0200	310.00	1.60	2.30	3.50	0.27	3	0.07	0.07	3	0.08	0.09	6	0	0
23	1.0175	308.00	1.59	2.90	5.00	0.29	3	0.08	0.09	3	0.06	0.07	6	0	0
24	1.0525	320.00	1.60	2.50	2.80	0.32	3	0.08	0.09	3	0.07	0.07	6	0	0
25	0.9925	296.00	1.57	3.10	5.20	0.28	3	0.07	0.08	3	0.07	0.08	6	0	0
26	0.9075	268.00	1.57	1.80	2.50	0.24	3	0.07	0.08	3	0.06	0.07	6	0	0
27	0.9825	298.00	1.60	1.30	1.70	0.16	3	0.04	0.04	3	0.02	0.03	6	0	0
28	1.0375	312.00	1.58	1.70	2.00	0.17	3	0.03	0.05	3	0.02	0.02	6	0	0
29	1.0200	308.00	1.59	1.60	1.90	0.15	3	0.02	0.02	3	0.03	0.06	6	0	0
30	1.0000	312.00	1.64	1.10	1.20	0.15	3	0.02	0.02	3	0.02	0.03	6	0	0
31	0.9775	310.00	1.67	1.10	1.50	0.14	3	0.02	0.03	3	0.02	0.03	6	0	0
Total	31.0859	9644.00					93			93			186	0	0
Avg.	1.0028	311.10	1.62	1.90	2.77	0.28		0.07	0.08		0.07		Total	Total	Total
Max	1.1150	409.00	1.93	3.10	5.60	0.47		0.09	0.12		0.09	0.11	6	0	0
Min.	0.8700	267.00	1.35	1.10	1.20	0.14		0.02	0.02		0.02				

WSSN 0600 | MONTH/YEAR | May-19 |

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	7.9	8.0	166	156	111	105	55	51	44	42	14	13		
2	8.0	8.0	166	156	116	104	50	52	43	41	14	13		
3	8.1	8.1	156	150	121	109	35	41	43	41	12	12		
4	8.1	8.1	164	158	104	112	60	46	45	42	13	13		
5	8.1	8.1	156	148	111	109	45	39	45	46	11	8		
6	8.2	8.0	170	164	113	101	57	63	43	41	15	15		
7	8.0	8.0	174	168	118	104	56	64	42	40	17	17		
8	8.0	7.9	164	156	110	105	54	51	42	40	15	14		
9	7.9	8.0	158	152	115	105	43	47	42	41	13	12		
10	8.0	8.0	164	152	118	108	46	44	40	39	16	13	20.5	23.5
11	7.9	8.0	166	154	118	108	48	46	42	40	16	13		
12	7.9	8.0	164	156	115	110	49	46	42	40	15	14		
13	8.1	8.0	154	152	112	109	42	43	50	47	7	8	19.5	21.5
14	8.1	8.1	158	152	112	109	46	43	42	41	13	12		
15	8.0	8.0	166	142	122	109	44	33	51	43	9	8		
16	8.0	8.0	170	158	121	111	49	47	42	40	16	14		
17	8.0	8.1	182	162	134	113	48	49	45	40	17	15		
18	8.0	8.0	160	156	119	120	41	36	46	46	11	10		
19	8.1	7.9	162	160	124	122	38	38	46	44	11	12		
20	8.2	8.1	178	170	125	116	53	54	43	42	17	16		
21	8.0	7.8	162	154	122	119	40	35	47	46	11	9	20.5	22.5
22	8.0	8.0	170	162	115	114	55	48	43	41	15	15		
23	7.9	8.0	168	164	114	110	54	54	43	44	15	13		
24	8.2	8.0	174	166	117	111	57	55	43	42	16	15		
25	8.0	8.0	172	162	117	111	55	51	43	41	16	15	20.5	23.5
26	8.1	8.1	166	158	115	110	51	48	44	42	14	13		
27	8.2	8.3	158	156	122	118	36	38	45	43	11	12	20.0	22.5
28	8.2	8.2	156	158	123	116	33	42	45	45	11	11		
29	8.0	8.1	152	148	115	113	37	35	46	44	9	9		
30	8.1	8.1	158	152	116	114	42	38	42	46	13	9		
31	8.2	8.1	152	148	113	109	39	39	49	47	9	7		
Avg.	8.0	8.0	164.5	156.7	117.2	110.8	47.3	45.9	44.0	42.3	13.4	12.4	20.2	22.7
Max	8.2	8.3	182.0	170.0	134.0	122.0	60.0	64.0	51.0	47.0	17.0	17.0	20.5	23.5
Min.	7.9	7.8	152.0	142.0	104.0	101.0	33.0	33.0	40.0	39.0	7.0	8.0	19.5	21.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.				
A	Samples	P/A	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T					Raw	Tap			To	Lbs PO4	Treatment	Residual
E									Distribution		mg/L	mg/L
1			1	A	44	0	8	8.0	0.8733	39	1.77	1.80
2			1	A	19	0	8	8.0	0.9377	39	1.65	1.80
3			1	A	34	0	8	9.0	0.8540	39	1.81	1.10
4			1	A	42	1	8	9.5	1.2263	30	0.97	1.20
5			1	A	25	1	8	9.0	0.8045	38	1.86	
6			1	A	19	0	8	8.5	1.0308	35	1.33	1.14
7			1	A	63	1	8	8.0	0.9711	37	1.51	1.31
8			1	A	38	0	7	8.5	0.9200	41	1.76	1.08
9			1	A	33	1	8	8.0	1.0134	34	1.31	1.16
10			1	A	0	0	9	8.0	1.0009	44	1.76	0.82
11			1	A	46	1	8	8.5	0.9705	29	1.17	1.22
12			1	A	38	0	8	8.5	1.0114	41	1.59	1.28
13			1	A	71	0	8	9.0	0.7560	36	1.89	0.80
14			1	A	46	1	9	10.0	1.1814	37	1.25	1.00
15			1	A	58	0	9	9.0	0.8256	37	1.79	0.80
16			1	A	53	0	9	9.0	0.9910	37	1.48	1.20
17			1	A	55	0	10	8.5	0.9851	37	1.48	1.25
18			1	A	64	8	8	10.0	0.7976	35	1.74	1.18
19			1	A	45	8	12	11.0	0.9296	38	1.62	1.14
20			1	A	23	0	13	10.0	0.9375	18	0.78	0.28
21			1	A	41	1	11	12.0	0.9257	4	0.16	0.11
22			1	A	30	0	11	11.0	0.8983	9	0.41	1.43
23			1	A	59	0	11	10.5	0.8535	20	0.93	1.03
24			1	A	58	0	13	11.5	0.9068	13	0.57	1.31
25			1	A	33	0	12	11.5	0.8899	33	1.45	1.14
26			1	A	112	18	13	12.5	0.8437	32	1.48	1.12
27			1	A	78	0	13.5	14.0	0.9646	33	1.35	1.15
28			1	A	63	0	9.0	12.0	0.9910	35	1.41	1.14
29			1	A	51	0	8.7	8.5	0.9759	34	1.39	
30			1	A	24	0	8.5	9.5	0.9535	41	1.69	1.50
31			1	A	46	0	13.0	14.0	0.9690	44	1.81	1.32
Totals									29.1900	1019.1		
AVG.			1	A	46	1	9	10	0.9416	32.9	1.38	1.11
Max					112	18	14	14	1.2263	44.4	1.89	1.80
Min					0	0	7	8	0.7560	3.7	0.16	0.11

MI0600 DMR May 2019 6/7/19

MI 0600 Distribution Monitoring Report MI 0600 DMR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 May-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1	1.01		1.06	0.87	1.10		0.55			
2										
3										
4										
5										
6										
7										
8	0.61		1.31	1.20	1.27		0.95			
9										
10										
11										
12										
13										
14										
15										
16	0.86		1.01	1.12	1.04		1.08			
17										
18										
19										
20										
21										
22										
23	0.96		1.02	1.18	0.77		0.63			
24										
25										
26										
27										
28										
29	0.81		0.91	1.01	0.49		0.69			
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	25		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.94	1.31	0.49
Total number of check samples	0600			
Total number of positive check samples	0600			

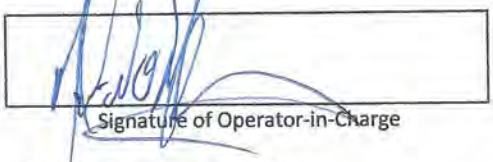
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **March-19**

F1-S1 **F1-S2**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2664	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	199.75	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.07	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.93	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.76%	Percent of Treated Water

Chemical Data

Chlorine on hand:	31815	lb.	Est. supply:	168	days
Primary Coagulant (Alum (Al3+)) on hand:	42495	lb.	Est. supply:	92	days
Cost of All Chemicals per Million Gallons:	$66.79	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	92	88
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	30.70932	Avg	1.0343368	Max	1.24356	Min	0.82712

Fluoride resumed 3/5/2019 after the Saturator to Day Tank Pump was fixed 3/4/2019
Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
I do not have this report ready for details of OPP treatment. I should soon.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **March-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.00	0.00	0.00		0	0.00	340	4.12	21	0.25	361	3.98	2.12	1.58	1.86
2	0.00	0.00	0.00		0	0.00	304	3.94	48	0.62	352	4.37	1.92	2.20	2.45
3	0.00	0.00	0.00		0	0.00	229	3.26	31	0.44	260	4.19	2.31	1.68	1.88
4	0.00	0.00	0.00		0	0.00	213	3.58	21	0.35	234	3.34	1.41	1.73	1.93
5	0.51	0.31	0.27		0	0.00	265	3.61	41	0.56	306	3.67	1.57	1.91	2.10
6	0.66	0.39	0.53		0	0.00	248	3.43	27	0.37	275	3.57	1.73	1.69	1.84
7	0.64	0.49	0.58		0	0.00	242	2.97	37	0.45	279	3.73	1.69	1.84	2.04
8	0.57	0.59	0.75		0	0.00	248	3.31	59	0.79	307	4.36	1.64	2.50	2.72
9	0.50	0.46	0.69		0	0.00	265	3.43	24	0.31	289	3.94	2.24	1.51	1.70
10	0.63	0.43	0.67		0	0.00	237	3.48	32	0.47	269	3.91	2.11	1.60	1.80
11	0.58	0.42	0.63		0	0.00	227	3.18	27	0.38	254	3.83	2.10	1.53	1.73
12	0.65	0.43	0.64		0	0.00	231	3.07	36	0.48	267	3.24	1.30	1.74	1.94
13	0.56	0.44	0.59	0.54	0	0.00	229	2.95	35	0.45	264	3.56	1.69	1.67	1.87
14	0.39				0	0.00	254	2.99	21	0.25	275	3.70	1.82	1.66	1.88
15	0.40	0.25	0.40		0	0.00	241	3.23	14	0.19	255	3.37	1.75	1.33	1.62
16	0.48	0.26	0.55		0	0.00	251	3.22	27	0.35	278	4.00	2.31	1.51	1.69
17	0.36	0.31	0.55		0	0.00	212	3.18	25	0.38	237	3.77	2.25	1.24	1.52
18	0.53	0.33	0.57		0	0.00	255	3.51	35	0.48	290	4.18	2.44	1.48	1.74
19	0.39	0.24	0.64		0	0.00	257	3.47	32	0.43	289	4.25	2.24	1.81	2.01
20	0.42	0.25	0.55	0.45	0	0.00	251	3.32	26	0.34	277	3.77	1.88	1.67	1.89
21	0.58	0.20	0.60		0	0.00	236	3.36	23	0.33	259	4.22	2.33	1.68	1.89
22	0.65	0.30	0.62		0	0.00	216	3.07	70	1.00	286	4.29	1.92	2.14	2.37
23	0.60	0.39	0.74		0	0.00	185	2.86	30	0.46	215	3.58	1.49	1.88	2.09
24	0.66	0.42	0.75		0	0.00	170	2.74	33	0.53	203	3.66	1.56	1.88	2.10
25	0.46	0.31	0.67		0	0.00	196	2.84	20	0.29	216	3.20	0.42	2.59	2.78
26	0.56	0.27	0.66		0	0.00	217	2.85	21	0.28	238	3.65	1.98	1.53	1.67
27	0.44	0.30	0.60		0	0.00	216	3.10	27	0.39	243	3.96	2.02	1.72	1.94
28	0.39	0.29	0.63		0	0.00	235	3.19	25	0.34	260	4.06	2.18	1.72	1.88
29	0.40	0.25	0.60		0	0.00	202	2.99	22	0.33	224	3.61	1.72	1.63	1.89
30	0.59	0.34	0.59		0	0.00	183	3.06	29	0.49	212	3.79	2.02	1.51	1.77
31	0.60	0.28	0.59		0	0.00	190	2.93	38	0.59	228	3.72	1.52	1.97	2.20
Tot.							6,905		936		8,202				
Avg.	0.45	0.30	0.52	0.50	0.00	0.00	235.17	3.24	30.63	0.43	265.80	3.83	1.87	1.74	1.95
Max	0.66	0.59	0.75	0.54	0.00	0.00	340.00	4.12	70.00	1.00	361.00	4.37	2.44	2.59	2.78
Min.	0.00	0.00	0.00	0.45	0.00	0.00	170.00	2.74	14.00	0.19	203.00	3.20	0.42	1.24	1.52

Pump tripped & feed resumed

WSSN 0600 City of Benton Harbor Month/Year March-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.2311	355.00	1.52	6.20	6.40	2.20	3	0.10	0.13	3	0.11	0.13	6	0	0
2	1.1512	471.00	2.15	6.80	10.30	1.30	3	0.10	0.11	2	0.09	0.10	5	0	0
3	1.0500	331.00	1.66	6.60	8.60	0.64	3	0.10	0.12	0	0.10	0.13	3	0	0
4	0.8875	340.00	2.02	9.20	13.70	0.78	3	0.10	0.12	3	0.09	0.11	6	0	0
5	1.0950	341.00	1.64	3.60	4.00	0.71	3	0.10	0.11	3	0.09	0.09	6	0	0
6	1.0800	384.00	1.66	4.30	7.40	0.56	3	0.11	0.12	3	0.10	0.12	6	0	0
7	1.2166	486.00	2.10	3.20	3.40	0.55	3	0.11	0.13	3	0.10	0.14	6	0	0
8	1.1200	325.00	1.53	2.70	3.10	0.68	3	0.09	0.10	3	0.09	0.10	6	0	0
9	1.1541	370.00	1.69	2.70	4.20	0.93	3	0.14	0.17	3	0.16	0.18	6	0	0
10	1.0180	338.00	1.75	2.60	2.90	0.53	3	0.11	0.12	3	0.11	0.15	6	0	0
11	1.0650	340.00	1.68	1.90	3.00	0.47	3	0.08	0.09	3	0.13	0.15	6	0	0
12	1.1250	369.00	1.73	2.60	4.80	0.50	3	0.07	0.07	3	0.11	0.15	6	0	0
13	1.1600	360.00	1.63	1.40	2.50	0.38	3	0.08	0.10	3	0.13	0.14	6	0	0
14	1.2664	403.00	1.67	2.80	3.90	1.10	3	0.09	0.13	3	0.19	0.23	6	0	0
15	1.1130	315.00	1.49	4.50	5.50	1.30	3	0.08	0.11	3	0.22	0.23	6	0	0
16	1.1619	362.00	1.64	4.20	4.70	0.94	3	0.09	0.09	3	0.08	0.08	6	0	0
17	0.9950	319.00	1.69	1.70	2.10	0.46	3	0.06	0.07	3	0.07	0.08	6	0	0
18	1.0850	345.00	1.67	2.00	2.70	0.48	3	0.06	0.07	3	0.07	0.08	6	0	0
19	1.1050	353.00	1.68	2.90	3.60	0.64	3	0.06	0.06	3	0.08	0.08	6	0	0
20	1.1300	359.00	1.67	3.40	5.50	0.52	3	0.07	0.07	3	0.07	0.08	6	0	0
21	1.0475	329.00	1.65	2.40	4.00	0.51	3	0.07	0.07	3	0.07	0.07	6	0	0
22	1.0500	321.00	1.61	1.50	1.80	0.44	3	0.06	0.07	3	0.07	0.07	6	0	0
23	0.9650	291.00	1.59	1.70	2.10	0.41	3	0.07	0.08	3	0.06	0.07	6	0	0
24	0.9263	285.00	1.62	3.10	4.20	0.47	3	0.07	0.08	3	0.08	0.09	6	0	0
25	1.0300	325.00	1.66	2.80	3.60	0.44	3	0.08	0.09	3	0.08	0.10	6	0	0
26	1.1375	345.00	1.66	1.80	1.80	0.29	3	0.06	0.07	3	0.06	0.07	6	0	0
27	1.0400	325.00	1.64	2.70	2.90	0.54	3	0.08	0.08	3	0.08	0.09	6	0	0
28	1.1000	343.00	1.64	3.10	3.80	0.56	3	0.07	0.08	3	0.07	0.08	6	0	0
29	1.0100	319.00	1.66	1.80	1.80	0.40	3	0.10	0.10	2	0.10	0.10	4	0	0
30	0.8925	283.00	1.67	1.80	3.20	0.37	3	0.08	0.09	3	0.09	0.12	6	0	0
31	0.9675	300.00	1.63	1.60	2.20	0.32	3	0.08	0.08	3	0.07	0.08	6	0	0
Total	33.3761	10732.00					93			88			180	0	0
Avg.	1.0766	346.19	1.69	3.21	4.31	0.66		0.08	0.10		0.10		Total	Total	Total
Max	1.2664	486.00	2.15	9.20	13.70	2.20		0.14	0.17		0.22	0.23	6	0	0
Min.	0.8875	283.00	1.49	1.40	1.80	0.29		0.06	0.06		0.06				

WSSN 0600 | MONTH/YEAR: March-19 |

CITY OF BENTON HARBOR CHEMICAL ANALYSES

DAY	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	7.9	7.9	182	142	151	107	31	35	55	39	11	11		
2	7.9	8.0	184	172	136	123	48	49	46	44	17	15		
3	8.1	8.0	176	190	123	126	53	64	46	49	15	17		
4	7.9	7.9	168	184	112	119	56	65	42	48	15	16	46.5	27.5
5	8.0	7.9	188	168	130	114	58	54	49	43	16	15		
6	7.9	7.9	188	178	135	124	53	54	50	47	16	15		
7	7.9	7.9	184	180	116	125	68	55	49	47	15	15		
8	7.9	7.8	206	174	127	116	79	58	59	49	15	13		
9	8.0	8.0	194	180	139	124	55	56	50	46	17	16		
10	7.9	7.9	208	210	128	129	80	81	58	55	16	18		
11	7.9	7.9	188	184	122	125	66	59	50	48	16	16		
12	7.9	7.9	188	190	124	125	64	65	51	52	15	15		
13	7.8	7.8	176	186	115	119	61	67	44	47	16	17		
14	7.9	7.8	174	170	130	119	44	51	57	50	8	11	29.0	25.5
15	7.9	7.8	164	168	119	124	45	44	51	53	9	9		
16	7.9	7.9	174	176	121	122	53	54	54	52	10	11		
17	7.8	7.9	166	172	130	118	36	54	55	51	7	11	19.0	21.5
18	8.1	7.7	182	178	124	125	58	53	47	49	15	14		
19	8.0	0.0	190	182	122	119	68	63	63	58	8	9		
20	8.0	8.0	194	190	132	126	62	64	49	48	17	17		
21	7.9	7.8	192	178	133	123	59	55	51	47	16	15		
22	7.9	7.9	186	178	129	127	57	51	49	46	16	15		
23	8.0	8.0	172	186	117	125	55	61	45	49	15	16	21.0	24.0
24	8.0	8.0	188	174	125	118	63	56	51	46	15	14		
25	8.1	7.8	146	156	112	119	34	37	46	49	7	8		
26	8.0	7.9	158	166	106	116	52	50	46	48	10	11	18.5	22.0
27	8.0	8.0	206	158	145	112	61	46	62	59	13	4		
28	8.0	8.0	174	162	133	123	41	39	47	46	14	11		
29	7.9	7.9	166	172	117	120	49	52	47	50	12	12		
30	8.0	8.0	172	182	119	128	53	54	44	48	15	15		
31	8.0	8.0	160	180	116	121	44	59	40	47	15	15		
Avg.	7.9	7.6	181.1	176.2	125.7	121.3	55.4	54.9	50.4	48.8	13.6	13.4	26.8	24.1
Max	8.1	8.0	208.0	210.0	151.0	129.0	80.0	81.0	63.0	59.0	17.0	18.0	46.5	27.5
Min.	7.8	0.0	146.0	142.0	106.0	107.0	31.0	35.0	42.0	39.0	7.0	4.0	18.5	21.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

D A T E	RAW No. of Samples	RAW Colilert P/A	PLANT TAP No. of Samples	PLANT TAP Colilert P/A	Standard Plate Count Raw	Standard Plate Count Tap	Raw TEMP. 'C	Tap TEMP. 'C	COLOR ___True ___Appar. Raw	COLOR Tap	ODOR ___Cold ___60'C Raw	ODOR Tap
1			1	A	131	0	2	4.0				
2			1	A	43	1	2	3.0				
3			1	A	28	1	2	3.5				
4			1	A	44	1	2	2.5				
5			1	A	89	0	2	2.5				
6			1	A	69	0	2	2.5				
7			1	A	90	0	2	2.0				
8			1	A	56	0	2	2.0				
9			1	A	75	0	2	2.5				
10			1	A	72	1	2	3.0				
11			1	A	33	0	2	2.5				
12			1	A	17	1	2	2.5				
13			1	A	29	0	2	3.5				
14			1	A	20	0	4	5.0				
15			1	A	57	0	4	5.0				
16			1	A	59	0	4	7.0				
17			1	A	43	0	4	6.0				
18			1	A	77	1	4	5.0				
19			1	A	72	1	5	6.0				
20			1	A	38	0	4	4.5				
21			1	A	82	0	4	5.0				
22			1	A	37	1	4	5.0				
23			1	A	36	1	3	0.0				
24			1	A	16	0	4	4.0				
25			1	A	46	0	3	6.0				
26			1	A	29	1	3	5.5				
27			1	A	39	0	5.0	6.0				
28			1	A	56	6	9.0	12.0				
29			1	A	54	29	8.7	8.5				
30			1	A	61	2	8.5	9.5				
31			1	A	46	1	3.2	5.5				
AVG.			1	A	53	2	3	5				
Max					131	29	9	12				
Min					16	0	2	0				

DISTRIBUTION SYSTEM MONITORING WSSN 0600 March-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13	1.18		1.07	1.19	0.94		0.93			
14										
15										
16										
17										
18										
19										
20	0.93		1.15	0.34	0.96		1.00			
21										
22										
23										
24										
25										
26										
27	1.19		1.21	1.15	1.15		1.59			
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.07	1.59	0.34
Total number of check samples	0600			
Total number of positive check samples	0600			

BNI 0600 Benton Harbor MOR October 2019 11/7/19

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **October-19**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1552	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	193.75	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.99	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.97	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.73%	Percent of Treated Water

Chemical Data

Chlorine on hand:	47470	lb.	Est. supply:	234 days
Primary Coagulant (Alum (Al3+)) on hand:	92933	lb.	Est. supply:	155 days
Cost of All Chemicals per Million Gallons:	$79.34	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	27.692576	Avg	0.923167	Max	1.0796	Min	0.7748

Remarks. We have been feeding Orthopolyphosphate (OPP) 70/30 Carus 8600 33% since March 25, 2019
Averaging about 2,200 lbs per month: 221 Days so far. Started 2nd Round of Lead and Copper Sampling.

WSSN 0600 City of Benton Harbor

Month/Year October-19

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# ample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	1.0075	292.00	1.52	2.90	3.30	0.26	3	0.06	0.06	3	0.07	0.07	6	0	0
2	0.9550	337.00	1.86	2.70	4.10	0.33	3	0.08	0.08	3	0.07	0.08	6	0	0
3	1.0425	427.00	2.15	3.80	5.70	0.25	3	0.08	0.08	3	0.08	0.08	6	0	0
4	0.9475	311.00	1.73	3.30	3.80	0.29	3	0.08	0.08	3	0.06	0.07	6	0	0
5	1.0150	313.00	1.62	2.50	2.60	0.34	3	0.08	0.09	3	0.06	0.07	6	0	0
6	1.0200	302.00	1.61	4.30	5.20	0.54	3	0.09	0.10	3	0.07	0.08	6	0	0
7	1.0825	363.00	1.76	4.60	5.80	0.54	3	0.09	0.10	3	0.07	0.08	6	0	0
8	1.0400	352.00	1.78	4.10	5.50	0.43	3	0.08	0.09	3	0.07	0.08	6	0	0
9	1.0475	321.00	1.61	3.80	4.70	0.44	3	0.08	0.09	3	0.07	0.08	6	0	0
10	1.0275	278.00	1.42	3.50	4.50	0.34	3	0.07	0.08	3	0.07	0.07	6	0	0
11	1.0575	329.00	1.64	2.80	4.40	0.30	3	0.07	0.08	3	0.07	0.08	6	0	0
12	1.0450	324.00	1.63	8.60	9.90	0.37	3	0.07	0.07	3	0.07	0.07	6	0	0
13	0.9725	296.00	1.60	4.70	6.70	0.42	3	0.06	0.07	3	0.07	0.07	6	0	0
14	1.1552	320.00	1.46	4.60	6.50	0.30	3	0.07	0.08	3	0.09	0.11	6	0	0
15	0.9750	312.00	1.68	4.50	8.80	0.24	3	0.07	0.08	3	0.08	0.08	6	0	0
16	1.0400	315.00	1.59	4.50	4.70	0.32	3	0.08	0.09	3	0.07	0.08	6	0	0
17	0.8825	280.00	1.67	11.90	16.10	0.51	3	0.09	0.10	3	0.08	0.09	6	0	0
18	1.0025	340.00	1.78	8.90	12.70	0.56	3	0.07	0.07	3	0.08	0.09	6	0	0
19	0.8800	190.00	1.14	6.50	7.70	0.61	3	0.07	0.08	3	0.08	0.08	6	0	0
20	0.9825	328.00	1.76	6.90	11.10	0.40	3	0.08	0.09	3	0.08	0.08	6	0	0
21	0.9525	295.00	1.63	5.90	8.80	0.34	3	0.07	0.07	3	0.08	0.08	6	0	0
22	0.9550	247.00	1.36	9.70	12.20	1.40	3	0.09	0.10	3	0.10	0.12	6	0	0
23	1.0575	352.00	1.75	7.20	9.90	0.35	3	0.08	0.10	3	0.08	0.08	6	0	0
24	0.9300	295.00	1.67	11.90	16.70	0.27	3	0.08	0.08	3	0.08	0.08	6	0	0
25	0.9250	284.00	1.62	6.00	10.10	0.38	3	0.07	0.08	3	0.08	0.09	6	0	0
26	0.8700	268.00	1.62	5.70	10.10	0.40	3	0.07	0.08	3	0.07	0.08	6	0	0
27	1.0700	275.00	1.35	7.60	12.40	0.80	3	0.08	0.08	3	0.08	0.09	6	0	0
28	0.9800	295.00	1.58	4.80	5.30	0.51	3	0.07	0.09	3	0.07	0.08	6	0	0
29	0.9775	290.00	1.56	4.50	5.20	0.51	3	0.08	0.09	3	0.08	0.09	6	0	0
30	0.9975	295.00	1.56	5.70	9.90	0.40	3	0.07	0.08	3	0.07	0.08	6	0	0
31	0.9475	282.00	1.57	5.00	6.20	0.41	3	0.06	0.07	3	0.07	0.07	6	0	0
Total	30.8402	9508.00					93			93			186	0	0
Avg.	0.9948	306.71	1.62	5.59	7.76	0.44		0.08	0.08		0.07		Total	Total	Total
Max	1.1552	427.00	2.15	11.90	16.70	1.40		0.09	0.10		0.10	0.12	6	0	0
Min.	0.8700	190.00	1.14	2.50	2.60	0.24		0.06	0.06		0.06				

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **October-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.47	0.23	0.81		0	0.00	420	6.22	40	0.59	460	7.42	5.74	1.47	1.68
2	0.60	0.26	0.75		0	0.00	416	6.50	60	0.94	476	7.80	5.83	1.77	1.97
3	0.57	0.15	0.71		0	0.00	433	6.20	61	0.87	494	6.99	4.99	1.83	2.00
4	0.53	0.25	0.78		0	0.00	321	5.06	47	0.74	368	5.68	3.86	1.63	1.82
5	0.50	0.29	0.80		0	0.00	418	6.15	43	0.63	461	7.30	5.57	1.60	1.73
6	0.52	0.30	0.79		0	0.00	424	6.21	27	0.40	451	7.74	6.12	1.52	1.62
7	0.63	0.46	0.78		0	0.00	490	6.76	47	0.65	537	8.98	7.43	1.41	1.55
8	0.60	0.30	0.81		0	0.00	536	7.69	93	1.33	629	9.47	8.04	1.30	1.43
9	0.54	0.32	0.81	0.82	0	0.00	584	8.32	117	1.67	701	9.69	7.74	1.75	1.95
10	0.39	0.26	0.81		0	0.00	555	8.06	68	0.99	623	10.54	8.70	1.66	1.84
11	0.52	0.31	0.77		0	0.00	504	7.11	1	0.01	505	7.67	6.23	1.30	1.44
12	0.56	0.25	0.81		0	0.00	545	7.79	0	0.00	545	8.94	7.11	1.67	1.83
13	0.57	0.26	0.81		0	0.00	512	7.86	33	0.51	545	10.50	8.60	1.78	1.90
14	0.47	0.29	0.77		0	0.00	540	6.98	81	1.05	621	9.36	6.82	2.36	2.54
15	0.52	0.29	0.80		0	0.00	487	7.46	39	0.60	526	9.06	6.94	1.92	2.12
16	0.56	0.27	0.79		0	0.00	474	6.80	19	0.27	493	7.85	5.78	1.92	2.07
17	0.50	0.22	0.84	0.71	0	0.00	404	6.83	17	0.29	421	7.72	5.79	1.78	1.93
18	0.55	0.28	0.80		0	0.00	527	7.85	26	0.39	553	9.42	7.43	1.89	1.99
19	0.55	0.05	0.66		0	0.00	266	4.51	39	0.66	305	5.36	2.76	2.40	2.60
20	0.51	0.30	0.63		0	0.00	255	3.87	19	0.29	274	4.46	2.18	2.09	2.28
21	0.55	0.19	0.72		0	0.00	238	3.73	16	0.25	254	4.12	1.98	1.95	2.14
22	0.57	0.24	0.62		0	0.00	234	3.66	16	0.25	250	4.17	2.10	1.88	2.07
23	0.56	0.26	0.64	0.66	0	0.00	252	3.56	38	0.54	290	4.32	1.70	2.42	2.62
24	0.59	0.24	0.82		0	0.00	216	3.47	38	0.61	254	4.29	2.02	2.10	2.27
25	0.52	0.18	0.61		0	0.00	205	3.31	32	0.52	237	3.86	1.71	1.99	2.15
26	0.76	0.32	0.69		0	0.00	184	3.16	19	0.33	203	3.50	1.63	1.69	1.87
27	0.58	0.27	0.68		0	0.00	223	3.11	16	0.22	239	3.79	1.95	1.64	1.84
28	0.47	0.27	0.75		0	0.00	218	3.32	23	0.35	241	3.78	2.12	1.49	1.66
29	0.62	0.30	0.78		0	0.00	226	3.45	21	0.32	247	4.07	2.56	1.37	1.51
30	0.51	0.34	0.74		0	0.00	233	3.49	60	0.90	293	4.44	2.57	1.71	1.87
31	0.49	0.33	0.76		0	0.00	282	4.44	15	0.24	297	4.85	3.10	1.60	1.75
Tot.							11,202		1,131		12,793				
Avg.	0.55	0.27	0.75	0.73	0.00	0.00	378.00	5.62	38.53	0.57	416.53	6.74	4.80	1.78	1.94
Max	0.76	0.46	0.84	0.82	0.00	0.00	584.00	8.32	117.00	1.67	701.00	10.54	8.70	2.42	2.62
Min.	0.39	0.05	0.61	0.66	0.00	0.00	184.00	3.11	0.00	0.00	203.00	3.50	1.63	1.30	1.43

WSSN 0600 | MONTH/YEAR | October-19 |

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D A T E	pH Raw 29.	pH Tap 30.	Raw 31.	Tap 32.	Raw 33.	Tap 34.	Raw 35.	Tap 36.	Raw 37	Tap 38	Raw 39	Tap 40	Raw 41	Tap 42
1	8.2	8.1	152	146	109	107	43	39	41	40	12	11		
2	8.0	8.1	156	148	110	105	46	43	39	38	14	13		
3	8.0	7.9	154	148	107	104	47	44	38	37	14	14		
4	8.2	8.1	164	158	118	117	46	41	40	38	16	15		
5	7.9	8.0	138	140	111	106	27	34	39	42	10	9		
6	8.2	8.2	156	142	127	104	29	38	47	42	9	9		
7	8.0	8.1	178	148	138	109	40	39	51	43	12	10		
8	8.0	8.1	172	158	136	117	36	41	51	49	11	9	19.0	19.5
9	8.1	8.0	158	162	124	120	34	42	45	46	11	12		
10	8.0	8.2	156	164	117	124	39	40	47	51	9	9		
11	8.1	8.1	144	162	113	122	31	40	42	46	10	11		
12	8.1	8.1	144	150	118	114	26	36	45	46	8	8		
13	8.1	7.9	146	148	112	112	34	36	42	45	10	9		
14	8.3	8.1	164	158	121	111	43	47	40	42	16	13		
15	8.1	7.9	164	158	112	107	52	51	42	41	14	14	20.0	24.5
16	8.1	8.1	146	140	116	107	30	33	44	45	9	7	21.0	24.0
17	8.2	8.1	152	142	121	109	31	33	42	44	11	8		
18	8.0	8.0	150	146	111	108	39	38	45	42	9	10		
19	8.1	8.0	166	154	114	106	52	48	40	38	16	14		
20	8.0	8.1	162	156	113	106	49	50	38	37	17	16	19.5	23.5
21	8.1	7.9	154	148	110	105	44	43	38	38	14	13		
22	8.2	7.9	194	154	145	115	49	39	46	38	19	15		
23	8.0	8.1	160	162	110	100	50	62	38	42	16	14		
24	8.1	7.9	162	152	114	103	48	49	42	41	14	12		
25	8.1	8.0	162	150	111	103	51	47	41	40	15	12		
26	8.1	8.1	172	152	119	103	53	49	42	39	17	13		
27	8.2	8.0	184	154	130	104	54	50	44	39	18	14		
28	8.1	8.0	162	156	128	105	34	51	47	46	11	10	21.5	23.0
29	8.2	8.1	152	154	121	111	31	43	46	46	9	9		
30	8.1	8.0	162	156	115	110	47	46	42	41	14	13		
31	8.0	8.1	170	162	110	107	60	55	43	42	15	14		
Avg.	8.1	8.0	159.5	152.2	118.4	109.1	41.2	43.1	42.8	42.1	12.8	11.5	20.2	22.9
Max	8.3	8.2	194.0	164.0	145.0	124.0	54.0	62.0	51.0	51.0	19.0	16.0	21.5	24.5
Min.	7.9	7.9	138.0	140.0	107.0	100.0	26.0	33.0	38.0	37.0	8.0	7.0	19.0	19.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1		0	1	A	66	0	18	19.0	0.9692	56	2.29	1.88
2			1	A	30	0	18	17.5	0.9540	41	1.72	1.40
3			1	A	54	1	18	18.0	1.1162	27	0.96	1.10
4			1	A	24	0	19	18.5	0.9694	46	1.86	1.39
5			1	A	83	0	14	19.0	0.9970	44	1.73	1.91
6			1	A	93	1	17	18.0	0.9173	42	1.82	1.29
7			1	A	134	0	18	17.0	0.9413	45	1.91	0.00
8			1	A	100	0	17	18.0	1.0320	45	1.71	1.25
9	1.52	City Hall	1	A	100	0	17	18.0	1.1290	41	1.43	1.33
9	1.28	Wolfs	1	A	85	1	17	18.0	0.9298	47	1.98	1.34
9	1.29	Bait Shed	1	A	58	0	16	17.0	1.0431	51	1.93	1.38
9	1.27	Sunny Spot	1	A	48	0	16	17.0	0.9615	48	1.97	1.63
9	1.40	B&Z	1	A	64	12	16	17.0	0.8060	47	2.30	1.89
14			1	A	78	1	15	17.5	1.0518	45	1.70	1.31
15			1	A	58	0	15	15.5	0.9144	44	1.92	0.00
16			1	A	122	0	16	17.0	0.9913	54	2.15	1.53
17	1.55	Bait Shed	1	A	44	2	14	16.0	0.8539	41	1.91	0.00
17	1.77	Wolfs	1	A	46	1	14	15.3	0.9278	52	2.20	1.32
17	1.71	City Hall	1	A	29	0	14	14.5	0.8942	43	1.92	1.51
17	1.56	Sunny Spot	1	A	133	0	14	14.3	0.9701	53	2.17	0.77
17	1.42	B&Z	1	A	67	0	15	14.5	0.9711	49	1.99	1.51
21			1	A	132	0	14	14.5	0.9442	49	2.04	1.59
22	1.44	City Hall	1	A	41	0	13	14.5	1.0643	49	1.82	1.50
22	1.29	Wolfs	1	A	24	0	13	14.0	0.9383	47	1.97	2.82
22	1.36	Bait Shed	1	A	77	1	13	13.5	1.2009	55	1.80	1.89
22	1.39	Sunny Spot	1	A	94	0	13	13.0	1.1464	59	2.04	1.85
22	1.19	B&Z	1	A	78	0	12.5	13.0	1.2206	54	1.74	2.01
27	0.78	City Hall	1	A	471	0	9.0	12.0	1.2580	47	1.47	1.22
27	1.19	Wolfs	1	A	43	1	8.7	8.5	1.2118	26	0.85	1.23
27	1.48	Bait Shed	1	A	48	0	8.5	9.5	1.2915	45	1.38	1.41
27	1.34	Sunny Spot	1	A	76	1	12.5	13.0	1.2133	47	1.53	1.46
Totals									31.8296	1436.7		
AVG.	1.38		1	A	84	1	14	15	1.0268	46.3	1.80	1.36
Max	1.77				471	12	19	19	1.2915	59.0	2.30	2.82
Min	0.78				24	0	9	9	0.8060	26.1	0.85	0.00

DISTRIBUTION SYSTEM MONITORING WSSN 0600 October-19

Chlorine Residual at Bacteriological Monitoring Stations mg/l

CITY OF BENTON HARBOR

DATE	1	2	3	4	5	blu water 6	B&Z 7			
1	1.07		0.78	0.54	0.73		0.69			
2										
3										
4										
5										
6										
7										
8										
9	0.79		0.70	0.87	0.42		0.60			
10										
11										
12										
13										
14										
15										
16										
17	1.49		0.79	0.62	0.94		0.59			
18										
19										
20										
21										
22										
23	0.25		1.19	1.03	1.08		0.85			
24										
25										
26										
27										
28										
29										
30	1.10		1.01	0.92	1.04		0.72			
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

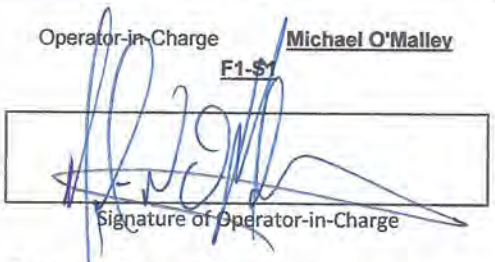
Total number of routine distribution samples analyzed	0600	25		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.83	1.49	0.25
Total number of check samples	0600			
Total number of positive check samples	0600			

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** **F1-S1**



Signature of Operator-in-Charge

Month/Year **April-19** **F1-S2**

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.145	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	257.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.98	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.40	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.89%	Percent of Treated Water

Chemical Data

Chlorine on hand:	27775	lb.	Est. supply:	371	days
Primary Coagulant (Alum (Al3+)) on hand:	90947	lb.	Est. supply:	93	days
Cost of All Chemicals per Million Gallons:	$67.29	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	89	89
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **If yes,** indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	NO
Did POE disinfectant residual fall below 0.2 ppm during the month? **If yes,** indicate date(s) and duration on a separate sheet.	NO
Was minimum C*T credit achieved for the entire month? **If no,** indicate on a separate sheet the date(s) not achieved.	YES
Was continuous POE chlorine residual monitoring equipment off-line during the month? **If yes,** indicate date(s) and duration on a separate sheet.	NO

Distribution	Total	26.890474	Avg	0.9254891	Max	1.06516	Min	0.79744

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
Page 6 modified to show Calculated Distribution Flows and Corrosion Control Treatment

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **April-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.65	0.25	0.63		0	0.00	148	2.19	22	0.33	170	2.90	1.01	1.70	1.89
2	0.61	0.19	0.63		0	0.00	275	4.55	111	1.84	386	6.12	3.48	2.39	2.64
3	0.51	0.31	0.69	0.56	0	0.00	354	5.09	4	0.06	358	5.92	4.23	1.42	1.69
4	0.39	0.27	0.69		0	0.00	290	3.94	7	0.09	297	4.89	2.83	1.84	2.06
5	0.39	0.33	0.59		0	0.00	293	4.26	5	0.07	298	4.59	2.39	1.99	2.20
6	0.59	0.25	0.53		0	0.00	234	3.92	20	0.34	254	4.02	1.59	2.19	2.43
7	0.50	0.28	0.63		0	0.00	253	3.86	8	0.12	261	4.25	1.91	2.11	2.34
8	0.52	0.28	0.42		0	0.00	224	3.54	14	0.22	238	3.87	1.08	2.54	2.79
9	0.60	0.21	0.57		0	0.00	221	3.34	0	0.00	221	3.63	1.47	1.94	2.16
10	0.84	0.36	0.42	0.53	0	0.00	231	3.42	0	0.00	231	3.75	1.77	1.75	1.98
11	0.60	0.26	0.47		0	0.00	223	3.44	0	0.00	223	3.59	1.77	1.63	1.82
12	0.76	0.23	0.42		0	0.00	216	3.32	0	0.00	216	3.21	1.26	1.74	1.95
13	0.56	0.37	0.58		0	0.00	245	3.53	20	0.29	265	4.13	2.12	1.88	2.01
14	0.57	0.39	0.63		0	0.00	199	3.60	18	0.33	217	3.51	1.61	1.73	1.90
15	0.51	0.33	0.62		0	0.00	258	3.55	17	0.23	275	3.85	1.95	1.68	1.90
16	0.65	0.32	0.74		0	0.00	230	3.52	21	0.32	251	4.17	2.21	1.75	1.96
17	0.45	0.55	0.74		0	0.00	246	3.64	15	0.22	261	4.35	2.53	1.62	1.82
18	0.69	0.36	0.74	0.65	0	0.00	259	3.99	54	0.83	313	5.22	3.41	1.60	1.81
19	0.61	0.39	0.86		0	0.00	226	3.53	13	0.20	239	3.86	2.09	1.62	1.77
20	0.53	0.35	0.83		0	0.00	199	3.59	17	0.31	216	3.93	2.22	1.55	1.71
21	0.60	0.40	0.84		0	0.00	231	3.56	22	0.34	253	4.02	2.11	1.71	1.91
22	0.49	0.35	0.78		0	0.00	231	3.58	19	0.29	250	3.75	1.80	1.67	1.95
23	0.67	0.26	0.70		0	0.00	242	3.55	16	0.23	258	4.83	2.94	1.70	1.89
24	0.55	0.40	0.80	0.76	0	0.00	282	3.68	16	0.21	298	4.36	2.60	1.56	1.76
25	0.53	0.43	0.77		0	0.00	261	3.66	10	0.14	271	4.22	2.46	1.61	1.76
26	0.65	0.50	0.83		0	0.00	253	3.67	12	0.17	265	4.41	2.46	1.76	1.95
27	0.56	0.34	0.66		0	0.00	218	3.57	48	0.79	266	4.75	2.16	2.37	2.59
28	0.74	0.23	0.65		0	0.00	217	3.41	26	0.41	243	3.83	1.78	1.84	2.05
29	0.52	0.40	0.74		0	0.00	217	3.31	14	0.21	231	3.74	1.65	1.89	2.09
30	0.45	0.28	0.81		0	0.00	229	3.34	13	0.19	242	3.82	1.79	1.87	2.03
Tot.							7,057		540		7,767				
Avg.	0.58	0.33	0.67	0.63	0.00	0.00	240.17	3.64	18.73	0.29	258.90	4.18	2.16	1.82	2.03
Max	0.84	0.55	0.86	0.76	0.00	0.00	354.00	5.09	111.00	1.84	386.00	6.12	4.23	2.54	2.79
Min.	0.39	0.19	0.42	0.53	0.00	0.00	148.00	2.19	0.00	0.00	170.00	2.90	1.01	1.42	1.69

WSSN 0600 City of Benton Harbor Month/Year April-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0100	329.00	1.71	4.10	4.40	0.51	3	0.07	0.08	3	0.07	0.08	6	0	0
2	0.9028	317.00	1.85	10.00	11.60	1.10	3	0.07	0.08	3	0.08	0.08	5	0	0
3	1.0375	330.00	1.67	5.10	5.90	0.84	3	0.08	0.10	3	0.10	0.10	3	0	0
4	1.1000	297.00	1.42	4.60	4.70	0.70	3	0.08	0.09	3	0.11	0.11	6	0	0
5	1.0275	323.00	1.65	3.00	4.80	0.55	3	0.07	0.07	3	0.08	0.08	6	0	0
6	0.8900	281.00	1.91	2.10	2.50	0.52	3	0.10	0.11	3	0.10	0.11	6	0	0
7	0.9775	302.00	1.63	2.00	2.60	0.46	3	0.11	0.16	3	0.09	0.09	6	0	0
8	0.9450	292.00	1.63	2.40	3.60	0.43	3	0.08	0.09	3	0.07	0.08	6	0	0
9	0.9875	310.00	1.65	2.00	2.10	0.45	3	0.08	0.08	3	0.08	0.09	6	0	0
10	1.0075	316.00	1.65	3.10	3.70	0.47	3	0.07	0.08	3	0.08	0.08	6	0	0
11	0.9675	282.00	1.53	2.10	2.60	0.39	3	0.07	0.07	3	0.09	0.10	6	0	0
12	0.9725	294.00	1.59	2.80	5.30	0.95	3	0.09	0.09	3	0.12	0.16	6	0	0
13	1.0350	324.00	1.65	4.40	4.80	0.48	3	0.06	0.06	3	0.07	0.08	6	0	0
14	0.8250	261.00	1.66	1.90	2.00	0.41	3	0.07	0.07	2	0.10	0.10	4	0	0
15	1.0850	337.00	1.63	3.20	3.60	0.44	3	0.06	0.07	3	0.07	0.09	6	0	0
16	0.9750	309.00	1.67	6.70	9.70	0.61	3	0.06	0.06	3	0.08	0.08	6	0	0
17	1.0075	322.00	1.68	5.20	8.60	0.64	3	0.08	0.09	3	0.09	0.10	6	0	0
18	0.9700	303.00	1.64	4.30	4.80	0.48	3	0.08	0.09	3	0.09	0.11	6	0	0
19	0.9550	298.00	1.64	5.70	6.00	0.55	3	0.06	0.06	3	0.07	0.08	6	0	0
20	0.8275	260.00	1.65	4.70	6.70	0.42	3	0.06	0.06	3	0.07	0.07	6	0	0
21	0.9675	301.00	1.64	2.80	3.40	0.37	3	0.06	0.07	3	0.07	0.07	6	0	0
22	0.9625	301.00	1.65	3.40	3.70	0.35	3	0.06	0.06	3	0.07	0.08	6	0	0
23	1.0175	317.00	1.64	3.90	5.00	0.48	3	0.07	0.08	3	0.08	0.08	6	0	0
24	1.1450	356.00	1.64	2.20	2.60	0.38	3	0.08	0.09	3	0.09	0.11	6	0	0
25	1.0650	332.00	1.64	1.80	2.60	0.26	3	0.07	0.07	3	0.07	0.07	6	0	0
26	1.0300	321.00	1.64	3.60	5.10	0.29	3	0.06	0.06	3	0.08	0.09	6	0	0
27	0.9125	290.00	1.67	3.30	5.70	0.37	3	0.07	0.07	3	0.06	0.07	6	0	0
28	0.9500	304.00	1.68	3.30	5.60	0.26	3	0.08	0.09	3	0.07	0.07	6	0	0
29	0.9775	303.00	1.63	2.50	4.30	0.22	3	0.06	0.06	3	0.07	0.07	6	0	0
30	1.0250	325.00	1.67	2.00	2.90	0.26	3	0.07	0.07	3	0.07	0.08	6	0	0
31															
Total	29.5578	9237.00					90			89			174	0	0
Avg.	0.9853	307.90	1.65	3.61	4.70	0.49		0.07	0.08		0.08		Total	Total	Total
Max	1.1450	356.00	1.91	10.00	11.60	1.10		0.11	0.16		0.12	0.16	6	0	0
Min.	0.8250	260.00	1.42	1.80	2.00	0.22		0.06	0.06		0.06				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	7.9	7.9	188	176	122	117	66	59	49	44	16	16		
2	7.9	8.0	212	192	163	119	49	73	47	52	23	15		
3	8.0	7.8	172	176	133	139	39	37	49	54	12	10	22.0	24.0
4	8.2	8.0	178	170	141	128	37	42	51	50	12	11		
5	7.9	7.9	170	176	121	127	49	49	53	59	9	7		
6	8.1	8.0	186	190	124	131	62	59	46	48	17	17		
7	8.2	8.1	172	168	129	127	43	41	51	51	11	10		
8	8.0	8.0	186	178	126	124	60	54	50	47	15	15		
9	8.1	8.1	190	178	138	128	52	50	50	47	16	15		
10	8.2	8.1	190	192	125	126	65	66	49	50	17	17		
11	7.8	7.8	186	192	125	122	61	70	46	51	17	16		
12	7.9	8.0	164	176	110	117	54	59	42	49	14	13	19.0	24.0
13	8.2	8.1	182	158	147	119	35	39	55	50	11	8		
14	8.2	7.9	174	164	135	122	39	42	58	53	7	8	20.5	23.0
15	8.1	8.0	164	158	131	129	33	29	51	50	9	8		
16	8.1	8.0	178	168	137	128	41	40	53	50	11	11		
17	8.0	8.0	192	174	139	124	53	50	50	46	17	14		
18	8.0	8.0	194	180	137	128	57	52	51	47	16	15		
19	8.0	8.0	186	174	139	128	47	46	55	51	12	12		
20	8.2	8.2	182	172	138	133	44	39	59	58	8	7		
21	8.1	8.1	172	176	121	129	51	47	47	54	13	10	21.5	26.0
22	8.2	8.0	164	164	124	123	40	41	47	49	11	10		
23	8.1	8.0	174	168	135	124	39	44	55	55	9	7		
24	8.1	8.0	162	166	119	125	43	41	45	46	12	12		
25	8.2	7.9	154	158	119	124	35	34	46	54	10	6		
26	8.1	8.2	174	164	119	120	55	44	57	51	8	9		
27	8.1	8.0	174	166	123	112	51	54	42	40	17	16		
28	8.2	8.0	170	164	121	114	49	50	43	42	15	15	18.5	22.0
29	8.0	7.9	152	154	113	114	39	40	46	47	9	9	18.5	21.0
30	8.1	8.0	164	146	112	111	52	35	46	46	12	8		
Avg.	8.1	8.0	176.9	171.3	128.9	123.7	48.0	47.5	49.6	49.7	12.9	11.6	20.0	23.3
Max	8.2	8.2	212.0	192.0	163.0	139.0	66.0	73.0	59.0	59.0	23.0	17.0	22.0	26.0
Min.	7.8	7.8	152.0	146.0	110.0	111.0	33.0	29.0	42.0	40.0	7.0	6.0	18.5	21.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS DISTRIBUTION METER; CORROSION CONTROL FEED OPP

	RAW		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	No. of	Colilert	No. of	Colilert			TEMP.	TEMP.				
A	Samples	P/A	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T					Raw	Tap			To	Lbs PO4	Treatment	Residual
E									Distribution		mg/L	mg/L
1			1	A	55	0	4	5.5	0.8742	6	0.57	
2			1	A	29	0	5	5.0	0.9413	13	1.16	
3			1	A	51	0	5	6.0	0.9030	12	1.11	
4			1	A	75	2	6	7.0	0.9069	12	1.11	
5			1	A	67	0	5	7.0	0.9684	12	1.05	1.57
6			1	A	65	0	6	5.5	0.9443	11	0.99	1.43
7			1	A	61	0	6	7.0	0.9163	13	1.15	1.71
8			1	A	34	0	6	6.0	0.9184	13	1.20	0.29
9			1	A	69	0	7	6.5	0.9078	12	1.11	0.29
10			1	A	36	1	6	7.0	0.9203	14	1.24	0.43
11			1	A	34	3	6	7.0	0.9260	12	1.10	1.00
12			1	A	57	1	6	6.5	1.0049	14	1.20	1.14
13			1	A	23	0	6	7.0	0.9567	13	1.10	1.29
14			1	A	24	0	8	8.0	0.9222	12	1.06	1.86
15			1	A	29	3	7	8.0	1.0652	14	1.12	0.57
16			1	A	76	2	8	9.0	0.8992	13	1.24	1.29
17			1	A	25	0	7	7.5	0.8961	12	1.16	1.00
18			1	A	17	0	8	8.0	0.8944	14	1.27	2.00
19			1	A	65	0	9	9.5	0.9240	12	1.12	1.14
20			1	A	58	0	8	9.5	0.8195	12	1.27	1.29
21			1	A	32	0	8	9.0	0.9384	12	1.11	0.57
22			1	A	17	0	8	10.0	0.9943	14	1.22	1.57
23			1	A	29	0	9	9.5	0.7974	10	1.07	0.57
24			1	A	38	0	8	9.0	1.0202	13	1.09	0.29
25			1	A	29	0	8	9.0	0.9578	14	1.20	0.57
26			1	A	30	4	8	9.0	0.8971	12	1.14	0.71
27			1	A	30	0	7.8	8.0	0.8358	11	1.11	2.43
28			1	A	23	0	9.0	12.0	0.9462	14	1.23	2.14
29			1	A	21	1	8.7	8.5	0.9230	12	1.13	1.43
30			1	A	75	1	8.5	9.5	0.9453	14	1.22	1.71
TOTAL								TOTALS	27.7647	373		
AVG.			1	A	42	1	7	8	0.9255	12	1.13	1.16
Max					76	4	9	12	1.0652	14	1.27	2.43
Min					17	0	4	5	0.7974	6	0.57	0.29

DISTRIBUTION SYSTEM MONITORING WSSN 0600 April-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3	1.00		0.80	1.11	1.16		1.29			
4										
5										
6										
7										
8										
9										
10	1.29		1.34	1.17	0.92		1.42			
11										
12										
13										
14										
15										
16										
17										
18	0.94		0.66	0.84	1.13		0.82			
19										
20										
21										
22										
23										
24	0.82		1.16	0.49	0.87		0.77			
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	20		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.00	1.42	0.49
Total number of check samples	0600			
Total number of positive check samples	0600			

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

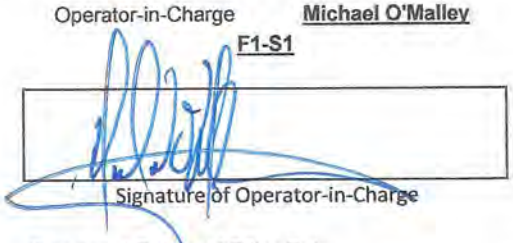
WSSN:600

Operator-in-Charge **Michael O'Malley**

Month/Year **June-19**

F1-S1

F1-S2



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.3399	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	245.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.04	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.91	Gallons Per Square Feet per Minute
Average Wash Water Use:	12.40%	Percent of Treated Water

Chemical Data

Chlorine on hand:	49490	lb.	Est. supply:	246	days
Primary Coagulant (Alum (Al3+)) on hand:	65133	lb.	Est. supply:	163	days
Cost of All Chemicals per Million Gallons:	$66.09	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Distribution	Total	29.15056	Avg	1.002112	Max	1.14064	Min	0.90952

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **June-19**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.57	0.31	0.77		0	0.00	239	3.64	27	0.41	266	4.35	2.25	1.91	2.10
2	0.67	0.23	0.84		0	0.00	232	3.65	25	0.39	257	4.16	2.27	1.73	1.89
3	0.52	0.32	0.73		0	0.00	237	3.56	54	0.81	291	4.66	2.51	1.96	2.15
4	0.48	0.26	0.76		0	0.00	228	3.45	22	0.33	250	3.79	2.05	1.54	1.74
5	0.57	0.19	0.65	0.78	0	0.00	236	3.52	32	0.48	268	3.93	2.20	1.54	1.73
6	0.67	0.26	0.81		0	0.00	241	3.54	58	0.85	299	4.37	2.33	1.85	2.04
7	0.54	0.33	0.82		0	0.00	247	3.53	51	0.73	298	4.20	2.41	1.60	1.79
8	0.56	0.24	0.79		0	0.00	229	3.47	36	0.55	265	4.08	2.22	1.67	1.86
9	0.61	0.41	0.77		0	0.00	226	3.45	28	0.43	254	4.14	2.54	1.42	1.60
10	0.50	0.33	0.81		0	0.00	226	3.52	24	0.37	250	4.00	2.10	1.71	1.90
11	0.62	0.36	0.76		0	0.00	242	3.50	28	0.40	270	4.13	2.33	1.59	1.80
12	0.57	0.31	0.72		0	0.00	248	3.50	27	0.38	275	4.10	1.87	2.01	2.23
13	0.55	0.28	0.69	0.67	0	0.00	248	3.52	23	0.33	271	4.22	2.52	1.56	1.70
14	0.54	0.32	0.75		0	0.00	275	3.82	28	0.39	303	4.73	3.06	1.52	1.67
15	0.58	0.30	0.81		0	0.00	280	3.85	29	0.40	309	4.49	2.82	1.52	1.67
16	0.65	0.34	0.86		0	0.00	294	4.04	29	0.40	323	5.30	3.84	1.28	1.46
17	0.54	0.23	0.80		0	0.00	274	4.03	36	0.53	310	4.45	2.65	1.59	1.80
18	0.51	0.29	0.81		0	0.00	276	3.91	46	0.65	322	4.56	2.38	1.98	2.18
19	0.58	0.19	0.68	0.77	0	0.00	275	3.91	63	0.90	338	4.86	2.43	2.24	2.43
20	0.45	0.36	0.82		0	0.00	260	3.72	28	0.40	288	4.00	2.21	1.63	1.79
21	0.58	0.34	0.80		0	0.00	256	3.61	29	0.41	285	4.29	2.36	1.74	1.93
22	0.38	0.35	0.78		0	0.00	252	3.59	26	0.37	278	3.93	2.09	1.65	1.84
23	0.51	0.37	0.72		0	0.00	229	3.51	53	0.81	282	4.17	1.50	2.47	2.67
24	0.56	0.47	0.73		0	0.00	248	3.45	13	0.18	261	3.75	2.08	1.51	1.67
25	0.43	0.42	0.75		0	0.00	244	3.53	20	0.29	264	3.83	1.97	1.72	1.86
26	0.45	0.34	0.84		0	0.00	247	3.49	21	0.30	268	4.07	2.42	1.47	1.65
27	0.57	0.46	0.76		0	0.00	251	3.48	22	0.30	273	3.80	2.03	1.55	1.77
28	0.39	0.30	0.83		0	0.00	306	3.41	25	0.28	331	4.33	2.57	1.55	1.76
29	0.58	0.27	0.75		0	0.00	263	3.61	9	0.12	272	3.74	2.10	1.47	1.64
30	0.58	0.37	0.77		0	0.00	234	3.43	17	0.25	251	3.93	2.18	1.59	1.75
31															
Tot.							7,304		902		8,472				
Avg.	0.54	0.32	0.77	0.74	0.00	0.00	251.43	3.61	30.97	0.45	282.40	4.21	2.34	1.69	1.87
Max	0.67	0.47	0.86	0.78	0.00	0.00	306.00	4.04	63.00	0.90	338.00	5.30	3.84	2.47	2.67
Min.	0.38	0.19	0.65	0.67	0.00	0.00	226.00	3.41	9.00	0.12	250.00	3.74	1.50	1.28	1.46

WSSN 0600 City of Benton Harbor Month/Year June-19

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS				FILTERED NORTH			FILTERED SOUTH		2 Hour Compliance Periods		
D	GAL.	Dry	as Al3+	RAW		Applied	#			#				#of	#of
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of Periods	Periods >.30NTU	Periods >.30NTU
T		Pounds													
E		Add												North	South
1	0.9800	308.00	1.65	1.40	1.70	0.16	3	0.02	0.02	3	0.02	0.02	6	0	0
2	0.9500	296.00	1.64	1.20	1.70	0.13	3	0.03	0.04	3	0.02	0.02	6	0	0
3	0.9925	307.00	1.63	2.20	3.20	0.21	3	0.04	0.07	3	0.05	0.06	6	0	0
4	0.9875	296.00	1.58	1.30	2.40	0.17	3	0.06	0.07	3	0.05	0.05	6	0	0
5	1.0000	302.00	1.59	1.80	2.90	0.23	3	0.05	0.06	3	0.05	0.06	6	0	0
6	1.0150	305.00	1.57	1.90	2.70	0.29	3	0.05	0.05	3	0.04	0.05	6	0	0
7	1.0450	311.00	1.57	2.40	4.40	0.20	3	0.04	0.05	3	0.05	0.07	6	0	0
8	0.9850	268.00	1.43	2.00	3.00	0.16	3	0.05	0.06	3	0.05	0.05	6	0	0
9	0.9775	288.00	1.55	1.20	1.70	0.25	3	0.05	0.06	3	0.05	0.07	6	0	0
10	0.9575	290.00	1.59	1.80	2.90	0.18	3	0.03	0.04	3	0.02	0.03	6	0	0
11	1.0325	309.00	1.57	1.80	2.70	0.15	3	0.02	0.03	3	0.03	0.03	6	0	0
12	1.0575	317.00	1.58	2.20	2.50	0.21	3	0.03	0.04	3	0.02	0.02	6	0	0
13	1.0525	320.00	1.60	5.80	8.70	0.21	3	0.02	0.02	3	0.03	0.02	6	0	0
14	1.0750	324.00	1.59	6.50	7.90	0.22	3	0.02	0.03	3	0.03	0.03	6	0	0
15	1.0850	326.00	1.58	6.50	7.40	0.45	3	0.02	0.03	3	0.03	0.04	6	0	0
16	1.0875	328.00	1.59	2.30	2.50	0.20	3	0.02	0.02	3	0.03	0.05	6	0	0
17	1.0150	305.00	1.58	3.10	4.90	0.20	3	0.05	0.06	3	0.06	0.06	6	0	0
18	1.0550	313.00	1.56	2.90	5.10	0.20	3	0.04	0.05	3	0.04	0.05	6	0	0
19	1.0500	316.00	1.58	3.20	5.20	0.15	3	0.03	0.03	3	0.03	0.04	6	0	0
20	1.0425	311.00	1.57	2.50	4.60	0.14	3	0.04	0.04	3	0.03	0.04	6	0	0
21	1.0600	320.00	1.59	2.40	2.70	0.21	3	0.04	0.04	3	0.03	0.04	6	0	0
22	1.0475	316.00	1.59	2.60	4.60	0.16	3	0.03	0.04	3	0.03	0.04	6	0	0
23	0.9750	290.00	1.56	2.00	3.10	0.16	3	0.03	0.04	3	0.03	0.03	6	0	0
24	1.0725	328.00	1.61	1.50	1.90	0.14	3	0.03	0.03	3	0.03	0.03	6	0	0
25	1.0325	321.00	1.64	2.10	2.80	0.17	3	0.03	0.03	3	0.03	0.03	6	0	0
26	1.0575	322.00	1.64	1.30	1.90	0.12	3	0.03	0.03	3	0.02	0.02	6	0	0
27	1.0775	328.00	1.60	1.30	1.50	0.12	3	0.03	0.03	3	0.02	0.02	6	0	0
28	1.3399	406.00	1.59	5.00	7.60	0.21	3	0.03	0.03	3	0.02	0.02	6	0	0
29	1.0875	341.00	1.65	1.80	3.20	0.13	3	0.03	0.04	3	0.03	0.04	6	0	0
30	1.0175	301.00	1.56	1.50	2.50	0.14	3	0.02	0.03	3	0.02	0.02	6	0	0
31															
Total	31.2099	9413.00					90			90			180	0	0
Avg.	1.0403	313.77	1.59	2.52	3.66	0.19		0.03	0.04		0.03		Total	Total	Total
Max	1.3399	406.00	1.65	6.50	8.70	0.45		0.06	0.07		0.06	0.07	6	0	0
Min.	0.9500	268.00	1.43	1.20	1.50	0.12		0.02	0.02		0.02				

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	8.1	150	142	116	109	34	33	44	41	10	10		
2	8.1	8.1	136	138	114	113	22	25	42	42	7	8		
3	8.0	8.1	164	154	115	106	49	48	41	39	15	14		
4	7.9	8.1	162	152	117	108	45	44	40	38	15	14		
5	8.0	8.0	166	150	117	105	49	45	43	39	14	13		
6	8.1	8.1	168	152	123	109	45	43	42	39	15	13		
7	7.9	8.0	168	160	120	113	48	47	42	39	16	15	18.0	21.5
8	8.0	8.0	158	154	113	111	45	43	39	38	15	15		
9	8.0	8.1	160	154	114	110	46	44	39	38	15	16		
10	8.1	7.9	136	134	114	112	22	22	46	45	5	5	20.5	22.0
11	8.1	8.1	152	146	113	112	39	34	43	41	11	11		
12	8.2	8.2	148	146	124	110	24	36	45	43	9	9		
13	8.2	8.1	148	144	117	112	31	32	42	40	11	11		
14	8.2	8.1	156	146	121	113	35	33	42	41	12	11		
15	8.2	8.1	168	150	131	115	37	35	46	46	13	9		
16	8.2	8.3	150	156	110	119	40	37	38	43	13	12		
17	8.0	8.1	152	154	107	111	45	43	38	39	14	14	21.0	24.0
18	8.0	8.1	154	148	115	106	39	42	37	38	15	13		
19	8.0	8.0	152	148	108	105	44	43	38	38	14	13		
20	8.0	8.0	156	150	110	105	46	45	37	36	16	15		
21	8.0	8.1	154	146	109	102	45	44	38	37	14	13		
22	8.1	8.1	158	146	111	101	47	45	37	36	16	14		
23	8.1	8.1	148	144	110	104	38	40	36	37	14	13	19.0	23.0
24	8.1	8.1	142	138	117	106	25	32	41	38	10	10	19.5	22.0
25	8.1	8.1	138	136	113	104	25	32	42	39	8	6		
26	8.1	8.0	134	142	108	107	26	35	38	46	9	7		
27	8.1	8.1	142	136	106	103	36	33	37	36	12	11		
28	8.1	8.1	130	126	108	103	22	23	38	38	9	7		
29	8.2	8.1	138	132	108	101	30	31	39	36	10	10		
30	8.2	8.0	136	136	109	102	27	34	41	44	8	6		
31														
Avg.	8.1	8.1	150.8	145.3	113.9	107.9	36.9	37.4	40.4	39.7	12.2	11.3	19.6	22.5
Max	8.2	8.3	168.0	160.0	131.0	119.0	49.0	48.0	46.0	46.0	16.0	16.0	21.0	24.0
Min.	7.9	7.9	130.0	126.0	106.0	101.0	22.0	22.0	36.0	36.0	5.0	5.0	18.0	21.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				Tap
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	70	1	15	14.0	0.9128	38	1.65	1.32
2			1	A	29	2	14	14.0	0.9212	39	1.65	1.27
3			1	A	28	0	10	13.5	0.9324	39	1.64	1.29
4			1	A	30	0	10	12.5	0.9856	41	1.63	1.31
5	0.92	CH	1	A	0	0	13	12.0	1.0178	41	1.60	1.35
6	1.18	CH	1	A	40	1	13	12.5	1.0220	39	1.53	1.33
7	1.08	bt	1	A	44	2	12	13.0	1.0598	41	1.52	1.26
8	1.25	SS	1	A	35	0	11	12.5	0.9702	38	1.55	1.44
9	0.84	BZ	1	A	51	0	11	12.0	0.9156	38	1.62	1.19
10			1	A	69	0	13	14.5	0.9324	15	0.62	1.32
11			1	A	64	0	11	14.0	0.9758	43	1.74	1.22
12	1.08	CH	1	A	79	0	14	14.0	1.0024	43	1.69	1.28
13	1.06	CH	1	A	97	0	16	14.0	0.9576	45	1.84	1.24
14	1.21	W	1	A	48	0	15	14.0	0.9562	46	1.90	1.31
15	0.75	BS	1	A	75	3	17	16.0	1.0276	40	1.56	1.32
16	1.09	SS	1	A	32	2	17	16.0	0.9095	42	1.81	1.48
17	0.79	BZ	1	A	61	0	16	15.5	1.0392	51	1.93	1.18
18			1	A	52	0	16	16.5	1.0538	35	1.33	1.71
19	1.17	W	1	A	47	1	16	16.0	1.0384	53	2.01	1.30
20	1.18	CH	1	A	34	1	15	16.0	1.0758	53	1.94	1.05
21	1.49	BS	1	A	51	1	14	15.5	0.9923	48	1.89	1.38
22	1.22	BZ	1	A	62	3	14	15.0	1.0546	45	1.70	1.67
23	1.37	SS	1	A	73	1	14	14.5	1.0086	20	0.78	0.18
24			1	A	50	0	15	16.0	1.0392	52	1.96	0.37
25			1	A	41	0	17	16.0	1.0297	51	1.95	1.30
26			1	A	80	1	18	17.0	0.9826	44	1.78	1.76
27			1	A	26	0	17.0	17.0	1.0713	56	2.07	1.34
28			1	A	45	0	9.0	12.0	1.1406	40	1.38	1.34
29			1	A	74	0	8.7	8.5	1.0854	49	1.79	1.43
30			1	A	39	0	8.5	9.5	0.9528	45	1.88	1.43
31												
Total									30.0634	1,266.4		
AVG.	1.11		1	A	51	1	14	14	1.0021	42	1.66	1.28
Max	1.49				97	3	18	17	1.1406	56	2.07	1.76
Min	0.75				0	0	9	9	0.9095	15	0.62	0.18

DISTRIBUTION SYSTEM MONITORING WSSN 0600 June-19

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5	0.97		1.10	0.87	1.18		1.72			
6										
7										
8										
9										
10										
11										
12										
13	0.56		1.07	0.84	0.80		0.45			
14										
15										
16										
17										
18										
19	0.81		0.95	0.48	0.71		0.80			
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600	0		
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.89	1.72	0.45
Total number of check samples	0600	0		
Total number of positive check samples	0600	0		

From: Sarkipato, Ernest (EGLE)
To: Jason Marquardt; David A. Cornwell
Cc: Abul Ahmed; Darold Harlan; rjones@fv-operations.com
Subject: data dump #4
Date: Wednesday, September 1, 2021 8:37:00 AM
Attachments: MI0600 Benton Harbor Water MOR April 2020reduced.pdf
MI 0600 Benton Harbor MOR for March 2020reduced.pdf
MI 0600 Benton Harbor MOR June 2020reduced.pdf
MI 0600 Benton Harbor MOR February 2020reduced.pdf
MI 0600 Benton Harbor MOR January 2020reduced.pdf
MI 0600 Benton Harbor MOR May 2020reduced.pdf
MI 0600 Benton Harbor Feb MOR Cover Rev and Data Sheet it comes fromreduced.pdf
WSSN 00600 MOR 12-2020reduced.pdf
MOR NOV 2020reduced.pdf
MI 0600 Benton Harbor MOR September 2020reduced.pdf
MI 0600 Benton Harbor MOR July 2020reduced.pdf
MOR markup draft Oct 2020reduced.pdf
MI 0600 Benton Harbor MOR August 2020reduced.pdf

-13 MOR files should be attached for 2020.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:27 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #3

-14 MOR files should be attached for 2019.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:10 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #2

-12 MOR should be attached for 2018.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 7:58 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: Corrosion Study contacts and data dump #1

Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,
-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

MI 0600 Benton Harbor MOR April 2020

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **April-20**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1125	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	191.75	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.89	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.96	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.78%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	204	days
Primary Coagulant (Alum (Al3+)) on hand:	42495	lb.	Est. supply:	142	days
Cost of All Chemicals per Million Gallons:	$64.24	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	92	92
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
***If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.*

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	25.258464	Avg	0.871259	Max	0.988736	Min	0.748013

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019. Then changed under EGLE orders to a 90/10 blend and double the dose on February 21, 2020

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **April-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	*Fluoride*		*mg/l*												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.51	0.32	0.87		0	0.00	190	3.11	32	0.52	222	3.77	1.95	1.66	1.82
2	0.59	0.32	0.88		0	0.00	196	2.90	31	0.46	227	3.69	1.78	1.75	1.91
3	0.50	0.27	0.76		0	0.00	178	3.03	30	0.51	208	3.72	1.67	1.86	2.05
4	0.50	0.39	0.88		0	0.00	188	3.02	29	0.47	217	3.66	1.85	1.66	1.81
5	0.55	0.35	0.78		0	0.00	203	3.04	38	0.57	241	3.92	1.97	1.73	1.95
6	0.50	0.34	0.86		0	0.00	181	3.00	35	0.58	216	3.60	1.80	1.64	1.80
7	0.53	0.38	0.82	0.68	0	0.00	162	2.80	30	0.52	192	3.19	1.23	1.79	1.96
8	0.52	0.38	0.89		0	0.00	210	2.87	36	0.49	246	3.72	1.81	1.75	1.91
9	0.47	0.24	0.87		0	0.00	162	2.95	26	0.47	188	3.75	1.91	1.67	1.84
10	0.49	0.23	0.86		0	0.00	200	3.18	32	0.51	232	3.72	2.10	1.46	1.62
11	0.51	0.24	0.82		0	0.00	197	3.38	41	0.70	238	4.24	2.50	1.61	1.74
12	0.60	0.35	0.83		0	0.00	221	3.27	39	0.58	260	4.31	2.02	2.06	2.29
13	*0.41*	*0.22*	*0.83*		*0*	*0.00*	*186*	*3.22*	*28*	*0.48*	*214*	*4.02*	*2.23*	*1.59*	*1.79*
14	0.53	0.26	0.74		0	0.00	231	3.10	35	0.47	266	4.43	2.84	1.39	1.59
15	0.57	0.33	0.80		0	0.00	179	3.16	31	0.55	210	4.19	2.40	1.69	1.79
16	0.56	0.26	0.74		0	0.00	174	3.23	27	0.50	201	3.22	1.52	1.55	1.70
17	0.52	0.25	0.62	0.73	0	0.00	188	3.09	30	0.49	218	3.43	1.52	1.76	1.91
18	0.64	0.24	0.62		0	0.00	201	3.32	46	0.76	247	4.71	2.96	1.60	1.75
19	0.58	0.29	0.52		0	0.00	192	3.19	47	0.78	239	3.61	1.80	1.65	1.81
20	0.63	0.21	0.63		0	0.00	200	3.30	36	0.59	236	4.23	2.36	1.72	1.87
21	0.55	0.22	0.71		0	0.00	190	3.13	26	0.43	216	3.75	2.10	1.51	1.65
22	0.51	0.28	0.73	0.62	0	0.00	208	3.14	31	0.47	239	3.99	2.10	1.74	1.89
23	0.50	0.28	0.84		0	0.00	181	3.17	29	0.51	210	4.06	2.48	1.41	1.58
24	0.53	0.31	0.72		0	0.00	220	3.12	30	0.43	250	4.07	2.51	1.36	1.56
25	0.59	0.23	0.66		0	0.00	186	3.30	25	0.44	211	3.93	2.17	1.61	1.76
26	0.54	0.23	0.70		0	0.00	177	2.96	25	0.42	202	3.32	1.56	1.60	1.76
27	0.48	0.32	0.76		0	0.00	177	2.77	32	0.50	209	3.39	1.40	1.83	1.99
28	0.55	0.34	0.68		0	0.00	164	2.71	27	0.45	191	3.53	1.55	1.82	1.98
29	0.60	0.29	0.71	0.74	0	0.00	206	3.07	36	0.54	242	4.25	2.26	1.86	1.99
30	0.52	0.20	0.84		0	0.00	174	3.09	28	0.50	202	3.53	1.84	1.50	1.69
31															
Tot.							5,532		936		6,690				
Avg.	0.54	0.29	0.77	0.69	0.00	0.00	190.73	3.09	32.27	0.52	223.00	3.83	2.01	1.66	1.83
Max	0.64	0.39	0.89	0.74	0.00	0.00	231.00	3.38	47.00	0.78	266.00	4.71	2.96	2.06	2.29
Min.	0.41	0.20	0.52	0.62	0.00	0.00	162.00	2.71	25.00	0.42	188.00	3.19	1.23	1.36	1.56

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3		Total Alkalinity as CaCO3		Non-Carb. Hardness as CaCO3		Calcium as Ca++		Magnesium as Mg++		Chloride as Cl-	
D	pH													
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	7.9	178	192	118	128	60	64	43	48	17	17		
2	8.1	8.0	196	188	129	123	67	65	50	46	18	17		
3	8.0	8.0	178	172	133	119	45	53	43	42	17	17		
4	8.1	8.1	166	170	123	126	43	44	51	52	9	10		
5	8.3	7.9	160	158	132	129	28	29	47	47	10	10		
6	8.1	8.1	182	174	121	121	61	53	44	42	17	17	20.5	23.5
7	8.1	8.0	192	178	130	115	62	63	46	44	18	17		
8	8.0	8.0	196	172	143	110	53	62	49	45	18	15		
9	8.1	8.1	194	176	131	120	63	56	47	46	18	15		
10	8.1	8.0	202	190	146	124	56	66	50	47	19	17		
11	8.1	9.1	164	166	136	130	28	36	50	53	10	8		
12	8.1	8.1	178	172	144	133	34	39	54	55	11	9		
13	8.2	8.1	182	176	148	136	34	40	59	56	9	9		
14	8.2	8.2	170	178	124	138	46	40	49	52	12	12	21.0	23.0
15	8.2	8.1	168	172	131	132	37	40	50	55	11	9		
16	8.1	8.2	198	188	145	125	53	63	49	46	18	18	22.5	26.0
17	8.3	8.1	232	194	168	126	64	68	51	46	26	19	23.5	25.0
18	8.1	8.2	208	194	144	135	64	59	52	50	19	17	22.0	26.0
19	8.1	8.1	196	192	143	138	53	54	46	48	19	17	22.5	25.0
20	8.3	8.2	152	174	119	138	33	36	40	59	13	7	24.0	25.5
21	8.3	8.2	148	168	118	134	30	34	44	58	9	6		
22	8.3	8.2	172	168	129	131	43	37	52	55	10	7		
23	8.3	8.3	190	174	143	133	47	41	63	50	8	12		
24	8.2	8.2	172	178	134	134	38	44	47	49	13	14		
25	8.2	8.1	184	200	115	129	69	71	46	51	17	18		
26	8.0	8.0	170	182	118	122	52	60	43	49	15	15		
27	8.1	8.1	166	158	115	114	51	44	42	41	15	14	19.0	23.0
28	8.1	8.2	186	164	131	114	55	50	46	41	17	15	20.5	23.5
29	8.3	8.2	170	152	142	119	28	33	47	48	13	8	24.5	25.5
30	8.3	8.1	166	164	140	128	26	36	52	51	9	9		
31														
Avg.	8.2	8.1	180.5	176.1	133.1	126.8	47.4	49.3	48.4	49.1	14.5	13.2	22.0	24.6
Max	8.3	9.1	232.0	200.0	168.0	138.0	69.0	71.0	63.0	59.0	26.0	19.0	24.5	26.0
Min.	8.0	7.9	148.0	152.0	115.0	110.0	26.0	29.0	40.0	41.0	8.0	6.0	19.0	23.0

WSSN 0600 City of Benton Harbor Month/Year April-20

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9125	292.00	1.68	9.50	14.00	1.10	3	0.09	0.12	3	0.17	0.19	6	0	0
2	1.0075	321.00	1.68	10.90	17.80	1.30	3	0.08	0.10	3	0.19	0.24	6	0	0
3	0.8775	268.00	1.61	5.90	7.60	1.30	3	0.11	0.13	3	0.15	0.18	6	0	0
4	0.9300	293.00	1.66	5.10	6.00	1.20	3	0.08	0.09	3	0.17	0.18	6	0	0
5	0.9975	309.00	1.63	7.30	7.70	1.50	3	0.08	0.09	3	0.10	0.11	6	0	0
6	0.9000	284.00	1.81	8.10	12.50	0.99	3	0.07	0.08	3	0.10	0.12	6	0	0
7	0.8625	294.00	1.79	8.20	14.10	1.80	3	0.09	0.10	3	0.09	0.10	6	0	0
8	1.0925	337.00	1.62	6.50	8.60	1.40	3	0.09	0.10	3	0.08	0.09	6	0	0
9	0.8200	251.00	1.61	11.70	14.90	1.20	3	0.09	0.10	3	0.09	0.10	6	0	0
10	0.9375	291.00	1.63	13.40	18.70	1.50	3	0.11	0.14	3	0.08	0.09	6	0	0
11	0.8700	273.00	1.65	7.30	7.60	1.10	3	0.14	0.19	3	0.08	0.08	6	0	0
12	1.0075	318.00	1.66	6.40	6.70	1.20	3	0.17	0.20	3	0.07	0.09	6	0	0
13	0.8625	270.00	1.65	10.60	10.70	1.50	3	0.11	0.12	3	0.08	0.09	6	0	0
14	1.1125	350.00	1.66	13.10	14.50	1.10	3	0.09	0.10	3	0.12	0.16	6	0	0
15	0.8450	261.00	1.63	8.50	12.20	0.94	3	0.08	0.09	3	0.08	0.08	6	0	0
16	0.8050	239.00	1.56	7.50	11.20	1.10	3	0.11	0.11	3	0.10	0.09	6	0	0
17	0.9075	286.00	1.66	5.70	7.90	0.94	3	0.13	0.16	3	0.11	0.14	6	0	0
18	0.9050	280.00	1.63	9.70	13.60	0.97	3	0.12	0.14	3	0.10	0.11	6	0	0
19	0.8975	277.00	1.62	7.30	12.20	0.88	3	0.12	0.13	3	0.09	0.10	6	0	0
20	0.9050	262.00	1.52	4.90	6.50	0.73	3	0.14	0.15	3	0.09	0.09	6	0	0
21	0.9075	271.00	1.57	7.10	8.80	0.89	3	0.11	0.14	3	0.09	0.11	6	0	0
22	0.9900	299.00	1.59	6.60	7.20	0.92	3	0.13	0.17	3	0.09	0.11	6	0	0
23	0.8525	254.00	1.57	6.70	10.80	0.89	3	0.12	0.15	3	0.08	0.09	6	0	0
24	1.0525	310.00	1.55	4.10	4.90	1.00	3	0.15	0.17	3	0.08	0.10	6	0	0
25	0.8425	242.00	1.51	4.20	6.50	0.96	3	0.13	0.15	3	0.09	0.11	6	0	0
26	0.8925	261.00	1.51	3.20	3.50	0.66	3	0.13	0.14	3	0.09	0.10	6	0	0
27	0.9525	281.00	1.55	4.90	7.80	0.70	3	0.14	0.15	3	0.07	0.07	6	0	0
28	0.9050	266.00	1.55	4.30	6.80	0.73	3	0.12	0.17	3	0.08	0.09	6	0	0
29	1.0025	292.00	1.53	4.30	7.30	0.80	3	0.10	0.11	3	0.09	0.09	6	0	0
30	0.8400	250.00	1.57	23.90	26.40	1.80	2	0.08	0.09	2	0.10	0.10	4	0	0
31															
Total	27.6925	8482.00					89			89			178	0	0
Avg.	0.9231	282.73	1.62	7.90	10.50	1.10		0.11	0.13		0.10		Total	Total	Total
Max	1.1125	350.00	1.81	23.90	26.40	1.80		0.17	0.20		0.19	0.24	6	0	0
Min.	0.8050	239.00	1.51	3.20	3.50	0.66		0.07	0.08		0.07				

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	110	0	6	6.5	0.8793	94	4.24	3.12
2			1	A	132	0	6	6.5	0.9188	80	3.43	3.10
3			1	A	86	0	7	6.5	0.8479	84	3.92	
4			1	A	90	1	7	8.0	0.8840	68	3.06	3.02
5			1	A	55	1	7	8.0	0.9182	96	4.14	3.05
6			1	A	88	0	6	7.0	0.8947	89	3.94	2.99
7	2.73	City Hall	1	A	44	0	7	7.0	0.8975	120	5.28	3.04
7	2.86	Bait Shed	1	A	88	0	7	7.0	0.9869	40	0.00	2.94
7	3.07	SunnySpot	1	A	51	1	8	7.5	0.7480	66	3.48	3.10
7	2.85	B & Z	1	A	67	0	8	7.5	0.9304	71	3.00	3.30
11			1	A	36	0	8	9.0	0.8387	83	3.91	2.78
12			1	A	78	0	8	9.0	0.9003	85	3.73	2.90
13			1	A	79	0	9	10.0	0.7955	89	4.40	2.90
14			*1*	*A*	*63*	*1*	*9*	*10.0*	*0.8963*	*52*	*2.28*	*2.87*
15	2.59	City Hall	1	A	44	0	9	10.0	0.7480	85	4.49	3.23
15	3.30	Bait Shed	1	A	96	1	9	9.0	0.9327	68	2.88	3.11
15	2.89	SunnySpot	1	A	56	1	9	9.5	0.9479	74	3.08	3.18
15	2.98	B & Z	1	A	37	1	8	9.5	0.7830	83	4.18	3.10
19			1	A	57	0	9	9.5	0.9887	66	2.65	3.10
20			1	A	37	1	9	10.0	0.8332	77	3.63	3.15
21	2.97	City Hall	1	A	35	0	9	10.0	0.8595	107	4.92	3.10
21	3.02	Bait Shed	1	A	58	0	9	10.0	0.8933	61	2.69	3.30
21	3.00	SunnySpot	1	A	55	0	10	10.0	0.7716	90	4.61	3.10
21	2.66	B & Z	1	A	81	0	9	10.5	0.9175	74	3.20	3.22
25			1	A	39	1	8	9.0	0.8010	32	0.00	3.17
26			1	A	44	1	8	9.0	0.9074	57	2.49	3.01
27	2.77	City Hall	1	A	39	0	7.5	8.5	0.9198	76	3.26	3.18
27	2.97	Bait Shed	1	A	41	0	9.0	12.0	0.8068	81	3.96	2.96
27	2.93	SunnySpot	1	A	37	0	8.7	8.5	0.8500	103	4.79	2.74
27	3.30	B & Z	1	A	58	0	8.5	9.5	0.8539	60	2.79	2.95
31												
Totals									26.1510	2307.2		
AVG.	2.93		1	A	61	0	8	9	0.8717	76.9	3.39	3.06
Max	3.30				132	1	10	12	0.9887	119.7	5.28	3.30
Min	2.59				35	0	6	7	0.7480	31.8	0.00	2.74

DISTRIBUTION SYSTEM MONITORING WSSN 0600 April-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7	1.01			0.90	1.20		0.79			
8										
9										
10										
11										
12										
13										
14										
15										
16										
17	1.14			0.95	1.13		0.94			
18										
19										
20										
21										
22	0.77			1.20	1.01		0.52			
23										
24										
25										
26										
27										
28										
29	1.25			1.08	1.33		1.11			
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	16		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.02	1.33	0.52
Total number of check samples	0600			
Total number of positive check samples	0600			

MI0600 Benton Harbor MOR for March 2020

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** F1-S1

Signature of Operator-in-Charge

Month/Year **March-20** F1-S2

Water Plant Classification

Berrien County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1375	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	180.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.99	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.94	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.82%	Percent of Treated Water

Chemical Data

Chlorine on hand:	53530	lb.	Est. supply:	356	days
Primary Coagulant (Alum (Al3+)) on hand:	77444	lb.	Est. supply:	174	days
Cost of All Chemicals per Million Gallons:	$63.61	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	NO
Did POE disinfectant residual fall below 0.2 ppm during the month? **If yes**, indicate date(s) and duration on a separate sheet.	NO
Was minimum C*T credit achieved for the entire month? **If no**, indicate on a separate sheet the date(s) not achieved.	YES
Was continuous POE chlorine residual monitoring equipment off-line during the month? **If yes**, indicate date(s) and duration on a separate sheet.	NO

Distribution	Total	37.3951	Avg	1.2459774	Max	1.4139	Min	0.997

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **March-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.37	0.27	0.76		0	0.00	184	2.97	16	0.26	200	2.43	0.63	1.64	1.80
2	0.52	0.33	0.83		0	0.00	231	3.14	20	0.27	251	2.72	1.02	1.56	1.70
3	0.40	0.34	0.82		0	0.00	238	3.84	17	0.27	255	2.81	1.01	1.63	1.80
4	0.50	0.29	0.77	0.80	0	0.00	227	3.11	21	0.29	248	2.71	0.68	1.83	2.03
5	0.51	0.40	0.87		0	0.00	198	3.09	13	0.20	211	2.91	1.10	1.63	1.81
6	0.55	0.36	0.83		0	0.00	206	3.06	98	1.46	304	3.71	1.48	2.06	2.23
7	0.72	0.22	0.76		0	0.00	213	3.08	27	0.39	240	2.91	0.87	1.76	2.04
8	0.50	0.19	0.87		0	0.00	214	3.07	24	0.34	238	2.73	0.77	1.76	1.96
9	0.55	0.33	0.90		0	0.00	201	3.20	19	0.30	220	2.42	0.64	1.61	1.78
10	0.52	0.33	0.90		0	0.00	218	3.08	18	0.25	236	2.65	0.98	1.50	1.67
11	0.53	0.37	0.85	0.78	0	0.00	206	2.91	22	0.31	228	2.68	1.00	1.52	1.68
12	0.58	0.35	0.83		0	0.00	188	3.03	20	0.32	208	2.31	0.47	1.68	1.84
13	0.47	0.44	0.89		0	0.00	207	2.91	21	0.30	228	2.42	0.69	1.56	1.73
14	0.51	0.41	0.85		0	0.00	181	2.84	20	0.31	201	2.39	0.66	1.57	1.73
15	0.51	0.28	0.76		0	0.00	201	2.78	23	0.32	224	2.37	0.62	1.59	1.75
16	0.52	0.37	0.71		0	0.00	214	3.00	39	0.55	253	2.93	0.95	1.83	1.98
17	0.54	0.41	0.88		0	0.00	211	3.01	31	0.44	242	2.81	1.03	1.64	1.78
18	0.48	0.52	0.90		0	0.00	192	3.08	28	0.45	220	2.57	0.68	1.73	1.89
19	0.61	0.34	0.87	0.83	0	0.00	166	2.72	22	0.36	188	2.07	0.12	1.75	1.95
20	0.49	0.39	0.85		0	0.00	182	2.70	21	0.31	203	2.41	0.37	1.67	2.04
21	0.47	0.30	0.91		0	0.00	204	2.75	27	0.36	231	3.03	1.04	1.79	1.99
22	0.55	0.38	0.94		0	0.00	214	2.81	35	0.46	249	2.94	0.96	1.79	1.98
23	0.48	0.26	0.97		0	0.00	161	2.84	28	0.49	189	2.38	0.42	1.78	1.96
24	0.50	0.36	0.87		0	0.00	206	2.78	33	0.44	239	2.71	0.90	1.61	1.81
25	0.55	0.31	0.98		0	0.00	177	2.82	27	0.43	204	2.70	0.63	1.91	2.07
26	0.52	0.32	0.75		0	0.00	173	2.80	24	0.39	197	2.58	0.70	1.64	1.88
27	0.47	0.27	0.81		0	0.00	179	2.80	25	0.39	204	2.67	0.81	1.64	1.86
28	0.51	0.43	0.92		0	0.00	189	2.99	29	0.46	218	3.01	1.47	1.41	1.54
29	0.61	0.35	0.91		0	0.00	156	2.96	21	0.40	177	2.65	1.04	1.45	1.61
30	0.51	0.32	0.85		0	0.00	189	3.08	26	0.42	215	3.09	1.49	1.45	1.60
31	0.48	0.24	0.85		0	0.00	195	3.22	29	0.48	224	2.81	1.07	1.58	1.74
Tot.							5,937		808		6,945				
Avg.	0.52	0.34	0.85	0.80	0.00	0.00	197.53	2.97	26.50	0.40	224.03	2.69	0.84	1.67	1.85
Max	0.72	0.52	0.98	0.83	0.00	0.00	238.00	3.84	98.00	1.46	304.00	3.71	1.49	2.06	2.23
Min.	0.37	0.19	0.71	0.78	0.00	0.00	156.00	2.70	13.00	0.20	177.00	2.07	0.12	1.41	1.54

WSSN 0600 City of Benton Harbor Month/Year March-20

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9250	284.00	1.62	16.30	25.40	3.10	3	0.10	0.11	3	0.08	0.09	6	0	0
2	1.0975	336.00	1.61	11.40	20.10	2.80	3	0.10	0.11	3	0.08	0.09	6	0	0
3	0.9250	301.00	1.71	10.00	18.00	2.40	3	0.10	0.12	3	0.07	0.08	6	0	0
4	1.0900	363.00	1.75	6.80	10.70	1.50	3	0.08	0.09	3	0.06	0.06	6	0	0
5	0.9575	325.00	1.79	5.00	5.70	1.90	3	0.10	0.12	3	0.09	0.09	6	0	0
6	1.0050	312.00	1.70	10.00	11.70	1.70	3	0.09	0.10	3	0.07	0.07	6	0	0
7	1.0325	325.00	1.66	21.20	24.50	3.30	3	0.10	0.11	3	0.09	0.10	6	0	0
8	1.0400	339.00	1.71	14.20	18.20	3.20	3	0.08	0.09	3	0.08	0.09	6	0	0
9	0.9375	287.00	1.61	16.80	21.30	3.10	3	0.12	0.13	3	0.08	0.09	6	0	0
10	1.0550	346.00	1.73	17.10	20.60	2.50	3	0.08	0.11	3	0.08	0.09	6	0	0
11	1.0550	330.00	1.65	16.20	22.70	2.10	3	0.07	0.08	3	0.08	0.10	6	0	0
12	0.9275	291.00	1.65	14.20	26.20	1.90	3	0.08	0.09	3	0.07	0.08	6	0	0
13	1.0625	318.00	1.57	11.60	15.50	1.70	3	0.11	0.15	3	0.08	0.10	6	0	0
14	0.9500	303.00	1.68	10.00	16.60	1.60	3	0.06	0.07	3	0.09	0.09	6	0	0
15	1.0775	343.00	1.67	10.10	14.50	1.60	3	0.07	0.08	3	0.07	0.08	6	0	0
16	1.0650	338.00	1.67	8.90	11.30	1.50	3	0.07	0.08	3	0.10	0.11	6	0	0
17	1.0475	358.00	1.80	6.80	10.00	1.40	3	0.08	0.09	3	0.08	0.08	6	0	0
18	0.9300	293.00	1.66	7.90	13.30	1.60	3	0.09	0.10	3	0.12	0.13	6	0	0
19	0.9125	280.00	1.61	10.50	21.90	1.60	3	0.08	0.10	3	0.12	0.16	6	0	0
20	1.0075	301.00	1.57	6.70	8.50	1.50	3	0.08	0.08	3	0.08	0.09	6	0	0
21	1.1075	331.00	1.57	12.00	12.80	1.80	3	0.07	0.08	3	0.12	0.18	6	0	0
22	1.1375	352.00	1.63	10.90	12.20	2.10	3	0.07	0.08	3	0.16	0.18	6	0	0
23	0.8475	262.00	1.63	10.00	13.90	1.80	3	0.07	0.09	3	0.13	0.15	6	0	0
24	1.1075	341.00	1.62	6.70	7.30	1.40	3	0.08	0.09	3	0.18	0.19	6	0	0
25	0.9375	288.00	1.62	6.80	9.20	1.40	3	0.08	0.09	3	0.16	0.17	6	0	0
26	0.9225	280.00	1.62	4.90	5.90	1.40	3	0.08	0.08	3	0.15	0.16	6	0	0
27	0.9550	285.00	1.57	5.50	6.70	1.30	3	0.08	0.10	3	0.15	0.16	6	0	0
28	0.9450	275.00	1.53	6.50	11.10	1.40	3	0.10	0.13	3	0.13	0.16	6	0	0
29	0.7875	228.00	1.52	11.50	17.40	1.40	3	0.12	0.14	3	0.12	0.15	6	0	0
30	0.9175	269.00	1.54	13.50	19.20	1.70	3	0.10	0.12	3	0.14	0.17	6	0	0
31	0.9050	279.00	1.62	10.10	17.20	1.40	3	0.08	0.09	3	0.13	0.16	6	0	0
Total	30.6700	9563.00					93			93			186	0	0
Avg.	0.9894	308.48	1.64	10.65	15.15	1.91		0.09	0.10		0.10		Total	Total	Total
Max	1.1375	363.00	1.80	21.20	26.20	3.30		0.12	0.15		0.18	0.19	6	0	0
Min.	0.7875	228.00	1.52	4.90	5.70	1.30		0.06	0.07		0.06				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness							
D	pH		as CaCO3		as CaCO3		as CaCO3		Calcium as Ca++		Magnesium as Mg++		Chloride as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	7.9	206	162	142	116	64	46	54	42	17	14		
2	8.1	8.0	198	184	153	120	45	64	44	46	21	17		
3	8.0	7.9	194	180	141	130	53	50	46	43	19	17	22.0	26.5
4	8.1	8.0	158	168	130	121	28	47	45	45	11	14		
5	8.0	8.0	188	180	139	126	49	54	46	51	18	13		
6	8.1	8.0	180	176	134	122	46	54	44	46	17	15		
7	8.1	8.1	152	158	123	125	29	33	43	46	11	10		
8	8.3	7.9	176	166	143	121	33	45	55	49	9	11		
9	8.1	8.2	192	184	138	121	54	63	51	46	16	17		
10	8.0	8.0	184	196	119	128	65	68	46	51	17	17	19.5	23.5
11	7.9	8.0	196	170	156	122	40	48	41	45	23	14		
12	8.1	8.1	194	176	137	117	57	59	46	46	19	15		
13	8.1	8.1	180	172	126	117	54	55	45	46	17	14		
14	8.1	8.1	180	170	129	120	51	50	48	46	15	14		
15	8.0	8.0	182	172	124	117	58	55	46	45	16	15		
16	8.2	7.9	146	154	116	121	30	33	43	47	9	9	21.0	22.5
17	8.2	8.1	164	158	133	117	31	41	49	51	10	7		
18	8.0	8.0	190	172	130	113	60	59	48	45	17	15		
19	8.0	8.1	178	170	127	118	51	52	46	42	16	16		
20	8.3	8.3	178	166	138	121	40	45	52	46	12	12		
21	8.1	8.3	146	156	119	121	27	35	46	53	7	6		
22	8.1	8.0	178	166	141	123	37	43	58	57	8	6		
23	8.1	8.1	168	162	130	121	38	41	46	45	13	12	22.0	23.0
24	8.2	8.2	148	170	115	119	33	51	44	55	9	8		
25	8.1	8.1	148	150	109	123	39	27	42	46	11	9		
26	8.3	8.2	180	156	147	114	33	42	58	51	9	7		
27	8.2	8.2	176	154	147	122	29	32	52	46	11	9		
28	8.1	8.1	182	172	134	124	48	48	44	42	17	16		
29	8.1	8.0	196	188	132	124	64	64	49	46	18	17		
30	8.1	8.0	196	184	132	123	64	61	49	46	18	17	21.5	24.5
31	8.0	8.1	196	180	144	125	52	55	48	46	18	16		
Avg.	8.1	8.1	177.8	169.7	132.8	120.9	45.0	48.8	47.5	47.0	14.4	12.8	21.2	24.0
Max	8.3	8.3	206.0	196.0	156.0	130.0	65.0	68.0	58.0	57.0	23.0	17.0	22.0	26.5
Min.	7.9	7.9	146.0	150.0	109.0	113.0	27.0	27.0	41.0	42.0	7.0	6.0	19.5	22.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1		0	1	A	108	0	2	2.5	0.9436	83	3.46	2.74
2		0	1	A	77	0	2	2.5	1.0651	87	3.25	2.95
3		0	1	A	98	0	3	2.5	1.0201	46	1.78	2.47
4	2.06	City Hall	1	A	46	1	3	4.0	1.0256	96	3.70	3.06
4	1.29	Wolfs	1	A	29	0	3	3.0	0.9190	90	3.89	2.99
4	1.58	Bait Shed	1	A	49	1	3	3.5	0.9945	84	3.35	3.01
4	2.72	Sunny Spot	1	A	93	0	3	5.0	0.9846	67	2.70	3.08
4	2.46	B & Z	1	A	91	0	4	5.0	0.9499	84	3.49	3.09
9		0	1	A	82	0	5	3.5	1.0003	82	3.24	2.99
10		0	1	A	87	0	4	5.0	1.0048	82	3.23	3.05
11	2.90	City Hall	1	A	127	0	4	5.5	0.9446	100	4.21	3.00
11	2.89	Wolfs	1	A	78	0	4	4.5	1.0273	92	3.54	2.82
11	2.82	Bait Shed	1	A	91	0	4	5.0	1.0761	86	3.17	3.23
11	2.85	Sunny Spot	1	A	88	0	4	5.1	0.9306	97	4.14	3.19
11	2.43	B & Z	1	A	78	0	4	4.5	1.0662	64	2.36	0.59
16		0	1	A	16	0	4	6.0	0.9614	71	2.92	3.02
17		0	1	A	31	0	5	5.0	1.0010	92	3.62	2.94
18		0	1	A	32	0	5	4.5	0.9713	83	3.37	2.83
19	2.72	City Hall	1	A	46	0	4	4.5	1.0271	85	3.27	2.81
19	2.81	Wolfs	1	A	58	0	5	7.0	0.9800	89	3.59	2.89
19	2.54	Bait Shed	1	A	27	0	4	6.0	0.8992	63	2.76	3.03
19	2.60	Sunny Spot	1	A	32	0	5	6.0	0.9842	62	2.48	2.85
19	2.25	B & Z	1	A	47	0	5	6.0	0.8789	83	3.74	2.98
24		0	1	A	16	0	5	6.0	1.0177	80	3.09	3.18
25		0	1	A	38	0	5	6.0	0.8329	91	4.33	3.23
26		0	1	A	58	1	6	6.0	0.8512	99	4.60	3.12
27		0	1	A	15	1	6.0	7.0	0.9134	81	3.51	3.08
28		0	1	A	123	0	9.0	12.0	0.8263	57	2.72	3.08
29		0	1	A	44	0	8.7	8.5	0.7592	82	4.29	2.94
30		0	1	A	149	1	8.5	9.5	0.8649	74	3.40	3.08
31		0	1	A	84	0	6.3	6.5	0.9270	71	3.01	3.17
Totals									29.6479	2501.2		
AVG.	2.46		1	A	64	0	5	6	0.9564	80.7	3.36	2.93
Max	2.90				149	1	9	12	1.0761	100.4	4.60	3.23
Min	1.29				15	0	2	3	0.7592	45.8	1.78	0.59

MI 0600 Distribution Monitoring Report MI 0600 DMR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 March-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4	1.44		1.40	1.19	1.30		1.14			
5										
6										
7										
8										
9										
10										
11	1.21		1.20	1.36	1.59		1.36			
12										
13										
14										
15										
16										
17										
18										
19	0.79		1.01	1.49	1.49		1.01			
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.27	1.59	0.79
Total number of check samples	0600			
Total number of positive check samples	0600			

MI 0600 Benton Harbor NOR June 2020

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **June-20**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.105	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	170.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.99	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.96	Gallons Per Square Feet per Minute
Average Wash Water Use:	18.10%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	348 days
Primary Coagulant (Alum (Al3+)) on hand:	84593	lb.	Est. supply:	129 days
Cost of All Chemicals per Million Gallons:	$67.61	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	27.7093	Avg	0.9554356	Max	1.015611	Min	0.87387

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
Changed OPP to 90/10 Carus Aquadene SK7661 and raise dose to 3.0 mg/L February 21, 2020
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

WSSN 0600 City of Benton Harbor Month/Year June-20

COAGULATION PARAMETERS

DAY	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# sample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.9525	347.00	1.92	3.30	6.30	0.69	3	0.09	0.10	3	0.08	0.11	6	0	0
2	0.8675	283.00	1.72	4.50	5.80	0.32	3	0.09	0.11	3	0.08	0.09	6	0	0
3	0.8875	324.00	1.92	5.30	8.30	0.45	3	0.07	0.07	3	0.09	0.10	6	0	0
4	1.1050	391.00	1.86	5.20	10.40	0.35	3	0.09	0.10	3	0.11	0.12	6	0	0
5	0.9400	252.00	1.41	4.40	7.20	0.38	3	0.09	0.10	3	0.09	0.11	6	0	0
6	0.9350	290.00	1.42	2.30	2.60	0.47	3	0.08	0.09	3	0.10	0.11	6	0	0
7	1.0125	313.00	1.63	3.60	6.10	0.44	3	0.08	0.09	3	0.09	0.10	6	0	0
8	0.9875	306.00	1.63	2.00	2.50	0.30	3	0.07	0.07	3	0.08	0.09	6	0	0
9	1.0900	336.00	1.62	3.20	3.60	0.39	3	0.08	0.10	3	0.08	0.09	6	0	0
10	0.9000	277.00	1.62	6.50	8.00	0.66	3	0.11	0.13	3	0.12	0.15	6	0	0
11	0.9600	338.00	1.85	5.60	6.50	0.33	3	0.09	0.10	3	0.08	0.09	6	0	0
12	0.9300	326.00	1.84	6.60	12.10	0.45	3	0.08	0.09	3	0.08	0.09	6	0	0
13	0.9275	324.00	1.84	6.20	8.50	0.32	3	0.11	0.13	3	0.10	0.11	6	0	0
14	0.9050	365.00	2.12	4.30	8.50	0.34	3	0.10	0.11	3	0.08	0.09	6	0	0
15	0.9700	299.00	1.62	2.00	2.80	0.29	3	0.08	0.08	3	0.08	0.09	6	0	0
16	1.0775	333.00	1.63	1.70	2.40	0.31	3	0.07	0.08	3	0.08	0.09	6	0	0
17	0.9850	300.00	1.60	1.70	2.80	0.34	3	0.07	0.07	3	0.08	0.09	6	0	0
18	0.9700	295.00	1.60	1.70	2.20	0.35	3	0.08	0.08	3	0.07	0.07	6	0	0
19	1.0450	320.00	1.61	2.60	3.70	0.29	3	0.07	0.08	3	0.07	0.07	6	0	0
20	1.0550	314.00	1.57	4.70	8.30	0.38	3	0.10	0.11	3	0.10	0.11	6	0	0
21	1.0275	307.00	1.57	4.60	8.00	0.33	3	0.10	0.10	3	0.10	0.10	6	0	0
22	0.9850	299.00	1.60	4.40	7.40	0.29	3	0.09	0.11	3	0.09	0.11	6	0	0
23	0.9550	289.00	1.59	5.60	10.90	0.35	3	0.08	0.09	3	0.09	0.09	6	0	0
24	1.0225	309.00	1.59	2.90	3.70	0.37	3	0.08	0.09	3	0.08	0.08	6	0	0
25	1.0550	317.00	1.58	3.80	4.10	0.36	3	0.08	0.08	3	0.08	0.08	6	0	0
26	1.0275	315.00	1.58	2.90	3.50	0.26	3	0.08	0.09	3	0.08	0.09	6	0	0
27	0.9175	281.00	1.61	3.60	4.80	0.33	3	0.08	0.09	3	0.08	0.09	6	0	0
28	0.9875	290.00	1.55	2.90	3.10	0.33	3	0.08	0.09	3	0.07	0.07	6	0	0
29	1.0200	310.00	1.60	5.60	10.30	0.36	3	0.08	0.09	3	0.09	0.10	6	0	0
30	1.0200	304.00	1.57	4.20	7.00	0.34	3	0.07	0.08	3	0.09	0.11	6	0	0
31															
Total	29.5200	9354.00					90			90			180	0	0
Avg.	0.9840	311.80	1.66	3.93	6.05	0.37		0.08	0.09		0.09		Total	Total	Total
Max.	1.1050	391.00	2.12	6.60	12.10	0.69		0.11	0.13		0.12	0.15	6	0	0
Min.	0.8675	252.00	1.41	1.70	2.20	0.26		0.07	0.07		0.07				

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **June-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
DATE	Fluoride Applied as Fmg/l	Raw	Tap	Dist.	INTAKE PPD	INTAKE Free mg/l	Pre Treat Raw Line PPD	Pre Treat Raw Line Free mg/l	FILTERED PPD	FILTERED Free mg/l	Total NaOCl Use PPD	Total NaOCl Use Free mg/l	Demand mg/L	TAP Free mg/l	TAP Total mg/l
1	0.55	0.30	0.84		0	0.00	203	3.18	42	0.66	245	3.83	1.99	1.68	1.84
2	0.42	0.15	0.73		0	0.00	175	3.01	34	0.59	209	3.46	1.50	1.80	1.96
3	0.26	0.12	0.76		0	0.00	202	3.40	38	0.64	240	3.64	1.80	1.68	1.84
4	0.55	0.19	0.69		0	0.00	265	3.58	47	0.63	312	5.13	3.41	1.56	1.72
5	0.48	0.19	0.65		0	0.00	219	3.48	39	0.62	258	4.41	2.46	1.79	1.95
6	0.55	0.24	0.69		0	0.00	216	3.45	37	0.59	253	4.11	2.01	1.95	2.10
7	0.57	0.19	0.72		0	0.00	232	3.42	41	0.60	273	4.07	2.22	1.72	1.85
8	0.49	0.21	0.67		0	0.00	220	3.33	23	0.35	243	3.69	1.72	1.76	1.97
9	0.55	0.15	0.71		0	0.00	231	3.16	39	0.53	270	4.13	1.84	2.06	2.29
10	0.47	0.18	0.84		0	0.00	192	3.18	30	0.50	222	3.41	1.51	1.75	1.90
11	0.49	0.18	0.75		0	0.00	218	3.39	35	0.54	253	4.07	2.21	1.70	1.86
12	0.52	0.18	0.74		0	0.00	206	3.31	34	0.55	240	3.60	1.91	1.53	1.69
13	0.56	0.13	0.72		0	0.00	201	3.24	34	0.55	235	3.84	1.99	1.70	1.85
14	0.60	0.16	0.65		0	0.00	199	3.28	35	0.58	234	3.83	2.04	1.64	1.79
15	0.42	0.16	0.67		0	0.00	211	3.25	38	0.58	249	3.84	2.09	1.55	1.75
16	0.55	0.27	0.74		0	0.00	234	3.24	43	0.60	277	4.19	2.36	1.63	1.83
17	0.58	0.24	0.71		0	0.00	214	3.24	38	0.58	252	3.98	2.01	1.78	1.97
18	0.50	0.17	0.72		0	0.00	211	3.25	39	0.60	250	3.80	1.76	1.79	2.04
19	0.53	0.17	0.74		0	0.00	227	3.24	41	0.59	268	3.94	1.66	2.05	2.28
20	0.46	0.27	0.72		0	0.00	237	3.35	37	0.52	274	4.13	1.92	2.05	2.21
21	0.58	0.13	0.69		0	0.00	231	3.36	38	0.55	269	4.14	2.40	1.57	1.74
22	0.53	0.14	0.71		0	0.00	219	3.32	35	0.53	254	3.95	2.23	1.55	1.72
23	0.51	0.41	0.84		0	0.00	220	3.44	34	0.53	254	3.95	2.27	1.52	1.68
24	0.49	0.19	0.81	0.76	0	0.00	240	3.50	36	0.53	276	4.19	2.14	1.86	2.05
25	0.53	0.28	0.79		0	0.00	250	3.54	40	0.57	290	4.43	2.59	1.71	1.84
26	0.54	0.15	0.74		0	0.00	242	3.52	39	0.57	281	4.35	2.60	1.60	1.75
27	0.56	0.25	0.79		0	0.00	217	3.53	35	0.57	252	4.22	2.57	1.50	1.65
28	0.62	0.13	0.77		0	0.00	225	3.40	37	0.56	262	4.41	2.84	1.46	1.57
29	0.54	0.18	0.81		0	0.00	248	3.63	43	0.63	291	4.54	3.13	1.25	1.41
30	0.59	0.06	0.75		0	0.00	243	3.56	46	0.67	289	4.32	2.88	1.29	1.44
31															
Tot.							6,445		1,085		7,775				
Avg.	0.52	0.19	0.74	0.76	0.00	0.00	221.60	3.36	37.57	0.57	259.17	4.05	2.20	1.68	1.85
Max	0.62	0.41	0.84	0.76	0.00	0.00	265.00	3.63	47.00	0.67	312.00	5.13	3.41	2.06	2.29
Min.	0.26	0.06	0.65	0.76	0.00	0.00	175.00	3.01	23.00	0.35	209.00	3.41	1.50	1.25	1.41

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

DAY	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
TEST	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.0	156	150	109	102	47	48	38	37	15	14	18.0	20.5
2	8.1	7.9	160	152	117	100	43	52	38	37	16	15	18.5	21.0
3	8.1	8.1	168	156	125	104	43	52	40	42	17	13	18.0	21.0
4	8.1	8.2	168	158	124	108	44	50	38	36	18	17	18.5	21.0
5	8.2	8.2	166	156	120	111	46	45	40	39	16	14	18.0	20.5
6	8.1	8.2	154	150	113	114	41	36	43	39	11	13	26.0	27.0
7	8.3	8.2	140	146	109	114	31	32	42	46	8	8		
8	8.2	8.2	146	146	108	109	38	37	43	44	9	9	23.5	25.5
9	8.2	8.2	136	136	109	110	27	26	41	43	8	7		
10	8.2	8.2	156	148	111	105	45	43	37	37	16	14	20.0	23.0
11	8.1	8.1	158	150	114	105	44	45	38	37	16	14	19.0	22.5
12	8.3	8.2	158	152	112	106	46	46	41	39	14	13	18.5	21.5
13	8.2	8.2	156	148	112	104	44	44	38	36	15	14	18.5	22.5
14	8.2	8.1	156	148	112	104	44	44	38	36	15	14	18.5	22.0
15	8.1	8.2	136	136	108	106	28	30	39	40	9	9	24.0	25.5
16	8.1	8.2	140	144	108	113	32	31	40	42	10	9		
17	8.0	8.0	136	132	107	100	29	32	41	42	8	6		
18	8.0	8.1	138	136	110	103	28	33	42	43	8	7		
19	8.0	7.9	142	138	113	106	29	32	37	41	12	9		
20	8.0	8.1	156	146	111	100	45	46	35	34	17	15	18.5	22.0
21	8.0	8.0	156	148	110	103	46	45	37	35	16	15	17.5	21.5
22	8.1	8.1	160	152	112	103	48	49	37	36	17	15	18.5	22.0
23	8.1	8.1	162	156	115	105	47	51	37	35	17	17	19.5	22.0
24	8.3	8.2	138	136	113	105	25	31	37	39	11	9	22.5	23.5
25	8.3	8.2	142	138	115	106	27	32	38	38	12	10		
26	8.1	8.2	138	136	110	106	28	30	35	35	12	12		
27	8.3	8.2	136	134	107	105	29	29	37	37	11	10		
28	8.3	8.3	138	136	114	109	24	27	38	37	11	11		
29	8.2	8.0	160	154	111	102	49	52	39	38	15	15	19.0	23.0
30	8.1	8.1	154	148	110	104	44	44	39	37	14	13	19.0	22.5
31														
Avg.	8.1	8.1	150.3	145.5	112.3	105.7	38.0	39.8	38.8	38.6	13.1	12.0	19.7	22.5
Max	8.3	8.3	168.0	158.0	125.0	114.0	49.0	52.0	43.0	46.0	18.0	17.0	26.0	27.0
Min.	8.0	7.9	136.0	132.0	107.0	100.0	24.0	26.0	35.0	34.0	8.0	6.0	17.5	20.5

MI 0600 Distribution Monitoring Report MI 0600 DMR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 June-20

Chlorine Residual at Bacteriological Monitoring Stations mg/l

CITY OF BENTON HARBOR

DATE	1	2	3	4	5	blu water 6	B&Z 7
1							
2							
3			06/05/2020	Bait Shed Positive Coliform			
4	0.52		1.26	1.31	1.46		0.84
5	Up Stream	0.74		0.93	Down Str	0.70	
6	Up Stream	0.77		0.36	Down Str	0.45	
7							
8							
9							
10	1.23		1.60	1.05	1.10		0.96
11							
12							
13							
14							
15							
16							
17	1.26		1.34	1.39	1.34		1.26
18							
19							
20							
21							
22							
23							
24	1.06		1.12	0.97	1.16		1.07
25							
26							
27							
28							
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	32		
Total number of positive routine distribution samples	0600	1		
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.05	1.60	0.36
Total number of check samples	0600	6		
Total number of positive check samples	0600	0		

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

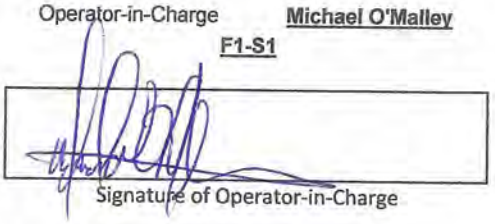
	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A					High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap	'C	'C	To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	66	1	9	10.0	0.9538	86	3.57	2.76
2			1	A	125	2	11	10.0	0.9029	76	3.33	3.03
3			1	A	28	0	14	10.5	0.9841	71	2.84	2.74
4	2.84	CH	1	A	56	0	13	12.5	0.9087	78	3.39	3.11
4	3.34	wolfs	1	A	29	0	13	13.0	0.8739	113	5.10	3.12
4	2.89	Bait	1	A	30	0	15	14.0	0.9180	79	3.41	3.09
4	2.76	Sunny	1	A	37	0	14	15.0	1.0012	79	3.14	3.13
4	2.52	BZ	1	A	44	0	11	14.0	0.9819	82	3.31	3.22
9			1	A	81	0	11	13.0	0.9762	82	3.31	3.03
10	2.73	CH	1	A	185	0	14	12.0	0.9730	70	2.85	3.13
10	2.87	wolfs	1	A	107	1	15	13.0	0.9284	28	1.18	3.05
10	3.05	Bait	1	A	53	0	16	14.0	0.9963	58	2.31	3.09
10	2.93	Sunny	1	A	31	0	15	14.5	0.9143	59	2.56	3.06
10	2.64	BZ	1	A	60	0	12	15.0	0.9729	78	3.38	3.05
15			1	A	33	0	11	16.0	0.9675	83	3.38	2.97
16			1	A	36	0	10	13.0	0.9869	83	3.34	3.00
17			1	A	52	0	11	14.0	0.9448	84	3.51	2.91
18			1	A	10	4	10	12.0	0.9815	86	3.47	2.74
19			1	A	42	1	13	13.0	1.0156	91	3.56	2.99
20			1	A	114	0	14	11.5	0.9905	45	1.81	2.73
21			1	A	78	0	14	12.5	0.9703	75	3.04	3.12
22			1	A	83	0	15	13.5	0.9596	86	3.56	3.27
23			1	A	55	0	18	14.0	0.9610	81	3.34	3.17
24	3.05	CH	1	A	68	0	20	17.0	0.9831	75	3.02	3.19
24	3.00	wolfs	1	A	77	0	20	18.0	0.9775	82	3.30	3.13
24	2.97	Bait	1	A	45	0	18	19.0	0.9637	82	3.38	2.91
24	2.96	Sunny	1	A	139	0	20.0	19.0	0.8924	47	2.09	2.68
24	2.65	BZ	1	A	17	1	9.0	12.0	0.8866	84	3.75	2.55
29			1	A	28	0	8.7	8.5	0.9578	94	3.89	
30			1	A	62	0	8.5	9.5	0.9986	104	4.11	2.42
31												
Totals									28.6631	2320.5		
AVG.	2.88		1	A	62	0	14	14	0.9554	77.4	3.19	2.99
Max	3.34				185	4	20	19	1.0156	112.6	5.10	3.27
Min	2.52				10	0	9	9	0.8739	27.7	1.18	2.42

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** **F1-S1**



Signature of Operator-in-Charge

Month/Year **February-20** **F1-S2**

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2575	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	149.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.02	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.15	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.43%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	424	days
Primary Coagulant (Alum (Al3+)) on hand:	93330	lb.	Est. supply:	129	days
Cost of All Chemicals per Million Gallons:	$65.32	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	87	87
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **If yes**, attach specific filter(s) information and indicate required follow-up status.	NO
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	NO
Did POE disinfectant residual fall below 0.2 ppm during the month? **If yes**, indicate date(s) and duration on a separate sheet.	NO
Was minimum C*T credit achieved for the entire month? **If no**, indicate on a separate sheet the date(s) not achieved.	YES
Was continuous POE chlorine residual monitoring equipment off-line during the month? **If yes**, indicate date(s) and duration on a separate sheet.	NO

Distribution	Total	27.124642	Avg	0.9680086	Max	1.084577	Min	0.878279

Remarks. We have begun to feed a new and more effective Orthopolyphosphate (OPP) 90 /10 Carus 32% February 21, 2020 Flow Meter is in full service at this time.
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **February-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.52	0.41	0.82		0	0.00	221	3.48	27	0.43	248	3.91	2.06	1.68	1.85
2	0.55	0.35	0.85		0	0.00	201	3.32	10	0.17	211	3.30	1.61	1.53	1.69
3	0.53	0.28	0.80		0	0.00	248	3.51	102	1.44	350	4.82	0.56	4.07	4.26
4	0.42	0.36	0.92		0	0.00	203	3.31	20	0.33	223	3.46	1.62	1.67	1.84
5	0.52	0.33	0.90		0	0.00	226	3.30	36	0.53	262	3.81	1.59	2.03	2.22
6	0.55	0.45	0.82		0	0.00	196	3.19	24	0.39	220	3.69	1.76	1.74	1.93
7	0.54	0.22	0.77		0	0.00	206	3.09	24	0.36	230	3.42	1.65	1.60	1.77
8	0.47	0.27	0.79		0	0.00	209	3.10	33	0.49	242	3.59	1.64	1.70	1.95
9	0.55	0.38	0.83		0	0.00	236	3.17	33	0.44	269	4.12	2.09	1.73	2.03
10	0.51	0.38	0.76		0	0.00	235	3.32	32	0.45	267	3.82	1.99	1.67	1.83
11	0.54	0.39	0.83		0	0.00	201	3.22	23	0.37	224	3.77	2.10	1.50	1.67
12	0.61	0.41	0.89	0.77	0	0.00	224	3.34	27	0.40	251	3.71	2.00	1.55	1.71
13	0.48	0.37	0.84		0	0.00	228	3.23	31	0.44	259	3.88	2.11	1.64	1.77
14	0.55	0.32	0.86		0	0.00	173	3.05	27	0.48	200	3.40	1.69	1.54	1.71
15	0.61	0.34	0.92		0	0.00	213	3.26	42	0.64	255	4.20	1.90	2.02	2.30
16	0.45	0.36	0.84		0	0.00	225	3.28	44	0.64	269	4.21	2.31	1.69	1.90
17	0.52	0.36	0.81		0	0.00	243	3.27	43	0.58	286	4.53	2.63	1.63	1.90
18	0.45	0.36	0.74		0	0.00	231	3.21	38	0.53	269	4.14	2.17	1.75	1.97
19	0.52	0.38	0.80	0.66	0	0.00	237	3.24	33	0.45	270	4.26	2.31	1.82	1.95
20	0.48	0.31	0.80		0	0.00	197	2.92	12	0.18	209	3.34	0.64	2.50	2.70
21	0.49	0.39	0.88		0	0.00	185	2.91	16	0.25	201	3.10	1.18	1.74	1.92
22	0.52	0.28	0.80		0	0.00	184	2.91	15	0.24	199	3.17	1.24	1.76	1.93
23	0.56	0.23	0.83		0	0.00	206	2.92	16	0.23	222	3.51	1.69	1.65	1.82
24	0.45	0.29	0.75		0	0.00	220	2.61	29	0.34	249	3.59	1.81	1.56	1.78
25	0.47	0.33	0.69		0	0.00	228	3.02	25	0.33	253	4.04	2.22	1.69	1.82
26	0.53	0.31	0.78		0	0.00	214	3.05	23	0.33	237	3.56	1.63	1.72	1.93
27	0.50	0.38	0.83		0	0.00	208	3.05	23	0.34	231	3.61	1.64	1.79	1.97
28	0.51	0.26	0.87		0	0.00	206	3.02	21	0.31	227	3.30	1.21	1.90	2.09
29	0.53	0.24	0.84		0	0.00	215	3.06	19	0.27	234	3.64	1.81	1.66	1.83
30															
31															
Tot.							5,998		821		7,067				
Avg.	0.51	0.34	0.82	0.72	0.00	0.00	214.45	3.15	29.24	0.43	243.69	3.76	1.75	1.81	2.00
Max	0.61	0.45	0.92	0.77	0.00	0.00	248.00	3.51	102.00	1.44	350.00	4.82	2.63	4.07	4.26
Min.	0.42	0.22	0.69	0.66	0.00	0.00	173.00	2.61	10.00	0.17	199.00	3.10	0.56	1.50	1.67

WSSN 0600 City of Benton Harbor Month/Year February-20

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9475	280.00	1.55	5.50	9.70	1.40	3	0.10	0.11	3	0.08	0.10	6	0	0
2	0.9025	269.00	1.57	8.40	13.80	1.00	3	0.10	0.14	3	0.08	0.10	6	0	0
3	1.0550	323.00	1.61	7.90	15.20	1.20	3	0.10	0.12	3	0.08	0.09	6	0	0
4	0.9150	273.00	1.57	4.90	5.10	1.00	3	0.12	0.15	3	0.08	0.08	6	0	0
5	1.0225	380.00	1.96	7.20	10.70	1.30	3	0.15	0.18	3	0.07	0.08	6	0	0
6	0.9175	346.00	2.18	6.00	9.50	1.30	3	0.15	0.15	3	0.09	0.10	6	0	0
7	0.9950	349.00	1.85	5.70	9.90	1.50	3	0.12	0.18	3	0.11	0.14	6	0	0
8	1.0075	393.00	2.05	7.40	12.90	1.60	3	0.09	0.12	3	0.11	0.13	6	0	0
9	1.1125	435.00	2.06	5.60	8.00	1.60	3	0.11	0.13	3	0.11	0.12	6	0	0
10	1.0575	345.00	1.72	7.30	9.90	1.50	3	0.13	0.17	3	0.12	0.16	6	0	0
11	0.9325	302.00	1.70	6.70	11.70	1.80	3	0.13	0.16	3	0.08	0.09	6	0	0
12	1.0025	295.00	1.55	7.80	12.90	1.70	3	0.15	0.19	3	0.12	0.16	6	0	0
13	1.0525	335.00	1.67	6.30	8.50	1.50	3	0.12	0.15	3	0.11	0.13	6	0	0
14	0.8475	273.00	1.69	11.20	11.50	2.10	3	0.12	0.16	3	0.15	0.17	6	0	0
15	0.9750	304.00	1.64	10.60	11.90	3.40	3	0.14	0.15	3	0.25	0.31	6	0	0
16	1.0250	329.00	1.69	6.30	7.20	2.90	3	0.13	0.15	3	0.29	0.33	6	0	0
17	1.1100	357.00	1.69	5.00	5.90	2.00	3	0.11	0.14	3	0.11	0.16	6	0	0
18	1.0750	321.00	1.57	7.70	8.60	1.80	3	0.10	0.12	3	0.08	0.09	6	0	0
19	1.0925	320.00	1.54	7.50	10.50	1.70	3	0.09	0.10	3	0.10	0.16	6	0	0
20	1.0075	302.00	1.58	8.50	9.10	1.40	3	0.07	0.07	3	0.07	0.08	6	0	0
21	0.9500	285.00	1.58	6.70	8.40	1.40	3	0.08	0.10	3	0.08	0.08	6	0	0
22	0.9450	290.00	1.61	7.90	13.80	1.50	3	0.12	0.15	3	0.08	0.09	6	0	0
23	1.0525	316.00	1.58	4.90	7.00	2.20	3	0.08	0.08	3	0.08	0.11	6	0	0
24	1.2575	324.00	1.36	5.40	8.30	1.60	3	0.08	0.09	3	0.08	0.09	6	0	0
25	1.1275	338.00	1.58	4.70	6.00	1.40	3	0.07	0.07	3	0.09	0.10	6	0	0
26	1.0475	317.00	1.58	5.30	6.70	1.50	3	0.07	0.08	3	0.08	0.09	6	0	0
27	1.0175	309.00	1.60	5.40	7.40	1.50	3	0.07	0.08	3	0.07	0.07	6	0	0
28	1.0175	307.00	1.59	13.50	14.30	2.70	3	0.08	0.08	3	0.08	0.08	6	0	0
29	1.0475	308.00	1.55	13.80	22.70	2.90	3	0.08	0.08	3	0.12	0.14	6	0	0
30															
31															
Total	29.5150	9325.00					87			87			174	0	0
Avg.	1.0178	321.55	1.67	7.28	10.24	1.74		0.11	0.13		0.11		Total	Total	Total
Max	1.2575	435.00	2.18	13.80	22.70	3.40		0.15	0.19		0.29	0.33	6	0	0
Min.	0.8475	269.00	1.36	4.70	5.10	1.00		0.07	0.07		0.07				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.0	192	188	129	125	63	63	47	46	18	17		
2	8.0	8.0	198	188	131	113	67	75	47	45	19	18		
3	8.0	8.1	196	182	141	123	55	59	50	47	17	16	20.5	24.5
4	8.0	8.1	188	182	127	121	61	61	46	45	18	17		
5	8.1	7.9	158	160	111	127	47	33	43	47	12	10	20.5	23.0
6	8.0	7.9	174	170	118	104	56	66	42	43	17	15		
7	7.9	7.9	168	164	115	109	53	55	41	42	16	15		
8	8.1	8.0	186	152	141	113	45	39	59	51	10	6		
9	8.0	8.0	174	164	133	116	41	48	55	52	9	8		
10	8.0	8.1	194	188	141	121	53	67	47	49	18	16		
11	8.0	8.1	192	196	124	126	68	70	48	50	17	17		
12	8.0	8.0	218	184	156	123	62	61	58	51	18	14		
13	8.0	8.0	206	190	152	130	54	60	50	52	20	15	19.0	26.0
14	7.9	7.9	178	186	117	129	61	57	46	47	16	17		
15	8.2	8.1	182	164	148	126	34	38	59	51	8	9		
16	7.9	7.9	174	176	149	135	25	41	58	59	7	7		
17	8.0	7.9	152	168	120	135	32	33	51	63	6	3	21.0	24.5
18	8.0	8.0	152	168	112	129	40	39	47	52	8	9		
19	7.9	8.0	176	180	116	121	60	59	42	44	17	17		
20	7.9	7.9	166	174	115	117	51	57	43	46	14	15		
21	7.9	7.8	164	170	113	110	51	60	42	45	14	14		
22	8.0	7.9	180	152	134	108	46	44	45	38	17	14		
23	8.0	8.0	180	172	125	115	55	57	45	46	17	14	23.5	26.0
24	8.0	8.0	162	158	120	116	42	42	49	50	10	8	21.5	23.5
25	8.0	7.9	152	152	119	122	33	30	46	46	9	9		
26	8.0	7.9	152	158	115	119	37	39	39	44	13	12		
27	8.1	7.9	142	148	121	117	21	31	46	50	6	6		
28	8.2	8.1	166	156	128	111	38	45	50	51	10	7		
29	8.0	7.9	174	164	126	115	48	49	43	40	16	16		
30														
31														
Avg.	8.0	8.0	175.7	170.8	127.5	119.9	48.2	51.0	47.7	48.0	13.7	12.4	21.0	24.6
Max	8.2	8.1	218.0	196.0	156.0	135.0	68.0	75.0	59.0	63.0	20.0	18.0	23.5	26.0
Min.	7.9	7.8	142.0	148.0	111.0	104.0	21.0	30.0	39.0	38.0	6.0	3.0	19.0	23.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	81	0	3	3.5	0.9476	54	2.25	1.53
2			1	A	65	0	3	3.5	0.9547	57	2.37	1.55
3			1	A	51	0	4	3.5	1.0846	59	2.14	1.54
4			1	A	75	1	4	4.0	0.9626	57	2.35	1.52
5			1	A	81	1	4	5.0	1.0256	59	2.29	1.66
6			1	A	79	2	3	4.0	0.9092	65	2.82	1.95
7			1	A	68	0	3	3.5	1.0041	46	1.82	1.53
8			1	A	61	0	3	5.0	1.0052	49	1.93	1.56
9			1	A	59	1	4	5.0	0.9741	54	2.19	1.53
10			1	A	62	0	3	3.5	1.0439	48	1.83	1.78
11			1	A	66	2	3	3.5	0.9065	54	2.35	0.87
12	1.53	City Hall	1	A	89	0	4	3.5	1.0096	52	2.02	1.57
13	1.52	Wolfs	1	A	98	3	3	4.0	0.9967	59	2.33	1.55
14	1.38	Bait Shed	1	A	65	0	3	4.0	0.8991	36	1.58	1.58
15	1.50	Sunny Spot	1	A	99	0	3	4.5	0.9068	50	2.19	1.52
16	1.34	B & Z	1	A	61	0	3	5.0	0.9541	54	2.22	1.56
17			1	A	70	0	3	4.0	0.9430	53	2.24	1.49
18			1	A	67	1	3	4.0	0.9697	64	2.62	1.54
19	1.53	City Hall	1	A	60	1	3	3.0	0.9459	65	2.73	1.43
20	1.46	Wolfs	1	A	72	0	2	2.5	0.9334	58	2.47	1.41
21	1.51	Bait Shed	1	A	54	0	2	3.0	0.9942	91	3.63	2.93
22	1.65	Sunny Spot	1	A	71	0	2	2.5	0.9375	89	3.76	3.30
23	1.48	B & Z	1	A	66	0	2	2.5	0.9444	81	3.41	2.49
24			1	A	80	1	3	4.0	1.0242	77	2.97	2.65
25	2.47	City Hall	1	A	94	0	3	4.0	0.9347	79	3.34	2.80
26	2.42	Sunny Spot	1	A	58	0	3	4.0	0.9936	92	3.67	2.94
27	1.98	B & Z	1	A	52	0	2.5	3.5	0.9256	96	4.10	2.77
28	2.48	Wolfs	1	A	47	0	9.0	12.0	1.0256	94	3.63	2.62
29	2.27	Bait Shed	1	A	84	0	8.7	8.5	0.9590	83	3.41	2.95
30												
31												
Totals									28.1153	1875.3		
AVG.	1.77		1	A	70	0	3	4	0.9695	64.7	2.66	1.95
Max	2.48				99	3	9	12	1.0846	95.9	4.10	3.30
Min	1.34				47	0	2	3	0.8991	35.9	1.58	0.87

DISTRIBUTION SYSTEM MONITORING WSSN 0600 February-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12	1.20		1.10	1.11	1.32		0.95			
13										
14										
15										
16										
17										
18										
19	0.85		1.14	1.02	1.19		0.85			
20										
21										
22										
23										
24										
25										
26	1.10		1.17	1.04	1.29		0.76			
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	15	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.07	1.32 0.76
Total number of check samples	0600		
Total number of positive check samples	0600		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **January-20**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1225	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	180.83	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.02	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.21	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.23%	Percent of Treated Water

Chemical Data

Chlorine on hand:	29795	lb.	Est. supply:	406	days
Primary Coagulant (Al3+)) on hand:	99685	lb.	Est. supply:	94	days
Cost of All Chemicals per Million Gallons:	$65.46	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	29.0181	Avg	0.9657619	Max	1.23554	Min	0.68451

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.
BH Water Recieved an Action Level Exceedance for Lead in mid January. Recieved Load Alum in January.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **January-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.46	0.38	0.77	0.70		0.00	207	3.09	12	0.18	219	3.55	1.68	1.69	1.87
2	0.49	0.28	0.72		0	0.00	216	3.07	12	0.17	228	3.63	1.78	1.63	1.85
3	0.53	0.37	0.76		0	0.00	199	3.14	12	0.19	211	3.48	1.75	1.57	1.73
4	0.43	0.43	0.87		0	0.00	241	3.37	35	0.49	276	3.55	1.84	1.56	1.71
5	0.57	0.40	0.86		0	0.00	223	3.36	29	0.44	252	4.39	2.58	1.64	1.81
6	0.47	0.33	0.91		0	0.00	218	2.93	35	0.47	253	4.09	2.39	1.54	1.70
7	0.61	0.42	0.85		0	0.00	231	3.25	38	0.53	269	4.19	2.22	1.80	1.97
8	0.49	0.29	0.79	0.80	0	0.00	245	3.29	38	0.51	283	4.42	2.38	1.86	2.04
9	0.52	0.48	0.99		0	0.00	232	3.22	32	0.44	264	4.25	2.25	1.82	2.00
10	0.51	0.32	0.81		0	0.00	200	3.23	18	0.29	218	3.75	1.86	1.66	1.89
11	0.50	0.27	0.78		0	0.00	219	3.24	12	0.18	231	3.71	1.89	1.56	1.82
12	0.44	0.34	0.91		0	0.00	232	3.18	13	0.18	245	3.96	2.20	1.53	1.76
13	0.40	0.27	0.87		0	0.00	219	3.52	15	0.24	234	3.51	1.57	1.79	1.94
14	0.59	0.39	0.75		0	0.00	250	3.77	18	0.27	268	4.16	2.34	1.66	1.82
15	0.52	0.28	0.85	0.76	0	0.00	229	3.52	28	0.43	257	3.87	2.04	1.66	1.83
16	0.40	0.41	0.83		0	0.00	197	3.26	29	0.48	226	3.39	1.11	2.10	2.28
17	0.42	0.50	0.80		0	0.00	189	3.05	28	0.45	217	3.44	1.30	1.97	2.14
18	0.50				0	0.00	219	3.10	33	0.47	252	3.85	1.72	1.90	2.13
19	0.49	0.30	0.76		0	0.00	200	3.13	21	0.33	221	3.84	2.08	1.57	1.76
20	0.50	0.21	0.77		0	0.00	198	3.11	21	0.33	219	4.78	2.94	1.67	1.84
21	0.46	0.25	0.73		0	0.00	208	3.27	23	0.36	231	3.80	1.91	1.64	1.89
22	0.49	0.39	0.84	0.74	0	0.00	242	3.48	20	0.29	262	4.08	2.47	1.45	1.61
23	0.41	0.40	0.80		0	0.00	214	3.49	20	0.33	234	3.54	1.75	1.62	1.79
24	0.52	0.28	0.83		0	0.00	247	3.50	23	0.33	270	3.79	1.88	1.67	1.91
25	0.38	0.28	0.70		0	0.00	252	3.46	41	0.56	293	3.54	1.43	1.95	2.11
26	0.37	0.35	0.73		0	0.00	298	3.96	23	0.31	321	3.95	1.77	1.97	2.18
27	0.51	0.27	0.75		0	0.00	295	4.06	22	0.30	317	4.02	2.34	1.37	1.68
28	0.55	0.30	0.68		0	0.00	261	3.50	21	0.28	282	4.68	2.88	1.65	1.80
29	0.45	0.42	0.86	0.66	0	0.00	251	3.55	16	0.23	267	4.21	2.33	1.67	1.88
30	0.51	0.43	0.86		0	0.00	218	3.55	17	0.28	235	3.92	1.74	2.01	2.18
31	0.49	0.40	0.82		0	0.00	265	3.64	10	0.14	275	4.15	2.39	1.61	1.76
Tot.							6,908		703		7,830				
Avg.	0.48	0.35	0.81	0.73	0.00	0.00	228.33	3.35	23.50	0.34	251.83	3.91	2.01	1.71	1.90
Max	0.61	0.50	0.99	0.80	0.00	0.00	298.00	4.06	41.00	0.56	321.00	4.78	2.94	2.10	2.28
Min.	0.37	0.21	0.68	0.66	0.00	0.00	189.00	2.93	12.00	0.17	211.00	3.39	1.11	1.37	1.61

WSSN 0600 City of Benton Harbor Month/Year January-20

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# sample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	1.0000	311.00	1.64	4.50	5.30	1.30	3	0.08	0.10	3	0.13	0.14	6	0	0
2	1.0500	316.00	1.58	4.30	5.00	0.97	3	0.08	0.08	3	0.12	0.14	6	0	0
3	0.9475	289.00	1.60	3.90	4.10	1.30	3	0.09	0.10	3	0.11	0.12	6	0	0
4	1.0675	313.00	1.54	5.60	6.50	1.50	3	0.11	0.13	3	0.10	0.12	6	0	0
5	0.9900	301.00	1.60	4.90	6.90	1.30	3	0.09	0.10	3	0.10	0.11	6	0	0
6	1.1125	290.00	1.42	5.80	9.90	1.50	3	0.10	0.11	3	0.09	0.10	6	0	0
7	1.0625	330.00	1.63	4.20	7.00	1.10	3	0.11	0.13	3	0.10	0.10	6	0	0
8	1.1100	338.00	1.60	2.90	4.20	0.81	3	0.08	0.08	3	0.10	0.10	6	0	0
9	1.0750	329.00	1.61	6.20	6.40	1.40	3	0.08	0.12	3	0.10	0.10	6	0	0
10	0.9250	286.00	1.63	4.00	5.70	1.30	3	0.13	0.16	3	0.10	0.13	6	0	0
11	1.0100	310.00	1.61	5.90	6.90	1.40	3	0.12	0.13	3	0.11	0.13	6	0	0
12	1.0875	333.00	1.61	4.70	5.40	1.30	3	0.13	0.14	3	0.09	0.11	6	0	0
13	0.9300	279.00	1.58	18.90	21.90	2.80	3	0.12	0.14	3	0.09	0.17	6	0	0
14	0.9900	305.00	1.62	14.20	23.70	4.10	3	0.16	0.17	3	0.15	0.19	6	0	0
15	0.9700	319.00	1.73	8.70	9.50	1.80	3	0.09	0.11	3	0.09	0.09	6	0	0
16	0.9025	262.00	1.53	10.40	11.60	1.90	3	0.08	0.09	3	0.09	0.09	6	0	0
17	0.9250	283.00	1.61	12.30	17.30	1.60	3	0.08	0.08	3	0.08	0.09	6	0	0
18	1.0550	323.00	1.61	6.10	7.20	2.10	3	0.07	0.09	3	0.09	0.12	6	0	0
19	0.9550	296.00	1.63	7.30	8.20	1.30	3	0.08	0.09	3	0.11	0.12	6	0	0
20	0.9500	301.00	1.67	17.30	19.70	3.60	3	0.06	0.07	3	0.07	0.09	6	0	0
21	0.9500	295.00	1.63	10.00	13.10	3.60	3	0.15	0.18	3	0.10	0.10	6	0	0
22	1.0375	320.00	1.62	12.20	13.40	3.60	3	0.09	0.10	3	0.11	0.12	6	0	0
23	0.9150	293.00	1.68	9.70	13.70	3.60	3	0.12	0.14	3	0.14	0.17	6	0	0
24	1.0550	370.00	1.85	9.40	14.30	2.10	3	0.09	0.10	3	0.12	0.12	6	0	0
25	1.0875	361.00	1.75	9.90	18.30	1.90	3	0.12	0.15	3	0.12	0.16	6	0	0
26	1.1225	433.00	1.75	15.10	18.90	4.90	3	0.17	0.27	3	0.16	0.26	6	0	0
27	1.0850	409.00	1.98	7.50	9.50	1.90	3	0.11	0.11	3	0.12	0.13	6	0	0
28	1.1125	321.00	1.52	5.50	7.90	1.00	3	0.08	0.09	3	0.08	0.08	6	0	0
29	1.0550	302.00	1.51	4.80	5.30	0.95	3	0.09	0.11	3	0.07	0.07	6	0	0
30	0.9175	266.00	1.53	7.40	11.40	1.80	3	0.10	0.11	3	0.09	0.09	6	0	0
31	1.0875	313.00	1.51	6.20	12.00	1.50	3	0.11	0.13	3	0.08	0.09	6	0	0
Total	31.5400	9797.00					93			93			186	0	0
Avg.	1.0174	316.03	1.63	8.06	10.65	1.98		0.10	0.12		0.10		Total	Total	Total
Max	1.1225	433.00	1.98	18.90	23.70	4.90		0.17	0.27		0.16	0.26	6	0	0
Min.	0.9025	262.00	1.42	2.90	4.10	0.81		0.06	0.07		0.07				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness							
D	pH		as CaCO3		as CaCO3		as CaCO3		Calcium as Ca++		Magnesium as Mg++		Chloride as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.2	8.0	178	156	140	113	38	43	59	51	8	7		
2	8.1	7.9	162	148	129	114	33	34	46	43	11	10		
3	8.1	8.0	168	162	126	118	42	44	54	51	8	8		
4	8.0	8.0	212	178	145	120	67	58	53	45	19	16		
5	8.0	8.1	190	186	118	124	72	62	51	49	16	16	20.0	22.5
6	8.0	8.0	188	192	144	126	44	66	40	42	21	21		
7	7.9	7.9	192	186	131	126	61	60	50	47	17	17		
8	7.9	8.0	146	162	113	124	33	38	45	48	8	10	21.5	24.0
9	8.0	7.9	188	182	121	117	67	65	50	48	16	15	19.0	22.5
10	8.1	8.1	162	158	123	117	39	41	53	55	7	5		
11	8.2	8.0	172	156	130	112	42	44	57	49	7	8		
12	8.2	8.2	158	156	116	117	42	39	49	51	9	7		
13	8.0	7.9	182	168	131	114	51	54	46	42	17	16		
14	7.9	8.0	192	168	133	114	59	54	49	42	17	15		
15	8.0	7.9	176	180	115	120	61	60	45	46	16	16		
16	8.0	7.9	180	176	117	112	63	64	44	45	17	16	19.5	23.0
17	8.0	7.9	182	174	117	112	65	62	43	41	18	17		
18	8.0	8.0	148	146	117	114	31	32	47	48	7	6		
19	8.0	7.8	140	154	106	112	34	42	43	51	8	7		
20	8.0	7.8	162	154	128	110	34	44	51	51	8	7		
21	8.0	8.0	160	154	119	109	41	45	51	46	8	9	20.5	22.0
22	7.9	7.7	192	172	132	112	60	60	47	42	18	17	21.5	24.5
23	8.1	8.0	188	178	129	116	59	62	46	48	17	14		
24	8.1	7.9	160	158	117	122	43	36	51	50	8	8		
25	7.9	7.8	172	176	114	115	58	61	45	46	15	15		
26	8.0	8.0	214	172	146	110	68	62	53	45	20	15		
27	8.0	8.1	166	168	121	126	45	42	49	51	11	10	23.0	24.5
28	8.2	8.1	152	178	119	120	33	58	54	55	4	10		
29	8.1	8.1	148	150	124	127	24	23	47	48	7	7		
30	8.0	8.0	214	188	143	116	71	72	53	45	20	18		
31	7.9	8.0	188	178	129	121	59	57	47	43	17	17		
Avg.	8.0	8.0	174.8	167.9	125.5	117.0	49.3	50.9	49.0	47.4	12.8	12.1	20.7	23.3
Max	8.2	8.2	214.0	192.0	146.0	127.0	72.0	72.0	59.0	55.0	21.0	21.0	23.0	24.5
Min.	7.9	7.7	140.0	146.0	106.0	109.0	24.0	23.0	40.0	41.0	4.0	5.0	19.0	22.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1		0	1	A	65	0	4	7.0	0.9203	47	2.01	1.56
2	1.77	City Hall	1	A	49	0	5	6.0	0.9363	49	2.08	1.57
2	1.51	Wolfs	1	A	78	1	5	6.0	0.9053	59	2.57	1.52
2	1.46	Bait Shed	1	A	118	1	5	6.0	1.1615	56	1.92	1.49
2	1.38	Sunny Spot	1	A	48	0	5	5.6	0.8574	53	2.46	1.53
2	1.31	B & Z	1	A	74	0	4	5.5	0.9236	54	2.31	1.62
7		0	1	A	75	0	5	5.0	0.9585	56	2.30	1.50
8	1.77	City Hall	1	A	77	0	5	7.0	0.9554	45	1.86	1.57
8	1.67	Wolfs	1	A	105	0	4	4.5	0.9277	54	2.28	1.74
8	1.64	Bait Shed	1	A	111	0	4	6.0	0.8667	56	2.57	0.00
8	1.56	Sunny Spot	1	A	78	0	0	0.0	0.9286	50	2.11	1.61
8	1.51	B & Z	1	A	93	0	4	6.0	0.9226	55	2.34	1.53
13		0	1	A	118	0	5	4.5	0.9937	50	1.98	1.57
14		0	1	A	185	1	4	5.0	0.9617	40	1.63	0.33
15	1.54	City Hall	1	A	108	1	4	4.5	0.9915	50	2.01	1.61
15	1.59	Wolfs	1	A	85	1	4	4.5	0.9951	52	2.06	1.57
15	1.52	Bait Shed	1	A	103	0	4	4.5	0.9419	58	2.42	1.56
15	1.38	Sunny Spot	1	A	80	0	4	6.0	0.9756	55	2.24	1.48
15	1.35	B & Z	1	A	81	0	4	5.0	0.8577	58	2.66	1.46
20		0	1	A	96	0	3	5.0	0.6844	64	3.67	1.52
21		0	1	A	86	1	3	4.5	0.9064	64	2.79	1.54
22	1.68	City Hall	1	A	97	1	2	3.5	0.9575	63	2.59	1.69
22	2.17	Wolfs	1	A	100	0	2	3.5	0.9855	61	2.44	1.82
22	1.71	Bait Shed	1	A	112	0	3	4.0	1.0631	35	1.29	1.84
22	1.73	Sunny Spot	1	A	93	2	3	3.0	1.2352	87	2.79	1.65
22	1.43	B & Z	1	A	53	0	3	3.0	1.2130	88	2.88	1.54
27	1.54	City Hall	1	A	86	0	3.0	4.0	1.1758	48	1.63	1.54
27	1.67	Wolfs	1	A	75	0	9.0	12.0	0.8992	50	2.19	1.54
27	1.56	Bait Shed	1	A	53	1	8.7	8.5	0.9466	47	1.96	
27	1.75	Sunny Spot	1	A	120	0	8.5	9.5	0.8946	50	2.20	1.60
27	1.45	B & Z	1	A	96	0	3.2	3.5	0.9883	53	2.13	1.57
Totals									29.9307	1703.8		
AVG.	1.59		1	A	91	0	4	5	0.9655	55.0	2.28	1.49
Max	2.17				185	2	9	12	1.2352	88.2	3.67	1.84
Min	1.31				48	0	0	0	0.6844	34.7	1.29	0.00

DISTRIBUTION SYSTEM MONITORING WSSN 0600 January-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1	1.03		0.76	1.34	0.92		0.80			
2										
3										
4										
5										
6										
7										
8	1.10		1.27	0.89	1.17		0.80			
9										
10										
11										
12										
13										
14										
15	1.24		1.08	0.90	1.19		0.49			
16										
17										
18										
19										
20										
21										
22	0.96		1.13	1.11	1.22		0.96			
23										
24										
25										
26										
27										
28										
29	1.08		1.03		1.02		0.74			
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	24		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.01	1.34	0.49
Total number of check samples	0600			
Total number of positive check samples	0600			

MI 0600 Benton Harbor May 2020 MOR 6/4/20

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** **F1-S1**

Signature of Operator-in-Charge

Month/Year **May-20** **F1-S2**

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0925	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	171.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.93	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.94	Gallons Per Square Feet per Minute
Average Wash Water Use:	9.55%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	127	days
Primary Coagulant (Alum (Al3+)) on hand:	27403	lb.	Est. supply:	136	days
Sodium Fluoride (NaF) on hand	2250	lb.	Est. supply:	51	days
Orthopolyphosphate on Hand (SK7661)	4703	lb.	Est. supply:	268	days
Cost of All Chemicals per Million Gallons:	$64.41	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	92	92
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	26.191698	Avg	0.8767278	Max	0.996586	Min	0.77845

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
Changed OPP to 90/10 Carus Aquadene SK7661 and raise dose to 3.0 mg/L February 21, 2020
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **May-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.56	0.25	0.81		0	0.00	204	3.12	29	0.44	233	3.52	1.80	1.56	1.72
2	0.51	0.20	0.92		0	0.00	191	3.26	36	0.61	227	4.20	2.22	1.74	1.98
3	0.53	0.29	0.86		0	0.00	201	3.17	32	0.50	233	3.84	1.88	1.71	1.96
4	0.52	0.26	0.96		0	0.00	243	3.32	35	0.48	278	4.25	2.61	1.49	1.64
5	0.52	0.22	0.87		0	0.00	197	3.17	31	0.50	228	3.97	2.27	1.55	1.70
6	0.45	0.18	0.86		0	0.00	191	2.95	30	0.46	221	3.51	1.69	1.66	1.82
7	0.56	0.34	0.84		0	0.00	173	2.94	29	0.49	202	3.69	1.84	1.69	1.85
8	0.54	0.27	0.87		0	0.00	208	2.94	31	0.44	239	4.15	2.31	1.68	1.84
9	0.58	0.31	0.89		0	0.00	189	3.09	38	0.62	227	3.75	2.25	1.39	1.50
10	0.40	0.33	0.84		0	0.00	195	3.02	35	0.54	230	4.22	2.20	1.85	2.02
11	0.54	0.19	0.83		0	0.00	205	3.02	36	0.53	241	4.30	2.36	1.73	1.94
12	0.35	0.24	0.81		0	0.00	172	3.04	27	0.48	199	3.56	1.86	1.58	1.70
13	0.58	0.29	0.94	0.81	0	0.00	211	3.32	33	0.52	244	3.74	1.80	1.69	1.84
14	0.51	0.27	0.85		0	0.00	196	3.18	33	0.54	229	4.19	2.25	1.77	1.94
15	0.56	0.25	0.89		0	0.00	168	3.13	28	0.52	196	3.48	1.53	1.78	1.95
16	0.59	0.28	0.91		0	0.00	166	3.05	28	0.51	194	3.44	1.56	1.73	1.88
17	0.50	0.29	0.84		0	0.00	171	2.87	30	0.50	201	3.19	1.76	1.28	1.43
18	0.51	0.31	0.87		0	0.00	193	3.04	39	0.61	232	4.08	1.80	2.10	2.28
19	0.52	0.36	0.89		0	0.00	191	2.99	33	0.52	224	3.79	1.91	1.66	1.88
20	0.50	0.35	0.88		0	0.00	193	3.01	35	0.55	228	3.85	1.86	1.85	1.99
21	0.58	0.27	0.88	0.81	0	0.00	184	2.99	31	0.50	215	4.12	1.87	1.96	2.25
22	0.53				0	0.00	170	2.92	29	0.50	199	3.53	1.73	1.63	1.80
23	0.42	0.39	0.89		0	0.00	142	2.27	31	0.50	173	2.98	1.15	1.68	1.83
24	0.54	0.30	0.86		0	0.00	161	3.03	30	0.57	191	3.37	1.59	1.62	1.78
25	0.44	0.37	0.85		0	0.00	188	2.99	39	0.62	227	3.40	1.51	1.75	1.89
26	0.61	0.21	0.85		0	0.00	189	3.11	38	0.63	227	3.77	1.64	1.96	2.13
27	0.53	0.28	0.85		0	0.00	198	3.03	41	0.63	239	3.72	1.46	2.08	2.26
28	0.60	0.33	0.86		0	0.00	182	2.92	35	0.56	217	3.58	1.39	1.99	2.19
29	0.56	0.36	0.89		0	0.00	182	2.93	36	0.58	218	3.73	1.52	2.21	2.21
30	0.55	0.40	0.92		0	0.00	167	2.76	110	1.82	277	5.31	3.19	1.98	2.12
31	0.53	0.34	0.88		0	0.00	179	2.82	35	0.55	214	3.68	1.62	1.85	2.06
Tot.							5,596		1,074		6,903				
Avg.	0.52	0.29	0.87	0.81	0.00	0.00	187.37	3.02	35.60	0.58	222.97	3.81	1.90	1.75	1.91
Max	0.61	0.40	0.96	0.81	0.00	0.00	243.00	3.32	110.00	1.82	278.00	5.31	3.19	2.21	2.28
Min.	0.35	0.18	0.81	0.81	0.00	0.00	142.00	2.27	27.00	0.44	173.00	2.98	1.15	1.28	1.43

WSSN 0600 City of Benton Harbor Month/Year May-20

COAGULATION PARAMETERS

D A I E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# sample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	0.9775	303.00	1.63	16.20	26.50	2.00	3	0.09	0.10	3	0.10	0.10	6	0	0
2	0.8750	266.00	1.60	7.10	7.30	1.00	3	0.07	0.08	3	0.08	0.10	6	0	0
3	0.9475	294.00	1.63	9.20	12.10	1.00	3	0.08	0.09	3	0.08	0.09	6	0	0
4	1.0925	310.00	1.49	10.90	12.70	1.40	3	0.08	0.09	3	0.12	0.15	6	0	0
5	0.9275	292.00	1.66	10.50	14.80	1.00	3	0.08	0.10	3	0.09	0.10	6	0	0
6	0.9675	253.00	1.59	10.80	14.90	2.30	3	0.10	0.13	3	0.17	0.26	6	0	0
7	0.8775	339.00	2.03	9.00	14.70	0.57	3	0.09	0.11	3	0.11	0.12	6	0	0
8	1.0550	318.00	1.59	8.20	10.00	0.63	3	0.10	0.11	3	0.10	0.14	6	0	0
9	0.9125	266.00	1.53	11.60	15.10	0.63	3	0.09	0.10	3	0.09	0.09	6	0	0
10	0.9625	296.00	1.62	14.80	16.30	1.10	3	0.10	0.10	3	0.11	0.12	6	0	0
11	1.0150	312.00	1.62	13.10	13.90	0.96	3	0.10	0.11	3	0.10	0.11	6	0	0
12	0.8450	264.00	1.64	15.00	16.40	1.00	2	0.09	0.09	2	0.10	0.11	4	0	0
13	0.9500	266.00	1.47	12.80	20.20	1.50	3	0.14	0.21	3	0.13	0.19	6	0	0
14	0.9200	283.00	1.62	8.20	11.60	0.75	3	0.09	0.11	3	0.08	0.08	6	0	0
15	0.8000	252.00	1.66	14.00	21.10	0.88	3	0.09	0.10	3	0.09	0.11	6	0	0
16	0.8125	266.00	1.72	7.40	13.60	0.72	3	0.09	0.10	3	0.09	0.09	6	0	0
17	0.8900	272.00	1.61	7.00	12.50	0.50	3	0.11	0.12	3	0.08	0.09	6	0	0
18	0.9475	298.00	1.65	4.90	7.00	0.49	3	0.08	0.09	3	0.08	0.08	6	0	0
19	0.9550	304.00	1.67	4.90	6.00	0.49	3	0.07	0.07	3	0.08	0.09	6	0	0
20	0.9575	299.00	1.64	5.60	8.20	0.62	3	0.07	0.08	3	0.08	0.10	6	0	0
21	0.9175	233.00	1.34	4.70	6.30	1.20	3	0.09	0.09	3	0.08	0.09	6	0	0
22	0.8700	274.00	1.66	4.90	6.70	0.56	3	0.07	0.08	3	0.08	0.09	6	0	0
23	0.9325	292.00	1.65	3.90	6.20	0.54	3	0.10	0.11	3	0.08	0.09	6	0	0
24	0.7925	243.00	1.61	8.40	11.40	0.42	3	0.10	0.11	3	0.09	0.10	6	0	0
25	0.9375	281.00	1.58	3.60	5.40	0.55	3	0.10	0.10	3	0.08	0.09	6	0	0
26	0.9075	318.00	1.58	4.20	5.60	0.42	3	0.11	0.13	3	0.10	0.12	6	0	0
27	0.9750	307.00	1.66	1.90	2.30	0.32	3	0.08	0.09	3	0.07	0.08	6	0	0
28	0.9300	288.00	1.63	2.00	2.20	0.37	3	0.08	0.09	3	0.09	0.10	6	0	0
29	0.9275	286.00	1.62	2.70	4.30	0.30	3	0.07	0.08	3	0.08	0.08	6	0	0
30	0.9025	278.00	1.62	2.50	3.90	0.30	3	0.07	0.07	3	0.08	0.09	6	0	0
31	0.9475	292.00	1.62	2.20	2.80	0.29	3	0.07	0.07	3	0.08	0.09	6	0	0
Total	28.7275	8845.00					92			92			184	0	0
Avg.	0.9267	285.32	1.62	7.81	10.71	0.80		0.09	0.10		0.09		Total	Total	Total
Max	1.0925	339.00	2.03	16.20	26.50	2.30		0.14	0.21		0.17	0.26	6	0	0
Min.	0.7925	233.00	1.34	1.90	2.20	0.29		0.07	0.07		0.07				

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1		0	1	A	43	0	9	9.5	0.9869	75	3.02	2.64
2		0	1	A	64	0	9	10.5	0.8220	83	4.00	
3		0	1	A	65	0	11	10.0	0.9067	85	3.72	2.80
4		0	1	A	51	0	10	10.0	0.9762	81	3.29	2.77
5		0	1	A	81	0	10	10.0	0.8581	66	3.03	2.58
6		0	1	A	63	0	10	10.0	0.9389	80	3.39	2.86
7		0	1	A	52	0	11	10.5	0.8163	87	4.23	2.87
8		0	1	A	28	0	10	10.5	0.8607	85	3.92	3.27
9		0	1	A	64	0	10	12.0	0.9036	72	3.14	3.12
10		0	1	A	28	0	10	10.5	0.8134	89	4.33	3.18
11		0	1	A	83	0	12	12.0	0.8373	77	3.65	3.03
12		0	1	A	102	0	11	12.0	0.8344	70	3.32	2.88
13	2.88	City Hall	1	A	79	0	10	10.0	0.9727	79	3.21	2.93
13	2.67	Wolfs	1	A	65	0	10	10.5	0.8167	75	3.55	3.20
13	2.86	Bait Shed	1	A	66	0	10	10.5	0.8402	70	3.29	3.03
13	2.91	Sunny Spot	1	A	60	0	11	10.5	0.8416	77	3.62	3.13
13	2.78	B & Z	1	A	39	0	10	11.5	0.9393	72	3.05	2.97
18		0	1	A	49	0	11	12.0	0.8486	77	3.57	3.13
19		0	1	A	83	0	10	12.0	0.8818	76	3.43	3.25
20		0	1	A	58	0	10	12.0	0.8847	75	3.35	3.15
21	2.74	City Hall	1	A	54	0	10	11.5	0.7785	82	4.15	2.98
21	1.79	Wolfs	1	A	71	4	11	12.0	0.8419	78	3.64	3.03
21	2.51	Bait Shed	1	A	59	1	10	10.5	0.8666	81	3.69	3.20
21	2.62	Sunny Spot	1	A	78	1	11	10.5	0.8471	89	4.16	3.25
21	2.77	B & Z	1	A	70	0	12	11.0	0.9966	85	3.38	2.86
26		0	1	A	45	3	11	11.5	0.8988	87	3.83	3.22
27		0	1	A	54	0	12.0	13.0	0.9585	93	3.84	3.20
28		0	1	A	66	0	9.0	12.0	0.9247	90	3.86	
29		0	1	A	35	0	8.7	8.5	0.8728	38	1.73	
30		0	1	A	15	0	8.5	9.5	0.7794	93	4.71	2.94
31		0	1	A	31	0	10.0	13.0	0.8677	85	3.89	3.00
Totals									27.2126	2451.1		
AVG.	2.65		1	A	59	0	10	11	0.8778	79.1	3.60	3.03
Max	2.91				102	4	12	13	0.9966	93.0	4.71	3.27
Min	1.79				15	0	9	9	0.7785	38.1	1.73	2.58

DISTRIBUTION SYSTEM MONITORING WSSN 0600 May-20

Chlorine Residual at Bacteriological Monitoring Stations mg/l

CITY OF BENTON HARBOR

DATE	1	2	3	4	5	blu water 6	B&Z 7			
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13	1.09		0.49	1.17	1.27		1.03			
14										
15										
16										
17										
18										
19										
20										
21	1.42		0.22	1.20	1.32		1.02			
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	10		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.02	1.42	0.22
Total number of check samples	0600			
Total number of positive check samples	0600			

MI 0600 Cover Page Feb 2020 MOR Revised

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: CITY OF BENTON HARBOR

WSSN:600

Operator-in-Charge **Michael O'Malley** F1-S1

Signature of Operator-in-Charge

Month/Year **February-20** F1-S2

Water Plant Classification

Berrien County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2575	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	149.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.02	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.15	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.43%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	424 days
Primary Coagulant (Alum (Al3+)) on hand:	93330	lb.	Est. supply:	129 days
Cost of All Chemicals per Million Gallons:	$65.32	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	2
Number of filter confluence samples collected:	87	87
Percent of filter confluence samples > 0.3 NTU:	0%	2%
Number of filter confluence samples > 1 NTU	0	0

Missing in original

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? **If yes,** attach specific filter(s) information and indicate required follow-up status.	NO
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? **If yes,** indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	NO
Did POE disinfectant residual fall below 0.2 ppm during the month? **If yes,** indicate date(s) and duration on a separate sheet.	NO
Was minimum C*T credit achieved for the entire month? **If no,** indicate on a separate sheet the date(s) not achieved.	YES
Was continuous POE chlorine residual monitoring equipment off-line during the month? **If yes,** indicate date(s) and duration on a separate sheet.	NO

Distribution	Total	27.124642	Avg	0.9680086	Max	1.084577	Min	0.878279

Remarks. We have begun to feed a new and more effective Orthopolyphosphate (OPP) 90 /10 Carus 32% February 21, 2020 Flow Meter is in full service at this time.
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

2 Filter Confluence of Effluent (CFE)

Date	North Filter Line		South Filter Line	
	Filt Avg	Filt Max	Filt Avg	Filt Max
2/1/2020	0.10	0.11	0.08	0.10
2/2/2020	0.10	0.14	0.08	0.10
2/3/2020	0.10	0.12	0.08	0.09
2/4/2020	0.12	0.15	0.08	0.08
2/5/2020	0.15	0.18	0.07	0.08
2/6/2020	0.15	0.15	0.09	0.10
2/7/2020	0.12	0.18	0.11	0.14
2/8/2020	0.09	0.12	0.11	0.13
2/9/2020	0.11	0.13	0.11	0.12
2/10/2020	0.13	0.17	0.12	0.16
2/11/2020	0.13	0.16	0.08	0.09
2/12/2020	0.15	0.19	0.12	0.16
2/13/2020	0.12	0.15	0.11	0.13
2/14/2020	0.12	0.16	0.15	0.17
2/15/2020	0.14	0.15	0.25	0.31
2/16/2020	0.13	0.15	0.29	0.33
2/17/2020	0.11	0.14	0.11	0.16
2/18/2020	0.10	0.12	0.08	0.09
2/19/2020	0.09	0.10	0.10	0.16
2/20/2020	0.07	0.07	0.07	0.08
2/21/2020	0.08	0.10	0.08	0.08
2/22/2020	0.12	0.15	0.08	0.09
2/23/2020	0.08	0.08	0.08	0.11
2/24/2020	0.08	0.09	0.08	0.09
2/25/2020	0.07	0.07	0.09	0.10
2/26/2020	0.07	0.08	0.08	0.09
2/27/2020	0.07	0.08	0.07	0.07
2/28/2020	0.08	0.08	0.08	0.08
2/29/2020	0.08	0.08	0.12	0.14

3samples/day Analyzed by Operator
3 sample taken per day | 29 day
87

water plant has 2 CFE 1) North 2) South

Reg on CFE Sampling original rule preferred Samples be taken by operators every 3 hrs so that is what we do

Reg CFE Turbidity must be ≤ 0.3 NTU in 95% of Samples Taken during the month.

2/87 = 0.23 ∝ 97.7% <0.3 ntu

There was supposed to be a data section below that populates the Turbidity answers on the Cover sheet. It got lost in all the changes I've had to make to my MOR File I created originally in 1992

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **H. George Regan** Month/Year **December 2020**

F1-S2

F1-S2
Water Plant Classification

H. George Regan
Signature of Operator-in-Charge

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.654	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	193.17	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.87	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	3.04	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.13%	Percent of Treated Water

Chemical Data

Chlorine on hand:	37118	lb.	Est. supply:	426	days
Primary Coagulant (Alum (Al3+)) on hand:	90153	lb.	Est. supply:	140	days
Cost of All Chemicals per Million Gallons:	$64.92	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	87	87
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	22.491763	Avg	0.75585161	Max	0.982333	Min	0.534407

Remarks:
The fluoride chemical feed system was taken out of service on December 18, 2020 due to issues with the granular chemical mixing tank transfer pump. A replacement pump has been ordered.
A tap pH value was not recorded on the laboratory bench sheet on December 10, 2020.
A raw temperature value was not recorded on the laboratory bench sheet on December 30, 2020.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **December 2020**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9675	299.00	1.63	6.70	7.10	0.64	3	0.09	0.10	3	0.10	0.13	6	0	0
2	0.8725	265.00	1.60	7.70	8.60	0.69	3	0.08	0.09	3	0.09	0.09	6	0	0
3	0.7925	240.00	1.59	10.30	11.60	0.99	3	0.10	0.10	3	0.09	0.10	6	0	0
4	0.8588	263.00	1.61	12.70	13.30	1.00	3	0.10	0.12	3	0.09	0.11	6	0	0
5	0.9150	283.00	1.63	12.30	13.60	0.96	3	0.09	0.10	3	0.09	0.09	6	0	0
6	0.7600	235.00	1.96	6.90	7.10	0.84	3	0.09	0.10	2	0.10	0.10	4	0	0
7	0.8950	285.00	1.68	5.70	5.90	1.13	3	0.11	0.13	3	0.11	0.12	6	0	0
8	0.9725	298.00	1.61	5.10	6.90	0.75	3	0.08	0.08	3	0.08	0.08	6	0	0
9	0.8775	274.00	1.64	8.80	11.30	0.91	3	0.09	0.09	3	0.09	0.10	6	0	0
10	0.8650	262.00	1.59	6.10	7.90	0.76	3	0.09	0.10	3	0.08	0.09	6	0	0
11	0.8300	255.00	1.62	5.60	8.30	0.78	3	0.09	0.10	3	0.09	0.11	6	0	0
12	0.7400	225.00	1.60	8.80	9.30	0.78	3	0.08	0.08	2	0.08	0.10	4	0	0
13	0.8425	246.00	1.54	14.10	23.50	0.97	3	0.07	0.08	3	0.09	0.11	6	0	0
14	0.7975	227.00	1.50	16.10	14.30	1.20	3	0.09	0.09	3	0.07	0.08	6	0	0
15	0.9550	303.00	1.67	9.90	12.60	1.10	3	0.09	0.10	3	0.09	0.11	6	0	0
16	0.7875	252.00	1.68	9.50	16.30	0.84	3	0.08	0.09	3	0.09	0.09	6	0	0
17	0.7875	253.00	1.69	9.20	17.50	1.00	3	0.08	0.09	3	0.08	0.10	6	0	0
18	0.7875	253.00	1.69	7.70	12.80	1.00	3	0.09	0.11	3	0.10	0.10	6	0	0
19	0.7550	228.00	1.59	10.50	13.50	1.20	3	0.09	0.10	2	0.10	0.10	4	0	0
20	0.7975	252.00	1.66	6.70	8.40	1.00	3	0.10	0.10	2	0.10	0.10	4	0	0
21	1.0075	314.00	1.64	6.40	7.80	0.97	3	0.11	0.12	3	0.10	0.10	6	0	0
22	0.8075	254.00	1.65	8.50	8.90	1.10	3	0.07	0.07	2	0.09	0.09	4	0	0
23	1.6540	289.00	0.92	17.80	35.90	0.96	3	0.09	0.10	3	0.10	0.11	6	0	0
24	0.7500	237.00	1.66	7.90	8.80	1.10	3	0.08	0.11	3	0.09	0.09	6	0	0
25	0.8825	295.00	1.76	8.80	12.50	1.00	3	0.09	0.10	3	0.09	0.10	6	0	0
26	0.7125	246.00	1.76	8.90	11.90	1.00	3	0.09	0.12	3	0.09	0.10	6	0	0
27	0.6900	232.00	1.77	6.80	7.80	1.00	3	0.09	0.10	3	0.10	0.11	6	0	0
28	0.9325	310.00	1.75	8.10	10.50	1.00	3	0.08	0.09	3	0.10	0.12	6	0	0
29	0.8075	243.00	1.58	7.50	8.20	1.30	3	0.07	0.07	2	0.10	0.10	4	0	0
30	0.9350	286.00	1.61	5.90	6.60	1.50	3	0.09	0.10	3	0.11	0.12	6	0	0
31	0.9900	307.00	1.63	5.30	5.40	1.00	3	0.11	0.12	3	0.12	0.13	6	0	0
Total	27.0253	8211.00					93			87			174	0	0
Avg.	0.8718	264.87	1.63	8.78	11.42	0.98		0.09	0.10		0.09		Total	Total	Total
Max	1.6540	314.00	1.96	17.80	35.90	1.50		0.11	0.13		0.12	0.13	6	0	0
Min.	0.6900	225.00	0.92	5.10	5.40	0.64		0.07	0.07		0.07				

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR **December 2020**

CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D	pH													
A														
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.2	8.1	156	154	128	129	28	25	46	47	10	9		
2	8.2	8.2	158	156	125	124	33	32	46	49	10	8	23.0	24.5
3	8.0	7.9	156	150	131	123	25	27	45	47	11	8		
4	8.1	7.9	152	146	125	123	27	23	44	46	10	8		
5	8.2	8.2	158	154	132	127	26	27	46	49	10	8		
6	8.2	8.1	144	146	124	127	20	19	42	43	10	9		
7	8.2	7.9	162	154	141	124	21	30	50	42	9	12	22.5	25.5
8	8.2	8.2	160	156	136	131	24	25	47	47	10	9		
9	8.2	8.2	164	160	143	133	21	27	51	49	9	9	23.0	26.0
10	8.2		164	168	138	129	26	39	47	50	11	11		
11	8.3	8.3	158	160	137	134	21	26	51	53	8	7		
12	8.2	8.2	152	156	126	130	26	26	41	46	12	10		
13	8.2	8.2	156	154	131	128	25	26	46	46	10	10		
14	8.1	8.0	198	174	135	124	63	50	57	41	14	17	20.0	24.0
15	8.1	8.0	184	174	134	123	50	51	40	39	20	18	19.5	24.0
16	8.1	8.0	182	176	129	124	53	52	41	40	19	18	18.5	23.5
17	8.1	8.0	178	170	128	121	50	49	40	39	19	17	19.5	24.0
18	8.1	7.9	204	172	151	122	53	50	42	38	24	18	20.0	24.0
19	8.1	8.0	168	158	143	127	25	31	49	47	11	10		
20	8.1	8.1	162	158	136	127	26	31	51	50	9	8		
21	8.1	8.1	164	162	142	136	22	26	51	53	9	7	23.0	24.5
22	8.1	8.0	164	162	136	134	28	28	51	51	9	9		
23	8.1	8.0	196	188	126	128	70	60	55	51	15	15		
24	8.1	8.1	184	178	128	125	56	53	42	42	19	18	17.5	22.5
25	8.1	8.2	188	182	126	126	62	56	45	43	18	18	20.0	24.5
26	8.1	8.1	182	176	127	121	55	55	44	43	17	17	18.5	23.0
27	8.1	8.1	192	174	148	124	44	50	42	41	21	17	19.0	23.5
28	8.1	7.8	182	168	134	124	48	44	44	42	17	16	19.5	24.0
29	8.0	7.9	162	160	132	123	30	37	53	52	7	7		
30	8.2	8.1	172	164	153	125	19	39	55	54	9	7		
31	8.1	8.0	166	162	123	132	43	30	47	57	12	5		
Avg.	8.1	8.1	170.1	163.7	134.2	126.5	35.9	37.1	46.8	46.0	12.9	11.8	20.3	24.1
Max	8.3	8.3	204.0	188.0	153.0	136.0	70.0	60.0	57.0	54.0	24.0	18.0	23.0	26.0
Min.	8.0	7.8	144.0	146.0	124.0	121.0	19.0	19.0	40.0	38.0	7.0	7.0	17.5	22.5

MONTH/YEAR **December 2020**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application									Chlorine Residual mg/L	
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as F mg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.56	0.34	0.85		0	0.00	231	3.56	20	0.31	251	3.99	2.32	1.53	1.67
2	0.57	0.35	0.78		0	0.00	207	3.54	35	0.60	242	4.38	2.12	2.10	2.26
3	0.67	0.26	0.79		0	0.00	189	3.56	33	0.62	222	4.32	2.15	1.94	2.17
4	0.49	0.16	0.74		0	0.00	203	3.53	36	0.63	239	5.12	2.88	2.04	2.24
5	0.56	0.30	0.77		0	0.00	218	3.56	25	0.41	243	5.11	3.36	1.54	1.75
6	0.77	0.28	0.86		0	0.00	181	3.56	17	0.33	198	4.30	2.73	1.43	1.57
7	0.57	0.30	0.77		0	0.00	218	3.64	24	0.40	242	4.10	2.36	1.66	1.74
8	0.56	0.31	0.81		0	0.00	233	3.58	41	0.63	274	5.45	3.38	1.89	2.07
9	0.64	0.36	0.85	0.88	0	0.00	218	3.71	40	0.68	258	5.16	2.93	2.05	2.23
10	0.69	0.40	0.88		0	0.00	213	3.68	29	0.50	242	4.36	2.79	1.38	1.57
11	0.57	0.40	0.79		0	0.00	200	3.60	36	0.65	236	4.86	2.74	1.93	2.12
12	0.56	0.37	0.78		0	0.00	178	3.59	7	0.14	185	4.11	2.38	1.60	1.73
13	0.61	0.43	0.78		0	0.00	201	3.56	27	0.48	228	4.45	2.46	1.86	1.99
14	0.50	0.35	0.75		0	0.00	196	3.67	34	0.64	230	4.69	2.87	1.66	1.82
15	0.60	0.24	0.79	0.72	0	0.00	228	3.56	42	0.66	270	5.24	3.65	1.42	1.59
16	0.46	0.23	0.76		0	0.00	185	3.51	26	0.49	211	4.31	2.34	1.81	1.97
17	0.45	0.29	0.77		0	0.00	178	3.37	25	0.47	203	3.97	1.89	1.93	2.08
18	0.40	0.25	0.72		0	0.00	169	3.20	23	0.44	192	3.82	1.72	1.95	2.10
19	0.00	0.20	0.76		0	0.00	160	3.16	28	0.55	188	4.21	1.93	2.11	2.28
20	0.00	0.36	0.72		0	0.00	170	3.18	28	0.52	198	3.78	1.81	1.91	1.97
21	0.00	0.33	0.67	0.62	0	0.00	218	3.23	26	0.39	244	5.59	3.75	1.63	1.84
22	0.00	0.34	0.57		0	0.00	151	2.79	30	0.55	181	5.06	3.33	1.59	1.73
23	0.00	0.10	0.47		0	0.00	199	1.80	31	0.28	230	4.80	2.98	1.67	1.82
24	0.00	0.27	0.41		0	0.00	164	3.26	20	0.40	184	3.98	2.03	1.80	1.95
25	0.00	0.27	0.48		0	0.00	179	3.03	46	0.78	225	3.42	0.94	2.31	2.48
26	0.00	0.22	0.44		0	0.00	146	3.06	18	0.38	164	3.67	1.83	1.68	1.84
27	0.00	0.23	0.42		0	0.00	141	3.05	21	0.45	162	3.54	1.65	1.74	1.89
28	0.00	0.31	0.42		0	0.00	187	2.99	28	0.45	215	3.42	1.46	1.81	1.96
29	0.00	0.26	0.46	0.38	0	0.00	167	3.09	32	0.59	199	3.79	1.69	1.99	2.10
30	0.00	0.37	0.52		0	0.00	194	3.10	12	0.19	206	3.88	2.25	1.54	1.63
31	0.00	0.27	0.44		0	0.00	217	3.27	39	0.59	256	4.73	2.71	1.88	2.02
Avg.	0.34	0.30	0.69	0.65	0.00	0.00	190.73	3.32	28.00	0.49	218.73	4.36	2.42	1.78	1.94
Max	0.77	0.43	0.88	0.88	0.00	0.00	233.00	3.71	46.00	0.78	274.00	5.59	3.75	2.31	2.48
Min.	0.00	0.10	0.41	0.38	0.00	0.00	141.00	1.80	7.00	0.14	162.00	3.42	0.94	1.38	1.57

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MONTH/YEAR **December 2020**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	29	0	8.0	11.0
2	1	A	30	0	8.0	10.0
3	1	A	14	0	8.0	10.0
4	1	A	18	0	8.0	10.0
5	1	A	12	0	8.0	10.0
6	1	A	11	0	8.0	9.0
7	1	A	11	0	7.0	9.0
8	1	A	14	0	8.0	9.0
9	1	A	12	0	8.0	9.0
10	1	A	15	0	8.0	9.0
11	1	A	10	1	8.0	9.0
12	1	A	10	0	8.0	10.0
13	1	A	31	1	7.0	8.0
14	1	A	54	1	6.7	8.0
15	1	A	56	0	6.2	6.5
16	1	A	106	1	6.3	7.5
17	1	A	18	0	5.8	7.5
18	1	A	14	0	5.5	7.0
19	1	A	17	0	7.0	9.0
20	1	A	31	0	6.0	8.0
21	1	A	39	0	6.0	7.0
22	1	A	19	0	6.0	8.0
23	1	A	51	0	6.3	6.5
24	1	A	49	0	5.7	7.0
25	1	A	48	0	4.8	6.5
26	1	A	27	0	3.5	6.0
27	1	A	24	0	3.8	6.5
28	1	A	19	0	3.8	5.5
29	1	A	26	0	4.0	7.0
30	1	A	25	0		7.0
31	1	A	20	0	4.0	5.0
AVG.	1	A	28	0	6	8
Max			106	1	8	10
Min			10	0	4	5

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MONTH/YEAR **December 2020**

Distrubution Flow and Corrosion Treatment

	Ortho P Distribution System					Distribution flow and Corrosion Treatment			
D A T E	City Hall Ortho P Residual mg/L	Wolfs Ortho P Residual mg/L	Bait Shed Ortho P Residual mg/L	Sunny Spot Ortho P Residual mg/L	B&Z Ortho P Residual mg/L	High Lift To Distribution	Lbs PO4	PO4 Treatment mg/L	Ortho P Residual mg/L
1						0.6160	74	4.78	2.89
2						0.4928	37	2.93	2.94
3						0.4774	34	2.82	2.93
4						0.4312	87	7.97	2.99
5						0.4158	86	8.20	2.99
6						0.4466	84	7.44	3.02
7						0.5236	93	7.05	3.05
8						0.4312	92	8.44	2.90
9	3.19			2.87	2.93	0.4451	88	7.84	3.07
10						0.4928	82	6.60	3.10
11						0.4466	75	6.65	3.08
12						0.4004	75	7.41	3.02
13						0.4774	77	6.37	3.23
14						0.4774	77	6.35	3.14
15	2.96	3.02	2.80	2.60	2.86	0.5544	73	5.17	3.14
16						0.4620	73	6.23	3.12
17						0.4620	77	6.58	3.09
18						0.4774	81	6.71	3.10
19						0.4774	40	3.32	3.04
20						0.5390	66	4.87	3.09
21	3.07	2.86	2.17	2.92	2.56	0.4312	83	7.57	3.14
22						0.3080	71	9.15	3.21
23						0.4774	82	6.80	3.28
24						0.4620	80	6.81	3.08
25						0.5698	77	5.31	3.06
26						0.4466	66	5.83	3.10
27						0.4620	73	6.28	3.08
28						0.6622	65	3.88	3.19
29	2.98	2.60	3.01	3.01	3.68	0.4774	72	5.98	3.03
30						0.4312	79	7.22	3.06
31						0.4620	77	6.55	3.15
Totals						14.7363	2293.5		
AVG.	3.05	2.83	2.66	2.85	3.01	0.4754	74.0	6.34	3.08
Max	3.19	3.02	3.01	3.01	3.68	0.6622	93.3	9.15	3.28
Min	2.96	2.60	2.17	2.60	2.56	0.3080	34.0	2.82	2.89

CITY OF BENTON HARBOR PAGE 7

DISTRIBUTION SYSTEM MONITORING WSSN 0600 December 2020

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8							
9	0.91		1.10	0.92	1.14		0.96
10							
11							
12							
13							
14							
15	1.21		1.31	1.08	1.57		1.18
16							
17							
18							
19							
20							
21	1.11		1.23	1.13	1.26		0.81
22							
23							
24							
25							
26							
27							
28							
29	1.64		1.36	1.56	1.26		0.80
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	1.18	1.64	0.80
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	**10**		
Total number of check samples	0		
Total number of positive check samples	0		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **H. George Regan** Month/Year **November-20**

F1-S2 **F1-S2**

H. George Regan

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.5828	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	176.33	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.96	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.96	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.00%	Percent of Treated Water

Chemical Data

Chlorine on hand:	22725	lb.	Est. supply:	290	days
Primary Coagulant (Alum (Al3+)) on hand:	77841	lb.	Est. supply:	73	days
Cost of All Chemicals per Million Gallons:	$72.70	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	87	87
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Distribution	Total	26.206314	Avg	0.9078745	Max	1.527494	Min	0.705196

A Treatment Technique vioation occurred 11/4/20. Failure to add Alum at the plant's initial start-up
Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **November-20**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	Samples	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9575	302.00	1.66	13.80	15.70	0.69	3	0.09	0.10	3	0.08	0.09	6	0	0
2	0.9900	307.00	1.63	20.20	30.60	0.67	3	0.09	0.10	3	0.08	0.09	6	0	0
3	1.0750	308.00	1.51	17.80	22.70	1.20	3	0.09	0.10	3	0.12	0.15	6	0	0
4	0.7728	166.00	1.13	15.90	16.20	7.00	1	0.13	0.16	1	0.18	0.23	2	0	0
5	1.2575	396.00	1.66	18.80	27.00	1.30	3	0.12	0.13	3	0.16	0.18	6	0	0
6	1.5828	502.00	1.67	16.70	19.60	2.00	3	0.10	0.11	3	0.12	0.16	6	0	0
7	0.9275	315.00	1.79	5.10	6.00	0.72	3	0.10	0.12	3	0.08	0.09	6	0	0
8	1.0500	338.00	1.69	4.80	5.60	0.59	3	0.10	0.10	3	0.09	0.10	6	0	0
9	1.0850	340.00	1.65	3.40	3.60	0.63	3	0.09	0.10	3	0.11	0.14	6	0	0
10	0.7850	244.00	1.64	3.50	3.70	0.64	3	0.09	0.10	3	0.09	0.10	6	0	0
11	1.0850	328.00	1.59	6.70	7.90	0.62	3	0.09	0.10	3	0.09	0.10	6	0	0
12	0.8525	267.00	1.65	5.60	6.80	0.64	3	0.08	0.09	3	0.09	0.10	6	0	0
13	0.9825	317.00	1.70	6.70	8.00	0.62	3	0.09	0.09	3	0.09	0.09	6	0	0
14	0.8250	260.00	1.66	7.70	9.90	0.54	2	0.09	0.09	2	0.09	0.09	4	0	0
15	0.9575	295.00	1.62	9.00	10.60	0.49	3	0.09	0.10	3	0.08	0.09	6	0	0
16	0.8100	338.00	2.20	9.90	11.50	0.67	3	0.09	0.09	3	0.09	0.10	6	0	0
17	1.2933	581.00	2.36	11.10	18.30	0.64	3	0.09	0.10	3	0.08	0.09	6	0	0
18	1.1708	707.00	3.18	13.10	15.90	0.53	3	0.07	0.09	3	0.08	0.08	6	0	0
19	0.8200	376.00	2.41	7.70	10.90	0.58	3	0.10	0.11	3	0.08	0.09	6	0	0
20	0.9050	276.00	1.60	8.00	12.80	0.55	3	0.08	0.08	3	0.09	0.10	6	0	0
21	0.8975	271.00	1.59	7.20	11.50	0.46	3	0.10	0.10	3	0.10	0.11	6	0	0
22	1.1350	328.00	1.52	3.80	4.20	0.49	3	0.10	0.11	3	0.10	0.11	6	0	0
23	0.8400	251.00	1.57	6.50	10.10	0.46	3	0.08	0.09	3	0.09	0.10	6	0	0
24	0.9875	295.00	1.57	4.60	5.30	0.46	3	0.09	0.12	3	0.09	0.09	6	0	0
25	0.8950	258.00	1.52	5.20	6.40	0.53	3	0.09	0.10	3	0.08	0.09	6	0	0
26	0.7925	244.00	1.52	4.00	5.40	0.58	3	0.07	0.09	3	0.09	0.11	6	0	0
27	0.8150	249.00	1.61	6.50	12.00	0.54	3	0.08	0.09	3	0.11	0.12	6	0	0
28	0.7600	239.00	1.65	4.80	7.00	0.65	3	0.09	0.10	3	0.09	0.10	6	0	0
29	0.8300	254.00	1.61	4.20	6.40	0.52	3	0.08	0.09	3	0.07	0.08	6	0	0
30	0.7825	239.00	1.61	5.10	8.30	0.49	3	0.10	0.11	3	0.09	0.10	6	0	0
31															
Total	28.9197	9591.00					87			87			174	0	0
Avg.	0.9640	319.70	1.73	8.58	11.33	0.88		0.09	0.10		0.10				
Max	1.5828	707.00	3.18	20.20	30.60	7.00		0.13	0.16		0.18	0.23	6	0	0
Min.	0.7600	166.00	1.13	3.40	3.60	0.46		0.07	0.08		0.07				

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.2	176	166	130	121	46	45	41	39	18	17	19.0	24.5
2	8.1	8.0	174	166	128	120	46	46	40	39	18	17		
3	8.2	8.1	150	148	126	121	24	27	39	42	13	10	23.5	24.5
4														
5	7.9	7.8	156	152	133	121	23	31	46	45	10	10		
6	8.2	8.1	152	150	139	134	13	16	47	48	8	7		
7	8.2	8.0	164	160	144	134	20	26	51	52	9	7		
8	8.3	8.2	162	156	143	133	19	23	52	49	8	8		
9	8.1	8.0	174	170	128	126	46	44	42	40	17	17		
10	8.2	8.2	186	170	139	125	47	45	44	42	18	17		
11	8.4	8.4	142	146	119	128	23	18	41	45	10	8	21.5	23.0
12	8.3	8.2	146	148	128	127	18	21	38	39	13	12		
13	8.2	8.2	146	150	123	124	23	26	39	43	12	10		
14	8.2	8.1	148	152	127	122	21	30	41	46	11	9		
15	8.2	8.1	156	152	135	119	21	33	44	49	11	7		
16	8.2	8.1	162	156	124	122	38	34	36	34	17	17		
17	8.1	8.1	168	164	120	117	48	47	38	37	17	17		
18	8.0	8.0	164	158	124	116	40	42	38	38	17	15	19.5	24.0
19	8.1	8.0	172	158	128	115	44	43	41	38	17	15	20.5	24.0
20	8.1	8.1	174	160	132	116	42	44	39	40	18	15	20.5	25.0
21	8.3	8.1	152	148	128	116	24	32	44	43	10	10	23.0	24.5
22	8.3	8.2	152	150	124	118	28	32	39	42	13	11		
23	8.2	8.2	152	150	126	116	26	34	42	43	11	10		
24	8.3	8.2	154	150	127	117	27	33	44	46	11	8		
25	8.1	8.0	172	162	125	116	47	46	41	40	17	15	19.5	24.0
26	8.1	8.1	172	162	125	118	47	44	39	38	18	17	19.0	24.0
27	8.1	8.0	178	166	132	117	46	49	38	38	20	18	19.5	24.5
28	8.2	8.2	204	166	154	118	50	48	46	39	22	17	21.0	25.5
29	8.1	8.1	178	166	134	124	44	42	39	38	19	17	20.0	24.5
30	8.2	8.2	172	178	130	126	42	52	38	41	19	18	19.0	23.5
31														
Avg.	8.2	8.1	164.1	157.9	130.2	121.6	33.9	36.3	41.6	41.8	14.6	13.0	20.4	24.3
Max	8.4	8.4	204.0	178.0	154.0	134.0	50.0	52.0	52.0	52.0	22.0	18.0	23.5	25.5
Min.	7.9	7.8	142.0	146.0	119.0	115.0	13.0	16.0	36.0	34.0	8.0	7.0	19.0	23.0

WSSN 0600 MONTH/YEAR **November-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.58	0.08	0.65		0	0.00	226	3.52	27	0.42	253	3.67	1.75	1.75	1.92
2	0.56	0.22	0.81		0	0.00	244	3.68	32	0.48	276	4.56	2.71	1.68	1.85
3	0.57	0.19	0.75		0	0.00	266	3.69	25	0.35	291	4.65	2.92	1.63	1.73
4	0.49			0.62	0	0.00	192	3.71	33	0.64	225	3.21	1.73	1.35	1.48
5	0.60	0.23	0.69		0	0.00	329	3.91	37	0.44	366	5.01	3.23	1.68	1.78
6	0.39	0.22	0.78		0	0.00	455	4.29	50	0.47	505	8.03	6.07	1.82	1.96
7	0.57	0.33	0.73		0	0.00	290	4.67	52	0.84	342	5.85	3.61	2.24	2.24
8	0.61	0.34	0.72		0	0.00	349	4.96	54	0.77	403	6.76	4.55	2.15	2.21
9	0.50	0.29	0.69		0	0.00	343	4.72	33	0.45	376	5.63	3.51	1.95	2.12
10	0.47	0.31	0.69		0	0.00	205	3.90	17	0.32	222	4.43	2.21	2.05	2.22
11	0.55	0.25	0.67		0	0.00	280	3.85	42	0.58	322	4.67	2.39	2.20	2.28
12	0.58	0.17	0.72	0.60	0	0.00	223	3.90	35	0.61	258	5.03	2.96	1.94	2.07
13	0.52	0.15	0.66		0	0.00	259	3.94	36	0.55	295	4.48	2.59	1.75	1.89
14	0.57	0.26	0.69		0	0.00	223	4.04	25	0.45	248	4.91	3.08	1.67	1.83
15	0.57	0.17	0.76		0	0.00	256	3.99	33	0.51	289	4.85	2.87	1.81	1.98
16	0.65	0.28	0.80		0	0.00	229	4.22	69	1.27	298	5.95	3.74	2.04	2.21
17	0.54	0.16	0.75		0	0.00	336	3.88	44	0.51	380	3.71	1.45	2.09	2.26
18	0.57	0.18	0.81		0	0.00	308	3.93	34	0.43	342	5.24	3.21	1.86	2.03
19	0.65	0.27	0.71		0	0.00	204	3.71	30	0.55	234	4.61	2.49	1.95	2.12
20	0.54	0.26	0.78		0	0.00	221	3.65	34	0.56	255	4.17	1.88	2.11	2.29
21	0.65	0.22	0.73		0	0.00	216	3.59	25	0.42	241	4.05	1.93	1.81	2.12
22	0.51	0.33	0.82		0	0.00	273	3.59	42	0.55	315	4.11	1.87	2.00	2.24
23	0.53	0.28	0.75		0	0.00	204	3.63	19	0.34	223	3.89	2.14	1.54	1.75
24	0.53	0.28	0.73		0	0.00	236	3.57	30	0.45	266	4.30	2.27	1.85	2.03
25	0.52	0.26	0.71		0	0.00	226	3.77	20	0.33	246	4.27	2.42	1.68	1.85
26	0.85	0.26	0.78		0	0.00	193	3.64	24	0.45	217	4.27	2.32	1.78	1.95
27	0.55	0.30	0.82		0	0.00	198	3.63	19	0.35	217	4.07	2.20	1.71	1.87
28	0.55	0.29	0.86		0	0.00	188	3.69	25	0.49	213	4.51	2.63	1.70	1.88
29	0.60	0.24	0.82		0	0.00	204	3.67	25	0.45	229	4.40	2.51	1.72	1.89
30	0.55	0.30	0.84		0	0.00	185	3.53	51	0.97	236	4.79	2.88	1.75	1.91
31															
Avg.	0.56	0.25	0.75	0.61	0.00	0.00	252.03	3.88	34.07	0.53	286.10	4.74	2.74	1.84	2.00
Max	**0.85**	**0.34**	**0.86**	**0.62**	**0.00**	**0.00**	**455.00**	**4.96**	**69.00**	**1.27**	**505.00**	**8.03**	**6.07**	**2.24**	**2.29**
Min.	**0.39**	**0.08**	**0.65**	**0.60**	**0.00**	**0.00**	**185.00**	**3.52**	**17.00**	**0.32**	**213.00**	**3.21**	**1.45**	**1.35**	**1.48**

CITY OF BENTON HARBOR PAGE 5

WSSN 0600 MONTH/YEAR **November-20**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	79	0	12	13.0
2	1	A	71	0	11	12.5
3	1	A	99	0	11	13.0
4	1	A	74	0	11	13.0
5	1	A	75	0	12	13.0
6	1	A	40	0	12	13.0
7	1	A	63	1	12	13.0
8	1	A	14	0	12	13.0
9	1	A	40	0	12	12.0
10	1	A	37	0	13	12.5
11	1	A	41	0	13	13.0
12	1	A	28	0	12	13.0
13	1	A	50	0	12	13.0
14	1	A	42	2	12	13.0
15	1	A	51	0	12	11.0
16	1	A	56	0	10	12.0
17	1	A	49	0	10	12.0
18	1	A	54	0	9	10.5
19	1	A	46	0	9	10.0
20	1	A	14	0	10	10.0
21	1	A	20	0	9	10.0
22	1	A	15	0	10	12.0
23	1	A	10	0	10	12.0
24	1	A	38	1	10	13.0
24	1	A	23	0	9	9.5
24	1	A	28	0	9	9.5
24	1	A	63	1	8.8	9.5
24	1	A	49	0	9.2	9.5
29	1	A	47	0	8.8	9.5
30	1	A	14	0	8.8	9.5
31						
Totals						
AVG.	1	A	43	0	11	12
Max			99	2	13	13
Min			10	0	9	10

CITY OF BENTON HARBOR

WSSN 0600

MONTH/YEAR **November-20**

DISTRIBUTION FLOW AND CORROSION TREATMENT

					Distribution System Locations				
D					City Hall	Wolfs	Bait Shed	Sunny Spot	B&Z
A	High Lift		PO4	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P
T	To	Lbs PO4	Treatment	Residual	Residual	Residual	Residual	Residual	Residual
E	Distribution		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
1	0.6160	88	5.65	2.99					
2	0.5698	84	5.81	3.05					
3	0.5236	66	4.96	3.09					
4	0.7084	91	5.11	0.00	1.91	1.3	2.73	2.77	2.8
4	0.6006	102	6.69	3.24					
4	0.5544	85	6.05	2.98					
4	0.4928	83	6.69	3.01					
4	0.4928	94	7.56	2.91					
9	0.4774	97	8.04	2.94					
10	0.4928	87	6.97	2.87					
10	0.5852	86	5.84	2.97					
10	0.5082	71	5.50	3.02	2.93	3.24	2.92	3.06	2.92
10	0.5698	79	5.47	3.05					
10	0.5390	63	4.62	2.94					
15	0.5082	76	5.90	3.02					
16	0.5236	99	7.51	3.04					
17	1.1858	17	0.57	2.93	3.01	2.27	2.77	2.85	2.66
18	0.6468	133	8.11	2.98					
19	0.5082	47	3.64	2.99					
20	0.5698	87	6.05	3.04					
21	0.4774	84	6.94	2.99					
22	0.9394	58	2.43	3.01					
23	0.4620	69	5.88	2.94					
24	0.6006	67	4.38	2.97					
24	0.4928	82	6.55	3.02					
24	0.5082	69	5.40	2.85					
24	0.4928	73	5.82	2.96					
24	0.4774	67	5.51	2.87					
29	0.4774	72	6.00						
30	0.4620	80	6.87	2.91					
31									
Totals	17.0632	2352.7							
AVG.	0.5688	78.4	5.75	2.88	2.62	2.27	2.81	2.89	2.79
Max	1.1858	132.6	8.11	3.24	3.01	3.24	2.92	3.06	2.92
Min	0.4620	17.2	0.57	0.00	1.91	1.30	2.73	2.77	2.66

CITY OF BENTON HARBOR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 November-20

DAT E	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4	1.25		1.19	1.07	0.39		0.88			
5										
6										
7										
8										
9										
10										
11										
12	1.48		1.60	1.37	1.34		1.41			
13										
14										
15										
16										
17	1.33		1.40	1.47	1.40		0.86			
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max	Min
Chlorine Residual, mg/L	1.23	1.60	0.39
Total number of routine distribution samples analyzed	**15**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	**10**		
Total number of check samples	6		
Total number of positive check samples	0		

MI0600 Benton Harbor MOR September 2020

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: CITY OF BENTON HARBOR

WSSN:600

Operator-in-Charge **Michael O'Malley** F1-S1

10/9/20

Signature of Operator-in-Charge

Month/Year **September-20** F1-S2

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1225	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	195.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.94	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.12	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.35%	Percent of Treated Water

Chemical Data

Chlorine on hand:	47470	lb.	Est. supply:	144 days
Primary Coagulant (Alum (Al3+)) on hand:	39318	lb.	Est. supply:	171 days
Cost of All Chemicals per Million Gallons:	$71.05	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution Total 26.779661 Avg 0.924192 Max 1.139716 Min 0.799648

Remarks

Orthopolyphosphate Lead corrosion Inhibitor started March 26, 2019: Total Days 556
Orthopolyphosphate Lead corrosion Inhibitor started Feburary 20 2020: Total Days 223
The bacteria Page includes Tap Water Metering and OPP data for the month.

MI0600 BtNW MoR Sept 20

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **September-20**

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FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.46	0.23	0.75		0	0.00	456	6.91	74	1.12	530	8.36	6.07	2.07	2.29
2	0.47	0.24	0.77		0	0.00	435	6.96	77	1.23	512	8.10	6.20	1.75	1.90
3	0.57	0.19	0.73	0.78	0	0.00	418	6.80	76	1.24	494	8.43	6.56	1.72	1.87
4	0.55	0.23	0.76		0	0.00	285	4.51	73	1.16	358	5.36	3.11	2.11	2.25
5	0.77	0.14	0.78		0	0.00	256	4.05	72	1.14	328	5.17	3.03	1.98	2.14
6	0.59	0.09	0.79		0	0.00	243	4.02	70	1.16	313	5.46	3.20	2.10	2.26
7	0.55	0.23	0.83		0	0.00	249	4.04	64	1.04	313	4.78	2.06	2.44	2.72
8	0.55	0.23	0.76		0	0.00	244	3.83	33	0.52	277	4.40	2.47	1.78	1.93
9	0.54	0.20	0.77		0	0.00	240	3.80	32	0.51	272	4.80	3.11	1.53	1.69
10	0.33	0.21	0.83	0.80	0	0.00	208	3.78	24	0.44	232	4.33	2.76	1.40	1.57
11	0.62	0.23	0.83		0	0.00	260	3.85	32	0.47	292	4.50	2.94	1.42	1.56
12	0.53	0.15	0.78		0	0.00	224	3.80	97	1.65	321	5.61	3.11	2.33	2.50
13	*0.55*	*0.20*	*0.77*		*0*	*0.00*	*224*	*3.79*	*34*	*0.58*	*258*	*4.65*	*2.81*	*1.67*	*1.84*
14	0.67	0.18	0.79		0	0.00	224	3.73	98	1.63	322	5.08	2.44	2.46	2.64
15	0.53	0.22	0.80		0	0.00	248	3.74	42	0.63	290	4.50	2.56	1.77	1.94
16	0.53	0.21	0.83		0	0.00	230	3.68	34	0.54	264	4.23	2.57	1.49	1.66
17	0.53	0.20	0.74	0.92	0	0.00	273	3.63	43	0.57	316	4.14	2.00	1.87	2.14
18	0.62	0.26	0.75		0	0.00	240	3.60	35	0.53	275	4.27	2.14	1.97	2.13
19	0.72	0.23	0.77		0	0.00	220	3.70	34	0.57	254	4.25	2.42	1.69	1.83
20	0.56	0.34	0.65		0	0.00	242	3.75	37	0.57	279	4.72	2.98	1.56	1.74
21	0.56	0.36	0.74		0	0.00	228	3.68	34	0.55	262	3.98	2.01	1.80	1.97
22	0.73	0.19	0.67		0	0.00	242	3.61	36	0.54	278	4.12	2.29	1.67	1.83
23	0.66	0.29	0.64	0.73	0	0.00	237	3.72	37	0.58	274	4.50	2.53	1.80	1.97
24	0.59	0.23	0.58		0	0.00	222	3.48	39	0.61	261	4.38	2.19	2.02	2.19
25	0.58	0.23	0.54		0	0.00	211	3.43	36	0.59	247	3.59	1.43	1.99	2.16
26	0.58	0.23	0.64		0	0.00	205	3.35	29	0.47	234	4.05	2.04	1.85	2.01
27	0.60	0.29	0.68		0	0.00	195	3.32	21	0.36	216	3.78	2.11	1.56	1.67
28	0.57	0.27	0.69		0	0.00	203	3.31	36	0.59	239	4.16	1.95	1.92	2.21
29	0.44	0.28	0.69		0	0.00	207	3.02	19	0.28	226	3.62	2.10	1.31	1.52
30	0.55	0.26	0.73		0	0.00	215	3.51	33	0.54	248	4.06	2.30	1.59	1.76
31															
Tot.							7,128		1,327		8,985				
Avg.	0.57	0.23	0.74	0.81	0.00	0.00	252.80	4.01	46.70	0.75	299.50	4.85	2.85	1.82	2.00
Max	0.77	0.36	0.83	0.92	0.00	0.00	456.00	6.96	98.00	1.65	530.00	8.43	6.56	2.46	2.72
Min.	0.33	0.09	0.54	0.73	0.00	0.00	195.00	3.02	19.00	0.28	216.00	3.59	1.43	1.31	1.52

MI0600 BHWW MOR Sept 20

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WSSN 0600 City of Benton Harbor Month/Year September-20

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9850	297.00	1.59	2.70	3.20	0.29	3	0.10	0.11	3	0.07	0.08	6	0	0
2	0.9325	284.00	1.60	3.60	4.70	0.36	3	0.11	0.13	3	0.09	0.10	6	0	0
3	0.9175	282.00	1.62	3.00	3.50	0.38	3	0.08	0.09	3	0.08	0.08	6	0	0
4	0.9425	288.00	1.61	4.00	5.00	0.36	3	0.09	0.10	3	0.09	0.10	6	0	0
5	0.9425	292.00	1.63	5.50	6.90	0.39	3	0.10	0.10	3	0.07	0.07	6	0	0
6	0.9025	277.00	1.70	4.50	6.20	0.35	3	0.09	0.10	3	0.07	0.08	6	0	0
7	0.9200	287.00	1.64	3.40	4.50	0.33	3	0.10	0.11	3	0.09	0.09	6	0	0
8	0.9500	298.00	1.65	5.10	5.90	0.35	3	0.10	0.11	3	0.09	0.10	6	0	0
9	0.9425	291.00	1.62	4.90	6.20	0.30	3	0.09	0.10	3	0.09	0.09	6	0	0
10	0.8225	258.00	1.65	5.30	5.70	0.39	3	0.09	0.11	3	0.08	0.09	6	0	0
11	1.0075	311.00	1.62	4.10	4.30	0.31	3	0.11	0.12	3	0.07	0.08	6	0	0
12	0.8800	256.00	1.53	4.30	5.20	0.41	3	0.08	0.10	3	0.08	0.09	6	0	0
13	0.8825	265.00	1.58	2.80	4.00	0.33	3	0.09	0.11	3	0.08	0.09	6	0	0
14	0.8975	272.00	1.59	3.90	6.20	0.29	3	0.09	0.09	3	0.08	0.10	6	0	0
15	0.9900	300.00	1.59	3.50	5.20	0.33	3	0.08	0.09	3	0.08	0.09	6	0	0
16	0.9325	277.00	1.56	2.20	2.40	0.27	3	0.08	0.08	3	0.08	0.08	6	0	0
17	1.1225	330.00	1.55	2.40	3.00	0.26	3	0.08	0.08	3	0.09	0.10	6	0	0
18	0.9950	294.00	1.55	2.20	2.70	0.28	3	0.09	0.09	3	0.08	0.08	6	0	0
19	0.8875	259.00	1.54	1.20	1.30	0.27	3	0.08	0.09	3	0.09	0.10	6	0	0
20	0.9625	289.00	1.58	1.40	1.50	0.26	3	0.09	0.09	3	0.08	0.09	6	0	0
21	0.9250	260.00	1.48	1.70	2.80	0.40	3	0.09	0.11	3	0.10	0.11	6	0	0
22	1.0000	296.00	1.56	2.00	3.80	0.27	3	0.10	0.14	3	0.10	0.11	6	0	0
23	0.9500	298.00	1.65	2.50	4.00	0.33	3	0.07	0.09	3	0.10	0.11	6	0	0
24	0.9525	298.00	1.65	2.90	5.20	0.28	3	0.09	0.10	3	0.09	0.10	6	0	0
25	0.9175	283.00	1.62	2.40	3.70	0.30	3	0.08	0.09	3	0.09	0.10	6	0	0
26	0.9125	299.00	1.62	2.00	2.20	0.29	3	0.08	0.08	3	0.08	0.09	6	0	0
27	0.8775	278.00	1.67	2.60	2.90	0.33	3	0.08	0.08	3	0.08	0.08	6	0	0
28	0.9150	290.00	1.67	2.30	3.00	0.33	3	0.08	0.08	3	0.08	0.09	6	0	0
29	1.0225	302.00	1.55	3.50	3.80	0.30	3	0.08	0.09	3	0.09	0.09	6	0	0
30	0.9150	286.00	1.64	2.80	3.50	0.32	3	0.07	0.08	3	0.10	0.11	6	0	0
31															
Total	28.2025	8597.00					90			90			180	0	0
Avg.	0.9401	286.57	1.60	3.16	4.08	0.32		0.09	0.10		0.08		Total	Total	Total
Max	1.1225	330.00	1.70	5.50	6.90	0.41		0.11	0.14		0.10	0.11	6	0	0
Min.	0.8225	256.00	1.48	1.20	1.30	0.26		0.07	0.08		0.07				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

DAY	pH		Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.3	8.3	144	138	118	110	26	28	40	42	11	8		
2	8.2	8.2	162	158	113	107	49	51	38	37	17	16	21.0	27.5
3	8.3	8.2	156	150	113	109	43	41	38	36	15	15	22.0	27.0
4	8.2	8.2			123	108								
5	8.2	8.2	174	166	123	117	51	49	41	39	17	17	21.5	28.0
6	8.2	8.2	170	160	130	123	40	37	38	36	18	17	20.5	26.5
7	8.4	8.2	146	148	122	124	24	24	38	41	13	11	23.0	29.0
8	8.3	8.2	176	164	126	112	50	52	41	39	18	16	21.5	26.5
9	8.2	8.3	166	162	126	119	40	43	38	39	17	16	19.5	24.5
10	8.3	8.0	140	138	124	119	16	19	38	41	9	9		
11	8.3	8.3	146	140	125	119	21	21	39	40	12	10		
12	8.2	8.2	172	164	129	120	43	44	38	37	18	17	19.5	24.5
13	8.2	8.3	168	160	127	120	41	40	38	37	18	17	19.5	25.5
14	8.1	8.1	168	158	126	118	42	40	40	38	17	15	22.0	27.5
15	8.2	8.2	172	160	131	121	41	39	40	38	17	16	20.5	25.5
16	8.3	8.3	142	142	125	124	17	18	39	40	11	10	23.5	24.5
17	8.4	8.3	144	142	129	124	15	18	38	39	12	11		
18	8.3	8.3	140	146	127	124	13	22	40	43	10	9		
19	8.0	8.1	140	144	122	121	18	23	41	43	9	9		
20	8.0	8.1	144	138	125	120	19	18	39	40	11	9		
21	8.2	8.2	166	158	123	116	43	42	40	39	16	15	20.5	25.5
22	8.1	8.1	168	160	121	116	47	44	37	36	18	17	19.0	24.0
23	8.1	8.1	158	152	117	115	41	37	38	37	15	15	19.0	24.0
24	8.0	8.1	162	152	120	113	42	39	38	37	16	15	20.0	25.0
25	8.2	8.1	172	156	128	114	44	42	39	37	18	16	20.5	25.5
26	8.2	7.9	138	142	120	120	18	22	37	39	11	11		
27	8.4	8.3	146	148	125	117	21	31	39	43	12	10		
28	8.4	8.2	148	142	124	116	24	26	40	39	12	11	23.5	25.5
29	8.4	8.3	142	140	122	118	20	22	39	39	11	10		
30	8.3	8.0	164	156	124	117	40	39	38	37	17	16	20.5	25.0
31														
Avg.	8.2	8.2	156.3	151.2	123.6	117.4	32.7	33.5	38.9	38.9	14.3	13.2	20.9	25.8
Max	8.4	8.3	176.0	166.0	131.0	124.0	51.0	52.0	41.0	43.0	18.0	17.0	23.5	29.0
Min.	8.0	7.9	138.0	138.0	113.0	107.0	13.0	18.0	37.0	36.0	9.0	8.0	19.0	24.0

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MI 0600 Distribution Monitoring Report MI 0600 DMR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 September-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2	1.03		1.22	1.38	1.11		0.85			
3										
4										
5										
6										
7										
8										
9										
10	1.06		1.39	0.72	0.83		0.76			
11										
12										
13										
14										
15										
16										
17	0.81		0.87	0.88	0.87		0.69			
18										
19										
20										
21										
22										
23	1.46		1.43	1.62	1.18		1.17			
24										
25										
26										
27										
28										
29										
30			0.91	0.61	1.05		1.19			
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	24	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max / Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.05	1.62 / 0.61
Total number of check samples	0600	6	
Total number of positive check samples	0600	0	

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

DATE	Ortho P System System Ortho P Residual mg/L	Location	PLANT TAP No. of Samples	Colilert P/A	Standard Plate Count Raw	Tap	Raw TEMP. 'C	Tap TEMP. 'C	Distrubution flow and Corrosion Treatment High Lift To Distribution	Lbs PO4	PO4 Treatment mg/L	Ortho P Residual mg/L
1			1	A	96	0	23	22.0	0.9468	82	3.44	2.89
2	2.92	CityHall	1	A	109	1	21	21.5	0.9432	80	3.37	2.99
2	2.36	Wolfs	1	A	143	0	22	21.5	0.8750	86	3.88	3.13
2	2.84	BaitShed	1	A	92	0	22	22.0	0.9977	86	3.41	3.01
2	2.51	SunnySpot	1	A	105	0	22	22.5	0.9476	84	3.51	3.09
2	2.54	B&Z	1	A	154	0	22	22.5	0.8557	84	3.87	3.01
7			1	A	134	3	22	23.0	0.9775	89	3.60	3.14
8			1	A	165	0	22	22.5	0.9404	85	3.59	2.74
9			1	A	158	0	17	22.0	0.8455	85	3.97	2.81
10	2.78	CityHall	1	A	93	1	18	22.0	0.8000	88	4.33	2.67
10	2.53	Wolfs	1	A	175	1	20	20.0	0.9687	80	3.27	2.84
10	1.96	BaitShed	1	A	97	0	20	19.5	0.8538	86	3.99	2.84
10	2.75	SunnySpot	1	A	155	0	20	19.5	0.8291	77	3.67	3.00
10	2.54	B&Z	1	A	150	1	20	19.5	0.9460	76	3.19	2.89
15			1	A	164	0	20	20.5	0.9615	74	3.03	3.13
16			1	A	136	0	21	21.0	0.9326	90	3.82	3.28
17	2.86	CityHall	1	A	139	0	21	21.0	1.1392	63	2.17	3.10
17	2.82	Wolfs	1	A	104	0	14	16.0	0.9609	69	2.85	3.05
17	2.96	BaitShed	1	A	42	0	12	20.0	0.8921	66	2.95	3.06
17	3.01	SunnySpot	1	A	51	1	13	18.0	0.8816	74	3.31	
17	2.69	B&Z	1	A	45	0	12	15.5	0.9837	87	3.50	2.85
22			1	A	34	0	12	14.5	1.0079	81	3.19	3.02
23	2.93	CityHall	1	A	55	0	13	14.0	0.9085	82	3.56	3.05
23	2.98	Wolfs	1	A	85	0	15	13.5	0.8889	91	4.03	3.04
23	2.84	BaitShed	1	A	71	0	16	14.0	1.0273	81	3.11	2.95
23	2.77	SunnySpot	1	A	96	0	17	16.0	0.8626	69	3.17	2.95
23	2.61	B&Z	1	A	98	0	18.0	16.0	0.8517	79	3.67	3.28
30	2.59	CityHall	1	A	105	0	18.0	17.0	0.8575	73	3.39	2.73
30	2.88	Wolfs	1	A	65	0	18.0	19.0	0.9323	70	2.96	3.06
30	2.90	BaitShed	1	A	55	0	17.7	17.5	0.9111	74	3.21	3.10
30	2.79	SunnySpot										
30	2.91	B&Z										
Totals									27.7263	2390.7		
AVG.	2.73		1	A	106	0	18	19	0.9242	79.7	3.43	2.99
Max	3.01				175	3	22	23	1.1392	90.6	4.33	3.28
Min	1.96				34	0	12	14	0.8000	62.6	2.17	2.67

MI 0600 Benton Harbor MOR JULY 2020

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** F1-S1

Signature of Operator-in-Charge

Month/Year **July-20** F1-S2

Water Plant Classification

Berrien County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2832	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	215.67	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.04	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.53	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.91%	Percent of Treated Water

Chemical Data

Chlorine on hand:	17170	lb.	Est. supply:	2360 days
Primary Coagulant (Alum (Al3+)) on hand:	884850	lb.	Est. supply:	50 days
Cost of All Chemicals per Million Gallons:	$78.91	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
***If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.*

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution Total 29.090186 Avg 0.9719165 Max 1.0796 Min 0.8418

Orthopolyphosphate Lead corrosion Inhibitor started March 26, 2019: Total Days 495 **Orthopolyphosphate Lead corrosion Inhibitor Changed February 21, 2020** Total Days 162

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CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **July-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
S	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.52	0.28	0.87	0.79	0	0.00	262	3.61	52	0.72	314	4.51	3.00	1.35	1.51
2	0.55	0.27	0.89		0	0.00	260	3.68	64	0.91	324	4.98	3.44	1.38	1.54
3	0.58	0.26	0.77		0	0.00	231	3.60	51	0.80	282	4.63	3.01	1.46	1.62
4	0.64	0.32	0.66		0	0.00	257	3.78	52	0.76	309	4.75	2.76	1.86	1.99
5	0.56	0.18	0.72		0	0.00	270	3.89	56	0.81	326	5.19	3.09	1.91	2.10
6	0.43	0.30	0.69		0	0.00	273	3.79	53	0.74	326	4.93	2.69	2.02	2.24
7	0.55	0.22	0.67		0	0.00	276	3.74	52	0.70	328	4.92	2.79	1.96	2.13
8	0.57	0.30	0.77		0	0.00	281	3.86	53	0.73	334	4.84	2.94	1.73	1.90
9	0.54	0.21	0.75	0.74	0	0.00	291	3.88	54	0.72	345	4.94	3.12	1.66	1.82
10	0.20	0.28	0.81		0	0.00	280	3.90	120	1.67	400	5.65	3.84	1.63	1.81
11	0.52	0.34	0.70		0	0.00	304	4.09	45	0.61	349	5.64	3.94	1.53	1.70
12	0.56	0.22	0.76		0	0.00	267	4.23	47	0.74	314	5.44	3.79	1.49	1.65
~~13~~	~~0.57~~	~~0.29~~	~~0.71~~		~~0~~	~~0.00~~	~~311~~	~~4.33~~	~~48~~	~~0.67~~	~~359~~	~~5.25~~	~~3.31~~	~~1.76~~	~~1.94~~
14	0.59	0.25	0.66		0	0.00	299	4.32	48	0.69	347	5.33	3.57	1.61	1.76
15	0.58	0.11	0.75	0.67	0	0.00	295	4.34	48	0.71	343	5.18	3.28	1.73	1.90
16	0.57	0.24	0.81		0	0.00	329	4.60	53	0.74	382	5.65	3.60	1.87	2.05
17	0.55	0.31	0.80		0	0.00	299	4.30	49	0.71	348	5.81	3.67	1.82	2.14
18	0.60	0.28	0.91		0	0.00	290	4.31	47	0.70	337	5.05	3.29	1.51	1.76
19	0.47	0.14	0.81		0	0.00	274	4.28	45	0.70	319	5.55	3.74	1.63	1.81
20	0.50	0.20	0.90		0	0.00	324	4.80	56	0.83	380	5.66	4.07	1.43	1.59
21	0.61	0.24	0.82	0.80	0	0.00	333	5.19	61	0.95	394	6.21	4.88	1.18	1.33
22	0.54	0.15	0.80		0	0.00	412	5.93	64	0.92	476	7.14	5.66	1.34	1.48
23	0.56	0.18	0.64		0	0.00	352	5.11	62	0.90	414	6.45	4.46	1.87	1.99
24	0.56	0.21	0.74		0	0.00	353	5.49	67	1.04	420	7.13	5.80	1.18	1.33
25	0.66	0.32	0.83		0	0.00	365	5.63	76	1.17	441	6.73	5.32	1.28	1.41
26	0.53	0.19	0.81		0	0.00	377	5.59	80	1.19	457	7.32	5.74	1.43	1.58
27	0.61	0.21	0.73		0	0.00	411	5.83	88	1.25	499	7.41	5.50	1.76	1.91
28	0.58	0.29	0.87		0	0.00	422	6.07	85	1.22	507	7.01	5.06	1.79	1.95
29	0.55	0.28	0.76		0	0.00	382	6.18	76	1.23	458	6.40	4.52	1.72	1.88
30	0.49	0.20	0.75		0	0.00	438	6.15	72	1.01	510	7.75	5.92	1.68	1.83
31	0.46	0.30	0.71		0	0.00	519	6.04	78	0.91	597	10.59	8.70	1.73	1.89
Tot.							9,775		1,850		11,939				
Avg.	0.55	0.24	0.77	0.75	0.00	0.00	317.27	4.62	60.80	0.88	378.07	5.78	3.99	1.62	1.79
Max	0.66	0.34	0.91	0.80	0.00	0.00	438.00	6.18	120.00	1.67	510.00	7.75	5.92	2.02	2.24
Min.	0.20	0.11	0.64	0.67	0.00	0.00	231.00	3.60	45.00	0.61	282.00	4.51	2.69	1.18	1.33

WSSN 0600 City of Benton Harbor Month/Year July-20

COAGULATION PARAMETERS

D A Y	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	RAW Max.	Applied Avg.	# sample	FILTERED NORTH Avg.	FILTERED NORTH Max.	# Samples	FILTERED SOUTH Avg.	FILTERED SOUTH Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	1.0825	321.00	1.56	3.20	4.50	0.30	3	0.08	0.09	3	0.09	0.09	6	0	0
2	1.0550	310.00	1.55	3.50	5.50	0.32	3	0.10	0.12	3	0.10	0.11	6	0	0
3	0.9575	284.00	1.56	4.40	7.60	0.34	3	0.09	0.11	3	0.09	0.09	6	0	0
4	1.0150	297.00	1.54	1.90	2.20	0.27	3	0.08	0.09	3	0.07	0.08	6	0	0
5	1.0350	309.00	1.57	2.30	2.50	0.27	3	0.08	0.08	3	0.07	0.07	6	0	0
6	1.0750	312.00	1.51	2.50	3.00	0.32	3	0.09	0.10	3	0.08	0.09	6	0	0
7	1.1025	421.00	2.01	2.20	2.40	0.48	3	0.07	0.07	3	0.07	0.07	6	0	0
8	1.0875	345.00	1.67	2.50	2.60	0.41	3	0.09	0.09	3	0.08	0.10	6	0	0
9	1.1200	392.00	1.84	3.00	3.70	0.39	3	0.07	0.08	3	0.08	0.09	6	0	0
10	1.0725	368.00	1.81	3.20	3.20	0.48	3	0.07	0.08	3	0.08	0.09	6	0	0
11	1.1100	373.00	1.77	5.80	7.40	0.51	3	0.08	0.08	3	0.09	0.10	6	0	0
12	0.9425	317.00	1.77	4.60	7.70	0.72	3	0.08	0.08	3	0.08	0.09	6	0	0
13	1.0725	347.00	1.70	4.80	5.70	0.55	3	0.09	0.09	3	0.08	0.09	6	0	0
14	1.0325	348.00	1.77	2.50	2.90	0.48	3	0.07	0.07	3	0.08	0.08	6	0	0
15	1.0150	320.00	1.66	3.30	3.70	0.55	3	0.08	0.08	3	0.08	0.08	6	0	0
16	1.0675	349.00	1.72	2.60	2.90	0.47	3	0.08	0.10	3	0.07	0.07	6	0	0
17	1.0375	287.00	1.46	2.70	3.10	0.58	3	0.08	0.10	3	0.08	0.09	6	0	0
18	1.0050	274.00	1.43	2.40	2.70	0.51	3	0.07	0.08	3	0.08	0.10	6	0	0
19	0.9550	283.00	1.56	2.20	2.60	0.66	3	0.07	0.07	3	0.08	0.09	6	0	0
20	1.0075	294.00	1.54	3.00	3.80	0.64	3	0.08	0.09	3	0.10	0.11	6	0	0
21	0.9575	294.00	1.62	2.90	4.70	0.47	3	0.08	0.08	3	0.07	0.08	6	0	0
22	1.0375	294.00	1.49	1.80	2.00	0.47	3	0.07	0.07	3	0.08	0.09	6	0	0
23	1.0275	332.00	1.70	1.60	1.80	0.41	3	0.07	0.08	3	0.08	0.08	6	0	0
24	0.9600	282.00	1.55	2.90	3.50	0.58	3	0.09	0.12	3	0.08	0.08	6	0	0
25	0.9675	293.00	1.59	2.50	4.60	0.42	3	0.08	0.10	3	0.08	0.08	6	0	0
26	1.0075	311.00	1.59	2.00	3.10	0.48	3	0.08	0.09	3	0.08	0.09	6	0	0
27	1.0525	327.00	1.63	1.90	2.60	0.40	3	0.09	0.10	3	0.09	0.10	6	0	0
28	1.0375	329.00	1.67	1.70	2.30	0.46	3	0.08	0.10	3	0.08	0.08	6	0	0
29	0.9225	537.00	3.06	2.80	3.90	0.36	3	0.08	0.08	3	0.08	0.10	6	0	0
30	1.0625	428.00	2.12	2.00	2.40	0.48	3	0.09	0.09	3	0.09	0.12	6	0	0
31	1.2832	602.00	2.47	8.90	13.00	1.50	3	0.09	0.10	3	0.10	0.11	6	0	0
Total	32.1632	10580.00					93			93			186	0	0
Avg.	1.0375	341.29	1.73	3.02	3.99	0.49		0.08	0.09		0.08		Total	Total	Total
Max.	1.2832	602.00	3.06	8.90	13.00	1.50		0.10	0.12		0.10	0.12	6	0	0
Min.	0.9225	274.00	1.43	1.60	1.80	0.27		0.07	0.07		0.07				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
DAY	pH													
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
TEST	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.2	8.2	156	148	112	103	44	45	38	37	15	14	19.0	23.0
2	8.1	8.1	154	146	107	101	47	45	38	36	15	14	18.5	23.0
3	8.1	8.1	160	154	109	103	51	51	38	37	16	15	18.8	22.5
4	8.2	8.0	156	150	109	104	47	46	44	46	11	8		
5	8.1	8.2	154	146	111	105	43	41	42	42	12	10		
6	8.3	8.1	146	140	109	103	37	37	41	42	11	9	22.5	23.5
7	8.3	8.2	148	142	112	104	36	38	41	41	11	10		
8	8.2	8.0	152	148	109	102	43	46	41	42	12	11	18.5	22.5
9	8.1	8.1	162	144	112	97	50	47	40	37	15	13	18.5	22.5
10	8.2	8.1	164	150	117	102	47	48	38	37	17	14	18.5	22.5
11	8.3	8.2	164	152	124	103	40	49	37	35	17	16	19.0	23.0
12	8.2	8.1	168	156	113	104	55	52	42	40	15	14	19.5	23.0
13	8.3	8.2	148	140	120	103	28	37	42	40	11	10	22.0	25.5
14	8.4	8.2	140	142	115	109	25	33	40	42	10	9		
15	8.3	8.2	142	140	118	108	24	32	46	47	6	5		
16	8.2	8.2	142	138	113	109	29	29	42	42	9	8		
17	8.2	8.1	140	142	109	107	31	35	41	42	9	9		
18	8.2	8.2	142	140	110	108	32	32	42	45	9	7		
19	8.3	8.2	154	146	109	103	45	43	43	42	11	10		
20	8.2	8.1	176	158	121	105	55	53	42	39	17	15	18.0	22.0
21	8.3	8.1	158	154	115	112	43	42	38	38	15	15	19.0	23.0
22	8.2	8.2	140	142	112	114	28	28	41	42	9	9		
23	8.3	8.2	152	144	123	113	29	31	41	38	12	12		
24	8.2	8.0	166	160	111	110	55	50	42	40	15	15	19.0	25.5
25	8.0	8.1	164	162	110	110	54	52	40	39	16	16	19.5	24.5
26	8.2	8.2	164	160	114	107	50	53	39	40	16	15	18.0	23.0
27	8.3	8.0	162	150	116	107	46	43	39	37	16	14	19.0	24.5
28	8.3	8.2	162	154	118	108	44	46	37	36	17	16	19.0	24.5
29	8.2	8.2	162	156	118	108	44	48	38	37	16	16		
30	8.3	8.0	164	156	116	106	48	50	39	37	16	16	19.5	25.0
31	8.1	8.2	166	160	110	106	56	54	41	38	15	16	18.0	23.5
Avg.	8.2	8.1	155.4	148.7	113.7	105.9	41.7	42.7	40.4	39.8	13.2	12.2	19.2	23.5
Max	8.4	8.2	176.0	162.0	124.0	114.0	55.0	53.0	46.0	47.0	17.0	16.0	22.5	25.5
Min.	8.0	8.0	140.0	138.0	107.0	97.0	24.0	28.0	37.0	35.0	6.0	5.0	18.0	22.0

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
Y	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1	2.54	CH	1	A	83	0	15	18.0	1.0392	115	4.37	2.53
1	2.46	wolfs	1	A	37	0	14	16.5	0.9710	110	4.49	2.52
1	2.48	Bait	1	A	76	0	14	16.0	0.9096	96	4.17	3.05
1	2.54	Sunny	1	A	61	0	11	16.0	0.9709	85	3.45	3.02
1	2.33	B & Z	1	A	95	0	11	16.0	0.9375	93	3.94	3.08
6			1	A	67	3	14	15.0	0.9866	95	3.81	3.02
7			1	A	95	1	14	15.0	0.9948	97	3.87	2.96
8			1	A	33	0	13	14.0	1.0299	95	3.63	3.07
9	3.01	CH	1	A	37	0	14	14.0	1.0421	98	3.73	3.05
9	3.12	wolfs	1	A	86	1	19	15.0	1.0561	89	3.32	3.06
9	2.69	Bait	1	A	76	0	17	17.0	0.9235	88	3.78	3.01
9	2.41	Sunny	1	A	66	0	19	17.0	0.8620	89	4.10	2.97
9	2.72	BZ	1	A	88	0	15	18.0	1.0212	92	3.57	3.05
14			1	A	40	1	15	16.0	0.9723	95	3.88	2.98
15	2.88	CH	1	A	66	0	17	20.0	0.9878	91	3.64	2.97
15	2.98	wolfs	1	A	78	0	16	17.0	1.0098	89	3.47	2.91
15	3.29	Bait	1	A	60	0	13	16.0	0.8937	86	3.81	3.01
15	2.90	Sunny	1	A	43	0	14	16.0	0.9954	97	3.85	2.91
15	2.86	BZ	1	A	31	1	18	16.0	0.8574	101	4.65	2.97
20			1	A	57	0	23	15.5	1.0024	105	4.13	2.97
21	2.75	CH	1	A	29	0	22	19.5	0.9467	104	4.36	2.93
21	2.93	wolfs	1	A	168	1	19	21.0	0.9956	85	3.36	2.89
21	2.80	Bait	1	A	112	1	24	21.0	0.9582	95	3.91	3.01
21	2.75	Sunny	1	A	119	0	15	21.5	0.9055	84	3.67	1.79
21	2.46	BZ	1	A	132	0	14	19.5	1.0176	106	4.10	
28			1	A	168	0	21	18.0	0.9610	101	4.15	2.68
29	2.95	CH	1	A	128	0	20.5	19.0	1.0334	106	4.07	2.87
29	2.96	wolfs	1	A	132	0	9.0	12.0	1.1195	113	3.99	
29	2.96	Bait	1	A	219	0	8.7	8.5	1.0960	130	4.69	
29	2.83	Sunny	1	A	142	0	8.5	9.5	0.9823	96	3.85	3.28
29	2.55	BZ	1	A	119	0	13.7	22.5	0.8714	89	4.03	2.89
Totals									30.3503	3012.6		
AVG.	2.78		1	A	89	0	15	17	0.9790	97.2	3.92	2.92
Max	3.29				219	3	24	23	1.1195	129.8	4.69	3.28
Min	2.33				29	0	9	9	0.8574	83.9	3.32	1.79

DISTRIBUTION SYSTEM MONITORING WSSN 0600 July-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1	0.85		1.01	1.05	0.89		0.77			
2										
3										
4										
5										
6										
7										
8										
9	1.12		1.21	1.02	0.92		1.01			
10										
11										
12										
13										
14										
15	0.96		1.03	1.00	0.85		0.91			
16										
17										
18										
19										
20										
21	1.04		1.04	1.24	1.24		0.59			
22										
23										
24										
25										
26										
27										
28										
29	1.25		1.42	1.45	1.06		1.11			
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	25		
Total number of positive routine distribution samples	0600	0		
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.03	1.45	0.59
Total number of check samples	0600	0		
Total number of positive check samples	0600	0		

MI 0600 Benton Harbor October 2020 MOR 1 of 6

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **October-20**

F1-S1 **F1-S2**

Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.097	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	190.00	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.92	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.91	Gallons Per Square Feet per Minute
Average Wash Water Use:	12.70%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	221	days
Primary Coagulant (Alum (Al3+)) on hand:	56792	lb.	Est. supply:	134	days
Cost of All Chemicals per Million Gallons:	$69.74	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
***If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.*	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Distribution	Total	27.261596	Avg	0.9086145	Max	1.137601	Min	0.692453

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

The chorine section could be formatted more clearly. I assume that everything but the tap is applied chlorine and not measured residuals, but it's not very clear.

WSSN 0600 MONTH/YEAR October-20

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
DATE	Fluoride Applied as Fmg/l	Raw mg/l	Tap mg/l	Dist.	INTAKE PPD	INTAKE Free mg/l	Pre Treat Raw Line PPD	Pre Treat Raw Line Free mg/l	FILTERED PPD	FILTERED Free mg/l	Total NaOCl Use PPD	Total NaOCl Use Free mg/l	Demand mg/L	TAP Free mg/l	TAP Total mg/l
1	0.59	0.25	0.80		0	0.00	267	3.63	47	0.64	314	5.18	3.33	1.67	1.85
2	0.55	0.25	0.78		0	0.00	218	3.58	39	0.64	257	4.91	3.22	1.52	1.69
3	0.50	0.24	0.86		0	0.00	198	3.69	34	0.63	232	4.19	2.38	1.63	1.81
4	0.53	0.22	0.81		0	0.00	200	3.82	33	0.63	233	4.35	2.66	1.51	1.69
5	0.49	0.17	0.79		0	0.00	259	3.62	48	0.67	307	4.20	2.29	1.73	1.91
6	0.53	0.19	0.78		0	0.00	202	3.62	34	0.61	236	3.89	1.96	1.76	1.93
7	0.54	0.35	0.78	0.72	0	0.00	256	3.71	43	0.62	299	4.58	2.72	1.71	1.86
8	0.60	0.23	0.77		0	0.00	212	3.72	33	0.58	245	3.59	1.52	1.90	2.07
9	0.67	0.30	0.78		0	0.00	264	3.72	41	0.58	305	4.59	2.41	1.97	2.18
10	0.59	0.28	0.79		0	0.00	196	3.70	27	0.51	223	4.81	2.83	1.78	1.98
11	0.59	0.29	0.69		0	0.00	217	3.79	22	0.38	239	4.38	2.79	1.42	1.59
12	0.68	0.31	0.60		0	0.00	241	3.81	29	0.46	270	4.23	2.55	1.50	1.68
13	0.60	0.20	0.62		0	0.00	214	3.67	32	0.55	246	4.46	2.48	1.81	1.98
14	0.55	0.21	0.69		0	0.00	220	3.66	36	0.60	256	4.51	2.37	2.01	2.14
15	0.53	0.18	0.80		0	0.00	237	3.63	35	0.54	272	4.61	2.62	1.74	1.99
16	0.55	0.17	0.75		0	0.00	229	3.65	23	0.37	252	4.05	2.49	1.42	1.56
17	0.63	0.24	0.82		0	0.00	211	3.66	32	0.56	243	4.04	2.42	1.41	1.62
18	0.52	0.23	0.70		0	0.00	199	3.66	32	0.59	231	4.29	2.53	1.59	1.76
19	0.53	0.33	0.77		0	0.00	267	3.68	42	0.58	309	4.47	2.53	1.77	1.94
20	0.55	0.19	0.77		0	0.00	226	3.64	34	0.55	260	4.18	2.38	1.63	1.80
21	0.63	0.18	0.73	0.59	0	0.00	260	3.64	39	0.55	299	4.35	2.53	1.64	1.82
22	0.51	0.22	0.70		0	0.00	228	3.72	32	0.52	260	4.30	2.42	1.71	1.88
23	0.52	0.21	0.67		0	0.00	231	3.82	33	0.55	264	4.94	3.03	1.73	1.91
24	0.65	0.24	0.64		0	0.00	245	3.94	39	0.63	284	4.11	2.07	1.86	2.04
25	0.60	0.24	0.61		0	0.00	237	4.07	36	0.62	273	4.79	2.87	1.74	1.92
26	0.57	0.29	0.74		0	0.00	267	4.04	46	0.70	313	4.80	2.70	2.32	2.10
27	0.61	0.25	0.61		0	0.00	238	3.90	39	0.64	277	5.12	2.71	2.30	2.41
28	0.68	0.27	0.52	0.65	0	0.00	240	3.85	30	0.48	270	3.77	1.55	2.06	2.22
29	0.61	0.24	0.55		0	0.00	269	3.76	62	0.87	331	4.34	1.99	2.17	2.35
30	0.52	0.26	0.56		0	0.00	230	3.69	31	0.50	261	4.79	2.90	1.72	1.89
31	0.57	0.21	0.56		0	0.00	196	3.68	31	0.58	227	3.97	1.99	1.81	1.98
Tot.							6,907		1,067		8,288				
Avg.	0.57	0.24	0.72	0.65	0.00	0.00	232.60	3.74	36.10	0.58	268.70	4.43	2.51	1.76	1.92
Max	0.68	0.35	0.86	0.72	0.00	0.00	269.00	4.07	62.00	0.87	331.00	5.18	3.33	2.32	2.41
Min.	0.49	0.17	0.52	0.59	0.00	0.00	196.00	3.58	22.00	0.37	223.00	3.59	1.52	1.41	1.56

It is helpful to me when the avg, max and min are boxed off from the daily values or bolded or a different color or something - also, do we really need a total row here?

This should be the first page after the cover sheet

3066

WSSN 0600 City of Benton Harbor

Month/Year October-20

COAGULATION PARAMETERS

D A T E	MIL. GAL. TREAT.	Dry Al2(SO3)4 Pounds Add	ALUM as Al3+ mg/l	TURBIDITY UNITS RAW Avg.	Max.	Applied Avg.	# sample	FILTERED NORTH Avg.	Max.	# Samples	FILTERED SOUTH Avg.	Max.	2 Hour Compliance Periods # of Periods	#of Periods >.30NTU North	#of Periods >.30NTU South
1	1.0970	347.00	1.66	7.10	7.90	0.41	3	0.08	0.09	3	0.09	0.10	6	0	0
2	0.9100	284.00	1.64	6.60	9.40	0.43	3	0.09	0.09	3	0.10	0.12	6	0	0
3	0.8000	253.00	1.66	7.40	9.30	0.38	3	0.09	0.11	3	0.10	0.10	6	0	0
4	0.7825	249.00	1.67	7.10	12.10	0.42	3	0.08	0.09	3	0.09	0.10	6	0	0
5	1.0675	324.00	1.60	8.10	9.90	0.43	3	0.09	0.09	3	0.10	0.11	6	0	0
6	0.8325	265.00	2.05	10.20	15.50	0.48	3	0.10	0.11	3	0.08	0.09	6	0	0
7	1.0300	314.00	1.60	4.70	4.70	0.40	3	0.08	0.09	3	0.09	0.09	6	0	0
8	0.8500	272.00	1.68	5.20	5.60	0.32	3	0.10	0.12	3	0.09	0.12	6	0	0
9	1.0600	333.00	1.65	4.00	4.10	0.31	3	0.09	0.09	3	0.08	0.09	6	0	0
10	0.7900	243.00	1.62	3.70	3.80	0.41	3	0.10	0.10	3	0.08	0.09	6	0	0
11	0.8550	273.00	1.68	5.40	6.40	0.34	3	0.09	0.12	3	0.10	0.12	6	0	0
12	0.9450	282.00	1.57	5.90	10.20	0.33	3	0.08	0.09	3	0.09	0.09	6	0	0
13	0.8700	275.00	1.66	5.10	5.90	0.33	3	0.09	0.10	3	0.09	0.10	6	0	0
14	0.8975	276.00	1.62	4.30	4.60	0.35	3	0.08	0.08	3	0.10	0.12	6	0	0
15	0.9750	306.00	1.65	6.20	8.00	0.41	3	0.07	0.08	3	0.09	0.10	6	0	0
16	0.9375	297.00	1.67	8.00	8.20	0.37	3	0.08	0.10	3	0.08	0.08	6	0	0
17	0.8600	250.00	1.53	5.90	6.30	0.37	3	0.09	0.09	3	0.10	0.11	6	0	0
18	0.8125	256.00	1.66	4.90	5.30	0.39	3	0.09	0.09	3	0.10	0.11	6	0	0
19	1.0825	335.00	1.63	5.30	7.90	0.45	3	0.09	0.11	3	0.09	0.10	6	0	0
20	0.9275	294.00	1.67	6.00	8.30	0.39	3	0.09	0.10	3	0.08	0.09	6	0	0
21	1.0650	335.00	1.65	6.50	7.80	0.47	3	0.08	0.08	3	0.08	0.08	6	0	0
22	0.9150	294.00	1.69	4.90	7.90	0.47	3	0.09	0.09	3	0.09	0.10	6	0	0
23	0.9025	291.00	1.70	4.10	5.80	0.49	3	0.09	0.11	3	0.08	0.11	6	0	0
24	0.9275	294.00	1.67	4.80	5.20	0.49	3	0.08	0.10	3	0.09	0.10	6	0	0
25	0.8700	309.00	1.87	8.60	12.20	0.53	3	0.10	0.10	3	0.09	0.10	6	0	0
26	0.9875	314.00	1.87	8.40	9.00	0.62	3	0.08	0.09	3	0.08	0.09	6	0	0
27	0.9100	267.00	1.54	8.80	10.20	0.52	3	0.09	0.10	3	0.09	0.09	6	0	0
28	0.9300	289.00	1.63	8.80	11.80	0.81	3	0.10	0.11	3	0.09	0.10	6	0	0
29	1.0675	345.00	1.70	5.10	6.00	0.48	3	0.08	0.09	3	0.09	0.10	6	0	0
30	0.9300	298.00	1.69	8.20	11.80	0.53	3	0.09	0.10	3	0.10	0.10	6	0	0
31	0.7950	256.00	1.69	8.80	9.90	0.64	3	0.09	0.09	3	0.08	0.09	6	0	0
Total	28.6820	9020.00					93			93			186	0	0
Avg.	0.9252	290.97	1.67	6.39	8.10	0.44		0.09	0.10		0.09		Total	Total	Total
Max	1.0970	347.00	2.05	10.20	15.50	0.81		0.10	0.12		0.10	0.12	6	0	0
Min.	0.7825	243.00	1.53	3.70	3.80	0.31		0.07	0.08		0.08				

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CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness as CaCO3 mg/l		Total Alkalinity as CaCO3 mg/l		Non-Carb. Hardness as CaCO3 mg/l		Calcium as Ca++ mg/l		Magnesium as Mg++ mg/l		Chloride as Cl- mg/l	
D A T E	pH Raw 29.	pH Tap 30.	Raw 31.	Tap 32.	Raw 33.	Tap 34.	Raw 35.	Tap 36.	Raw 37	Tap 38	Raw 39	Tap 40	Raw 41	Tap 42
1	8.2	8.2	166	156	124	117	42	39	38	37	17	16	19.5	24.5
2	8.3	8.1	176	162	136	118	40	44	39	40	19	15	20.5	25.0
3	8.2	8.1	166	158	125	119	41	39	38	37	17	16	19.0	24.0
4	8.2	8.2	168	162	122	117	46	45	39	38	17	17	19.0	24.0
5	8.3	8.0	166	158	123	116	43	42	39	38	17	16	19.5	24.0
6	8.2	8.0	166	154	124	117	42	37	39	37	17	15	19.5	24.0
7	8.4	8.3	152	144	131	118	21	26	43	42	11	10		
8	8.4	8.2	144	142	127	121	17	21	40	40	10	10		
9	8.4	8.2	142	140	124	121	18	19	39	40	11	10		
10	8.5	8.3	152	148	134	122	18	26	41	40	12	12		
11	8.5	8.4	152	148	131	119	21	29	41	42	12	11		
12	8.3	8.2	166	158	125	117	41	41	38	38	17	16	19.0	24.0
13	8.2	8.1	162	156	123	119	39	37	37	36	17	16	19.5	24.0
14	8.3	8.3	142	140	128	122	14	18	42	41	9	9		
15	8.4	8.1	154	150	130	118	24	32	43	43	11	10		
16	8.4	8.2	144	146	122	124	22	22	40	41	11	11		
17	8.3	8.3	142	144	122	121	20	23	42	44	9	8		
18	8.2	8.2	148	146	129	122	19	24	43	43	10	9		
19	8.2	8.1	174	164	128	121	46	43	41	39	17	16	18.5	23.5
20	8.1	8.0	174	168	126	118	48	50	41	42	17	16	19.5	24.5
21	8.2	8.2	172	168	124	117	48	51	43	41	17	16	19.5	24.0
22	8.2	8.1	174	166	128	117	46	49	40	41	18	16	20.0	24.5
23	8.2	8.2	176	164	129	118	47	46	39	38	19	17	21.5	25.5
24	8.1	8.2	178	162	135	119	43	43	41	38	18	16	19.5	24.5
25	8.1	8.1	178	174	125	118	53	56	39	40	19	18	19.5	24.0
26	8.0	8.1	144	146	126	121	18	25	38	40	12	11	22.0	24.0
27	8.3	8.0	138	142	121	119	17	23	41	43	9	8		
28	8.1	8.2	182	158	139	117	43	41	41	37	19	16	21.0	25.5
29	8.1	8.2	172	164	127	122	45	42	41	40	17	16	19.5	24.0
30	8.1	8.1	172	162	128	119	44	43	40	39	17	16	19.0	24.0
31	8.1	8.0	182	170	130	119	52	51	42	40	19	17	21.0	25.5
Avg.	8.2	8.2	161.4	155.0	127.2	119.1	34.2	35.9	40.2	39.8	14.8	13.6	19.7	24.3
Max	8.5	8.4	182.0	174.0	139.0	124.0	53.0	56.0	43.0	44.0	19.0	18.0	22.0	25.5
Min.	8.0	8.0	138.0	140.0	121.0	116.0	14.0	18.0	37.0	36.0	9.0	8.0	18.5	23.5

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1		0	1	A	62	0	18	17.5	0.9055	76	3.31	3.15
2		0	1	A	89	0	17	17.5	0.7817	66	3.34	3.0
3		0	1	A	57	0	17	17.5	0.8263	68	3.27	3.0
4		0	1	A	51	0	17	17.5	0.8000	78	3.86	3.1
5		0	1	A	35	0	16	17.5	1.0921	65	2.36	2.9
6		0	1	A	15	0	16	16.5	0.9055	82	3.57	3.1
7	2.87	City Hall	1	A	33	0	17	18.0	0.9751	74	3.01	2.8
7	2.87	Wolfs	1	A	48	0	17	18.0	1.0211	83	3.20	3.2
7	2.88	BaitShed	1	A	22	0	17	18.0	0.9907	74	2.94	2.9
7	2.91	SunnySpot	1	A	23	1	17	18.0	0.6925	80	4.57	2.92
7	2.75	B&Z	1	A	40	0	17	18.0	0.8136	58	2.80	0.00
12		0	1	A	29	0	16	16.5	0.9534	71	2.93	3.04
13		0	1	A	19	0	16	16.5	0.8234	69	3.31	2.98
14	2.84	City Hall	1	A	32	0	16	18.0	0.8489	66	3.08	2.81
14	2.85	Wolfs	1	A	21	0	17	18.0	0.8816	68	3.03	2.90
14	2.92	BaitShed	1	A	15	0	15	16.0	0.9287	73	3.10	3.25
14	2.22	SunnySpot	1	A	37	1	16	17.0	0.8979	58	2.57	3.28
14	2.68	B&Z	1	A	32	2	15	17.0	0.8038	67	3.32	2.91
19		0	1	A	49	0	14	15.5	1.0313	53	2.02	2.99
20		0	1	A	30	0	14	15.0	0.9279	59	2.52	2.96
21	2.95	City Hall	1	A	55	1	14	15.0	1.0269	94	3.62	2.91
21	2.88	Wolfs	1	A	45	1	14	14.5	0.9032	81	3.55	2.90
21	2.86	BaitShed	1	A	99	0	14	14.5	0.7975	88	4.38	2.94
21	2.77	SunnySpot	1	A	53	0	14	14.5	1.0303	81	3.10	3.05
21	2.67	B&Z	1	A	86	0	14	14.5	0.8506	77	3.59	3.01
26		0	1	A	64	0	14	15.0	0.9744	83	3.35	2.96
27	2.78	City Hall	1	A	97	0	13.0	15.0	0.8080	94	4.59	3.05
27	2.84	Wolfs	1	A	134	0	12.5	13.5	1.0704	94	3.49	3.10
27	2.87	BaitShed	1	A	43	0	12.5	13.5	1.1376	93	3.23	
27	2.77	SunnySpot	1	A	58	0	12.3	13.0	0.8141	77	3.72	3.05
27	2.65	B&Z	1	A	126	0	11.8	13.0	0.8541	88	4.07	3.09
Totals									28.1679	2334.9		
AVG.	2.79	0.00				0	15	16	0.9086	75.3	3.32	2.92
Max	2.95	0.00				2	17	18	1.1376	94.4	4.59	3.28
Min	2.22	0.00				0	12	13	0.6925	52.6	2.02	0.00

The phosphate data should either have its own page or be grouped with the other chemical addition data, not squeezed into the extra space ont he bacti page, and we would prefer to have it in order of applied, tap residual, distribution residuals. Additionally, if samples are not taken on a day, please leave that cell blank instead of putting a zero there, as that can mess up the averages.

The distribution PO4 data shouldn't have multiple rows for the same day. If possible, it should be formatted more like the distro chlorine data (could even be put on the same page).

MI 0600 Distribution Monitoring Report MI 0600 DMR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 October-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5										
6										
7	1.14		1.22	1.44	1.55		1.09			
8										
9										
10										
11										
12										
13										
14	1.55		1.43	1.13	1.65		0.80			
15										
16										
17										
18										
19										
20										
21	1.45		1.17	1.03	1.46		0.99			
22										
23										
24										
25										
26										
27										
28	1.30		1.23	1.13	1.42		0.64			
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	20	
Total number of positive routine distribution samples	0600		
Total number of routine distribution samples required	0600	10	Max / Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.24	1.65 / 0.64
Total number of check samples	0600	0	
Total number of positive check samples	0600	0	

This bottom area is formatted "by WSSN" because they used to have customers. IT could be cleaned up to look better now.

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Michael O'Malley** Month/Year **August-20**

F1-S1 **F1-S2**

Water Plant Classification

Signature of Operator-in-Charge

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0925	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	176.17	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.01	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.89	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.01%	Percent of Treated Water

Chemical Data

Chlorine on hand:	38885	lb.	Est. supply:	133	days
Primary Coagulant (Alum (Al3+)) on hand:	67913	lb.	Est. supply:	125	days
Cost of All Chemicals per Million Gallons:	$89.00	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
***If yes**, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.*

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	29.505554	Avg	0.9852258	Max	1.120149	Min	0.839929

Remarks. We began to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
In early 2020, EGLE forced the city to change to (OPP) 90/10 Carus Aquadene at 2x's rate Feb 20, 2020
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

CITY OF BENTON HARBOR

WSSN 0600 MONTH/YEAR **August-20**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.67	0.35	0.71		0	0.00	416	6.35	75	1.15	491	7.07	5.09	1.81	1.98
2	0.54	0.31	0.64		0	0.00	389	6.26	70	1.13	459	7.33	5.04	2.14	2.29
3	0.53	0.26	0.67		0	0.00	418	6.01	74	1.06	492	7.32	5.31	1.86	2.01
4	0.55	0.32	0.77		0	0.00	384	6.03	68	1.07	452	7.10	5.14	1.77	1.96
5	0.61	0.23	0.71	0.74	0	0.00	393	6.18	68	1.07	461	7.02	5.11	1.76	1.91
6	0.56	0.11	0.71		0	0.00	414	6.31	75	1.14	489	7.96	6.09	1.71	1.87
7	0.66	0.20	0.83		0	0.00	439	6.65	95	1.44	534	8.04	6.35	1.53	1.69
8	0.54	0.12	0.77		0	0.00	421	6.70	93	1.48	514	8.54	6.93	1.46	1.61
9	0.50	0.20	0.76		0	0.00	425	6.24	76	1.12	501	7.64	5.58	1.90	2.06
10	0.54	0.16	0.71		0	0.00	483	6.60	73	1.00	556	8.18	6.18	1.83	2.00
11	0.55	0.12	0.72		0	0.00	482	6.59	73	1.00	555	8.44	6.47	1.75	1.97
12	0.58	0.10	0.67	0.63	0	0.00	404	6.47	62	0.99	466	7.64	6.10	1.39	1.54
13	*0.70*	*0.17*	*0.71*		*0*	*0.00*	*464*	*6.43*	*72*	*1.00*	*536*	*7.72*	*6.04*	*1.52*	*1.68*
14	0.58	0.13	0.58		0	0.00	456	6.55	71	1.02	527	7.63	5.29	2.14	2.34
15	0.59	0.29	0.69		0	0.00	454	6.79	73	1.09	527	8.07	6.54	1.37	1.53
16	0.73	0.29	0.67		0	0.00	445	6.66	76	1.14	521	7.67	6.00	1.51	1.67
17	0.73	0.24	0.56		0	0.00	449	6.64	77	1.14	526	7.76	6.00	1.69	1.76
18	0.63	0.22	0.50		0	0.00	462	6.88	79	1.18	541	8.20	6.48	1.56	1.72
19	0.60	0.22	0.49		0	0.00	424	6.97	69	1.14	493	8.19	6.55	1.39	1.64
20	0.56	0.25	0.49	0.59	0	0.00	474	6.97	81	1.19	555	8.45	6.70	1.61	1.75
21	0.71	0.17	0.56		0	0.00	475	6.97	79	1.16	554	8.01	5.74	2.11	2.27
22	0.71	0.19	0.49		0	0.00	485	7.00	79	1.14	564	8.88	7.13	1.63	1.75
23	0.65	0.24	0.52		0	0.00	500	7.02	80	1.12	580	8.43	6.26	1.91	2.17
24	0.70	0.20	0.46		0	0.00	476	7.05	78	1.16	554	8.28	6.21	1.89	2.07
25	0.58	0.23	0.55		0	0.00	498	6.98	80	1.12	578	8.19	6.34	1.61	1.85
26	0.58	0.19	0.69	0.59	0	0.00	519	7.11	85	1.16	604	8.05	6.22	1.68	1.83
27	0.65	0.22	0.74		0	0.00	428	7.02	74	1.21	502	7.83	5.89	1.79	1.94
28	0.43	0.13	0.69		0	0.00	500	6.91	86	1.19	586	7.92	5.95	1.81	1.97
29	0.63	0.24	0.77		0	0.00	475	6.80	76	1.09	551	8.39	6.21	2.00	2.18
30	0.56	0.32	0.74		0	0.00	408	6.86	65	1.09	473	8.41	6.45	1.71	1.96
31	0.53	0.28	0.77		0	0.00	491	6.88	80	1.12	571	8.97	6.89	1.98	2.08
Tot.							13,535		2,287		16,313				
Avg.	0.60	0.21	0.65	0.64	0.00	0.00	448.67	6.67	76.07	1.13	524.73	7.95	6.05	1.73	1.90
Max	0.73	0.35	0.83	0.74	0.00	0.00	519.00	7.11	95.00	1.48	604.00	8.88	7.13	2.14	2.34
Min.	0.43	0.10	0.46	0.59	0.00	0.00	384.00	6.01	62.00	0.99	452.00	7.02	5.04	1.37	1.53

WSSN 0600 City of Benton Harbor Month/Year August-20

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
Y		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.9775	290.00	1.56	0.99	1.20	1.70	3	0.20	0.23	3	0.22	0.27	6	0	0
2	0.9275	305.00	1.73	1.50	2.20	0.31	3	0.08	0.08	3	0.10	0.13	6	0	0
3	1.0375	317.00	1.61	2.30	2.50	0.31	3	0.07	0.07	3	0.08	0.09	6	0	0
4	0.9500	292.00	1.62	6.20	8.50	0.42	3	0.07	0.08	3	0.08	0.09	6	0	0
5	0.9500	292.00	1.62	4.50	6.30	0.55	3	0.08	0.08	3	0.08	0.09	6	0	0
6	0.9800	291.00	1.57	3.30	4.40	0.38	3	0.08	0.09	3	0.08	0.08	6	0	0
7	0.9850	292.00	1.56	2.90	4.30	0.37	3	0.08	0.09	3	0.07	0.08	6	0	0
8	0.9375	281.00	1.58	2.50	3.70	0.32	3	0.08	0.08	3	0.08	0.09	6	0	0
9	1.0175	300.00	1.55	3.60	6.60	0.36	3	0.09	0.10	3	0.09	0.09	6	0	0
10	1.0925	330.00	1.59	2.60	2.90	0.42	3	0.08	0.09	3	0.09	0.10	6	0	0
11	1.0925	338.00	1.63	1.90	2.10	0.26	3	0.11	0.11	3	0.09	0.09	6	0	0
12	0.9325	282.00	1.59	2.10	2.30	0.25	3	0.11	0.16	3	0.08	0.09	6	0	0
13	1.0775	329.00	1.61	2.10	2.20	0.26	3	0.08	0.08	3	0.08	0.09	6	0	0
14	1.0400	318.00	1.61	1.80	2.30	0.25	3	0.09	0.11	3	0.10	0.12	6	0	0
15	0.9975	309.00	1.63	2.20	2.70	0.33	3	0.08	0.08	3	0.08	0.08	6	0	0
16	0.9975	307.00	1.62	2.50	3.90	0.34	3	0.08	0.09	3	0.09	0.10	6	0	0
17	1.0100	328.00	1.71	2.50	3.40	0.37	3	0.09	0.10	3	0.09	0.09	6	0	0
18	1.0025	388.00	2.04	3.30	4.70	0.29	3	0.09	0.10	3	0.08	0.09	6	0	0
19	0.9075	286.00	1.66	2.40	4.00	0.40	3	0.09	0.10	3	0.10	0.15	6	0	0
20	1.0150	310.00	1.61	1.60	2.10	0.29	3	0.09	0.10	3	0.08	0.08	6	0	0
21	1.0175	319.00	1.65	2.60	3.20	0.28	3	0.10	0.12	3	0.08	0.08	6	0	0
22	1.0350	325.00	1.65	2.30	3.10	0.27	3	0.11	0.13	3	0.08	0.08	6	0	0
23	1.0625	330.00	1.63	2.10	2.20	0.27	3	0.09	0.10	3	0.08	0.10	6	0	0
24	1.0075	317.00	1.66	2.00	2.70	0.29	3	0.09	0.10	3	0.07	0.07	6	0	0
25	1.0650	320.00	1.58	2.40	3.60	0.37	3	0.09	0.09	3	0.07	0.07	6	0	0
26	1.0900	324.00	1.58	2.00	2.20	0.31	3	0.08	0.08	3	0.09	0.11	6	0	0
27	0.9100	285.00	1.65	2.70	3.00	0.41	3	0.09	0.11	3	0.09	0.09	6	0	0
28	1.0800	339.00	1.65	2.70	4.20	0.29	3	0.09	0.09	3	0.08	0.08	6	0	0
29	1.0425	319.00	1.61	2.40	2.80	0.28	3	0.09	0.10	3	0.08	0.09	6	0	0
30	0.8875	271.00	1.61	3.50	3.90	0.35	3	0.10	0.12	3	0.08	0.08	6	0	0
31	1.0650	326.00	1.61	3.30	3.60	0.36	3	0.10	0.11	3	0.08	0.08	6	0	0
Total	31.1900	9660.00					93			93			186	0	0
Avg.	1.0061	311.61	1.63	2.61	3.45	0.38		0.09	0.10		0.09		Total	Total	Total
Max	1.0925	388.00	2.04	6.20	8.50	1.70		0.20	0.23		0.22	0.15	6	0	0
Min.	0.8875	271.00	1.55	0.99	1.20	0.25		0.07	0.07		0.07				

WSSN 0600 | MONTH/YEAR | August-20 |

CITY OF BENTON HARBOR CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.3	8.2	138	136	104	105	34	31	38	38	10	10		
2	8.1	8.0	138	136	108	104	30	32	43	43	7	7		
3	8.1	8.1	134	138	108	105	26	33	36	37	11	11	24.0	27.5
4	8.1	8.1	146	142	106	104	40	38	39	41	12	10		
5	8.1	7.9	176	154	119	102	57	52	41	38	18	14	19.5	24.0
6	8.3	8.2	176	154	126	104	50	50	42	39	17	14	21.0	26.0
7	8.2	8.2	162	156	118	111	44	45	39	38	16	15	19.5	26.5
8	8.2	8.1	162	154	119	111	43	43	39	38	16	14	20.0	28.5
9	8.2	8.2	178	162	126	111	52	51	43	38	17	16	21.5	25.5
10	8.4	8.3	152	144	127	114	25	30	42	41	11	10		
11	8.5	8.4	148	152	118	117	30	35	39	42	12	12	23.0	29.0
12	8.4	8.3	138	142	109	114	29	28	38	41	10	10		
13	8.3	8.2	142	144	110	109	32	35	38	39	12	11		
14	8.3	8.3	142	140	106	107	36	33	36	36	13	12		
15	8.1	8.1	156	150	111	107	45	43	38	37	15	14	19.5	26.0
16	8.3	8.1	158	152	113	106	45	46	38	36	16	15	19.0	24.5
17	8.2	8.2	164	154	112	105	52	49	38	37	17	15	20.0	25.0
18	8.3	8.3	162	152	116	107	46	45	38	37	16	15	19.5	25.5
19	8.2	8.2	144	142	113	107	31	35	39	40	11	10	23.5	27.0
20	8.2	8.2	134	132	113	107	21	25	38	37	10	10		
21	8.4	8.3	142	140	112	104	30	36	37	38	12	11		
22	8.3	8.3	142	140	113	105	29	35	41	38	10	11		
23	8.3	8.2	144	142	114	108	30	34	39	40	11	10		
24	8.3	8.2	142	140	112	107	30	33	38	38	11	11	21.5	29.0
25	8.4	8.2	146	140	117	105	29	35	39	38	12	11		
26	8.3	8.1	166	156	111	107	55	49	38	37	17	16	20.0	26.0
27	8.2	8.1	168	158	115	107	53	51	38	37	17	16	20.5	26.5
28	8.1	8.2	164	152	117	107	47	45	38	35	17	16	19.5	26.0
29	8.4	8.2	142	140	113	110	29	30	37	41	12	9		
30	8.2	8.4	146	142	116	108	30	34	40	42	11	9		
31	8.4	8.3	142	144	114	109	28	35	38	42	11	9	24.5	28.5
Avg.	8.3	8.2	151.7	146.2	114.1	107.5	37.7	38.7	38.9	38.6	13.2	12.2	20.7	26.4
Max	8.5	8.4	178.0	162.0	127.0	117.0	57.0	52.0	43.0	43.0	18.0	16.0	24.0	29.0
Min.	8.1	7.9	134.0	132.0	104.0	102.0	21.0	25.0	36.0	35.0	7.0	7.0	19.0	24.0

DISTRIBUTION SYSTEM MONITORING WSSN 0600 August-20

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	CITY OF BENTON HARBOR					blu water	B&Z			
	1	2	3	4	5	6	7			
1										
2										
3										
4										
5	1.50		0.74	1.08	1.55		1.69			
6										
7										
8										
9										
10										
11										
12	0.61		1.27	1.18	1.19		0.52			
13										
14										
15										
16										
17										
18										
19										
20	1.22		1.03	0.72	1.00		1.17			
21										
22										
23										
24										
25										
26	1.26		1.49	1.09	1.15		1.43			
27										
28										
29										
30										
31										

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	20		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	1.14	1.69	0.52
Total number of check samples	0600	0		
Total number of positive check samples	0600	0		

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BACTERIOLOGICAL AND PHYSICAL PARAMETERS and Distrubution Flow and Corrosion Treatment

	Ortho P System		PLANT TAP		Standard Plate Count		Raw	Tap	Distrubution flow and Corrosion Treatment			
D	System	System	No. of	Colilert			TEMP.	TEMP.				
A	Ortho P	Ortho P	Samples	P/A			'C	'C	High Lift		PO4	Ortho P
T	Residual	Residual			Raw	Tap			To	Lbs PO4	Treatment	Residual
E	mg/L	Location							Distribution		mg/L	mg/L
1			1	A	102	0	13	13.0	1.0705	74	2.74	3.03
2			1	A	134	0	12	18.0	0.9780	85	3.44	2.84
3			1	A	134	0	15	17.0	1.0425	85	3.23	3.21
4			1	A	83	0	13	16.0	0.9806	84	3.39	2.71
5	2.82	City Hall	1	A	57	0	17	14.0	1.0204	88	3.40	3.27
5	2.79	Wolfs	1	A	92	0	20	15.5	0.9456	82	3.44	2.80
5	2.87	Bait Shed	1	A	114	0	21	18.0	1.0301	85	3.25	3.18
5	2.77	SunnySpot	1	A	132	0	21	19.5	0.9273	82	3.49	2.71
5	2.69	B&Z	1	A	123	0	21	20.5	0.9795	89	3.60	3.26
10			1	A	110	0	23	21.0	1.0541	72	2.70	3.28
11			1	A	96	0	24	25.0	1.0327	83	3.17	2.98
12	2.45	City Hall	1	A	98	0	24	23.0	0.9443	93	3.88	3.29
12	2.28	Wolfs	1	A	197	0	22	24.0	1.0650	85	3.15	2.87
12	2.73	Bait Shed	1	A	113	0	21	23.0	1.0941	186	6.71	3.27
12	2.66	SunnySpot	1	A	137	0	18	21.5	0.9751	126	5.13	0.00
12	2.39	B&Z	1	A	189	0	19	20.0	1.0140	113	4.39	3.12
17			1	A	176	0	21	19.5	1.0123	91	3.55	3.10
18			1	A	148	0	21	20.5	0.9843	85	3.43	3.14
19			1	A	127	0	17	22.0	0.9249	56	2.38	3.01
20	2.96	City Hall	1	A	171	0	17	21.0	1.0204	85	3.28	3.29
20	3.03	Wolfs	1	A	159	0	20	20.0	1.0679	82	3.03	3.14
20	3.01	Bait Shed	1	A	131	0	21	20.0	0.9764	80	3.24	2.81
20	3.09	SunnySpot	1	A	104	0	22	21.0	1.0666	113	4.21	3.18
20	2.90	B&Z	1	A	45	0	23	21.0	1.0294	90	3.46	2.83
25			1	A	46	1	22	22.0	1.0917	96	3.49	3.12
26			1	A	57	0	20	22.0	1.1201	88	3.13	2.87
27	2.83	City Hall	1	A	58	1	22.0	22.0	0.9571	117	4.84	3.25
27	2.67	Wolfs	1	A	96	13	9.0	12.0	1.1040	99	3.56	2.96
27	2.86	Bait Shed	1	A	104	0	8.7	8.5	1.0086	91	3.55	2.85
27	2.76	SunnySpot	1	A	107	1	8.5	9.5	0.8950	93	4.11	3.26
27	2.51	B&Z	1	A	143	2	21.0	23.0	0.9754	71	2.86	0.00
Totals									31.3880	2846.3		
AVG.	2.75		1	A	116	1	19	19	1.0125	91.8	3.62	2.85
Max	3.09				197	13	24	25	1.1201	185.6	6.71	3.29
Min	2.28				45	0	9	9	0.8950	55.6	2.38	0.00

From: Sarkipato, Ernest (EGLE)
To: Jason Marquardt; David A. Cornwell
Cc: Abul Ahmed; Darold Harlan; rjones@fv-operations.com
Subject: data dump #5
Date: Wednesday, September 1, 2021 8:39:00 AM
Attachments: JUNE-2021 MOR 2AA.pdf
MOR APRIL 2021 rev 05172021.pdf
WSSN 600 MOR APRIL 2021.pdf
WSSN 600 MOR FEB 2021.pdf
WSSN 600 MOR JAN 2021.pdf
WSSN 600 MOR MAR 2021.pdf
BH May 2021 MOR.pdf
July 2021 MOR Report.pdf

-8 MOR files should be attached for 2021.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:38 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #4

-13 MOR files should be attached for 2020.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:27 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #3

-14 MOR files should be attached for 2019.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:10 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #2

-12 MOR should be attached for 2018.

From: Sarkipato, Ernest (EGLE)

Sent: Wednesday, September 1, 2021 7:58 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: Corrosion Study contacts and data dump #1

Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,
-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261
www.Michigan.gov/communitywater

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR** Page 1

WSSN:600

Operator-in-Charge **Abul D Ahmed** Month/Year **June-21**

F1

Water Plant Classification

Signature of Operator-in-Charge

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.2966	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	190.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.06	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.26	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.88%	Percent of Treated Water

Chemical Data

Chlorine on hand:	57570	lb.	Est. supply:	382 days
Primary Coagulant (Alum (Al3+)) on hand:	104450	lb.	Est. supply:	182 days
Cost of All Chemicals per Million Gallons:	$67.34	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	90	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.S NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	32.593847	Avg	1.1208767	Max	1.39052	Min	0.796215

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

WSSN 0600 City of Benton Harbor Month/Year June-21

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0075	303.00	1.58	1.60	2.90	0.44	3	0.08	0.10	3	0.09	0.09	6	0	0
2	0.9875	299.00	1.59	1.40	1.60	0.41	3	0.08	0.09	3	0.08	0.08	6	0	0
3	0.9600	293.00	1.61	1.20	1.40	0.40	3	0.07	0.07	3	0.07	0.08	6	0	0
4	1.0650	328.00	1.62	1.60	2.90	0.35	3	0.07	0.07	3	0.07	0.08	6	0	0
5	0.9425	284.00	1.59	1.60	2.40	0.28	3	0.07	0.08	3	0.07	0.07	6	0	0
6	1.0800	332.00	1.38	1.10	1.40	0.28	3	0.06	0.07	3	0.07	0.08	6	0	0
7	1.0500	321.00	1.61	1.20	1.90	0.44	3	0.08	0.10	3	0.09	0.10	6	0	0
8	1.0475	325.00	1.63	1.02	1.50	0.51	3	0.09	0.10	3	0.09	0.09	6	0	0
9	1.0525	322.00	1.61	1.10	1.70	0.30	3	0.08	0.09	3	0.07	0.08	6	0	0
10	1.2000	368.00	1.61	0.78	0.91	0.29	3	0.07	0.08	3	0.07	0.08	6	0	0
11	1.1600	394.00	1.79	3.00	4.50	0.60	3	0.06	0.07	3	0.08	0.09	6	0	0
12	0.9850	299.00	1.60	1.20	2.00	0.38	3	0.08	0.09	3	0.08	0.10	6	0	0
13	1.1375	300.00	1.39	0.89	1.50	0.32	3	0.08	0.09	3	0.09	0.10	6	0	0
14	1.1775	357.00	1.60	0.67	0.76	0.34	3	0.08	0.08	3	0.08	0.09	6	0	0
15	1.1375	331.00	1.53	1.00	1.24	0.49	3	0.09	0.09	3	0.08	0.09	6	0	0
16	1.1975	359.00	1.58	1.10	1.40	0.48	3	0.07	0.07	3	0.06	0.07	6	0	0
17	1.0050	310.00	1.62	0.99	1.30	0.36	3	0.06	0.06	3	0.07	0.07	6	0	0
18	1.0875	322.00	1.56	1.70	1.90	0.64	3	0.07	0.07	3	0.06	0.06	6	0	0
19	0.8600	253.00	1.55	1.00	1.50	0.31	3	0.07	0.08	3	0.07	0.08	6	0	0
20	1.0600	327.00	1.62	1.90	3.70	0.44	3	0.08	0.09	3	0.08	0.10	6	0	0
21	1.0000	293.00	1.54	1.10	1.50	0.41	3	0.07	0.09	3	0.07	0.09	6	0	0
22	1.1075	350.00	1.66	7.70	14.10	0.40	3	0.10	0.12	3	0.08	0.09	6	0	0
23	1.2966	447.00	1.81	4.30	5.00	0.91	3	0.08	0.09	3	0.07	0.07	6	0	0
24	1.1316	358.00	1.66	4.50	5.80	0.78	3	0.08	0.08	3	0.07	0.08	6	0	0
25	1.0166	299.00	1.55	4.40	4.60	0.91	3	0.07	0.07	3	0.07	0.07	6	0	0
26	1.0350	311.00	1.55	2.00	3.00	0.48	3	0.09	0.10	3	0.10	0.10	6	0	0
27	0.8150	254.00	1.64	1.90	2.40	0.42	3	0.07	0.07	3	0.09	0.10	6	0	0
28	1.0125	315.00	1.64	2.20	4.20	0.32	3	0.07	0.08	3	0.08	0.09	6	0	0
29	1.1508	362.00	1.66	2.00	3.30	0.36	3	0.09	0.10	3	0.09	0.10	6	0	0
30	1.0799	406.00	1.98	3.80	7.50	0.64	3	0.09	0.10	3	0.09	0.10	6	0	0
31															
Total	31.8455	9822.00					90			90			180	0	0
Avg.	1.0615	327.40	1.61	2.00	2.99	0.46		0.08	0.08		0.08		Total	Total	Total
Max	1.2966	447.00	1.98	7.70	14.10	0.91		0.10	0.12		0.10	0.10	6	0	0
Min.	0.8150	253.00	1.38	0.67	0.76	0.28		0.06	0.06		0.06				

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR **June-21**

CHEMICAL ANALYSES

			Total Hardness		Total Alkalinity		Non-Carb. Hardness		Calcium		Magnesium		Chloride		WQP	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-		Conductivity	Sulfate
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l		umhos	mg/l
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42		
1	8.1	7.7	152	150	128	118	24	32	42	40	12	12				
2	8.1	8.1	154	148	126	119	28	29	54	51	5	5	22.5	24.5		
3	8.1	8.1	148	146	127	117	21	29	43	43	10	9				
4	8.1	8.0	148	150	118	121	30	29	50	51	6	6				
5	8.2	8.1	144	148	118	115	26	33	41	46	10	8				
6	8.3	8.1	144	142	117	119	27	23	39	41	11	10				
7	8.3	7.9	150	136	120	114	30	22	60	39	99	5	23.0	26.0		
8	8.0	8.0	154	138	128	108	26	30	40	46	10	6				
9	8.1	8.1	170	166	121	113	49	53	37	38	19	17			324.0	39.0
10	8.2	7.9	140	144	119	112	21	32	37	41	12	10				
11	8.2	7.9	172	168	119	111	53	57	38	37	18	18				
12	8.1	8.0	174	168	119	112	55	56	46	45	15	14				
13	8.1	8.0	172	166	117	112	55	54	41	38	17	17	18.5	22.5		
14	8.2	7.9	162	154	112	113	50	41	48	59	12	14	22.5	25.5		
15	8.6	8.1	144	140	122	112	22	28	57	62	14	15				
16	8.1	8.1	136	138	119	114	17	24	38	42	10	8				
17	8.1	8.0	138	136	123	116	15	20	39	42	10	8			288.0	31.0
18	8.2	8.1	146	144	121	116	25	28	38	38	13	12				
19	8.2	8.1	168	160	120	114	48	46	42	40	16	15	19.5	24.0		
20	8.1	8.0	172	166	119	114	53	52	45	42	15	15				
21	8.4	8.0	146	144	120	111	26	33	40	64	10	15				
22	8.0	8.0	146	138	126	112	20	26	45	68	11	16				
23	8.3	8.2	144	142	126	118	18	24	42	40	10	10				
24	8.3	8.2	156	150	134	119	22	31	44	41	11	12			323.0	42.0
25	8.4	8.3	154	150	129	121	25	29	42	45	12	9				
26	8.2	8.1	176	170	124	120	52	50	44	43	16	15				
27	8.2	8.2	164	158	122	118	42	40	39	38	16	16	19.5	24.0		
28	8.1	8.1	164	156	121	116	43	40	39	37	16	16				
29	8.1	8.0	146	150	123	117	23	33	60	60	14	15				
30	8.2	8.0	166	156	120	112	46	44	39	38	17	15				
31																
Avg.	8.2	8.0	155.0	150.7	121.9	115.1	33.1	35.6	43.6	45.2	15.6	12.1	20.9	24.4	311.7	37.3
Max	8.6	8.3	176.0	170.0	134.0	121.0	55.0	57.0	60.0	68.0	99.0	18.0	23.0	26.0	324.0	42.0
Min.	8.0	7.7	136.0	136.0	112.0	108.0	15.0	20.0	37.0	37.0	5.0	22.0	18.5	22.5	288.0	31.0

WSSN 0600 MONTH/YEAR **June-21**

FLUORIDATION AND CHLORINATION

	Fluoride Analysis				Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.57	0.34	0.66		0	0.00	211	3.13	49	0.73	260	3.76	1.70	1.93	2.06
2	0.74	0.23	0.75	0.03	0	0.00	208	3.14	25	0.38	233	3.70	1.87	1.61	1.83
3	0.63	0.27	0.75		0	0.00	201	3.13	48	0.75	249	3.51	0.84	2.39	2.67
4	0.61	0.22	0.75		0	0.00	225	3.15	57	0.80	282	4.11	1.97	1.84	2.14
5	0.62	0.14	0.63		0	0.00	199	3.15	51	0.81	250	3.48	1.40	1.81	2.08
6	0.61	0.17	0.53		0	0.00	227	3.14	55	0.76	282	3.68	1.25	2.22	2.43
7	0.68	0.21	0.51		0	0.00	223	3.17	49	0.70	272	4.24	2.60	1.41	1.64
8	0.61	0.36	0.76		0	0.00	219	3.12	33	0.47	252	3.59	1.82	1.47	1.77
9	0.66	0.30	0.95	0.75	0	0.00	230	3.26	43	0.61	273	4.03	2.38	1.50	1.65
10	0.60	0.24	0.71		0	0.00	266	3.31	53	0.66	319	4.31	1.43	2.71	2.88
11	0.38	0.25	0.73		0	0.00	254	3.27	51	0.66	305	3.77	1.72	1.89	2.05
12	0.63	0.24	0.70		0	0.00	218	3.30	59	0.89	277	4.35	2.25	1.93	2.10
13	0.62	0.32	0.84		0	0.00	213	2.80	64	0.84	277	3.73	1.80	1.77	1.93
14	0.68	0.24	0.71		0	0.00	253	3.21	52	0.66	305	3.86	1.77	1.87	2.09
15	0.59	0.23	0.33		0	0.00	244	3.20	51	0.67	295	4.03	2.16	1.65	1.87
16	0.59	0.14	0.74	0.70	0	0.00	254	3.17	44	0.55	298	3.92	1.99	1.72	1.93
17	0.55	0.31	0.80		0	0.00	216	3.21	41	0.61	257	3.88	1.96	1.67	1.92
18	0.63	0.21	0.67		0	0.00	223	3.06	51	0.70	274	3.69	1.91	1.63	1.78
19	0.61	0.27	0.77		0	0.00	194	3.37	46	0.80	240	3.71	2.06	1.49	1.65
20	0.66	0.22	0.74		0	0.00	255	3.59	64	0.90	319	4.31	2.30	1.86	2.01
21	0.56	0.15	0.54		0	0.00	259	3.87	42	0.63	301	5.64	3.80	1.71	1.84
22	0.68	0.16	0.60		0	0.00	269	3.63	81	1.09	350	6.00	3.92	1.96	2.08
23	0.57	0.11	0.57	0.63	0	0.00	308	3.55	95	1.09	403	4.58	1.67	2.69	2.91
24	0.51	0.16	0.80		0	0.00	272	3.59	72	0.95	344	3.91	0.96	2.72	2.95
25	0.44	0.19	0.72		0	0.00	246	3.61	52	0.76	298	3.20	0.75	2.28	2.45
26	0.67	0.31	0.71		0	0.00	264	3.81	77	1.11	341	3.66	1.26	2.24	2.40
27	0.78	0.22	0.74		0	0.00	212	3.88	57	1.04	269	3.17	1.08	1.93	2.09
28	0.62	0.25	0.64		0	0.00	258	3.80	64	0.94	322	3.50	0.97	2.37	2.53
29	0.62	0.19	0.58		0	0.00	264	3.42	63	0.82	327	3.59	1.06	2.37	2.53
30	0.65	0.16	0.61	0.66	0	0.00	201	2.78	55	0.76	256	2.91	0.29	2.45	2.62
Avg.	0.61	0.23	0.68	0.55	0.00	0.00	236.20	3.33	54.80	0.77	291.00	3.93	1.76	1.97	2.16
Max	0.78	0.36	0.95	0.75	0.00	0.00	308.00	3.88	95.00	1.11	403.00	6.00	3.92	2.72	2.95
Min.	0.38	0.11	0.33	0.03	0.00	0.00	194.00	2.78	25.00	0.38	233.00	2.91	0.29	1.41	1.64

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MONTH/YEAR June-21

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	14	0	11	12.5
2	1	A	18	0	10	12.0
3	1	A	32	0	10	12.0
4	1	A	55	0	12	13.0
5	1	A	16	2	13	13.0
6	1	A	3	1	15	14.0
7	1	A	13	8	15	15.0
8	1	A	57	14	18	16.0
9	1	A	21	1	16	15.0
10	1	A	12	0	13	15.5
11	1	A	28	0	12	14.5
12	1	A	3	5	12	13.5
13	1	A	9	0	11	13.5
14	1	A	5	0	14	16.0
15	1	A	3	0	13	14.0
16	1	A	2	0	12	13.0
17	1	A	5	2	12	13.0
18	1	A	55	1	17	14.0
19	1	A	5	2	17	14.0
20	1	A	126	2	18	14.5
21	1	A	158	1	19	17.0
22	1	A	12	1	16	18.0
23	1	A	14	1	20	18.0
24	1	A	67	2	20	19.0
25	1	A	116	1	20	21.0
26	1	A	82	0	19	19.5
27	1	A	366	3	19.3	19.5
28	1	A	138	0	18.3	19.0
29	1	A	91	0	18.2	18.5
30	1	A	30	0	18.8	18.5
31	1	A	0	0	0.0	0.0
AVG.	1	A	51	2	15	15
Max			366	14	20	21
Min			0	0	0	0

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MONTH/YEAR June-21

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D A T E	City Hall Ortho P Residual mg/L	Wolfs Ortho P Residual mg/L	Bait Shed Ortho P Residual mg/L	Sunny Spot Ortho P Residual mg/L	B&Z Ortho P Residual mg/L	High Lift To Distribution	Lbs PO4	PO4 Treatment mg/L	Ortho P Residual mg/L
1						1.0325	111	4.25	3.55
2	3.92	3.68	4.02	4.02	3.50	0.9413	92	3.87	4.20
3						1.0593	97	3.62	3.86
4						1.0233	97	3.75	4.36
5						1.0712	87	3.21	4.28
6						1.1453	94	3.25	4.06
7						0.9571	93	3.84	4.05
8						1.0486	57	2.15	4.66
9	3.50	3.22	3.56	3.40	3.20	1.0119	91	3.56	5.02
10						1.1056	146	5.23	4.28
11						1.2067	104	3.41	4.16
12						0.9517	117	4.86	3.96
13						1.1078	106	3.79	4.36
14						1.1797	141	4.73	4.48
15						1.0926	119	4.31	4.42
16	4.38	4.39	4.10	4.18	4.44	1.1334	111	3.88	4.76
17						0.9878	28	1.12	4.24
18						1.1100	102	3.64	4.10
19						0.9655	81	3.32	4.20
20						1.1047	89	3.19	3.96
21						0.7962	25	1.24	4.34
22						0.8706	100	4.55	3.58
23	3.98	4.02	3.74	4.44	3.64	1.3135	91	2.74	4.20
24						1.3135	112	3.37	4.58
25						1.3905	91	2.59	4.26
26						1.3905	83	2.36	4.12
27						1.2673	72	2.25	3.94
28						1.3751	93	2.68	4.04
29						1.3597	79	2.30	3.60
30	3.98	3.76	3.90	3.80	3.97	1.3135	90	2.71	3.68
31									
Totals						33.6264	2799.0		
AVG.	3.95	3.81	3.86	3.97	3.75	1.1209	93.3	3.29	4.20
Max	4.38	4.39	4.10	4.44	4.44	1.3905	146.0	5.23	5.02
Min	3.50	3.22	3.56	3.40	3.20	0.7962	25.0	1.12	3.55

CITY OF BENTON HARBOR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 June-21

DATE	Chlorine Residual at Bacteriological Monitoring Stations mg/l									
	City Hall		Wolf Marine	470 W.main	Sunny Spot	blu water	B&Z			
	1	2	3	4	5	6	7			
1	0.00		0.00	0.00	0.00		0.00			
2	1.67		1.44	1.21	0.41		1.09			
3	0.00		0.00	0.00	0.00		0.00			
4	0.00		0.00	0.00	0.00		0.00			
5	0.00		0.00	0.00	0.00		0.00			
6	0.00		0.00	0.00	0.00		0.00			
7	0.00		0.00	0.00	0.00		0.00			
8	0.00		0.00	0.00	0.00		0.00			
9	2.12		2.25	2.19	0.27		1.47			
10	0.00		0.00	0.00	0.00		0.00			
11	0.00		0.00	0.00	0.00		0.00			
12	0.00		0.00	0.00	0.00		0.00			
13	0.00		0.00	0.00	0.00		0.00			
14	0.00		0.00	0.00	0.00		0.00			
15	0.00		0.00	0.00	0.00		0.00			
16	1.46		1.36	1.47	0.24		0.42			
17	0.00		0.00	0.00	0.00		0.00			
18	0.00		0.00	0.00	0.00		0.00			
19	0.00		0.00	0.00	0.00		0.00			
20	0.00		0.00	0.00	0.00		0.00			
21	0.00		0.00	0.00	0.00		0.00			
22	0.00		0.00	0.00	0.00		0.00			
23	0.99		0.85	0.86	0.71		0.34			
24	0.00		0.00	0.00	0.00		0.00			
25	0.00		0.00	0.00	0.00		0.00			
26	0.00		0.00	0.00	0.00		0.00			
27	0.00		0.00	0.00	0.00		0.00			
28	0.00		0.00	0.00	0.00		0.00			
29	0.00		0.00	0.00	0.00		0.00			
30	1.16		0.00	1.49	0.16		0.71			
31	0.00		0.00	0.00	0.00		0.00			

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

Total number of routine distribution samples analyzed	0600	155		
Total number of positive routine distribution samples	0600			
Total number of routine distribution samples required	0600	10	Max	Min
Average Chlorine Residuals by WSSN, mg/L	0600	0.17	2.25	0.00
Total number of check samples	0600	6		
Total number of positive check samples	0600	0		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Catherine A. Winn** **F1-S1**

Month/Year **April-21** **F1-S2**

Catherine A. Winn

Signature of Operator-in-Charge

REVISED 5/17/2021

Water Plant Classification **Berrien** County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1866	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	169.67	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.97	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.93	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.88%	Percent of Treated Water

Chemical Data

Chlorine on hand:	66357	lb.	Est. supply:	293 days
Primary Coagulant (Alum (Al3+)) on hand:	65530	lb.	Est. supply:	230 days
Cost of All Chemicals per Million Gallons:	$64.74	dollars		
Total Power Cost per Million Gallons:		dollars		

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	87	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	26.495952	Avg	0.9172796	Max	1.333876	Min	0.733097

Remarks:
Catherine A. Winn is OIC for final data review only.
We continue to work with City staff on plant tap WQP analysis frequency.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **April-21**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30 NTU	>.30 NTU
														North	South
1	1.0800	331.00	1.61	4.50	5.40	0.78	3	0.07	0.07	3	0.16	0.20	6	0	0
2	1.1200	340.00	1.60	4.90	5.20	0.95	3	0.07	0.07	3	0.15	0.17	6	0	0
3	1.1050	317.00	1.51	6.30	6.90	1.40	3	0.07	0.08	3	0.16	0.18	6	0	0
4	1.1325	326.00	1.51	3.60	4.10	0.92	3	0.08	0.09	3	0.11	0.14	6	0	0
5	0.8925	254.00	1.50	3.10	5.10	0.81	3	0.08	0.08	3	0.09	0.13	6	0	0
6	0.9275	281.00	1.44	4.40	6.40	0.74	3	0.07	0.07	3	0.11	0.11	6	0	0
7	0.9150	274.00	1.58	4.30	8.00	0.76	3	0.07	0.07	3	0.08	0.08	6	0	0
8	0.9525	287.00	1.59	3.20	5.40	0.58	3	0.07	0.08	3	0.09	0.09	6	0	0
9	1.1866	399.00	1.77	5.20	6.40	0.74	3	0.08	0.09	3	0.08	0.08	6	0	0
10	1.0125	408.00	2.12	1.80	1.90	0.38	3	0.07	0.07	3	0.07	0.07	6	0	0
11	1.0500	312.00	1.56	2.00	2.00	0.49	3	0.00	0.00	3	0.07	0.07	3	0	0
12	1.0375	322.00	1.63	2.00	2.20	0.50	3	0.08	0.09	3	0.07	0.08	6	0	0
13	1.0875	313.00	1.51	2.30	2.90	0.52	3	0.08	0.08	3	0.06	0.07	6	0	0
14	0.9425	274.00	1.53	2.40	2.90	0.54	3	0.08	0.10	3	0.09	0.09	6	0	0
15	0.8925	275.00	1.62	2.80	4.30	0.48	3	0.08	0.09	3	0.09	0.10	6	0	0
16	0.9475	276.00	1.53	2.90	3.40	0.47	3	0.08	0.10	3	0.07	0.07	6	0	0
17	0.9475	288.00	1.60	3.70	6.90	0.55	3	0.09	0.12	3	0.07	0.08	6	0	0
18	0.7675	235.00	1.61	2.60	5.50	0.48	3	0.08	0.09	3	0.07	0.08	6	0	0
19	1.0050	310.00	1.62	2.40	2.70	0.78	3	0.07	0.08	3	0.07	0.07	6	0	0
20	0.7625	215.00	1.48	3.40	4.10	0.65	3	0.08	0.10	3	0.08	0.09	6	0	0
21	1.1275	343.00	1.60	3.10	3.50	0.64	3	0.08	0.09	3	0.08	0.08	6	0	0
22	1.0625	328.00	1.62	3.60	4.30	0.82	3	0.08	0.09	3	0.09	0.11	6	0	0
23	0.9150	284.00	1.63	3.10	3.60	0.70	3	0.10	0.10	3	0.09	0.10	6	0	0
24	0.9000	276.00	1.61	2.30	2.50	0.61	3	0.09	0.12	3	0.10	0.12	6	0	0
25	0.8900	274.00	1.62	3.80	4.00	0.59	3	0.08	0.08	3	0.08	0.10	6	0	0
26	0.8725	264.00	1.62	2.80	3.10	0.57	3	0.08	0.09	3	0.10	0.10	6	0	0
27	0.9175	283.00	1.62	3.20	3.70	0.77	3	0.08	0.09	3	0.07	0.07	6	0	0
28	0.9400	287.00	1.61	3.10	4.10	0.55	3	0.09	0.09	3	0.08	0.09	6	0	0
29	0.9525	289.00	1.60	2.20	2.30	0.52	3	0.08	0.07	3	0.08	0.10	6	0	0
30	0.8725	265.00	1.60	2.40	2.50	0.53	3	0.07	0.08	3	0.08	0.09	6	0	0
31											0.00	0.00	0	0	0
Total	29.2141	8930.00					90			90			177	0	0
Avg.	0.9738	297.67	1.60	3.25	4.18	0.66		0.08	0.08		0.09		Total	Total	Total
Max	1.1866	408.00	2.12	6.30	8.00	1.40		0.10	0.12		0.16	0.20	6	0	0
Min.	0.7625	215.00	1.44	1.80	1.90	0.38		0.00	0.00		0.00				

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR **April-21**

CHEMICAL ANALYSES

			Total		Total		Non-Carb.								WQP	
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride		Conductivity	Sulfate
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-			
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l		umhos	mg/l
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42		
1	8.4	8.3	186	178	156	149	30	29	53	54	13	11				
2	8.3	8.2	168	172	138	138	30	34	46	50	13	12				
3	8.4	8.2	196	174	163	136	33	38	59	55	12	9				
4	8.2	7.9	156	174	131	138	25	36	44	49	11	13				
5	8.2	8.1	172	186	129	136	43	50	41	48	17	16				
6	8.1	7.9	196	182	142	131	54	51	48	45	18	17				
7	8.1	7.8	190	182	136	129	54	53	47	45	17	17				
8	8.1	8.0	178	184	131	130	47	54	45	48	16	16	21.0	25.5	754	45
9	8.2	7.9	176	178	128	127	48	51	45	47	16	15				
10	8.2	8.1	152	156	127	127	25	29	41	46	12	10				
11	8.3	8.2	158	154	129	124	29	30	42	49	13	8				
12	8.3	8.2	156	154	131	123	25	31	42	46	12	9				
13	8.1	8.1	172	158	145	125	27	33	50	46	12	11	25.5	28.5		
14	8.2	7.9	176	166	134	124	42	42	39	38	19	17				
15	8.1	7.8	176	182	129	125	47	57	46	50	15	14				
16	8.2	8.3	152	158	124	123	28	35	42	42	12	13				
17	8.1	8.0	176	178	125	122	51	56	46	47	15	15				
18	8.1	8.0	172	168	124	119	48	49	41	42	17	15	19.5	24.0		
19	8.3	7.9	146	144	132	123	14	21	42	42	10	10				
20	8.1	7.7	168	158	139	120	29	38	48	46	12	11				
21	8.3	8.2	158	152	134	126	24	26	45	43	11	11	23.0	26.5		42
22	8.4	8.2	176	166	145	139	31	27	49	47	13	12				
23	8.5	8.3	186	168	150	137	36	31	51	47	14	12				
24	8.2	8.1	194	190	141	140	53	50	49	48	17	17				
25	8.1	7.8	196	192	138	138	58	54	48	50	18	17	21.5	26.5		
26	8.2	8.0	198	194	136	136	62	58	48	50	19	17				
27	8.1	7.9	204	194	142	132	62	62	49	47	20	18				
28	8.2	8.0	204	196	143	134	61	62	46	44	22	21				
29	8.0	8.0	204	196	137	134	67	62	49	48	20	18				
30	8.0	8.0	198	192	140	131	58	61	50	48	18	17	23.0	27.5		
31																
Avg.	8.2	8.0	178.0	174.2	136.6	130.5	41.4	43.7	46.4	46.9	15.1	14.0	22.3	26.4	754	44
Max	8.5	8.3	204.0	196.0	163.0	149.0	67.0	62.0	59.0	55.0	22.0	21.0	25.5	28.5	754	45
Min.	8.0	7.7	146.0	144.0	124.0	119.0	14.0	21.0	39.0	38.0	10.0	8.0	19.5	24.0	754	42

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MONTH/YEAR **April-21**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.48	0.28	0.69		0	0.00	245	3.39	46	0.64	291	4.25	2.25	1.76	2.00
2	0.48	0.36	0.70		0	0.00	244	3.25	26	0.35	270	3.60	1.84	1.56	1.76
3	0.41	0.38	0.73		0	0.00	240	3.24	35	0.47	275	4.41	2.31	1.96	2.10
4	0.46	0.29	0.78		0	0.00	242	3.19	38	0.50	280	3.68	1.49	2.01	2.19
5	0.42	0.29	0.77		0	0.00	186	3.11	50	0.84	236	4.32	1.64	2.51	2.68
6	0.41	0.24	0.77		0	0.00	183	2.95	36	0.58	219	4.05	2.07	1.82	1.98
7	0.41	0.23	0.78	0.78	0	0.00	185	3.02	54	0.88	239	4.00	0.81	3.02	3.19
8	0.49	0.38	0.77		0	0.00	189	2.96	37	0.58	226	3.91	1.84	1.91	2.07
9	0.37	0.26	0.81		0	0.00	227	2.86	26	0.33	253	2.83	0.53	2.14	2.30
10	0.47	0.23	0.74		0	0.00	234	3.45	41	0.60	275	4.19	1.77	2.20	2.42
11	0.43	0.36	0.82		0	0.00	209	2.97	37	0.53	246	4.44	2.24	2.00	2.20
12	0.47	0.34	0.76		0	0.00	205	2.95	36	0.52	241	4.09	1.84	2.00	2.25
13	0.66	0.31	0.72		0	0.00	222	3.05	38	0.52	260	3.77	1.59	1.90	2.18
14	0.64	0.27	0.73		0	0.00	197	3.12	31	0.49	228	3.81	1.94	1.72	1.87
15	0.63	0.41	0.83		0	0.00	185	3.09	38	0.64	223	4.00	1.99	1.86	2.01
16	0.51	0.50	0.90		0	0.00	187	2.95	20	0.32	207	3.33	1.50	1.63	1.83
17	0.64	0.29	0.71		0	0.00	193	3.04	38	0.60	231	3.89	1.87	1.87	2.02
18	0.61	0.27	0.69		0	0.00	147	2.86	30	0.58	177	3.60	1.70	1.74	1.90
19	0.44	0.30	0.72		0	0.00	162	2.41	33	0.49	195	3.16	0.78	2.10	2.38
20	0.59	0.31	0.79		0	0.00	151	2.96	34	0.67	185	3.77	1.97	1.60	1.80
21	0.51	0.29	0.82	0.61	0	0.00	223	2.95	45	0.60	268	3.41	1.23	1.93	2.18
22	0.50	0.40	0.84		0	0.00	220	3.09	39	0.55	259	4.00	1.97	1.79	2.03
23	0.56	0.38	0.87		0	0.00	191	3.12	26	0.42	217	3.81	2.20	1.34	1.61
24	0.76	0.30	0.87		0	0.00	211	3.50	43	0.71	254	4.67	3.01	1.51	1.66
25	0.55	0.26	0.80		0	0.00	206	3.46	40	0.67	246	4.44	2.74	1.55	1.70
26	0.55	0.26	0.68		0	0.00	203	3.47	37	0.63	240	4.26	2.35	1.75	1.91
27	0.53	0.32	0.65		0	0.00	211	3.43	41	0.67	252	4.10	1.97	1.96	2.13
28	0.69	0.22	0.67	0.84	0	0.00	214	3.40	41	0.65	255	5.05	2.57	2.31	2.48
29	0.42	0.26	0.76		0	0.00	215	3.37	42	0.66	257	3.98	1.66	2.18	2.32
30	0.43	0.24	0.76		0	0.00	176	3.01	38	0.65	214	3.77	1.68	1.94	2.09
31															
Avg.	0.52	0.31	0.76	0.74	0.00	0.00	203.43	3.12	37.20	0.58	240.63	3.95	1.84	1.92	2.11
Max	0.76	0.50	0.90	0.84	0.00	0.00	245.00	3.50	54.00	0.88	291.00	5.05	3.01	3.02	3.19
Min.	0.37	0.22	0.65	0.61	0.00	0.00	147.00	2.41	20.00	0.32	177.00	2.83	0.53	1.34	1.61

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MONTH/YEAR **April-21**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	57	0	9	9.0
2	1	A	51	0	7	9.0
3	1	A	79	4	8	8.5
4	1	A	92	1	7	9.0
5	1	A	21	0	7	7.5
6	1	A	48	0	8	7.5
7	1	A	50	1	9	8.0
8	1	A	38	1	9	8.5
9	1	A	53	0	9	9.0
10	1	A	64	0	9	10.0
11	1	A	43	0	10	11.0
12	1	A	62	1	9	10.0
13	1	A	39	0	10	11.0
14	1	A	40	1	10	10.0
15	1	A	41	0	10	10.0
16	1	A	43	1	10	11.0
17	1	A	10	2	9	10.0
18	1	A	11	0	8	9.5
19	1	A	19	0	9	10.0
20	1	A	24	0	9	9.5
21	1	A	28	0	9	10.0
22	1	A	46	0	9	9.0
23	1	A	30	0	10	10.0
24	1	A	22	1	10	10.5
25	1	A	23	0	9	9.5
26	1	A	46	1	9	9.5
27	1	A	35	0	9.8	9.5
28	1	A	36	1	10.5	10.0
29	1	A	57	0	10.5	10.5
30	1	A	31	0	10.5	11.0
31						
AVG.	1	A	41	1	9	10
Max			92	4	11	11
Min			10	0	7	8

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MONTH/YEAR **April-21**

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D	City Hall	Wolfs	Bait Shed	Sunny Spot	B&Z				
A	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P	High Lift		PO4	Ortho P
T	Residual	Residual	Residual	Residual	Residual	To	Lbs PO4	Treatment	Residual
E	mg/L	mg/L	mg/L	mg/L	mg/L	Distribution		mg/L	mg/L
1						0.7238	98	5.36	3.11
2						0.7084	105	5.86	2.94
3						0.6314	113	7.08	2.93
4						0.7392	96	5.14	3.27
5						0.5082	87	6.77	3.24
6						0.4774	92	7.63	3.29
7	3.30		3.21	3.09	3.07	0.5082	96	7.47	3.16
8						0.5236	137	10.35	3.15
9						0.9394	99	4.17	3.25
10						0.6622	83	4.96	3.12
11						0.4620	87	7.45	3.14
12						0.5082	103	8.02	3.10
13						0.6314	93	5.83	3.25
14	3.27	3.00	3.29	3.15	3.14	0.4774	101	8.37	3.19
15						0.5852	86	5.81	4.08
16						0.5698	98	6.81	3.08
17						0.4928	100	8.03	3.36
18						0.4928	88	7.07	3.74
19						0.5544	98	6.99	2.99
20						0.4928	117	9.39	4.00
21	3.10	3.10	3.24	3.07	2.96	0.8316	99	4.71	3.14
22						0.5544	108	7.71	3.09
23						0.4928	99	7.95	3.10
24						0.4774	95	7.87	3.11
25						0.4928	65	5.22	3.21
26						0.4928	59	4.74	3.04
27						0.9185	96	4.14	3.14
28	2.93	2.54	2.60	1.59	2.57	0.5698	109	7.57	4.28
29						0.5698	107	7.43	4.24
30						0.5544	106	7.57	4.44
31									
Totals						17.6429	2920.0		
AVG.	3.15	2.88	3.09	2.73	2.94	0.5881	97.3	6.83	3.35
Max	3.30	3.10	3.29	3.15	3.14	0.9394	137.0	10.35	4.44
Min	2.93	2.54	2.60	1.59	2.57	0.4620	59.0	4.14	2.93

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DISTRIBUTION SYSTEM MONITORING WSSN 0600 April-21

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7	1.26		1.24	1.28	0.75		1.09
8							
9							
10							
11							
12							
13							
14	1.20		1.25	1.25	0.44		0.89
15							
16							
17							
18							
19							
20							
21	1.13		0.89	1.13	0.81		0.44
22							
23							
24							
25							
26							
27							
28	1.61		1.35	1.24	1.04		0.46
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	**1.04**	1.61	0.44
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	10		
Total number of check samples	**0**		
Total number of positive check samples	**0**		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Catherine A. Winn** Month/Year **April-21**

F1-S1 **F1-S2**

Catherine A. Winn 5/10/21

Signature of Operator-in-Charge

Water Plant Classification

Berrien

County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.1866	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	169.67	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.97	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.93	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.88%	Percent of Treated Water

Chemical Data

Chlorine on hand:	66357	lb.	Est. supply:	293	days
Primary Coagulant (Alum (Al3+)) on hand:	65530	lb.	Est. supply:	230	days
Cost of All Chemicals per Million Gallons:	$64.74	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	87	90
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	26.495952	Avg	0.9172796	Max	1.333876	Min	0.733097

Remarks:

Catherine A. Winn is OIC for final data review only.
We continue to work with City staff on plant tap WQP analysis frequency.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **April-21**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30 NTU	>.30 NTU
														North	South
1	1.0800	331.00	1.61	4.50	5.40	0.78	3	0.07	0.07	3	0.16	0.20	6	0	0
2	1.1200	340.00	1.60	4.90	5.20	0.95	3	0.07	0.07	3	0.15	0.17	6	0	0
3	1.1050	317.00	1.51	6.30	6.90	1.40	3	0.07	0.08	3	0.16	0.18	6	0	0
4	1.1325	326.00	1.51	3.60	4.10	0.92	3	0.08	0.09	3	0.11	0.14	6	0	0
5	0.8925	254.00	1.50	3.10	5.10	0.81	3	0.08	0.08	3	0.09	0.13	6	0	0
6	0.9275	281.00	1.44	4.40	6.40	0.74	3	0.07	0.07	3	0.11	0.11	6	0	0
7	0.9150	274.00	1.58	4.30	8.00	0.76	3	0.07	0.07	3	0.08	0.08	6	0	0
8	0.9525	287.00	1.59	3.20	5.40	0.58	3	0.07	0.08	3	0.09	0.09	6	0	0
9	1.1866	399.00	1.77	5.20	6.40	0.74	3	0.08	0.09	3	0.08	0.08	6	0	0
10	1.0125	408.00	2.12	1.80	1.90	0.38	3	0.07	0.07	3	0.07	0.07	6	0	0
11	1.0500	312.00	1.56	2.00	2.00	0.49	3	0.00	0.00	3	0.07	0.07	3	0	0
12	1.0375	322.00	1.63	2.00	2.20	0.50	3	0.08	0.09	3	0.07	0.08	6	0	0
13	1.0875	313.00	1.51	2.30	2.90	0.52	3	0.08	0.08	3	0.06	0.07	6	0	0
14	0.9425	274.00	1.53	2.40	2.90	0.54	3	0.08	0.10	3	0.09	0.09	6	0	0
15	0.8925	275.00	1.62	2.80	4.30	0.48	3	0.08	0.09	3	0.09	0.10	6	0	0
16	0.9475	276.00	1.53	2.90	3.40	0.47	3	0.08	0.10	3	0.07	0.07	6	0	0
17	0.9475	288.00	1.60	3.70	6.90	0.55	3	0.09	0.12	3	0.07	0.08	6	0	0
18	0.7675	235.00	1.61	2.60	5.50	0.48	3	0.08	0.09	3	0.07	0.08	6	0	0
19	1.0050	310.00	1.62	2.40	2.70	0.78	3	0.07	0.08	3	0.07	0.07	6	0	0
20	0.7625	215.00	1.48	3.40	4.10	0.65	3	0.08	0.10	3	0.08	0.09	6	0	0
21	1.1275	343.00	1.60	3.10	3.50	0.64	3	0.08	0.09	3	0.08	0.08	6	0	0
22	1.0625	328.00	1.62	3.60	4.30	0.82	3	0.08	0.09	3	0.09	0.11	6	0	0
23	0.9150	284.00	1.63	3.10	3.60	0.70	3	0.10	0.10	3	0.09	0.10	6	0	0
24	0.9000	276.00	1.61	2.30	2.50	0.61	3	0.09	0.12	3	0.10	0.12	6	0	0
25	0.8900	274.00	1.62	3.80	4.00	0.59	3	0.08	0.08	3	0.08	0.10	6	0	0
26	0.8725	264.00	1.62	2.80	3.10	0.57	3	0.08	0.09	3	0.10	0.10	6	0	0
27	0.9175	283.00	1.62	3.20	3.70	0.77	3	0.08	0.09	3	0.07	0.07	6	0	0
28	0.9400	287.00	1.61	3.10	4.10	0.55	3	0.09	0.09	3	0.08	0.09	6	0	0
29	0.9525	289.00	1.60	2.20	2.30	0.52	3	0.08	0.07	3	0.08	0.10	6	0	0
30	0.8725	265.00	1.60	2.40	2.50	0.53	3	0.07	0.08	3	0.08	0.09	6	0	0
31											0.00	0.00	0	0	0
Total	29.2141	8930.00					90			90			177	0	0
Avg.	0.9738	297.67	1.60	3.25	4.18	0.66		0.08	0.08		0.09		Total	Total	Total
Max	1.1866	408.00	2.12	6.30	8.00	1.40		0.10	0.12		0.16	0.18	6	0	0
Min.	0.7625	215.00	1.44	1.80	1.90	0.38		0.00	0.00		0.00				

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CHEMICAL ANALYSES

			Total		Total		Non-Carb.								WQP	
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride		Conductivity	Sulfate
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-			
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l		umhos	mg/l
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42		
1	8.4	8.3	186	178	156	149	30	29	53	54	13	11				
2	8.3	8.2	168	172	138	138	30	34	46	50	13	12				
3	8.4	8.2	196	174	163	136	33	38	59	55	12	9				
4	8.2	7.9	156	174	131	138	25	36	44	49	11	13				
5	8.2	8.1	172	186	129	136	43	50	41	48	17	16				
6	8.1	7.9	196	182	142	131	54	51	48	45	18	17				
7	8.1	7.8	190	182	136	129	54	53	47	45	17	17				
8	8.1	8.0	178	184	131	130	47	54	45	48	16	16	21.0	25.5	754	45
9	8.2	7.9	176	178	128	127	48	51	45	47	16	15				
10	8.2	8.1	152	156	127	127	25	29	41	46	12	10				
11	8.3	8.2	158	154	129	124	29	30	42	49	13	8				
12	8.3	8.2	156	154	131	123	25	31	42	46	12	9				
13	8.1	8.1	172	158	145	125	27	33	50	46	12	11	25.5	28.5		
14	8.2	7.9	176	166	134	124	42	42	39	38	19	17				
15	8.1	7.8	176	182	129	125	47	57	46	50	15	14				
16	8.2	8.3	152	158	124	123	28	35	42	42	12	13				
17	8.1	8.0	176	178	125	122	51	56	46	47	15	15				
18	8.1	8.0	172	168	124	119	48	49	41	42	17	15	19.5	24.0		
19	8.3	7.9	146	144	132	123	14	21	42	42	10	10				
20	8.1	7.7	168	158	139	120	29	38	48	46	12	11				
21	8.3	8.2	158	152	134	126	24	26	45	436	11	11	23.0	26.5		42
22	8.4	8.2	176	166	145	139	31	27	49	47	13	12				
23	8.5	8.3	186	168	150	137	36	31	51	47	14	12				
24	8.2	8.1	194	190	141	140	53	50	49	48	17	17				
25	8.1	7.8	196	192	138	138	58	54	48	50	18	17	21.5	26.5		
26	8.2	8.0	198	194	136	136	62	58	48	50	19	17				
27	8.1	7.9	204	194	142	132	62	62	49	47	20	18				
28	8.2	8.0	204	196	143	134	61	62	46	44	22	21				
29	8.0	8.0	204	196	137	134	67	62	49	48	20	18				
30	8.0	8.0	198	192	140	131	58	61	50	48	18	17	23.0	27.5		
31																
Avg.	8.2	8.0	178.0	174.2	136.6	130.5	41.4	43.7	46.4	60.0	15.1	14.0	22.3	26.4	754	44
Max	8.5	8.3	204.0	196.0	163.0	149.0	67.0	62.0	59.0	436.0	22.0	21.0	25.5	28.5	754	45
Min.	8.0	7.7	146.0	144.0	124.0	119.0	14.0	21.0	39.0	38.0	10.0	8.0	19.5	24.0	754	42

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MONTH/YEAR **April-21**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.48	0.28	0.69		0	0.00	245	3.39	46	0.64	291	4.25	2.25	1.76	2.00
2	0.48	0.36	0.70		0	0.00	244	3.25	26	0.35	270	3.60	1.84	1.56	1.76
3	0.41	0.38	0.73		0	0.00	240	3.24	35	0.47	275	4.41	2.31	1.96	2.10
4	0.46	0.29	0.78		0	0.00	242	3.19	38	0.50	280	3.68	1.49	2.01	2.19
5	0.42	0.29	0.77		0	0.00	186	3.11	50	0.84	236	4.32	1.64	2.51	2.68
6	0.41	0.24	0.77		0	0.00	183	2.95	36	0.58	219	4.05	2.07	1.82	1.98
7	0.41	0.23	0.78	0.78	0	0.00	185	3.02	54	0.88	239	4.00	0.81	3.02	3.19
8	0.49	0.38	0.77		0	0.00	189	2.96	37	0.58	226	3.91	1.84	1.91	2.07
9	0.37	0.26	0.81		0	0.00	227	2.86	26	0.33	253	2.83	0.53	2.14	2.30
10	0.47	0.23	0.74		0	0.00	234	3.45	41	0.60	275	4.19	1.77	2.20	2.42
11	0.43	0.36	0.82		0	0.00	209	2.97	37	0.53	246	4.44	2.24	2.00	2.20
12	0.47	0.34	0.76		0	0.00	205	2.95	36	0.52	241	4.09	1.84	2.00	2.25
13	0.66	0.31	0.72		0	0.00	222	3.05	38	0.52	260	3.77	1.59	1.90	2.18
14	0.64	0.27	0.73		0	0.00	197	3.12	31	0.49	228	3.81	1.94	1.72	1.87
15	0.63	0.41	0.83		0	0.00	185	3.09	38	0.64	223	4.00	1.99	1.86	2.01
16	0.51	0.50	0.90		0	0.00	187	2.95	20	0.32	207	3.33	1.50	1.63	1.83
17	0.64	0.29	0.71		0	0.00	193	3.04	38	0.60	231	3.89	1.87	1.87	2.02
18	0.61	0.27	0.69		0	0.00	147	2.86	30	0.58	177	3.60	1.70	1.74	1.90
19	0.44	0.30	0.72		0	0.00	162	2.41	33	0.49	195	3.16	0.78	2.10	2.38
20	0.59	0.31	0.79		0	0.00	151	2.96	34	0.67	185	3.77	1.97	1.60	1.80
21	0.51	0.29	0.82	0.61	0	0.00	223	2.95	45	0.60	268	3.41	1.23	1.93	2.18
22	0.50	0.40	0.84		0	0.00	220	3.09	39	0.55	259	4.00	1.97	1.79	2.03
23	0.56	0.38	0.87		0	0.00	191	3.12	26	0.42	217	3.81	2.20	1.34	1.61
24	0.76	0.30	0.87		0	0.00	211	3.50	43	0.71	254	4.67	3.01	1.51	1.66
25	0.55	0.26	0.80		0	0.00	206	3.46	40	0.67	246	4.44	2.74	1.55	1.70
26	0.55	0.26	0.68		0	0.00	203	3.47	37	0.63	240	4.26	2.35	1.75	1.91
27	0.53	0.32	0.65		0	0.00	211	3.43	41	0.67	252	4.10	1.97	1.96	2.13
28	0.69	0.22	0.67	0.84	0	0.00	214	3.40	41	0.65	255	5.05	2.57	2.31	2.48
29	0.42	0.26	0.76		0	0.00	215	3.37	42	0.66	257	3.98	1.66	2.18	2.32
30	0.43	0.24	0.76		0	0.00	176	3.01	38	0.65	214	3.77	1.68	1.94	2.09
31															
Avg.	0.52	0.31	0.76	0.74	0.00	0.00	203.43	3.12	37.20	0.58	240.63	3.95	1.84	1.92	2.11
Max	0.76	0.50	0.90	0.84	0.00	0.00	245.00	3.50	54.00	0.88	291.00	5.05	3.01	3.02	3.19
Min.	0.37	0.22	0.65	0.61	0.00	0.00	147.00	2.41	20.00	0.32	177.00	2.83	0.53	1.34	1.61

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MONTH/YEAR **April-21**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	57	0	9	9.0
2	1	A	51	0	7	9.0
3	1	A	79	4	8	8.5
4	1	A	92	1	7	9.0
5	1	A	21	0	7	7.5
6	1	A	48	0	8	7.5
7	1	A	50	1	9	8.0
8	1	A	38	1	9	8.5
9	1	A	53	0	9	9.0
10	1	A	64	0	9	10.0
11	1	A	43	0	10	11.0
12	1	A	62	1	9	10.0
13	1	A	39	0	10	11.0
14	1	A	40	1	10	10.0
15	1	A	41	0	10	10.0
16	1	A	43	1	10	11.0
17	1	A	10	2	9	10.0
18	1	A	11	0	8	9.5
19	1	A	19	0	9	10.0
20	1	A	24	0	9	9.5
21	1	A	28	0	9	10.0
22	1	A	46	0	9	9.0
23	1	A	30	0	10	10.0
24	1	A	22	1	10	10.5
25	1	A	23	0	9	9.5
26	1	A	46	1	9	9.5
27	1	A	35	0	9.8	9.5
28	1	A	36	1	10.5	10.0
29	1	A	57	0	10.5	10.5
30	1	A	31	0	10.5	11.0
31						
AVG.	1	A	41	1	9	10
Max			92	4	11	11
Min			10	0	7	8

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MONTH/YEAR **April-21**

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D	City Hall	Wolfs	Bait Shed	Sunny Spot	B&Z				
A	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P	High Lift		PO4	Ortho P
T	Residual	Residual	Residual	Residual	Residual	To	Lbs PO4	Treatment	Residual
E	mg/L	mg/L	mg/L	mg/L	mg/L	Distribution		mg/L	mg/L
1						0.7238	98	5.36	3.11
2						0.7084	105	5.86	2.94
3						0.6314	113	7.08	2.93
4						0.7392	96	5.14	3.27
5						0.5082	87	6.77	3.24
6						0.4774	92	7.63	3.29
7	3.30		3.21	3.09	3.07	0.5082	96	7.47	3.16
8						0.5236	137	10.35	3.15
9						0.9394	99	4.17	3.25
10						0.6622	83	4.96	3.12
11						0.4620	87	7.45	3.14
12						0.5082	103	8.02	3.10
13						0.6314	93	5.83	3.25
14	3.27	3.00	3.29	3.15	3.14	0.4774	101	8.37	3.19
15						0.5852	86	5.81	4.08
16						0.5698	98	6.81	3.08
17						0.4928	100	8.03	3.36
18						0.4928	88	7.07	3.74
19						0.5544	98	6.99	2.99
20						0.4928	117	9.39	4.00
21	3.10	3.10	3.24	3.07	2.96	0.8316	99	4.71	3.14
22						0.5544	108	7.71	3.09
23						0.4928	99	7.95	3.10
24						0.4774	95	7.87	3.11
25						0.4928	65	5.22	3.21
26						0.4928	59	4.74	3.04
27						0.9185	96	4.14	3.14
28	2.93	2.54	2.60	1.59	2.57	0.5698	109	7.57	4.28
29						0.5698	107	7.43	4.24
30						0.5544	106	7.57	4.44
31									
Totals						17.6429	2920.0		
AVG.	3.15	2.88	3.09	2.73	2.94	0.5881	97.3	6.83	3.35
Max	3.30	3.10	3.29	3.15	3.14	0.9394	137.0	10.35	4.44
Min	2.93	2.54	2.60	1.59	2.57	0.4620	59.0	4.14	2.93

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DISTRIBUTION SYSTEM MONITORING WSSN 0600 April-21

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7	1.26		1.24	1.28	0.75		1.09
8							
9							
10							
11							
12							
13							
14	1.20		1.25	1.25	0.44		0.89
15							
16							
17							
18							
19							
20							
21	1.13		0.89	1.13	0.81		0.44
22							
23							
24							
25							
26							
27							
28	1.61		1.35	1.24	1.04		0.46
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	**1.04**	1.61	0.44
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	10		
Total number of check samples	**6**		
Total number of positive check samples	**0**		

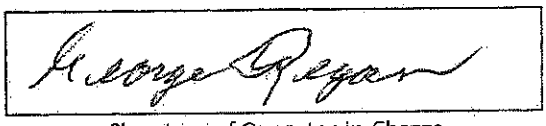
MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: CITY OF BENTON HARBOR

WSSN:600

Operator-in-Charge: George Regan
F-1/S-2

Month/Year: February-21
F1-S2



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.396	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	104.88	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.98	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.02	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.67%	Percent of Treated Water

Chemical Data

Chlorine on hand:	72831	lb.	Est. supply:	298	days
Primary Coagulant (Alum (Al3+)) on hand:	58778	lb.	Est. supply:	263	days
Cost of All Chemicals per Million Gallons:	$64.07	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	81	81
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months?	NO
If yes, attach specific filter(s) information and indicate required follow-up status.	
Was continuous (every 15 minutes) filter monitoring equipment off-line during the month?	NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.	
Did POE disinfectant residual fall below 0.2 ppm during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	
Was minimum C*T credit achieved for the entire month?	YES
If no, indicate on a separate sheet the date(s) not achieved.	
Was continuous POE chlorine residual monitoring equipment off-line during the month?	NO
If yes, indicate date(s) and duration on a separate sheet.	

Distribution	Total	25.483492	Avg	0.9362938	Max	1.310021	Min	0.71353

OIC in review of final data only. Phosphate residuals average good, at greater than 3.0 mg/l (distribution).
Remarks: We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **February 2021**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	Samples	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30 NTU	>.30 NTU
														North	South
1	0.7750	250.00	1.70	3.40	4.80	1.30	3	0.08	0.09	3	0.08	0.08	3	0	0
2	0.7850	254.00	1.70	3.70	5.20	1.20	3	0.08	0.09	3	0.07	0.07	3	0	0
3	0.7525	257.00	1.80	4.80	7.50	1.20	3	0.08	0.09	3	0.08	0.10	3	0	0
4	0.8175	295.00	1.90	4.50	7.60	1.10	3	0.07	0.08	3	0.08	0.10	3	0	0
5	0.8850	280.00	1.66	7.20	9.70	1.50	3	0.09	0.10	3	0.08	0.09	3	0	0
6	0.9750	269.00	1.51	4.40	4.90	1.40	3	0.09	0.10	3	0.11	0.12	3	0	0
7	0.8775	277.00	1.66	5.70	7.00	1.40	3	0.07	0.07	2	0.09	0.09	2	0	0
8	0.7425	227.00	1.61	3.90	4.60	1.50	3	0.08	0.08	3	0.08	0.09	3	0	0
9	0.9300	301.00	1.70	5.00	8.40	1.30	3	0.07	0.08	3	0.07	0.09	3	0	0
10	0.9325	301.00	1.70	3.60	4.80	1.40	3	0.09	0.10	3	0.09	0.09	3	0	0
11	0.8950	277.00	1.63	2.60	3.10	1.60	3	0.09	0.10	3	0.11	0.12	3	0	0
12	0.9725	297.00	1.61	2.70	3.50	1.50	3	0.07	0.08	3	0.13	0.16	3	0	0
13	0.8050	246.00	1.61	3.70	4.90	1.40	3	0.07	0.07	2	0.12	0.14	2	0	0
14	0.7850	240.00	1.61	4.60	6.20	1.40	3	0.07	0.07	2	0.17	0.18	2	0	0
15	1.3960	333.00	1.26	9.90	15.40	4.60	3	0.18	0.22	3	0.16	0.18	3	0	0
16	1.2565	357.00	1.49	11.90	20.10	2.80	3	0.09	0.09	3	0.11	0.15	3	0	0
17	1.0350	318.00	1.62	3.40	4.70	1.60	3	0.08	0.10	3	0.11	0.11	3	0	0
18	0.7275	228.00	1.65	3.60	5.70	1.70	3	0.08	0.11	3	0.11	0.14	3	0	0
19	0.9650	323.00	1.76	2.40	3.30	1.30	3	0.07	0.08	3	0.11	0.15	3	0	0
20	0.9775	325.00	1.75	2.00	3.20	1.10	3	0.08	0.09	3	0.13	0.16	3	0	0
21	0.9875	329.00	1.75	1.90	3.40	0.93	3	0.08	0.09	3	0.14	0.18	3	0	0
22	1.0900	336.00	1.62	1.80	1.90	0.85	3	0.08	0.08	3	0.16	0.18	3	0	0
23	1.1425	367.00	1.69	1.40	2.60	0.86	3	0.07	0.08	3	0.14	0.15	3	0	0
24	1.1325	349.00	1.62	1.50	3.00	0.64	3	0.09	0.10	3	0.17	0.20	3	0	0
25	1.2650	432.00	1.80	1.70	3.10	0.95	3	0.08	0.09	3	0.12	0.15	3	0	0
26	1.1250	354.00	1.80	0.98	1.70	0.82	3	0.09	0.12	3	0.12	0.13	3	0	0
27	1.0750	329.00	1.61	0.93	1.20	0.72	3	0.08	0.09	3	0.11	0.14	3	0	0
28	1.2566	432.00	1.81	1.80	3.40	0.87	3	0.10	0.11	3	0.11	0.12	3	0	0
29															
30															
31															
Total	27.3616	8583.00					84			81			81	0	0
Avg.	0.9772	306.54	1.66	3.75	5.53	1.39		0.08	0.09		0.11		3	0	0
Max	1.3960	432.00	1.90	11.90	20.10	4.60		0.18	0.22		0.17	0.20	3	0	0
Min.	0.7275	227.00	1.26	0.93	1.20	0.64		0.07	0.07		0.07		2		

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR **February 2021**

CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	7.9	176	170	123	119	53	51	43	42	17	17		
2	8.0	8.0	178	174	123	120	55	54	41	40	18	18		
3	8.0	7.8	176	172	124	118	52	54	40	38	18	18		
4	8.0	7.8	184	174	127	115	57	59	43	42	18	17		
5	8.2	8.1	154	150	124	120	30	30	47	47	9	8	23.0	24.5
6	8.1	8.1	150	146	123	118	27	28	46	45	8	8		
7	8.1	8.0	148	144	121	120	27	24	46	47	8	6		
8	8.1	7.9	198	172	132	116	66	56	50	42	18	16	19.0	24.0
9	8.1	8.0	178	166	136	119	42	47	39	38	19	17		
10	8.3	8.1	162	158	138	128	24	30	51	51	8	8		
11	8.3	8.0	182	176	152	126	30	50	59	54	8	10		
12	8.2	8.1	184	172	131	135	53	37	55	49	11	12		
13	8.2	8.1	172	168	134	129	38	39	57	51	7	10		
14	8.1	8.1	168	166	134	137	34	29	55	54	7	8		
15	8.1	8.0	164	162	134	134	30	28	49	47	10	11		
16	8.3	8.2	162	164	127	133	35	31	44	46	13	12	23.0	24.5
17	8.1	7.8	206	176	154	124	52	52	50	43	20	17		
18	8.1	7.9	218	180	161	129	57	51	51	47	22	15	22.0	26.0
19	8.1	8.0	206	186	151	134	55	52	49	45	20	18	22.0	26.5
20	8.1	7.8	202	194	144	138	58	56	46	44	21	20	23.5	28.5
21	8.1	8.0	190	188	135	135	55	53	46	45	18	18	21.0	25.5
22	8.2	8.2	150	154	126	136	24	18	49	51	7	6	22.0	25.0
23	8.1	8.0	150	158	123	128	27	30	49	52	7	7		
24	8.0	8.0	156	154	130	125	26	29	47	46	9	9		
25	8.2	8.0	154	150	128	125	26	25	47	49	9	7		
26	8.0	8.0	158	156	133	129	25	27	50	51	8	7		
27	8.1	8.1	178	170	130	124	48	46	43	42	17	16	20.0	24.5
28	8.1	7.9	182	180	124	123	58	57	48	46	15	16	19.0	23.5
29														
30														
31														
Avg.	8.1	8.0	174.5	167.1	132.9	126.3	41.6	40.8	47.9	46.2	13.2	12.6	21.5	25.3
Max	8.3	8.2	218.0	194.0	161.0	138.0	66.0	59.0	59.0	54.0	22.0	20.0	23.5	28.5
Min.	8.0	7.8	148.0	144.0	121.0	115.0	24.0	18.0	39.0	38.0	7.0	6.0	19.0	23.5

MONTH/YEAR **February 2021**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	mg/L	PPD	mg/L	PPD	mg/L	PPD	mg/L	Demand	Free	Total
E													mg/L	mg/l	mg/l
1	0.47	0.34	0.50		0	0.00	147	2.83	20	0.39	167	3.40	1.36	1.88	2.04
2	0.57	0.34	0.62		0	0.00	150	2.85	69	1.31	219	4.21	1.39	2.65	2.82
3	0.76	0.35	0.57	0.47	0	0.00	153	3.04	51	1.01	204	3.81	1.18	2.47	2.63
4	0.57	0.31	0.66		0	0.00	156	2.85	28	0.51	184	3.78	1.83	1.78	1.95
5	0.50	0.24	0.70		0	0.00	172	2.90	25	0.42	197	3.12	1.34	1.53	1.78
6	0.42	0.32	0.71		0	0.00	175	2.68	29	0.44	204	4.27	2.32	1.84	1.95
7	0.73	0.21	0.69		0	0.00	168	2.86	30	0.51	198	3.41	1.38	1.79	2.03
8	0.58	0.11	0.61		0	0.00	149	3.00	53	1.07	202	3.21	1.62	1.43	1.59
9	0.50	0.20	0.64		0	0.00	186	2.99	37	0.59	223	3.08	1.14	1.79	1.94
10	0.60	0.25	0.70	0.56	0	0.00	189	3.03	34	0.54	223	4.59	2.31	2.06	2.28
11	0.55	0.39	0.65		0	0.00	176	2.94	29	0.48	205	3.37	1.10	2.16	2.27
12	0.57	0.34	0.69		0	0.00	195	2.99	46	0.71	241	4.60	2.55	1.95	2.05
13	0.66	0.39	0.76		0	0.00	160	2.97	22	0.41	182	3.57	1.57	1.78	2.00
14	0.56	0.33	0.77		0	0.00	153	2.91	25	0.48	178	3.02	1.22	1.62	1.80
15	0.30				0	0.00	256	2.74	16	0.17	272	4.72	2.89	1.59	1.83
16	0.40	0.37	0.73		0	0.00	250	2.97	39	0.46	289	5.29	3.17	1.97	2.12
17	0.74	0.38	0.62		0	0.00	214	3.09	41	0.59	255	3.83	1.89	1.78	1.94
18	0.61	0.29	0.73	0.82	0	0.00	150	3.08	23	0.47	173	3.42	1.37	1.89	2.05
19	0.56	0.08	0.74		0	0.00	198	3.06	32	0.50	230	3.71	1.64	1.91	2.07
20	0.60	0.44	0.78		0	0.00	196	2.99	73	1.11	269	3.85	1.54	2.15	2.31
21	0.57	0.43	0.83		0	0.00	189	2.86	35	0.53	224	3.18	0.92	2.09	2.26
22	0.54	0.35	0.81		0	0.00	195	2.67	45	0.62	240	3.32	0.83	2.18	2.49
23	0.43	0.44	0.90		0	0.00	199	2.60	40	0.52	239	3.12	0.88	2.04	2.24
24	0.54	0.38	0.85	0.70	0	0.00	198	2.61	46	0.61	244	3.08	0.72	2.08	2.36
25	0.49	0.48	0.76		0	0.00	228	2.69	48	0.57	276	3.40	1.09	2.04	2.31
26	0.57	0.49	0.83		0	0.00	205	2.72	47	0.62	252	3.21	0.92	2.08	2.29
27	0.61	0.44	0.81		0	0.00	194	2.69	37	0.51	231	3.32	1.38	1.78	1.94
28	0.50	0.49	0.90		0	0.00	222	2.64	37	0.44	259	2.95	1.06	1.74	1.89
29															
30															
31															
Avg.	0.55	0.34	0.72	0.64	0.00	0.00	186.54	2.87	37.75	0.59	224.29	3.64	1.52	1.93	2.12
Max	0.76	0.49	0.90	0.82	0.00	0.00	256.00	3.09	73.00	1.31	289.00	5.29	3.17	2.65	2.82
Min.	0.30	0.08	0.50	0.47	0.00	0.00	147.00	2.60	16.00	0.17	167.00	2.95	0.72	1.43	1.59

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MONTH/YEAR **February 2021**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	36	0	2	3.0
2	1	A	36	0	2	3.5
3	1	A	33	0	2	3.5
4	1	A	24	0	2	3.5
5	1	A	39	0	2	4.0
6	1	A	14	0	3	4.0
7	1	A	21	10	3	4.5
8	1	A	19	0	1	3.5
9	1	A	16	0	2	2.5
10	1	A	23	0	2	3.0
11	1	A	29	1	2	3.0
12	1	A	30	0	2	3.0
13	1	A	36	0	2	3.0
14	1	A	12	0	2	3.0
15	1	A	22	1	2	3.0
16	1	A	37	0	2	3.5
17	1	A	27	0	1	2.0
18	1	A	54	0	2	2.5
19	1	A	48	0	2	2.0
20	1	A	47	0	2	2.0
21	1	A	66	0	1	2.0
22	1	A	56	0	2	3.0
23	1	A	40	0	2	3.5
24	1	A	18	0	2	3.0
25	1	A	17	1	2	3.5
26	1	A	15	0	2	3.0
27	1	A	21	0	2	2.0
28	1	A	43	0	2	2.5
29						
30						
31						
AVG.	1	A	31	0	2	3
Max			66	10	3	5
Min			12	0	1	2

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MONTH/YEAR **February 2021**

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D	City Hall	Wolfs	Bait Shed	Sunny Spot	B&Z				
A	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P	High Lift		PO4	Ortho P
T	Residual	Residual	Residual	Residual	Residual	To	Lbs PO4	Treatment	Residual
E	mg/L	mg/L	mg/L	mg/L	mg/L	Distribution		mg/L	mg/L
1						0.4466	83	7.33	3.15
2						0.4774	84	7.00	3.10
3	2.98	3.22	3.05	3.04	3.17	0.4928	85	6.82	3.15
4						0.4774	94	7.75	3.24
5						0.6314	84	5.26	3.17
6						0.4774	90	7.43	3.25
7						0.6160	93	5.95	3.26
8						0.5852	62	4.16	3.06
9						0.7238	71	3.89	3.09
10	2.95	3.19	3.16	3.29	2.87	0.4928	84	6.75	3.17
11						0.5390	74	5.43	2.95
12						0.4466	76	6.71	3.01
13						0.4466	79	7.03	3.22
14						0.5390	75	5.48	3.11
15						0.5082	60	4.70	3.01
16						0.5852	89	6.04	2.71
17						0.7084	58	3.24	2.98
18	2.88	2.54	2.95	2.89	2.75	0.4620	76	6.49	2.88
19						0.6930	80	4.56	2.70
20						0.7392	73	3.89	2.72
21						0.6468	77	4.73	3.04
22						0.6622	97	5.78	2.76
23						0.7546	97	5.07	3.07
24	3.03	3.07	3.02	3.07	2.80	0.7700	120	6.16	3.16
25						0.7700	119	6.12	3.19
26						0.6930	116	6.63	3.19
27						0.7084	114	6.36	3.00
28						0.9086	96	4.20	2.86
29									
30									
31									
Totals						17.0016	2404.5		
AVG.	2.96	3.01	3.05	3.07	2.90	0.6072	85.9	5.69	3.04
Max	3.03	3.22	3.16	3.29	3.17	0.9086	119.8	7.75	3.26
Min	2.88	2.54	2.95	2.89	2.75	0.4466	58.0	3.24	2.70

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DISTRIBUTION SYSTEM MONITORING WSSN 0600 February 2021

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3	1.99		1.93	2.09	1.48		1.33
4							
5							
6							
7							
8							
9							
10	1.60		1.46	1.22	1.74		1.34
11							
12							
13							
14							
15							
16							
17							
18	1.41		1.57	1.94	1.61		1.16
19							
20							
21							
22							
23							
24	1.53		1.30	1.36	1.46		1.37
25							
26							
27							
28							
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	**1.54**	2.09	1.16
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	10		
Total number of check samples	**0**		
Total number of positive check samples	**0**		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **George Regan** **F1-S2**

Month/Year **January 2021**

George Regan

Signature of Operator-in-Charge

F1-S2
Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.0925	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	180.25	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.85	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.89	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.71%	Percent of Treated Water

Chemical Data

Chlorine on hand:	74740	lb.	Est. supply:	308	days
Primary Coagulant (Alum (Al3+)) on hand:	59573	lb.	Est. supply:	279	days
Cost of All Chemicals per Million Gallons:	$64.51	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	85	85
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	24.531959	Avg	0.8158492	Max	1.243107	Min	0.673007

George Regan is OIC for final data review only.
Fluoride chemical feed system was off-line from December 18, 2020 to January 24, 2021 due to issues with the transfer pump.
No Plant Tap ortho-phosphorus value was recorded on the bench sheet for January 17, 2021.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **January 2021**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	0.8300	262.00	1.66	4.20	4.70	1.30	3	0.08	0.09	2	0.08	0.09	4	0	0
2	0.9125	262.00	1.51	6.10	9.50	0.87	3	0.07	0.10	3	0.07	0.08	6	0	0
3	0.8125	249.00	1.61	5.90	8.80	1.00	3	0.08	0.08	3	0.07	0.08	6	0	0
4	0.9025	278.00	1.62	4.10	6.30	1.54	3	0.08	0.10	3	0.10	0.11	6	0	0
5	0.8525	274.00	1.69	4.50	7.70	1.10	3	0.09	0.10	3	0.09	0.09	6	0	0
6	0.7750	225.00	1.86	2.70	3.40	0.99	3	0.08	0.09	3	0.09	0.10	6	0	0
7	0.9550	314.00	1.73	3.40	6.00	0.85	3	0.07	0.08	3	0.08	0.08	6	0	0
8	0.7475	245.00	1.72	3.00	5.00	1.00	3	0.08	0.09	3	0.08	0.09	6	0	0
9	1.0150	323.00	1.67	3.30	3.60	1.20	3	0.07	0.07	3	0.07	0.07	6	0	0
10	0.7400	243.00	1.73	3.50	4.40	1.10	3	0.08	0.08	2	0.09	0.09	4	0	0
11	1.0800	338.00	1.65	4.00	6.60	1.20	3	0.08	0.09	3	0.07	0.08	6	0	0
12	1.0850	349.00	1.69	4.00	6.30	0.97	3	0.08	0.08	3	0.08	0.08	6	0	0
13	1.0925	347.00	1.67	4.20	7.90	1.20	3	0.08	0.08	3	0.08	0.09	6	0	0
14	0.9300	302.00	1.71	2.30	3.30	1.00	3	0.07	0.08	3	0.09	0.10	6	0	0
15	0.7275	240.00	1.74	2.90	5.60	1.10	3	0.08	0.11	3	0.09	0.11	6	0	0
16	0.7700	231.00	1.58	2.40	2.80	0.85	3	0.08	0.08	2	0.08	0.08	4	0	0
17	0.9050	284.00	1.65	2.90	3.40	0.95	3	0.08	0.08	3	0.09	0.11	6	0	0
18	0.8675	291.00	1.76	2.80	5.30	0.82	3	0.08	0.08	3	0.08	0.09	6	0	0
19	0.7700	256.00	1.75	2.50	2.90	0.76	3	0.08	0.09	2	0.08	0.09	4	0	0
20	0.8400	262.00	1.64	3.70	5.00	0.76	3	0.09	0.10	2	0.11	0.12	4	0	0
21	0.8175	249.00	1.60	4.00	4.00	1.00	3	0.08	0.08	2	0.08	0.09	4	0	0
22	0.7900	234.00	1.56	4.90	6.70	1.10	3	0.07	0.07	2	0.08	0.08	4	0	0
23	0.7350	216.00	1.55	6.00	6.20	1.10	3	0.08	0.10	3	0.09	0.11	6	0	0
24	0.7900	246.00	1.64	3.40	5.20	1.40	3	0.08	0.09	3	0.09	0.10	6	0	0
25	0.8850	275.00	1.63	3.60	7.20	0.88	3	0.09	0.10	3	0.08	0.09	6	0	0
26	0.7200	210.00	1.63	4.30	5.60	0.96	3	0.09	0.10	3	0.09	0.12	6	0	0
27	0.8300	273.00	1.73	4.90	9.10	1.00	3	0.08	0.08	3	0.07	0.08	6	0	0
28	0.7800	235.00	1.59	4.90	5.90	0.99	3	0.09	0.09	2	0.07	0.07	4	0	0
29	0.7850	252.00	1.69	5.10	5.90	1.80	3	0.09	0.10	3	0.10	0.12	6	0	0
30	0.7825	228.00	1.53	4.00	5.90	1.30	3	0.08	0.09	3	0.09	0.12	6	0	0
31	0.9300	297.00	1.68	3.30	4.50	1.30	3	0.08	0.09	3	0.08	0.09	6	0	0
Total	26.4550	8290.00					93			85			170	0	0
Avg.	0.8534	267.42	1.66	3.90	5.64	1.08		0.08	0.09		0.08	0.09	Total	Total	Total
Max	1.0925	349.00	1.86	6.10	9.50	1.80		0.09	0.11		0.11	0.12	6	0	0
Min.	0.7200	210.00	1.51	2.30	2.80	0.76		0.07	0.07		0.07	0.07			

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR **January 2021**

CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.0	7.9	184	170	153	134	31	36	59	51	9	10		
2	8.1	7.9	178	170	130	126	48	44	43	42	17	16		
3	8.1	8.1	196	178	127	129	69	49	51	45	17	16	21.5	26.5
4	8.0	8.0	218	179	165	132	53	47	52	43	21	17	19.5	24.0
5	8.1	7.9	194	188	143	135	51	53	49	46	17	17	20.5	25.0
6	8.0	8.0	196	192	137	132	59	60	46	47	19	18	20.0	24.5
7	8.1	7.9	196	182	145	129	51	53	46	43	19	18	22.5	25.5
8	8.2	7.9	194	186	137	132	57	54	46	45	19	18		
9	8.1	7.8	152	156	123	136	29	20	45	49	10	8	21.0	25.5
10	8.1	7.9	172	166	143	133	29	33	50	49	12	11		
11	8.2	8.0	198	176	152	126	46	50	41	45	23	16		
12	8.0	7.8	178	192	121	130	57	62	41	46	18	18	19.0	23.5
13	8.0	7.8	192	178	132	122	60	56	46	43	19	17		
14	8.0	8.0	184	174	131	123	53	51	44	42	18	17		
15	8.1	7.9	182	188	127	125	55	63	41	44	19	19	18.0	22.5
16	8.1	8.0	164	156	134	132	30	24	53	48	8	8		
17	8.0	7.9	152	150	131	123	21	27	47	49	8	7	21.5	23.0
18	8.0	7.9	152	150	132	116	20	34	48	51	8	5		
19	8.1	8.0	148	152	119	122	29	30	46	47	8	8		
20	8.2	7.8	142	146	115	117	27	29	47	49	6	6		
21	8.0	8.0	146	144	111	109	35	35	42	42	10	9		
22	8.0	7.8	146	142	105	103	41	39	43	42	9	9		
23	8.1	7.9	168	156	119	98	49	58	43	39	15	15		
24	8.1	8.1	182	178	127	121	55	57	43	40	18	19		
25	8.0	8.0	154	152	86	84	68	68	46	45	10	10	23.0	26.0
26	8.0	7.9	182	172	132	122	50	50	46	45	17	15	19.0	24.0
27	8.0	7.8	176	172	123	120	53	52	42	41	17	17	19.0	24.0
28	8.2	8.2	156	152	125	118	31	34	43	46	12	9		
29	8.1	8.1	150	148	127	122	23	26	43	42	10	10		
30	8.0	8.0	186	176	131	119	55	57	43	42	19	17		
31	8.0	7.9	178	176	128	119	50	57	41	40	18	18	18.5	23.5
Avg.	8.1	7.9	173.9	167.4	129.4	122.3	44.5	45.0	45.8	44.9	14.4	13.3	20.4	24.5
Max	8.2	8.2	218.0	192.0	165.0	136.0	69.0	68.0	59.0	51.0	23.0	19.0	23.0	26.5
Min.	8.0	7.8	142.0	142.0	86.0	84.0	20.0	20.0	41.0	39.0	6.0	5.0	18.0	22.5

MONTH/YEAR **January 2021**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1		0.31	0.48		0	0.00	180	3.24	30	0.54	210	4.13	1.69	2.30	2.44
2		0.29	0.45		0	0.00	197	3.22	32	0.52	229	3.68	1.83	1.69	1.85
3		0.36	0.44		0	0.00	164	3.01	23	0.42	187	3.76	1.77	1.84	1.99
4		0.34	0.38		0	0.00	182	3.01	47	0.78	229	3.75	0.64	2.94	3.11
5		0.29	0.41		0	0.00	167	2.92	17	0.30	184	3.45	1.41	1.88	2.04
6		0.28	0.39		0	0.00	161	3.10	33	0.64	194	3.69	1.66	1.88	2.03
7		0.34	0.49		0	0.00	186	2.91	28	0.44	214	3.25	1.33	1.76	1.92
8		0.34	0.44		0	0.00	146	2.92	73	1.46	219	4.70	2.37	2.18	2.33
9		0.36	0.52		0	0.00	195	2.87	26	0.38	221	4.41	2.46	1.74	1.95
10		0.39	0.51		0	0.00	150	3.03	25	0.50	175	3.76	1.72	1.81	2.04
11		0.26	0.46		0	0.00	214	2.96	32	0.44	246	2.95	1.14	1.68	1.81
12		0.29	0.38	0.44	0	0.00	205	2.82	68	0.94	273	4.05	1.61	2.27	2.44
13		0.22	0.42		0	0.00	215	2.94	37	0.51	252	3.50	1.51	1.84	1.99
14		0.30	0.44		0	0.00	177	2.84	29	0.47	206	3.67	1.54	1.97	2.13
15		0.33	0.42		0	0.00	138	2.83	21	0.43	159	3.39	1.48	1.76	1.91
16		0.31	0.42		0	0.00	149	2.89	19	0.37	168	3.73	2.10	1.43	1.63
17		0.33	0.55		0	0.00	180	2.97	16	0.26	196	3.35	1.64	1.44	1.71
18		0.25	0.45		0	0.00	177	3.05	9	0.15	186	3.88	2.15	1.50	1.73
19		0.33	0.49		0	0.00	154	2.99	7	0.14	161	3.10	1.49	1.46	1.61
20		0.38	0.49		0	0.00	167	2.97	20	0.36	187	3.55	1.71	1.70	1.84
21		0.41	0.46		0	0.00	163	2.98	33	0.60	196	3.92	1.74	1.98	2.18
22		0.37	0.52		0	0.00	155	2.93	28	0.53	183	3.79	1.62	2.00	2.17
23		0.27	0.39		0	0.00	155	3.15	32	0.65	187	4.14	2.09	1.90	2.05
24	0.78	0.32	0.48		0	0.00	158	2.99	26	0.49	184	3.21	1.17	1.88	2.04
25	0.68	0.24	0.55		0	0.00	181	3.05	34	0.57	215	3.91	1.59	2.09	2.32
26	0.56	0.30	0.48		0	0.00	146	3.03	89	1.85	235	5.21	1.84	3.20	3.37
27	0.53	0.28	0.50		0	0.00	156	2.81	23	0.41	179	2.91	0.71	2.04	2.20
28	0.62	0.40	0.63	0.43	0	0.00	148	2.83	22	0.42	170	3.20	1.42	1.57	1.78
29	0.60	0.40	0.63		0	0.00	148	2.81	12	0.23	160	2.98	1.31	1.55	1.67
30	0.81	0.28	0.50		0	0.00	153	2.92	29	0.55	182	3.89	2.01	1.73	1.88
31	0.59	0.31	0.54		0	0.00	181	2.91	37	0.59	218	3.80	1.89	1.76	1.91
Avg.	0.65	0.32	0.47	0.44	0.00	0.00	168.90	2.97	30.67	0.54	199.57	3.70	1.62	1.90	2.07
Max	0.81	0.41	0.63	0.44	0.00	0.00	215.00	3.24	89.00	1.85	273.00	5.21	2.46	3.20	3.37
Min.	0.00	0.22	0.38	0.43	0.00	0.00	138.00	2.81	7.00	0.14	159.00	2.91	0.64	1.43	1.61

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MONTH/YEAR **January 2021**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	71	0	4.0	6.0
2	1	A	25	0	3.8	4.5
3	1	A	72	0	3.7	4.5
4	1	A	27	0	3.5	4.5
5	1	A	33	0	3.7	4.5
6	1	A	41	0	3.7	4.5
7	1	A	23	0	3.7	4.5
8	1	A	38	0	3.7	4.5
9	1	A	19	0	5.0	6.0
10	1	A	41	0	4.0	5.0
11	1	A	27	0	3.8	4.5
12	1	A	32	0	3.7	4.5
13	1	A	34	0	3.2	4.5
14	1	A	19	0	3.7	4.5
15	1	A	49	0	3.7	4.5
16	1	A	21	0	4.0	5.0
17	1	A	19	0	4.0	5.0
18	1	A	50	0	4.0	5.5
19	1	A	19	0	4.0	5.0
20	1	A	36	0	4.0	5.5
21	1	A	49	1	3.0	5.0
22	1	A	21	0	3.0	5.0
23	1	A	28	0	2.8	4.0
24	1	A	47	0	3.0	4.0
25	1	A	16	2	3.0	5.0
26	1	A	29	0	2.5	4.0
27	1	A	27	0	2.8	3.5
28	1	A	26	1	2.5	4.0
29	1	A	30	0	3.0	4.0
30	1	A	23	0	2.3	3.5
31	1	A	27	0	2.2	3.0
AVG.	1	A	32	0	3.4	4.5
Max			72	2	5.0	6.0
Min			16	0	2.2	3.0

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MONTH/YEAR **January 2021**

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D	City Hall	Wolfs	Bait Shed	Sunny Spot	B&Z				
A	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P	High Lift		PO4	Ortho P
T	Residual	Residual	Residual	Residual	Residual	To	Lbs PO4	Treatment	Residual
E	mg/L	mg/L	mg/L	mg/L	mg/L	Distribution		mg/L	mg/L
1						0.7594	78	4.06	3.08
2						0.9294	67	2.85	3.13
3						0.7429	79	4.23	3.12
4						0.9116	79	3.43	3.00
5						0.7955	83	4.13	3.04
6	3.14	3.18	2.71	2.81	2.36	0.7846	86	4.34	3.25
7						0.9844	77	3.08	3.14
8						0.6954	74	4.22	3.03
9						0.7474	84	4.45	3.09
10						0.6940	118	6.75	3.03
11						1.2431	109	3.46	3.28
12	2.96	2.87	2.92	2.41	2.59	1.0063	135	5.33	3.25
13						1.0759	82	3.02	3.19
14						0.8387	89	4.21	2.94
15						0.7010	76	4.25	2.88
16						0.6731	83	4.88	3.16
17						0.8726	77	3.48	
18						0.7159	87	4.82	3.22
19						0.7758	94	4.79	3.24
20	3.20	3.14	3.26	2.89	2.55	0.7861	89	4.45	3.21
21						0.7466	88	4.54	3.24
22						0.7204	83	4.56	3.24
23						0.6743	90	5.30	3.17
24						0.8558	71	3.29	3.11
25						0.8206	68	3.29	3.25
26						0.6730	89	5.26	3.08
27						0.9186	86	3.69	3.09
28	3.29	2.75	3.14	2.85	2.87	0.7928	89	4.43	3.14
29						0.8014	86	4.22	3.27
30						0.6981	89	5.06	3.11
31						0.8565	78	3.61	3.01
Totals						23.1535	2663.3		
AVG.	3.15	2.99	3.01	2.74	2.59	0.7469	85.9	4.25	3.13
Max	3.29	3.18	3.26	2.89	2.87	2.6026	135.4	6.75	3.28
Min	2.96	2.75	2.71	2.41	2.36	0.6730	67.1	2.85	2.88

CITY OF BENTON HARBOR PAGE 7

DISTRIBUTION SYSTEM MONITORING WSSN 0600 January 2021

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6	1.21		1.65	1.67	1.73		2.20
7							
8							
9							
10							
11							
12	1.56		1.71	1.13	2.20		1.36
13							
14							
15							
16							
17							
18							
19							
20	1.30		1.26	1.22	1.02		1.10
21							
22							
23							
24							
25							
26							
27							
28	1.58		1.76	1.65	2.20		1.35
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	1.54	2.20	1.02
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	**10**		
Total number of check samples	0		
Total number of positive check samples	0		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Catherine A. Winn** **F1-S1**

Month/Year **March-21**

Catherine A. Winn 4/9/21

Signature of Operator-in-Charge

F1-S2
Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.3041	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	174.50	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.99	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.85	Gallons Per Square Feet per Minute
Average Wash Water Use:	0.85%	Percent of Treated Water

Chemical Data

Chlorine on hand:	66266	lb.	Est. supply:	266	days
Primary Coagulant (Alum (Al3+)) on hand:	58778	lb.	Est. supply:	217	days
Cost of All Chemicals per Million Gallons:	$63.37	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	91	91
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	29.302246	Avg	0.9819423	Max	1.365944	Min	0.719086

Remarks:

Catherine A. Winn is OIC for final data review only.
No plant tap ortho-phosphate analysis was recorded on the bench sheet for 3/19/2021.
No raw water HPC result was recorded for 3/7/2021.

WSSN 0600 CITY OF BENTON HARBOR Month/Year **March-21**

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	Samples	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30 NTU	>.30 NTU
														North	South
1	1.0558	348.00	1.73	3.30	4.90	1.20	3	0.09	0.09	3	0.14	0.16	6	0	0
2	1.0841	346.00	1.68	3.90	9.00	1.00	3	0.09	0.10	3	0.13	0.15	6	0	0
3	1.0825	346.00	1.68	2.10	2.80	0.83	3	0.08	0.10	3	0.13	0.13	6	0	0
4	0.9225	292.00	1.67	2.00	3.50	0.96	3	0.08	0.10	3	0.11	0.13	6	0	0
5	1.0225	302.00	1.55	1.70	2.60	0.81	3	0.09	0.10	3	0.08	0.09	6	0	0
6	0.8300	267.00	1.91	1.60	1.60	1.10	3	0.09	0.10	2	0.08	0.08	4	0	0
7	0.9825	287.00	1.54	1.50	2.10	1.10	3	0.07	0.08	3	0.07	0.08	6	0	0
8	1.0700	327.00	1.61	1.60	2.80	0.90	3	0.09	0.10	3	0.09	0.10	6	0	0
9	1.0100	311.00	1.62	2.20	4.30	0.74	3	0.08	0.08	3	0.08	0.09	6	0	0
10	0.9150	263.00	1.51	1.60	2.20	1.00	3	0.09	0.10	3	0.08	0.08	6	0	0
11	0.9250	276.00	1.57	2.00	2.90	0.71	3	0.08	0.10	3	0.08	0.09	6	0	0
12	0.9450	285.00	1.59	2.90	4.90	0.69	3	0.07	0.08	3	0.09	0.10	6	0	0
13	0.9200	276.00	1.58	1.80	2.90	0.70	3	0.09	0.09	3	0.09	0.10	6	0	0
14	0.9200	276.00	1.58	1.70	2.90	0.60	3	0.08	0.08	3	0.09	0.10	6	0	0
15	0.8000	221.00	1.45	1.90	2.40	0.54	3	0.08	0.08	2	0.08	0.08	4	0	0
16	1.0775	306.00	1.49	1.10	1.50	0.54	3	0.07	0.08	3	0.08	0.09	6	0	0
17	0.9025	274.00	1.60	2.60	4.10	0.50	3	0.08	0.08	3	0.08	0.09	6	0	0
18	1.0925	329.00	1.58	1.60	2.30	0.68	3	0.08	0.09	3	0.09	0.10	6	0	0
19	0.9350	283.00	1.59	1.30	1.60	0.65	3	0.08	0.10	3	0.08	0.09	6	0	0
20	0.8975	272.00	1.59	2.70	3.80	0.67	3	0.08	0.09	3	0.07	0.07	6	0	0
21	0.7725	234.00	1.59	4.10	6.10	1.20	3	0.08	0.10	3	0.08	0.10	6	0	0
22	1.0650	307.00	1.52	2.10	2.70	0.83	3	0.08	0.09	3	0.09	0.10	6	0	0
23	0.8575	258.00	1.58	1.60	2.50	0.69	3	0.07	0.07	3	0.07	0.08	6	0	0
24	0.9900	289.00	1.54	1.80	2.30	0.67	3	0.08	0.09	3	0.08	0.09	6	0	0
25	1.1375	336.00	1.55	2.30	2.90	0.72	3	0.08	0.08	3	0.07	0.08	6	0	0
26	1.1000	320.00	1.55	2.40	3.00	0.59	3	0.08	0.10	3	0.08	0.09	6	0	0
27	1.0525	305.00	1.52	4.40	5.00	0.83	3	0.09	0.10	3	0.09	0.10	6	0	0
28	1.0400	312.00	1.58	5.60	7.00	1.20	3	0.08	0.09	3	0.09	0.10	6	0	0
29	1.0950	331.00	1.59	4.00	7.10	1.10	3	0.07	0.08	3	0.08	0.09	6	0	0
30	1.3041	416.00	1.68	10.20	14.10	1.80	3	0.07	0.08	3	0.15	0.18	6	0	0
31	1.0700	475.00	2.34	5.20	5.90	0.67	3	0.07	0.08	3	0.12	0.14	6	0	0
Total	30.8740	9470.00					93			91			182	0	0
Avg.	0.9959	305.48	1.62	2.74	3.99	0.85		0.08	0.09		0.09		Total	Total	Total
Max	1.3041	475.00	2.34	10.20	14.10	1.80		0.09	0.10		0.15	0.18	6	0	0
Min.	0.7725	221.00	1.45	1.10	1.50	0.50		0.07	0.07		0.07				

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CHEMICAL ANALYSES

			Total		Total		Non-Carb.							
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride	
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-	
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l	
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42
1	8.1	8.0	186	182	129	120	57	62	43	42	19	18		
2	8.1	7.9	168	162	126	118	42	44	40	42	17	14	22.0	26.5
3	8.1	7.8	204	176	142	118	62	58	55	44	17	16	22.5	26.5
4	8.1	7.8	192	182	131	126	61	56	46	43	18	18		
5	8.1	8.0	156	160	132	126	24	34	47	49	9	9		
6	8.1	7.9	164	154	138	124	26	30	52	46	8	9		
7	8.1	8.1	164	162	138	127	26	35	54	51	7	9	24.0	26.0
8	8.1	8.0	188	184	122	116	66	68	43	44	19	18		
9	8.1	8.0	168	164	127	127	41	37	55	53	8	8		
10	8.2	7.8	206	188	154	129	52	59	50	47	20	17		
11	8.1	7.8	202	184	152	131	50	53	47	46	20	17	22.5	27.0
12	8.1	7.8	218	196	152	133	66	63	51	50	22	17		
13	8.1	8.0	206	188	151	137	55	51	51	49	19	16		
14	8.0	7.9	178	196	131	138	47	58	42	51	17	17	19.0	24.5
15	8.2	8.1	152	168	124	136	28	32	46	51	9	10		
16	8.2	8.1	146	152	123	129	23	23	44	45	9	10		
17	8.2	7.9	178	172	123	120	55	52	46	45	15	15		
18	8.1	7.8	178	172	127	120	51	52	42	41	17	17		
19	8.1	7.8	166	178	120	129	46	49	39	42	17	17		
20	8.0	7.9	174	164	120	117	54	47	47	43	14	14	21.5	25.0
21	8.1	7.8	196	166	146	118	50	48	46	42	19	15		
22	8.1	8.0	156	150	131	126	25	24	46	48	10	7	22.0	24.5
23	8.2	8.1	154	152	128	126	26	26	51	51	6	6		
24	8.2	8.2	164	152	141	124	23	28	51	51	9	6		
25	8.2	8.1	166	152	141	124	25	28	51	47	10	8		
26	8.3	8.1	150	152	130	128	20	24	45	46	9	9		
27	8.2	7.9	202	188	147	122	55	66	51	49	18	16	21.0	25.0
28	8.3	7.9	210	188	154	128	56	60	51	46	20	17		
29	8.3	7.9	206	192	151	134	55	58	52	47	18	18		
30	8.1	8.1	214	196	154	138	60	58	55	50	18	17		
31	8.4	8.4	164	166	143	144	21	22	54	55	7	7	24.5	25.5
Avg.	8.1	8.0	180.4	172.4	136.2	126.3	44.2	46.1	48.0	46.7	14.6	13.5	21.8	25.6
Max	8.3	8.2	218.0	196.0	154.0	138.0	66.0	68.0	55.0	53.0	22.0	18.0	24.0	27.0
Min.	8.0	7.8	146.0	150.0	120.0	116.0	20.0	23.0	39.0	41.0	6.0	6.0	19.0	24.5

MONTH/YEAR **March-21**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.58	0.45	0.89		0	0.00	191	2.70	27	0.38	218	2.86	0.83	1.87	2.03
2	0.49	0.34	0.77		0	0.00	200	2.75	36	0.50	236	3.38	1.26	1.96	2.12
3	0.60	0.43	0.82	0.66	0	0.00	203	2.80	33	0.46	236	3.67	1.39	2.12	2.28
4	0.49	0.30	0.81		0	0.00	182	2.95	42	0.68	224	3.73	1.48	2.09	2.25
5	0.56	0.34	0.81		0	0.00	191	2.79	43	0.63	234	3.39	1.06	2.10	2.33
6	0.57	0.34	0.77		0	0.00	154	2.77	24	0.43	178	3.35	1.19	1.91	2.16
7	0.56	0.42	0.79		0	0.00	180	2.73	27	0.41	207	3.09	1.36	1.55	1.73
8	0.49	0.32	0.72		0	0.00	207	2.89	34	0.47	241	3.29	1.37	1.77	1.92
9	0.57	0.37	0.67		0	0.00	188	2.78	24	0.35	212	3.16	1.45	1.44	1.71
10	0.56	0.34	0.75	0.67	0	0.00	184	3.00	38	0.62	222	3.87	1.94	1.78	1.93
11	0.71	0.41	0.73		0	0.00	177	2.86	27	0.44	204	2.90	0.84	1.89	2.06
12	0.53	0.34	0.78		0	0.00	191	3.02	33	0.52	224	3.67	1.93	1.59	1.74
13	0.52	0.35	0.70		0	0.00	180	2.92	31	0.50	211	2.98	0.90	1.92	2.08
14	0.70	0.27	0.72		0	0.00	190	3.08	58	0.94	248	4.15	2.47	1.53	1.68
15	0.57	0.33	0.80		0	0.00	156	2.91	23	0.43	179	3.04	1.47	1.40	1.57
16	0.61	0.33	0.70		0	0.00	204	2.83	37	0.51	241	3.46	1.10	2.09	2.36
17	0.59	0.31	0.69	0.73	0	0.00	178	2.94	38	0.63	216	4.10	1.99	1.95	2.11
18	0.61	0.34	0.72		0	0.00	194	2.65	32	0.44	226	3.22	1.01	2.04	2.21
19	0.57	0.29	0.67		0	0.00	162	2.59	72	1.15	234	4.37	1.75	2.45	2.62
20	0.70	0.29	0.73		0	0.00	153	2.54	29	0.48	182	3.12	0.71	2.24	2.41
21	0.59	0.26	0.79		0	0.00	140	2.71	30	0.58	170	3.53	1.37	1.99	2.16
22	0.78	0.40	0.90		0	0.00	196	2.75	40	0.56	236	3.20	0.94	2.06	2.26
23	0.57	0.34	0.88		0	0.00	161	2.80	37	0.64	198	3.49	1.46	1.78	2.03
24	0.58	0.33	0.84		0	0.00	184	2.77	39	0.59	223	3.61	1.36	2.00	2.25
25	0.51	0.40	0.86	0.81	0	0.00	209	2.74	39	0.51	248	3.15	1.15	1.79	2.00
26	0.52	0.37	0.90		0	0.00	204	2.77	32	0.43	236	3.49	1.52	1.75	1.97
27	0.58	0.23	0.76		0	0.00	209	2.96	44	0.62	253	3.35	1.33	1.87	2.02
28	0.46	0.24	0.79		0	0.00	208	2.99	27	0.39	235	3.82	1.88	1.79	1.94
29	0.35	0.29	0.80		0	0.00	227	3.09	39	0.53	266	3.52	1.42	1.95	2.10
30	0.48	0.23	0.72		0	0.00	268	3.07	38	0.43	306	3.34	1.47	1.72	1.87
31	0.46	0.29	0.76	0.80	0	0.00	289	4.03	46	0.64	335	5.11	3.18	1.65	1.93
Avg.	0.57	0.33	0.78	0.72	0.00	0.00	189.03	2.84	35.77	0.54	224.80	3.44	1.38	1.88	2.06
Max	0.78	0.45	0.90	0.81	0.00	0.00	268.00	3.09	72.00	1.15	306.00	4.37	2.47	2.45	2.62
Min.	0.35	0.23	0.67	0.66	0.00	0.00	140.00	2.54	23.00	0.35	170.00	2.86	0.71	1.40	1.57

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MONTH/YEAR **March-21**

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	49	0	2	3.0
2	1	A	86	0	2	2.5
3	1	A	86	0	2	2.5
4	1	A	88	0	2	3.0
5	1	A	85	0	3	3.5
6	1	A	46	0	2	4.0
7	1	A		0	3	4.0
8	1	A	42	0	3	3.0
9	1	A	39	0	5	5.0
10	1	A	67	0	4	3.5
11	1	A	80	1	6	3.5
12	1	A	57	1	6	5.0
13	1	A	55	0	6	5.5
14	1	A	23	4	5	6.0
15	1	A	102	1	6	7.0
16	1	A	26	5	5	6.5
17	1	A	28	0	4	5.5
18	1	A	37	1	4	5.0
19	1	A	66	0	4	5.0
20	1	A	70	0	4	4.5
21	1	A	70	9	5	5.0
22	1	A	45	2	5	6.0
23	1	A	21	1	5	7.0
24	1	A	21	0	6	6.0
25	1	A	46	1	6	6.0
26	1	A	23	0	6	8.0
27	1	A	37	0	6.5	6.0
28	1	A	92	1	7.2	6.5
29	1	A	51	0	6.7	7.0
30	1	A	45	0	7.7	7.5
31	1	A	61	0	8.5	8.0
AVG.	1	A	55	1	5	5
Max			102	9	9	8
Min			21	0	2	3

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MONTH/YEAR **March-21**

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D	City Hall	Wolfs	Bait Shed	Sunny Spot	B&Z				
A	Ortho P	Ortho P	Ortho P	Ortho P	Ortho P	High Lift		PO4	Ortho P
T	Residual	Residual	Residual	Residual	Residual	To	Lbs PO4	Treatment	Residual
E	mg/L	mg/L	mg/L	mg/L	mg/L	Distribution		mg/L	mg/L
1						1.1380	88	3.07	2.87
2						1.0410	67	2.54	2.83
3	2.85	2.62	2.74	2.78	2.81	0.9600	75	3.08	2.70
4						0.8956	75	3.31	2.91
5						1.0311	74	2.84	2.65
6						0.7941	76	3.76	2.88
7						1.0008	88	3.48	2.78
8						1.0936	78	2.81	2.99
9						1.0009	78	3.10	3.19
10	3.12	3.05	2.86	2.96	2.70	0.8574	79	3.65	3.28
11						1.0483	81	3.06	2.95
12						0.9107	74	3.22	3.28
13						1.0567	75	2.81	2.96
14						0.8911	73	3.24	3.11
15						0.8792	65	2.93	3.15
16						1.0410	82	3.12	3.24
17	2.74	2.86	2.55	1.51	3.03	0.7873	101	5.08	2.98
18						1.0483	102	3.85	3.25
19						0.8003	82	4.05	
20						0.8707	89	4.04	3.01
21						0.7191	91	5.01	3.12
22						1.1024	101	3.63	3.22
23						0.8475	87	4.06	3.00
24						0.9225	121	5.19	3.22
25	3.14	3.05	3.15	2.98	2.96	1.1741	126	4.25	3.22
26						1.0084	109	4.28	3.12
27						1.1280	104	3.65	2.91
28						0.9175	42	1.81	2.98
29						1.1294	125	4.38	2.93
30						1.3659	103	2.98	3.16
31	2.85	3.05	2.93	2.55	2.53	0.9794	117	4.73	3.21
Totals						30.4402	2727.4		
AVG.	2.94	2.93	2.85	2.56	2.81	0.9819	88.0	3.60	3.04
Max	3.14	3.05	3.15	2.98	3.03	1.3659	126.0	5.19	3.28
Min	2.74	2.62	2.55	1.51	2.53	0.7191	42.0	1.81	2.65

CITY OF BENTON HARBOR PAGE 7

DISTRIBUTION SYSTEM MONITORING WSSN 0600 March-21

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3	1.15		1.06	0.92	0.93		1.04
4							
5							
6							
7							
8							
9							
10	1.33		1.32		1.18		1.19
11							
12							
13							
14							
15							
16							
17	1.20		1.30		1.09		0.86
18							
19							
20							
21							
22							
23							
24							
25	1.26		1.17				1.05
26							
27							
28							
29							
30							
31	1.06		1.03		0.61		0.85

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	**1.08**	1.33	0.61
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	10		
Total number of check samples	**0**		
Total number of positive check samples	**0**		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: CITY OF BENTON HARBOR

WSSN:600

Operator-in-Charge: **Abul Ahmed** F1

Month/Year: **May-21**

Signature of Operator-in-Charge

Water Plant Classification: **Berrien** County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.3382	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	225.33	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	0.98	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	1.94	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.05%	Percent of Treated Water

Chemical Data

Chlorine on hand:	29842	lb.	Est. supply:	289	days
Primary Coagulant (Alum (Al3+)) on hand:	69898	lb.	Est. supply:	100	days
Cost of All Chemicals per Million Gallons:	$65.29	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	93	93
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	27.864389	Avg	0.9306973	Max	1.465531	Min	0.664673

Remarks. We have begun to feed Orthopolyphosphate (OPP) 70/30 Carus 8600 33% March 25, 2019
This report has an updated Bacteria Page for Metered flow and OPP treat and residuals.

WSSN 0600 CITY OF BENTON HARBOR Month/Year May-21

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0250	312.00	1.60	2.30	2.40	0.53	3	0.07	0.07	3	0.08	0.09	6	0	0
2	0.7575	231.00	1.60	2.50	2.50	0.67	3	0.08	0.08	3	0.09	0.09	6	0	0
3	0.9725	289.00	1.56	1.60	2.30	0.46	3	0.09	0.11	3	0.10	0.11	6	0	0
4	1.0825	324.00	1.57	1.50	2.30	0.33	3	0.07	0.08	3	0.10	0.12	6	0	0
5	0.9200	273.00	1.56	1.50	2.10	0.33	3	0.08	0.10	3	0.09	0.10	6	0	0
6	0.9100	276.00	1.58	1.70	3.00	0.38	3	0.08	0.09	3	0.11	0.12	6	0	0
7	1.0800	347.00	1.69	1.60	2.00	0.34	3	0.07	0.07	3	0.08	0.09	6	0	0
8	0.9200	277.00	1.58	1.70	1.90	0.43	3	0.07	0.09	3	0.10	0.10	6	0	0
9	0.9450	288.00	1.60	0.96	1.00	0.36	3	0.07	0.07	3	0.09	0.10	6	0	0
10	0.9625	284.00	1.55	1.20	1.60	0.36	3	0.07	0.07	3	0.08	0.09	6	0	0
11	1.0000	294.00	1.55	1.10	1.30	0.36	3	0.07	0.08	3	0.08	0.09	6	0	0
12	0.8500	242.00	1.50	1.20	1.90	0.38	3	0.08	0.11	3	0.08	0.09	6	0	0
13	0.8850	265.00	1.58	1.10	1.40	0.35	3	0.07	0.08	3	0.08	0.09	6	0	0
14	0.9250	276.00	1.57	0.86	1.20	0.38	3	0.07	0.09	3	0.10	0.11	6	0	0
15	0.9325	279.00	1.57	1.10	1.90	0.35	3	0.07	0.08	3	0.10	0.11	6	0	0
16	0.9525	290.00	1.60	1.40	2.30	0.33	3	0.06	0.07	3	0.07	0.08	6	0	0
17	1.0350	312.00	1.59	1.70	3.00	0.50	3	0.07	0.07	3	0.08	0.09	6	0	0
18	0.9100	398.00	2.30	0.88	1.10	0.39	3	0.08	0.09	3	0.09	0.09	6	0	0
19	1.3382	390.00	1.53	4.70	7.60	1.00	3	0.08	0.09	3	0.09	0.10	6	0	0
20	1.1025	329.00	1.57	1.50	1.70	0.41	3	0.09	0.09	3	0.08	0.08	6	0	0
21	1.0000	301.00	1.58	1.10	1.30	0.34	3	0.09	0.09	3	0.08	0.09	6	0	0
22	0.9900	306.00	1.63	1.70	3.10	0.38	3	0.09	0.10	3	0.09	0.10	6	0	0
23	0.8000	244.00	1.60	1.70	2.70	0.34	3	0.08	0.08	3	0.08	0.10	6	0	0
24	1.0775	327.00	1.60	0.90	1.10	0.37	3	0.08	0.09	3	0.07	0.09	6	0	0
25	1.0750	329.00	1.61	1.90	3.80	0.58	3	0.09	0.10	3	0.08	0.09	6	0	0
26	1.0900	320.00	1.61	1.10	1.20	0.33	3	0.07	0.07	3	0.08	0.09	6	0	0
27	0.9525	288.00	1.59	1.01	1.50	0.26	3	0.07	0.08	3	0.07	0.08	6	0	0
28	0.9400	283.00	1.58	0.91	1.20	0.34	3	0.07	0.08	3	0.07	0.08	6	0	0
29	0.9225	280.00	1.60	0.99	1.20	0.35	3	0.07	0.08	3	0.07	0.08	6	0	0
30	1.0575	321.00	1.60	0.69	0.91	0.31	3	0.08	0.08	3	0.07	0.08	6	0	0
31	0.9200	272.00	1.56	0.92	1.30	0.38	3	0.10	0.11	3	0.09	0.09	6	0	0
Total	30.3307	9247.00					93			93			186	0	0
Avg.	0.9784	298.29	1.61	1.45	2.06	0.41		0.08	0.09		0.08		Total	Total	Total
Max	1.3382	398.00	2.30	4.70	7.60	1.00		0.10	0.11		0.11	0.12	6	0	0
Min.	0.7575	231.00	1.50	0.69	0.91	0.26		0.06	0.07		0.07				

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR **May-21**

CHEMICAL ANALYSES

			Total		Total		Non-Carb.								WQP	
			Hardness		Alkalinity		Hardness		Calcium		Magnesium		Chloride		Conductivity	Sulfate
D	pH		as CaCO3		as CaCO3		as CaCO3		as Ca++		as Mg++		as Cl-			
A			mg/l		mg/l		mg/l		mg/l		mg/l		mg/l		umhos	mg/l
T	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap
E	29.	30.	31.	32.	33.	34.	35.	36.	37	38	39	40	41	42		
1	8.3	8.2	162	168	134	136	28	32	46	51	11	10				
2	8.4	8.3	166	168	138	138	28	30	54	55	8	7				
3	8.0	7.9	170	186	129	136	41	50	40	51	17	14				
4	8.0	7.8	168	176	122	127	46	49	38	44	17	16				
5	8.0	8.1	178	176	122	121	56	55	37	44	16	16	20.0	24.5		
6	8.1	7.9	184	180	122	118	62	62	43	42	18	18				
7	8.1	7.9	178	174	120	118	58	56	41	40	18	18				
8	8.2	8.0	156	146	129	119	27	27	42	40	13	11				
9	8.2	8.2	152	148	127	118	25	30	40	39	13	12	20.5	23.5		
10	8.2	8.2	146	150	126	119	20	31	39	41	12	12			390.0	42.0
11	8.2	8.1	146	146	121	116	25	30	39	39	12	12				
12	8.1	7.9	176	170	123	116	53	54	47	46	14	14				
13	8.1	7.7	186	176	123	115	63	61	42	39	20	19				
14	8.1	8.0	176	166	122	113	54	53	41	39	18	17				
15	8.1	7.8	178	172	123	116	55	56	40	41	19	17	19.0	23.5		
16	8.1	7.8	176	172	123	116	53	56	41	42	18	17				
17	8.0	7.7	182	170	127	116	55	54	43	41	18	17				
18	8.1	7.7	176	172	124	117	52	55	40	42	18	17				
19	8.2	7.9	176	172	124	119	52	53	40	41	18	17				
20	8.2	8.0	152	148	129	120	23	28	43	50	11	6	20.5	23.0		
21	8.2	8.1	148	144	128	121	20	23	39	41	12	10				
22	8.1	7.9	186	182	129	118	57	64	41	42	20	18				
23	8.1	8.0	188	180	128	119	60	61	43	42	19	18				
24	8.1	7.9	180	172	126	119	54	53	41	40	19	17				
25	8.1	7.7	184	182	122	113	62	69	41	40	20	20	18.0	22.5		
26	8.2	8.1	148	146	125	117	23	29	38	43	13	9				
27	8.3	8.2	140	146	120	117	20	29	39	42	11	10				
28	8.4	8.2	150	146	128	118	22	28	40	42	12	10				
29	8.2	8.1	148	146	125	117	23	29	42	42	11	10			431.0	
30	8.0	8.0	148	146	123	117	25	29	43	42	10	10				
31	8.1	7.8	174	168	124	113	50	55	41	42	17	15	18.5	22.5		
Avg.	8.1	8.0	166.8	164.2	125.4	119.7	41.4	44.5	41.4	42.8	15.2	14.0	19.6	23.4	410.5	42.0
Max	8.4	8.3	188.0	186.0	138.0	138.0	63.0	69.0	54.0	55.0	20.0	20.0	20.5	24.5	431.0	42.0
Min.	8.0	7.7	140.0	144.0	120.0	113.0	20.0	23.0	37.0	39.0	8.0	6.0	18.0	22.5	390.0	42.0

MONTH/YEAR **May-21**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l												
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use			TAP	
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.35	0.28	0.77		0	0.00	241	3.51	19	0.28	260	3.93	2.36	1.26	1.57
2	0.43	0.36	0.81		0	0.00	183	3.61	32	0.63	215	4.67	2.73	1.80	1.94
3	0.49	0.34	0.73		0	0.00	224	3.44	82	1.26	306	3.12	-0.12	3.05	3.24
4	0.48	0.27	0.79		0	0.00	238	3.28	61	0.84	299	4.15	2.22	1.78	1.93
5	0.69	0.29	0.72	0.71	0	0.00	181	2.94	45	0.73	226	3.43	1.13	2.14	2.30
6	0.44	0.26	0.79		0	0.00	188	3.08	61	1.00	249	4.20	1.92	2.13	2.28
7	0.49	0.28	0.72		0	0.00	227	3.14	79	1.09	306	4.50	1.33	2.99	3.17
8	0.56	0.31	0.82		0	0.00	201	3.26	47	0.76	248	4.31	1.78	2.19	2.53
9	0.48	0.37	0.66		0	0.00	205	3.24	20	0.32	225	2.49	0.63	1.57	1.86
10	0.49	0.36	0.78		0	0.00	209	3.24	30	0.47	239	4.03	1.98	1.83	2.05
11	0.47	0.29	0.68		0	0.00	216	3.22	25	0.37	241	3.93	2.08	1.68	1.85
12	0.65	0.35	0.75	0.81	0	0.00	182	3.20	42	0.74	224	3.85	1.48	2.21	2.37
13	0.47	0.24	0.66		0	0.00	178	3.00	39	0.66	217	3.88	1.64	2.08	2.24
14	0.47	0.33	0.61		0	0.00	183	2.95	86	1.39	269	3.77	0.94	2.66	2.83
15	0.65	0.28	0.56		0	0.00	184	2.95	42	0.67	226	3.76	1.74	2.02	2.02
16	0.49	0.30	0.60		0	0.00	190	2.98	68	1.07	258	3.73	0.38	3.19	3.35
17	0.65	0.31	0.62		0	0.00	210	3.03	47	0.68	257	3.82	1.59	2.07	2.23
18	0.63	0.40	0.63		0	0.00	179	2.94	43	0.71	222	3.94	1.89	1.89	2.05
19	0.26	0.57	0.55	0.56	0	0.00	222	2.48	5	0.06	227	3.23	0.72	2.35	2.51
20	0.65	0.35	0.65		0	0.00	217	2.94	41	0.56	258	4.23	1.55	2.26	2.68
21	0.66	0.35	0.55		0	0.00	198	2.96	44	0.66	242	4.19	1.72	2.31	2.47
22	0.53	0.37	0.63		0	0.00	205	3.09	43	0.65	248	3.90	1.85	1.90	2.05
23	0.49	0.49	0.56		0	0.00	168	3.13	37	0.69	205	3.97	1.87	1.94	2.10
24	0.68	0.30	0.56		0	0.00	229	3.17	38	0.53	267	4.20	2.42	1.66	1.78
25	0.63	0.20	0.47		0	0.00	233	3.24	53	0.74	286	3.93	2.14	1.64	1.79
26	0.64	0.31	0.47	0.48	0	0.00	229	3.14	58	0.79	287	4.79	2.44	2.04	2.35
27	0.55	0.26	0.54		0	0.00	201	3.15	53	0.83	254	5.37	2.92	2.37	2.45
28	0.60	0.37	0.57		0	0.00	197	3.13	40	0.64	237	4.73	2.68	1.92	2.05
29	0.60	0.34	0.81		0	0.00	196	3.17	35	0.57	231	5.19	3.37	1.71	1.82
30	0.61	0.32	0.66		0	0.00	220	3.11	31	0.44	251	4.55	2.69	1.71	1.86
31	0.72	0.32	0.87		0	0.00	194	3.15	78	1.27	272	5.13	3.12	1.85	2.01
Avg.	0.54	0.33	0.66	0.64	0.00	0.00	204.47	3.12	44.87	0.69	249.33	4.06	1.80	2.08	2.26
Max	0.69	0.57	0.82	0.81	0.00	0.00	241.00	3.61	86.00	1.39	306.00	5.37	3.37	3.19	3.35
Min.	0.26	0.20	0.47	0.48	0.00	0.00	168.00	2.48	5.00	0.06	205.00	2.49	-0.12	1.26	1.57

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MONTH/YEAR May-21

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	164	5	11	11.0
2	1	A	73	2	12	15.0
3	1	A	21	0	10	10.5
4	1	A	20	0	11	11.0
5	1	A	27	0	11	11.0
6	1	A	31	3	11	11.5
7	1	A	34	1	10	11.0
8	1	A	26	0	11	12.0
9	1	A	35	0	10	11.0
10	1	A	66	1	10	12.0
11	1	A	22	1	9	11.0
12	1	A	64	1	9	10.0
13	1	A	14	0	9	10.0
14	1	A	27	0	8	9.5
15	1	A	24	0	9	9.5
16	1	A	20	0	9	9.5
17	1	A	22	1	9	9.5
18	1	A	12	7	8	9.5
19	1	A	38	3	9	9.5
20	1	A	5	1	11	11.0
21	1	A	11	1	10	11.0
22	1	A	19	1	11	10.5
23	1	A	12	19	13	11.5
24	1	A	35	1	11	11.5
25	1	A	42	0	13	12.0
26	1	A	19	0	16	14.0
27	1	A	22	0	12.0	15.0
28	1	A	18	0	10.0	8.0
29	1	A	9	0	9.0	14.0
30	1	A	6	2	9.0	12.0
31	1	A	23	2	8.7	10.0
AVG.	1	A	27	2	10	11
Max			73	19	16	15
Min			5	0	8	8

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MONTH/YEAR May-21

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
D A T E	City Hall Ortho P Residual mg/L	Wolfs Ortho P Residual mg/L	Bait Shed Ortho P Residual mg/L	Sunny Spot Ortho P Residual mg/L	B&Z Ortho P Residual mg/L	High Lift To Distribution	Lbs PO4	PO4 Treatment mg/L	Ortho P Residual mg/L
1	3.20	2.91	1.77	3.15	2.68	0.9872	94	3.77	3.85
2						0.6868	106	6.11	3.70
3						1.4655	74	2.00	3.27
4						1.0755	104	3.83	3.76
5	3.20	2.91	1.77	3.15	2.68	0.9837	121	4.87	4.16
6						0.8841	91	4.07	4.32
7						1.0149	94	3.66	3.88
8						0.8591	79	3.64	3.81
9						1.3466	55	1.62	3.73
10						0.8860	123	5.49	4.10
11						0.9151	75	3.24	4.03
12	3.96	3.40	3.09	3.54	2.78	0.8680	91	4.15	4.23
13						0.8349	103	4.88	4.32
14						1.0650	106	3.94	4.06
15						0.8967	97	4.28	4.28
16						1.0327	115	4.41	4.26
17						1.0034	106	4.18	3.04
18						0.8390	115	5.42	3.90
19	2.98	3.19	3.09	3.23	2.56	1.0495	98	3.69	3.46
20	2.41	3.11	2.67	2.34	2.95	0.9100	115	5.00	3.55
21						0.8625	114	5.23	3.93
22						0.9498	89	3.71	3.52
23						0.7707	104	5.34	3.24
24						1.1256	142	4.99	3.27
25						1.0858	90	3.28	3.90
26	3.62	4.42	4.32	3.66	4.04	1.3436	100	2.95	4.55
27						0.7067	98	5.49	4.08
28						0.9547	86	3.56	3.95
29						0.8988	133	5.86	3.98
30						0.9800	137	5.53	3.90
31						0.9961	120	4.77	3.94
Totals						30.2779	3175.0		
AVG.	3.23	3.41	2.99	3.18	3.00	0.9767	102.4	4.31	3.87
Max	3.96	4.42	4.32	3.66	4.04	1.4655	142.0	6.11	4.55
Min	2.41	2.91	1.77	2.34	2.56	0.6868	55.0	1.62	3.04

CITY OF BENTON HARBOR PAGE 7

DISTRIBUTION SYSTEM MONITORING WSSN 0600 May-21

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3							
4							
5	1.57		1.52	1.77	0.61		0.91
6							
7							
8							
9							
10							
11							
12	1.37		1.39	1.34	1.26		1.04
13							
14							
15							
16							
17							
18							
19	0.98		1.86	1.46	0.75		1.03
20	2.08		1.65	1.57	0.48		1.36
21							
22							
23	1.57		1.52	1.77	0.61		0.91
24							
25							
26	1.81		1.41	1.67	0.63		1.05
27							
28							
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

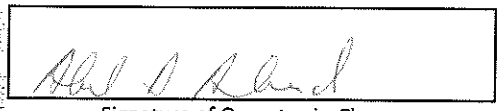
	Avg.	Max.	Min.
Chlorine Residuals, mg/L	1.30	2.08	0.48
Total number of routine distribution samples analyzed	30		
Total number of positive routine distribution samples			
Total number of routine distribution samples required	10		
Total number of check samples	6		
Total number of positive check samples	0		

MONTHLY OPERATION REPORT OF
THE CITY OF BENTON HARBOR WATER TREATMENT PLANT

SUPPLY NAME: **CITY OF BENTON HARBOR**

WSSN:600

Operator-in-Charge **Abul Ahmed-F1** Month/Year **July-21**



Signature of Operator-in-Charge

Water Plant Classification

Berrien
County

Treatment Rate and Filter Data

Maximum Treatment Rate:	1.3299	Million Gallons per Day
Rated Plant Capacity:	12	Million Gallons per Day
Average Filter Run:	133.63	Hours
Average Head Loss:	NA	Feet
Average Filtration Rate:	1.09	Gallons Per Square Feet per Minute
Maximum Filtration Rate:	2.48	Gallons Per Square Feet per Minute
Average Wash Water Use:	1.52%	Percent of Treated Water

Chemical Data

Chlorine on hand:	0	lb.	Est. supply:	0	days
Primary Coagulant (Alum (Al3+)) on hand:	0	lb.	Est. supply:	0	days
Cost of All Chemicals per Million Gallons:	$76.04	dollars			
Total Power Cost per Million Gallons:		dollars			

Remarks

	North Filter	South Filter
Number of filter confluence samples > 0.3 NTU:	0	0
Number of filter confluence samples collected:	86	86
Percent of filter confluence samples > 0.3 NTU:	0%	0%
Number of filter confluence samples > 1 NTU	0	0

Did any individual filter exceed:

1.0 NTU in two consecutive measurements taken 15 minutes apart? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? NO
If yes, attach specific filter(s) information and indicate required follow-up status.

Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? NO
If yes, indicate date(s), duration, and individual filter grab sampling frequency on a separate sheet.

Did POE disinfectant residual fall below 0.2 ppm during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Was minimum C*T credit achieved for the entire month? YES
If no, indicate on a separate sheet the date(s) not achieved.

Was continuous POE chlorine residual monitoring equipment off-line during the month? NO
If yes, indicate date(s) and duration on a separate sheet.

Distribution	Total	42.4394	Avg	1.4148619	Max	1.62152	Min	1.26732

Remarks: From 7/1/21 - 7/7/21 the polyphosphate chemical scale was out of service. The polyphosphate dosage remained constant during this time period, and the pounds used are estimated based on the application rate.

WSSN 0600 CITY OF BENTON HARBOR Month/Year July-21

COAGULATION PARAMETERS

	MIL.		ALUM	TURBIDITY UNITS											
D	GAL.	Dry	as Al3+	RAW		Applied	#	FILTERED NORTH		#	FILTERED SOUTH		2 Hour Compliance Periods		
A	TREAT.	Al2(SO3)4	mg/l	Avg.	Max.	Avg.	ample	Avg.	Max.	Samples	Avg.	Max.	# of	#of	#of
T		Pounds											Periods	Periods	Periods
E		Add												>.30NTU	>.30NTU
														North	South
1	1.0725	305.00	1.50	1.80	2.20	0.52	3	0.08	0.09	3	0.08	0.08	6	0	0
2	1.0275	300.00	1.54	2.40	2.80	0.52	3	0.08	0.09	3	0.09	0.10	6	0	0
3	0.9524	310.00	1.71	6.30	6.60	1.50	3	0.09	0.09	2	0.08	0.08	4	0	0
4	1.0699	327.00	1.61	4.10	4.30	1.40	3	0.07	0.07	2	0.09	0.09	4	0	0
5	1.0266	318.00	1.63	3.80	4.30	1.70	3	0.08	0.08	2	0.13	0.14	4	0	0
6	1.1350	359.00	1.47	1.40	1.50	0.85	3	0.08	0.09	3	0.08	0.09	6	0	0
7	1.2499	409.00	1.72	2.70	3.50	0.65	3	0.08	0.08	3	0.11	0.13	6	0	0
8	1.0500	303.00	1.52	1.50	1.60	0.40	3	0.07	0.08	3	0.12	0.13	6	0	0
9	1.2965	415.00	1.68	3.80	3.80	0.74	3	0.09	0.10	2	0.09	0.10	4	0	0
10	1.0866	332.00	1.61	3.70	5.40	0.69	3	0.08	0.08	3	0.10	0.11	6	0	0
11	0.9625	286.00	1.56	1.50	2.00	0.51	3	0.08	0.09	3	0.09	0.09	6	0	0
12	1.0700	335.00	1.65	1.70	2.50	0.60	3	0.08	0.08	3	0.07	0.09	6	0	0
13	1.0575	329.00	1.64	1.80	2.26	0.84	3	0.09	0.12	3	0.08	0.10	6	0	0
14	1.0800	339.00	1.65	2.00	3.00	0.60	3	0.09	0.10	3	0.10	0.11	6	0	0
15	1.2108	367.00	1.59	2.60	3.50	1.30	3	0.09	0.09	3	0.09	0.10	6	0	0
16	1.0325	327.00	1.67	1.60	1.80	0.46	3	0.09	0.10	3	0.08	0.09	6	0	0
17	1.0900	331.00	1.60	1.20	1.70	0.48	3	0.09	0.10	3	0.08	0.09	6	0	0
18	0.8900	275.00	1.63	1.20	1.30	0.50	3	0.08	0.08	3	0.08	0.09	6	0	0
19	1.0775	326.00	1.59	1.60	2.20	0.53	3	0.07	0.07	3	0.08	0.09	6	0	0
20	1.0750	335.00	1.64	1.40	1.80	0.55	3	0.07	0.08	3	0.09	0.09	6	0	0
21	1.3299	416.00	1.65	3.10	6.80	1.00	3	0.08	0.08	3	0.08	0.09	6	0	0
22	0.8866	270.00	1.60	3.30	3.30	1.30	3	0.07	0.07	2	0.08	0.09	4	0	0
23	1.0677	328.00	1.62	4.20	4.20	1.70	3	0.07	0.07	2	0.08	0.08	4	0	0
24	1.0266	311.00	1.59	4.90	6.70	1.40	3	0.08	0.08	2	0.08	0.08	4	0	0
25	1.1700	347.00	1.56	2.80	3.10	1.10	3	0.07	0.08	3	0.08	0.08	6	0	0
26	1.0441	318.00	1.56	2.00	2.50	0.77	3	0.08	0.09	3	0.08	0.08	6	0	0
27	1.2665	386.00	1.60	3.10	4.80	1.00	3	0.08	0.10	3	0.09	0.09	6	0	0
28	1.1666	352.00	1.59	2.60	3.70	1.10	3	0.08	0.08	3	0.09	0.10	6	0	0
29	1.1799	310.00	1.38	2.30	2.50	1.10	3	0.08	0.09	3	0.08	0.09	6	0	0
30	1.1050	315.00	1.50	1.80	2.50	0.48	3	0.08	0.09	3	0.09	0.09	6	0	0
31	0.9975	296.00	1.56	2.60	4.40	0.56	3	0.08	0.08	3	0.07	0.07	6	0	0
Total	33.7531	10277.00					93			86			172	0	0
Avg.	1.0888	331.52	1.59	2.61	3.31	0.87		0.08	0.09		0.09		Total	Total	Total
Max	1.3299	416.00	1.72	6.30	6.80	1.70		0.09	0.12		0.13	0.14	6	0	0
Min.	0.8866	270.00	1.38	1.20	1.30	0.40		0.07	0.07		0.07				

WSSN 0600 CITY OF BENTON HARBOR MONTH/YEAR July-21

CHEMICAL ANALYSES

D A T E	pH Raw 29.	pH Tap 30.	Total Hardness as CaCO3 mg/l Raw 31.	Total Hardness as CaCO3 mg/l Tap 32.	Total Alkalinity as CaCO3 mg/l Raw 33.	Total Alkalinity as CaCO3 mg/l Tap 34.	Non-Carb. Hardness as CaCO3 mg/l Raw 35.	Non-Carb. Hardness as CaCO3 mg/l Tap 36.	Calcium as Ca++ mg/l Raw 37	Calcium as Ca++ mg/l Tap 38	Magnesium as Mg++ mg/l Raw 39	Magnesium as Mg++ mg/l Tap 40	Chloride as Cl- mg/l Raw 41	Chloride as Cl- mg/l Tap 42	WQP Conductivity umhos Tap	WQP Sulfate mg/l Tap
1	8.1	8.0	172	162	123	112	49	50	42	42	17	14				
2	8.2	8.1	172	162	120	113	52	49	40	38	17	16				
3	8.3	8.2	146	148	118	116	28	32	43	42	9	10				
4	8.3	8.2	148	142	121	118	27	24	43	42	10	9				
5	8.3	8.2	146	148	123	119	23	29	44	45	9	9	21.0	23.0		
6	8.5	8.0	142	132	121	120	21	12	52	53	13	13			302.7	41.0
7	8.2	8.0	164	156	120	115	44	41	41	39	15	14				
8	8.2	8.1	168	162	123	115	45	47	38	38	18	16				
9	8.2	8.1	164	156	123	114	41	42	39	38	16	15	18.0	22.5		
10	8.2	8.1	162	154	121	113	41	41	37	36	17	16				
11	8.2	8.2	166	158	121	115	45	43	42	37	15	15				
12	8.2	8.1	138	136	121	115	17	21	40	42	10	10				
13	8.2	8.1	142	144	117	120	25	24	39	47	10	11				
14	8.2	8.0	170	158	123	115	47	43	38	39	18	15				
15	8.2	8.0	148	150	123	118	25	32	42	45	10	9				
16	8.4	8.2	146	152	117	119	29	33	40	43	11	11				
17	8.2	8.0	168	158	122	113	46	45	38	37	17	16				
18	8.1	8.1	164	158	120	116	44	42	35	34	18	18	18.5	23.0		
19	8.1	7.9	164	156	119	114	45	42	38	37	17	16				
20	8.1	8.0	164	154	122	110	42	44	39	38	16	15				
21	8.2	8.1	146	144	118	112	28	32	38	42	12	10			276.0	40.0
22	8.0	7.9	142	138	116	112	26	26	43	42	8	8	24.0	26.0		
23	8.3	8.2	146	144	122	115	24	29	39	39	12	11				
24	8.3	8.2	154	148	127	119	27	29	44	42	11	10				
25	8.4	8.3	142	148	119	120	23	28	37	39	12	12				
26	8.3	8.0	140	144	115	114	25	30	38	42	9	10				
27	8.2	7.8	150	142	126	110	24	32	44	43	11	11				
28	8.2	7.9	168	158	124	116	44	42	39	38	17	15				
29	8.2	8.0	170	174	120	115	50	59	38	42	18	17				
30	8.1	8.1	168	162	117	112	51	50	40	39	17	16				
31	8.1	7.9	162	152	121	113	41	39	38	37	16	15	19.0	23.5		
Avg.	8.2	8.1	156.0	151.6	120.7	115.2	35.3	36.4	40.3	40.7	13.7	12.9	20.4	23.6	289.4	40.5
Max	8.5	8.3	172.0	174.0	127.0	120.0	52.0	59.0	52.0	53.0	18.0	18.0	24.0	26.0	302.7	41.0
Min	8.0	7.8	138.0	132.0	115.0	110.0	17.0	12.0	35.0	34.0	8.0	8.0	18.0	22.5	276.0	40.0

MONTH/YEAR **July-21**

FLUORIDATION AND CHLORINATION

		Fluoride Analysis			Chlorine Application And Chlorine Residual in mg/L										
D	Fluoride		mg/l											TAP	
A	Applied				INTAKE		Pre Treat Raw Line		FILTERED		Total NaOCl Use				
T	as Fmg/l	Raw	Tap	Dist.	PPD	Free	PPD	Free	PPD	Free	PPD	Free	Demand	Free	Total
E						mg/l		mg/l		mg/l		mg/l	mg/L	mg/l	mg/l
1	0.69	0.23	0.58		0	0.00	270	3.76	65	0.90	335	3.52	1.30	2.06	2.22
2	0.76	0.18	0.56		0	0.00	255	3.70	59	0.86	314	3.41	1.15	2.10	2.26
3	0.36	0.22	0.51		0	0.00	231	3.62	23	0.36	254	2.79	1.10	1.40	1.69
4	0.50	0.15	0.46		0	0.00	253	3.53	44	0.61	297	3.26	0.69	2.32	2.57
5	0.42	0.31	0.41		0	0.00	252	3.66	39	0.57	291	2.99	0.76	2.06	2.23
6	0.63	0.35	0.62		0	0.00	215	2.83	46	0.61	261	2.71	1.01	1.50	1.70
7	0.64	0.19	0.50	0.48	0	0.00	347	4.14	67	0.80	414	4.26	1.99	2.10	2.27
8	0.82	0.22	0.46		0	0.00	286	4.07	61	0.87	347	3.73	1.50	2.07	2.23
9	0.42	0.23	0.47		0	0.00	383	4.41	56	0.64	439	4.56	2.42	1.98	2.14
10	0.54	0.32	0.65		0	0.00	576	7.91	81	1.11	657	7.56	5.25	2.15	2.31
11	0.71	0.32	0.70		0	0.00	482	7.48	53	0.82	535	5.81	3.65	2.01	2.16
12	0.78	0.27	0.62		0	0.00	527	7.35	22	0.31	549	6.10	4.14	1.76	1.96
13	0.65	0.15	0.41		0	0.00	514	7.26	52	0.73	566	6.01	3.71	2.01	2.30
14	0.55	0.27	0.76	0.64	0	0.00	557	7.70	70	0.97	627	6.73	4.42	2.23	2.31
15	0.56	0.39	0.91		0	0.00	466	5.75	59	0.73	525	5.64	3.49	1.96	2.15
16	0.66	0.38	0.90		0	0.00	344	4.97	53	0.77	397	4.31	1.93	2.17	2.38
17	0.55	0.30	0.79		0	0.00	344	4.71	54	0.74	398	4.32	2.18	1.99	2.14
18	0.61	0.30	0.73		0	0.00	274	4.60	45	0.75	319	3.76	1.81	1.79	1.95
19	0.60	0.27	0.65		0	0.00	330	4.57	49	0.68	379	3.98	1.95	1.86	2.03
20	0.80	0.25	0.70		0	0.00	327	4.54	52	0.72	379	4.02	2.10	1.80	1.92
21	0.66	0.19	0.60		0	0.00	389	4.37	55	0.62	444	4.71	2.70	1.86	2.01
22	0.52	0.16	0.59	0.65	0	0.00	277	4.66	31	0.52	308	3.38	1.48	1.66	1.90
23	0.63	0.18	0.49		0	0.00	339	4.74	40	0.56	379	3.70	1.76	1.72	1.94
24	0.72	0.19	0.56		0	0.00	319	4.64	46	0.67	365	3.79	1.71	1.87	2.08
25	0.68	0.30	0.72		0	0.00	366	4.67	48	0.61	414	4.30	2.24	1.81	2.06
26	0.74	0.09	0.58		0	0.00	339	4.85	40	0.57	379	3.90	2.36	1.38	1.54
27	0.74	0.20	0.54		0	0.00	478	5.63	54	0.64	532	4.90	3.07	1.68	1.83
28	0.79	0.28	0.58	0.62	0	0.00	456	5.84	44	0.56	500	4.88	3.23	1.50	1.65
29	0.82	0.17	0.48		0	0.00	387	4.90	57	0.72	444	4.21	2.08	1.96	2.13
30	0.69	0.15	0.40		0	0.00	337	4.55	49	0.66	386	4.10	1.95	2.03	2.15
31	0.73	0.19	0.42		0	0.00	314	4.70	67	1.00	381	4.14	1.96	2.03	2.18
Avg.	0.64	0.24	0.60	0.60	0.00	0.00	364.00	4.98	50.47	0.69	414.47	4.38	2.30	1.89	2.07
Max	0.82	0.39	0.91	0.65	0.00	0.00	576.00	7.91	81.00	1.11	657.00	7.56	5.25	2.32	2.57
Min.	0.36	0.09	0.40	0.48	0.00	0.00	215.00	2.83	22.00	0.31	254.00	2.71	0.69	1.38	1.54

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MONTH/YEAR July-21

BACTERIOLOGICAL AND PHYSICAL PARAMETERS

	PLANT TAP		Standard Plate Count		Raw	Tap
D	No. of	Colilert			TEMP.	TEMP.
A	Samples	P/A			'C	'C
T			Raw	Tap		
E						
1	1	A	83	0	18	18.5
2	1	A	81	0	11	18.0
3	1	A	22	0	11	17.0
4	1	A	48	2	14	15.0
5	1	A	87	1	17	14.0
6	1	A	31	7	20	15.0
7	1	A	34	0	19	17.5
8	1	A	70	0	20	19.0
9	1	A	51	0	18	19.5
10	1	A	11	0	18	18.5
11	1	A	25	0	17	18.0
12	1	A	49	1	16	18.0
13	1	A	34	2	16	18.0
14	1	A	47	0	19	17.5
15	1	A	110	0	22	19.0
16	1	A	134	0	21	20.0
17	1	A	18	0	20	20.5
18	1	A	176	0	19	20.0
19	1	A	110	0	19	19.5
20	1	A	122	0	20	19.5
21	1	A	101	0	20	20.0
22	1	A	93	0	18	20.0
23	1	A	103	0	22	20.0
24	1	A	65	0	23	20.0
25	1	A	126	0	23	22.0
26	1	A	121	2	23	21.5
27	1	A	92	1	23.5	22.0
28	1	A	141	0	23.2	22.5
29	1	A	154	0	24.2	23.5
30	1	A	102	0	21.5	23.5
31	1	A	117	0	17.3	22.0
AVG.	1	A	83	1	19	19
Max			176	7	24	24
Min			11	0	11	14

WSSN 0600 CITY OF BENTON HARBOR PAGE 6

MONTH/YEAR July-21

Distrubution Flow and Corrosion Treatment

	Ortho P System					Distrubution flow and Corrosion Treatment			
DATE	City Hall Ortho P Residual mg/L	Wolfs Ortho P Residual mg/L	Bait Shed Ortho P Residual mg/L	Sunny Spot Ortho P Residual mg/L	B&Z Ortho P Residual mg/L	High Lift To Distribution	Lbs PO4	PO4 Treatment mg/L	Ortho P Residual mg/L
1						1.4213	120	3.34	3.42
2						1.3751	121	3.48	3.44
3						1.3597	118	3.43	3.62
4						1.3597	114	3.32	3.40
5						1.4521	100	2.72	3.48
6						1.4367	105	2.89	3.52
7	3.68	3.26	3.34	3.10	3.20	1.4521	100	2.72	3.18
8						1.3905	112	3.19	3.54
9						1.4367	112	3.08	3.54
10						1.2981	92	2.80	3.48
11						1.3751	99	2.85	3.84
12						1.3443	92	2.71	3.76
13						1.4059	73	2.05	3.96
14	3.76	4.18	4.24	3.66	3.74	1.3905	113	3.22	4.40
15						1.3905	104	2.96	4.02
16						1.3751	89	2.56	4.18
17						1.3751	96	2.76	3.84
18						1.2673	100	3.12	3.98
19						1.4213	112	3.12	3.46
20						1.4059	99	2.79	3.54
21	3.64	3.54	3.54	3.40	3.54	1.4059	112	3.15	3.56
22						1.3597	94	2.74	3.96
23						1.5291	91	2.35	4.06
24						1.4367	91	2.51	3.56
25						1.4367	43	1.18	3.94
26						1.4521	109	2.97	3.74
27						1.6215	110	2.68	3.86
28	3.02	3.15	3.22	3.00	2.52	1.5291	105	2.72	3.50
29						1.5753	100	2.51	3.78
30						1.4059	86	2.42	3.68
31						1.3751	91	2.62	3.48
Totals						43.8607	3103.0		
AVG.	3.53	3.53	3.59	3.29	3.25	1.4149	100.1	2.79	3.71
Max	3.76	4.18	4.24	3.66	3.74	1.6215	121.0	3.48	4.40
Min	3.02	3.15	3.22	3.00	2.52	1.2673	43.0	1.18	3.18

CITY OF BENTON HARBOR

DISTRIBUTION SYSTEM MONITORING WSSN 0600 July-21

Chlorine Residual at Bacteriological Monitoring Stations mg/l

	City Hall		Wolf Marine	470 W. Main	Sunny Spot		B&Z
DATE	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7	1.03		0.75	0.83	0.26		0.48
8							
9							
10							
11							
12							
13							
14	1.16		0.84	1.07	0.38		0.59
15							
16							
17							
18							
19							
20							
21	0.98		1.02	1.01	0.19		0.39
22							
23							
24							
25							
26							
27							
28	0.57		0.75	1.02	0.09		0.36
29							
30							
31							

DISTRIBUTION SAMPLES -- BACTERIOLOGICAL SUMMARY

	Avg.	Max.	Min.
Chlorine Residuals, mg/L	**0.69**	1.16	0.09
Total number of routine distribution samples analyzed	**20**		
Total number of positive routine distribution samples			
Total number of routine distribution samples required	10		
Total number of check samples	**6**		
Total number of positive check samples	**0**		

From:	Sarkipato, Ernest (EGLE)
To:	Jason Marquardt; David A. Cornwell
Cc:	Abul Ahmed; Darold Harlan; rjones@fv-operations.com
Subject:	data dump #6
Date:	Wednesday, September 1, 2021 9:11:00 AM
Attachments:	00600_BentonHarbor_LCR_RevisedReport_2020-1.pdf 00600_BentonHarbor_LCR_RevisedReport_2020-2.pdf 00600_BentonHarbor_LCR_SiteCodeAddresses.xls 0600_Benton Harbor_LCR_Report, Results_2018.pdf DHHS_Draft Data_BentonHarbor-Lead-Data.xlsx 1st-Lead-Results-table-for-BHcity-us reduced.pdf 00600_BentonHarbor_LCR_Report_2019-1.pdf 00600_BentonHarbor_LCR_Report_2019-2.pdf 00600_BentonHarbor_LCR_RevisedReport(3)_2021-1.pdf

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Final send from EGLE: attached are the records we have that (attempt) to tie address information to tap sample results. As you will see, the use of codes has been highly confusing and creates difficulty in trying to analyze data over time.

Last, one of these files summarizes the investigative sampling conducted by Michigan Department of Health and Human Services (DHHS) Drinking Water Unit.

Ernie

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:40 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #5

-8 MOR files should be attached for 2021.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:38 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #4

-13 MOR files should be attached for 2020.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:27 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>

Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #3

-14 MOR files should be attached for 2019.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 8:10 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: data dump #2

-12 MOR should be attached for 2018.

From: Sarkipato, Ernest (EGLE)
Sent: Wednesday, September 1, 2021 7:58 AM
To: Jason Marquardt <jmarquardt@abonmarche.com>; David A. Cornwell <DCornwell@cornwellinc.com>
Cc: Abul Ahmed <aahmed@fv-operations.com>; Darold Harlan <dharlan@fv-operations.com>; rjones@fv-operations.com
Subject: Corrosion Study contacts and data dump #1

Good morning all,

Per Dave's request for onsite contacts, I am providing the following for the City/Fleis & Vandenbrink:

Abul Ahmed (OIC, WTP): aahmed@fv-operations.com
Darold Harlan (Distribution Operator): dharlan@fv-operations.com
Rob Jones (Lead and Copper specialist): rjones@fv-operations.com

Also, the first data dump is attached:

-EGLE's MOR tracker which shows max/min/ave for many of the operating parameters,
-EGLE's Lead and Copper/WQP tracker,
-List of known LSL addresses (tier 1 sites), from F&V on 6/17/21

Next data dump will include as many MOR's as I can fit into an email.

Ernie Sarkipato, P.E.
Surface Water Treatment Specialist
Drinking Water and Environmental Health Division
Michigan Department of Environment, Great Lakes, and Energy
616-307-0261

www.Michigan.gov/communitywater

MI 0600 Benton Harbor Lead & Copper June 2020 Revised

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

EGLE

LEAD AND COPPER REPORT AND CONSUMER NOTICE FOR COMMUNITY WATER SUPPLY FORM A – SUPPLIES WITH LEAD SERVICE LINES

Issued under authority of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), MCL 325.1001 et seq., and the Administrative Rules.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within ten days after the end of the monitoring period. This form may be used to meet this requirement. Form instructions are available on pages 8 - 10. Submit the information to the appropriate Michigan Department of Environment, Great Lakes, and Energy (EGLE) district office.

1. Supply Name: Benton Harbor
2. County: Berrien 3. WSSN: 0600
4. Population: 9670 5. Monitoring Period: From: 1/1/2020 To: 6/30/2020
6. Minimum # of Samples Required: 60 7. # of Samples Taken: 63
8. Name of Certified Laboratory: Eurofins Eaton Analytical, South Bend IN.

9. SAMPLE CRITERIA:

This form is for water supplies collecting *some* or *all* lead and copper samples from sites WITH LEAD SERVICE LINES. All other supplies should use Form B.

Yes	No		
x		Are some or all samples from sites WITH lead service lines? If no sites served by a lead service line, STOP and use Form B.	For more information see *Instructions* item 11 "Tier and Sample Category" at the end of the document.
x	☐	Did you prioritize sample collection according to the following: • Tier 1 sites must be used unless insufficient Tier 1 sites available. • If insufficient Tier 1 sites available, then Tier 2 sites must be used. • If insufficient Tier 2 sites, then Tier 3 sites must be used. • If no Tier 1, 2, or 3 sites are available, sites must be representative of plumbing materials typically found throughout the water system.	
☐	x	Were the same sampling sites used as in the previous monitoring period? **If no, explain** (attach additional pages if needed): I said yes & No because some where & some were Not	

Comments:
There were some sampling locations that were sampled in previous years.
Most were likely new locations.
This Preformated EGLE Version in word document is very hard to use. Try it once & see what I mean

10. SIGNATURE:

Name: Mike O'Malley Signature:
Title: Water Operator In Charge Phone: (269)363-0575 Date: 7/2/20
Revised

MI 0600 Benton Harbor Lead & Copper 1/1/20 to 6/30/20 Revised

11. TAP SAMPLING DATA

Sheet 1 of 3. Revised

Sample Location	Sample Date	Tier	Category	Building	Service Line	Tap Type	1st Liter Sample			5th Liter Sample		
		1	A	Plumbing Unknown	Very Likely = known Likely = lead nearby Unknown = Lead in area	Kitchen	Lead ug/L	Copper ug/L	Lab Sample Number	Lead ug/L	Copper mg/L ug/L	Lab Sample Number
RP2	4/30/2020	1	A	Unknown	Likely	Kitchen	0	1.4	4621306	0	1.1	4621325
RP3	4/28/2020	1	A	Unknown	very Likely	Kitchen	1.2	0	4621307	1.6	0	4621326
RP4	4/28/2020	1	A	Unknown	Likely	Kitchen	0	2.5	4621308	0	1.5	4621327
RP5	4/29/2020	1	A	Unknown	PLSLR	Kitchen	0	9	4621309	0	6.1	4621328
RP6	4/29/2020	1	A	Unknown	Likely	Kitchen	0	2.5	4621310	0	1.4	4621329
RP7	4/28/2020	1	A	Unknown	very Likely	Kitchen	5.2	150	4621311	5.1	28	4621330
RP9	4/29/2020	1	A	Unknown	Possible	Kitchen	0	2.1	4621312	0	2.6	4621331
RP10	4/29/2020	1	A	Unknown	very Likely	Kitchen	3	1.3	4621313	9.2	1.9	4621332
RP11	4/29/2020	1	A	Unknown	Possible	Kitchen	0	5.7	4621314	0	4	4621333
RP13	4/29/2020	1	A	Unknown	Possible	Kitchen	1.3	3	4621315	0	0	4621334
RP14	4/29/2020	1	A	Unknown	Likely	Kitchen	7.2	3	4621316	10	1.6	4621335
RP15	4/29/2020	1	A	Unknown	very Likely	Kitchen	1.7	0	4621317	0	0	4621336
RP16	4/29/2020	1	A	Unknown	Possible	Kitchen	440	130	4621318	1	2.7	4621337
RP17	4/28/2020	1	A	Unknown	Possible	Kitchen	3.5	17	4621319	5.1	8.6	4621338
RP19	4/28/2020	1	A	Unknown	very Likely	Kitchen	0	8.9	4621320	0	7.2	4621339
RP21	4/29/2020	1	A	Unknown	very Likely	Kitchen	0	2.3	4621321	0	1.7	4621340
RP23	4/30/2020	1	A	Unknown	very Likely	Kitchen	0	17	4621322	0	4.2	4621341
RP24	4/28/2020	1	A	Unknown	very Likely	Kitchen	0	2.3	4621323	0	2.4	4621342
RP25	4/29/2020	1	A	Unknown	Likely	Kitchen	3.8	6.8	4621324	5.1	1.3	4621343
rpb1	5/6/2020	1	A	Unknown	Possible	Kitchen	1.1	9.4	4624126	0	2.5	4624146
rpb2	5/6/2020	1	A	Unknown	very Likely	Kitchen	1.1	0	4624127	2	0	4624147
rpb3	5/7/2020	1	A	Unknown	very Likely	Kitchen	0.0	37.0	4624128	0.0	9.6	4624148
rpb4	5/6/2020	1	A	Unknown	Possible	Kitchen	1.8	13.0	4624129	3.4	2.6	4624149
rpb5	5/6/2020	1	A	Unknown	Possible	Kitchen	0.0	8.7	4624130	0.0	8.3	4624150

If you tried to fill in page 1 of the report trying this page for Ever more fun!

11. TAP SAMPLING DATA

Sheet 2 of 3. Revised

Sample Location	Sample Date	Tier	Category	Building	Service Line	Tap Type	1st Liter Sample			5th Liter Sample		
		1	A	Plumbing Unknown	Very Likely = known Likely = lead nearby Unknown = Lead in area	Kitchen	Lead ug/L	Copper ug/L	Lab Sample Number	Lead ug/L	Copper mg/L ug/L	Lab Sample Number
rpb6	5/8/2020	1	A	Unknown	very Likely	Kitchen	2.4	1.7	4624131	1.3	1.2	4624151
rpb7	5/7/2020	1	A	Unknown	very Likely	Kitchen	0.0	3.2	4624132	0.0	1.1	4624152
rpb8	5/7/2020	1	A	Unknown	very Likely	Kitchen	21.0	4.4	4624133	4.2	1.5	4624153
rpb9	5/7/2020	1	A	Unknown	very Likely	Kitchen	3.6	1.1	4624134	7.9	4.4	4624154
rpb10	5/7/2020	1	A	Unknown	likely	Kitchen	5.7	2.3	4624135	14.0	2.0	4624155
rpb11	5/7/2020	1	A	Unknown	very Likely	Kitchen	9.2	2.0	4624136	23.0	2.6	4624156
rpb12	5/7/2020	1	A	Unknown	very Likely	Kitchen	8.5	6.4	4624137	5.3	1.4	4624157
rpb13	5/7/2020	1	A	Unknown	very Likely	Kitchen	0.0	4.1	4624138	0.0	1.7	4624158
rpb15	5/7/2020	1	A	Unknown	very Likely	Kitchen	6.2	48.0	4624139	4.3	50.0	4624159
rpb16	5/7/2020	1	A	Unknown	very Likely	Kitchen	2.4	1.7	4624140	1.3	1.1	4624160
rpb17	5/7/2020	1	A	Unknown	very Likely	Kitchen	0.0	1.4	4624141	0.0	5.1	4624161
rpb18	5/7/2020	1	A	Unknown	very Likely	Kitchen	0.0	1.2	4624142	0.0	1.8	4624162
rpb19	5/5/2020	1	A	Unknown	very Likely	Kitchen	0.0	2.2	4624143	0.0	1.3	4624163
rpb20	5/7/2020	1	A	Unknown	very Likely	Kitchen	100.0	5.4	4624144	5.3	1.0	4624164
rpb21	5/8/2020	1	A	Unknown	very Likely	Kitchen	3.5	230.0	4624145	1.4	20.0	4624165
RPC 1	5/13/2020	1	A	Unknown	very Likely	Kitchen	0	10	4629473	0	2	4629490
RPC 2	5/13/2020	1	A	Unknown	very Likely	Kitchen	2.4	2.1	4629474	2	1.6	4629491
RPC 3	5/13/2020	1	A	Unknown	very Likely	Kitchen	1.5	2.6	4629475	1.5	0	4629492
RPC 4	5/12/2020	1	A	Unknown	very Likely	Kitchen	29	4.4	4629476	11	1.6	4629493
RPC 5	5/12/2020	1	A	Unknown	very Likely	Kitchen	0	3.2	4629477	0	2.9	4629494
RPC 6	5/13/2020	1	A	Unknown	Likely	Kitchen	0	18	4629478	0	14	4629495
RPC 7	5/13/2020	1	A	Unknown	very Likely	Kitchen	0	2.5	4629479	0	2.8	4629496
RPC 8	5/13/2020	1	A	Unknown	very Likely	Kitchen	1.5	9.1	4629480	0	2	4629497
RPC 9	5/13/2020	1	A	Unknown	very Likely	Kitchen	22	7.3	4629481	18	7.5	4629498
RPC 10	5/13/2020	1	A	Unknown	very Likely	Kitchen	0	0	4629482	0	0	4629499
RPC 11	5/13/2020	1	A	Unknown	very Likely	Kitchen	0	7.8	4629483	0	1.4	4629500

11. TAP SAMPLING DATA

Sheet 3 of 3 Revised

Sample Location	Sample Date	Tier	Category	Building	Service Line	Tap Type	1st Liter Sample			5th Liter Sample		
		1	A	Plumbing Unknown	Very Likely = known Likely = lead nearby Unknown = Lead in area	Kitchen	Lead ug/L	Copper ug/L	Lab Sample Number	Lead ug/L	Copper mg/L ug/L	Lab Sample Number
RPC 12	5/13/2020	1	A	Unknown	very Likely	Kitchen	2.2	5	4629484	2.4	2.7	4629501
RPC 13	5/12/2020	1	A	Unknown	Likely	Kitchen	0	1.1	4629485	0	0	4629502
RPC 14	5/13/2020	1	A	Unknown	very Likely	Kitchen	0	0	4629486	8.3	2	4629503
RPC 15	5/13/2020	1	A	Unknown	very Likely	Kitchen	1.4	36	4629487	1.3	2.9	4629504
RPC 16	5/13/2020	1	A	Unknown	very Likely	Kitchen	44	3.7	4629488	81	1.8	4629505
RPC 17	5/13/2020	1	A	Unknown	very Likely	Kitchen	6.4	2.9	4629489	4.3	1.5	4629506
RPd 1	6/9/2020	1	A	Unknown	Likely	Kitchen	23	1.8	4651648	2.4	1.3	4651655
RPd 2	6/10/2020	1	A	Unknown	Likely	Kitchen	3.4	33	4651649	2.9	2.6	4651656
RPd 3	6/10/2020	1	A	Unknown	very Likely	Kitchen	11	45	4651650	3.9	28	4651657
RPd 4	6/10/2020	1	A	Unknown	very Likely	Kitchen	4.4	5.6	4651651	6.6	7.5	4651658
RPd 5	6/10/2020	1	A	Unknown	very Likely	Kitchen	1.4	3.9	4651652	1.6	1.2	4651659
RPd 6	6/10/2020	1	A	Unknown	Likely	Kitchen	0	2.2	4651653	0	2.1	4651660
RPd 7	6/10/2020	1	A	Unknown	very Likely	Kitchen	17	28	4651654	23	26	4651661

WSSN 0600 City of Benton Harbor 2nd Half 2020

Lead and Copper Report and Consumer Notice for Community Water Supply Form A -Supplies

							1st Draw		5th Draw	
Sample Location	Sample Date	Tier (1,2, 3, OT)	Category	Building Plumbing	Service Line (L, C, G, P)	Tap Type (K, B)	Lead ppb	Copper ppb	Lead ppb	Copper ppb
1292 Bishop	10/29/20	Tier 1	A	Unk	Lead	KITCHEN	1.8	1.5	1.9	1.2
931 Monroe	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	4.6	2	9.2	1.8
1129 Jennings	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	17	2	20	1.3
1354 Bishop	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	1.3	0	1.1	0
948 Ogden	10/21/20	Tier 1	A	Unk	Lead	KITCHEN	6.9	52	7.1	44
1133 Jennings	10/21/20	Tier 1	A	Unk	Lead	KITCHEN	25	4.2	25	2.7
1248 Broadway	11/09/20	Tier 1	A	Unk	Lead	KITCHEN	4.1	0	2	0
1026 Bishop	11/09/20	Tier 1	A	Unk	Lead	KITCHEN	5.5	45	4.4	2.7
1271 Pavone	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	8.6	8.4	3.9	11
1259 Bishop	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	6.3	4.2	5.1	0
285 Hastings	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	1.6	7.2	1.3	1.6
1086 Superior	10/29/20	Tier 1	A	Unk	Lead	KITCHEN	7	0	11	0
174 Hastings	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	3.4	1.1	4.4	1.2
649 Pipestone	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	31	5.7	20	14
1112 Agard	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	0	8.2	1.1	1.6
1053 Jennings	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	4.1	5.8	0	6.6
1020 Bishop	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	0	14	0	5.8
1251 Columbus	10/21/20	Tier 1	A	Unk	Lead	KITCHEN	2.6	36	5.1	42
142 Cross St.	10/20/20	Tier 1	A	Unk	Lead	KITCHEN	7	1.9	8.3	1
885 Mineral	11/09/20	Tier 1	A	Unk	Lead	KITCHEN	0	4.2	0	5.5
1110 Ogden	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	28	16	29	13
781 Buss	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	100	3.9	1.6	0
610 Superior	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	5.2	37	3	3.1
1124 Colfax	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	3.8	4.9	3.2	5
1016 LaVette	10/14/20	Tier 1	A	Unk	Lead	KITCHEN	6.1	1.6	5.1	0
1197 Agard	10/15/20	Tier 1	A	Unk	Lead	KITCHEN	2.9	0	2.9	0
999 Pearl St	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	9.8	7.3	28	16

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1178 Broadway	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	18	1.6	19	1.9
857 Ogden	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	21	0	24	0
141 Winan	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	0	2.4	1.3	4.5
768 Broadway	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	0	1.2	0	1.1
812 Lavette	10/21/20	Tier 1	A	Unk	Lead	KITCHEN	240	36	50	2.5
1264 Pavone	10/29/20	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
166 Searles	10/07/20	Tier 1	A	Unk	Lead	KITCHEN	12	2.1	13	2
819 Vineyard	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	1.2	4.8	2.4	2.4
1237 Columbus	10/06/20	Tier 1	A	Unk	Lead	KITCHEN	27	3.4	40	3.7
1115 Superior	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	3.6	51	3.9	54
578 Edwards	11/09/20	Tier 1	A	Unk	Lead	KITCHEN	0	19	6.6	150
341 Brunson	10/29/20	Tier 1	A	Unk	Lead	KITCHEN	0	1.5	0	2
1011 Pearl St	10/21/20	Tier 1	A	Unk	Lead	KITCHEN	2.1	6.5	1.8	2.4
1191 Pavone	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	0	1.2	1.6	2.1
1069 Hurd	11/10/20	Tier 1	A	Unk	Lead	KITCHEN	2.9	25	3.7	1.5
1225 Colfax	11/09/20	Tier 1	A	Unk	Lead	KITCHEN	4.5	2.9	3.2	0
1289 Bishop	10/21/20	Tier 1	A	Unk	Lead	KITCHEN	8.7	1.1	4.2	0
1291 Superior St	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	2	0	2	0
1244 Jennings	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	1	0	1	0
185 Parker Ave	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	1	0	5	0
1161 Union St	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	3	0	5	0
504 Territorial Rd	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
552 Buena Vista	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	2	0	2	0
1143 Union	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	5	0	4	0
854 LaSalle St	12/3/2020	Tier 1	A	Unk	Lead	KITCHEN	1	0	1	0
232 Hastings Ave	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
201 Garfield	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	1	0	1	0
400 John Street	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	1	0
204 Garfield	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
1043 Agard	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	4	0	2	0
1037 Pearl	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
582 Niles	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	2	0
660 McGuigan	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
1167 Broadway	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
1066 Monroe	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
855 Lavette	12/3/2020	Tier 1	A	Unk	Lead	KITCHEN	0	0	0	0
565 Clay (stagnation	12/4/2020	Tier 1	A	Unk	Lead	KITCHEN	2	0	2	0

RECEIVED
Feb 3 2021
EGLE-DWEHD-CWSS-LCU

Lab Code	Name	Contact	Numb	Street
BHFree 61	[redacted]	[redacted]	1146	Agard
BHEAM 126	[redacted]	[redacted]	665	Beachwood Path
BHEAM 124	[redacted]	[redacted]	1125	Bishop
WA3	[redacted]	[redacted]	1281	Bishop
BHFEA 5	[redacted]	[redacted]	1165	Bishop Ave
BHFree 106	[redacted]	[redacted]	692	Broadway
BHFree 21	[redacted]	[redacted]	759	Broadway
BH10	[redacted]	[redacted]	1034	Broadway
BHFEA 49	[redacted]	[redacted]	1046	Broadway
BHFree 59	[redacted]	[redacted]	1197	Broadway
BHFree 38	[redacted]	[redacted]	553	Broadway Ave
BHEAM 130	[redacted]	[redacted]	837	Broadway St.
BHEAM 114	[redacted]	[redacted]	847	Broadway St.
BH2	[redacted]	[redacted]	786	Buss
BHFree 50	[redacted]	[redacted]	843	Buss
BHFree 98	[redacted]	[redacted]	555	Cass St
BHFree 73	[redacted]	[redacted]	453	Cherry St
BHFree 107	[redacted]	[redacted]	326	Colby Ave
BHEAM 95	[redacted]	[redacted]	709	Colfax
BHFEA 46	[redacted]	[redacted]	1031	Colfax
BHFree 54	[redacted]	[redacted]	601	Colfax Ave
BHFree 88	[redacted]	[redacted]	646	Colfax Ave
BHFree 35	[redacted]	[redacted]	869	Colfax Ave
BHFree 70	[redacted]	[redacted]	867	Columbus
BHFree 72	[redacted]	[redacted]	988	Columbus
BHe21	[redacted]	[redacted]	1196	Columbus
BHFree 76	[redacted]	[redacted]	1294	Columbus
BHEAM 142	[redacted]	[redacted]	1035	Columbus Ave.
BHFree 34	[redacted]	[redacted]	584	E Main
BHFree 43	[redacted]	[redacted]	777	E Main St
BHFree 31	[redacted]	[redacted]	803	E Vineyard Ave
BHFree 5	[redacted]	[redacted]	696	E. High
WA5	[redacted]	[redacted]	676	East High
BHFree 27	[redacted]	[redacted]	534	East Main
BHEAM 159	[redacted]	[redacted]	852	East Vineyard Ave.
BHEAM 156	[redacted]	[redacted]	839	Edgecumbe
BHFEA 39	[redacted]	[redacted]	550	Edward Ave
BHFree 68	[redacted]	[redacted]	613	Empire Ave
BHFEA 31	[redacted]	[redacted]	463	Foster Ave
BHFEA 21	[redacted]	[redacted]	110	Grand Blvd
BHFree 39	[redacted]	[redacted]	120	Grand Blvd
BHEAM 158	[redacted]	[redacted]	533	Green Ave.
BHFree 18	[redacted]	[redacted]	546	Heck Court
BHFree 83	[redacted]	[redacted]	530	Heck Ct
BHFree 15	[redacted]	[redacted]	367	High
BHEAM 167	[redacted]	[redacted]	742	Lasalle
BHEAM 121	[redacted]	[redacted]	986	Lavette
BHEAM 135	[redacted]	[redacted]	344	Lincoln St.
BHFree 6	[redacted]	[redacted]	738	Madison
BHFree 16	[redacted]	[redacted]	452	Maple
BHFree 13	[redacted]	[redacted]	970	McAllister
BHFEA 30	[redacted]	[redacted]	768	Monroe St
BHFEA 33	[redacted]	[redacted]	395	Morton

BHFree 47	[redacted]	309	N Hull St
BH21		127	North McCord
BHP3		146	North McCord
WA2		471	North Winans
BHEAM 120		220	Oden
BHFree 26		1051	Ogden
BHFree 62		1246	Ogden Ave
BHFEA 32		1638	Paw Paw Ave
BHFree 10		888	Pearl
BHEAM 111		633	Pipestone
BHFree 58		359	Pipestone St
BHEAM 113		575	Ridgeway
BHe23		127	South Hull
BHFEA 4		134	Territorial
BHFEA 2		504	Territorial
BHFree 80		650	Territorial
BHFree 90		190	Territorial Rd #2-B
BHFree 105		376	W Main Apt 205
BHFree 66		376	W Main St
BHFree 89		200	Water St Unit2
BH15		630	Wauconda
BHEAM 173		838	Wauconda
BHEAM 125		898	Wauconda
BHFree 45		784	Waukonda
BHEAM 134		307	Windsor Rd.
BHFree 30		211	a East Main
BH59		286	Brunson
BH45		588	Cass
BHFree 81		580	E Empire
BHFree 42		213	E Wall St
BH24		217	E. Main Apt C
WA7		711	East Main
BH35		470	Edwards
BH39		1094	McAllister
BHEAM 144		930	Monroe
BHEA88		138	North McCord
BH36		1271	Ogden
BHM2		1282	Ogden
BHFree 11		1120	Pearl
BHFree 7		1260	Pearl
BH43		308	Stevens
BH38		654	Thresher
BH53		442	Vineyard
BH54		463	Vineyard
BHFree 79		216	W Empire
BH16		627	W. Main
BH15		643	W. Main
BH58		559	Waukonda
BHEA75		284	West Empire
BH20		753	Broadway
BHFEA 28		478	Vineyard
BH56		1191	Pavone
BHFEA 47		988	Pearl
BH60		235	Park Ave
BHFEA 35		836	E Vineyard

BH28	[redacted]	801 LaSalle
BH55		688 S. Fair
BH42		155 Smith Ct
BHFEA 42		1141 MCAllister
BHEAM 136		1148 Agard
BHEAM 97		1186 Agard
BHFEA 25		161 Apple St
BHFree 97		977 Bishop
BHFree 94		412 Broadway
BHFree 49		430 Clay
BHFree 36		831 Colfax Ave
BHFree 28		819 East Vineyard
BH24		525 Edwards
BHFree 60		1086 Jennings
BHFree 91		770 LaSalle
BHFree 32		846 Mineral Ave
BHFree 40		111 N. Seeley
BHEAM 177		830 Nate Wells Drive
BHFree 64		400 Packard
BHFree 52		220 Robins
BHFEA 51		160 Smith Ct
BHEAM 123		781 Thresher
BHFree 92		807 Wauceda Ave
BHFEA 26		956 Superior
BHFEA 44		141 N Winans
BH20		156 North Seely
BH17		824 Ogden
BHFEA 13		758 Pearl
BHFEA 43		974 Jennings
BH11		465 Packard
BH47		554 Pearl
BHFree 14		128 Apple
BHEAM 163		875 Broadway
BHFree 96		576 Colfax
BHFree 2		1025 Colfax
BHEAM 164		995 Colfax Ave.
BHFree 24		577 East Main
BHEAM 147		768 Lavette
BHFEA 36		1264 Monroe
BHEAM 99		986 Pavone
BHFree 95		614 Pearl
BHFree 46		805 Pearl St
BHFree 77		665 Pipestone St
BH27		1022 Hurd
BHFEA 24		750 Pearl
BHFree 101		1049 Colfax
BHFree 63		531 Columbus
BHFree 3		1228 Pavone
BHFree 19		1019 Pearl
BHFree 87		847 Wauceda Ave
BHFEA 27		1362 Bishop
BH3		350 Cross
BHFEA 15		695 Pearl St
BH25		1014 Superior
BH33		972 McAllister

BH8	[redacted]	994	McAllister
BH17		1181	Ogden
BH29		1046	Agard
BH12		617	Thresher
BH41		875	Warwick
BHEAM 116		1068	Agard
BHEAM 93		1034	Bishop
BHEAM 100		1159	Colfax
BHFree 17		565	Columbus
BHFree 93		1152	Jennings
BHFree 100		1230	Ogden
BHFree 51		1266	Ogden Ave
BHFree 86		1264	Pavone St
BHFEA 1		964	Pearl St
WA6		210	Searles
BHEAM 190		782	Terrritorial Road
BHFree 65		1229	Union Ave
BHFEA 3		697	Buss
BHFEA 40		1292	Bishop
BHFEA 38		341	Brunson
BH14		1384	Union
BHM1		285	Hastings
BHFEA 9		647	Highland
BHEAM 178		449	East Main St.
BHFree 85		523	Heck Ct
BHFree 104		161	Kline
BHEAM 170		831	Lasalle
BHe24		507	Green
BHFEA 6		174	Hastings
BHFEA 11		1086	Superior
BHFEA 8		668	E Empire
BH52		827	McAllister
BH50		1110	Bishop
BHFree 12		546	Columbus
BHFree 57		1122	Jennings Ave
BHFree 48		815	Pearl PO box 875
WA1		884	Waceda
BH31		946	Pavone
BH32		719	McAllister
BH18		1030	Union
BHFree 41		1237	Columbus Ave
BHFree 8		1152	Monroe
BHFree 78		1128	Ogden Ave
BHFree 75		539	Pearl St
BH22		212	Parker
BH37		956	Ogden
BH44		941	Broadway
BH19		1369	Bishop
BHFree 82		370	N McCord St
BHFree 74		255	Parker Ave
BHFree 37		150	Searles
BHFree 55		2136	Superior
BH34		1218	Monroe
BHFEA 48		1011	Pearl St
BH57		166	Parker

BHFree 103	[redacted]	781	Buss Ave
BHEA70		805	East Vineyard
BHFree 25		475	Green
BHEAM 141		633	Highland
BHP2		133	Kline
BHFree 69		538	Columbus Ave
BH32		981	McAllister
BH30		969	Monroe
BHEAM 151		741	Pipestone
BHEAM 143		1248	Broadway
BHFree 1		1251	Columbus
BHEAM 128		1267	Columbus
BHFEA 23		1175	Jennings
BHFree 71		1229	Monroe St
BH29		947	Pearl
BH25		1055	Agard
BHEA74		1081	Jennings
BHFree 29		812	Lavette
BHEAM 191		366	North McCord
BHFEA 16		1212	Pearl St
BHFree 9		1112	Agard
BH49		1188	Agard
BH28		1096	Columbus
BH30		1039	Hurd
BHEAM 94		1315	Jennings
BH26		961	Monroe
BHFree 4		610	Superior
WA4		675	East High
BHFEA 18		1016	LaVette
BH6		1190	McAllister
BHFree 53		948	Ogden
BHFEA 14		955	Ogden
BHFree 84		1259	Bishop Ave
BHFree 44		860	Columbus St
BH5		155	Kline
BHFree 22		1271	Pavone
BHFEA 50		1197	Agard
BHFree 33		1053	Jennings
BHEAM 139		1174	Broadway
BH31		468	Colfax
BHFEA 22		1124	Colfax Ave
BH46		872	McAllister
BH1		805	McGuigan
BHFEA 29		1164	Monroe
BHFree 56		142	Cross St
BHFEA 52		1129	Jennings
BH16		838	Lavette
BHP1		1094	Superior
BH33		1050	Columbus
BHFEA 41		1110	Ogden
BH51		1109	Pavone
BH23		918	Colfax
BHEAM 137		828	Columbus Ave.
BHFree 23		166	Searles
BHFEA 37		1354	Bishop Ave

BHFEA 7	[redacted]	931	Monroe
Bhe22		182	Searles
BHFEA 34		134	Cross St
BHD1		791	Buss
BHFEA 12		1133	Jennings
BHFEA 17		768	Pearl St
BH48		152	Robbins
BHFree 67		1289	Bishop
BHFEA 10		1083	Superior
BH40		1237	Superior
BHFree 102		999	Pearl St
BH23		554	Columbus
BHFree 20		1159	Lavette
BHFree 99		649	Pipestone
BHFEA 19		933	Ogden Ave
BHFEA 20		857	Ogden
BHFEA 45		1178	Broadway
BH21		875	Mineral
BH19		1180	Lavette
BHEAM 138		1294	Broadway
BHEAM 129		1120	Hurd Ave.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
DRINKING WATER AND MUNICIPAL ASSISTANCE DIVISION

LEAD AND COPPER REPORT AND CONSUMER NOTICE OF LEAD AND COPPER RESULTS CERTIFICATE FOR COMMUNITY WATER SUPPLY

Issued under authority of 1976 PA 399, MCL 325.1001 et seq., and Administrative Rules, as amended.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within 10 days after the end of the monitoring period. This form may be used to meet this requirement. Form instructions available on pages 5 and 6. Submit the information to the appropriate Department of Environmental Quality (DEQ) district office.

1. Supply Name: City of Benton Harbor MI.
2. County: Berrien 3. WSSN: **0600**
4. Population: 8800 5. Monitoring Period: From: 6/1/2018 To: 9/30/2018
6. Minimum # of Samples Required: 30 7. # of Samples Taken: 30
8. Name of Certified Laboratory: Eurofins Eaton Analytical, 210 Hill St, South Bend IN.

9. SAMPLE CRITERIA:

Yes	No	NA		
☒	☐		Are all samples from Tier 1 sites? Yes to our knowledge	For more information see *Instructions* item 11 "Tier and Sample Category" on pages 5-6.
☒	☐		Did you prioritize sample collection according to the following: • Tier 1 sites must be used unless insufficient Tier 1 sites available. • If insufficient Tier 1 sites available, then Tier 2 sites must be used. • If insufficient Tier 2 sites, then Tier 3 sites must be used. • If no Tier 1, 2, or 3 sites are available, sites must be representative of plumbing materials typically found throughout the water system.	
☒	☐	☐	If Tier 1 or 2 sites used, were at least 50% of samples from sites with lead service lines? **If no, explain** (attach additional pages if needed): To the best of our knowledge these sites had lead service lines, even if City Service Lines only.	
☐	☒		Were the same sampling sites used as in the previous monitoring period? **If no, explain** (attach additional pages if needed): Many of the homes in the original sampling pool were gone, vacant or refused to participate.	

Additional comments: There were 26 sites used from the 2015 sampling period. 2 of those sites were removed from the sample list since their service lines had been replaced with copper, leaving 24 available from 2015. Many former participants chose not to help us (mostly by not leaving a sample for us to pick up). 6 additional sites were added to the list to make up the required 30.

10. SIGNATURE:

Name: Michael O'Malley Michael O'Malley Signature:

Title: Benton Harbor Water Supt Phone: (269) 363-0575 Date: 10/7/18

11. TAP SAMPLING DATA: (Use additional sheets as needed) Water Supply Name: City of Benton Harbor WSSN: 0600

Sample Location	Sample Date	Tier (1,2,3,O)[1]	Category (see below)[2]	Service Line (L,C,G,P)[3]	Building Plumbing (L,C,G,P)[3]	Tap Type (K,B)[4]	Lead ☐ mg/L ☒ ug/L	Copper ☐ mg/L ☒ ug/L	Lab Sample Number
BH2	9/18/18	1	H	L *	NA	B	0	2.3	4064980
BH10	9/18/18	1	H	L *	NA	B	0	61	4067554
BH15	9/18/18	1	H	L *	NA	B	0	2.3	4064969
BH21	9/18/18	1	H	L *	NA	B	0	16	4064967
BHP3	9/24/18	1	H	L *	NA	B	0	60	4067562
BH24	9/18/18	1	H	L *	NA	B	2	22	4064978
BH20	9/18/18	1	H	L *	NA	B	2.4	72	4064977
BH17	9/18/18	1	H	L *	NA	B	2.5	4.1	4067553
BH11	9/18/18	1	H	L *	NA	B	2.7	9.3	4064973
BH3	9/18/18	1	H	L *	NA	B	4.1	4.4	4064975
BH8	9/18/18	1	H	L *	NA	B	4.4	4.2	4064970
BH33	9/18/18	1	H	L *	NA	B	4.4	18	4064981
BH29	9/18/18	1	H	L *	NA	B	4.7	14	4067552
BH12	9/18/18	1	H	L *	NA	B	4.9	2.5	4064968
BH14	9/18/18	1	H	L *	NA	B	5.5	4.1	4064972
BHM1	9/24/18	1	H	L *	NA	B	5.8	3.3	4067558
BHP2	9/23/18	1	H	L *	NA	B	10	15	4067561
BH32	9/19/18	1	H	L *	NA	B	11	62	4064964
BH25	9/19/18	1	H	L *	NA	B	13	47	4067556
BH28	9/18/18	1	H	L *	NA	B	14	7	4064976
BH30	9/18/18	1	H	L *	NA	B	14	2	4064971
BH6	9/18/18	1	H	L *	NA	B	16	8.4	4064974
BH5	9/18/18	1	H	L *	NA	B	17	14	4064979
BH1	9/19/18	1	H	C/G	NA	B	19	6.4	4064965

BH31	9/18/18	1	H	L *	NA	B	19	2.1	4064966
BH16	9/18/18	1	H	L *	NA	B	21	86	4064982
BHP1	9/24/18	1	H	L *	NA	B	22	6.2	4067560
BHD1	9/24/18	1	H	L *	NA	B	29	48	4067559
BH23	9/18/18	1	H	L *	NA	B	40	11	4067557
BH19	9/18/18	1	H	L *	NA	B	60	1.5	4067555

[1] Tier	[2] Category	Description
Tier 1	A	Single Family w/ lead service line
	B	Single Family w/ copper plumbing with lead solder installed after 1982 and before 1989
	C	Single Family w/ interior lead plumbing
	D	Multi-family Residence (MFR) if MFRs comprise at least 20% of total service connections.
	* If a supply has lead service lines (LSL), at least 50% of sites must have a LSL. Sites with lead goosenecks/pigtails are Tier 1 sites.	
Tier 2	E	Multi Family or buildings w/ lead service line
	F	Multi Family or buildings w/ copper plumbing with lead solder installed after 1982 and before 1989
	G	Multi Family or buildings w/ interior lead plumbing
Tier 3	H	Single Family w/ copper plumbing with lead solder installed before 1983
Other	OT	If no Tier 1, 2, 3 sites, use sites representative of plumbing commonly found throughout the supply.

[3] Material	[4] Tap Type
L = Lead C = Copper G = Galvanized P = Plastic	K = Kitchen Sink B = Bathroom Sink O = Other (not an option for residential sites)

Notes: BH

There were not enough data lines. I had to add enough for 30 samples.
And nowhere was a question regarding 90th percentile: The 90th Sample for Lead is #27: at 48 ppt. at Site BHD1

L* means presumed lead service line, but unknown. A great number of the known and unknown of Benton Harbor's water services are:
Tapped with Brass; Lead to Brass Curb Stop and Galvanized beyond.
Or for newer construction: Tapped with brass; Copper to Brass Curb Stop and unknown beyond and into house.

NA means that we did not enter the household; and that material records in the homes were not accessed; or available.

C/G means the one site we know to have a new lead service lead replaced with copper and connected to a galvanized pipe beyond the Curb Stop Valve.

You may notice that the sites and lab numbers vary as the entire data pool above is sorted on Lead (lowest to highest).
And finally, the lab numbers vary in 2 separate sequences, since there were 2 deliveries to the lab.

10/1/18

eurofins | Eaton Analytical

110 South Hill Street
South Bend, IN 46617
Tel: (574) 233-4777
Fax: (574) 233-8207
1 800 332 4345

Benton Harbor MI0600
Lead & Copper Results
Pool 1 to Eurofins
in South Bend IN
delivered 9/19/18

Laboratory Report

Client: City of Benton Harbor

Attn: Michael O'Malley
200 East Wall Street
Benton Harbor, MI 49002

Report: 430599
Priority: Standard Written
Status: Final
PWS ID: MI0600

Sample Information

EEA ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
4064964	BH 32	200.8	09/19/18 13:15	Client	09/21/18 08:45
4064965	BH 1	200.8	09/19/18 07:30	Client	09/21/18 08:45
4064966	BH 31	200.8	09/18/18 06:25	Client	09/21/18 08:45
4064967	BH 21	200.8	09/18/18 07:05	Client	09/21/18 08:45
4064968	BH 12	200.8	09/19/18 04:09	Client	09/21/18 08:45
4064969	BH 15	200.8	09/18/18 05:00	Client	09/21/18 08:45
4064970	BH 8	200.8	09/18/18 07:30	Client	09/21/18 08:45
4064971	BH 30	200.8	09/18/18 10:24	Client	09/21/18 08:45
4064972	BH 14	200.8	09/19/18 06:05	Client	09/21/18 08:45
4064973	BH 11	200.8	09/18/18 07:56	Client	09/21/18 08:45
4064974	BH 6	200.8	09/18/18 05:00	Client	09/21/18 08:45
4064975	BH 3	200.8	09/18/18 08:00	Client	09/21/18 08:45
4064976	BH 28	200.8	09/18/18 06:47	Client	09/21/18 08:45
4064977	BH 20	200.8	09/18/18 06:42	Client	09/21/18 08:45
4064978	BH 24	200.8	09/18/18 07:00	Client	09/21/18 08:45
4064979	BH 5	200.8	09/18/18 08:00	Client	09/21/18 08:45
4064980	BH 2	200.8	09/18/18 05:30	Client	09/21/18 08:45
4064981	BH 33	200.8	09/19/18 05:15	Client	09/21/18 08:45
4064982	BH 16	200.8	09/17/18 04:00	Client	09/21/18 08:45

Report Summary

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

We appreciate the opportunity to provide you with this analysis. If you have any questions concerning this report, please do not hesitate to call Nathan Trowbridge at (574) 233-4777.

Note: This report may not be reproduced, except in full, without written approval from EEA.

Note: I did not ask for written Approval,
10/8/18

BH did NOT use the MDEQ Lab, in Lansing, would not have been done in time!

Pool #2

CS. Manager

Authorized Signature

Title

10/04/2018

Date

Client Name: City of Benton Harbor

Report #: 430599

Sampling Point: BH 32

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	62	ug/L	---	09/29/18 18:11	4064964
7439-92-1	Lead	200.8	15 !	1.0	11	ug/L	---	09/29/18 18:11	4064964

Sampling Point: BH 1

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	6.4	ug/L	---	09/29/18 18:13	4064965
7439-92-1	Lead	200.8	15 !	1.0	19	ug/L	---	09/29/18 18:13	4064965

Sampling Point: BH 31

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	2.1	ug/L	---	09/29/18 18:16	4064966
7439-92-1	Lead	200.8	15 !	1.0	4.9	ug/L	---	09/29/18 18:16	4064966

Sampling Point: BH 21

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	16	ug/L	---	09/29/18 18:18	4064967
7439-92-1	Lead	200.8	15 !	1.0	< 1.0	ug/L	---	09/29/18 18:18	4064967

Sampling Point: BH 12

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	2.5	ug/L	---	09/29/18 18:20	4064968
7439-92-1	Lead	200.8	15 !	1.0	4.9	ug/L	---	09/29/18 18:20	4064968

Client Name: City of Benton Harbor

Pool 1, 4

Report #: 430599

Sampling Point: BH 15

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	2.3	ug/L	---	09/29/18 18:23	4064969
7439-92-1	Lead	200.8	15 !	1.0	< 1.0	ug/L	---	09/29/18 18:23	4064969

Sampling Point: BH 8

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	4.2	ug/L	---	09/29/18 18:25	4064970
7439-92-1	Lead	200.8	15 !	1.0	4.4	ug/L	---	09/29/18 18:25	4064970

Sampling Point: BH 30

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	2.0	ug/L	---	09/29/18 18:38	4064971
7439-92-1	Lead	200.8	15 !	1.0	14	ug/L	---	09/29/18 18:38	4064971

Sampling Point: BH 14

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	4.1	ug/L	---	09/29/18 18:45	4064972
7439-92-1	Lead	200.8	15 !	1.0	5.5	ug/L	---	09/29/18 18:45	4064972

Sampling Point: BH 11

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	9.3	ug/L	---	09/29/18 18:47	4064973
7439-92-1	Lead	200.8	15 !	1.0	2.7	ug/L	---	09/29/18 18:47	4064973

Client Name: City of Benton Harbor

Pool 1, 5

Report #: 430599

Sampling Point: BH 6

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	8.4	ug/L	---	09/29/18 18:50	4064974
7439-92-1	Lead	200.8	15 !	1.0	16	ug/L	---	09/29/18 18:50	4064974

Sampling Point: BH 3

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	44	ug/L	---	09/29/18 18:52	4064975
7439-92-1	Lead	200.8	15 !	1.0	4.1	ug/L	---	09/29/18 18:52	4064975

Sampling Point: BH 28

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	7.0	ug/L	---	09/29/18 18:55	4064976
7439-92-1	Lead	200.8	15 !	1.0	14	ug/L	---	09/29/18 18:55	4064976

Sampling Point: BH 20

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	72	ug/L	---	09/29/18 18:57	4064977
7439-92-1	Lead	200.8	15 !	1.0	2.4	ug/L	---	09/29/18 18:57	4064977

Sampling Point: BH 24

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	22	ug/L	---	09/29/18 19:00	4064978
7439-92-1	Lead	200.8	15 !	1.0	2.0	ug/L	---	09/29/18 19:00	4064978

Client Name: City of Benton Harbor

Pool 1, 6

Report #: 430599

Sampling Point: BH 5

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	14	ug/L	---	09/29/18 19:02	4064979
7439-92-1	Lead	200.8	15 !	1.0	17	ug/L	---	09/29/18 19:02	4064979

Sampling Point: BH 2

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	2.3	ug/L	---	09/29/18 19:05	4064980
7439-92-1	Lead	200.8	15 !	1.0	< 1.0	ug/L	---	09/29/18 19:05	4064980

Sampling Point: BH 33

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	18	ug/L	---	09/29/18 19:12	4064981
7439-92-1	Lead	200.8	15 !	1.0	4.4	ug/L	---	09/29/18 19:12	4064981

Sampling Point: BH 16

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	86	ug/L	---	09/29/18 19:19	4064982
7439-92-1	Lead	200.8	15 !	1.0	21	ug/L	---	09/29/18 19:19	4064982

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

eurofins | Eaton Analytical

110 South Hill Street
South Bend, IN 46617
Tel: (574) 233-4777
Fax: (574) 233-8207
1 800 332 4345

3rd Water
Lead & Copper Test
Pool 2
Deliver to lab
9/24/18

Laboratory Report

Client: City of Benton Harbor

Attn: Michael O'Malley
200 East Wall Street
Benton Harbor, MI 49002

Report: 430776
Priority: Standard Written
Status: Final
PWS ID: MI0600

Sample Information

EEA ID #	Client ID	Method	Collected Date / Time	Collected By:	Received Date / Time
4067552	BH29	200.8	09/18/18 03:15	Client	09/25/18 14:20
4067553	BH17	200.8	09/18/18 07:00	Client	09/25/18 14:20
4067554	BH10	200.8	09/18/18 07:00	Client	09/25/18 14:20
4067555	BH19	200.8	09/18/18 07:15	Client	09/25/18 14:20
4067556	BH25	200.8	09/19/18 07:15	Client	09/25/18 14:20
4067557	BH23	200.8	09/18/18 16:20	Client	09/25/18 14:20
4067558	BHM1	200.8	09/24/18 04:30	Client	09/25/18 14:20
4067559	BHD1	200.8	09/24/18 15:00	Client	09/25/18 14:20
4067560	BHP1	200.8	09/24/18 08:30	Client	09/25/18 14:20
4067561	BHP2	200.8	09/23/18 06:00	Client	09/25/18 14:20
4067562	BHP3	200.8	09/24/18 07:00	Client	09/25/18 14:20

Report Summary

Detailed quantitative results are presented on the following pages. The results presented relate only to the samples provided for analysis.

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Notice: I did not ask for written approval
10/10/18

CS Manager

Authorized Signature — Title — 10/04/2018 Date

Client Name: City of Benton Harbor
Report #: 430776

Client Name: City of Benton Harbor

Pool 2, 1

Report #: 430776

Sampling Point: BH29

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	14	ug/L	---	10/01/18 21:49	4067552
7439-92-1	Lead	200.8	15 !	1.0	4.7	ug/L	---	10/01/18 21:49	4067552

Sampling Point: BH17

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	4.1	ug/L	---	10/01/18 21:58	4067553
7439-92-1	Lead	200.8	15 !	1.0	2.5	ug/L	---	10/01/18 21:58	4067553

Sampling Point: BH10

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	61	ug/L	---	10/01/18 22:01	4067554
7439-92-1	Lead	200.8	15 !	1.0	< 1.0	ug/L	---	10/01/18 22:01	4067554

Sampling Point: BH19

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	1.5	ug/L	---	10/01/18 22:04	4067555
7439-92-1	Lead	200.8	15 !	1.0	60	ug/L	---	10/01/18 22:04	4067555

Sampling Point: BH25

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	47	ug/L	---	10/01/18 22:07	4067556
7439-92-1	Lead	200.8	15 !	1.0	13	ug/L	---	10/01/18 22:07	4067556

Client Name: City of Benton Harbor

Pool 2, 2

Report #: 430776

Sampling Point: BH23

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	11	ug/L	---	10/01/18 22:10	4067557
7439-92-1	Lead	200.8	15 !	1.0	40	ug/L	---	10/01/18 22:10	4067557

Sampling Point: BHM1

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	3.3	ug/L	---	10/01/18 22:13	4067558
7439-92-1	Lead	200.8	15 !	1.0	5.8	ug/L	---	10/01/18 22:13	4067558

Sampling Point: BHD1

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	48	ug/L	---	10/01/18 22:16	4067559
7439-92-1	Lead	200.8	15 !	1.0	29	ug/L	---	10/01/18 22:16	4067559

Sampling Point: BHP1

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	6.2	ug/L	---	10/01/18 22:19	4067560
7439-92-1	Lead	200.8	15 !	1.0	22	ug/L	---	10/01/18 22:19	4067560

Sampling Point: BHP2

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	15	ug/L	---	10/01/18 22:22	4067561
7439-92-1	Lead	200.8	15 !	1.0	10	ug/L	---	10/01/18 22:22	4067561

Client Name: City of Benton Harbor

Pool 2, 3

Report #: 430776

Sampling Point: BHP3

PWS ID: MI0600

Lead and Copper									
Analyte ID #	Analyte	Method	Reg Limit	MRL†	Result	Units	Preparation Date	Analyzed	EEA ID #
7440-50-8	Copper	200.8	1300 !	1.0	**6.0**	ug/L	---	10/01/18 22:30	4067562
7439-92-1	Lead	200.8	15 !	1.0	< 1.0	ug/L	---	10/01/18 22:30	4067562

† EEA has demonstrated it can achieve these report limits in reagent water, but can not document them in all sample matrices.

Reg Limit Type:	MCL	SMCL	AL
Symbol:	*	^	!

						Total Met
Database ID	**Sampled Addresses**	**City**	**County**	**Water source**	**Sample collection dates**	**Cu (µg/L)**
144	1180 LaVette Ave	Benton Harbor	Berrien	Surface Water	4/25/2019	
280	554 Columbus Ave	Benton Harbor	Berrien	Surface Water	2/8/2019	
388	875 Mineral Ave	Benton Harbor	Berrien	Surface Water	3/18/2019	
395	918 Colfax Ave	Benton Harbor	Berrien	Surface Water	2/26/2019	
386	872 McAlister ST	Benton Harbor	Berrien	Surface Water	3/22/2019	
203	152 Robbins Ave	Benton Harbor	Berrien	Surface Water	2/8/2019	
116	1109 Pavone ST	Benton Harbor	Berrien	Surface Water	2/25/2019	
217	182 Searles Ave	Benton Harbor	Berrien	Surface Water	3/5/2019	
283	555 Edwards Ave	Benton Harbor	Berrien	Surface Water	2/12/2019	
286	563 Pipestone ST	Benton Harbor	Berrien	Surface Water	2/12/2019	
378	851 E High ST	Benton Harbor	Berrien	Surface Water	4/29/2019	
362	828 Columbus AVE	Benton Harbor	Berrien	Surface Water	2/22/2019	
141	1174 Broadway	Benton Harbor	Berrien	Surface Water	3/26/2019	
183	1294 Broadway	Benton Harbor	Berrien	Surface Water	3/11/2019	
129	1133 Jennings AVE	Benton Harbor	Berrien	Surface Water	2/25/2019	
87	1016 LaVette AVE	Benton Harbor	Berrien	Surface Water	1/25/2019	
399	933 Ogden Ave	Benton Harbor	Berrien	Surface Water	2/8/2019	
380	857 Ogden AVE	Benton Harbor	Berrien	Surface Water	2/22/2019	
124	1124 Colfax Ave	Benton Harbor	Berrien	Surface Water	1/29/2019	
190	134 Cross St	Benton Harbor	Berrien	Surface Water	1/29/2019	
192	1354 Bishop Ave	Benton Harbor	Berrien	Surface Water	3/19/2019	
119	1110 Ogden AVE	Benton Harbor	Berrien	Surface Water	1/24/2019	
143	1178 Broadway	Benton Harbor	Berrien	Surface Water	3/26/2019	
127	1129 Jennings AVE	Benton Harbor	Berrien	Surface Water	1/25/2019	
398	931 Monroe ST	Benton Harbor	Berrien	Surface Water	3/5/2019	
423	999 Pearl St	Benton Harbor	Berrien	Surface Water	1/25/2019	
138	1159 LaVette AVE	Benton Harbor	Berrien	Surface Water	2/12/2019	
177	1271 Pavone ST	Benton Harbor	Berrien	Surface Water	3/26/2019	
213	166 Searles AVE	Benton Harbor	Berrien	Surface Water	4/8/2019	
104	1053 Jennings AVE	Benton Harbor	Berrien	Surface Water	4/9/2019	
403	948 Ogden AVE	Benton Harbor	Berrien	Surface Water	4/9/2019	
199	142 Cross St	Benton Harbor	Berrien	Surface Water	2/25/2019	
181	1289 Bishop AVE	Benton Harbor	Berrien	Surface Water	2/11/2019	
168	1259 Bishop Ave	Benton Harbor	Berrien	Surface Water	1/17/2019	
377	849 Pipestone ST	Benton Harbor	Berrien	Surface Water	1/22/2019	
112	1093 Superior ST	Benton Harbor	Berrien	Surface Water	3/19/2019	
313	675 E High ST	Benton Harbor	Berrien	Surface Water	4/25/2019	
6743	1080 LaVette AVE	Benton Harbor	Berrien	Surface Water	2/26/2019	
261	468 Colfax AVE	Benton Harbor	Berrien	Surface Water	3/5/2019	
130	114 Robbins	Benton Harbor	Berrien	Surface Water	8/30/2019	
372	846 E Britain AVE	Benton Harbor	Berrien	Surface Water	8/20/2019	

382	860 Pitkins AVE	Benton Harbor	Berrien	Surface Water	8/30/2019	
102	1050 Columbus AVE	Benton Harbor	Berrien	Surface Water	8/23/2019	
6857	1015 Agard Ave	Benton Harbor	Berrien	Surface Water	7/29/2020	
388	875 Mineral AVE	Benton Harbor	Berrien	Surface Water	7/29/2020	
	1161 Union Ave	Benton Harbor	Berrien	Surface Water	8/5/2020	31.0
	1143 Union AVE	Benton Harbor	Berrien	Surface Water	8/6/2020	39.0
	854 Lasalle ST	Benton Harbor	Berrien	Surface Water	8/5/2020	4.6
6880	135 Hastings AVE	Benton Harbor	Berrien	Surface Water	2/5/2020	
6858	100 Hastings AVE	Benton Harbor	Berrien	Surface Water	1/16/2020	
197	141 Hastings AVE	Benton Harbor	Berrien	Surface Water	1/29/2020	2.9

Notes

als			Dissolved Metals				Particulates				General Chemistry	
Fe (µg/L)	Pb (µg/L)	Mn (mg/L)	Cu (µg/L)	Fe (µg/L)	Pb (µg/L)	Mn (mg/L)	Cu (µg/L)	Fe (µg/L)	Pb (µg/L)	Mn (mg/L)	Alkalinity (mg/L)	Ca (mg/L)

56.0	7.4	ND	18.0	20.0	1.3	ND	13.0	36.0	6.1	ND	110.0	37.0
120.0	13.0	ND	2.5	20.0	1.2	ND	1.4	100.0	12.0	ND	110.0	39.0
86.0	3.6	ND	3.5	20.0	1.0	ND	1.1	66.0	2.6	ND	110.0	36.0
ND	1.2	ND	27.0	ND	1.0	ND	0.2	ND	0.2	ND	130.0	43.0

ND: Not detected

parameters										Pb - First draw sample	
Chloride (mg/L)	Conductivity (umhos/cm)	Hardness (mg/L)	Mg (mg/L)	OrthoP (mg/L)	pH	SO_4 (mg/L)	TDS (mg/L)	Turbidity (NTU)	CSMR	PbB1P1	PbB1P2
										4	3
										7	3
										13	17
										16	16
										7	6
										16	16
										27	18
										9	11
										192	708
										11	12
										5	5
										9	10
										536	135
										18	9
										80	42
										19	29
										5	2
										5	5
										14	17
										17	12
										3	3
										4	2
										51	38
										54	31
										30	29
										130	85
										12	10
										7	12
										21	23
										8	8
										91	77
										9	7
										10	13
										12	15
										0	0
										11	7
										2	

										14	16
										15	18
22.0	338.0	140.0	12.0	0.6	7.8	35.0	220.0	ND	0.6	8	11
22.0	331.0	150.0	13.0	0.8	7.9	36.0	215.0	ND	0.6	9	9
22.0	337.0	140.0	12.0	0.7	8.0	34.0	219.0	ND	0.6	4	3
										4	5
										8	7
23.0	0.5	160.0	14.0	0.5	7.7	37.0	242.0	1.2	0.6	1	1

OrthoP: Orthophosphate CSMR:Chloride to Sulfate Ma

es		Pb - Sequential samples							
PbB2P1	PbB2P2	PbKP1	PbKP2	PbKA1	PbKA2	PbKA3	PbKA4	PbKA5	PbKA6
11	18	11	16	10	12	11	10	2	2
		11	8	4	1	0	0	0	0
		12	18	42	24	25	23	18	21
		75	49	28	27	23	21	22	23
59	46	10	10	10	12	8	5	5	5
		10	12	15	16	14	11	29	10
		15	16	11	4	3	3	2	2
		12	12	8	7	9	13	19	23
		41	25	34	21	16	18	46	94
8	10	9	12	9	8	8	8	8	8
		5	12	6	4	4	3	10	9
		8	10	9	10	12	13	14	13
		25	22	15	13	11	4	2	2
28	38	32	39	33	15	12	12	12	12
		25	20	21	25	38	23	15	11
		5	11	12	14	14	15	16	17
		1	5	0	0	0	0	0	0
		7	5	19	25	16	16	22	52
8	7	8	14	12	12	10	8	7	6
		10	23	17	9	9	9	8	8
8	6	2	2	4	5	5	3	3	4
		2	5	4	1	0	0	0	0
		12	20	24	23	23	23	21	16
		18	16	21	25	30	28	24	23
		6	13	19	18	16	11	9	12
		10	12	12	8	7	7	7	8
		18	14	10	6	5	6	11	23
16	25	9	11	15	13	11	8	9	34
		10	15	16	15	14	13	12	13
7	12	2	7	6	3	2	1	ND	ND
		7	7	12	10	10	8	10	29
		5	5	7	11	8	4	16	20
		8	11	12	13	13	12	11	10
		17	14	15	15	16	14	12	9
		26	25	34	26	29	24	26	27
		21	12	56	36	12	3	3	3
		0	0	0	0	0	0	0	0
		6	6	6	6	6	6	7	6
		4	4	4	1	0	0	0	0
		15	12	12	10	9	8	8	9
		4	8	4	4	4	3	3	4

		6	6	11	14	18	16	13	24
		9	8	17	24	20	20	23	24
5	5	13	8	9	12	14	12	13	16
		9	14	10	15	18	18	15	33
		6	5	5	6	5	6	5	6
		6	8	9	8	8	8	8	8
		2	4	3	2	3	3	3	3
		4	6	5	5	5	5	5	5
		13	19	24	16	10	10	10	10
4	4	1	2	2	2	2	2	2	3

ss Ratio

PbKA7	PbKA8	PbKA9	PbKA10	PbKA11	PbKA12	PbKA13	PbKA14	PbKA15	PbKA16
1	1	1	1	1	1	1	1	1	0
0	0	0	0	0	0				
27	27	22	10	6	6	6	6	5	
26	27	27	27	26	21				
5	5	5	5	4	4	3	3		
9	9	10	13	17	19				
2	1	1	1	1	1	1			
20	9	4	3	3	2	2	2	2	2
43	43	27	13	10					
9	11	14	17	20	19				
4	3	2	1	1	1	1	1	1	1
11	10	10	16	18	13				
2	2	2	2	1	1	1			
14	14	9	7	6	6	6	6		
11	14	17	16	12	9	8			
18	21	20	15	9	7	7	7	7	7
0	0	0	0	0	0				
66	54	31	21	14	9				
6	7	7	7	7	7	8			
8	9	10	10	8	7	5			
16	22	9	3	2	2	2	2	2	
0	0	0	0	0	0	0	0	0	0
17	18	32	57	48	46	29			
26	53	79	75	42	19	14	12	13	13
27	50	56	41	20	10	7	6	5	6
10	9	7	7	6	4	4	4	4	4
17	9	4	6						
63	56	32	17	10	7				
20	37	44	24	10	8	7	7	7	6
ND	ND	ND	ND	ND	ND	ND	ND	ND	
21	6	4	4	4	4	4	4	4	4
19	19	14	6	4	3	3	3	2	
11	12	13	13	10	7				
9	16	28	29	23					
26	26	38	61	78	64	40	24	17	13
2	1	1	1	1	1	1	0	1	
0	0	0	0	0	0	0	0	0	0
6	6	6	5	6	6				
0	0	0	0	0	0	0	0	0	
11	11	10	9	9	9	9	9	9	10
4	4	3	3	3	3	3	3	3	

31	21	8	5	4	4	4	4	4	
25	30	32	28	20	14	13	12	12	
20	22	26	28	25	20	13	9	6	5
52	58	40	16	9	7	7	7	6	6
8	7	7	6	5	5	5	5	5	5
8	7	8	8	8	11	20	29	32	27
7	12	6	2	2	2	1	1	1	1
5	5	5	5	5	5	5	5	5	5
9	9	9	9	9	11	14	17	19	
3	2	2	0	0	0	0	0	0	

PbKA17	PbKA18	PbKA19	PbKA20	PbKA21	PbKA22	PbKA23	PbKA24	PbKA25
0	0							
2	2	2	2					
1	1							
7	7	7	6	6	7	6	6	6
0	0	0	0	0	0	0	0	0
13	12	11	10	11	10	10	10	10
5	5	5	5					
4	4	4	4	4	4	4	4	4
6								
4	4							
12	12	11	11					
0								
10								

6	6	6	6					
5	5	5	5					
17	10	7	6					
1	1	1	1					
5	4	4	3	3	3	3	2	2

Pg 1
0.0 to 0.0

0.0 is actually reported by the lab as N/D Not Detected

City of Benton Harbor's Free Lead and Copper Sampling
Start 10/29/2018
Results of the 1st group of Testing 159 samples Sorted by Lead
Mailed to homes 11/14/2018 on 6 pages. low to high
Your place in the pool by the code number you received in the mail.

Lab Code	Date	take sample	Copper	Lead
BHFree 61	10/25/2018	7:55am	0.0	0.0
BHFEA 5	10/26/2018	4:47pm	110.0	0.0
BHFree 21	10/26/2018	10:30am	0.0	0.0
BHFree 38	10/26/2018	7:30am	0.0	0.0
BHFree 59	10/25/2018	7:45am	0.0	0.0
BHFree 106	10/28/2018	6:35am	0.0	0.0
BHFEA 49	10/29/2018	3:30pm	26.0	0.0
BHFree 50	10/25/2018	7:45am	0.0	0.0
BHFree 98	10/28/2018	6:00am	0.0	0.0
BHFree 73	10/30/2018	7:00am	0.0	0.0
BHFree 107	10/29/2018	9:00am	0.0	0.0
BHFree 35	10/25/2018	10:00am	0.0	0.0
BHFree 54	10/25/2018	6:10am	0.0	0.0
BHFree 88	10/25/2018	7:00am	0.0	0.0
BHFEA 46	10/28/2018	6:00am	26.0	0.0
BHFree 70	10/25/2018	6:30am	0.0	0.0
BHFree 72	10/25/2018	7:00am	0.0	0.0
BHFree 76	10/26/2018	8:00am	0.0	0.0
BHFree 5	10/26/2018	6:05am	0.0	0.0
BHFree 27	10/26/2018	5:00am	0.0	0.0
BHFree 34	10/25/2018	5:30am	0.0	0.0
BHFree 43	10/26/2018	9:00am	0.0	0.0
BHFree 31	10/25/2018	8:00am	0.0	0.0
BHFEA 39	10/29/2018	12:30pm	7.5	0.0
BHFree 68	10/25/2018	5:37am	0.0	0.0
BHFEA 31	10/28/2018	6:20am	17.0	0.0
BHFEA 21	10/27/2018	9:30am	37.0	0.0
BHFree 39	10/25/2018	7:00am	31.0	0.0

Pg 2

0.0 to 1.0

City of Benton Harbor's Free Lead and Copper Sampling

Start 10/29/2018

Results of the 1st group of Testing Sorted by Lead

Mailed to homes 11/14/2018 low to high

Your place in the pool by the code number you received in the mail.

Lab Code	Date	take sample	Copper	Lead
BHFree 18	10/26/2018	6:30am	0.0	0.0
BHFree 83	10/25/2018	11:00pm	0.0	0.0
BHFree 15	10/25/2018	3:00pm	0.0	0.0
BHFree 6	10/26/2018	5:30am	0.0	0.0
BHFree 16	10/26/2018	6:00am	0.0	0.0
BHFree 13	10/26/2018	4:00am	5.0	0.0
BHFEA 30	10/26/2018	6:15pm	20.0	0.0
BHFEA 33	10/29/2018	1:30pm	280.0	0.0
BHFree 47	10/25/2018	9:35am	9.0	0.0
BHFree 26	10/25/2018	4:00pm	0.0	0.0
BHFree 62	10/25/2018	6:30am	8.0	0.0
BHFEA 32	10/26/2018	4:30am	110.0	0.0
BHFree 10	10/26/2018	2:45am	0.0	0.0
BHFree 58	10/25/2018	10:00pm	0.0	0.0
BHFree 80	10/28/2018	6:10am	0.0	0.0
BHFree 90	10/25/2018	7:35am	7.0	0.0
BHFEA 2	10/25/2018	12:10am	160.0	0.0
BHFEA 4	10/25/2018	8:00am	52.0	0.0
BHFree 89	10/29/2018	8:21am	0.0	0.0
BHFree 45	10/25/2018	7:18am	0.0	0.0
BHFree 66	10/25/2018	7:40am	0.0	0.0
BHFree 105	10/27/2018	12:00pm	0.0	0.0
BHFree 81	10/29/2018	3:00pm	0.0	1.0
BHFree 30	10/26/2018	6:45am	0.0	1.0
BHFree 42	10/25/2018	8:35am	0.0	1.0
BHFree 7	10/25/2018	2:20pm	30.0	1.0
BHFree 11	10/26/2018	6:45am	0.0	1.0
BHFree 79	10/27/2018	12:19pm	0.0	1.0

1st Sample lead is detected

Pg 3
1.2 to 3.0

City of Benton Harbor's Free Lead and Copper Sampling
Start 10/29/2018
Results of the 1st group of Testing Sorted by Lead
Mailed to homes 11/14/2018 low to high
Your place in the pool by the code number you received in the mail.

Lab Code	Date	take sample	Copper	Lead
BHFEA 28	10/28/2018	9:15am	36.0	1.2
BHFEA 47	10/29/2018	6:45am	3.2	1.3
BHFEA 35	10/29/2018	3:00pm	1.9	1.6
BHFEA 42	10/29/2018	3:00pm	9.8	1.9
BHFEA 25	10/27/2018	4:00pm	2.7	2.0
BHFree 97	10/28/2018	4:40am	0.0	2.0
BHFree 94	10/28/2018	5:15am	0.0	2.0
BHFree 49	10/25/2018	7:00am	0.0	2.0
BHFree 36	10/25/2018	5:30pm	0.0	2.0
BHFree 28	10/26/2018	5:45am	0.0	2.0
BHFree 60	10/25/2018	4:30am	0.0	2.0
BHFree 91	10/28/2018	6:00am	0.0	2.0
BHFree 32	10/26/2018	10:00am	0.0	2.0
BHFree 40	10/25/2018	5:55am	0.0	2.0
BHFree 64	10/25/2018	8:00am	0.0	2.0
BHFree 52	10/25/2018	7:00am	0.0	2.0
BHFEA 51	10/25/2018	6:00pm	21.0	2.0
BHFree 92	10/27/2018	4:00am	0.0	2.0
BHFEA 26	10/20/2018	4:00am	5.0	2.1
BHFEA 44	10/28/2018	7:46am	14.0	2.2
BHFEA 13	10/27/2018	12:00am	3.4	2.5
BHFEA 43	10/29/2018	3:30pm	7.1	2.7
BHFree 14	10/25/2018	11:30pm	0.0	3.0
BHFree 2	10/25/2018	6:00am	0.0	3.0
BHFree 96	10/26/2018	7:00am	0.0	3.0
BHFree 24	10/26/2018	9:30am	0.0	3.0
BHFEA 36	10/29/2018	3:15pm	18.0	3.0
BHFree 46	10/25/2018	5:00am	0.0	3.0

Pg 4
3.0 to 7.0

City of Benton Harbor's Free Lead and Copper Sampling
Start 10/29/2018
Results of the 1st group of Testing Sorted by Lead
Mailed to homes 11/14/2018 low to high
Your place in the pool by the code number you received in the mail.

Lab Code	Date	take sample	Copper	Lead
BHFree 95	10/28/2018	5:00am	0.0	3.0
BHFree 77	10/27/2018	9:00am	0.0	3.0
BHFEA 24	10/26/2018	4:40am	81.0	3.5
BHFree 101	10/26/2018	6:30am	0.0	4.0
BHFree 63	10/26/2018	8:00am	0.0	4.0
BHFree 3	10/26/2018	3:00pm	0.0	4.0
BHFree 19	10/26/2018	8:30am	0.0	4.0
BHFree 87	10/28/2018	7:10am	0.0	4.0
BHFEA 27	10/28/2018	9:30am	40.0	4.1
BHFEA 15	10/28/2018	7:15am	4.9	4.1
BHFree 17	10/26/2018	7:30am	0.0	5.0
BHFree 93	10/28/2018	8:00apm	0.0	5.0
BHFree 51	10/25/2018	4:30am	0.0	5.0
BHFree 100	10/28/2018	6:00am	0.0	5.0
BHFree 86	10/25/2018	6:30pm	0.0	5.0
BHFEA 1	10/28/2018	6:30am	3.0	5.0
BHFree 65	10/25/2018	8:00am	0.0	5.0
BHFEA 3	10/25/2018	5:00am	1.9	5.1
BHFEA 40	10/29/2018	7:19am	4.3	5.2
BHFEA 38	10/28/2018	5:30am	51.0	5.2
BHFEA 9	10/28/2018	8:00pm	4.4	5.9
BHFree 85	10/26/2018	9:00am	0.0	6.0
BHFree 104	10/26/2018	11:45pm	0.0	6.0
BHFEA 6	10/28/2018	7:00am	160.0	6.4
BHFEA 11	10/27/2018	6:00pm	3.1	6.4
BHFEA 8	10/26/2018	9:10am	3.8	6.5
BHFree 12	10/26/2018	8:00:am	0.0	7.0
BHFree 57	10/25/2018	?	0.0	7.0

Pg 5
7.0 to 18.0

City of Benton Harbor's Free Lead and Copper Sampling
Start 10/29/2018
Results of the 1st group of Testing Sorted by Lead
Mailed to homes 11/14/2018 low to high
Your place in the pool by the code number you received in the mail.

Lab Code	Date	take sample	Copper	Lead
BHFree 48	10/25/2018	6:35am	0.0	7.0
BHFree 41	10/26/2018	8:00am	0.0	8.0
BHFree 8	10/26/2018	7:00am	0.0	8.0
BHFree 78	10/28/2018	6:30am	0.0	8.0
BHFree 75	10/29/2018	7:30am	0.0	8.0
BHFree 82	10/28/2018	8:00am	0.0	9.0
BHFree 74	10/25/2018	9:42am	0.0	9.0
BHFree 37	10/25/2018	6:30am	0.0	9.0
BHFree 55	10/25/2018	10:00am	0.0	9.0
BHFEA 48	10/28/2018	8:02am	21.0	9.6
BHFree 103	10/28/2018	7:00am	0.0	10.0
BHFree 25	10/25/2018	10:00am	0.0	10.0
BHFree 69	10/25/2018	4:00am	0.0	11.0
BHFree 1	10/26/2018	1:30pm	0.0	12.0
BHFEA 23	10/27/2018	6:00am	5.2	12.0
BHFree 71	10/25/2018	6:00am	0.0	12.0
BHFree 29	10/26/2018	5:45am	0.0	13.0
BHFEA 16	10/27/2018	2:00pm	55.0	13.0
BHFree 9	10/26/2018	9:00am	0.0	14.0
BHFree 4	10/26/2018	6:00am	0.0	14.0
BHFEA 18	10/27/2018	10:00am	3.6	16.0
BHFree 53	10/25/2018	8:32am	0.0	16.0
BHFEA 14	10/26/2018	6:00am	26.0	16.0
BHFree 84	10/25/2018	6:30am	0.0	17.0
BHFree 44	10/25/2018	6:30am	0.0	17.0
BHFree 22	10/26/2018	7:45am	0.0	17.0
BHFEA 50	10/28/2018	7:00am	2.6	18.0
BHFree 33	10/26/2018	7:35am	0.0	18.0

Above EPA Action Level of 15ppb

Page 6
19.0 to 56.0

City of Benton Harbor's Free Lead and Copper Sampling
Start 10/29/2018
Results of the 1st group of Testing
Mailed to homes 11/14/2018
Your place in the pool by the code number you received in the mail.

Sorted by Lead
low to high

All Above Action level of USEPA 15 ppb

Lab Code	Date	take sample	Copper	Lead
BHFEA 22	10/27/2018	7:30am	23.0	19.0
BHFEA 29	10/29/2018	9:20am	23.0	19.0
BHFree 56	10/25/2018	9:00am	0.0	21.0
BHFEA 52	10/26/2018	5:30am	10.0	21.0
BHFEA 41	10/28/2018	5:00am	21.0	24.0
BHFree 23	10/26/2018	5:00am	0.0	25.0
BHFEA 37	10/28/2018	5:50am	2.1	26.0
BHFEA 7	10/27/2018	6;00am	9.3	27.0
BHFEA 34	10/29/2018	3:00am	9.8	28.0
BHFEA 12	10/28/2018	2:00am	4.4	30.0
BHFEA 17	10/29/2018	3:17pm	11.0	32.0
BHFree 67	10/25/2018	7:00am	0.0	34.0
BHFEA 10	10/27/2018	7:00am	4.3	35.0
BHFree 102	10/28/2018	5:00am	0.0	38.0
BHFree 20	10/23/2018	10:30pm	5.0	41.0
BHFree 99	10/29/2018	7:55am	0.0	50.0
BHFEA 19	10/28/2018	6:00am	34.0	51.0
BHFEA 20	10/26/2018	7:30am	15.0	55.0
BHFEA 45	10/28/2018	8:30am	4.6	56.0

Action Level by EPA for this group

Total # samples above Action Level (AL) = 27

17% of samples in this pool are above the AL

Sent & Email 7/10/19 5:20 pm

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

LEAD AND COPPER REPORT AND CONSUMER NOTICE FOR COMMUNITY WATER SUPPLY FORM A – SUPPLIES WITH LEAD SERVICE LINES

Issued under authority of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), MCL 325.1001 et seq., and the Administrative Rules.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within ten days after the end of the monitoring period. This form may be used to meet this requirement. Form instructions are available on pages 8 - 10. Submit the information to the appropriate Michigan Department of Environment, Great Lakes, and Energy (EGLE) district office.

1. Supply Name: City of Benton Harbor, MI.
2. County: Berrien 3. WSSN: 0600
4. Population: 9,670* 5. Monitoring Period: From: 1/1/19 To: 6/30/19
6. Minimum # of Samples Required: 60 (Should be 40) 7. # of Samples Taken: 47
8. Name of Certified Laboratory: MDEQ Laboratory, Lansing, MI.

9. SAMPLE CRITERIA:

This form is for water supplies collecting *some* or *all* lead and copper samples from sites WITH LEAD SERVICE LINES. All other supplies should use Form B.

Yes	No		
☒		Are some or all samples from sites WITH lead service lines? All Tiers If no sites served by a lead service line, STOP and use Form B.	For more information see *Instructions* item 11 "Tier and Sample Category" at the end of the document.
☒	☐	Did you prioritize sample collection according to the following: • Tier 1 sites must be used unless insufficient Tier 1 sites available. All Tiers • If insufficient Tier 1 sites available, then Tier 2 sites must be used. • If insufficient Tier 2 sites, then Tier 3 sites must be used. • If no Tier 1, 2, or 3 sites are available, sites must be representative of plumbing materials typically found throughout the water system.	
☒	☒	Were the same sampling sites used as in the previous monitoring period? **If no, explain** (attach additional pages if needed): Yes* Most No Mostly – only a couple of sites from 2018 met the new Sample criteria Tier I	

Comments:
* You can see by the 2015 Water Population = 9,670 people It has revised to in 2019 to 9,760. MDEQ Forced 60 sites. Both are under 10,000 so renewed Sampling by rule required only 40 (to original)

10. SIGNATURE:

Name: Michael O'Malley Signature: [signature]

Title: Benton Harbor Water Supt. Phone: (269) 363-0575 Date: 7/10/19

City of Benton Harbor WSSN 600 Lead and Copper Report

7/10/2019

							1st Liter Sample			5th Liter Sample		
Sample Location Code	Sample Date	Tier	Category	Building Plumbing	Service Line	Tap Type	Lead Result mg/L	Copper Result mg/L	Lab Sample Number	Lead Result mg/L	Copper Result mg/L	Lab Sample Number
JPb46	6/25/2019	1	A	N/A	L	K	0.012	0.100	LI48039	0.012	0.000	LI48040
JPb41	6/26/2019	1	A	N/A	L	K	0.003	0.000	LI48038	0.003	0.000	LI48035
JPb30	6/26/2019	1	A	N/A	L	K	0.006	0.000	LI48035	0.003	0.000	LI48036
JPb13	6/27/2019	1	A	N/A	L	K	0.008	0.000	LI48034	0.005	0.000	LI48033
JBp4	6/27/2019	1	A	N/A	L	K	0.014	0.000	LI48031	0.012	0.000	LI48032
JPb27	6/27/2013	1	A	N/A	L	K	0.029	0.000	LI48030	0.059	0.000	LI48029
JBp37	6/25/2019	1	A	N/A	L	K	0.000	0.000	LI48027	0.000	0.000	LI48028
JPb16	6/25/2019	1	A	N/A	L	K	0.005	0.000	LI48026	0.005	0.000	LI48025
JPb19	6/25/2019	1	A	N/A	L	K	0.000	0.000	LI48022	0.000	0.000	LI48021
JPb18	6/25/2019	1	A	N/A	L	K	0.000	0.000	LI48023	0.000	0.000	LI48024
JPb36	6/26/2019	1	A	N/A	L	K	0.013	0.000	LI48019	0.005	0.000	LI48020
JPb39	6/26/2019	1	A	N/A	L	K	0.023	0.000	LI48017	0.008	0.000	LI48017
JPb7	6/25/2019	1	A	N/A	L	K	0.035	0.000	LI48016	0.022	0.000	LI48015

City of Benton Harbor WSSN 600 Lead and Copper Report

7/10/2019

							1st Liter Sample			5th Liter Sample		
Sample Location Code	Sample Date	Tier	Category	Building Plumbing	Service Line	Tap Type	Lead Result mg/L	Copper Result mg/L	Lab Sample Number	Lead Result mg/L	Copper Result mg/L	Lab Sample Number
JPb11	6/27/2019	1	A	N/A	L	K	0.008	0.000	LI48014	0.031	0.000	LI48013
JPb32	6/25/2019	1	A	N/A	L	K	0.021	0.000	LI48012	0.013	0.000	LI48011
JPb5	6/26/2019	1	A	N/A	L	K	0.003	0.000	LI48009	0.002	0.000	LI48010
JPb9	6/25/2019	1	A	N/A	L	K	0.005	0.000	LI48008	0.003	0.000	LI48007
JPb58	6/26/2019	1	A	N/A	L	K	0.004	0.000	LI48005	0.000	0.000	LI48006
JPb54	6/26/2019	1	A	N/A	L	K	0.004	0.000	LI48004	0.011	0.000	LI48003
JPb52	6/25/2019	1	A	N/A	L	K	0.000	0.000	LI48002	0.000	0.000	LI48001
JPb40	6/28/2019	1	A	N/A	L	K	0.007	0.000	LI47999	0.007	0.000	LI48000
JPb23	6/26/2019	1	A	N/A	L	K	0.001	0.000	LI47997	0.000	0.000	LI47998
JPb8	6/27/2019	1	A	N/A	L	K	0.022	0.000	LI47995	0.024	0.000	LI47996
JPb20	6/25/2019	1	A	N/A	L	K	0.005	0.000	LI47994	0.012	0.000	LI47993
JPb38	6/24/2019	1	A	N/A	L	K	0.007	0.000	LI47991	0.005	0.000	LI47992
JPb43	6/25/2019	1	A	N/A	L	K	0.000	0.000	LI47990	0.000	0.000	LI47989

City of Benton Harbor WSSN 600 Lead and Copper Report

7/10/2019

							1st Liter Sample			5th Liter Sample		
Sample Location Code	Sample Date	Tier	Category	Building Plumbing	Service Line	Tap Type	Lead Result mg/L	Copper Result mg/L	Lab Sample Number	Lead Result mg/L	Copper Result mg/L	Lab Sample Number
JPb48	6/27/2019	1	A	N/A	L	K	0.004	0.000	LI47988	0.005	0.000	LI47987
JPb44	6/25/2019	1	A	N/A	L	K	0.003	0.000	LI47985	0.003	0.000	LI47986
JPb42	6/26/2019	1	A	N/A	L	K	0.000	0.000	LI47983	0.000	0.000	LI47984
JPb51	6/24/2019	1	A	N/A	L	K	0.012	0.000	LI47981	0.017	0.000	LI47982
JPb60	6/27/2019	1	A	N/A	L	K	0.004	0.000	LI47979	0.021	0.000	LI47980
JPb22	6/25/2019	1	A	N/A	L	K	0.003	0.000	LI47977	0.002	0.000	LI47978
JPb33	6/25/2019	1	A	N/A	L	K	0.015	0.000	LI47975	0.006	0.000	LI47976
JPb26	6/25/2019	1	A	N/A	L	K	0.004	0.050	LI47973	0.002	0.060	LI47974
JPb49	6/24/2019	1	A	N/A	L	K	0.011	0.000	LI47971	0.019	0.000	LI47972
JPb28	6/27/2019	1	A	N/A	L	K	0.002	0.000	LI47969	0.002	0.000	LI47970
JPb34	6/29/2019	1	A	N/A	L	K	0.001	0.000	LI47967	0.001	0.000	LI47968
JPb50	6/26/2019	1	A	N/A	L	K	0.010	0.000	LI47965	0.036	0.000	LI47966
JPb1	6/25/2019	1	A	N/A	L	K	0.000	0.000	LI47963	0.000	0.000	LI47964

City of Benton Harbor WSSN 600 Lead and Copper Report

7/10/2019

							1st Liter Sample			5th Liter Sample		
Sample Location Code	Sample Date	Tier	Category	Building Plumbing	Service Line	Tap Type	Lead Result mg/L	Copper Result mg/L	Lab Sample Number	Lead Result mg/L	Copper Result mg/L	Lab Sample Number
JPb47	6/24/2019	1	A	N/A	L	K	0.044	0.000	LI47961	0.023	0.000	LI47962
JPb17	6/27/2019	1	A	N/A	L	K	0.000	0.000	LI47959	0.000	0.000	LI47960
JPb24	6/26/2019	1	A	N/A	L	K	0.002	0.000	LI47958	0.003	0.000	LI47957
JPb14	6/26/2019	1	A	N/A	L	K	0.006	0.000	LI47955	0.007	0.000	LI47956
JPb55	6/26/2019	1	A	N/A	L	K	0.000	0.000	LI47951	0.000	0.000	LI47952
JPb60	6/27/2019	1	A	N/A	L	K	0.002	0.000	LI47953	0.003	0.000	LI47954
JPb15	6/25/2019	1	A	N/A	L	K	0.009	0.000	LI47949	0.008	0.000	LI47950
JPb29	6/25/2019	1	A	N/A	L	K	0.014	0.000	LI47947	0.018	0.000	LI47948

MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
DRINKING WATER AND ENVIRONMENTAL HEALTH DIVISION

EGLE

LEAD AND COPPER REPORT AND CONSUMER NOTICE FOR COMMUNITY WATER SUPPLY FORM A – SUPPLIES WITH LEAD SERVICE LINES

Issued under authority of the Michigan Safe Drinking Water Act, 1976 PA 399, as amended (Act 399), MCL 325.1001 et seq., and the Administrative Rules.
Failure to submit this information is a violation of Act 399 and may subject the water supply to enforcement penalties.

Administrative Rule R 325.10710d requires water supplies to report lead and copper monitoring information within ten days after the end of the monitoring period. This form may be used to meet this requirement. Form instructions are available on pages 8 - 10. Submit the information to the appropriate Michigan Department of Environment, Great Lakes, and Energy (EGLE) district office.

1. Supply Name: Benton Harbor Water
2. County: Berrien 3. WSSN: **0600**
4. Population: 9,639 5. Monitoring Period: From: 7/1/2019 To: 12/31/2019
6. Minimum # of Samples Required: 7. # of Samples Taken: 40
8. Name of Certified Laboratory: 8 to MDEQ the rest to Eurofins Eaton Analytical 32

9. SAMPLE CRITERIA:

This form is for water supplies collecting *some* or *all* lead and copper samples from sites WITH LEAD SERVICE LINES. All other supplies should use Form B.

Yes	No		
☒		Are some or all samples from sites WITH lead service lines? If no sites served by a lead service line, STOP and use Form B.	For more information see *Instructions* item 11 "Tier and Sample Category" at the end of the document.
☒ All Tier 1 sites	☐	Did you prioritize sample collection according to the following: • Tier 1 sites must be used unless insufficient Tier 1 sites available. • If insufficient Tier 1 sites available, then Tier 2 sites must be used. • If insufficient Tier 2 sites, then Tier 3 sites must be used. • If no Tier 1, 2, or 3 sites are available, sites must be representative of plumbing materials typically found throughout the water system.	
☒	☐	Were the same sampling sites used as in the previous monitoring period? **If no, explain** (attach additional pages if needed): Identify by New Code* or NewCode Previous EGLE Code	

Comments:

I am Sorry, I use Excel for all data, 3 tables attached in Landscape Print
This Word document I cannot edit Eurofins Sample reports attached in their entire form (Eurofins Rule).
I did not attach EGLE Sample Results (7 of 8)

10. SIGNATURE:

Name: Mike O'Malley Signature:
Title: Benton Harbor Waters Operators In Charge Phone: (269) 363-0575 Date: 1/9/20

11. TAP SAMPLING DATA

Use additional sheets as needed. Sheet 1 of 3.

Water Supply Name: Benton Harbor WSSN: 0600

Lab Sample Numbers ~~#~~ with only Numbers are from Eurofins

Sample Location * was sampled before; and Past EGLE Code	Sample Date	Tier (1,2,3,OT) [1]	Category (see below)[2]	Building Plumbing (L,C,G,P) [3]	Service Line (L*,C,G,P)[3]	Tap Type (K,B)[4]	1st Liter Sample			5th Liter Sample		
							Lead ug/L	Copper mg/L	Lab Sample Number	Lead ug/L	Copper mg/L	Lab Sample Number
OctPb14	11/12/2019	1	A	N/A	L or PSLR	K	0	8.6	4488794	0	8	4488795
JPb 29*	12/2/2019	1	A	N/A	L or PSLR	K	0	2.4	4512569	0	2.1	4512570
JPb 4*	12/10/2019	1	A	N/A	L or PSLR	K	9.2	15	4516476	6.3	2.5	4516477
JPb 27*	12/10/2019	1	A	N/A	L or PSLR	K	33	5.1	4516488	21	2.8	4516489
JPb 39*	12/17/2019	1	A	N/A	L or PSLR	K	10	8.6	4523031	7.8	3.4	4523032
OctPb12* JPb22	11/7/2019	1	A	N/A	L or PSLR	K	4.4	2.5	4488796	3.9	3.6	4488797
CCNPb 28* JPb48	11/29/2019	1	A	N/A	L or PSLR	K	3.1	11	4512929	3.1	11	4512550
NPb 10* JPb47	12/4/2019	1	A	N/A	L or PSLR	K	72	7.8	4512571	39	11	4512572
NPb12* JPb50	12/9/2019	1	A	N/A	L or PSLR	K	38	3.6	4512565	24	1.6	4512566
NPb 13* JPb51	12/9/2019	1	A	N/A	L or PSLR	K	8.6	4	4512563	5.3	2.1	4512563
NPb 4* JPb29	12/2/2019	1	A	N/A	L or PSLR	K	22	3.4	4512551	32	5.1	4512552
NPb 5* JPb32	12/2/2019	1	A	N/A	L or PSLR	K	10	15	4512553	12	1.8	4512554
NPb 17* JPb8	12/9/2019	1	A	N/A	L or PSLR	K	23	53	4512575	9.4	2.1	4512576
NPb 16* JPb7	12/10/2019	1	A	N/A	L or PSLR	K	25	1.6	4512573	18	0	4512574

Table Pg 2 of 3

Sample Codes w/ LI xxxxx are from EGLE Lab Reports

Sample Location * was sampled before; and Past EGLE Code	Sample Date	Tier (1,2,3,OT) [1]	Category (see below)[2]	Building Plumbing (L,C,G,P) [3]	Service Line (L*,C,G,P)[3]	Tap Type (K,B)[4]	1st Liter Sample			5th Liter Sample		
							Lead ug/L	Copper mg/L	Lab Sample Number	Lead ug/L	Copper mg/L	Lab Sample Number
OctPb1* JPb1	11/1/2019	1	A	N/A	L or PSLR	K	0	0	LI74912	0	0	LI74911
OctPb2* JPb14	10/29/2019	1	A	N/A	L or PSLR	K	7	0	LI74907	7	0	LI74908
OctPb3	11/1/2019	1	A	N/A	L or PSLR	K	4	0	LI74909	3	0	LI74910
OctPb5* JPb20	10/26/2019	1	A	N/A	L or PSLR	K	4	0	LI74916	4	0	LI74915
OctPb6* JPb60	10/29/2019	1	A	N/A	L or PSLR	K	2	0	LI74914	5	0	LI74913
OctPb9	10/29/2019	1	A	N/A	L or PSLR	K	2	0	LI74930	2	0	LI74929
OctPb10	10/25/2019	1	A	N/A	L or PSLR	K	2	0	LI74928	0	0	LI74927
CCNPb 7	12/4/2019	1	A	N/A	L or PSLR	K	3.4	12	4512555	1.9	1.8	4512556
CCNPb 34	12/1/2019	1	A	N/A	L or PSLR	K	0	7.2	4512557	0	8.5	4512558
CCNPb 29	12/3/2019	1	A	N/A	L or PSLR	K	8.4	16	4512559	1.6	7.3	4512560
CCNPb25	12/8/2019	1	A	N/A	L or PSLR	K	9.3	3.3	4512561	1.8	1.5	4512562
OctPb 11	12/2/2019	1	A	N/A	L or PSLR	K	0	0	4512567	0	1.5	4512568
CCNPb 5	12/11/2019	1	A	N/A	L or PSLR	K	3.6	2.5	4546488	2.2	4	4546489
SCT 1	12/12/2019	1	A	N/A	L or PSLR	K	0	3.4	4516480	0	1.4	4516481
SCT 3	12/12/2019	1	A	N/A	L or PSLR	K	0	3	4516482	0	2	4516483
SCT 5	12/12/2019	1	A	N/A	L or PSLR	K	0	7.1	4516484	0	6	4516485

Table Page 3 of 3

Sample Location * was sampled before; and Past EGLE Code	Sample Date	Tier (1,2,3,OT) [1]	Category (see below)[2]	Building Plumbing (L,C,G,P) [3]	Service Line (L*,C,G,P)[3]	Tap Type (K,B)[4]	1st Liter Sample			5th Liter Sample		
							Lead ug/L	Copper mg/L	Lab Sample Number	Lead ug/L	Copper mg/L	Lab Sample Number
CCNPb 31	12/15/2019	1	A	N/A	L or PSLR	K	0	28	4516486	0	2	4516487
CCNPb 1	12/10/2019	1	A	N/A	L or PSLR	K	4.9	4.1	4516490	11	2.8	4516491
CCNPb 16	12/15/2019	1	A	N/A	L or PSLR	K	3.7	18	4516492	14	2.9	4596493
CCNPb 17	12/16/2019	1	A	N/A	L or PSLR	K	5.6	4	4523023	0	1.6	4523024
TGPb 1	12/17/2019	1	A	N/A	L or PSLR	K	2.3	1.2	4523025	19	4.8	4523026
EPDPb 8	12/18/2019	1	A	N/A	L or PSLR	K	19	4.8	4523027	40	2.2	4523028
EPDPb 9	12/18/2019	1	A	N/A	L or PSLR	K	18	6.7	4523029	11	1.6	4523030
EPDPb 1	12/20/2019	1	A	N/A	L or PSLR	K	0	4.9	4523033	0	1.6	4523034
EPDPb 4	12/21/2019	1	A	N/A	L or PSLR	K	19	3.6	4523041	30	2	4523042

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WSSN 0600 City of Benton Harbor 1st Half 2021

Lead and Copper Report and Consumer Notice for Community Water Supply Form A -Supplies with Lead Service Leads

							1st Draw			5th Draw		
Sample Location	Sample Date	Tier (1,2, 3, OT)	Category	Building Plumbing	Service Line (L, C, G, P)	Tap Type (K, B)	Lead ppb	Sample ID	Copper ppb	Lead ppb	Sample ID	Copper ppb
261 Searles	04/21/21	1	A		L	K	ND	LJ53660	ND	ND	LJ53661	ND
718 Territorial	04/22/21	1	A		L	K	21	LJ53662	120	107	LJ53663	650
663 Thresher	04/23/21	1	A		L	K	1	LJ53664	ND	ND	LJ53665	ND
150 Parker	04/22/21	1	A		L	K	5	LJ53670	ND	2	LJ53671	ND
797 Wauceda	04/21/21	1	A		L	K	4	LJ53674	ND	3	LJ53675	ND
127 Searles	04/22/21	1	A		L	K	2	LJ53676	ND	3	LJ53677	ND
754 Lavette	04/21/21	1	A		L	K	2	LJ53678	ND	ND	LJ53679	90
711 Buss	04/21/21	1	A		L	K	ND	LJ53680	ND	ND	LJ53681	ND
759 Buss	04/21/21	1	A		L	K	3	LJ53682	ND	1	LJ53683	ND
277 Hastings	04/22/21	1	A		L	K	2	LJ53684	ND	3	LJ53685	ND
732 McAlister	04/21/21	1	A		L	K	1	LJ53686	ND	2	LJ53687	ND
140 Benton	04/23/21	1	A		L	K	ND	LJ53688	110	ND	LJ53689	200
753 Broadway	04/21/21	1	A		L	K	ND	LJ53692	ND	1	LJ53693	ND
792 Britain	04/22/21	1	A		L	K	1	LJ53694	ND	ND	LJ53695	ND
1178 Broadway	04/29/21	1	A		L	K	22	LJ54648	ND	9	LJ54649	ND
1237 Columbus	04/29/21	1	A		L	K	23	LJ54652	ND	4	LJ54653	ND
857 Ogden	04/29/21	1	A		L	B	10	LJ54654	ND	10	LJ54655	ND
999 Pearl	04/28/21	1	A		L	B	8	LJ54658	ND	9	LJ54659	ND
931 Monroe	04/29/21	1	A		L	B	9	LJ54660	ND	14	LJ54661	ND
1110 Ogden	04/27/21	1	A		L	K	ND	LJ54662	ND	3	LJ54663	ND
1129 Jennings	04/29/21	1	A		L	K	9	LJ54664	ND	12	LJ54665	ND
806 Lasalle	04/23/21	1	A		L	K	ND	LJ54670	ND	ND	LJ54671	ND
141 Winan	04/29/21	1	A		L	K	ND	LJ54672	ND	ND	LJ54673	ND
1167 Broadway	04/29/21	1	A		L	K	1	LJ54674	ND	ND	LJ54675	ND
660 McGuigan	04/28/21	1	A		L	K	ND	LJ54678	ND	ND	LJ54679	ND
174 Hasting	04/27/21	1	A		L	K	13	LJ54680	ND	2	LJ54681	ND
161 Kline	04/29/21	1	A		L	K	4	LJ54682	ND	ND	LJ54682	ND
552 Buena Vista	04/27/21	1	A		L	K	469	LJ54650	7650	143	LJ54651	1440
582 Niles	05/06/21	1	A		L	K	2	LJ55761	ND	2	LJ55762	ND

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1264 Pavone	05/04/21	1	A		L	K	2	LJ55763	ND	ND	LJ55764	ND
817 Nate Wells	05/06/21	1	A		L	K	7	LJ55765	110	3	LJ55766	80
1248 Broadway	05/07/21	1	A		L	K	2	LJ55767	ND	2	LJ55768	ND
191 Searles	05/06/21	1	A		L	K	ND	LJ55769	ND	ND	LJ55770	ND
1086 Superior	05/05/21	1	A		L	K	ND	LJ55771	ND	ND	LJ55772	ND
208 Seeley	05/06/21	1	A		L	K	ND	LJ55783	ND	ND	LJ55784	ND
781 Buss	05/06/21	1	A		L	K	41	LJ55785	ND	4	LJ55786	ND
166 Searles	05/06/21	1	A		L	K	18	LJ55795	ND	16	LJ55796	ND
341 Brunson	05/07/21	1	A		L	K	ND	LJ55797	ND	ND	LJ55798	ND
596 Cass	05/14/21	1	A		L	K	ND	LJ57925	ND	ND	LJ57926	ND
1274 Ogden	05/18/21	1	A		L	K	ND	LJ57929	ND	ND	LJ57930	ND
1118 Broadway	05/18/21	1	A		L	K	6	LJ57931	ND	5	LJ57932	ND
446 Packard	05/18/21	1	A		L	K	1	LJ57935	ND	ND	LJ57936	ND
578 Edwards	05/18/21	1	A		L	B	ND	LJ57941	ND	ND	LJ57942	ND
1165 Hannah	05/14/21	1	A		L	K	2	LJ57943	60	1	LJ57944	ND
566 Territorial	05/17/21	1	A		L	K	1	LJ57947	ND	1	LJ57948	ND
1037 Pearl	05/18/21	1	A		L	K	1	LJ57937	ND	1	LJ57938	ND
1037 Pearl	04/27/21	1	A	duplicate	L	K	5	LJ54676	60	109	LJ54677	1300
366 McCord	04/21/21	1	A	volume<	L	K	6	LJ53666	ND	8	LJ53667	ND
534 E Main	04/21/21	1	A	volume<	L	K	ND	LJ53668	ND	ND	LJ53669	ND
1022 Hurd	05/18/21	1	A	volume<	L	K	ND	LJ57939	ND	ND	LJ57940	ND
810 Nate Wells	04/21/21	1	A	volume<	L	K	ND	LJ53690	ND	ND	LJ53691	ND
946 BISHOP	06/22/21	1	A		L	K	2	LJ64551	ND	1	LJ64552	ND
285 Hastings	06/24/21	1	A		L	K	1	LJ64533	ND	1	LJ64534	ND
1112 Agard	06/22/21	1	A		L	K	28	LJ64555	ND	2	LJ64556	ND
1020 Bishop	06/22/21	1	A		L	K	ND	LJ64549	ND	ND	LJ64550	ND
768 Broadway	06/24/21	1	A		L	K	ND	LJ64553	ND	ND	LJ64554	ND
1191 Pavone	06/22/21	1	A		L	B	ND	LJ64547	ND	2	LJ64548	ND
1225 Colfax	06/22/21	1	A		L	K	3	LJ64539	ND	2	LJ64540	ND
1161 Union St	06/22/21	1	A		L	K	7	LJ64545	ND	7	LJ64546	ND
1143 Union	06/22/21	1	A		L	K	ND	LJ64541	ND	ND	LJ64542	ND
201 Garfield	06/22/21	1	A		L	K	6	LJ64543	ND	14	LJ64544	ND
204 Garfield	06/22/21	1	A		L	B	ND	LJ64529	ND	ND	LJ64530	ND
1043 Agard	06/22/21	1	A		L	B	3	LJ64537	ND	9	LJ64538	ND
1066 Monroe	06/22/21	1	A		L	B	ND	LJ64531	ND	4	LJ64532	ND
1008 Pearl	05/18/21	1	A		L	K	ND	LJ57927	ND	ND	LJ57928	ND
807 High	04/22/21	1	A		L	K	605	LJ53672	1290	145	LJ53673	690
246 Pipestone	03/01/21	2	D		L	K	ND	LJ46050	ND	ND	LJ46051	ND
427 Foster	04/21/21	unknown				K	ND	LJ53696	ND	ND	LJ53697	ND
849 Pipestone	04/30/21	unknown				K	9	LJ54656	ND	8	LJ54657	ND
1240 Pavone	04/27/21	unknown				K	ND	LJ54666	ND	ND	LJ54667	ND
270 May	04/27/21	unknown				K	4	LJ54668	ND	ND	LJ54669	ND

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626 Territorial	05/06/21	unknown				K	39	LJ55773	350	4	LJ55774	70
558 Niles	05/07/21	unknown				K	2	LJ55775	50	2	LJ55776	50
717 Highland	05/06/21	unknown				K	11	LJ55777	130	11	LJ55778	120
1111 Superior	05/06/21	unknown				K	ND	LJ55779	ND	ND	LJ55780	ND
152 Lake	05/06/21	unknown				K	ND	LJ55781	ND	ND	LJ55782	ND
1152 Monroe	05/06/21	unknown				K	1	LJ55787	ND	ND	LJ55788	ND
1173 Lavette	05/06/21	unknown				K	1	LJ55789	ND	4	LJ55790	ND
1034 Broadway	05/06/21	unknown				K	ND	LJ55791	ND	ND	LJ55792	ND
823 Lavette	05/06/21	unknown				K	ND	LJ55793	ND	ND	LJ55794	ND
1046 Broadway	05/07/21	unknown				K	889	LJ55799	1433	7	LJ55800	80
507 Britain	05/18/21	unknown				K	ND	LJ57933	ND	ND	LJ57934	ND
1063 Columbus	05/18/21	unknown				K	6	LJ57945	ND	6	LJ57946	ND
823 Lavette	06/23/21	unknown				K	ND	LJ64535	ND	ND	LJ64536	ND

Chlorine Feed #1
(Sodium Hypo)
Target Dose Range:
3 - 5 ppm (as Cl2)

Aluminum Sulfate
48% strengh
Target Dose Range:
1.3 - 1.8 ppm (as Al3+)

Chlorine Feed #2
(Sodium Hypo, 12%)
Target Dose Range:
0.7 - 0.8 ppm (as Cl2)

Fluosilicic Acid
(saturated solution)
Target Dose Range:
0.6 - 0.7 ppm (as F-)

90% Ortho/10% Poly
Phosphate blend (33%)

Target Dose Range: 4-6
mg/L ortho as PO4)

Target Distrib.
Residual = 3.0 mg/L
ortho as PO4)

LAKE MICHIGAN

CHLORINE

12' DIA. INTAKE CRIB
3,375' FT. FROM SHORE
DEPTH 40'±

36"Ø EMERGENCY
RISERS AT 1,500' &
2,500'

36"Ø STEEL
INTAKE PIPE

30"Ø PLANT DRAIN LINE

MH

30"Ø OVERFLOW LINE

SUMP
DRAIN
PUMP

24" CONE
VALVE

OVERFLOW WEIR

INLET SCREEN

PUMP TO
WASTE

24"Ø DIP

12"Ø TYP.
PUMP
DISCHARGE

#1 #2 #3 #4 #5

LOW SERVICE PUMPS
PLANT WET WELL

85,600 GAL. TANK CAPACITY

LOW SERVICE PUMP #1 = 1,480 GPM (2.1 MGD)@ 51' TDH (25 HP)
LOW SERVICE PUMP #2 = 2,250 GPM (3.2 MGD) @ 52' TDH (40 HP)
LOW SERVICE PUMP #3 = 3,500 GPM (5.0 MGD) @ 48' TDH (50 HP)
LOW SERVICE PUMP #4 = 2,777 GPM (4.0 MGD) @ 52' TDH (50 HP)
LOW SERVICE PUMP #5 = 3,900 GPM (5.6 MGD) @ 48' TDH (60 HP)
DRAIN SUMP PUMP = 1,000 GPM (1.4 MGD) @ 30' TDH (10 HP)

POLYMER

FLASH
MIXER
CHAMBER

CHLORINE

30" BYPASS

8" DRAIN TO LAGOON

30"Ø BV

20" BV

20" GV

30" DIP

24" BUTTERFLY VALVE
CHLORINE (ALT)

POLYMER (ALT)

POLYMER

Cl2

PROPOSED
FLOCCULATOR

FLASH MIXER CHAMB
NUMBER OF CHAMBE
MIXER TYPE = PROPE
FLOCCULATION BASI
NUMBER OF BASINS =
NUMBER OF FLOCCU
BASIN DETENTION TIME = 40 MINUTES
NUMBER OF PLATE SETTLER TRAINS = 2
TOTAL NUMBER OF PLATES PER BASIN - 598
FLOW RATE PER PLATE = 6.97 GPM
SLUDGE WITHDRAW - SUCTION TUBE
SLUDGE DISPOSAL = LAGOONS

BACKFLOW
PREVENTOR

30" SETTLED WATER

ALT. POLYMER

CHLORINE (ALT)

ARV

FILTER INFLUENT TROUGH

FILTER #1 FILTER #2 FILTER #5 FILTER #6 FILTER #9 FILTER #10

#3 FILTER #4 FILTER #7 FILTER #8 FILTER #11 FILTER #12

24" BACKWASH WASTE

20"Ø 24"Ø 24"Ø 20"Ø

30"Ø FILTERED WATER

BACKWASH
WASTE
TROUGH
(EACH SIDE)

FILTER CELLS #1 THRU #12

16"Ø OVERFLOW

36"Ø DRAIN

MH

18"Ø CMP

48"Ø

18"Ø CP
EMERGENCY
OVERFLOW

INFLUENT
STRUCTURE

OUTLET PIPE

OUTLET
TROUGH

SHEET
PILING WALL
FOR CELL
DIVIDER

CELL #1
5,870 SF

CELL #2
30,930 SF

PROPOSED
BACKWASH WASTE
LAGOONS

EXISTING
WET LAND

PAW PAW RIVER

HIGH SERVICE PUMPS #1 = 1,410 GPM @ 200' TDH (100 HP)
HIGH SERVICE PUMPS #2 = 2,980 GPM @ 200' TDH (200 HP)
HIGH SERVICE PUMPS #3 = 3,000 GPM @ 202' TDH (200 HP)
HIGH SERVICE PUMPS #4 = 3,000 GPM @ 202' TDH (200 HP)
HIGH SERVICE PUMPS #5 = 1,410 GPM @ 200' TDH (100 HP)

30"Ø

LOWER LEVEL
OVERFLOW
PROTECTION WEIR

FUTURE
PUMP

30" GV

PLANT
PROCESS

#1 #2 #5 #4 #3

30"Ø ℄582

20"Ø 20"Ø

GV

BACKWASH SUPPLY PUMPS
5,200 TO 5,500 GPM

24"Ø BACKWASH SUPLY

6" SURFACE WASH

6" SURFACE WASH (600 GPM)

24"Ø BACKWASH SUPPLY

18"Ø SUCTION
WELL OVERFLOW

12"Ø
BACKFLUSH
LINE (NOT
OPERATIONAL)

OVERFLOW

97,000 GAL.
HIGH LIFT PUMP
SUCTION WELL
49' x 16' x 16.5' SWD

SURGE SUPPRESSOR

20"Ø DISCHARGE TO DISTRIBUTION

36" GV

Cl2

36"Ø

36"Ø FILTERED WATER

20"Ø DISCHARGE TO DISTRIBUTION

HIGH LIFT SUCTION WELL

EFFLUENT /
BACKWASH TROUGHS

FILTER GALLET

1. 16" FILTER INFLUENT - SETTLED WATER
2. 16" FILTER BACKWASH SUPPLY
3. 18" BACKWASH WASTE TO CHANNEL
4. 10" FILTERED WATER
5. 16" TO 20" FILTERED WATER HEADER
6. 10" RATE OF FLOW CONTROL VALVE
7. 8" FILTERED WATER TO WASTE
8. 4" FILTER SURFACE WASH WATER SUPPLY

ENLARGED TYPICAL FILTER CELL PLAN

GRAVITY FILTERS
12 BEDS EACH WITH 349 SF
FILTER CAPACITY -
AT 2 GPM PER SF = 12 MGD
AT 4 GPM PER SF = 24 MGD
TYPE - DUAL MEDIA SAND & ANTHRICITE
CONSTANT HEAD
BACKWASH AT 15.7 GPM PER SF
SURFACE WASH AT 600 GPM
NEW FILTER TO WASTE

16"Ø OVERFLOW

30"Ø FILTERED WATER

BYPASS VALVE

16" GV (TYP)

NEW BAFFLES

NEW BAFFLES

12" EQUALIZATION VALVE

1,000,000 GAL. CAPACITY
100'x100'x13' SWD

1,000,000 GAL. CAPACITY
100'x100'x13' SWD

36"Ø FILTERED WATER

2,000,000 GAL. FILTERED WATER RESERVOIR

NOTES

1. WATER LEVEL (WL) IS BASED ON THE FLUCTUATING WATER LEVELS OF LAKE MICHIGAN. DESIGN IS BASED ON LOW LAKE LEVEL OF 577.00 & HIGH LAKE LEVEL OF 584.00
2. Horizontal datum is NAD83 per State Plane Coordinates, MI Zone South, US Feet
3. Vertical datum is NAVD88

TO DISTRIBUTION SYSTEM

SED PROCESS FLOW DIAGRAM
NTS

24" SHUT-OFF (GATE & BUTTERFLY VALVES)

24" FLOW METER

CHLORINE

ALUM

24"Ø ℄616.36

617.82

WL 617.44

WL 617.36

FLR. 602.36

FLASH MIXER
CHAMBER

30"Ø ℄591.11
OVERFLOW TO
PLANT DRAIN

PROPOSED
FLOCCULATORS / PLATE SETTLERS

SURFACE WASH
PUMP

FLR. 609.36

GRADE 605.86

HWL 607.36

TOP OF WASH WATER GULLY WALL 604.86

TOP OF WASH WATER TROUGH 604.36

FLR. 598.36

FILTER BACKWASH
PUMPS

FLR. 591.36

BACKWASH DISCHARGE
NEW FILTER TO WASTE

BACKWASH
WASTE CONDUIT
TO PLANT DRAIN

GRAVITY FILTERS

30" FILTERED WATER TO
STORAGE RESERVIORS
585.11 TO 584.61

T.O.C. 597.36

OVERFLOW WEIR 597.61

TOP OF
PIPE 595.36

HWL 596.36

FLR. 584.00 +/-

16"Ø ℄588.11
TO PLANT DRAIN

36"Ø ℄585.36 ±

FILTERED WATER RESERVOIR

FLR. 597.86

HWL 595.86

HIGH PRESSURE RELIEF

SURGE SUPPRESSORS

(2) 20"Ø DISCHARGES TO
DISTRIBUTION

OVERFLOW 596.36

HIGH SERV. PUMPS

36"Ø ℄581.36 TO
HIGH LIFT PUMPS

GV

FLR. 579.36

30"Ø ℄581.36

HIGH SERVICE PUMP
SUCTION WELL

ELEV. 610.00
ELEV. 600.00
ELEV. 590.00
ELEV. 580.00
ELEV. 570.00
ELEV. 560.00

GRADE 605.86

FLR. 609.36

UPPER CONE
VALVE PIT GRATING
ELEV. 593.86

24"Ø ℄597.78

24" HYDRO
REGULATING VALVE

FLR. 593.36

CV TYP.

24"Ø ℄586.36

FLR. 579.36

WL SEE NOTE 1

INTAKE CRIB IN
LAKE MICHIGAN

24" CONE
VALVE
℄561.61

INLET SCREEN

#2 #1

#3 #4 #5

SUMP DRAIN PUMP

FLR. 559.36

36" RAW WATER
INTAKE 560.11

PLANT WET WELL

PROPOSED HYDRAULIC FLOW DIAGRAM
SCALE: NTS

NO.	REVISION DESCRIPTION:	BY:	DATE:

ABONMARCHE
Confidence By Design

ENGINEERING
ARCHITECTURE
MARINA/WATERFRONT
SURVEYING
LANDSCAPE ARCHITECTURE
PLANNING

95 West Main Street
P.O. Box 1088
Benton Harbor, MI. 49023
T 269.927.2295
F 269.934.7146
www.abonmarche.com

MANISTEE, MI
SOUTH BEND, IN
FORT WAYNE, IN

PROJECT:
BENTON HARBOR
WATER FILTRATION PLANT
RENOVATIONS
BENTON HARBOR, MICHIGAN

SHEET TITLE:
PROPOSED PROCESS
FLOW DIAGRAMS

DRAWN BY: GNF
DESIGNED BY: rs
PM REVIEW: kcm
QA/QC REVIEW: Century
DATE: 9-30-09
SEAL:

SIGNATURE:
DATE:

HARD COPY IS INTENDED TO BE 24" X 36" WHEN PLOTTED. SCALE(S) INDICTED AND GRAPHIC QUALITY MAY NOT BE ACCURATE FOR ANY OTHER SIZES

SCALE: NONE
Unless Noted Otherwise

ACI JOB # M8-0668

SHEET NO. PF-2