EARTH WEEK CLEAN-UP BY: ELLEN MONHAUT

Earth Day started 52 years ago on April 21, 1970. A Wisconsin Senator, Gaylord Nelson, was inspired by student activists after the 1969 oil spill in Santa Barbarba, CA. Nelson and activist Denis Hayes formed a staff and organized a nationwide environmental teach-in.

The date, April 22, was chosen, as it falls between spring break and final exams for students. In 1990, Hayes put in the work to make Earth Day an international event. Now, in 2022, millions of people honor this event.

In celebration of Earth Day, 16 Empire employees volunteered to clean up the outside areas at Empire. We got lucky with a 60° sunny day during a week that contained snow, rain, and wind. After an hour outside, we gathered 58 pounds of trash.

Thank you to everyone who helped: Amy Bettis, Emily Syring, Sierra Craig, Ellen Monhaut, Jack Przywojski, Daniel Puent, Jennifer Jahnke, Stephanie Haring, Brandon Pierce, Justin Gabel, Ana Mueller, Becca Bridges, Brandon Dougherty, Angie Severson, Jennifer Schloesser, and Keith Cook.

SAFETY AWARENESS NEWS

SAFETY UPDATES AT EMPIRE

BY: AMY BETTIS

As we celebrated our safety milestone of 244 days with no lost-time accidents and counting, I would like to call to attention to what our safety committee has been working towards regarding several improvements around Empire.

Trip hazards created by the uneven floor at the entrances from roll-to-roll and the die storage hallway into SVS were busted out and replaced with new concrete, eliminating the trip hazards. Floor signage was created and placed outside the bathrooms near job out to warn personnel to stay clear of doors that swing outward.

This spring, independent alarms were added to exterior doors to help secure our building. If a door is accidently opened, maintenance must be called to turn the alarm off with a key.

On March 17, 2022, Michael Fetting, loss prevention specialist from our workers comp provider, SFM, toured Empire to conduct noise mapping in our production areas. Through his observations, we will be conducting dosimetry testing on May 4, 2022 in hard tooling and LVS in order to properly evaluate the need to expand hearing conservation program from screen making to these departments.

If you have an interest in helping keep yourself and your co-workers safe, no matter what shift you work, **the safety committee would like to reach out for potential new members**. If interested, contact Keith Cook (R&D 1st shift) or Amy Bettis (SVS-2). We will bring your name to our next meeting for committee selection and approval. Meetings are the second Tuesday of the month at 1:30pm.

SAFETY COMMITTEE

SAFETY COORDINATOR

Keith Cook.....R&D

COMMITTEE MEMBERS

Kathy Vaughan.....Human Resources
Amy Bettis.....Small Value Stream Supervisor
Nancy Gilbertson.....Customer Service
Curtis Johnson.....I.T.
Tom Donaldson.....Digital Manager
Theresa Antony.....Small Value Stream Operator
Shane Hulburt.....Doming Supervisor
Bob Fischer.....Small Value Stream Operator
Mike Wakeen.....Director of Manufacturing

EMPIRE RECEIVES ENERGY REBATES

BY: CATHY BUTTELL

Every year, Riverland Energy has rebates available to members as an incentive to purchase or retrofit energy-efficient products. These rebates are decided on at the end of every year. For the 2020-21 year, Jeff Gierok and I put together two rebate proposals for submission: the UV 12x14 Retrofit and the Aquaflex UV Retrofit. We were fortunate to receive a total of $17,000 in rebates.

Jeff Gierok (L) and Jim Brush (R)
receive rebate checks from Riverland Energy

12x14 RETROFIT:

This was the last 12x14 press that Empire retrofitted, eliminating the high cost of producing parts using traditional UV lines and moving towards environmental sustainability. The 12x14 is a three-color press, changed to three LED-curing ovens that have 14-inch lights at each station. These ovens are single station units with a 16-watt-per-inch curing area.

With the traditional UV mercury bulbs, there would have been 300-watt double-station UV units at an 18" cure area. The exhaust for the ozone on the UV mercury units would have been over 5,000 cfm (cubic feet per minute). This would take out a large amount of cool air in the summer and hot air in the winter, which adds up to a significant amount of energy just going up through the stacks. The LED curing has no air or exhaust needed, eliminating that energy cost completely.

Before:
Exhaust was needed for the ozone created from the mercury bulbs.

After:
No exhaust is needed for LED curing technology.

BEFORE: 12x14 UV Press

AFTER: 12x14 LED Press

GREEN COMMITTEE

Jennifer Schloesser.....Creative Director
Amy Bettis.....Small Value Stream Supervisor
Cathy Buttell.....Project Manager
Keith Cook.....R&D
Jeff Gierok.....Electrical Technician

SUSTAINABILITY NEWS

Energy Information for the 12x14:

Mercury vs. UV LED

12x14 3-COLOR PRESS POWER CONSUMPTION COMPARISON (Based on 5,000 work hours/year)		
Description	**Traditional UV Mercury Press**	**Retrofit UV LED Press**
Average Amps	56 Amps	**4.1 Amps**
Voltage	480 Volts (3 Phase)	**208 Volts (3 Phase)**
Kilowatts/Hour	46.6 kW/h	**1.48 kW/h**
Kilowatt Hours/Year	232,780 kWh	**7,377 kWh***
Price per Kilowatt	$.0733	**$.0733**
Total cost to run per year	$17,063.00	**$540.73**
CFM Exhaust for press	5,000 CFM (38 kW/h)	**0 CFM**
Cost of CFM Exhaust	$13,927.00	**$0.00**
Cost of Bulbs per year	$3,240 (18 @ $180 ea.)	**$0.00**
TOTAL COST/YR TO RUN	**$34,250.00**	**$540.73**

BEFORE: Aquaflex Press

AFTER: Aquaflex Press

AQUAFLEX UV RETROFIT:

We retrofitted our flexographic press to eliminate the high cost of producing parts using traditional UV lines as well as moving towards environmental sustainability and employee safety.

Empire's flexo press is a complete in-line manufacturing system. It can print up to eight colors, front and/or back printing, lamination, custom die cutting, perforating, slitting and sheeting—all performed in one continuous operation from a roll. The image is printed on the substrate, then pulled through a series of print stations. Each station prints a single color and used one LED bulb for curing.

Prior to the LED conversion, the exhaust for the ozone on the UV mercury units would have been 4,000 cfm (cubic feet per minute). The LED curing has no air or exhaust needed, eliminating that energy cost completely. Total kWh per year is also reduced by 85.75 percent.

Energy Information for Flexo Aquaflex:

Mercury vs. UV LED

FLEXO AQUAFLEX CONSUMPTION COMPARISON (Based on 4,000 work hours/year)		
Description	**Traditional UV Mercury Press**	**Retrofit UV LED Press**
Run/Idle Time	2000/2000	**2000/2000**
KW/Hr	62.3 kW/h	**13.3 kW/h**
KW/Year	200600 kWh	**36600 kWh**
Price per Kilowatt	$.073	**$.073**
Total cost to run per year	$14,644	**$2,672**
CFM Exhaust for press	4,000 CFM (30.4 kW/h)	**0 CFM**
Cost of CFM Exhaust	$8,906	**$0.00**
Cost of Bulbs per year	$960 (8 @ $120 ea.)	**$0.00**
TOTAL COST/YR TO RUN	**$37,470.00**	**$2,672.00**

CREATING AN RC CAR

BY: JENNIFER SCHLOESSER

Sometimes, we get opportunities that are a little beyond the day-to-day scope.

Our outside sales rep, Ian Munnoch, contacted me about helping with an RC car. He asked if I would be interested in designing vehicle graphics for the SPE Student RC Car Competition in Grand Rapids, Michigan.

I had questions and concerns about creating something in 3D only to find out all the hard work was already done by Avery Tolboe and Timothy McGough, students at Central Connecticut State University, and Distortion Arts did the 3D forming. The college students already had the CAD drawing, schematics, and the 3D rendering done.

All I had to do was have some fun and come up with a cool look. After researching and talking with the students about what they had in mind, I developed a design. They were thrilled with the outcome and the help I provided. The students received two awards, one for People's Choice and the other for Best Design. It wasn't until after the competition that I got to see the final results. The car looked fantastic! I was happy to be a part of their success.

In their own words, here is the article written by Avery Tolboe and Timothy McGough about their experience designing, fabricating, working with suppliers, and performing at the SPE competition:

Our group participated in the student design competition at the 2021 SPE Thermoforming Division Conference in Grand Rapids, Michigan. The team was tasked with designing and producing a thermoformed shell for a RC car which would be judged on complexity and presentation. Our student team consisted of two senior mechanical engineering students, Avery Tolboe and Timothy McGough from Central Connecticut State University. We were advised by our professor, Ned Moore, and sponsored by Ian Munnoch from MSA Components.

Design:

During the initial stages of the design portion of the project, we decided to draw inspiration from '20s to '40s era American automobiles. The competition was in Michigan, after all. After sketching multiple designs, we settled on a car with large fenders and running boards. We wanted to push ourselves to use a complex mold and that the large draw down to the running boards, the tight radii along the running boards and fenders, and the details in the windows with overhangs would test us. Using a CMM arm to map all the critical points on the RC car chassis, such as the shell mounting points and any possible interference with the tires, a CAD model of the mold was made based on our sketches. The CAD model was then imported into a nonlinear ANSYS simulation of the thermoforming process to prove that an initial sheet thickness of 0.040" would give us a designed minimum part thickness of 0.020 inches. Using guidance from our sponsor and our ANSYS simulation, it was decided that we would utilize PETG because of the ease of forming.

Mold Manufacturing:

After designing the mold, the decision of its manufacture had to be made. We were at the height of COVID-19 lockdowns and had limited access to equipment. Initially, we planned on 3D printing our mold; we had successes when testing the thermoforming process using 0.040" PETG sheets with ¼ scale molds made from ABS filament. The full scale mold was significantly larger than our available print bed sizes, requiring us to print the mold in eight separate pieces. With the clock ticking down to our deadline, the incredibly long print times, complications with printing ABS, and difficulties producing a mold with a fit and finish to our standards, it was ultimately decided that the 3D printed mold was not an adequate solution. After searching our local contacts, we gained access to a 3-axis CNC wood router and shifted our focus to producing a mold from MDF due to its low cost and ease of machining. With the limited Z-travel of the router, the mold was split into multiple layers that were glued together after machining. Ultimately, the MDF mold had a good fit and left a nice surface finish on the thermoformed parts.

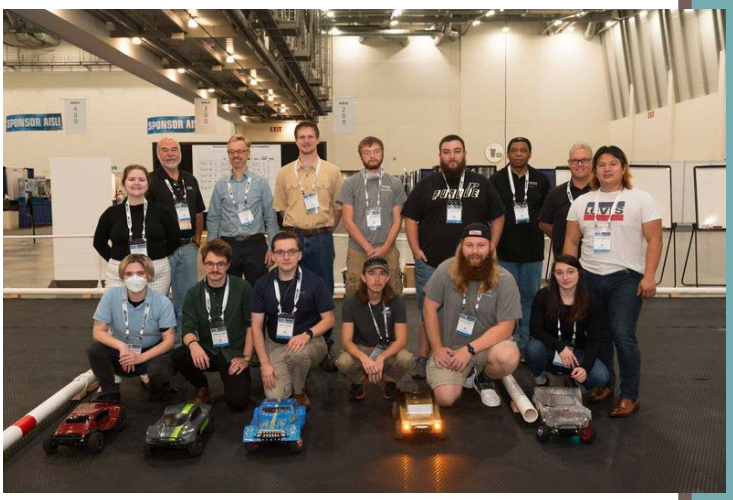
Graphics:

The other part of the competition besides high part complexity was presentation. To be competitive, our sponsor introduced us to distortion graphics—printing an image on the plastic sheet prior to forming—to create detailed, complex, and repeatable graphics. Two companies were an integral part of getting our desired graphics from concept to our final part: Distortion Arts and IT Supplies. Distortion Arts specializes in manipulating 2D graphic concepts into a flat, continuous image that puts the decal art in precisely the correct spot when thermoformed. IT Supplies utilizes HP latex printing technology to print artwork on plastic sheets. The process began with printing a dotted grid on sheets with the same specification as those used in production. A setback came when it was discovered that our roll of 0.040" PETG stock could not be flattened sufficiently for the printing process. Alison Svoboda at Distortion Arts graciously offered to supply us with 0.050" flat polycarbonate (PC) sheets,

which put us back on schedule. After receiving the PC dotted sheets, our team formed them to our mold and sent the formed parts to Distortion Arts to analyze the distortion and apply it to our 2D graphics. IT Supplies then printed our distorted graphics onto unformed sheets to use when forming our final product. We were lucky we had switched to a wooden mold, as the ABS tool we originally envisioned may not have withstood the temperatures required to form polycarbonate.

Thermoforming:

The thermoforming of the final parts opened our eyes to the complexity of the process. One unexpected challenge was the influence of the latex paint color on the heat transfer processes when forming. The initial distortion mapping was performed on clear polycarbonate, but the final part was made with a base coat of white, still visible on the bottom, and mix of colors dominated by blue and yellow latex paint on the top. This caused the painted parts to heat differently than the parts used to generate the distortion map. This resulted in changes to the mechanical properties of the material and thus the final form of the art. For good parts, we learned repeatability was key. Variations in room temperature were especially detrimental to the consistency of the parts. This was especially evident with the checkered banner that ran down the center of our shell, which ended up bowed on the final set of parts. After months of working with PETG, we also needed to quickly adapt and learn the nuances of polycarbonate and the challenges that come with using thicker stock. The key trick for us was to lower the duty cycle of the top bank of heaters on our MAAC ASP thermoforming machine so that we could mimic the heating behavior of the original clear sheet. Although the 0.050" PC sheets were more difficult to work with than the original 0.040" PETG, we managed to create great looking parts that, due to the superior properties of polycarbonate, were almost indestructible when mounted on the RC car. And at the competition, the car took a beating and kept on going.



Competition:

Despite the obstacles that we were faced with, our team prevailed and earned the People's Choice and Best Design Award. We could not have done it without the help from our advisor Dr. Moore and our sponsors, Ian Munnoch from MSA Components; Jennifer Schloesser from Empire Screen Printing developed the car graphics, Bob Rychel from IT Supplies; and Alison Svoboda, John Davidson, and Neil Compson from Distortion Arts. The opportunity provided by SPE Thermoforming to compete was invaluable, with many educational opportunities both throughout the project and at the conference itself.

EMPIRE SCREEN PRINTING

MARCH MADNESS

Each year, Empire employees are invited to participate in the NCAA March Madness bracket challenge. A bracket pool is set up for Empire employees, with the prizes including trophies and ultimate bragging rights. Here are the results from this year:

1st • Joe Piper

2nd • Shane Hulburt

3rd • Angie Severson

Overall Standings

Total Brackets: 13

RANK	CHAMPION	BRACKET NAME	PTS	MAX	CPK	RD1	RD2	S16	E8	FF	NCG
1	(152)	Joe Piper	105	105	37	23	18	8	8	16	32
2	(142)	SHANE HULBURT	98	98	34	22	16	4	8	16	32
3	(120)	Angela Severson	62	62	38	24	22	8	8	0	0
3	(155)	kevin gerstenberger	62	62	36	22	20	12	8	0	0
5	(154)	nancy gilbertson	61	61	33	21	16	8	16	0	0
6	(127)	Ellen Klug	59	59	34	21	18	12	8	0	0
6	(170)	Levi Adank	59	59	37	25	18	8	8	0	0
8	(156)	Amy Bettis	54	54	35	26	12	8	8	0	0
9	(145)	Jared Papenfuss	49	49	34	23	18	8	0	0	0
10	(124)	Matthew Vanderloop	46	46	28	16	18	12	0	0	0
11	(168)	Dave Benzschawel	41	41	32	25	12	4	0	0	0
12	(136)	Jennifer Schloesser	40	40	30	22	14	4	0	0	0
13	(120)	David Hulburt	38	38	28	20	14	4	0	0	0

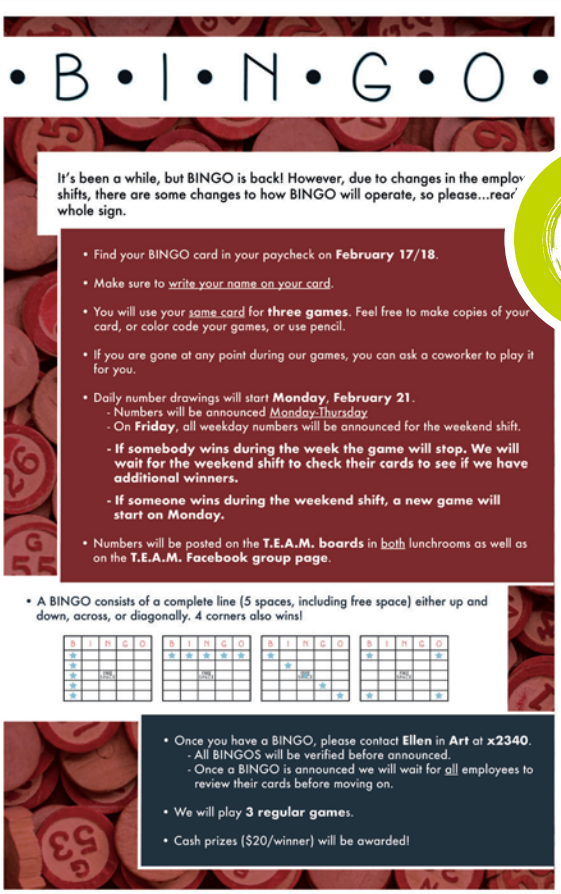
BINGO

In February, all employees were given a bingo card in their paychecks. Since then, one number has been called Monday to Thursday every week. The numbers are recapped for the weekend shift on Fridays. Bingo winners receive $20 cash! We have completed all of the bingo games! There were two winners in game one, one winner in game two, and one winner in game three.

Game 1 winners:
Deborah Felix (SVS, 1st shift)
Dan Poff (SVS, 2nd Shift)

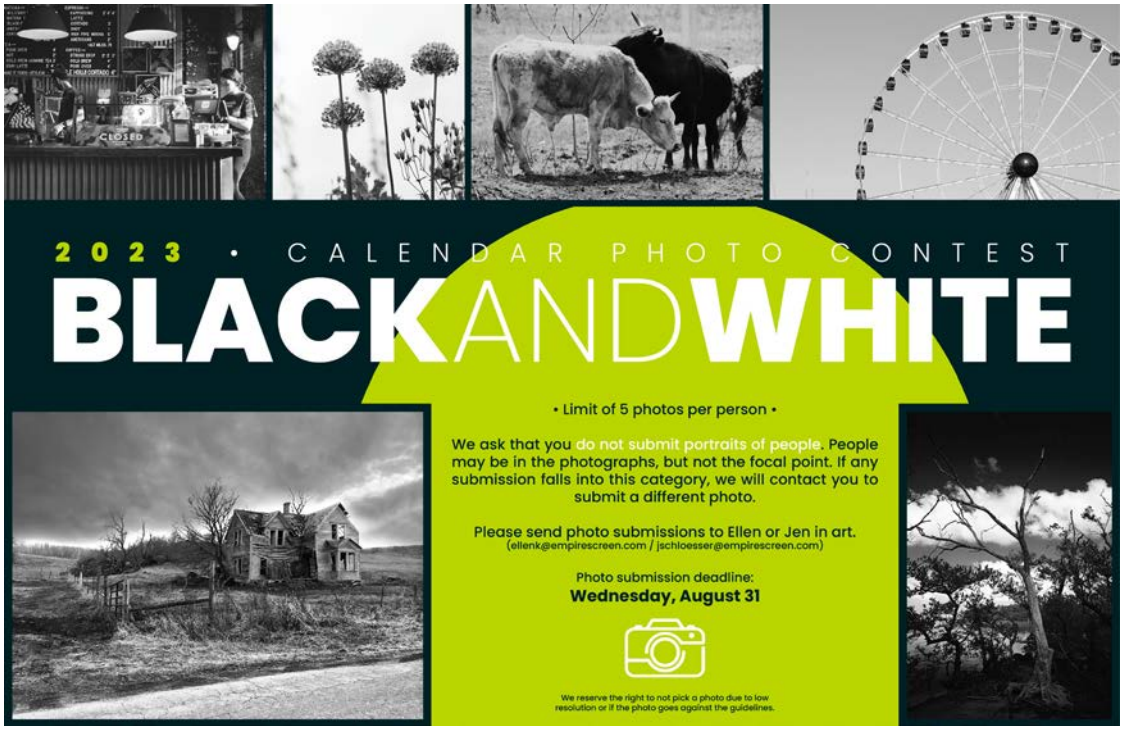
Game 2 winner:
Misty Merritt (Flexo, 1st shift)

Game 3 winner:
Jenny Ledman (Art, 1st shift)



2023 CALENDAR THEME

Each year, Empire creates calendars that are sent out to our top customers. The photos for these calendars are submitted by employees! Our theme for 2023 is Black and White Photography.



NEW BVISIONS MEDIA VIDEOS

BY: ELLEN MONHAUT

Bailey Nelson is the brains and talent behind BVisions Media, a video production company located in La Crosse, WI. We first worked with Bailey this past summer for the Tattoos and Tailgates concert event. After seeing the final videos, we were so pleased with Bailey that we invited him to our facilities to shoot a couple more videos. The first video is a virtual tour with Empire president John Freismuth. The second video is a testimonial video of various Empire employees.

Check out these videos on YouTube to learn more about Empire, our employees, and what we do!

TO WATCH THE VIDEOS CLICK THESE OR SCAN THESE

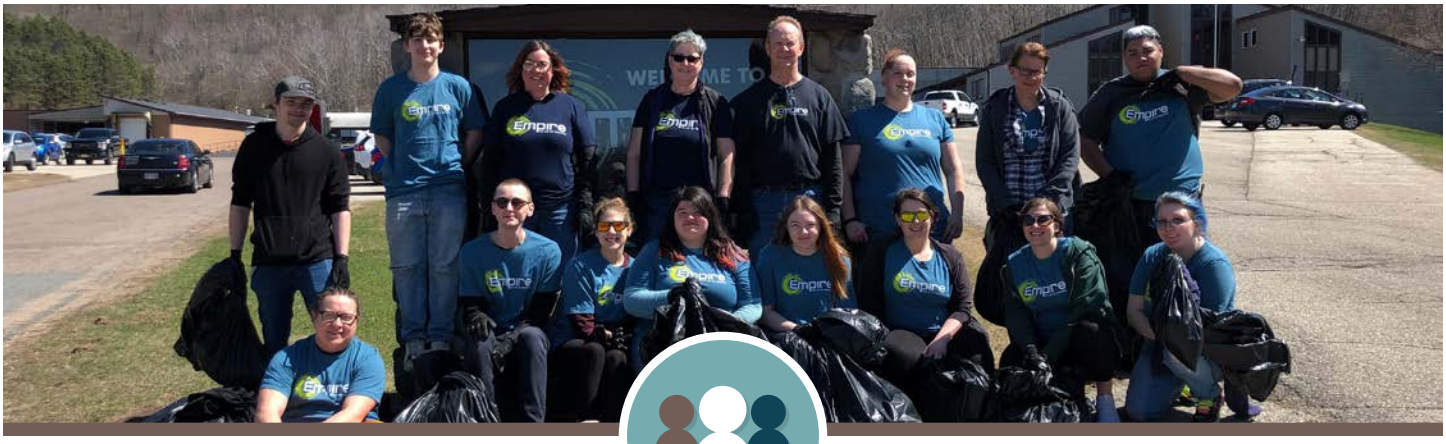
Learn more about Bailey and BVisions Media at: www.bvisionsmedia.com

RETIREMENTS

Gigi Cundy-Lalande (SVS) retired on February 10, 2022 from full-time employment and will be working part-time starting 02/14/2022. Amy Bettis (SVS) made Gigi this beautiful quilt as a retirement gift.

On Thursday, February 24, 2022, we celebrated the retirement of Steve Remen. Steve worked at Empire for over 49 years. In 1970-something, he started off in the stockcutting department, and he ended his employment as an account manager in customer service. Thank you for all your hard work and dedication, Steve!

On Wednesday, April 27, 2022, we celebrated Deb Gorniak's last day at Empire. Deb worked at Empire for 27 years. Best of luck on your next adventure, Debbie!



ANNIVERSARIES

JANUARY

Steve Nelson.....35 years
Randy Hoff.....33 years
Fred Baures.....29 years
Chris Mikunda.....24 years
Jennifer Schloesser.....22 years
Mai Khang.....15 years
Eric Wienkes.....14 years
Nick Wolfe.....12 years
Rick Burg.....8 years
Steve Limpert.....5 years
Carol Tollefson.....4 years
Emily Syring.....4 years
Cody Volden.....4 years
Lisa Lehrke.....2 years
Phillip Treu.....1 year

FEBRUARY

John Freismuth.....30 years
Shane Hulburt.....28 years
Guy Gregerson.....26 years
Jason Harnisch.....21 years
Angie Severson.....18 years
Stacie Boisen.....15 years
Dan Poff.....13 years
Georgina Cundy-Lalande.....4 years
Heather Reinsvold.....2 years
Samantha Manley.....1 year
Andrea Bell.....1 year
Lakota Standing Bear.....1 year
Evan Heintz.....1 year

MARCH

Jim Schwinefus.....51 years
Clark Martin.....33 years
Sherri Vinson.....29 years
Jeff Gierok.....29 years
Daniel Metz.....29 years
Jessica Kamrowski.....26 years
Petra Vogel.....25 years
Vanessa Fox.....21 years
Andy Kiedrowski.....16 years
Alexis Marsh.....8 years
Walter Staff.....7 years
Chad Hoesley.....7 years
Cass Rehfuss.....5 years
Crystal Monn.....3 years
Alexander Taylor.....3 years
Brittany Cairns.....2 years
Amy McCurdy.....2 years
Jared Ball.....2 years

APRIL

Troy Stockers.....32 years
Kevin Mason.....30 years
Randy Lemke.....30 years
Jenny Ledman.....29 years
Bill Feyen.....24 years
John Johnson.....22 years
Mark Klinski.....17 years
Amy Bettis.....17 years
Rhonda Peterson.....15 years
Rebecca Wurzel.....12 years
Teri Herold.....12 years
Curt Johnson.....12 years
Anthony McDowell.....12 years
James Owsley.....5 years
Patty Wells.....3 years
Jory Stall.....3 years
Greg Peterson.....3 years
Paula Price.....3 years
Lori Repinski.....1 year
Daniel Puent.....1 year
Sharon Ronnie.....1 year
Misty Merritt.....1 year

NEW EMPLOYEES

Macy Carty
Ashleigh Kidd
Shane Harter
Miranda Klema
Jakob Sands
Jamie Dropp
Sarah Haskins
Deborah Schmitz
Jacob Olson
Kayla Selberg
Christopher Stenberg
Ethan Marsh
Rita Howe
Jordan Henke
Hannah Knudson
Devin Lehman
Brannon McLees
Robert Sanders
Justin Gabel
Tracy Bishop
Alex Yang
Sara Sauers
Caida Alland
Anthony Hagan
Eric Olson
Brandan Pierce

Deadline for the next newsletter: 06/24/2022

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