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VOLUME 102 JANUARY 2014 - JUNE 2014 NUMBERS 1-6

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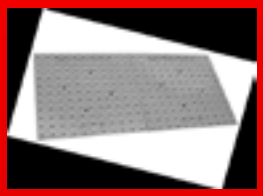

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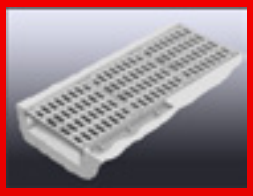

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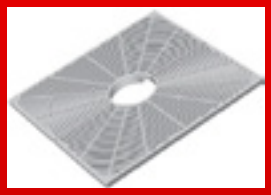

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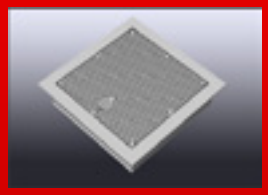

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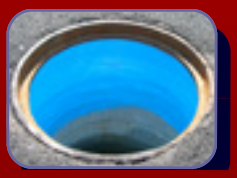

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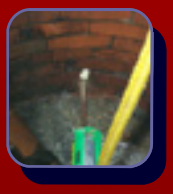

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Members of the conference are indebted to those members and others who have contributed articles and other materials for this publication.

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*Error correction: The *Official Bulletin* staff would like to applogize for the following errors made in the Winter Issue Volume 101, Numbers 10-12. The captions on the photograph on page 18 should read Dale Neubauer, and the caption for the photograph on page 64 should read Eric Dodds. The editor regrets these errors.

CONFERENCE BUSINESS PHONE: **701-328-6622**
The advertising contained in the *Official Bulletin* describes the products and services offered by companies in the water and wastewater industries. The listings are paid advertising. The publishers of the *Official Bulletin*, members of the North Dakota Water and Pollution Control Conference, and the water and wastewater organizations that support its publication are not responsible for the accuracy of the advertisements nor any claims made therein.

On the cover: Photos of the 54th Annual North Dakota Water and Pollution Control Operator Training, Bismarck, North Dakota. Photos by Justin Feld

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The objectives of this Conference shall be: the advancement of the knowledge of design, construction, operation and management of water and wastewater systems; the promotion and encouragement, through annual meetings or otherwise, of an exchange of information and experience among its membership; the promotion and encouragement of the protection of public health and improved environment through the construction and efficient operation of water supply and wastewater treatment facilities; and the promotion of water and wastewater system operator education and certification programs.

Article II of the Constitution of the
North Dakota Water and Pollution Control Conference

To receive the *Official Bulletin* electronically or to no longer receive a paper copy, email Justin Feld at jfeld@nd.gov, or call 701-328-6624.

To access past issues of the *Official Bulletin* on the web, go to: http://www.ndhealth.gov/MF/ and click on "publications."

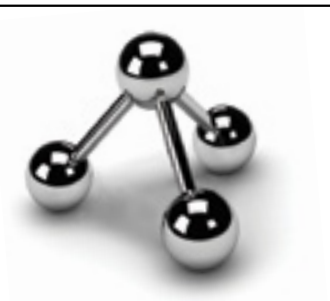
Lead Reduction Act and Fire Hydrant Confusion

by Greg Wavra, Drinking Water Program Manager, North Dakota Department of Health

The federal Reduction of Lead in Drinking Water Act was enacted on January 4, 2011 and reduced the amount of lead permissible in most system components. Specific exemptions to the law were given to service saddles, distribution main gate valves two inches in diameter and larger in size, and other devices utilized exclusively for non-potable uses. The Act gave the waterworks industry three years to transition to low-lead components. The requirements of this law took effect January 4, 2014.

In response to this act, changes were made to ND Admin. Code Article 62-03.1, Plumbing Installation Standards. Prior to the changes, the Impacted Lead Ban Provisions read as follows:
Water pipe and fittings with a lead content which exceeds eight (8) percent shall be prohibited in piping systems used to convey potable water.

A hearing was held October 18, 2013 on proposed changes to this provision which were subsequently enacted. The provision now reads:
Lead content. Water pipe and fittings with a lead content which exceeds eight (8) percent shall be prohibited in piping systems used to convey potable water. Effective January 4, 2014, the maximum allowable lead content shall not exceed a weighted average of zero point two five (0.25) percent with respect to wetted surfaces of pipes, pipe fittings, plumbing fittings, and fixtures used to convey or dispense water for human consumption.



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The federal Act did not mention fire hydrants specifically, but, due to the non-potable normal use of fire hydrants, the waterworks industry and manufacturers had assumed the fire hydrants were not required to comply with the requirements of the Act. Confusion arose in October of 2013 when the Environmental Protection Agency (EPA) issued written guidance concerning the Act and made that guidance available on the EPA website. This guidance indicated that fire hydrants are occasionally used for drinking water purposes under some emergency situations. During the months of November and December 2013, there was a flurry of activities as the waterworks industry reacted to the news that fire hydrants would be subject to the requirements of the Act. A letter, jointly signed by the American Water Works Association, National Rural Water Association and others, petitioned EPA to revise its guidance and to indicate that hydrants were exempt from the requirements of the Act.

On a separate front, the U.S. House of Representatives sponsored Bill HR 3588, titled Community Fire Safety Act, that passed both the House and Senate and was signed into law on December 20, 2013.

On December 20, 2013, EPA revised its guidance and indicated that fire hydrants are exempt from the requirements of the Act once the Community Fire Safety Act of 2013 is enacted. This Act has since been enacted.

Now that it is clear that fire hydrants are not required to comply with the requirements of the Act, utilities can proceed to utilize their fire hydrant inventory that they have on hand. However, water systems need to remain aware that in March 2013 the National Sanitation Foundation (NSF) Standard 61 was modified to cover fire hydrants under the standard. The testing protocol for NSF 61 certification will ensure that the normally wet components of the fire hydrant will not impart contaminants of concern into the drinking water system. The North Dakota Department of Health's Rules and Regulations pertaining to Public Water Systems require that components used in all public water systems be certified in accordance with NSF Standard 61.

Governor Proclaims Public Works Week in North Dakota

Bismarck, North Dakota

Gov. Jack Dalrymple has proclaimed May 18 through 24, 2014, as Public Works Week in North Dakota.

Public Works Week is observed annually to celebrate the contributions of public works professionals, including those who manage community water, sewer, public transportation and refuse-removal systems, as well as those who are responsible for maintaining public buildings and grounds.

"We value our communities and the role public works professionals play in keeping them safe and functioning smoothly," said Chuck Abel, executive secretary for the North Dakota Chapter of the American Public Works Association. "Public works professionals maintain and improve the systems and services vital to a community's health, safety and comfort."

For more information about Public Works Week, contact Chuck Abel, at 701.328.5207.

WHEREAS, public works infrastructure, facilities and services are of vital importance to the health, safety and well-being of the people of North Dakota; and

WHEREAS, it is important for the citizens and civic leaders of this state to gain knowledge of and to maintain a progressive interest in the public works needs and programs of their respective communities; and

WHEREAS, public works professionals, engineers and administrators are responsible for and must design, build, operate and maintain the transportation, water supply, sewage and refuse disposal systems, public buildings, and other structures and facilities essential to serving our citizens; and

WHEREAS, North Dakota's public works professionals, engineers and administrators should be recognized for their dedication and contributions to the growth, development and stability of our state.

NOW, THEREFORE, as Governor of the State of North Dakota, I do hereby proclaim May 18-24, 2014, PUBLIC WORKS WEEK in the state of North Dakota.

Jack Dalrymple
Governor

left to right: Terry Boehm, North Dakota Chapter of the American Public Works Association; Governor Jack Dalrymple; Chuck Abel, North Dakota Chapter of the American Public Works Association

City of Fargo Water Treatment Plant Pilot Study

by Brian R. Bergantine, P.E., AE_2S; and Qigang Change, PhD, P.E., AE_2S

The City of Fargo is preparing to begin construction of a three-year Water Treatment Plant (WTP) upgrade that will effectively remove elevated sulfates from Sheyenne River water, which serves as a water supply source for Fargo. Fargo leaders began planning for a future expansion several years ago because they knew the WTP would need to handle increasing sulfate concentrations and greater water demands.

Fargo's primary water source is the Red River, but the WTP also draws raw water from the Sheyenne River, which has high sulfate concentrations due to discharges from Devils Lake. Fargo's existing WTP was not designed to remove the high sulfate concentrations. The City of Fargo contracted with Advanced Engineering and Environmental Services, Inc. (AE_2S) to begin a Reverse Osmosis (RO) pilot study in July 2011. Due to dramatic seasonal variations in water quality of the source water, it was determined by the AE_2S project team that the RO pilot study should be conducted over an entire year to investigate both cold and warm seasonal impacts. The team also wanted to capture the seasonal characteristics of the Sheyenne River water quality, particularly during spring runoff.

High Sulfate Concentrations

The State of North Dakota has constructed emergency outlets to discharge floodwater into the Sheyenne River to alleviate the substantial impact of Devils Lake flooding. Although the operation of the emergency outlets has helped alleviate problematic flooding on Devils Lake, it has also led to increased sulfate concentrations in the Sheyenne River, which pose water quality and treatment issues for the City of Fargo. Devils Lake has high total dissolved solids (TDS) concentrations and the release of the sulfate-laden floodwater causes a degradation of the downstream water quality in the Sheyenne River.

The City of Fargo's existing conventional lime softening WTP relies on the Sheyenne River as a raw water supply source approximately 40 percent of the time, but it is not currently capable of removing sulfates. In WTPs that are not designed specifically to remove sulfates, a salty or mineral taste can occur in the tap water. Sulfates can cause gastrointestinal upset in vulnerable populations such as infants and the elderly, as well as visitors to the area whose bodies are not accustomed to the sulfate levels concentrations. It is possible for consumers to become acclimated to elevated sulfate concentrations, but since Fargo routinely switches between the Red River and the Sheyenne River for its source water, customers would struggle to acclimate to the elevated sulfate concentrations in their drinking water.

A study by the US Geological Survey (USGS) predicted that sulfate concentrations in the Sheyenne River will reach 750 milligrams per liter (mg/L) in the lower Sheyenne River at Fargo with the two emergency outlets operating at 600 cubic feet per second (cfs). On April 1, 2013, the Fargo WTP's weekly source water monitoring program detected a sulfate concentration of 894 mg/L in the Sheyenne River. When the current Fargo WTP was constructed, the historic average sulfate concentration in the Sheyenne River at Fargo was approximately 160 mg/L. Additionally, the Environmental Protection Agency's secondary standard for sulfate in drinking water is 250 mg/L. The North Dakota Department of Health also recommends a drinking water sulfate concentration of 250 mg/L.

Year-long Pilot Study

Pilot studies are generally completed in three to six months, but the project team of AE_2S, Black & Veatch (B&V), and the City of Fargo wanted to thoroughly investigate the changing water quality over all four seasons because of the wide temperature fluctuations. "The study was conducted over a full year in order to allow for the dramatic seasonal variations in water quality in North Dakota's source waters. We wanted to study cold and warm water seasonal impacts, as well as capture the water quality differences within the Sheyenne River - particularly during spring runoff," explained AE_2S Operations Manager Eric Dodds, PE. AE_2S' Instrumentation and Controls group integrated monitoring assistance into the WTP's existing Supervisory Control and Data Acquisition (SCADA) system so the team could watch the RO performance closely. This allowed the project team members to assist the City of Fargo WTP staff by providing another set of eyes on the monitoring of the pilot equipment. This was especially important when chemical feed pumps became air bound or weren't operating properly in the middle of the night or on weekends.

Pilot Study Results

An integrated membrane solution, consisting of membrane filtration and RO, was recommended as the preferred technologies for the Fargo WTP in the 2012 WTP Facility Plan, but the project team wanted to investigate the feasibility of RO technology for two treatment scenarios - polishing and parallel. Since membrane applications are very site-specific, the pilot study was critical in order to check the feasibility of the membrane technology, as well as to establish key design parameters. During the pilot operations, it was found that the RO membranes experienced rapid fouling in the polishing scenario, which used RO to further treat filtered water from the City's existing WTP and which had already undergone pretreatment, lime softening, ozone, and granular filtration processes. RO membranes exhibited superior performance in the Parallel Scenario, which utilized a separate treatment process involving pretreatment plus membrane filtration using microfiltration/ultrafiltration (MF/UF), plus RO in an operation parallel to the existing WTP processes. RO membrane autopsies were performed as a part of the pilot study to determine the primary fouling characteristics under the two treatment scenarios. The autopsies indicated that organic and biological membrane fouling contributed to the majority of the fouling in the polishing scenario, while organic and scaling fouling was more prevalent for the parallel scenario. Optimization studies were performed in the Parallel Scenario to determine optimal coagulation conditions for pretreatment as well as flux, recovery, and membrane cleaning regimes for both the MF/UF and the RO.

Although not a standard part of typical pilot studies, an RO membrane selection pilot was also conducted at the Fargo WTP for both polishing and parallel scenarios to evaluate four different RO membrane elements from four manufacturers. The membrane selection pilot proved very valuable as one particular RO membrane element, a top performer in other parts of the country, could not be cleaned adequately after exposure to the unique water quality conditions of the Sheyenne River water. Without the product testing through the pilot study, the City of Fargo potentially could have wasted millions of dollars on RO membrane elements that were not the best option for the local water conditions.

The RO pilot study verified that a robust and stable pretreatment is critical to membrane performance. An extensive pretreatment optimization was performed in the pilot study to identify the appropriate coagulant, coagulant dose, coagulation pH, and mixing energy to improve both the MF/UF membrane and RO operations. The optimization study provided the Fargo WTP staff with a matrix to determine the most cost-efficient way to operate the pretreatment unit in the future to meet the treatment goal of 25 to 30 percent total organic carbon (TOC) reduction, as well as settled water with turbidity less than three Nephelometric Turbidity Units (NTUs). The study also evaluated various RO membrane fluxes, recoveries, and membrane cleaning regimes. The recommended membrane cleaning regime can recover 90 to 95 percent of RO membrane permeability in the parallel Scenario.

The one-year pilot study proved that RO technology is feasible to reduce sulfate concentrations to acceptable levels in the City's finished water, and the results of the study are being incorporated into the Fargo WTP expansion project's design. Construction on the WTP expansion is set to begin in late August 2014, and wrap up in 2017.

The Fargo WTP Pilot Study recently won an American Council of Engineering Companies (ACEC) 2014 Engineering Excellence Award in the Studies, Research, and Consulting Engineering Services category.

NDWPCC Joint Board Meeting Minutes

January 22, 2014, Mandan, ND

A meeting of the Joint Board of Directors of the North Dakota Water and Pollution Control Conference (NDWPCC); North Dakota Water Environment Association (NDWEA); North Dakota Chapter of the American Public Works Association (NDCAPWA); North Dakota Section of the American Water Works Association (NDAWWA); and North Dakota Chapter of the North American Stormwater and Erosion Control Association (NASECA-ND) was held on January 22, 2014, in the Pier 7 Room of the Seven Seas Inn, Mandan, ND. President Dean Sletten called the meeting to order at 10:32 a.m. President Sletten asked those in attendance to introduce themselves and to sign the attendance sheets being circulated. Copies of the meeting agenda and 2013 NDWPCC financial report were also provided. The following board members and guests were present: Chuck Abel, Mike Berg, Terry Boehm, Mike Brisben, David Bruschwein, Dustin Dale, Justin Feld, Bill Gefroh, Shawn Heinle, Jeff Heintz, Jeff Hruby, Dan Jonasson, Murthy Kasi, Dennis Larson, Wei Lin, Lance Meyer, Bobby Nasset, Karla Olson, Melanie Parvey, Colleen Peterson, Mark Peterson, Derrick Placek, Meredith Quinn, Reed Schwartzkopf, Dean Sletten, Jason Sorenson, Gregg Stewart, Larry Thelen, Greg Wavra, and Gary Zuroft.

For the first order of business, President Sletten called for a motion to dispense with the reading of the minutes from the October 22, 2013 joint board meeting and October 24, 2013 NDWPCC business meeting in Grand Forks, and approve the minutes in the *Official Bulletin* or the copy mailed to all board members. Dan Jonasson so moved, Murthy Kasi seconded, and the motion carried.

Next, President Sletten called for the Treasurer's Report. Mike Brisben read the 2013 NDWPCC financial report which showed a net loss of $7,502.79 and total assets of $99,891.38. President Sletten asked for any other discussion. Larry Thelen questioned the reason for the net loss. Mr. Brisben noted that the cost for the 2013 conference was greater than in previous years and that payments that were charged in 2013 were still being received. Hearing no further discussion, President Sletten called for a motion to approve the Treasurer's Report. Wei Lin so moved, Dan Jonasson seconded, and the motion carried.

Next, President Sletten called for the Auditing Committee Report. Mike Berg stated that a software problem was discussed and has been resolved and that NDWPCC financial records were in order.

Reed Schwartzkopf noted that previous reports fluctuated and that even with the 2013 net loss, NDWPCC finances were solvent showing an average profit over the past several years of $5,000 per year.

Continuing with old business, President Sletten called for an update on the 2014 Conference in Fargo. Mr. Brisben noted that several board members from Fargo were unable to attend today's meeting and that a local arrangement committee meeting would be scheduled prior to the next joint board meeting and a report would be put on the agenda.

Next, President Sletten noted that Joe Ferguson had submitted a proposal for Grand Forks to host in 2018 to the NDWPCC executive committee. Mr. Brisben reviewed the proposal which included a $3,500 donation from the Grand Forks Convention and Visitors Bureau (GFCVB) and a meeting room discount from the Alerus Center. Mr. Brisben noted that additional out of pocket costs would be approximately $1,200.00. Meredith Quinn asked if registration fees could be increased to cover the costs. Mr. Brisben noted that he would approach the city of Grand Forks for assistance similar to what was provided in 2013, and that raising registration fees would be another option. Mr. Brisben indicated that earlier dates were still not available in Bismarck unless the joint boards were to consider a Monday thru Wednesday conference, October 22-24, 2018.

Next, President Sletten asked for a report on the 2013 conference in Grand Forks. Mr. Brisben noted that a total of 396 people pre-registered with 386 able to attend. People served during the business luncheons were 177 Tuesday, 281 Wednesday, and 148 Thursday. The Wednesday breakfast served 290 and 227 attended the awards banquet. The city of Grand Forks can be thanked for the Tuesday evening reception. Attendance at the pre-conference Disaster Management Workshop and the Mobile Workshops (Membrane Treatment and Public Works/Greenway) were 38, 16, and 10, respectively.

President Sletten asked for discussion on the 2019 conference. Mr. Brisben reviewed the dates available in Minot, Fargo, Grand Forks, and Bismarck. Gary Zuroft asked what space was needed and indicated that Dickinson might be ready to host in 2019. Mr. Brisben noted the 2019 dates would be revisited at the May meeting and that a call for a vote to reserve a site would be needed. President Sletten called for any other old business.

Hearing none, President Sletten asked that the joint boards provide Mr. Brisben a list of topics and presenters by the next meeting. Colleen Peterson asked if the stormwater session could be scheduled so they don't overlap. Mr. Brisben noted that the schedule varies depending on the length (30/60 minutes) and number of topics for each association, but he would try to accommodate. David Bruschwein asked if operator and/or management tracks could be considered. Mr. Brisben indicated tracks similar to the Rural Water Expo would be more difficult because of the interests of the joint boards, and unlike the spring training sessions, not many topics are specifically just for operators. Murthy Kasi asked if student/YP topics would be accepted. Mr. Brisben noted that four requests to present were received in 2013.

Next, President Sletten called for a report on the 2014 water and wastewater operator training program. Mr. Brisben indicated the announcement was mailed in early January and that six sessions (four water and two wastewater) had been scheduled for March and April.

Next, President Sletten asked for discussion regarding publishing the *Official Bulletin*. Mr. Brisben indicated that the Health Department was feeling the impact of oil activity and asked if any of the associates represented by the joint board members would be willing to assist. Mr. Brisben said Image Printing would be willing but would charge $35 per page plus printing. Mr. Brisben noted that the last three issues totaled 172 pages, and setup costs plus printing would be approximately $21,000 with advertising bringing in $14,000. Justin Feld, *Official Bulletin* editor, indicated that the spring issue published in June and the conference issue published in September overlap with the Department's facilities inspection season, which generally runs from May through September. Mr. Feld noted that he handles the northwest region where the Department has seen the greatest increase in water and wastewater systems.

Mr. Feld described the In Design software being used and said that each issue requires approximately two weeks preparation prior to printing. Ms. Quinn asked what specifically was needed. Mr. Feld indicated that followup with Image Printing and page set up during preparation would be helpful, if he is in the field.

Next, President Sletten called for any other new business. Hearing none, President Sletten called for a motion to dismiss. Karla Olson so moved, Dan Jonasson seconded, and the meeting adjourned at 11:21 a.m.

The NDAWWA can be thanked for the refreshments and noon luncheon.

Respectfully submitted,

Mike Brisben
Secretary/Treasurer

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Student Poster Competition

by: North Dakota Young Professionals

The Students and Young Professionals (YP) Poster Competition took place on Tuesday, October 22, 2013, during the North Dakota Water and Pollution Control Conference (NDWPCC) in the Alerus Center in Grand Forks, N.D. The event was organized by the North Dakota Water Young Professionals (YP) Committee, with strong support from the conference organizers.

left to right: Adam Zach, Dhriti Roy, Kevin Young, Jacob Stombeck, and Murthy Kasi

The poster session was organized as an opportunity for students and YPs to present their design and research works in the water and wastewater fields to fellow section members. The event showcased 13 posters, with topics ranging from research in water and wastewater treatment, surface water quality, and water resources management to design in water treatment. In addition to the regular practice of identifying the top three posters and selecting the top poster in the water treatment category, selection of the top poster in the wastewater category was also included in this year's poster competition. Adam Zach of Advanced Engineering and Environmental Services won the first place overall and received the scholarship of up to $1,500 to cover his trip expenses to present his poster at American Water Works Association's Annual Conference and Exhibition (ACE14) in Boston in June 2014. Dhriti Roy of the Department of Civil Engineering at North Dakota State University (NDSU) was named the top poster in the wastewater section and second place overall, receiving a $100 prize from the North Dakota Water Environment Association (NDWEA). Kevin Young of Moorhead Public Services and Jacob Strombeck of Advanced Engineering and Environmental Services, Inc. were tied for third place in the overall competition. Summary articles of all these winning posters are presented in the following pages.

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Potential Drought Conditions and Water Quality Impacts Prompt UF & RO Pilot Study in Grand Forks, N.D.

by Adam Zach and Matt Erickson, AE_2S

Due to aging infrastructure, potential regulatory challenges, and long-term water demand and capacity concerns, the City of Grand Forks, N.D. is currently in the planning stages for a new water treatment plant. Prior to 2012, the preferred treatment technology consisted of pretreatment, lime softening, ozone/advanced oxidation processes, and biologically activated carbon (BAC) filters, chosen based on a series of facility tours, treatment technology comparisons, and ozone/BAC piloting. Recently, a significant change to the City's source water quality occurred due to regional drought conditions and upstream basin impacts of Devils Lake (Figure 1). This prompted a six-month membrane pilot study consisting of pretreatment (three-stage flocculation and inclined plate settlers), ultra filtration (UF), and reverse osmosis (RO) to address the water quality challenges.

The pretreatment objectives of turbidity and organics removal were found to be acceptable and most beneficial at a pH of around seven, using polyaluminium chloride (PACL) as the coagulant. This resulted in effluent water quality typically below 3 Nephelometric Turbidity Units (NTU) with Total Organic Carbon (TOC) removal near 50% in winter and approximately 30% during summer.

The UF produced acceptable filtrate water quality (less than 0.03 NTU). One "sludge" event occurred during winter operations which ultimately led to the conclusion that pretreatment operations and the type of organics, not necessarily the quantity of organics, in the source water play an important role in membrane fouling. The final UF recovery clean (after six months of operations) indicated no signs of irreversible fouling.

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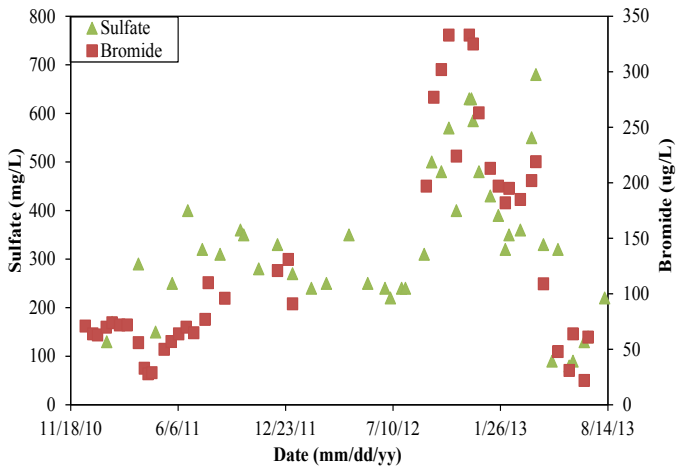


Figure 1. Devils Lake Impacts on Red River Water Quality.

The RO pilot units provided excellent downstream water quality in terms of inorganic removal (greater than 97.5 percent removal), trace organic removal (removed all herbicides, pesticides, and pharmaceuticals present in feed water), and reduced disinfection by-product formation by approximately 25-65 percent (as compared to full-scale distribution system). However, some unique source water quality challenges (primarily unique and high concentrations of organic substances) ultimately led to signs of accelerated, irreversible organic/inorganic fouling complexes.

The RO-accelerated, irreversible fouling (although not completely known) was attributed to (1) high pH cleaner – a variety of high pH cleaners were used showing mixed results, but the originally recommended high pH cleaner from Avista (P312) actually caused a loss of permeability, which was shown in pilot and autopsy results; (2) high system/element recoveries – the pilot systems were operated between 82 percent and 85 percent recovery, which may have been too aggressive for the challenging source water, (it is anticipated that lower system recovery and higher cross-flow velocity could have improved system performance dramatically); and (3) source water characteristics – it is also possible the complex characteristics of the Grand Forks source (specifically organic constituents) simply provoke higher fouling rates. Grand Forks' high-organic source waters exceed typical RO feed water quality. Interestingly, there were no signs of biological fouling.

The pilot study established a new benchmark for the City of Grand Forks in regard to applicable membrane technology. Most importantly, it provided evidence that membrane technology could be considered for full-scale implementation. Implementation, however, would need to consider how the unique source water challenged each unit process, resulting in a variety of operational strategies/considerations moving forward. The pilot study, in combination with previous project work (current facility condition evaluation, water demand projections, treatment technology investigations, facility tours, and an ozone/BAC pilot study laid the foundation for consideration for a new treatment technology option – labeled the "Hybrid" alternative. This alternative consists of a conventional lime softening treatment train with ozone and BAC filters, run parallel to an UF and RO membrane train which will be blended together before being sent to the distribution system. The selection was based upon a Kepner-Tregoe decision analysis, as well as comparable capital and O&M cost estimates, and is capable of handling the current and potential future water quality challenges facing Grand Forks (Figure 2).

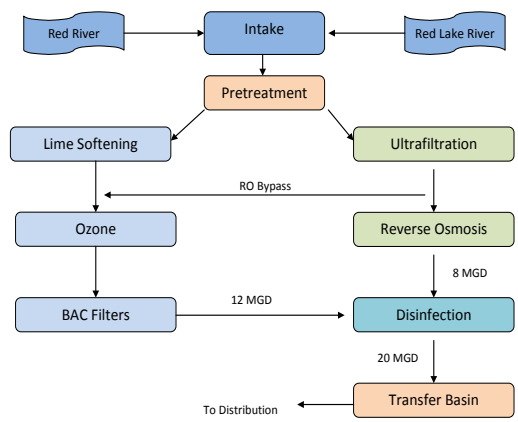


Figure 2. Potential "Hybrid" Alternative Treatment Technology

Mr. Adam Zach is an engineer at AE_2S in its Grand Forks, N.D. office. He obtained his Bachelor of Science and Master of Science Degrees in Civil Engineering from the University of North Dakota. His experiences include potable water piloting with water quality analysis for pretreatment, ozone, advanced oxidation, biological filtration, granular-activated carbon, ultrafiltration, and reverse osmosis. His project work has included preliminary engineering, design services, plant operations and support, potable water quality and blending analysis, and construction observation and administration.

Modeling of Temperature Impacts on Fixed Film Microbial Growth and Nitrification Kinetics

by: Jacob Strombeck and Corey Bjornberg, North Dakota State University, AE$_2$S/City of Rochester

Kinetic models, which are commonly used in simulating microbial growth in biological wastewater treatment systems, suggest significant decreases of substrate utilization at lower temperatures. However, treatment plants and researchers have documented that performance of fixed film treatment systems are not hindered with declining temperatures, but rather substrate removal stays relatively consistent even at wastewater temperatures as low as 10 °C during winter months. A previous study at the Moorhead, Minn., wastewater treatment plant showed significant impact of temperature on biofilm growth in its moving bed biofilm reactor (MBBR) as shown in Figure 1. However, overall performance of the MBBR remained relatively stable. It is understood that biofilm kinetic and substrate removal rates decrease with declining temperature; however, performance of biofilm systems, as in the case of the Moorhead MBBR, is not hindered by the temperature decline. To further study the temperature impacts to fixed film growth, degradation kinetics and the difficulty of applying kinetic models to fixed film systems, (specifically related to the Moorhead MBBR), this study was undertaken and involved the development of the diffusion and biological degradation-based kinetic models for fixed film applications. A series of bench-scale trials were performed to simulate the operation of Moorhead MBBR at various temperatures

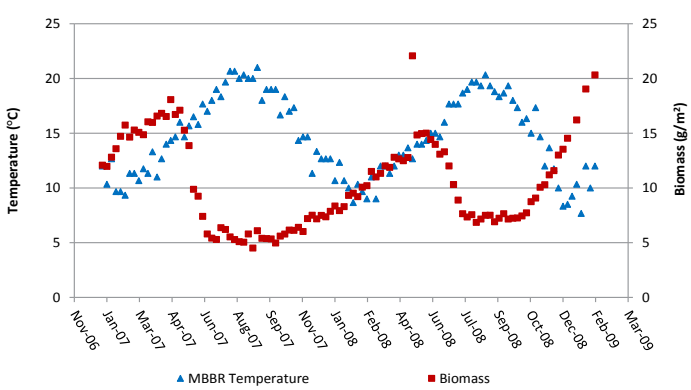


Figure 1. Relationship between temperature and biomass in the Moorhead MBBR

and measure ammonium nitrogen removal. Each trial involved collecting the plastic media with active biological growth directly from the MBBR right before the experiment, filling the reactor (Figure 2) with un-nitrified water from the influent to the full-scale MBBR and running the reactor as a batch system.

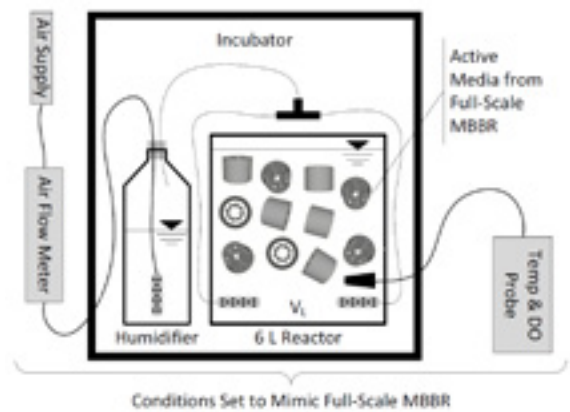


Figure 2. Nitrogen removal bench-scale trials reactor diagram

An image of the plastic media with attached biomass is shown in Figure 3. Within the reactor, the media fill percentage (amount of reactor volume filled with the plastic media), water temperature, and airflow rates were set to be nearly identical to those of the MBBR. This was done in an effort to measure ammonium nitrogen removal that is indicative of what is happening in the full-scale MBBR. Biomass attached on the media (Figure 3) was measured, and an image analysis was carried out to determine biofilm surface area and

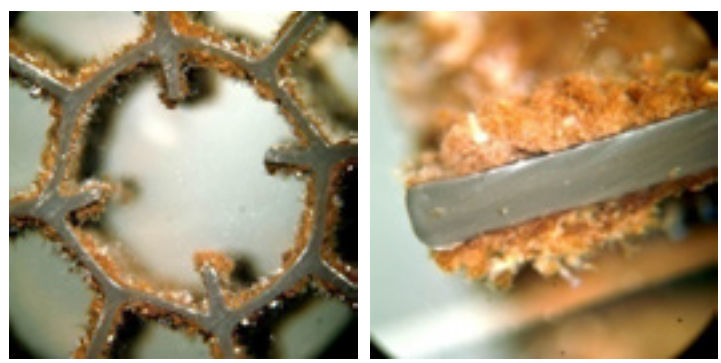


Figure 3. Attached biomass image analysis example

thickness, which were used to calculate the biofilm density and to determine the biofilm geometry. This information was analyzed to determine if changes in temperatures induce changes in the amount of attached biomass or changes to biofilm properties.

From the image analysis, it was found that the biofilm thickness and surface area significantly increased when more biomass was present, which corresponded to colder water temperatures. A diffusion-based Monod kinetic model was then developed to simulate the ammonium nitrogen removal from the bench-scale trial.

The model was also developed to incorporate different biofilm thicknesses, surface areas, and densities at different temperature conditions. Overall, the diffusion-based models and Monod kinetics were able to fit the experimental data and work well for fixed-film systems, as long as the temperature-induced changes in biofilm properties are accounted for within the model (an example of bench-scale trial data and model results are shown in Figure 4). The increased biomass and increased biofilm surface area present in colder conditions offset the effects of decreased kinetics and allow for unhindered performance of fixed-film systems in colder conditions.

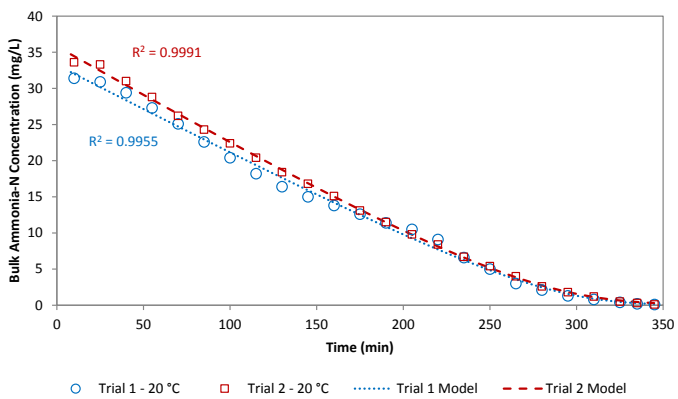


Figure 4. Bench-scale trials 1 and 2 and corresponding model simulations

The Monod kinetic parameters obtained from each trial were evaluated, and the results indicate that the commonly used temperature correction method works well as shown in Figure 5. Therefore, to properly apply Monod kinetics to fixed-film systems, the kinetic parameters need to be adjusted for temperature, and the temperature-induced changes to biofilm properties needed to be included. The significance of the findings includes improved understanding of how biofilm growth and performance are affected by temperature, leading to better model development and improved design methods.

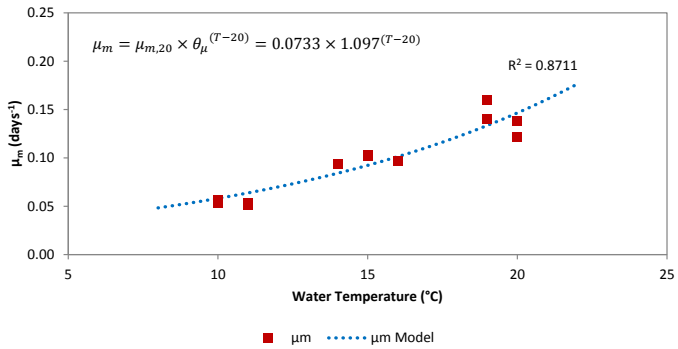
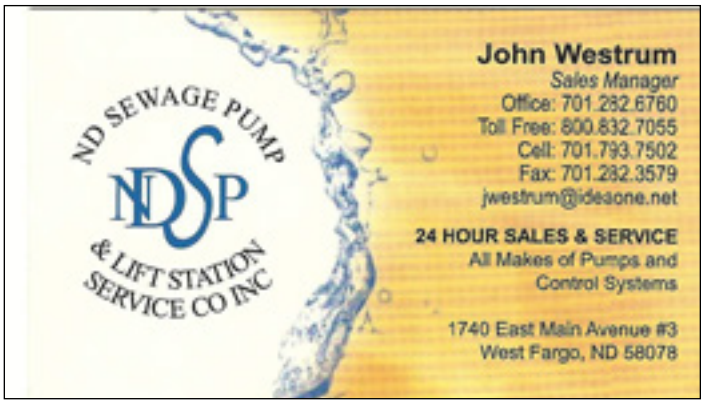
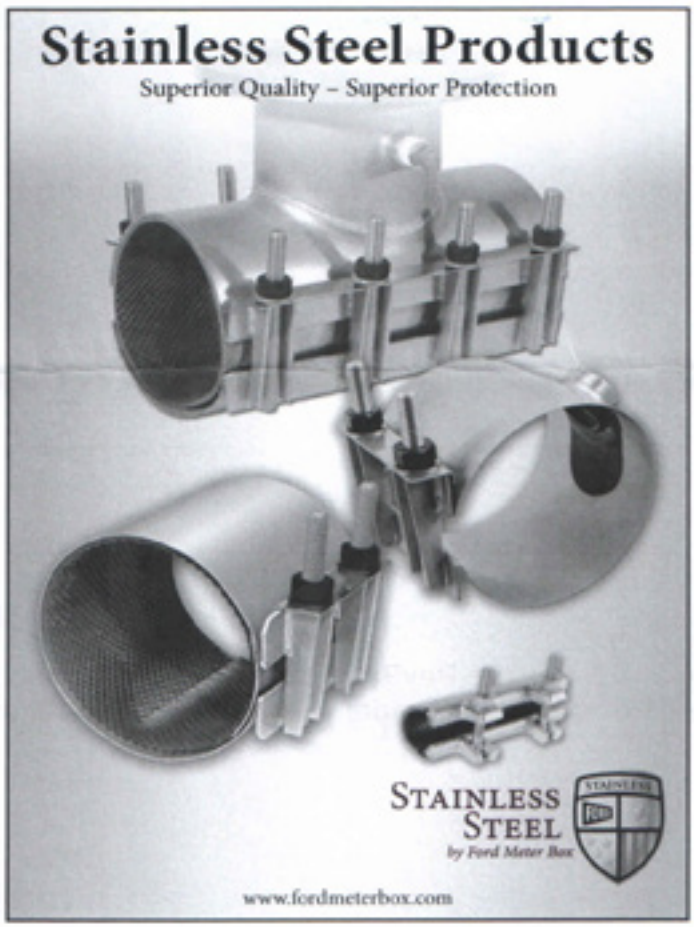


Figure 5. Monod maximum specific growth rate (μ_m) versus water temperature

Mr. Jacob Strombeck is an engineer in the Fargo, N.D. office of the consulting firm Advanced Engineering and Environmental Services, Inc. (AE_2S), a consulting engineering firm with offices located in North Dakota, Minnesota, and Montana. Mr. Strombeck has five years of experience and specializes in project development including planning, funding, and preliminary design for a variety of water and wastewater treatment plants in the region. Mr. Strombeck holds a Bachelor's Degree in Civil Engineering and a Master's Degree in Environmental Engineering from North Dakota State University. The research work presented was developed as part of Mr. Strombeck's Master's Degree.





Abundance of Ammonia Oxidizing Archaea in Two-Stage Trickling Filters and Moving Bed Biofilm Reactor

by Dhriti Roy, John McEvoy, Mark Blonigen, Maria Amundson and Eakalak Khan, North Dakota State University, City of Fargo and City of Moorhead

The oxidation of ammonium to nitrite, the first step in nitrification, is performed by ammonia-oxidizing prokaryotic organisms. Microbial ammonia oxidation was thought to be solely carried out by ammonia-oxidizing bacteria (AOB) in wastewater treatment plants (WWTP) until the detection of ammonia-oxidizing archaea (AOA). Moreover, recent studies have identified AOA as the main contributor to nitrification. However, the role of AOA in nitrification has not been studied in wastewater treatment systems. In addition, AOA detection has only been done in the activated sludge systems, and their detection in attached growth systems, particularly in trickling filters (TF) and in moving bed biofilm rectors (MBBR), is yet to be confirmed. This study was conducted to investigate the presence and activity of AOA in TF and MBBR biofilm. The presence of AOA and AOB has been detected by *amoA gene*, which is responsible for ammonia oxidation. The study provided the first comprehensive insight into the key ammonia-oxidizing microbial groups in full-scale TF and MBBR systems.

Biofilm samples were collected from the TF system in the City of Fargo's WWTP and the MBBR system in the City of Moorhead's WWTP. Deoxyribonucleic acid (DNA) was extracted from these samples to conduct molecular and microbiological studies. Quantitative polymerase chain reaction (qPCR), a molecular technique, with specific primers was used to determine the absolute quantity of the *amoA gene* (Figure 1a-1e). The quantification of *amoA* helped to determine how many AOA and AOB cells were present in the sample. DNA-stable isotope probing (SIP), a microbiological technique, was conducted to determine if AOA cells contributed to ammonia removal.

Study results showed the presence of AOA *amoA* in both TF and MBBR biofilm (Figure 1f) and the *amoA* corresponding to AOA outnumbered the *amoA* corresponding to AOB. The number of AOA cells was higher in TF than those in MBBR. The AOA *amoA* were higher during warm periods (March-September) than cold periods (October-February).

This first time detection of AOA in both TF and MBBR biofilm opens the scope to do more research in the nitrification process within engineered systems. Although our current results showed the presence of AOA in both TF and MBBR, further investigation is needed to confirm the role of AOA in the ammonia conversion process. The DNA-SIP study is ongoing and will help us in understanding the role of AOA in ammonia oxidation within engineered systems.

Understanding the role of AOA relative to that of AOB will help in optimizing the ammonia removal kinetics in attached growth systems. The current research is at the preliminary stages and confined to the laboratory scale involving the use of expensive molecular tools. Future research and pilot scale experiments should focus on understanding the kinetics and determining the kinetic constants that will help in a better design and operation of attached growth systems.

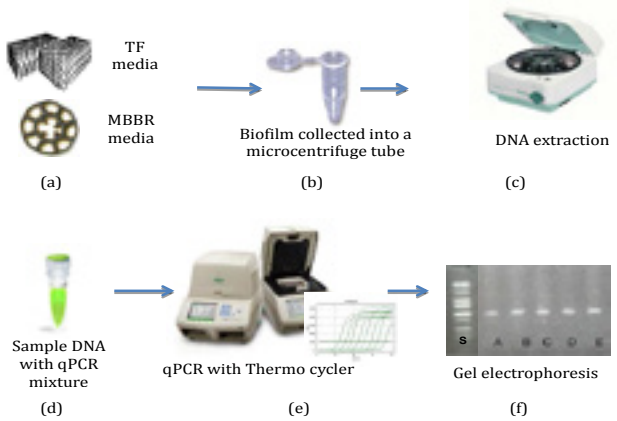


Figure 1. Schematic of (a) & (b) sample collection, (c) DNA extraction, (d) & (e) qPCR protocol and (f) the results from gel electrophoresis. Gel electrophoresis shows DNA fragments from samples A, B, C, D and E. The location of these DNA fragments are compared with the bands on standard (S in Figure 1f) to confirm the presence of *amoA*.

Dhriti Roy is a PhD student in the Environmental and Conservation Sciences Program at North Dakota State University, Fargo, N.D. She received her Master's Degree in Marine and Environmental Biology from Nicholls State University, Thibodaux, LA and her Bachelor's Degree in Botany from Kalyani University, India. Her doctoral dissertation research is focused on understanding nitrification process by ammonia oxidizing archaea in engineered systems.

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Prevention of Bromate Formation in the Moorhead Water Treatment Plant

by: Kevin Young
Department of Civil and Environmental Engineering, North Dakota State University

Although the mechanisms and pathways for bromate formation have been well established, research regarding the formation and control of bromate in full-scale ozone water disinfection processes is lacking. A two- year study was carried out at the Moorhead Water Treatment Plant (MWTP) focusing on the impact of operational conditions and source water selections on bromate formation in the plant's ozone disinfection system. Ozone used in the water treatment process can oxidize bromide, (naturally occurring in MWTP's source water), into bromate, which has a maximum contaminant level (MCL) of 10 parts per billion (ppb) in drinking water. Goals of this research were to identify key parameters that affect bromate formation and to develop strategies to minimize finished water bromate concentrations through operational controls and the use of optimal combinations of surface water and groundwater sources.

Samples from the surface water source, (the Red River of the North), and wells in two groundwater aquifers were taken for bromide analysis to determine the potential for bromate formation. A sampling plan was implemented at MWTP to monitor bromate concentrations in different sections of the ozone chamber (Figure 1). Based on literature review, parameters known to affect bromate formation including bromide concentration, pH, organics content, temperature, and ozone dose, were also measured.

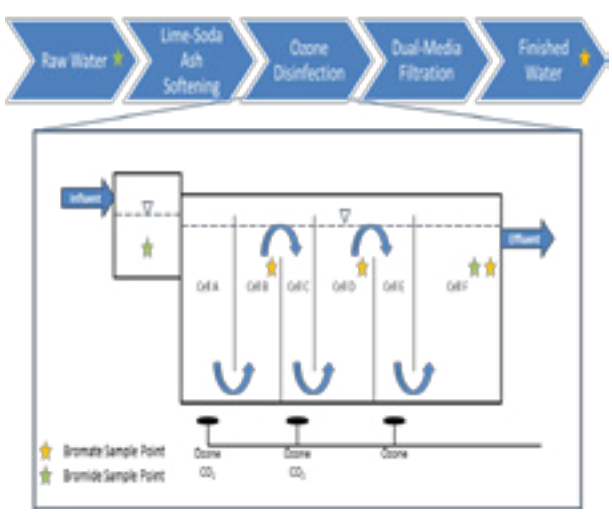

Figure 1: Bromide/Bromate Sample Locations in MWTP process

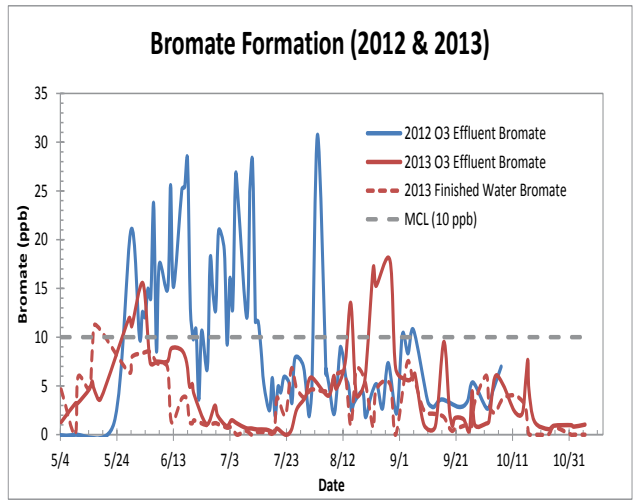

Figure 2: Bromate Formation in 2012 & 2013

Results from the first year study in 2012 showed that bromate formation was indeed a concern at the MWTP, with bromate concentrations often exceeding the MCL and peaking at 30 ppb in the ozone chamber effluent during the summer (Figure 2) when the water temperature is greater than 15 degrees Celsius. It was found that operational procedures carried out at the water treatment plant (increasing ozone CT, using a source water containing high bromide concentration, etc.) to overcome water quality concerns (increased organics content in raw water, increased hardness in the Red River, etc.) could have resulted in high bromate formation in the ozone chamber. Bromide concentration, pH, organics content, temperature, and ozone dose were identified as parameters having significant impacts on bromate formation. A regression model was developed and calibrated to provide quantitative relationships between bromate concentration and the parameters that were found to have a significant impact on bromate formation.

Based on the findings of the first-year study, new operational control strategies were developed and implemented to minimize bromate formation and, at the same time, to meet other water quality standards. System modifications were also made to enable direct measurements and control of ozone dose to each of the three sections in the ozone chamber. Sampling was continued for a second year (2013), with some modifications for further development of the regression model. Sampling results showed the new strategies and

procedures are effective in reducing bromate formation. With the exception of a few transient periods, the bromate concentration in the ozone chamber effluent was reduced to below the MCL of 10 ppb, and finished water in reservoirs has rarely exceeded the bromate MCL (Figure 2). Results from the second year will be combined with the results from the first year to refine the bromate formation model and develop a real-time prediction method that can be programmed into MWTP's SCADA system.

Mr. Kevin Young is employed at Moorhead Public Service (MPS) as Water Plant Supervisor and has previously held water plant operator and water division engineer positions with MPS. Mr. Young received his Bachelor of Science Degree in Civil Engineering from North Dakota State University (NDSU) in May 2012 and is currently completing a Master of Science Degree in Civil Engineering from NDSU. His research on bromate formation during ozone disinfection was conducted as part of his Master's Degree thesis at the Moorhead Water Treatment Plant.

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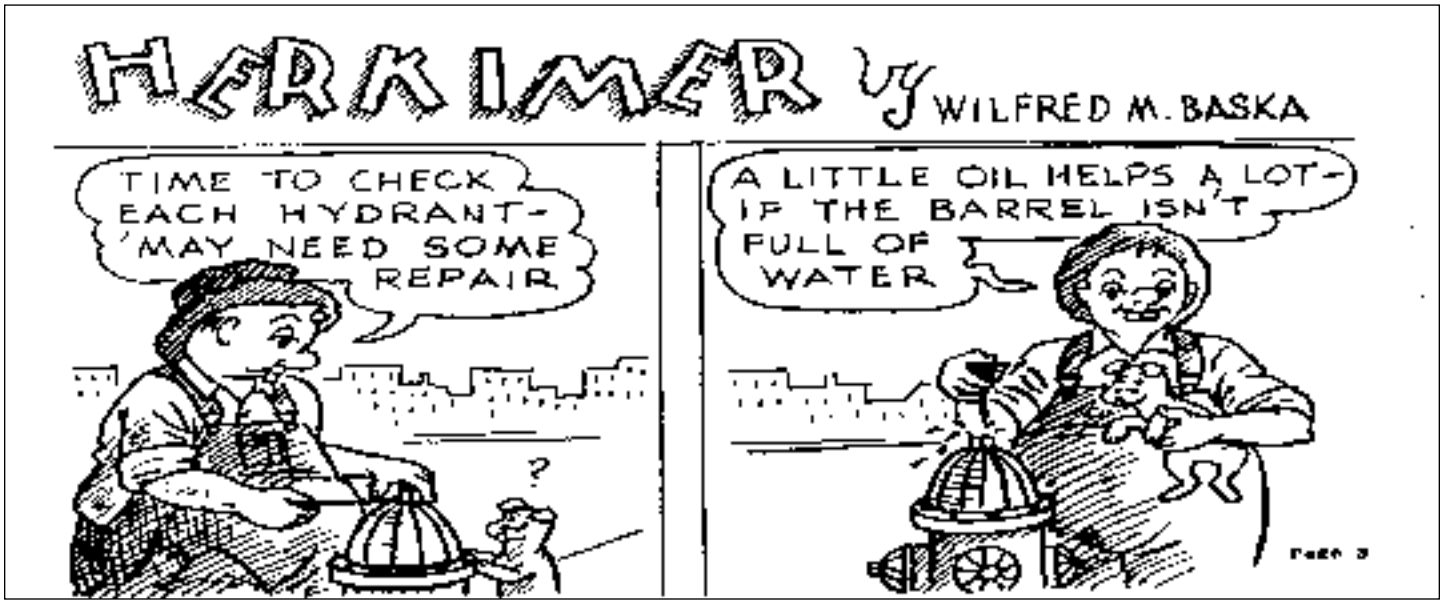
Thank You for the YP Article Submissions

The *Official Bulletin* staff and board of the North Dakota Water and Pollution Control Conference would like to recognize the group of Young Professionals and their hard work in creating their article submissions for this edition of the *Official Bulletin*. Their work is valuable to the surrounding communities and the environment around us. Thank you for sharing your work.



Minutes of the Board of Trustees Meeting North Dakota Section of AWWA

October 22, 2013

The fall meeting of the North Dakota Section of the American Water Works Association was held at the Alerus Center of Grand Forks, ND on October 22, 2013. Present at the meeting were Chair Eric Volk; Chair-elect Jason Sorenson; Past Chair, Tim Paustian; Director Larry Thelen; Trustees Meredith Quinn, Dennis Larson, and Wade Hesch; Secretary/Treasurer David Bruschwein, and Assistant Secretary/Treasurer Greg Wavra. Others attending the meeting were AWWA Past-President Charlie Anderson, Dean Sletten, Deon Stockert, Charles Vein, Shawn Heinle, and Murthy Kasi.

The meeting was called to order by Mr. Sorenson at 7:40 a.m.

The Secretary's Report was presented by Mr. Bruschwein. Mr. Thelen moved to approve the minutes of the May 14, 2013 Board Meeting. Mr. Paustian seconded, and the motion passed.

Mr. Wavra presented the Treasurer's Report. As of October 17, 2013, the section had income of $17,166.55 and expenses of $9,855.00. The section has $28,708.55 in the checking and money market accounts. The section also has $83,964.13 in student support endowments and reserve accounts. There was discussion on the finances so far in 2013. The Section has had lower expenses in 2013 than in a normal year because Mr. Thelen did not attend the ACE, Moore Engineering covered Mr. Sletten's participation at the ACE to receive his Fuller Award, and the poster award winner was very frugal with her participation at ACE. Ms. Quinn moved to accept the Treasurer's report. Mr. Hesch seconded, and the motion carried.

Committee Reports

Education and Research Committee
Ms. Quinn presented the Education Committee report.

Conference Highlights – Tuesday is YP/Student day at the conference. Emphasis for this day is on YP/student presenters, and the day will be finished with the poster competition. The drinking water poster competition winner will represent the section at ACE next year.

Education and Research Committee and YP/Student Committee – Ms. Quinn recommended the splitting of the Education and Research committee into separate Education and Research, and YP/Student Committees.

Student Chapter – Currently there are 30 students in the NDSU chapter, but the UND chapter is struggling.

Official Bulletin Article – This committee would like to offer peer-reviewed content for the *Official Bulletin*.

YP (35 and under)/Student co-chair – Mr. Kasi has been working to identify NDAWWA members that meet the definition of YP. It appears that there are about 50 members. He is also working to get more members at the UND chapter. There was discussion on what the break down is for the budget for the student chapters. It was decided the budget break down is as follows; $1,500 for the poster winner to attend ACE, $500 for NDSU to attend WEFTEC, $500 for UND to attend WEFTEC, $250 to NDSU for college conference/North Dakota field trip attendance, and $250 to UND for college conference/North Dakota field trip attendance.

Membership
Mr. Sletten reported the Section is at 248 members, including 11 that are late on their dues. The section is participating in the membership competition with a goal to keep 60 percent of new members (8 of 11).

WFP
Mr. Vein reported the golf sponsorship is currently at $5,600. The goal of the committee is to again raise at least $5,000 to attain the level of country sponsor.

Public Relations
Ms. Quinn presented the PR committee report. Awards the committee is working with at the conference include drinking water taste test, operator certification, poster and competition winner.

WUC
Mr. Thelen covered the current council membership and the upcoming Fly-In.

Director's Report
Mr. Thelen covered the strategic plan that was approved at the June meeting. Mr. Charlie Anderson covered WIFIA and AWWA support for the proposed legislation. The winter Director's meeting will be held in Austin. The main item currently on the agenda is the election of the next Association president.

Old Business
Mr. Bruschwein provided an update on the proposed by-law change. Everything is prepared and in place for the final Section vote at the upcoming Section Business Meeting.

Mr. Kasi reported the summer AWWA training was excellent and would recommend others to attend.

Mr. Sorenson reported that the Water Day at the State Fair was cool and not well attended.

There was no other old business.

New Business
Ms. Nancy Huether has submitted a resignation letter as she has changed employers and is currently not involved in the water field. Mr. Sorenson moved to accept Ms. Huether's resignation, move the trustees up one year in their term of office, and bring both nominees on as trustees. Mr. Larson seconded the motion. The motion carried.

Mr. Wavra presented a proposed budget for 2014. The budget as presented is near even. Ms. Quinn moved to approve the budget for 2014 as presented. Mr. Thelen seconded the motion, and the motion passed.

Other new business
Ms. Quinn made the motion for the YP/Student Committee to be a formal committee with Murthy Kasi as the committee chair. Mr. Sorenson seconded the motion. The motion carried.

Ms. Quinn requested that Dustin Dale be the new Education and Research Committee co-chair. Mr. Eric Volk appointed Dustin Dale as the Education and Research Committee co-chair with the Board's agreement.

Mr. Wavra motioned to adjourn and was seconded by Mr. Hesch. The meeting adjourned at 8:55 a.m.

Respectfully submitted,
David Bruschwein
Secretary-Treasurer

Round 2: Long Term Surface Water Treatment Rule

by Greg Wavra, Drinking Water Program Manager, North Dakota Department of Health

The North Dakota Department of Health is preparing for the required second round of water quality sampling associated with the Long Term Surface Water Treatment Rule two (LT2). EPA developed LT2 to improve drinking water quality and provide additional protection from disease-causing micro-organisms and contaminants that can form during drinking water treatment. LT2 applies to drinking water that comes from surface water sources (lakes, rivers, reservoirs) and to groundwater sources that are directly influenced by surface water (GWUDI).

Pathogens, such as Giardia and Cryptosporidium, are often found in surface water and can cause gastrointestinal illness (diarrhea, vomiting or cramps) and other health risks. All surface waters require treatment to remove and, or inactivate microbiological pathogens prior to delivery to customers for potable uses. Cryptosporidium is of significant concern in drinking water because it is resistant to typical filtration and disinfection treatment, and it can and has caused waterborne disease outbreaks in other states. Consuming water with Cryptosporidium can cause gastrointestinal illness, which may be severe in people with weakened immune systems (cancer, AIDS patients, etc.).

The purpose of the LT2 rule is to reduce disease incidents associated with Cryptosporidium and other pathogenic micro organisms in drinking water. The rule applies to all public water systems that use surface water or GWUDI of surface water. The rule strengthens existing regulations and provides a higher level of protection of drinking water supplies by:

- Targeting additional Cryptosporidium treatment requirements to higher risk systems.
- Providing provisions to ensure that systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts.
- Requiring provisions to reduce risks from uncovered, finished water storage facilities.

These steps, combined with existing regulations, are designed to provide protection from microbial pathogens while simultaneously minimizing health risks to the population from disinfection by-products.

The first of two rounds of source water monitoring required by the LT2 rule has been completed. A total of six surface waters were sampled as required: Missouri River, Red River, Lake Sakakawea, Mt. Carmel Dam, Goose River and Sheyenne River. An average of 0.062 Cryptosporidium cysts/10 Liters of source water sampled were identified in North Dakota. No systems in North Dakota were required to provide a higher level of protection regarding this rule.

The Division of Municipal Facilities is preparing for the required second round of source water monitoring in the LT2. The rule has mandatory compliance dates when the systems must begin the second round of source water monitoring as seen in the table below.

Systems that serve…	Schedule	Must begin the second round of source water monitoring
At least 100,000 people	1	April 1, 2015
From 50,000 to 99,999 people	2	October 1, 2015
From 10,000 to 49,999 people	3	October 1 2016
Fewer than 10,000 people and monitor for E.coli	4	October 1, 2017
Fewer than 10,000 people and monitor for Cryptosporidium	5	April 1, 2019

Monitoring for cryptosporidium is an expensive undertaking and involves use of an external laboratory via contracting. It is expected that this second round of source water monitoring will be conducted over four to five years.

Systems required to start the 2nd round of source water monitoring will be notified by official letters from the Department. This notification will also include a request for an updated system treatment schematic. Information on LT2ESWTR can be found at EPA's website: **http://water.epa.gov/lawsregs/rulesregs/sdwa/lt2/index.cfm** or by contacting Mike Trythall (**mtrythall@nd.gov**), 701-328-5269, or Greg Wavra (**gwavra@nd.gov**), 701-328-5224.

Minutes of the Business Meeting North Dakota Section of AWWA

October 23, 2013

The Business Meeting of the North Dakota Section of the American Water Works Association was held at the Alerus Center of Grand Forks, North Dakota, on October 23, 2013.

Mr. Eric Volk called the meeting to order at 12:20 p.m. and recognized the head table, Section Officers, Trustees, and AWWA Past-President Charlie Anderson.

The minutes of the October 18, 2012 Business Meeting was published in the 2012 post-conference issue of the *Official Bulletin*. Mr. Volk asked for any corrections to the minutes. There were none. Ms. Hazel Sletten moved to approve the minutes and was seconded by Mr. Deon Stockert. Motion carried.

Mr. Volk presented the Treasurer's Report. As of October 17, 2013 the Section had income of $17,166.53 and expenses of $9,855.00, for a net profit of $7,311.53 so far in 2013 the Section had $28,708.55 in checking and money market accounts, endowments, a reserve of $83,964.13, and no liabilities. Total assets for the Section are $112,672.58. Mr. Mel Bullinger moved to accept the Treasurer's Report, and Ms. Meredith Quinn seconded the motion. Motion carried.

Mr. Larry Thelen presented the Audit Committee results of the Section financial accounts. Mr. Thelen reported no discrepancies were found in the financial accounts for 2012, and all appeared to be in order. Ms. Miranda Kleven moved to accept the Audit Committee Report and Mr. Charlie Vein seconded the motion. Motion carried.

Mr. Volk introduced each of the Board of Trustee candidates. Nominees for trustee are Mr. Murthy Kasi and Mr. Mike Berg. Mr. Dean Sletten moved to have the two nominees fill the two trustee vacancies. Mr. Keith Demke seconded the motion. The motion carried.

Ms. Sarah Volk presented the Operator Certification awards to new operators or operators who increased their certification level within the past year and who are members of the North Dakota Section. Awards were presented to Troy Hall, Gary Hoffman, Gordon Johnson, Justin Smith, and Jeremy Scheeley.

There was no other unfinished business.

The only item of new business was the approval of the proposed by-law changes. Mr. Volk asked for discussion on the proposed by-law changes that were mailed out to the membership 30 days prior to the conference. There was no discussion on the proposed changes. Dr. Wei Lin moved to accept the by-laws changes as mailed to the membership. The motion was seconded by Mr. Larry Thelen. The motion passed.

There was no other new business.

Mr. Volk introduced the guest speaker, Mr. Charlie Anderson. Mr. Anderson is from Arlington, Texas, where he works as a management consultant for CDM Smith. His message covered the Member Value Survey. He talked about AWWA's dedication to helping members, current member issues, and how AWWA is attempting to help members by becoming an organization of total water solutions. The AWWA message is that every drop of water everywhere matters to its members: from source to tap to wastewater treatment and finally to reclamation.

Mr. Volk talked about the good things that Water For People is doing, and how the fundraisers are going so far at the conference. He encouraged everybody to support the raffle.

Mr. Volk thanked everybody for their support and help during his tenure as chair. He introduced Mr. Jason Sorenson, incoming Section Chair. Mr. Sorenson thanked Mr. Volk for the work that he accomplished during his time as Section Chair and presented him with a plaque.

Mr. Sorenson asked for a motion to adjourn the meeting. Ms. Hazel Sletten moved to adjourn, and Ms. Miranda Kleven seconded the motion. The motion carried, and the meeting was adjourned at 1:05 p.m.

Respectfully Submitted,

David J. Bruschwein
Secretary-Treasurer

54th Annual Water and Wastewater Operator Training Program

by Craig Bartholomay, North Dakota Department of Health

This past March and April, the North Dakota Department of Health, the North Dakota Water and Pollution Control Conference, the North Dakota Section of the American Water Works Association, the North Dakota Chapter of the American Public Works Association, and the North Dakota Water Environment Association sponsored the 54th Annual Water and Wastewater Operator Training Program.

There were six sessions offered with a total of 358 attendants.* Water treatment and distribution classes were offered March 3-5, March 10-12, March 24-26, and March 31-April 2. Wastewater treatment and collection classes were offered April 14-16 and April 21-23.

TRAINING SESSIONS	NUMBER OF ATTENDANTS
Water Treatment and Distribution	
March 3, 4, 5	58
March 10, 11, 12,	63
March 24, 25, 26	60
March 31, April 1, 2	50
Wastewater Treatment and Collection	
April 14, 15, 16	63
April 21, 22, 23	64
Total number of attendants	358*
*Some operators attended more than one session	

The objectives for these classes are to fulfill the continuing education credit (CEC) requirement for certified operators, to hear presentations regarding regulations and how to avoid mistakes that can lead to noncompliance, to learn general operation and maintenance topics, and to give operators an opportunity to write a certification exam.

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The courses are not geared specifically to prepare operators for certification exams.

During the training classes, there were six operator examination sessions scheduled. These were reserved for the last day of each session. The Department administered 256 examinations this year, with a passage rate of 72 percent.

EXAMINATION SESSION	NUMBER OF EXAMINATIONS WRITTEN
March 5	33
March 12	42
March 26	42
April 2	45
April 16	51
April 23	43
Total number of examinations written	256

The following is a breakdown of the certification examinations that were written during the 2014 operator training sessions:

EXAMINATION CLASSIFICATION	IA	I	II	III	IV	TOTALS
Water Treatment	20	23	8	3	2	56
Water Distribution	45	34	19	5	2	105
Wastewater Treatment	9	10	8	9	3	39
Wastewater Collection	19	20	12	2	3	56
TOTALS	93	87	47	19	10	256

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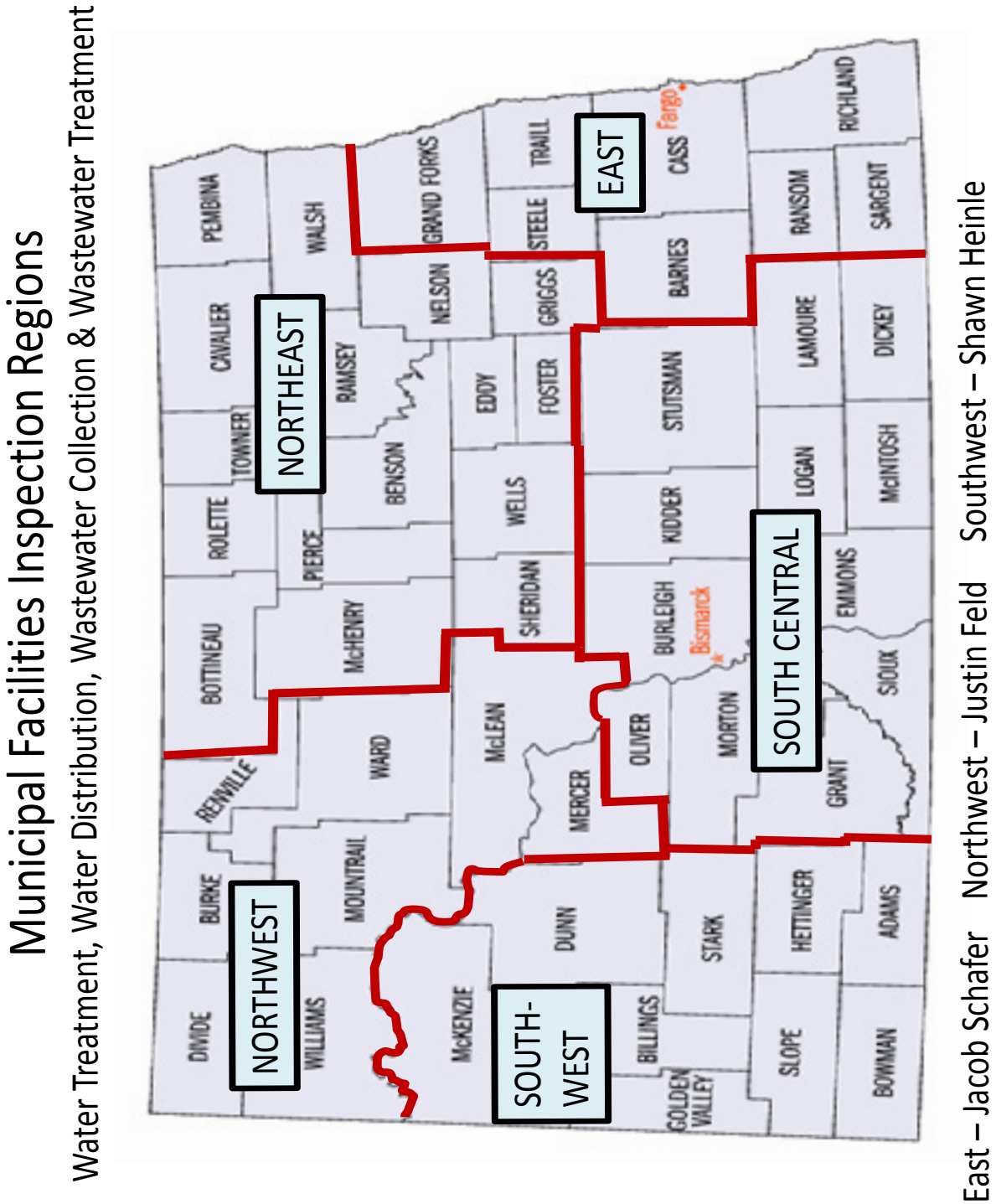
DESIGNING FOR A BETTER TOMORROW

New Municipal Facilities Inspection Regions

by: Bob Markhouse, environmental scientist, North Dakota Department of Health

Due to the increase of activity in the western part of the state, the Division of Municipal Facilities re-drew the lines for the inspection regions of the state. The biggest change is the addition of the Southwest Region. This region was created by taking high volume areas from the South Central and Northwest regions and other counties in order to alleviate the ever-increasing amount of inspections occurring in the oil patch area of the state. See the map below for current inspectors and inspection regions.



East – Jacob Schafer Northwest – Justin Feld Southwest – Shawn Heinle
Northeast – Gregg Stewart South Central – Bob Markhouse

North Dakota Water Environment Association

Executive Committee Meeting Minutes
January 22, 2014

The Executive Committee for the North Dakota Water Environment Association (NDWEA) met at the Seven Seas Inn in Mandan on January 22, 2014. Present were President Jessica Wagner, President Elect Karl Rockeman, Vice President Gary Zuroff, Past President Wei Lin, Past President and Delegate Karla Olson, and Secretary-Treasurer Bill Gefroh.

President Wagner called the meeting to order at 11:20 a.m. President Wagner requested a motion to dispense with the reading and approval of the minutes from the May 14, 2013 meeting as distributed to the Executive Committee members and printed in the *Official Bulletin*. Karla Olson so moved. Wei Lin seconded the motion, and the motion passed.

Bill Gefroh presented the Treasurer's Report, which reviewed in detail the receipts and expenses from January 1, 2013 through December 31, 2013. The NDWEA net worth, as recorded in the report, was $8,617.70 as compared to $7,739.52 last year at this time. President Wagner requested a motion to approve the report as presented. Karla Olson so moved. Gary Zuroff seconded the motion, and the motion passed. Current membership is at 129.

New Business:
Potential topics and speakers were discussed for the 2014 North Dakota Water and Pollution Control Conference (NDWPCC) that will be held in Fargo, October 14–16, 2014. Committee members will further investigate the topics discussed, potential presenters and other topics, and bring their findings to the next NDWEA meeting in May, 2014.

The NDWEA will support the 64th Annual North Dakota Science Fair (NDSF) by providing awards, cash prizes and judges. The 2014 NDSF will be held in Grand Forks with project judging on Friday, April 4, 2014. Awards will be presented to the best water quality project for both the junior and senior divisions. NDWEA will provide travel expenses for one student to compete nationally at the Stockholm Junior Water Prize (SJWP) Competition to be held in Herndon, V.A. on June 13 and 14, 2014.

NDWEA Committee members discussed educational support for 2014. Karla Olson made a motion that NDWEA provide support to:

- Gateway to Science in Bismarck, $250
- River Keepers in Fargo, $250
- Water Environment Research Foundation, $100
- Science fair plaques, ~$100 and cash prizes, $150
- Transportation for a science fair student to compete at the national SJWP, up to $1,000
- Student Poster Competition at the NDWPCC, $100
- NDWEA executive committee member travel expenses to attend one of the Water Environment Federation Member Exchange meetings (WEFMAX), $500
- NDSU Student Chapter activity fund to be used for expenses incurred for attending the Water Environment Federation Technical Exposition Conference (WEFTEC) 2014 in New Orleans to participate in the student design competition, $500. The NDSU team placed third in the Design Competition at WEFTEC 2013. Included is $1000 for reimbursement for their third place finish.
- UND Student Chapter activity fund to be used for expenses incurred for attending WEFTEC 2014 to participate in the student design competition, $500. The student chapters will be reimbursed $500 after presenting in the WEFTEC 2014 Design Competition, providing a financial report and an updated officer list. Gary Zuroff seconded the motion, and the motion carried.

Related to social networking, NDWEA has joined Facebook. The NDWEA Facebook account is North Dakotawea. Activities related to the NDWEA will be posted. Many photos have been added. If you find a photo that you do not like, let us know and we will remove it. Please friend North Dakota AWEA on Facebook.

With no further business, Jessica Wagner adjourned the meeting at 2:15 p.m.

Respectfully submitted,
Bill Gefroh
NDWEA Secretary-Treasurer

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Summer Operator Testing Scheduled

The summer operator certification exam session will be held on Wednesday, August 6, 2014 at the Environmental Training Center located at 2639 East Main Avenue in Bismarck. Examination times will be from 8:00 a.m. to 4:00 p.m. **To ensure adequate time for exams, testing must begin by 11:00 a.m.** Please indicate time of arrival on exam application form. If you don't have a copy of the application, you can print one by visiting: http://www.ndhealth.gov/mf/forms/Operator_Certification_Application.pdf.

Renewal and exam fees must be paid prior to testing.

Applications must be received by JULY 18, 2014.

Please contact Craig Bartholomay, North Dakota Department of Health, at 701-328-6626 with any questions regarding operator certification and/or exams.

North Dakota Water and Pollution Control Conference

NDWPCC

Upcoming Conference Dates:

2014 - Fargo, October 14, 15 and 16 Holiday Inn

2015 - Bismarck, October 6, 7 and 8 Ramkota Hotel

2016 - Minot, October 11, 12 and 13 Grand International

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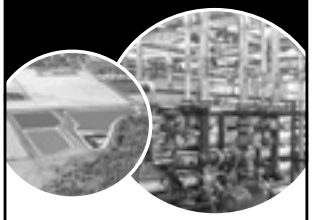

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Operators Pass Certification Examinations (March-April 2014)

Congratulations to the Operators

Operator	Employer	Certification Type/Grade
AASEN, JEREMY	THOMPSON	Wastewater Treatment 01
ADAMSON, LEE	JR SIMPLOT	Wastewater Treatment 03
ALBRECHT, JAMES	CASSELTON	Water Distribution 01
ALLEN, BRIAN	CARGILL SWEETENERS	Wastewater Treatment 01
ALTRINGER, JEFF	SOUTHWEST WATER	Water Treatment 01
ANDORFF, NATHAN	GRENORA	Wastewater Collection 1A
ANDREWS, GERAD	WATFORD CITY	Water Distribution 1A
BECKSTRAND, FOSTER	DAZEY	Water Distribution 1A
BELGARDE, KELLY	BISMARCK	Water Treatment 01
BENZ, JUSTIN	BEULAH	Water Treatment 01, Water Distribution 01
BEREND, BRIAN	CARGILL SWEETENERS	Water Distribution 1A, Wastewater Collection 1A
BESTE, NICK	NEW TOWN	Water Treatment 1A
BIRNBAUM, DAN	WEST FARGO	Wastewater Collection 01, Water Distribution 02
BOUSSON, GERALD	GARRISON	Water Treatment 02
BRACKEL, BARRY	ELGIN	Water Distribution 1A
BRANDT, BRODY	US ARMY CORPS OF ENGINEERS	Water Distribution 1A
BREHM, NICK	CANDO	Water Distribution 1A, Water Treatment 1A
BREINER, PETER	FLASHER	Wastewater Treatment 1A, Water Distribution 1A, Wastewater Collection 1A,
BRUCE, RANDY	RIVERVIEW HEIGHTS	Water Distribution 1A
BURRIS, JOSHUA JOE	DICKINSON	Wastewater Collection 01
CANERDY, JASON	WILLIAMS RURAL WATER	Water Distribution 01
CLARK, MIKE	WEST FARGO	Wastewater Collection 02
CURRAN, DAVID	T. ROOSEVELT N. P.	Wastewater Treatment 1A
DHINAA, MORKATAA	R & T WATER SYSTEM	Water Treatment 1A
DICKELMAN, RYAN	GRAND FORKS AIR FORCE BASE	Wastewater Treatment 01, Water Distribution 02
DRADER, KRYSTAL	TOWNER	Wastewater Collection 1A, Water Distribution 1A Water Treatment 1A
DUNN, STEVE	LIDGERWOOD	Water Distribution 1A
FALCON, DELMAR	TRENTON WATER USERS	Water Distribution 1A
FINKEN, CHAD	MINOT	Water Distribution 01
FISCHER, MIKE	BISMARCK	Wastewater Collection 02, Water Distribution 02
FORD, BRUCE	CANDO	Water Distribution 1A, Water Treatment 1A
FORD, KEVIN	OAKES	Water Distribution 1A, Water Treatment 1A
FREY, CURTIS	BISMARCK	Wastewater Collection 04, Water Distribution 04
FROELICH, JOE	SOUTH CENTRAL REGIONAL WATER	Water Treatment 1A
GANSKE, KEN	LELAND OLDS STATION	Water Distribution 1A
GIESE, TOM	MCCLUSKY	Wastewater Treatment 1A
GORSUCH, ALAN	T. ROOSEVELT N. P.	Wastewater Treatment 1A
GRANT, ED	MCKENZIE COUNTY RURAL WATER	Water Distribution 1A

Operator	Employer	Certification Type/Grade
GRZADZIELESKI, JASON	BISMARCK	Water Distribution 03
HAALAND, AMY	CARGILL SWEETENERS	Wastewater Treatment 03
HAGEN, KYLE	BISMARCK	Wastewater Collection 04, Water Distribution 04
HAGL, MATT	HAZELTON	Wastewater Collection 1A, Water Distribution 1A
HANSON, CHARLES	JR SIMPLOT	Wastewater Treatment 03
HANSON, DANIEL	GRAND FORKS	Water Treatment 02
HARING, KEVIN	OAKES	Wastewater Treatment 02, Water Distribution 02 Wastewater Collection 02
HASBARGEN, GARY	WAHPETON	Water Treatment 02
HEINLE, ROGER	MAX	Water Distribution 1A
HEISLER, ROD	NORTH DAKOTA NATIONAL GUARD	Water Distribution 1A
HENKE, MICHAEL	AMERICAN CRYSTAL SUGAR	Wastewater Treatment 02
HOFER, LARRY	MAPLE RIVER HUTTERIAN ASSOC.	Water Distribution 1A
HOFFMAN, GARY	WATFORD CITY	Water Distribution 02
IWEN, CHRIS	ENDERLIN	Water Treatment 01
JAMES, RYAN	WEST FARGO	Water Distribution 02, Wastewater Collection 02
JEFFRIES, TERRY "NATE'	WATFORD CITY	Wastewater Collection 01, Wastewater Treatment 01
KALGARD, WADE	PARK RIVER	Water Distribution 01

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- Solid Waste/Landfills
- Site Grading and Drainage Plans
- Flood Control
- Groundwater Studies
- Airport Improvements

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Operator	Employer	Certification Type/Grade
KASSIAN, LARRY	SOUTH CENTRAL REGIONAL WATER	Water Distribution 1A
KERSTING, MITCHELL	WILLISTON	Water Treatment 1A
KLEVEN, BYRON	STANLEY	Water Distribution 01, Wastewater Treatment 01 Wastewater Collection 01, Water Treatment 01
KNOOP, SCOT	MINOT	Water Distribution 01
KOHLER, STEVE	WILLISTON	Water Distribution 01
KOLRUD, GREG	WEST FARGO	Wastewater Collection 02
KOVAL, CHARLES	CARGILL SWEETENERS	Wastewater Collection 01, Wastewater Treatment 01
KRAFT, COREY	BISMARCK	Wastewater Collection 01, Water Distribution 01
KRANK, EDWARD	GLADSTONE	Water Distribution 1A
KREGER, CHRIS	IHD SOLIDS MGMT	Wastewater Collection 1A, Wastewater Treatment 1A
KRISTIANSEN, ROGER	NAPOLEON	Wastewater Collection 01
LADUE, WILLIE	NEW TOWN	Water Treatment 1A
LARSON, BLAINE	COOPERSTOWN	Wastewater Collection 01
LITTLE OWL, LEON	FORT BERTHOLD RURAL WATER	Water Treatment 1A
LOKKEN, BENJAMIN	STUTSMAN RURAL WATER	Water Treatment 02
LOLL, MIKE	HANKINSON	Water Distribution 1A
LYNCH, JOHN	STANLEY	Water Distribution 01
MACDONALD, KEN	POWERS LAKE	Water Distribution 1A, Water Treatment 1A
MALSAM, RYAN	MANDAN	Wastewater Treatment 02
MARTIN, DEAN	ROLLA	Water Distribution 1A, Water Treatment 1A
MARTINSON, STEVE	GREATER RAMSEY WATER	Water Treatment 01, Water Distribution 02
MCQUISTON, WILLIAM	WILLISTON	Wastewater Treatment 04
MEIDINGER, SIMON	SOUTH CENTRAL REGIONAL WATER	Water Treatment 02
MILLER, MONTY	CANDO	Water Treatment 1A
MOREL, RYAN	LINCOLN	Wastewater Collection 01
MORROW, MIKE	GRAND FORKS	Wastewater Collection 03
MOSES, MARK	AUX SABLE MIDSTREAM	Water Distribution 1A
MOSTAD, GERALD	SOUTHWEST WATER	Water Distribution 02
MOSZER, MARK	BISMARCK	Wastewater Collection 04, Water Distribution 03
MOTTL, GINA	WILLISTON	Wastewater Treatment 03
NANTT, LYLE	WISHEK	Water Treatment 01
NELSEN, JUSTIN	LEEDS	Wastewater Treatment 1A, Water Distribution 01, Wastewater Collection 1A
NELSON, TODD	TOWNER	Water Distribution 01
NOGUES, MARTY	FORT UNION TRADING POST NHS	Wastewater Collection 01, Water Distribution 1A
NORDSVEN, SHANE	KILLDEER	Wastewater Collection 1A, Wastewater Treatment 1A
OLSON, CHRISTOPHER	CASSELTON	Water Distribution 02
OLSON, JAY	CARGILL SWEETENERS	Wastewater Treatment 02
PELAFIGUE, JASON	WILLISTON VILLAGE RV RESORT	Water Distribution 1A
PETERSON, JOHN	MINOT AIR FORCE BASE	Wastewater Collection 1A, Water Distribution 1A
PFAU, DAVID	ORISKA	Water Distribution 1A

Operator	Employer	Certification Type/Grade
REGNIER, DAVID	WATFORD CITY	Wastewater Treatment 01
REILLY, BRIAN	WALSH RURAL WATER DISTRICT	Water Distribution 02
REIS, WILLIAM	CASS RURAL WATER DISTRICT	Water Distribution 01
RENNER, DEVIN	LELAND OLDS STATION	Water Distribution 1A
RIX, TANNER	CARGILL SWEETENERS	Wastewater Treatment 04
ROBISTOW, JOSHUA	GRAND FORKS AIR FORCE BASE	Water Distribution 01, Wastewater Collection 01
RODACKER, MONTE	JAMESTOWN	Wastewater Collection 03
ROSENLUND, PAGE	WATFORD CITY	Water Treatment 02
ROSS, KADE	WATFORD CITY	Water Distribution 1A
RUTHERFORD, GRAHAM	FLAXTON	Wastewater Collection 1A, Water Treatment 1A, Water Distribution 1A
SANFORD, GARRETT	LELAND OLDS STATION	Water Distribution 1A
SATHER, DAVID	BARNES RURAL WATER	Water Treatment 04
SCHWARTZ, BARRY	STANTON	Wastewater Collection 1A
SCOTT, JAMIE	MANDAN	Wastewater Collection 02
SHARBONO, WADE	DEVILS LAKE	Wastewater Treatment 03
SMITH, DAVID	NEW ENGLAND	Wastewater Collection 02, Water Distribution 02
SMITH, DOUGLAS	SOUTH CENTRAL REGIONAL WATER	Water Distribution 01
SMITH, JUSTIN	WATFORD CITY	Water Distribution 03

Operator	Employer	Certification Type/Grade
SMITH, RYAN	MILNOR	Water Distribution 01
STASSENS, TAYLOR	GRANVILLE	Wastewater Collection 1A
SWANSON, MATT	DAKOTALAND LODGING SPRINGBROOK	Water Distribution 1A
SWARTZ, JEREMY	MINOT AIR FORCE BASE	Water Distribution 1A
THORSTAD, WAYNE	CATHAY	Water Distribution 1A
TORGERSON, DUSTIN	MINOT AIR FORCE BASE	Wastewater Collection 1A, Water Distribution 1A
UNRUH, WYNNE	SOUTH CENTRAL REGIONAL WATER	Water Distribution 03
VENSTAD, SHAWN	SOUTH CENTRAL REGIONAL WATER	Water Distribution 01
VETTER, BRENT	MANDAN	Wastewater Collection 1A, Water Distribution 1A
VIGNESS, JOSH	GRAND FORKS	Water Distribution 03
WADESON, MIKE	VALLEY CITY	Wastewater Collection 02
WEAVER, MATTHEW	MAYVILLE	Wastewater Treatment 1A, Water Distribution 1A Wastewater Collection 1A, Water Treatment 1A
WEINER, CHRIS	GRAND FORKS	Water Distribution 02
WEINER, PERRY	NORTHWESTERN AREA WATER SUPPLY	Water Distribution 01
WEINMANN, JAMEY	HARVEY	Water Distribution 01
WESTERGAARD, STEVE	MINOT	Water Distribution 02
WIESER, SCOTT	BISMARCK	Wastewater Collection 01, Water Distribution 01
WILDER JR., RICH	INDIAN HILLS LODGING	Water Distribution 1A
WILDER, ROB	INDIAN HILLS LODGING	Water Distribution 1A
WILMER, JEFFREY	WALSH RURAL WATER	Water Distribution 02
WIPF, DAN	WILLOWBANK COLONY	Water Distribution 1A
WOOD, KENT	SURREY	Water Distribution 01
YOUNG, BRIAN	WILLISTON	Water Treatment 1A
ZASTOUPIL, DUANE	DICKINSON	Wastewater Collection 02, Wastewater Treatment 02
ZIEGLER, DAMIAN	MINOT	Wastewater Collection 01
ZIETZ, DANELLE	WHEATLAND VILLAGE	Water Distribution 1A

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AASEN, JEREMY	THOMPSON
ACKERSON, GARY	GRAND FORKS AIR FORCE BASE
ALBRECHT JR, KEN	MANDAN
ALBRECHT, JAMES	CASSELTON
ALTRINGER, JEFF	SOUTHWEST WATER
ALVIRA, NIKOMALDEUS	JAMESTOWN
ANDORFF, NATHAN	GRENORA
ANDREWS, GERAD	WATFORD CITY
ARP, LONNIE	GRAND FORKS AIR FORCE BASE
BACHLER, MARK	SOUTH CENTRAL REGIONAL WATER
BACKOWSKI, JOHN	CARGILL SWEETENERS
BASOL, BEN	PORTLAND
BATES, MARK	WILLISTON
BEACH, DELL	MEDORA
BECKSTRAND, FOSTER	DAZEY
BELGARDE, KELLY	BISMARCK
BENGE, DENNIS	BOWBELLS
BENZ, JUSTIN	BEULAH
BEREND, BRIAN	CARGILL SWEETENERS
BERG, DON	ROLETTE
BERRETH, TOBY L	JAMESTOWN
BESTE, NICK	AE_2S
BEYREIS, ALAN	GARRISON
BICKLER, KENT	R & T WATER SYSTEM
BINSTOCK, CLARENCE	NEW ENGLAND
BIRNBAUM, DAN	WEST FARGO
BLODIG, ALLISON	ECO WASTE, LLC
BOLTON, STEVEN	GRAND FORKS
BORNER, KEVIN	LELAND OLDS STATION
BOUSSON, GERALD	GARRISON
BRACKEL, BARRY	ELGIN
BRADEN, MIKE	BEACH
BRANDT, BRADLEY	GLENBURN
BRANDT, BRODY	US ARMY CORPS OF ENGINEERS
BRANDT, MARLIN D	BISMARCK
BREHM, NICK	CANDO
BREINER, PETER	FLASHER
BRODAL, CODY	MAPLETON
BROWN, ROBBY	VELVA
BRUCE, RANDY	RIVERVIEW HEIGHTS
BRUNEN, ANDY	NEW SALEM
BRUNSELL, FRANCIS	LELAND OLDS STATION
BUCHHOLZ, ALFRED	COUNTRY CLUB
BUELOW, GARY	MOHALL
BULLHEAD JR, DARRELL	STANDING ROCK SIOUX TRIBE
BURNS, CORY	GRAFTON
BURRIS, JOSHUA JOE	DICKINSON
BURTON, KEITH	INTERNATIONAL PEACE GARDEN
BUSSE, JASON	LANGDON
CAIN, GERALD	GARRISON
CANERDY, JASON	WILLIAMS RURAL WATER
CARROLL, JIM	MARMARTH
CASCADEN, TAYLOR	PARSHALL
CHASE, ALAN	FOUR BEARS CASINO & LODGE
CHASE, LOGAN	FOUR BEARS CASINO & LODGE
CHASE, MYLES	FOUR BEARS CASINO & LODGE
CHICK, TED	ANTELOPE VALLEY STATION
CHRISTENSEN, SHAWN	SOUTH CENTRAL REGIONAL WATER
CHRISTIANSON, BROCK	PARSHALL
CHRISTIE, SCOTT	AMERICAN CRYSTAL SUGAR
CHURCHILL, JOHN	M SPACE HOLDINGS
CLARK, MIKE	WEST FARGO
COREY, KEVIN	DAKOTA RURAL WATER
COZZI, BRANDON	BISMARCK
CURRAN, DAVID	T. ROOSEVELT N. P.
DAVIS, JERRY	DAKOTA ADVENTIST ACADEMY
DAVIS, TEDDY	M SPACE HOLDINGS
DEHNE, HEATHER	CLEVELAND
DELISLE, RONALD	BISMARCK
DHINAA, MORKATAA	R & T WATER SYSTEM

Operator	Employer
DICKELMAN, RYAN	GRAND FORKS AIR FORCE BASE
DIFFERDING, JEFF	VALLEY CITY
DOKKEN, BRUCE	CASS RURAL WATER
DOLL, ANTON (TONY)	NAPOLEON
DRADER, KRYSTAL	TOWNER
DUNN, DENNIS	GRAND FORKS
DUNN, STEVE	LIDGERWOOD
DUSEK, TOM	GRAFTON
ELLIOTT, CODY	AMERICAN CRYSTAL SUGAR
EVERETT, JAMES	FORT BERTHOLD RURAL WATER
EVERSON, KELLY	VALLEY CITY
FALCON, DELMAR	TRENTON WATER USERS
FIECHTNER, KEITH	MPC-MILTON R. YOUNG STATION
FINKEN, CHAD	MINOT
FISCHER, MIKE	BISMARCK
FOLDEN, TIM	SAWYER
FORD, BRUCE	CANDO
FORD, KEVIN	OAKES
FOX, LOREN	FORT BERTHOLD RURAL WATER
FREY, CURTIS	BISMARCK
FREY, MICHAEL	AMERICAN CRYSTAL SUGAR
FROELICH, JOE	SOUTH CENTRAL RURAL WATER
FUHRMAN, GLEN	ENDERLIN
GANSKE, KEN	LELAND OLDS STATION
GEFROH, TROY	MINOT
GIESE, TOM	MCCLUSKY
GILBERT, PAUL	SOUTHEAST WATER USERS (CENTRAL)
GORSUCH, ALAN	T. ROOSEVELT N.P.

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GRZADZIELESKI, JASON	BISMARCK
GULLICKSON, DARYN	MANDAN
GUSTAFSON, PHILIP	HALLIDAY
HAALAND, AMY	CARGILL SWEETENERS
HAGEN, KYLE	BISMARCK
HAGER, GARY	UPPER SOURIS WATER USERS
HAGL, MATT	HAZELTON
HALGREN, NELS	GREATER RAMSEY WATER
HALLDORSON, BRAD	DEVILS LAKE
HAMMOND, ROGER	DEVILS LAKE
HANSON, CHARLES	JR SIMPLOT
HANSON, CODY	DICKINSON
HARILDSTAD, JEFFERY	NORTH VALLEY SYSTEM II
HARING, KEVIN	OAKES
HART, JERICOLE	FOUR BEARS CASINO & LODGE
HARTMAN, LUCAS	BEULAH
HASBARGEN, GARY	WAHPETON
HATZENBELLER, MARK	CARGILL SWEETENERS
HEINLE, ROGER	MAX
HENDRIX, ARTHUR	LELAND OLDS STATION
HENKE, MICHAEL	AMERICAN CRYSTAL SUGAR
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HOLEN, PAT	LELAND OLDS STATION

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HUEBNER, STEVEN	STUTSMAN RURAL WATER
HUISENGA, DERICK	DAKOTALAND HOMES/ SPADER RV
HUSTON, TRENT	DICKINSON CITY OF
IWEN, CHRIS	ENDERLIN CITY OF
JACOBSON, KEVIN	VALLEY CITY
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JEFFRIES, TERRY "NATE"	WATFORD CITY
JOHNSON, CHAD	COOPERSTOWN
JOHNSON, RYAN	MCVILLE
KALGARD, WADE	PARK RIVER
KARY, BRUCE	DICKINSON
KELLER, LARRY	FESSENDEN
KERSTING, MITCHELL	WILLISTON
KILBER, KIM	LELAND OLDS STATION
KINDELSPIRE, DEL	LAMOURE

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KLABO, TRAVIS	JAMESTOWN
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KLEVEN, BYRON	STANLEY
KLEVEN, CHRISTINE	MPC-MILTON R. YOUNG STATION
KLINDWORTH, CASEY	LELAND OLDS STATION
KNIGHT, BEN	WESTHOPE
KNOLL, RODNEY	MANDAN
KNOOP, SCOT	MINOT
KOHLER, STEVE	WILLISTON
KOLB, JOEL	GRAND FORKS AIR FORCE BASE
KOLRUD, GREG	WEST FARGO
KOPP, STEVE	FARGO
KRAFT, COREY	BISMARCK
KRANK, EDWARD	GLADSTONE
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KRISTIANSEN, ROGER	NAPOLEON
KUB, TONY	WAHPETON
KUGLIN, TROY	MINOT
KUPFER, ROY	EDGELEY

Operator	Employer
KVERNUM, DEVIN	WILLIAMS RURAL WATER DISTRICT
LADUE, WILLIE	NEW TOWN
LARSON, BLAINE	COOPERSTOWN
LARSON, DEAN	WILTON
LARSON, GREG	R & T WATER SYSTEM
LEE, BRIAN	FARGO
LEIDHOLM, MARLIN	MCLEAN-SHERIDAN WATER
LEMER, GREG	R & T WATER SYSTEM
LEONARD, TOM	MINOT
LIEBERSBACH, PAUL	NEKOMA
LINGEN, CHAD	SOUTHEAST WATER USERS
LINSTAD, STEFAN	PARK RIVER
LITTLE OWL, LEON	FORT BERTHOLD RURAL WATER
LOCKWOOD, DIADIJISHWANA	FORT BERTHOLD RURAL WATER

Operator	Employer
LOKKEN, BENJAMIN	STUTSMAN RURAL WATER
LOLL, MIKE	HANKINSON
LOVELL, BRUCE	SANBORN
LUECK, GLEN	RURAL COMMUNITY ASSISTANCE
LUND, RONNIE	TIOGA
LYNCH, JOHN	STANLEY
MACDONALD, KEN	POWERS LAKE
MALSAM, RYAN	MANDAN
MARKEY, JAMES	CASSELTON
MARSOLEK, JAMES	JAMESTOWN
MARTIN, DEAN	ROLLA
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MOSZER, MARK	BISMARCK
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MUTZENBERGER, MYRON	GREAT RIVER ENERGY-STANTON
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NELSON, PATRICK	OAKES
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NORDSVEN, SHANE	KILLDEER
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OLSON, RONALD	JAMESTOWN
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REILLY, BRIAN	WALSH RURAL WATER
REINHART, KJ	BARNES RURAL WATER
REIS, WILLIAM	CASS RURAL WATER
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RIX, TANNER	CARGILL SWEETENERS
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ROSS, DAMON	BELFIELD
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SCHANTZ, ERICK	MANDAN
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SCHON, PATRICIA	NEKOMA
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SCHWEIGERT, DAVE	COTEAU PROPERTIES
SCOTT, JAMIE	MANDAN
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SHARBONO, WADE	DEVILS LAKE
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SIMS, SABRINA	WILLISTON
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STASSENS, TAYLOR	GRANVILLE
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TORGERSON, DUSTIN	BASE UTILITIES INC.
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WEINER, PERRY	STATE WATER COMMISSION
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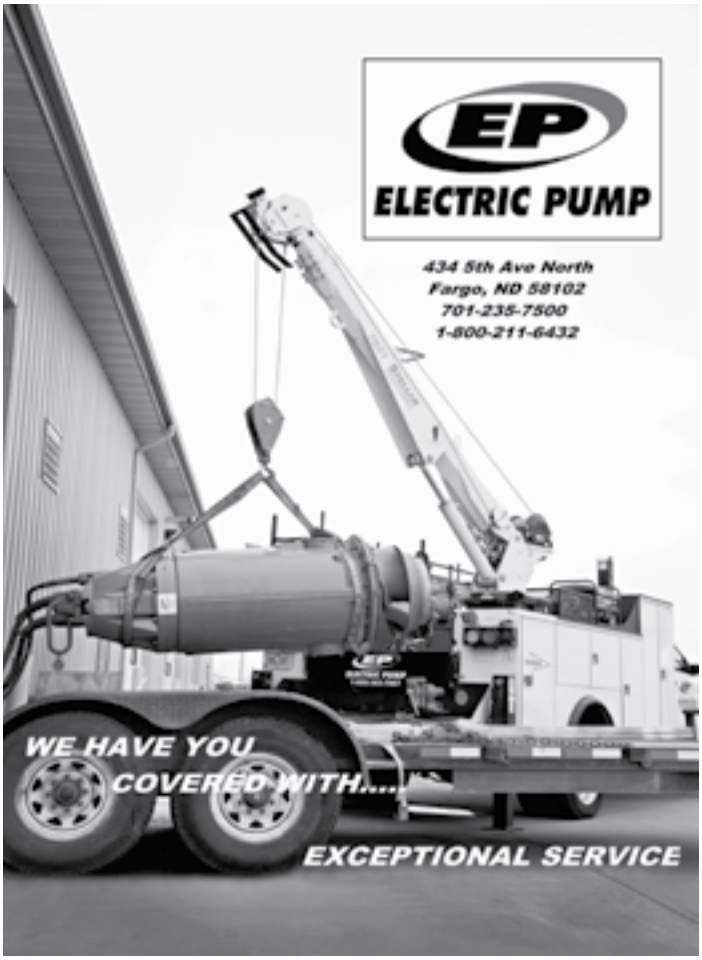

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Drinking Water the Focus of the 2014 Surface Water Treatment Workshop

Holiday Inn, Fargo, North Dakota

The seventh biennial Surface Water Treatment Workshop was presented April 29-May 1, 2014 at the Holiday Inn, Fargo, N.D. The workshop is hosted by the Minnesota, North Dakota and South Dakota sections of the American Water Works Association (AWWA). More than 175 regional city leaders, public works professionals, engineers, and students were in attendance to learn about the latest innovations for treating drinking water.

Many of the larger cities in the tri-state area get their drinking water from surface water sources such as rivers, lakes, and streams as opposed to water from aquifers or wells.

AWWA Surface Water Treament Workshop session

The utilization of surface water presents greater treatment challenges and has to meet more stringent regulations.

The Surface Water Treatment Workshop featured presentations on important water quality topics such as optimization and treatment, supply, disinfection, taste and odor solutions, new technology, and case studies from area water treatment plant projects. Presenters included water treatment professionals from the cities of Fargo, Moorhead, Grand Forks, Fairmont, Minneapolis, St. Paul, Mankato, Burnsville, and Valley City, as well as engineers from several firms.

Views From 2014 AWWA Surface Water Treatment Workshop

Holiday Inn, Fargo, North Dakota

Presentation on Valley City's new membrane treatment process

AWWA Surface Water Treatment Workshop welcome desk

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