Application for Membership

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City of Hastings’ Aquifer Storage and Restoration Project

By Scott Snell, Orton Management Projects and Programs Coordinator

Over the past two decades, the City of Hastings has been proactively addressing groundwater quality issues. Within Hastings’ municipal water supply wells, Nitrate, Uranium, Gross Alpha, Selenium, pH, Hardness and Inorganic levels have been increasing, as well as Atrazine being Detected at low levels. During this period, several wells for the city had to be taken off-line due to high levels of Nitrates in particular.

In fact, Nitrate contamination has been found throughout the local aquifer extending as far west as the Platte River. Knowing that estimated costs to construct a water treatment plant could range from $75-80 million for a system to service the size of City of Hastings, Hastings Utilities Environmental Director, Marty Stange, embarked on a bold and brave endeavor to begin mitigating contamination issues...this became known as the “Aquifer Storage and Restoration Project” or ASR. The idea was to find an alternative method to provide for a long-term reliable supply of potable water for the City of Hastings rather than over burdening taxpayers.

The ASR project set out to combine several water management options including Dual Pumping, Aquifer Storage & Restoration, Focused Water Treatment, Irrigation Reuse, and Management & Blending.

The ASR dual pumping operation began separating nitrate contaminated water within selected operating wells. This was accomplished by installing two or more pumps in a well and skimming the top water off which has the higher levels of nitrates. According to Marty Stange, “One of the foundations that allowed for the development of the ASR Project is the ‘skimming’ of water off of the top of the aquifer which is high in nitrates to reduce the overall nitrate level in a production well. This ‘skimming pump’ is a second pump (dual pump) placed in the production well to remove water from the top of the screen. In the Hastings area, nitrates found in the aquifer are floating on top of the aquifer.”

The top of the screen receives the water from the top of the aquifer. By placing the dual pump at the top of the screen, a separation of waters can be achieved. This may bring a slight decrease in overall nitrate levels in the production well. Various site and operating parameters impact the overall efficiency of this high nitrate recovery.

“Reducing nitrates by as little as 0.5 mg/l may be the difference in the ability to continue to use the well or shutting it down, and thus losing the value of the well,” Stange says. “With

Continued on next page...
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the cost of new production wells at $500,000 or more, any extension in the life of a well can provide substantial economic savings. Also, the ability to locate new well sites and connecting the new well to a water system can be very problematic,” Stange continues.

The water treatment has been limited to the high nitrate waters removed from the containment wells. The clean water captured by the containment wells, and the cleaned waters that are produced by the water treatment system are then re-injected into the aquifer for storage and use by the existing city water supply wells.

Wastewater generated by the treatment system and dual pumping are used for agricultural irrigation via a series of center pivots, as well as irrigation lines for city parks. This was done to beneficially dispose of the high nitrate waters that can be applied to adjacent farm fields and city park grass with offsetting nitrogen credit. The nitrate levels in this repurposed water benefit local farm ground and city parks by lessening the amount of nitrogen fertilizer that would have been applied to these acres. Additionally, this use of the high nitrate waters for designated irrigation allowed other irrigation wells located within the Aquifer Storage and Restoration recharge zone to be turned off, thus limiting this water for use only by existing city wells. The blending process and above ground storage has been used to meet the daily demands of the City of Hastings.

Drilling these specialized wells was a unique challenge... Downey Drilling Incorporated of Lexington, Nebraska was selected by the City of Hastings to work on this highly specialized project. Brent and Tom Downey were intrigued about the challenge of such a unique project. “When we were awarded the contract for the ASR Project, we were excited to be a part of this innovative program,” states Brent Downey. “Water quality is becoming more and more of a concern in our state. The City of Hastings took a proactive approach and developed a system that appears to be working very efficiently,” Brent continues. “It is showing positive results regarding the decreasing nitrate levels on various municipal wells. I think this model should and can be replicated by other municipalities with similar hydrogeological properties throughout Nebraska to combat water quality issues such as nitrates,” suggests Brent.

How can this large-scale project help smaller towns & villages with limited budgets?
Over the years since the inception of the ASR project, several more phases of activity have positively impacted portable water for the citizenry of Hastings. The lessons learned from the ASR project are indeed scalable to custom fit smaller towns and villages as well.

“For smaller communities, an ASR system could be a viable option especially in light of the disposal of high nitrate wastewater,” Stange notes. “Many smaller communities have facultative lagoons that are under-utilized as their populations are not growing or may be declining. Provided a sewer service can be found with sufficient capacity, the high nitrate wastewater can be sent to their facultative lagoon for processing and disposal."

This disposal can be augmented from the use of sprinkler irrigation for land application of treated wastewater. In some situations, other than the dual pump and some piping, communities may already have the resources they need to extend the life of a high nitrate well. “If there are municipal folks and locally elected officials reading this article, I would encourage them to look at how scalable this system is and how it could greatly impact the quality of their potable water,” encourages Stange. “I would be more than happy to share what I know and share the positive results we have witnessed here in Hastings.”

Marty Stange, Hastings Utilities Environment Director can be reached at the City of Hastings offices by calling (402) 461-2309.
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The Nebraska Well Drillers Association has a long tradition in the groundwater industry in Nebraska. It was established over seventy-five years ago and nurtured by key industry leaders along with academicians from the University of Nebraska.

The NWDA has served the industry by providing technical training, new product exposure, idea sharing and fellowship among the members. The organization represents businesses and industries, as well as, technicians dealing with water well drilling, pump installation, manufacturing and the supplying of equipment and material for water well work.

The NWDA has also become a significant voice in legislative and regulatory affairs of the State of Nebraska.
Types of licenses

• **Water Well Drilling Contractor** is the principal officer, director, manager or owner-operator of any business engaged in the construction or decommissioning of water wells.

• **Water Well Drilling Supervisor** is an individual engaged in the construction or decommissioning of water wells. Such supervisor may have discretionary and supervisory authority over other employees of a water well contractor and must be employed by a water well contractor.

• **Pump Installation Contractor** is the principal officer, director, manager or owner-operator of any business engaged in the installation of pumps and pumping equipment or decommissioning of water wells.

• **Pump Installation Supervisor** is an individual engaged in the installation of pumps and pumping equipment or the decommissioning of water wells. Such supervisor may have discretionary and supervisory authority over other employees of a pump installation contractor and must be employed by a pump installation contractor.

• **Water Well Monitoring Technician** is an individual engaged solely in the measuring of ground water levels, the collection of ground water samples from existing water wells or the inspection of installed water well equipment or pumping systems. This person does not need to work under a water well contractor and may NOT supervise the work of others.

• **Natural Resources Ground Water Technician** is an individual employed by a natural resources district and engaged in the inspection of chemigation systems, measuring and recording static water levels, inspection and servicing of flow meters and water sampling practices and techniques and may NOT supervise the work of others.
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Continuing Education is Important

Everyone knows, if you want your company to be successful, it’s important for employees to know the trade. In addition, learning never stops - there’s always more to know to broaden your knowledge and make your work the best it can be. The more you learn, the more efficient you are, and efficiency means money saved.

Knowing how to use your equipment to its fullest advantage makes the most of your investment. Improving the safety of your jobsite is vital for your employees and business. Proper training shows the best ways to use your equipment, how to operate it safely, and what needs to be done to maintain it - so you’ll create a safer environment for your workers and customers.

Operators who know how to maximize productivity and avoid preventable issues - and realize the importance of daily inspection and safety - are at a premium. Employees who are training and educating themselves regularly will allow the company to purchase better, more advanced equipment for their jobs. Education also helps increase your qualifications.

Not to mention, many people want to know their contractors are current on eco-friendly tech trends, and aren’t harming the environment more than necessary. Without continuously learning and embracing technology, you may miss important things to keep you at the top of your game.

Change is inevitable. Without continuing education to learn about the newest innovations available, how can you offer what customers are looking for?
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Check out our Nebraska Well Drillers Association web page at
http://www.nebraskawelldrillers.org/

for all the latest information relating to the Annual Convention and other upcoming Association sponsored events.

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Local Contact:
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David Wilson (303) 589.8274
Jay Roberts (405) 320.4599
Attention: Online Classes to begin in February

Online classes for 2021 will begin on February 22nd, 2021 and for the 2021 membership, you can get your hours for free. Classes will be offered to both the Nebraska Well Driller and Nebraska On-Site Waste Water Associations. There will be some crossover classes. Free online CEUs and PDHs only apply to classes offered by the state association. Registration will be required for classes. These following are the scheduled online class dates:

All classes will run from 9-10 am Central Time on Mondays starting on February 22nd and be good for 1 hour of CEU or PDH except the 811 Issues and Updated Regulations class which will run for 2 hrs and be good for 2 hrs of CEU or PDH. We will have a break in classes June-August and then we will resume on September 13, 2021.

PLEASE MAKE SURE THAT ALL YOUR INFORMATION IN OUR SYSTEM IS CORRECT. ESPECIALLY YOUR EMAIL ADDRESS AS THAT IS WHERE THE ZOOM INFORMATION WILL BE SENT AND THE ADDRESS YOU WILL USE TO SIGN INTO THE WEBINAR. INCORRECT INFORMATION WILL PREVENT YOU FROM BEING ABLE TO REGISTER. You can sign in and update any incorrect information in your user profile. If you do not remember your log in information, click “Forgot Your Password”.

LIST OF CLASSES:

2. 811 Issues and Updated Regulations when dealing with underground utilities – Doug Donnelson, Nebraska Fire Marshal. March 1, 2021 Crossover
3. Water Machine video March 8, 2021 Crossover
4. Communication & Engaging the Interest of the Younger Generations – Becky Schuerman UNL Extension March 15th, 2021 Crossover
6. High Strength Wastewater Design Considerations – Jim Bell, BioMicrobics. Session will discuss how to identify and deal with high strength waste in septic systems. March 29, 2021 On-Site
7. VFD – Scott Mathews, Yaskawa. April 5th, 2021 Well Drillers
9. Well Rehabilitation; Don’t Over Complicate It – Todd Tanahill – Cetco April 19th, 2021 Well Drillers
10. NDEE Q&A – Tom Buell, NDEE. April 26th, 2021 On-Site
14. Troubleshooting Wastewater Pumps and Panels – Jeff Rook, Xylem May 24, 2021 On-Site
15. Do I need an engineer for my project and how do I select one – Dana Peterson, P.E., Frontwater Engineering Sept 13, 2021 On-Site
18. Q&A session Dave Miesbach Water Well Standards License Board/NDEE – This will be the annual session where Dave discusses what is going on with the Water Well Standards Board and with NDEE. October 4th, 2021 Well Drillers
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Executive Director's Notes
by Lee Orton

In the last issue of Water Writes I discussed the early experiences with the world health crisis and also the personal experiences your Association office folks were faced with because of violence in the streets of Lincoln. Our office is back to normal except for being closed to the public because of continued health limitations...and of course the health of the world continues to be an international news story.

Your summer, fall and probably winter will continue to be life in the exciting times of the ongoing health crisis resulting from the world wide lack of taking responsible precautions including spacing, face masking and general care in community contact. Your designation as “critical businesses” has put you in extra contacts requiring you to take some additional protections. Hope you all have stayed well and will find your healthy way to a new year and a new awareness of our world.

Your Association will be investing in a number of “on-line” training opportunities in 2021 taking the place of our very successful convention and trade show. We have announced that plan in an industry wide mailing several weeks ago and will be announcing details soon for special benefits for our Association members. Our membership ranks have increased because of this opportunity. And, we hope long time members and our new members will stay with us for the future when we again return to a more traditional education format but include added “on-line” options as well.

Your profession will remain critical to America. You and your company and your staff will remain critical to that practice and you will continue to find new options to learn and to share your professional experiences. Your profession and your business are also critical to this Association. We represent you and the profession. The Association is a private, not for profit, enterprise and we need you to continue to be a part of this family. Hope you will take advantage of our special education opportunities in 2021 and do so as a participating member of the Nebraska Well Drillers Association.

Have a happy and safe holiday and we will see you in 2021 somewhere!
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