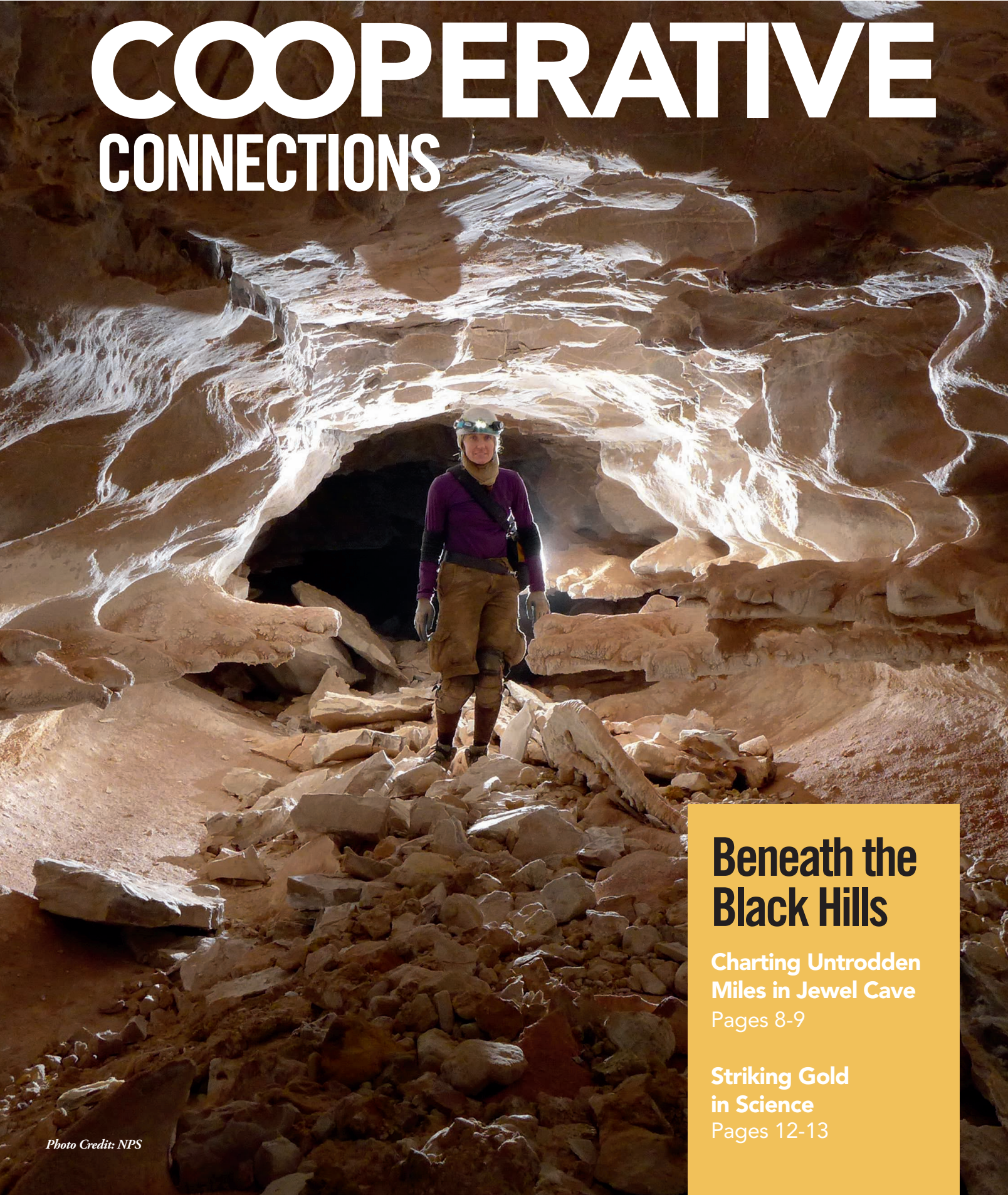


# COOPERATIVE CONNECTIONS



## **Beneath the Black Hills**

**Charting Untrodden  
Miles in Jewel Cave**  
Pages 8-9

**Striking Gold  
in Science**  
Pages 12-13



# Looking Forward-

## 2024 Budget & Financial Forecast



**Tim O'Leary**  
General Manager

This month's newsletter should get to your mailbox right before the holidays, so let me start by wishing everyone Happy Holidays.

This time of year, has us reflecting on the past year and looking forward to the upcoming year. Our look forward manifests itself in the cooperative's 2024 budget and financial forecast. The budget will be reviewed with the board at the budget meeting scheduled for December 11th and then again at the regularly scheduled board meeting on December 18th. The budget process allows an opportunity for the board and employees of the cooperative to set priorities and lay out the roadmap on how we accomplish those priorities in the upcoming year. The budget provides us with the information needed to make corrections throughout the year if things are not going as planned. We will discuss the need for a rate change due to increasing costs that we are seeing in all areas of the cooperative. The size of the increase and when it will be implemented will be determined by the budget process. As a reminder, the last rate change was done on January 1, 2017. Please check next month's article to see how the budget discussion turned out for the upcoming year.

The board reviewed the yearly audit report at the November board meeting. Parker Van Zee, our audit manager from Eide Bailly, reviewed the audit report with the board and answered questions from the board throughout the presentation. Parker reported that the cooperative was given a clean audit report and that the financial statements reviewed present fairly, in all material respects, the financial position of the cooperative as of August 31, 2023 and 2022, and the results of its operations and its cash flows for the years ended in accordance with accounting principles generally accepted in the United States of America. It is always nice to get through the audit with a clean opinion and I would like to thank all of the employees of the cooperative for their work throughout the year.

The board approved an estimated Capital Credit retirement for December in the amount of \$587,211.02. The retirement will include payments for capital credits allocated in 2001, 2002 and 2018 and G&T capital credits allocated in 2004. For those eligible to receive a retirement payment, the retirement appeared as a bill credit on the bill that you received at the beginning of December.

The board set the 2024 Annual Meeting date for Wednesday, June 5th and will be held at the cooperative's headquarters building in Tyler. The board continues to look for members willing to serve on the nominating committee or be nominated to serve as a director candidate for next year's director elections. The committee will meet in February to identify director candidates. If you are interested in serving on the nominating committee, know someone that would make a good candidate to serve on the board or would like to be a candidate, please give the office a call and we can answer your questions and provide additional information.

District meetings will be held on April 8th, 9th, and 11th at 7 pm. We will provide additional information in an upcoming newsletter.

Thank you for another great year and Happy Holidays!

A colorful graphic with a red and green background. At the top, it says "WE WANT YOU" in large white letters. Below that, it says "CONSIDER JOINING:" in bold blue letters. Underneath, there are two bullet points: "• The LLEC Nominating Committee" and "• The LLEC Board of Directors", separated by "OR" in a stylized font. At the bottom, it says "For additional information or questions on how you can serve your cooperative, contact our office at: 1-800-927-6276 or 507-247-5505". On the right side, there is an illustration of a hand holding a megaphone.

**COOPERATIVE  
CONNECTIONS**

**LYON-LINCOLN  
ELECTRIC**

(ISSN 1540-6989)

**Board of Directors**

Dale Fier, Taunton – President  
 Mike Longtin, Taunton – Vice President  
 Kathleen Schreurs, Tyler – Sec./Treas.  
 Joel Buyck, Garvin  
 Jared Dritz, Porter  
 Galen Grant, Russell  
 Mary Gunnink, Lake Benton  
 Scott Johnson, Tyler  
 James Rokeh, Minneota

**Staff and Personnel**

Tim O’Leary – General Manager  
 Lyle Lamote – Line Superintendent  
 Kristi Jensen - Finance Manager  
 Brian Jeremiason – Manager of  
 Marketing & External Relations  
 Rochelle Borresen – Accountant  
 Lisa Hauswedell – Billing Clerk  
 Jessica Gums – Executive Assistant

**Staff and Personnel**

Journeyman Linemen:  
 Ross Birath  
 Dan Tutt  
 Tyler Blomme  
 Tyler Sand  
 Nathan Pavek  
 Trent Skjefte – Apprentice Lineman  
 Sam Rohde – Apprentice Lineman  
 Wade Thooft – Operations Staff  
 Assistant  
 Alan Fischer – Warehouse  
 Coordinator/Work Order Clerk

**www.llec.coop**

Lyon-Lincoln Electric hours are  
 8:00 AM – 4:30 PM Mon. thru Fri.

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**Jessica Gums, Editor**

# Sign Up for SmartHub Today!

Lyon-Lincoln Electric’s SmartHub online and mobile app provides features that help you manage your electric account, anytime, anywhere! Pay your bill, monitor your energy use, report power outages, sign up for notifications and more, all through SmartHub. You can access SmartHub free through an online platform, or download the app to your smartphone or tablet, available for both Android and iOS.

## BILLING IS A BREEZE

With SmartHub, you can select how you want to be notified of a new billing statement, including via email or text message. With just a couple of clicks you can also view your billing history, make a payment, set up AutoPay and so much more. When viewing your account history, you can easily view both your current bill and bills from previous months allowing you to compare cost and consumption. Brent & Blythe Zeug - 1507700. Making payments through SmartHub is secure and easy. No more waiting on hold to pay your bill or wasting time and stamps manually mailing in payments. Electronic payments can be made 24/7 via My Account using checking/savings or debit/credit cards. The first time you make a payment either through the web or through the mobile app, you’ll be able to securely store your payment information for future transactions.

## EASILY TRACK YOUR USAGE

Trying to save energy? Through SmartHub, you can view your hour-by-hour energy usage or compare your energy usage week-over-week or year-over-year. You can also set usage thresholds so that you’ll be notified when you’re using more energy than you’d like, helping you keep your electric bill as low as possible.

## REPORT OUTAGES

While the Cooperative strives to maintain a strong reliability record, power outages do occur. Be prepared by creating your SmartHub account now, so in the event you find yourself without power, you can open your SmartHub app on your mobile device to quickly and conveniently report your outage with a few prompts. It’s that easy!

**SIGN UP NOW**

Access SmartHub by visiting [www.llec.coop](http://www.llec.coop) or by downloading the app on your mobile device:

\*Apple App Store (iOS)  
 \*Google Play Marketplace (Android).

Manage your Lyon-Lincoln Electric account simply, quickly and conveniently with SmartHub.

**SMART MANAGEMENT. SMART LIFE. SMARTHUB.**

# January is National Radon Action Month

### Radon is a Natural Danger

About one in 15 homes in the U.S. has radon levels at or above the the EPA action level, according to the National Cancer Institute. You can't see or smell radon, and scientists estimate 20,000 lung cancer deaths in the U.S. each year are attributed to it.

Radon is produced from a natural breakdown of uranium in soil, rock and water. It enters homes, offices, schools and other buildings through cracks in floors and walls, construction joints or gaps around service pipes, electrical wires and sump pits. The Environmental Protection Agency reports elevated levels of radon gas have been measured in every state and estimates nearly one out of every 15 homes in America has elevated radon levels.

People who breathe in these radioactive particles, swallow water with high radon levels or are exposed to radon for a long period of time are susceptible to lung damage and lung cancer. Smokers who are exposed to elevated levels of radon gas have a 10 times higher risk of developing lung cancer, according to the Centers for Disease Prevention and Control.

It may take years before health problems appear. Your chances of getting lung cancer from radon depend mostly on:

- How much radon is in your home
- Where you spend most of your time (the main living and sleeping areas)
- The amount of time you spend in your home
- Whether you are a smoker or have ever smoked

### Test Your Home

Old homes, new homes, homes with basements and homes without basements can have radon problems. Testing is the only way to determine how much radon is present.

Consider hiring a professional tester. Short-term (2-90 day) and long-term (more than 90-day) test kits are available, with the long-term kit producing more accurate results. The EPA website can help you find a radon test kit or measurement and mitigation professional near you. Do-it-yourself test kits also are available at many local hardware stores.

No level of radon exposure is considered completely safe, however the EPA only recommends reducing radon levels in your home if your long-term exposure averages four picocuries

per liter (pCi/L) or higher. A pCi is a measure of the rate of radioactive decay of radon gas. This decay causes radioactive particles that can get trapped in your lungs when you breathe.

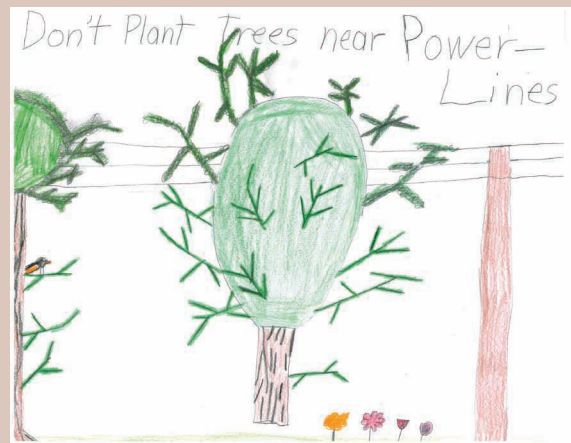
### Reduce Radon Gas in Your Home

The American Cancer Society says a variety of methods can be used to reduce radon gas levels in your home, including sealing cracks in floors and walls and increasing ventilation though sub-slab depressurization using pipes and fans.

The EPA recommends using a state or nationally certified contractor, because lowering high radon levels often requires technical expertise and special skills. Two agencies have set the standard for participants seeking certification:

- The American Association of Radon Scientists and Technologists
- National Radon Safety Board

Always test again after the work is finished and then every two years. The U.S. Environmental Protection Agency has designated January as National Radon Action Month, a time when health agencies across the country urge all Americans to have their homes tested for radon.



### Don't Plant Trees Near Power Lines

#### Annette Tschetter, Age 9

Annette Tschetter instructs readers to not plant trees near power lines. Annette is the daughter of Ryan and Elaine Tschetter from Revillo, S.D., members of Whetstone Valley Electric.

Kids, send your drawing with an electrical safety tip to your local electric cooperative (address found on Page 3). If your poster is published, you'll receive a prize. All entries must include your name, age, mailing address and the names of your parents. Colored drawings are encouraged.



# SOUPS & STEWS

## PUMPKIN APPLE SOUP

### Ingredients:

3 tbsps. butter  
1 cup finely chopped onion  
2 tps. pumpkin pie spice  
1 tsp. ground ginger  
1 can (15 ounces) pumpkin  
1 cup chunky applesauce  
3 1/2 cups chicken broth  
3/4 cup heavy cream

### Method

Melt butter in large saucepan on medium heat. Add onion; cook and stir 5 minutes or until softened. Stir in pumpkin pie spice and ginger.

Stir in pumpkin, applesauce and broth until well blended and smooth. Bring to boil, stirring occasionally. Reduce heat to low; simmer 5 minutes. Remove from heat. (If a smoother soup is desired, place mixture in batches in blender container; cover and blend until smooth.) Stir in cream. Heat gently before serving, if necessary.

[McCormick.com](http://McCormick.com)

## CREAMY CHICKEN NOODLE STEW

### Ingredients:

1/3 cup butter, cubed  
1 med. carrot, shredded  
1 celery rib, finely chopped  
1/3 cup all-purpose flour  
1 carton (32 oz) chicken broth  
1 cup whole milk  
1 cup uncooked kluski noodles or other egg noodles  
2 cups cubed cooked chicken  
1 1/2 cups shredded cheddar cheese  
1/4 tsp. salt  
1/4 tsp. pepper

### Method

In a large saucepan, heat butter over medium high heat; saute carrot and celery until tender, 3 to 5 minutes. Stir in flour until blended; gradually add the broth and milk. Bring to a boil, stirring constantly. Cook and stir until thickened, 1-2 minutes. Stir in the noodles. Reduce heat; simmer uncovered, until noodles are al dente, 8-10 minutes, stirring occasionally. Add the chicken, salt and pepper. Cook and stir until the chicken is heated through. Stir in the cheese until melted. Serve.

Susan Mitzner  
Balaton, Minn.

## CHICKEN NOODLE SOUP WITH ROTISSERIE CHICKEN

### Ingredients:

1 tbsp. vegetable oil  
1 1/2 cups chopped carrots, (about 1/2-inch)  
1 1/2 cups chopped celery, (about 1/2-inch)  
1 cup chopped white onion, (about 1/2-inch)  
1 tbsp. rotisserie chicken seasoning  
4 cups chicken stock  
4 cups medium egg noodles  
2 cups chopped rotisserie chicken  
1 tbsp. parsley flakes

### Method

Heat vegetable oil in large saucepan on medium-high heat. Add carrots, celery and onion; cook and stir 8 to 10 minutes until softened and lightly browned. Stir in Seasoning. Cook 1 minute.

Add stock and egg noodles. Bring to boil. Reduce heat; simmer 8 to 10 minutes until noodles are just tender.

Gently stir in chicken and salt. Simmer 2 minutes longer. Remove from heat. Stir in parsley to serve.

[McCormick.com](http://McCormick.com)

Please send your favorite recipes to your local electric cooperative (address found on Page 3). Each recipe printed will be entered into a drawing for a prize in December 2023. All entries must include your name, mailing address, phone number and cooperative name.

# October Board Meeting Minutes

The regular monthly meeting of the Board of Directors of Lyon-Lincoln Electric Cooperative was held on Monday, October 23, 2023. Directors present: James Rokeh, Kathy Schreurs, Jared Dritz, Scott Johnson, Mary Gunnink, Dale Fier, Mike Longtin and Joel Buyck. Absent: Galen Grant. Also present at the meeting were General Manager, Timothy O'Leary, Finance Manager, Kristi Jensen, and Attorney, Michael W. Cable.

The Board and others in attendance stood and gave the Pledge of Allegiance. President, Dale Fier, then called the meeting to order and routine business was conducted including approval of the September 25, 2023 meeting minutes, a review of the check schedule, applications for memberships, and shares to be cancelled.

Finance Manager, Kristi Jensen, gave the Financial and Statistical Report for the period ending August 31, 2023. The Board received and viewed a report from the National Rural Utilities Cooperative Finance Cooperation showing interest payments on Subordinated Certificates and Ms. Jensen reviewed with the Board the estimated payment concerning the Capital Credit General Retirement for 2023.

Lyle Lamote, Line Superintendent, gave the September Outage Report to the Board for the month of September. He also indicated that there was a

September Safety Meeting held on September 6, 2023 that involved the topic of Annual Compliance. Brandon Cruz from Star Energy Services was at the Cooperative to do the Annual Compliance Review. There was a Safety Meeting held on September 19, 2023 which involved the topic of CPR & AED Refresher conducted by Pam Bakker, Instructor from Minnesota West Community & Technical College. He then indicated that the linemen were doing the following work, some of which had been completed and some was still in process: working on the Hwy 75 project to move lines to assist East River Electric Power Cooperative, Inc. to do its project, resetting poles, and working on a half dozen underground jobs.

Brian Jeremiason, Manager of Marketing and External Relations, reviewed his report with the board which included the following: East River Electric Power Cooperative, Inc.'s IT Department was at the headquarters building on October 11, 2023 to install the new server equipment, his participation in an online Cybersecurity Tabletop Exercise with NRECA, and solar project concerns and updates.

General Manager, Timothy O'Leary, then gave his manager's report; some of the items reviewed were as follows: the Board reviewed the August power bill and sales to members and compared those figures to budgeted amounts, looked at line loss for the

system, and reported on the East River Electric Power Cooperative, Inc. MAC Meeting which included some of the following topics: engineering requests concerning interconnection to look at adding load at different spots throughout ER's territory, next generation load management receivers, and review of ER's 2024 "draft" Budget. Mr. O'Leary then reviewed with the Board information he had on loans made through the REED Fund that had been completed for area projects and shared with the board upcoming meetings, events, and notices.

The Board then reviewed the September 2023 Cyber Security Program Report presented by East River Cyber Security Department dated October 6, 2023. Directors gave a report concerning the recent meetings they had attended and reviewed upcoming meetings and notices. The Board received a report from the Meeting Committee concerning the Annual Meeting and District Meetings:

The Board recessed for lunch at 12:31 pm and reconvened at 1:10 pm and during the lunch period the Board reviewed The East River Electric Power Cooperative, Inc. monthly video report which included the Basin Summary. There being no further business to come before the Board, President, Dale Fier, adjourned the meeting at 1:27 pm.





- Expected to attend regular monthly board meetings (4th Monday of each month)
- Expected to attend district, annual and other special meetings as needed
- Encouraged to attend director seminars or other outside meetings that provide necessary education on matters relating to financing, electric rates, power requirements and legal issues of concern to rural electric members
- Other outside meeting activities may include East River Electric, Minnesota Rural Electric Association, Basin Electric, National Rural Electric Cooperative Association, CFC, CoBank, Cooperative Network or Midwest Electric Consumers Association.
- The elected director provides an important and necessary link between the member-owners and management staff of the cooperative
- The director also serves as an extension of the rights and responsibilities of the cooperative member. Joining with other directors of the cooperative, they try with honesty, consistency, and good conscience to make decisions and set policy for the cooperative which are in the best interest of the cooperative and the members as a whole.



## Thinking about running for the LLEC Board? Here are some things to consider:

Every year, the cooperative holds District meetings in each of the three director districts. The meetings are held to nominate two individuals from each district to represent the district on the ballot that will be voted on at the cooperative's annual meeting by the entire membership. You will be receiving district meeting notices in March to let you know where your meeting is located. So, if you are interested in being nominated for a director seat, please contact the office and we will give your name to to the Nominating Committee.

To let prospective board members know what commitments and expectations are to be held if they are elected to serve on the cooperative's board of directors, we have provided the following information above. If you would like a more detailed list of director expectations, please contact the cooperative's office at 800-927-6276.

## WIN MONEY FIND YOUR NAME & MEMBER #

The tradition of listing member names and numbers in the newsletter continues in the Co-op Connections. If you find your name and member number, call the office and let us know and you will receive a \$20 energy credit.

In last month's Co-op Connections, Maria CiFuentes & Jeffery Citterman were listed and will receive an energy credit if they spotted their names and call the office. Once again, there are two new names and numbers hidden in this issue. Good Luck!

## ENERGY EFFICIENCY TIP OF THE MONTH

During winter months, ensure your home is well sealed to reduce the need for excessive heating. Seal air leaks around your home and add insulation where needed to save up to 10% on annual energy bills.

Install weather stripping on exterior doors and apply caulk around windows. Check attic insulation levels and hire a qualified contractor if additional insulation is required.

Source: energystar.gov





Jewel Cave's walls glisten with a coating of calcite crystals coating that give this cave its unique name. *Image credit: NPS*

# BENEATH THE BLACK HILLS

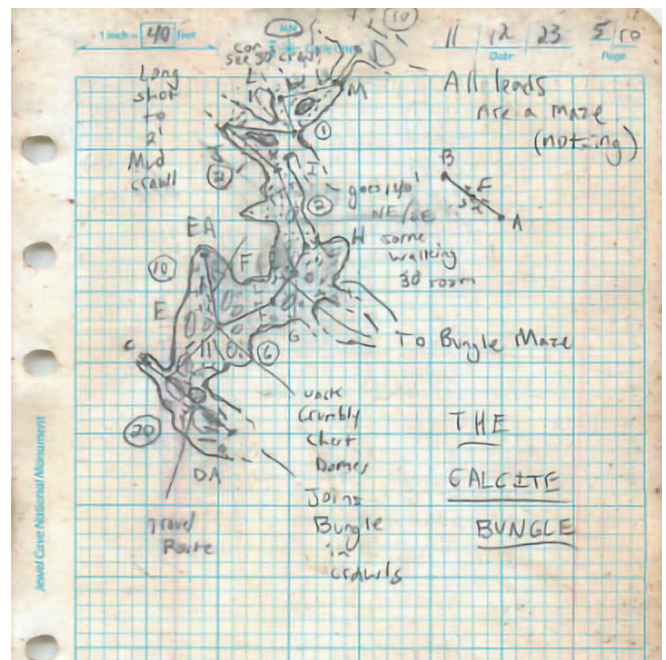
## Charting Untrodden Miles in Jewel Cave

Frank Turner

frank.turner@sdrea.coop

In the depths of the Black Hills lies an immense domain of underground caves renowned for their untouched beauty, enticing tourists with the opportunity for stunning photography and expert-led tours. Digging a little deeper, however, reveals that many of these unsuspecting attractions are actually home to a vast network of rooms and passages where no human has ever set foot before. Jewel Cave National Monument, located west of Custer and celebrated for its unique, crystal calcite coating, is one such subterranean cavern that continues to be a frontier of exploration.

Jewel Cave has thousands of miles of unexplored passages, crawlways and chasms that await discovery, making it one of the largest cave systems in the world. The immensity of Jewel Cave and others like it in the Black Hills has inspired multiple



A field sketch from the four-day Veterans Day weekend expedition. *Image credit: NPS*

generations of ambitious cave explorers who have devoted years of their lives to mapping out new areas of these underground expanses.

Despite their efforts, only a small fraction of Jewel Cave has



been navigated and mapped, leading to new cave discoveries being recorded even now.

Recently, a group of National Park Service volunteer cave explorers, led by volunteer Chris Pelczarski, expanded the known limits of Jewel Cave in an expedition over Veterans Day weekend of this year.

In total, their journey lasted four days. Bringing only what they could carry, the small group of cavers wriggled through miles of passages without natural sunlight or ready supplies to ultimately be the first to step into what was previously untrodden terrain.

To achieve their goal, the volunteers tackled the 3-D maze that defines the Jewel Cave network, hiking and climbing steep underground terrain. Despite the challenge, Pelczarski said the ending discovery made the whole journey worthwhile. When discovering something new, the challenge pales in comparison.

“The experience of pushing the edge of something is very unique,” said Pelczarski. “When entering a new space, it weighs on you that it’s the first time that a human has ever interacted with that space. As explorers, we have an incredible amount of responsibility because we are the ones who share that story with others and set the tone of that space.”

In total, the explorers discovered and charted just over one mile of new passages during their Veterans Day expedition, uncovering new passages and even a distinctive split in the rock their group named ‘Fruit by the Foot,’ due to the volunteer group garnering a “fruitful yield” of discovery from the rock formation.

The broader work of these cavers has led to several breakthroughs over the years, including the discovery of Jewel Cave’s first cave lake, Hourglass Lake.

“In 2015, our explorers got to a point where the lowest part of the cave dipped into the Madison Aquifer. It was Jewel Cave’s first cave lake,” said Michael Wiles, Chief of Resource Management at Jewel Cave National Monument. “Since that initial discovery, 12 more lakes have been

found within Jewel Cave.”

With the possibility of discovery around every corner, Wiles regards volunteer explorers like Pelczarski as torchbearers in a continuing legacy created by the many cave explorers that came before them, including South Dakota caving legends Herb and Jan Conn and Wiles himself.

“Herb and Jan are icons in the Black Hills area and throughout the world because they were the first to document and map the cave back in 1959,” said Wiles. “They fell in love with the cave and it really captured their imagination.”

Together, Herb and Jan discovered the first 70 miles of Jewel Cave. Building from Herb and Jan’s initial discoveries, Wiles, with the help of volunteers like Pelczarski,

has been involved in the mapping of an additional 150 miles of cave since the Conns retired.

To date, 218.8 miles of Jewel Cave have been discovered. However, Wiles explained that barometric airflow studies indicate that the cave could be up to 14,000 miles long, and only 3% of the cave’s estimated total length has been mapped and discovered.

“Jewel Cave, for practical purposes, isn’t going to end,” said Wiles. “We know that the cave is hundreds if not thousands of miles long and that, alone, is exciting.”

With only a fraction of the total cave discovered, it’s evident that several years of cave discoveries lie ahead.



Volunteer cave explorer Dan Austin sketching a passage of Jewel Cave. Using coordinates to draw a survey line in the book, Austin draws the cave walls around the line to represent the cave walls around him, adding additional notes as needed. *Image credit: NPS*

## RESPECT SUBSTATIONS

and all other electrical equipment



## REPORT SUSPICIOUS ACTIVITY

Only authorized utility workers should approach a substation, touch the fence or enter the gate.

Paying attention to activity in or near substations and other utility equipment helps keep everyone safe.

 Learn more at:  
[Safe Electricity.org](https://www.safeelectricity.org)

### Authorized workers should:

- Wear proper personal protective gear and display an ID badge.
- Use work vehicles that have utility branded logos/information.

### Suspicious activity includes individuals in street clothes who are:

- Near or inside a substation fence.
- Tampering with equipment, such as power poles, meters and padmount transformers.

### If you notice anything unusual at a substation, please report it to the electric utility. Examples include:

- An open or unlocked gate.
- A damaged fence.
- Obvious damage inside the fence.

### Call 9-1-1 and then the electric utility if you see:

- Smoke or fire.
- Non-utility workers inside the substation fence.
- Non-utility workers on a pole or tampering with a meter.



# Substation Safety:

## Help report suspicious activity in or near substations & other electrical equipment

Substations are part of the electrical generation, transmission and distribution system. Transformers are contained inside many of them, and their job is to transform voltage from high to low or vice versa, depending on their location within the distribution path.

Besides transformers, substations usually house switches, protective devices and control equipment. In large substations, circuit breakers are used to interrupt any short circuits or overloads that may occur.

No one should approach a substation, touch the fence or enter the gate unless they are authorized to do so.

Paying attention to individuals and activity around substations and other utility equipment helps keep everyone safe.

### Here are some things to look for:

- Take notice of individuals in street clothes working near or on utility equipment; if you see this, please report it immediately.
- Notice whether individuals are dressed in proper personal protective gear or have utility identification badges.
- Check vehicles or work trucks in the area for utility branded logos or information.
- Report any suspicious behavior you see, including non-utility employees tampering with utility poles, meters, padmount transformers or other equipment.
- If you notice anything unusual at a substation, please report it to Lyon-Lincoln Electric. Examples include the following:
  - An open or unlocked gate.
  - A damaged fence.
  - Obvious damage to equipment inside the fence.
- Call 9-1-1 and then Lyon-Lincoln Electric if you see the following:
  - Smoke or fire.
  - Non-utility workers inside the substation fence.



### First responder safety

- First responders should always wait for the go-ahead from the electric utility before addressing a fire or vandalism at a substation, power plant or solar farm. Earl Skaar - 1021101. First responders should also communicate with and wait for the utility before approaching a downed power line or damaged padmount transformer.

### General substation safety

- Never go near a substation.
- Teach children to never go near a substation or climb its fence to retrieve a ball or pet. Let them know they should always stay away and tell a parent or adult, who should call us to report the incident at 1-800-927-6276 or 507-247-5505.
- Teach children about the dangers of electricity from an early age.
- Never try to extinguish a transformer that is on fire since water and electricity do not mix. Call 9-1-1 to report the fire.
- If you see an issue with or notice something unusual about a substation, transformer or power line, Lyon-Lincoln Electric. Never try to address a problem yourself.

**For more information about electrical safety, visit [SafeElectricity.org](https://www.SafeElectricity.org)**



The Sanford Underground Research Facility partners with more than 2,000 scientists from more than 200 global institutions and universities, enabling groundbreaking research across multiple disciplines.

# STRIKING GOLD IN SCIENCE

## Unearthing Research at the Sanford Underground Research Facility

**Frank Turner**

[frank.turner@sdrea.coop](mailto:frank.turner@sdrea.coop)

Years ago, the Homestake Mine in Lead, South Dakota, lured prospectors with the promise of riches during the gold rush era. Yet today, the site where miners once delved for gold now hosts scientists pursuing their own discoveries, not for gold, but for discoveries in particle physics and dark matter at the Sanford Underground Research Facility.

The mine's transformation into a

state-of-the-art research facility really began in 1970 when Raymond Davis Jr. began what is now known today as the Homestake experiment, a research project that would forever change the entire landscape of western South Dakota. Seeing beyond the precious metal, Davis envisioned the Homestake Mine as the perfect location to conduct research on the illusive neutrino particle. Conducting neutrino research underground was a crucial component of the project because the deep

environment of the mine shielded his experiments from cosmic rays, allowing for more accurate detection of neutrinos. While the Homestake Mine was still in operation, Davis worked among the bustle of mining activities to conduct research, which led to groundbreaking discovery in neutrino research and ultimately to a Nobel Prize in 2002.

As Davis concluded his groundbreaking neutrino research, a chapter was closing for the Homestake Mine. According to the facility's website, Homestake was North America's largest and deepest gold mine at the time of its closing, producing approximately 41 million ounces of gold in its 126-year lifetime. When the mine was decommissioned in 2002, it threatened to not only leave a vast cavern in the earth but also a significant void in the local economy. Davis's success, however, prompted South Dakota's leadership to step in at a critical moment and



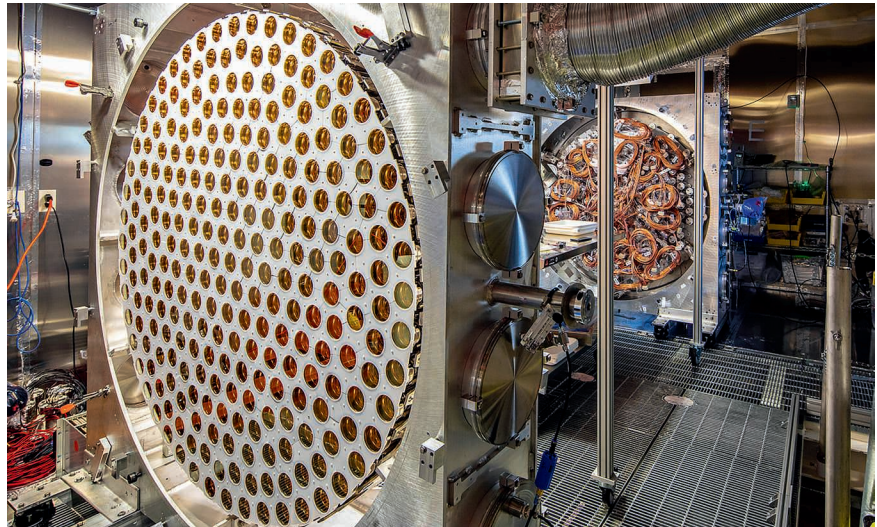
repurpose the mine into a bastion of scientific research.

Mike Ray, Media Relations Manager at Sanford Underground Research Facility, reflected on the state's response to the mine's closure. "Those in leadership at the time saw that this mine was closing and the terrible economic impact that the closure was going to have on the northern hills and this community, but they saw a light at the end of the tunnel," he said.

The light at the end of the tunnel became the Sanford Underground Research Facility. To advance one of South Dakota's most ambitious projects, the state secured a \$70 million donation from philanthropist T. Denny Sanford and a land donation from Barrick Gold Corporation, the mine's owner. The state then established the South Dakota Science and Technology Authority, which contributed an additional \$40 million to realize the project. These donations paved the way forward to begin construction on a space for some of the most advanced science projects ever made.

The herculean effort, Ray explained, was not only to mitigate the negative economic impact of the mine's closure but to create something even more impactful for South Dakota and its residents. Today, the Sanford Underground Research Facility collaborators include over 2,000 scientists from over 200 institutions and universities worldwide. It is expected to garner an estimated \$2 billion net economic impact in South Dakota by 2029.

Beyond its economic contributions, the lab holds potential for groundbreaking discoveries across various disciplines, including projects researching biology, geology, engineering or particle physics. Notably, the lab is currently home to LUX-ZEPLIN, the world's most sensitive dark matter detector and DUNE, the Deep



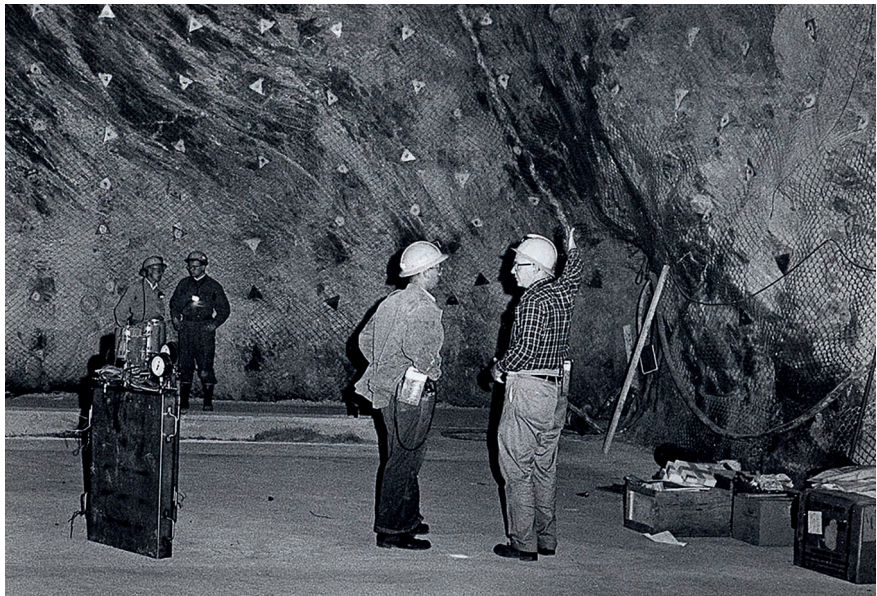
An array of the LUX-ZEPLIN, the world's most sensitive dark matter detector.  
Photo Credit: Matthew Kapust, Sanford Underground Research Facility.

Underground Neutrino Experiment, among several other significant projects. While LUX-ZEPLIN and DUNE are distinct projects, both seek to provide fundamental insights into our current understanding of the laws of physics.

"There are so many examples of how fundamental research can take decades to lead to innovation," Ray said. "The beauty of this is that we don't always know where this research will

take us, but if we don't do this kind of exploration, we will never know the applications of these far-reaching projects."

Regardless of the outcome, the Sanford Underground Research Facility will continue to not only preserve the historic legacy of South Dakota's Homestake Mine, but also place South Dakota at the forefront of discovery and innovation for years to come.



A historic view of the Davis Cavern that hosted Ray Davis's Nobel Prize-winning solar neutrino experiment. The cavern has since been expanded and its walls have been coated with shotcrete, a type of spray-on concrete, to accommodate research on dark matter.  
Photo Credit: Anna Davis, Sanford Underground Research Facility.





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THE MOST COMMON CAUSES OF  
**ELECTRICAL FIRES**

- Incorrectly installed wiring
- Overloaded circuits and extension cords
- Defective or improper plugs, switches and outlets
- Misuse or poor maintenance of lighting



**October Outage Report**

(10 or more consumers)

10/03/23- 469 consumers were off 2 hours 55 minutes out of the Marble Sub. The cause was East River Electric's loss of their transmission feed out of Blair, SD.

10/21/23- 224 consumers were off 1 hour and 55 minutes in Coon Creek and Island Lake Townships. The cause was an underground fault.

**YEAR-TO-DATE COMPARISON**

	Sept.- 2022	Sept.- 2023
Total Revenue	\$7,189,865	\$7,265,660
Cost of Power	\$3,892,394	\$4,045,059
Operating Expenses	\$3,047,751	\$2,959,928
Operating Margins	\$249,720	\$260,673
KWH's Purchased	67,295,844	67,665,211
Services in Place	4,121	4,125
Miles of Line	1,670	1,671
Revenue per Mile	\$4,305	\$4,348



**BE PROACTIVE IN**

Take steps to help prevent electrical fires by identifying possible issues before they occur.

**PREVENTING ELECTRICAL FIRES**

When assessing your home, the first step is to hire a qualified electrician to check all wiring to ensure it is up to code and that the electrical system can handle the demands of your electronics, appliances, lights and other electrical needs. Beyond that, watch for possible issues as they arise.

Symptoms of issues include flickering lights, discolored outlets and switch plates, damaged cords, frequently tripped circuit breakers or blown fuses.

**1 Electrical Outlets:**

Check for loose-fitting plugs and loose wall receptacles. Replace missing or broken wall plates. If you have young children, install tamper-resistant outlets if your home does not have them. Avoid overloading outlets with adapters and too many appliance plugs.

**2 Ground Fault Circuit Interrupters:**

Make sure GFCIs are installed in your kitchen, bathrooms, laundry room, workshop, basement, garage and outdoor outlets. GFCIs help protect against electrical shock. Use the Test and Reset buttons monthly to ensure that they are working properly.

**3 Cords:**

Check cords to ensure they are not frayed or cracked, placed under rugs, tightly wrapped around an object or located in high traffic areas. Do not nail or staple them to walls, floors or other objects.

**4 Extension Cords:**

These are not intended to be permanent solutions, so use them temporarily. If you find that you need more electrical outlets, consult your electrician.

**5 Light Bulbs:**

Verify that your light bulbs are the intended wattage for the lamp or fixture they are in.

**6 Appliances/Electronics:**

If an appliance repeatedly blows a fuse, trips a circuit breaker or gives you an electrical shock, it is time to discard it and replace it with a new version. Use surge protectors to protect expensive electronics. Make sure your appliances and electronics are placed in dry locations.

**7 Circuit Breakers/Fuses:**

Check that circuit breakers are working properly. Fuses should be properly rated for the circuits they protect.

**8 Electrical Wiring:**

If an outlet is not working, it may be an indicator of unsafe wiring. Also, check for loose wires and lighting fixtures. Listen for popping or sizzling sounds behind walls. If light switches are hot to the touch or lights spark and flicker, immediately shut them off at the circuit breaker and contact a qualified electrician to make repairs.

**9 Arc fault circuit interrupters:**

AFCIs, which monitor the flow of electricity throughout your home, should be properly installed. If an AFCI detects any abnormality, it shuts the system off to prevent a fire. Upon inspection, an electrician can assess whether your home is properly protected.

**10 Service Capacity:**

If fuses blow or trip frequently, you may need to increase the capacity of your electrical service or add new branch circuits. Contact a qualified electrician.

For more information on electrical safety, visit:  
**SafeElectricity.org**



**Jan. 26-27**  
**Pro Snocross Races**  
 18 Seventy Six Dr.  
 Deadwood, SD  
 605-578-1876

To have your event listed on this page, send complete information, including date, event, place and contact to your local electric cooperative. Include your name, address and daytime telephone number. Information must be submitted at least eight weeks prior to your event. Please call ahead to confirm date, time and location of event.

**JAN. 5**  
**Granite Sports Fantastic Friday**  
 3 p.m.  
 Hill City, SD

**JAN. 6**  
**Live on Stage**  
 High Country Guest Ranch  
 Hill City, SD

**JAN. 10**  
**45th Annual Ranchers Workshop**  
 9 a.m.  
 Sinte Gleska University Multi-Purpose Center  
 Mission, SD

**JAN. 12**  
**Granite Sports Fantastic Friday**  
 3 p.m.  
 Hill City, SD

**JAN. 13**  
**Knights of Columbus Bowling Tournament**  
 1 p.m.  
 Meadowood Lanes  
 Rapid City, SD

**JAN. 20**  
**Live on Stage**  
 High Country Guest Ranch  
 Hill City, SD

**JAN. 23**  
**A Trip to Chile (Reservations Required)**  
 6:30 p.m.  
 Mangiamo  
 Hill City, SD

**JAN. 25**  
**A Trip to Chile (Reservations Required)**  
 5:30 p.m.  
 Mangiamo  
 Hill City, SD

**JAN. 26**  
**Granite Sports Fantastic Friday**  
 3 p.m.  
 Hill City, SD

**JAN. 26-27**  
**Reliance Area Community Development 29th Annual Dinner Theater**  
 6 p.m.  
 Reliance Legion Hall  
 Reliance, SD

**FEB. 3**  
**Live On Stage**  
 High Country Guest Ranch  
 Hill City, SD

**FEB. 3**  
**Lake Hendricks Fishing Derby**  
 11 a.m.  
 City Boat Landing  
 Hendricks, MN

**FEB. 10**  
**Polar Bear Chili Cook-Off**  
 11 a.m.  
 Main Street  
 Hill City, SD

**FEB. 10**  
**Tour de Chocolate**  
 Main Street  
 Hill City, SD

**FEB. 17**  
**Live On Stage**  
 High Country Guest Ranch  
 Hill City, SD

**FEB. 18-20**  
**MASC presents Disaster! the Musical**  
 Vesta Community Center  
 Vesta, MN

**FEB. 20**  
**A Trip to Portugal**  
 6:30 p.m.  
 Mangiamo  
 Hill City, SD

**FEB. 22**  
**A Trip to Portugal**  
 6:30 p.m.  
 Mangiamo  
 Hill City, SD

**FEB. 23-24**  
**Women in Blue Jeans Conference**  
 Highland Conference Center  
 Mitchell, SD

**Note: Please make sure to call ahead to verify the event is still being held.**