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Official Publication of the Idaho Mining Association

2024



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Hercules Silver Corp. exploring 4,246 acres of historic silver district in Washington County, Idaho



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A message from the President of the Idaho Mining Association

MARK KIRBY

IDAHO MINERS: THE HEROES OF OUR PAST, PRESENT, AND FUTURE

hroughout my tenure as President of the Idaho Mining Association, I have noticed an unfortunate theme in our industry: miners are unsung heroes.

The mining industry is a key component to many, if not most, of the major advancements in our society. The minerals that you discover fuel our ability to travel, allow us to communicate instantly from across the world, broaden our understanding of the universe, and extend our lifespans. Without mining, we would not have the quality of life we do now.

Mining is truly the backbone of our advanced civilization, and it's all thanks to the hardworking, dedicated individuals who shoulder the responsibility without a promise of recognition or appreciation.

Your work matters, your contribution makes a difference, and I want each of you to know that your efforts are heroic.

So, while history may sometimes forget miner's contributions, I would like to take a moment to highlight a couple important milestones from Idaho's mining industry in 2023.

In southeastern Idaho, Itafos Conda successfully permitted its next phosphate mine, Husky 1/North Dry Ridge, after a 14-year NEPA process. This is huge as it will allow for the continued production of fertilizer in Idaho for our North American agriculture industry.

In central Idaho, Perpetua Resources was awarded \$15.5 million from the U.S. Department of Defense for their proposed Stibnite Mine. Their goal is to become the first fully domestic antimony mine that can help supply our country with ammunition.

Many other great companies are advancing projects across the state through their exploration, permitting, and development initiatives. New deposits are continually being discovered across the state, making Idaho a destination for new mining prospects. Exploration is at an all-time high in the Gem State, as it is one of the top mining jurisdictions in the world.

Plus, the IMA's membership continues to grow. Since our inaugural conference in 2018, annual attendance continues to boom, and we are excited to see what 2024 has in store.

Looking to the future, I believe there is much to be excited about for Idaho's mining industry and it's already starting in the classroom. The new Idaho LAUNCH grant program for high school seniors is shedding light on a variety of workforce training opportunities, in everything from heavy machinery operations to electricians. LAUNCH is game-changing for our industry because it helps Idaho students get the training they need to work in an Idaho trade.

Additionally, Idaho welcomed its Women in Mining (WIM) Chapter this year, a non-profit organization that focuses on education and public outreach. WIM is meeting directly with students to get them familiar with mining. This is setting our kids up for success because they are learning about viable options for their future careers at an early age, including the vast selection of trades that make up the mining industry.

The world will always need mining, and I applaud Idaho's initiatives to help the next generation of miners be prepared to take on tomorrow's challenges.

I have seen mining continue to grow in my three years as the IMA President. Idaho has established itself as a leader in the industry by its commitment to its land, water, wildlife, and people. It has been an honor to be an advocate for modern mining, and as my term as President comes to a close, I am committed to continuing to support responsible mining in this great state. After all, it is in our nature.



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A message from the Executive Director of the Idaho Mining Association

BENJAMIN J. DAVENPORT

n today's rapidly changing world, the mining industry faces both challenges and opportunities. It is imperative that industry adapt to the evolving environmental and regulatory landscapes while harnessing technological advancements to enhance safety and efficiency. It is our collective responsibility to ensure that mining remains sustainable, responsible, and positively contributes to the communities and regions we operate in.

In an increasingly interconnected and technologically driven world, the significance of critical minerals cannot be overstated. These minerals, often obscure to the general public, serve as the foundation of modern living. They are hidden heroes behind the electronic devices we use, the renewable energy we see, and the sustainable future we aspire to achieve. Currently, the United States relies on imports for 46 out of the 50 identified critical minerals. Our nation is 100 percent dependent on imports for 19 of those critical minerals because we do not currently mine them domestically. Idaho's mineral wealth is vast, which puts our state in a position to provide critical and non-critical minerals to the nation and help secure a domestic supply chain.

Projects around the state are leading the way in innovative mining practices and reclamation efforts. Often left overlooked, reclamation is not only a part of the permitting process but is of upmost importance to all mining companies and communities. Land reclamation is essential for mitigating the adverse impacts of mining operations and promoting a more sustainable and harmonious coexistence between mining activities and the environment. In Idaho, and across the country, industry makes



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Bruce Cox (406) 321-0506 Ted Antonioli (406) 251-5148 Rob Foster (208) 370-9900 significant contributions to the green energy transition while also often making the environment better than it was found.

Idaho's unique landscape and mineral deposits offer a variety of job opportunities for our rural communities. The mining industry provides high paying jobs and quality opportunities that allow Idahoans to live, work, and raise families in their hometowns. In 2022, the average salary package of a mining related job was 72 percent higher than the average Idaho salary, while mining also contributed \$1.4 billion to the Gross State Product (GSP). The mining industry contributed significantly to Idaho's economy.

Mining is a multifaceted industry with profound impacts on economies, technological progress, and resource availability. It's historical significance and ongoing contributions to society cannot be understated. While acknowledging its positive impacts, it is crucial to ensure that mining practices are responsible, sustainable. and environmentally conscious. By finding a harmonious balance between resource extraction and environmental and social responsibility, we can continue to harness the benefits of mining while protecting the planet and its inhabitants for generations to come. This is not only our challenge as an industry but our responsibility.

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IMA PRINCIPLES

Our Vision

The Idaho Mining Association advocates for a responsible and sustainable mining industry, benefiting our state and local communities.

Our Mission

TO BE RECOGNIZED AS THE TRUSTED VOICE OF IDAHO'S MINING INDUSTRY BY...

- 1. Advancing responsible development of Idaho's diverse mineral resources.
- 2. Encouraging economic growth by creating and maintaining high quality jobs.
- 3. Engaging government to support the interests of the membership.
- 4. Promoting industry best practices and technology.
- 5. Demonstrating the importance of the mineral industry to society.
- 6. Interacting with other organization on matters of common interest.

Our Beliefs

- 1. Idaho's uniquely diverse mineral base is a major asset of the state and it's utilization will enhance the economy.
- 2. A financially healthy mining industry is necessary to derive value from this asset.
- 3. Mining can be conducted in an environmentally responsible manner.
- 4. A close working relationship with government is necessary to accomplish the IMA mission.

Our Member Values

- 1. Excellence in Safety
- 2. Environmental Stewardship
- 3. Stakeholder Engagement
- 4. Ethical Business Practices
- 5. Trusted Community Partner



IMA MEMBERSHIP INFORMATION

Membership Categories

Operating

Companies that have produced or processed minerals in Idaho for at least one year.

Developing

Companies that have located minerals and are now in the process of contracting/permitting a mine to produce or process minerals.

Non-Operating

Companies that were operating members of the IMA for at least 3 years, but are not currently producing minerals.

Exploration

Companies that are engaged in the exploration for minerals in Idaho but are not currently producing or processing minerals.

Associate

Companies that provide products or services to the mining industry.

Volume of Business

Less than \$250,000 \$250,000 - \$500,000 \$500,000 - \$1,000,000 \$1,000,000 - \$2,500,000 More than \$2,500,000 **Dues** \$350 \$475 \$800 \$1,550 \$7,250



IMA MEMBERSHIP BENEFITS

Information

Stay informed on up-to-the-minute industry news that might otherwise pass you by. Becoming a member of the Idaho Mining Association (IMA) gives you access to news and developments in the industry along with the opportunity to hear and learn from peers in the industry

Networking

Connect and create relationships. The IMA provides a great networking opportunity for members who want to strengthen ties with clients or colleagues in their industry, hunt for jobs, or make long-term connections.

Best Practices

Lead the way in implementing industry best practices. Members of the IMA gain resources on what is happening in the industry to keep our practices safe and efficient and have a head start on implementing new practices as they are amended or changed.

Events

Make staying engaged easy. Companies who join the IMA participate in association events focused on forming valuable connections and trade shows, seminars, and workshops that provide valuable connections and education opportunities.

Strength and Power in Numbers

Influence how decisions are made. Working together, our collective experience on the issues and in navigating the burdensome regulatory environment are valuable benefits all IMA members enjoy.

Support the Cause and the Future

Amplify industry's voice, support industry growth, and act as a watchdog for mining as a whole. As a member, you will be supporting the mission of the IMA and the work we do. Many of our members see the values of helping promote the future of minng.

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Mines

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EVENTS RECAP SUCCESSFUL EVENTS

he Idaho Mining Association had a year full of successful events. We began the year with Mining Day at the Idaho State Capitol. This event brings our Idaho legislators and mining companies to the capitol for a day full of networking and educational opportunities. In the evening, legislators, members, and policy makers gathered for a reception and dinner.

After the 2023 Idaho Legislative Session came to end, the IMA team took off around the state for regional legislative receptions and site tours. In June, we hosted receptions in Coeur d'Alene and Pocatello, where many of our regional Idaho legislators and members were in attendance. We were fortunate enough to visit many project sites this summer including tours of Hecla's Lucky Friday, Simplot's Smoky Canyon Mine, Bayer's Caldwell Canyon Mine, Itafo's H1NDR, Liberty Gold Black Pine Mine, Perpetua Resource's Stibnite Mine, and Idaho Copper's CuMo Mine. Also, while we were in southeast Idaho, IMA participated in the Upper Blackfoot Confluence tour, which is a successful conservation partnership between mining companies and conservation groups.

This year was Idaho's year to host the annual Western States Mining Collaborative Council (WSMCC). The Idaho Mining Association took mining association executives from across the west to Valley County, where we hosted a reception and a tour of Perpetua's Stibnite Gold Project. This event is always a great time to discuss current mining issues across the country.

IMA and our board members met with Idaho's Congressional Delegation staff to discuss the ever-changing landscape of mining. We are thankful to have such support for the Idaho mining industry from our delegation and their staff. That evening, we hosted a congressional delegation reception which offered networking opportunities for members and policy makers.

In September, we made our annual trip to Washington D.C. where we were able to meet with federal agencies to discuss policy surrounding the industry. The lengthy permitting process and the White House's Interagency Working Group Recommendations dominated conversations.

Once again, the Idaho Mining Association sponsored the 2023 Clay Buster Bonanza and the Lowe Family Farmstead Mining Sluice. We are always proud to invest in community and industry events.

Lastly, we held the 6th annual Idaho Mining Conference. This year's conference was our biggest one yet, with over 550 attendees. Our vendor hall and technical sessions continue to be a success, adding over 20 vendors and two speaker sessions to the show. We are proud of the growth and success of this event, and we can't wait for next year's IMC.

Thank you to all our members for their hard work and dedication to the mining industry. Your support for the Idaho Mining Association is greatly appreciated. \blacktriangle



Legislative tour of Simplot's Smokey Canyon Mine.



IMA on a legislative tour of Bayer's Caldwell Canyon Mine.



Clockwise from top left: Idaho Mining Association at the AEMA Summer Summit in Spokane; IMA team on a Congressional tour of Idaho Copper's CuMo Project; IMA hosting a legislative reception in Pocatello; IMA on a legislative tour of the Hecla Lucky Friday Mine in Mullan, ID.



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CHANGE ON THE WIND: A SUMMARY OF THE 2023 IDAHO MINING CONFERENCE

t's a well-worn adage vou've no doubt heard before: "All politics are local." It seems straightforward enough. Many of the political issues that interest and impact us often derive from sources close to home (your pesky HOA included). There are exceptions, however, and though we like to think that local officials and state legislatures rule the day when it comes to regulating our collective backyard, we are reminded (sometimes painfully) at punctuated intervals of the broad sweep and blunt thump of federal land policy. Changes in administrations that come every four or eight years bring accordant shifts in priorities and ideologies that can have resounding impacts on the political and regulatory landscape. In the mining industry, the effects can be substantive, potentially requiring a shift in course during approval and permitting processes that - more and more commonly - have life spans that extend beyond periods of relative political and regulatory stability.

Savvy mining industry professionals do their best to track these changes in real time, keeping a keen eye on changes in regulatory arenas originating from both individual statehouses as well as D.C. This, while also tracking geopolitical complexities that impact global markets, supply chains, and the flow of mineral resources that form (quite literally) the building blocks of our society. Keeping up on the ever-changing topography of the local, state, and federal regulatory landscape that governs mining in the U.S. can seem daunting at times, and downright overwhelming when one considers all the day-to-day financial, technical, environmental, and safety issues that are inherent in developing mining projects and bringing them into production. It seems a taller order still when you throw in this concept of "worklife balance" (which I have been advised is very real and should be considered by everyone).

As a contributor to Idaho's mining industry, whether you be a geologist, engineer, environmental scientist, attorney, operator, etc., where can you turn to keep your finger on the pulse of the industry, track the transient nature of the regulations that govern your operation, and stay informed on the myriad issues that can affect your project?

The Idaho Mining Association (IMA) offers the annual Idaho Mining Conference (IMC) to ease this burden for you and the Idaho mining community. The IMC coalesces the resources of IMA Operating, Developing, Exploration, and Non-Operating and individual members, their supporting consultants and service providers, and regional policymakers and regulators. In two days of curated presentations, marquee appearances, and discussions on timely topics, the IMC assembles resources from every corner of the state and every facet of the industry to provide some clarity to the ever-shifting image. Now in its sixth year, the IMC has gone from elective to essential, and attendees are left to wonder how we've got along without it for so many years.

A focal point at this year's event explored the current "hard look" at the way we identify, study, explore, develop, permit, and mine just a fraction of the wealth of mineral resources with which



this country is endowed. Though not new to the IMC (see Mamula, N., Mine Idaho 2020), this topic has risen within the collective consciousness in recent years. Successive administrations have found some common ground in the recognition of the issue if not in the approach to addressing it. Is the concern justified? Most certainly. The Annual Commodity Summary reports published by the USGS provide the cold hard data; the U.S. is import reliant on many important mineral resources, exceedingly reliant on an unsettling number of critical materials (excluding fuels) and critical minerals, and this reliance tends to be increasing. Bear in mind that critical minerals are deemed as "essential to the economic or national security of the U.S. and which (have) a supply chain vulnerable to disruption." Powerful words; a shift to more stable domestic production is vital and requires robust action.

This clarion call has seen some hint of progress in the current administration's Final Report from its Interagency Working Group (IWG) on Mining Laws, Regulations, and Permitting: Recommendations to Improve Mining on Public Lands. This much-anticipated document outlines the IWG's perspective on the challenges we face in meeting our country's (exponentially) growing mineral and energy demands and offers recommendations for doing some while maintaining responsible environmental, social, and labor standards. These are tasks that are much more easily said than done to be sure, and resolution remains a ways off. What better time and place to give this topic center stage position than this year's IMC?

The opening speaker on the IMC main stage Day 1 (October 10, 2023) Steve Feldgus, Deputy Assistant Secretary for Land and Minerals Management at the U.S. Department of the Interior, offered the current administration's perspective on the IWG's recommendations. A critical assessment of Mr. Feldgus's presentation or the contents of the IWG's report is not within the scope of this

UNDERGROUND

summary; however, suffice it to say that certain recommendations within the IWG and noted by the Deputy Assistant Secretary (e.g. royalties, increased claim maintenance fees, expanded scope of reclamation bonding, additional enforcement authorities) were less well-received than others, which addressed consistency in regulations across federal agencies, facilitating Brownfield site mining/reclamation, and broad application of permitting best practices from districts with demonstrated efficiency (i.e. Nevada). Numerous other IWG recommendations were outlined, and the Deputy Assistant Secretary took care

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to note the IWG report represents a first run at this challenge and includes a list of potential course-corrections from which a comprehensive policy may be derived. A la carte, folks... not prix fixe.

The counterpoint to Mr. Feldgus's introduction of the IWG report came on the afternoon of IMC Day 2, from Katie Sweeney, Executive Vice President & Chief Operating Officer of the National Mining Association. Giving due consideration and merit to IWG recommendations that do have the potential to impart favorable reform to seemingly interminable approval and permitting processes, Ms. Sweeney also noted proposals that would seem to have the opposite effect. In short, adding to the number of already robust financial, temporal, technical and regulatory barriers that mining companies are faced with is not the answer to addressing a heightened call for domestic mineral development. And that is (very definitely) not to say that the mining industry is looking to a period of urgency as justification for a compromising of mining regulations, quite the opposite. Regardless of the mantras emanating from ENGOs who (incorrectly) claim to divine the desires of an entire industry, mining companies want consistent and reliable pathways to approvals and permits... not shortcuts.

Attendees wishing to hear more detail about topics pertinent to the IWG report were directed to additional presentations on legal and regulatory issues in the IMC's worthy suite of Technical Sessions.

 A two-part series on Day 1 featured a deep dive on financial assurance and provided perspectives from federal and state agencies including the U.S Forest Service (Chad Hood - Geologist), Bureau of Land Management (Bill Stout
 – Minerals Branch Chief), and Idaho Department of Lands (Mick Thomas – Division Administrator Mining). The proponent's view on the "new normal" on developing detailed financial assurance portfolios that meet the needs of multiple agency stakeholders was also presented (Mary Jay Martens – Brown and Caldwell Environmental Engineer). A panel discussion with Mr. Thomas (IDL) and Mr. Hood (USFS) added Jon Goode to the mix (Itafos Special Projects Manager), an operator who has seen the evolution of financial assurance in Idaho mining.

 Kaycee Royer, Associate Attorney at Stoel Rives, summarized the latest attempt to update the specific provisions of the National Environmental Policy Act (NEPA). Most recently, NEPA appears to be favored by a succession of administrations as a suitable platform for tweaking policy

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to reflect their approach to facilitating mineral resource development on public lands while maintaining high environmental standards.

- Understanding legal issues and how to promote productive interactions with Tribal communities, another focus of the IWG report, was presented by Sarah Hugues (Associate Attorney – Perkins Coie).
- The implications of a U.S. Supreme Court ruling on a Clean Water Act case stemming from Idaho's own Priest Lake area by Peter Smith IV (Attorney, Malek PLLC) marked the significance of a decision that is bound to have implications for quantifying and mitigating the effects of wetland impacts resulting from proposed mining projects.

These talks did not span the full breadth of the implications of the IWG's recommendations for reform, but they do provide important context and hint at the complexity inherent in revising U.S. mining law.

The IMC will continue to provide updates on these topics and track our nation and state's progress as we move forward into a future in which there are at least a few certainties: (1) domestic mining will only become increasingly crucial to our desired transition to cleaner energy sources; (2) the U.S. has an abundance of resources that can be developed responsibly to support this initiative as well as other demands; and (3) if we don't figure out how to do it here, we'll be increasingly import-reliant on minerals that are fundamental to our standard of living and our national security.

Even while the regulatory back-andforth continues to evolve, Idaho miners carry on. This year's IMC presentations also included talks on exploration projects across Idaho, new operations (Idaho Cobalt), and a promising lineup of developing mine projects from across the state (Stibnite, DeLamar, Black Pine, Beartrack-Arnett). These updates continue to represent a strong foundation to the IMC technical program. They provide a measure of assurance that through all the regulatory change, miners in Idaho are perpetuating our state's long tradition of mineral resource development and they're continually doing it better, more responsibly, and safely.

The Idaho Mining Association's Idaho Mining Conference is your resource for keeping up on Idaho's dynamic mining environment, and it's here to stay. With strong and growing sponsorship (thank you!) and attendee numbers that continue to trend upward, the IMC is a space for building community in one of our state's – and nation's – key industries.

We'll see you at next year's event from October 28 to 29, 2024. ▲





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IMA RETURNS TO WASHINGTON, D.C. FOR ANNUAL TRIP



n September, the Idaho Mining Association staff and Board of Directors made our annual trip to Washington D.C. where we had the opportunity to meet with our federal agencies and Idaho's Congressional Delegation.

Senator James E. Risch expressed support for the Good Samaritan Act but noted the challenges posed by the looming threat of a government shutdown and political gridlock, all while maintaining his steadfast support for the mining industry. Similarly, Congressman Mike Simpson underscored his support for the mining industry while criticizing detractors amid the green energy transformation. As always, we appreciate the continued support that the mining industry receives from the Idaho delegation.

Steve Feldgus, Deputy Assistant Secretary for the BLM, advocated for the Interagency Working Group on Mining Reform recommendation's expansion of Nevada's mine permitting



approach nationwide and expressed support for the proposed recommendation of a four to eight percent royalty and "dirt tax," claiming the money would help pay for historic mine clean up and mining curriculum across the country.

Ana Cohen, Senior Director for NEPA at the White House CEQ, emphasized the development of checklists for permitting transparency and the importance of early engagement with tribes and stakeholders while expressing cautious optimism about the prospects of mining law reform. There seemed to be a lack of understanding regarding permitting timelines.

Nick Goldstein from the SBA Office of Advocacy offered to help deliver the message on how permitting requirements and mining law reform efforts may impact small business in the industry and highlighted the potential negative impact of proposed mining law reform on capital markets. If many of the mining law reforms are realized, the United States could end up with hindered growth in the mining sector.

Manish Patel from the Federal Permitting Improvement Steering Council discussed encouraging developments with changes to Fast-41 rules to include mining of critical minerals. Her team also expressed their understanding of mining being a critical in securing a domestic supply chain.

Troy Heithecker and Jeffrey Vail from the USFS expect new draft rules that will likely include new bonding rules before the middle of 2024. They claimed they had an absence of interactions with senior USFS staff and legislators on drafting Rosemont Fix legislation. Their team sees the potential in Fast-41 to help development of critical mineral deposits.

Lastly, the Idaho Industries Breakfast heard from all four of Idaho's Congressional Delegation where they each expressed concerns about the looming government shutdown (averted) and the current state of Washington. The breakfast was sponsors by Boise State University and Hecla Mining Company. Mike Satre, Vice President of External Affairs for Hecla Mining, gave a brief update on project updates and emphasized the importance of mining in Idaho.

These discussions provide a comprehensive view of the current state of the mining industry, its challenges, and opportunities for progress in a complex legislative landscape. Many agency personnel expressed interest in spending time in Idaho to tour some of our projects and learn more about the challenges members are facing. ▲





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REGULATORY WATCH: REGULATIONS YOU NEED TO KNOW

By Todd Glindeman and Kelly Collins, Brown and Caldwell

This article spotlights updates to state regulations and two federal laws that impact the Idaho mining community.

IDAHO REGULATIONS

Water quality standards for arsenic and mercury

Arsenic: The Idaho Department of Environmental Quality (IDEQ) initiated rulemaking to update its 2010 arsenic surface water quality aquatic life criteria. The proposed criteria were aligned with Environmental Protection Agency's (EPA's) arsenic drinking water criteria, which are higher than EPA's recommended criteria under the Clean

Water Act (CWA). Ensuing litigation has been settled, and new criteria, approved by EPA on September 29, 2023, are now in place.

Mercury: In 2005, the Idaho legislature replaced IDEQ's mercury water quality standard for aquatic life with an EPAapproved narrative toxics standard. Legal action was taken against EPA and, in 2022, it entered into a settlement agreement in which EPA agrees to propose aguatic life mercury criteria unless the state of Idaho





adopts EPA-preapproved criteria by March 2024.

There are opportunities to be involved in, and comment on, the proposed water guality standard changes throughout the rulemaking process.

FEDERAL REGULATIONS

Clean Water Act: Water quality certification

The 40 CFR 121 regulations for water quality certifications were codified in 1971, revised in 2020, and subjected to numerous legal challenges. In 2022, EPA published a proposed revision to the 2020 rule, which will go into effect on November 27, 2023. This final rule updates 2020 regulations with an overarching switch from considering only the discharge to assessing the water quality impacts from the "activity as a whole."

Clean Water Act: Definition of waters of the United States

The definition of WOTUS was redefined through four different Supreme Court decisions between 2015 and 2023. In January 2023, the "Revised Definition of Waters of the United States Rule" was finalized and relied on agency discretion to determine WOTUS on a case-by-case basis using a "significant nexus" test. The final rule was litigated, resulting in an injunction that prohibits its use in 27

There are opportunities to be involved in, and comment on, the proposed water quality standard changes throughout the rulemaking process.

states, including Idaho. Pre-2015, WOTUS regulations remain applicable in these states until the litigation is settled.

In September 2023, EPA and the United States Department of the Army amended the definition of WOTUS to conform with the Supreme Court's interpretation of the CWA in the 2023 Sackett v. EPA decision. This conforming rule deleted the "significant nexus" standard for designating tributaries and adjacent wetlands as WOTUS and defined "adjacent" as having a relatively permanent continuous surface connection.

Functional equivalent of a point source discharge

In 2020, the Supreme Court ruled in the

County of Maui v. Hawaii Wildlife Fund that a discharge of pollutants that originate from a point source but are conveyed to navigable waters by a nonpoint source are subject to regulation under the National Pollutant Discharge Elimination System program if the nonpoint source is a "functional equivalent" of a point source discharge.

In the absence of EPA guidance, since 2020, there have been at least 12 citizen suits that required a functional equivalence decision. Four of those cases involve mining, specifically discharges from ponds or waste piles to groundwater, which transported pollutants to surface water. The decision in two cases required the state to complete a functional equivalence analysis. The decision in the other two cases identified the discharge as the functional equivalent of a point source discharge without a permit. The operations were shut down, and the operators were fined.

EPA has developed administrative guidance that defines what constitutes functional equivalence, and it is expected to be released in early 2024. There will be opportunity for public comment on the guidance document.

Todd Glindeman is Brown and Caldwell's (BC's) Mining Market Sector Director, and Kelly Collins, Managing Hydrogeology Principal, specializes in regulatory compliance at BC. BC provides compliance and permitting, industrial water, and site investigation and remediation support services to the mining industry.





By Rhonda Zuraff, Co-founder and Principal at P&C Recruiting and HR and member of the Idaho Mining Association

hether you are of the mindset to embrace the changing landscape faced by today's business leaders or, perhaps, you find yourself skeptical of the emerging trends and their "lastability," there's no disputing that all sectors – mining included – are facing similar challenges and opportunities in this complex world of attracting and retaining top talent.

We all see and hear the trends with Company Culture, Employee Value Proposition, Points of Differentiation... and we witness many employers "trying on for size" the ways in which they (regardless of company size and resource band width) can stretch their organizations to think and behave while leaning on these trends as strategies for attracting and retaining employees.

Recognizing these trends is step one. The real opportunity comes in step two, which encourages employers to share with others in the industry and to learn from one another about our successes and our failures in attracting and retaining top talent. Whether through the Idaho Mining Association, other trade associations, or industry networks, there is no disputing that we are all working together to solve these business challenges in this new era.

At P&C, we often look through the three-way lens of Culture, Employee Value Proposition, Differentiation, and Awareness, described below, when thinking about talent attraction and retention – for our clients and for our own company.

Culture

What do employees experience within your company as it relates to how people behave, their shared attitudes, the shared values, beliefs, how decisions are made, and what is the environment like on a day-to-day basis? We could write a lengthy paper on culture alone, but for the sake of space, some common considerations may include:

- Is your company a fun, positive place to work?
- How prepared, trained, and effective are your leaders to be leaders? We know that people join companies because of leaders and people leave companies because of leaders.
- What does lateral and upward career progression look like for your employees?
- Do you utilize opportunities to re-evaluate job breadth and job depth (scope) from time to time?
- Are there opportunities for two-way dialogue with employees to proactively seek out their input?

Employee Value Proposition (EVP)

Think of EVP as business marketing – but for employees versus customers. What do you have to offer your employees that, perhaps, others don't? Many employers think EVP means compensation. In today's era, it's assumed that you will offer competitive direct and intrinsic compensation. For now, let's think of EVP as:

• Well-defined career progression (both laterally and upward) paths.

- Varied work experiences.
- Flexibility this, too, could warrant a lengthy paper, but for the sake of space, it includes job task variety, ability to learn and get training, flexibility in work schedules, work locations, and work tasks.
- Benefits do you offer a one-size fits all or can you tailor to a degree based on employee needs?
- An environment of collaboration and engagement that helps drive accountability and results.

Differentiation and Awareness

Although having a strong or continuously improving Culture and Employee Value Proposition (EVP) are essential to attracting and retaining top talent in today's changing landscape, it's even more essential that companies take steps to tell their story and provide the workforce marketplace with the points of differentiation in a way that creates awareness and understanding of the Culture and EVP that prospective employees can look forward to. Some ways to accomplish this include:

- Using current employees as referral sources assuming they have positive stories to tell.
- Traditional mediums targeting your prospective workforce such as industry publications, local market media – messaging why your company versus others.

- Digital mediums including various social media such as LinkedIn, Twitter, Instagram, Facebook, and others – telling stories of Culture and EVP examples.
- Third-party advocates such as recruiting companies, higher education institutions, and regulators.
- Industry involvement Idaho Mining Association, other industry bodies which provide networking and promotion opportunities and forums.

Although competing for top talent in today's complex world can be characterized as being as competitive as it's ever been in terms of talent attraction and retention, all is not lost and there are many bright pockets of success, including within the mining sector.

Setting your Culture and EVP strategy, learning, and networking with other industry leaders and professionals - including members of the Idaho Mining Association – in parallel with educating the market about who you are will, when executed as part of your business plan, help you in attracting and retaining top talent.

For questions or more information about your people strategy, recruiting, branding, or other human resources topics, feel free to contact P&C Recruiting and HR at 833-775-7729 or by visiting www.pandcrecruiting.com. ▲



IDAHO CAN HAVE IT ALL: MINING, RECREATION AND TOURISM, AND OTHER IMPORTANT LAND USES

By Debra W. Struhsacker and Opal Adams with Revival Gold Inc.

Idaho's mineral wealth

Idaho, the Gem State, is known for its many treasures: its scenic beauty, its wildlife, its forests, its rivers, its famous potatoes, and its abundant mineral resources. These treasures make Idaho a special place to live, work, and play.

According to the Idaho Geological Survey, Idaho has two world-class mining districts: the famous Coeur d'Alene silver-lead-zinc mines in northern Idaho, and the Western Phosphate Reserve in southeastern in Idaho. Idaho also has important gold, cobalt, antimony, copper, sand and gravel, and other industrial mineral resources.

Much of Idaho's mineral wealth is located on National Forest System lands administered by the U.S. Forest Service (Forest Service). For example, the Salmon-Challis National Forest contains the largest cobalt resource in the United States (the Blackbird Mining District) and the largest past-producing gold mine in Idaho (the Beartrack Mine), as well as other significant resources of gold, silver, copper, lead, molybdenum, phosphate, manganese, iron, fluorite, uranium, thorium, rare earth oxides, and barite, according to the U.S. Geological Survey's (USGS). Idaho's other National Forests have similarly important mineral resources.

Mining and multiple use

The state and federal laws and regulations that govern using resources on federal lands (defined as lands administered by the U.S. Bureau of Land Management [BLM] and the Forest Service) require a balancing of interests to protect the environment so that the use of land for one purpose doesn't preclude other uses. This concept is known as "multiple use": using land for more than one purpose. Under multiple use principles mining, livestock grazing, timber harvesting, recreation, etc. can coexist in a general area.

Outdoor recreation is an important land use in Idaho. Both Idaho residents and tourists cherish the State's beautiful scenery and take advantage of its rugged mountains and clear rivers and streams for unparalleled recreational opportunities, especially on federal lands.

Some people have concerns that mining and outdoor recreation may be incompatible, and that proposed minerals exploration and mining projects could degrade, or even eliminate, nearby outdoor recreational opportunities. As discussed below, the regulations governing mining and multiple use require federal lands to be used for a broad array of purposes, including mineral development and recreation to the maximum extent possible.

Additionally, active mine sites can attract tourism. For example, mining companies in Alaska, Arizona, Colorado, Michigan, Utah, and Wisconsin offer public tours of their operations or feature mining observation platforms and museums.

Mining affects very little land in Idaho

In assessing how mineral exploration or mining projects could impact recreation and other land uses, it is important to understand the scale of mineral activities on federal lands in Idaho. The BLM tracks statistics on the number of active mining claims throughout the western U.S. The BLM's most recent statistics show that at the end of Fiscal Year 2022, there were 30,850 active unpatented mining claims on federal lands in Idaho, covering 644,623 acres.

The State of Idaho covers 53 million acres, with the BLM and the Forest Service managing about 33 million of those acres - roughly 62 percent of the entire State. The 644,623-acre mining claim footprint covers only 1.2 percent of the State's surface area and just 1.9 percent of the federal land in Idaho. The small amount of federal land in Idaho currently held as unpatented mining claims means that conflicts with other land uses will be rare and will not involve large tracts of land. Mineral exploration and mining projects usually include private lands in addition to mining claims on federal land. Mineral activities and other land uses on private lands are subject to the land owner's consent and the laws and regulations governing third-party use of private property. As discussed below, Idaho has stringent environmental protection and reclamation requirements for mining projects on private land – regardless of who owns the land.

So, the question that needs to be asked is what the regulatory requirements are to minimize mining-related impacts on recreation and other land uses on the limited areas where mineral activities are occurring.

The multiple use and ecosystem management balancing act

The federal laws and regulations governing mineral activities on federal

lands establish multiple use objectives and environmental protection and reclamation requirements. On National Forest System lands, the Organic Act of 1897 (16 U.S.C. 475) and the Multiple Use and Sustained Yield Act of 1960 (MUSYA) 16. U.S.C. 528 – 531 direct the Forest Service to manage the Nation's forests to produce renewable resources such as timber and forage for livestock; to promote multiple uses including clean water, wildlife habitat, and outdoor recreation; and to provide access to and support for mineral development.

On BLM-managed public lands, the Federal Land Policy and Management Act of 1976 ("FLPMA"), 43 United States Code (U.S.C.) 1701 et seq directs the BLM to manage public lands "on the basis of multiple use and sustained yield unless otherwise specified by law" and includes a specific mandate pertaining to minerals dictating that the public lands be managed in a manner that recognizes "the Nation's need for domestic sources of minerals, food, timber, and fiber." FLPMA Sections 102(a) (7) and (12).

The definitions of "multiple use" in FLPMA and MUSYA are very similar and emphasize the need for balance in managing the land to achieve and sustain multiple use objectives. For example, MUSYA, defines multiple use as:

"... the management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources;





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and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output." 16 U.S.C. 531(a).

MUSYA Section 528 explicitly preserves rights under the U.S. Mining Law to explore for and develop minerals on National Forest System lands: "Nothing herein shall be construed so as to affect the use or administration of the mineral resources of national forest lands." Thus, MUSYA requires managing the Nation's forest to balance production of renewable resources and minerals, which are a nonrenewable resource.

FLPMA's Section 103(c) multiple use definition is very similar to the MUSYA definition but expands the definition to include non-renewable resources and specifically references minerals stating the public lands must be managed:

"... to take into account the long-term needs of future generations for renewable and non-renewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output."

Thus, MUSYA and FLPMA create land management mandates that put a diverse group of land uses – including outdoor recreation and mining – on equal footing. Under these laws, the Forest Service and BLM are required to achieve an appropriate balance in managing federal lands to accommodate a wide array of uses while minimizing resource conflicts. The need for a balanced approach to land management to achieve multiple use is articulated in the Forest Services' Mineral Policy Program :

"The Federal Government's policy for minerals resource management is



expressed in the Mining and Minerals Policy Act of 1970, 'foster and encourage private enterprise in the development of economically sound and stable industries, and in the orderly and economic development of domestic resources to help assure satisfaction of industrial, security, and environmental needs.' Within this context, the National Forests and Grasslands have an essential role in contributing to an adequate and stable supply of mineral and energy resources while continuing to sustain the land's productivity for other uses and its capability to support biodiversity goals."

The Forest Service's Minerals Program Policy establishes that "exploration, development, and production of mineral and energy resources and reclamation activities are part of the Forest Service ecosystem management responsibility... to provide commodities for current and future generations commensurate with the need to sustain the long-term health and biological diversity of ecosystems."

The multiple use mandates in the laws governing mineral activities on federal land require both the Forest Service and BLM to minimize resource conflicts and adverse environmental impacts. For example, the Forest Service's Minerals Program Policy "ensure[s] that exploration, development, and production of energy and minerals resources are conducted in an environmentally sensitive manner and that these activities are integrated with the planning and management of other resources using the principles of ecosystem management." The Forest Service regulates mineral activities to satisfy these directives and objectives through its surface management regulations for hardrock minerals at 36 Code of Federal Regulations (CFR) Subpart 228A.

36 CFR Section 228.8 requires

that mineral projects "be conducted where feasible to minimize adverse environmental impacts on National Forest surface resources" and to comply with applicable federal and state air quality and water quality laws, regulations, and standards. This regulation also governs the placement and management of mine wastes like tailings and waste rock to minimize adverse impacts to the environment and forest surface resources, as well as requires mineral project facilities to be located and designed to "harmonize" with scenic values. Mineral projects must also take "all practical measures to maintain and protect fisheries and wildlife habitat. Project roads must be designed with adequate drainage and to minimize, or eliminate where practicable, damage to soil, water, and other resource values.

The Forest Services' 36 CFR Section

228.8 regulations include stringent reclamation directives that require companies to reclaim project facilities when exploration or mining operations are completed at the "earliest practicable time during operations, or within one year of the conclusion of operations." Reclamation must prevent or control onsite and off-site damage to the environment and forest surface resources. The regulations include specific requirements to control erosion, landslides, and water runoff; to isolate, remove, and control toxic materials; to reshape and revegetate disturbed areas where reasonably practicable; and to rehabilitate fisheries and wildlife habitat. Companies must provide the Forest Service with financial assurance (reclamation bonds) to guarantee that the site will be reclaimed. The agency will use the reclamation bond money to reclaim a mine site if the company fails to do so.

BLM's 43 CFR Part 3809 surface management regulations contain similar environmental protection and reclamation standards. These regulations implement the FLPMA Section 302(b) mandate that all activities on public lands, including mining, must "prevent unnecessary or undue degradation."

The National Environmental Policy Act of 1969 (NEPA) is another important federal environmental law governing all projects on federal lands, including mineral exploration and development. NEPA requires the Forest Service and BLM to prepare environmental analysis documents to evaluate the impacts associated with a proposed project and identify reasonable project alternatives that could avoid, minimize, or eliminate those impacts. The agencies use the



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information presented in the NEPA documents to evaluate whether a proposed project prevents adverse environmental impacts to environmental and surface resources on National Forest System Lands and prevents unnecessary or undue degradation of BLM-managed public lands. NEPA requires the agencies to seek public input and to respond to public comments on proposed projects.

The Forest Service and BLM normally prepare Environmental Impact Statements for proposed mining operations and typically prepare Environmental Assessments for proposed exploration projects. In some situations, the Forest Service may use a Categorical Exclusion to evaluate a small exploration project. BLM may authorize small exploration projects that create less than five acres of surface disturbance on BLM-managed lands without preparing a NEPA document if the agency ascertains that the project will prevent unnecessary or undue degradation.

Idaho has stringent environmental protection and reclamation regulations for mining

The Idaho Department of Lands (IDL), the Idaho Department of Environmental Quality (IDEQ), and the Idaho Department of Water Resources (IDWR) implement regulatory programs governing the design, operation, and closure of Idaho mining projects. These regulations apply to mining projects on both federal and private lands. Working together, these agencies' regulations provide effective comprehensive environmental and protection and establish site-specific financial assurance requirements on a project-by-project basis.

Idaho mining and mineral processing facilities must comply with Idaho's stringent antidegradation policy to protect existing and designated beneficial uses of surface waters and "all applicable laws and rules of the state of Idaho" governing Idaho's water guality standards, waste water treatment requirements, groundwater quality, hazardous and solid waste management, and stream channel protection. In order to qualify for a Reclamation and Closure permit, mine operators must demonstrate that a proposed project will comply with Idaho's antidegradation policy protecting beneficial uses of the waters of the State. Idaho's regulatory and financial assurance requirements for mining projects on federal lands are managed through the Idaho Joint Review Process, which is a structured consultation process that coordinates the interaction of state and federal regulatory agencies and facilitates the implementation of the state laws and regulations governing mineral development proposals on federal lands in Idaho.

Idaho minerals can reduce the country's reliance on imported minerals

Idaho's mineral deposits can play an important role in reducing the Nation's reliance on foreign sources of the minerals essential to our economy, national defense, communication and transportation infrastructure, technology and manufacturing sectors, and the production of conventional and renewable energy. The U.S. Commerce Department's recently released report, "A Federal Strategy to Ensure Secure and Reliable Supplies of Critical Minerals," finds that the country is heavily dependent on foreign sources of critical minerals, which poses a significant vulnerability to our economy and military. This report notes that the U.S. imports at least 50 percent of 31 minerals that the USGS designates as critical and that we have zero domestic

production of 14 critical minerals, even though we have deposits of most of these minerals.

The World Bank Group convened a conference in Washington, DC in May 2019 to discuss its recently published report, "The Growing Role of Minerals for a Low Carbon Future," and to launch its "Climate Smart Mining/Minerals for Climate Action Initiative." The World Bank report identifies 15 minerals that are critical for renewable energy. The U.S. relies on foreign imports for 14 of these 15 renewable energy minerals according to the USGS' 2019 Mineral Commodity Summary despite the fact that the U.S. has substantial deposits of many of these minerals.

Idaho minerals essential to renewable energy include gold, which is used in the electronics and computer chips that are an integral part of renewable energy technologies; silver, which is needed to manufacture solar panels; cobalt and antimony, which are important components of storage batteries; and copper and molybdenum, which are needed for electronic products and electric vehicles. Development of these minerals from Idaho's federal and private lands can help the U.S. reduce its mineral import reliance.

Idaho's mineral resources, including its renewable energy minerals, will be developed following strict state and federal environmental protection and reclamation requirements that are designed to support multiple land use objectives both during and after mining. While in operation, these mining projects will create jobs, make substantial contributions to the local and state economies, develop infrastructure that can be used to diversify local economies, and provide opportunities that will enrich the Gem State for many years into the future. ▲

SMALL FUELING PROCESS IMPROVEMENTS LEAD TO BIG PRODUCTION GAINS

arket forces continue to demand that the mining industry learn to do more with less. Increasing productivity while adhering to strict safety and environmental standards can be challenging, but fueling process improvement is an easy way to boost efficiency quickly without a huge capital expenditure.

Established in 2001, FlowTech Fueling is the leader in fueling process improvement. Their patented fueling systems and largescale mobile fueling depots are designed to meet the challenges of harsh mining environments. With several decades of mining experience, FlowTech's expertise and dedication to customer service is second to none.

FlowTech's non-pressure, overfill prevention fueling systems installed on your mobile equipment will eliminate fuel spillage, improve personnel safety, reduce tank maintenance, and minimize environmental impacts. With over 1800 systems installed throughout the U.S. and Canada, FlowTech's systems provide ease of installation, reliability, low maintenance, and are backed by excellent service and an absolute commitment to customer satisfaction.

FlowTech mobile fueling depots provide the efficiency and



flexibility of a high-flow, multi-station fueling facility with the added benefit of easily moving it as the mine plan requires. Our fuel depots are extremely customizable with various options for fuel storage capacity and fueling station configurations. A mine that recently installed two FlowTech fuel depots decreased fueling times nearly 50 percent for a fleet of 240-tonne class haul trucks, improving production by over 8,000 tons per shift. The return on investment was less than six months.

Fuel is often a mines second largest operating expense, yet little time is spent focusing on fueling process improvements. FlowTech helps customers develop a customized and comprehensive plan to boost efficiency from delivery to bulk storage and to equipment refueling. Fueling process improvement provides a unique opportunity to easily increase productivity while reducing operating costs so your operation can do more with less. ▲



Perpetua Resources first started exploring the Stibnite Mining District in 2010.

PERPETUA RESOURCES DEMONSTRATES ITS COMMITMENT TO RESTORING THE SITE



Deb Filler, a resident of Yellow Pine, says Perpetua Resources has shown the community they are serious about taking care of the environment.

hen Perpetua Resources first started exploring the Stibnite Mining District in 2010, community members

were skeptical of the gold mining company's commitment to use modern mining to restore the abandoned site.

"Mining left behind a lot of problems that we are still dealing with today," said Deb Filler, a resident of Yellow Pine, the community closest to the project. "Water quality has been deteriorating for decades, salmon can't return to their native spawning grounds, and the site is a mess. So, initially, it was hard to believe mining might be our best chance to get the area cleaned up."

Like many of her neighbors, Filler listened to Perpetua Resources' plans to use responsible, modern mining to clean up environmental legacies left behind from a century of mostly unregulated mining activity and waited to see how the company would work with the community.

"Up here, you can say a lot of things, but your actions have far more weight than your words do," said Filler. "Over the past decade, Perpetua Resources has shown us they are serious about taking care of the environment and our community."

Perpetua's biggest demonstration of its commitment to restoring the site started in 2021 when the company obtained permission from the Environmental Protection Agency and the U.S. Forest Service to voluntarily address legacy conditions that are negatively impacting water quality at Stibnite.

"We did not cause the problems impacting water quality at site, but we have always been clear on our intention to be part of the solution," said Laurel Sayer, chief executive officer of Perpetua Resources. "It was a great honor for our team to roll up our sleeves and show our fellow Idahoans just how committed we are to restoring the site. We believe our early cleanup work shows how responsible partnership with private industry can help improve environmental conditions at historical mine sites across Idaho and the U.S."

The first phase of cleanup included removing 325,000 tons of legacy waste and tailings away from the East Fork of the South Fork of the Salmon River, lining and rerouting stream channels to keep clean water clean and prevent arsenic and antimony from leaching into ground and surface water. This multi-year, multimillion-dollar cleanup effort has been led by Perpetua Resources, along with its consultants IMCO Construction and Iron Woman Construction and Environmental Services.

Later phases of work will allow for more comprehensive cleanup activities throughout the district should the Stibnite Gold Project move into operations.

"Any doubts I had when Perpetua Resources first started exploring the Stibnite Mining District are gone," said Filler. "Mining has come a long way and Perpetua has helped show me what is possible. I truly believe they can restore the site."

Perpetua Resources' proposed Stibnite Gold Project is currently under regulatory review with the United States Forest Service. The company is planning to produce gold and the critical mineral antimony from the site while concurrently restoring the environment. ▲



www.PerpetuaResources.com

IDAHO MINING ASSOCIATION INVESTS IN EXHIBIT AT CHILDREN'S MUSEUM OF IDAHO



he Idaho Mining Association, with the help of our sponsors, has invested in a mining exhibit at the Children's Museum of Idaho. We believe that early education is critical to a child's future growth and success. As we all know, public perception of industry's image is not as positive as we would like as we are far too often painted in the same light as mining of a bygone era. Our goal with the exhibit is to emphasize modern mining to both children and parents. The exhibit is designed to encourage curiosity and critical thinking in children. Our mission is to spark a lifelong love of learning and exploration in the hearts of young adventurers.

When thinking of a design plan, we wanted to emphasize the diverse opportunities that the mining industry offers, allowing both boys and girls to picture themselves as miners. To achieve this, we created an activity called "meet your miner." This activity allows kids to see a picture of a miner and then click a prerecorded button of the miner talking about why they love their job. We hope this interactive activity will allow kids to connect and find some similarities between themselves and the miner they are meeting.

Before our miners walk through the mine, they are instructed to put on a safety vest and headlamp. As they walk through the mine, they will see a miner with a button that talks about the importance of safety in the industry. The miner pictured will be wearing a safety vest, hard hat, close toed shoes, safety glasses, and a walkie talkie.

We also wanted to emphasize the importance of reclamation in modern mining. To do this, we created a felt wall that looks like a mine. There are also felt pieces that include trees, rivers, wildlife, and plant life. The goal of this activity is to allow kids to "reclaim" the mine by using the felt pieces. Reclamation is often overlooked and not understood to the general public, so teaching young minds about land reclamation was important to us.

It has become increasingly evident that early childhood experiences play a profound and lasting impact on a child's cognitive, social, and emotional development. By creating a stimulating environment where children can actively explore, experiment, and learn through play, the mine enhances crucial skills. We are proud of the positive impact this investment will make on our local community, and we hope the exhibit will educate children and adults on the mining industry in Idaho.

If you have not had the opportunity to do so, please take the time to take your children or grandchildren and join the over 100,000 visitors that the Children's Museum of Idaho welcomes annually and have a look at the mining experience we have created. ▲

HOOPES SPRINGS SELENIUM WATER TREATMENT PLANT PIONEERS INNOVATION

he Hoopes Springs Selenium Water Treatment Pilot plant, located at Smoky Canyon Mine, began initial operation in January 2015 as part of the CERCLA program to evaluate the potential for full-scale biological treatment for selenium removal from impacted surface water. The initial pilot operated at a flow of 250 gallons per minute for a period of two years. During this time, the effectiveness of a biological treatment system was evaluated to determine the feasibility of a larger scale plant. Upon successful demonstration, the plant was expanded to a capacity of 2,000 GPM or a daily flow of 2.8 million gallons per day. Operation of the expanded pilot plant began in late 2017 to demonstrate successful selenium treatment at a higher flow rate incorporating several unit processes to provide maximum effectiveness with a minimal footprint.

The treatment process begins with ultra filtration and reverse osmosis to concentrate the selenium prior to biological treatment. The concentrate stream from the reverse osmosis is processed in two biological reactors where bacteria is used to convert oxidized selenium in the water to elemental selenium. The elemental selenium particles are captured in the biofilm and removed from the reactor in a "backwash" process.

Following the biological treatment process, an aerobic activated sludge system is employed to reintroduce oxygen and remove any residual nutrients used in the biological process prior to discharge. The clarified water is then blended back with

the permeate stream from the reverse osmosis system prior to discharge back to the surface water streams.

This system was one of the first of its kind to successfully remove selenium at high flow rates. Once steady state was achieved and consistent, effective treatment was demonstrated, Simplot began to research and employ additional processes to improve the efficiency. Iron co-precipitation was implemented to further improve the removal of selenium. Iron Cc-precipitation uses ferric chloride to bond with and precipitate partially reduced selenium which is then wasted from the activated sludge system. This process increased the removal efficiency to an average of 90 percent – meaning 90 percent of the selenium in the influent water was removed in the treatment process.

Throughout the past five years, the operations team continued work to improve effectives and increase treatment efficiency. The most recent work focused on the anaerobic biofilm and the mechanisms for selenium removal in the bioreactor. Through this research, the biofilm was optimized, and the most recent data demonstrates an overall removal efficiency of 95 percent for the plant. To date, over 5,000 pounds of selenium have been removed from the surface water streams and the plant has successfully and safely treated over 4.5 billion gallons of water.

Simplot and the Smoky Canyon Mine continue their industry leading efforts in stewardship and environmental responsibility through this important work. ▲





PROTECTING IDAHO'S MOST VALUABLE RESOURCE



nderneath Idaho's vast and varied terrain lies miles of untapped potential. The Gem State was named so for a reason, because even before Idaho became the 43rd state in the union, miners flocked to this area in search of minerals.

Now, well over a hundred years later, we are still a group of miners searching for the critical resources that are laying wait within the state of Idaho. But unlike our historic counterparts, our priorities for how we go about mining for those resources has drastically changed for the better.

For nearly six decades, Itafos Conda has been operating out of the southeastern Idaho phosphate patch. Our goal since day one has been to responsibly and sustainably mine phosphate to then manufacture fertilizer for the North American agriculture industry. At our current Rasmussen Valley Mine, we produce more than two million tons of ore each year and turn that into nearly 600,000 tons of high-quality phosphate fertilizer.

Our team understands that a multitude of people are relying on our operations to grow crops and help feed their families. But before we begin our work, Itafos Conda puts every possible protection into place to protect Idaho's most valuable resource: the environment.

At Conda, we are more than miners; we are trusted stewards of the land.

At Rasmussen Valley and our newest permitted project, Husky 1/North Dry

Ridge, we have implemented numerous environmental safeguards. These include utilizing the existing facilities where possible, reclaiming the legacy open mine pits and 93 percent of all new disturbances, re-establishing and protecting waterways, and allowing wildlife to continue utilizing the project sites.

Modern mining is more than simply searching for the next best resource reserve. Modern mining means protecting the land for our generations to come.

In addition to our protections at Conda project sites, Itafos is working on several restoration projects for the overall betterment of Idaho.

One of those recent projects was the Mill Canyon culvert replacement. As a partner in the Upper Blackfoot Confluence, Conda

By Jon Goode, Manager, Special Projects at Itafos Conda

participated in the replacement of the old, undersized metal culvert on the Blackfoot River Road at Mill Creek in the Blackfoot Narrows. The new culvert has a larger concrete box bridge with a natural bed. Yellowstone cutthroat trout use Mill Creek for spawning and rearing, and this new culvert will help improve the trout's passage.

Also in Caribou County, Conda is working to reclaim the historic Lanes Creek phosphate mine site. This mine first opened in 1978 with limited production before its shutdown in the 1980s. It left behind an open pit and overburden pile. Itafos Conda restarted the mine in 2015 and, by 2020, extracted the remaining ore. Our team is currently completing the site reclamation and it is already yielding exceptional results.



The mining industry has come a long way since our ancestors first discovered this land's potential. Our goal is to prioritize the protection and restoration of our shared environment to create a new, positive legacy for modern mining. Idaho is one of a kind, and as we extend our operations in the Gem State, Itafos Conda is proud to be leading the way in environmental stewardship. ▲





IDAHO STRATEGIC RESOURCES, INC.: A PROFITABLE GOLD PRODUCER WITH THE LARGEST RARE EARTH ELEMENTS LANDHOLDINGS IN THE UNITED STATES

daho Strategic Resources, Inc. (IDR) is an Idaho-based, profitable gold miner that bootstrapped its gold production while simultaneously assembling what it believes is the largest rare earth elements (REE) landholdings in the U.S. The company also controls what is reportedly the number one thorium resource in the country.

With impressive growth in 2023, Idaho Strategic continues to expand its production at the Golden Chest Mine and advance exploration in the Murray Gold Belt area of the Coeur d'Alene Mining District. Having over 7,000 acres of patented and unpatented land surrounding and adjacent to the Golden Chest Mine, Idaho Strategic plans to explore for additional mines on its property. Its near to mid-term goals include expanding production at the Golden Chest to approximately 15,000 ounces of gold per year.

As part of Idaho Strategic's expanded gold production, the company announced the development of the H-Vein underground at the Golden Chest Mine. As discussed in IDR's April 18th press release, "the H-Vein consists of both a banded quartz vein as well as the adjacent silica-flooded zone bearing strong pyrite. The banded vein exhibits abundant visible gold with associated pyrite, galena, chalcopyrite, and sphalerite. The H-Vein zone strikes northerly and dips from 70 to 75 degrees to the west. IDR's initial chip samples of the banded vein show assay

WE LIVE HERE

Profitable Gold Producer – Largest U.S. Rare Earth Elements Landholder – Largest Thorium Resource in the U.S. – NYSE Listed: IDR



Domiciled Headquartered Operations



"Muck samples are collected from each round during drifting. Initial drifting along the vein yielded an average muck sample grade of 25.1 gpt for 24.8 meters of strike length."



values ranging between 29 grams per tonne (gpt) to 73.7 gpt gold. Widths of this banded vein are from 0.4 to 0.72 meters. The adjacent silica-flooded unit is hard, dark-colored and has three to five percent auriferous pyrite. Muck samples are collected from each round during drifting. Initial drifting along the vein yielded an average muck sample grade of 25.1 gpt for 24.8 meters of strike length."

The company will continue mining both the H-Vein and the Idaho Vein underground and, eventually, drive an exploration drift to the Paymaster ore shoot where two additional parallel underground veins are known to occur, potentially leading to a future production area.

Beyond gold production, Idaho Strategic has also advanced its rare earth elements projects located in central Idaho. IDR believes it is currently the U.S.'s largest rare earth elements landholder with approximately 18,000 acres comprised of three distinct projects: Mineral Hill, Lemhi Pass, and Diamond Creek, each situated along Idaho's 70-plus mile Rare Earth Element – Thorium Belt. Recent sampling efforts by IDR's geologists discovered an area at its Mineral Hill project which returned a grade of 23.5 percent total rare earth elements. IDR's geologists have so far traced the REE mineralization at Mineral Hill to a strike length of approximately 0.5 miles, utilizing the company's XRF device to confirm the continuity of the REE grade along strike.

Drilling during the 2022 season at IDR's Diamond Creek REE project returned favorable results which led Idaho Strategic to spend the 2023 field season identifying and permitting additional areas of the project for a follow-on drill program in 2024. At Lemhi Pass, over the course of the 2023 field season, Idaho Strategic completed a modest trenching program in areas of prospective and known REE mineralization to better understand its structural geology and identify areas where follow-on drill programs are warranted.

"Operating in the state of Idaho has proven to be a huge strategic advantage," said IDR's president and CEO, John Swallow. "With the Golden Chest running profitably and world class REE grades encountered at Mineral Hill, I am genuinely excited about 2024 and seeing our production-based exploration business plan unfold – for the benefit of our employees, shareholders, and the historic communities where we operate."

MINING FOR THE FUTURE: UTILIZING NEW TECHNOLOGIES TO MEET SUSTAINABILITY GOALS

he mine of the future is a cleaner, more sustainable operation than any we know today. As the mining industry evolves to keep up with changing environmental regulations and goals, Western States and Caterpillar are proud to offer solutions to help Idaho mines leap into the future with technology that can enhance mobile equipment with sustainable power that increases efficiency and productivity.

Fuel use and exhaust emissions are two significant challenges for mines working toward their sustainability goals. Caterpillar is dedicated to developing machines that are more efficient, maximizing productivity while cutting down on idle time and fuel burn. To help mines optimize fuel economy, Caterpillar offers equipment that can move faster, weighs less, and features economy mode power settings. While electric machines are also in demand for mining operations looking to cut emissions, the transition from an all-diesel to an all-electric fleet overnight isn't a feasible option. To help bridge the gap, Caterpillar offers machines that can run on both diesel and electric power. These hybrid powertrains can deliver the same performance as diesel, enabling a mine to maximize machine efficiency while moving forward toward sustainability goals.

Machine autonomy and technology are also key players in the push toward sustainability. Technology solutions like Cat MineStar and Cat Command can boost safety and productivity for a mining operation, as well as have a significant impact on a mine's progress toward its sustainability goals. With these technologies, mines can burn less fuel while maximizing equipment efficiency and reducing idle time. Technology solutions can also provide machine health information to maximize the equipment lifecycle, which ensures top performance and can lead to lower emissions, as well as extending the lifetime of consumables to reduce waste.

In addition to hybrid machine capabilities and autonomy, Caterpillar and Western States work side-by-side with mining customers to understand their power source needs and develop custom solutions to power a mine into the future. Pairing traditional power sources with new technologies in a hybrid format, or replacing them altogether with new power solutions, gives mining



operations the opportunity to adopt more efficient and fuel-flexible power. We're proud to offer reciprocating engines that run on low-carbon intensity renewable fuels, including biodiesel, renewable diesel, biogas, and landfill gas, as well as generator sets that can run on 100 percent hydrogen. Caterpillar also offers multiple solutions for storing sustainably produced power, including a microgrid system that pairs a generator with an energy storage unit, solar panels, and advanced controls. To get a first-hand understanding of what it takes to power a mine and better serve mining customers, Caterpillar is installing a microgrid system and other renewable power sources at the Tucson Proving Grounds in Arizona. By implementing the same sustainable power solutions as many mining customers, Caterpillar is developing strategies and mine site infrastructure that will support mining operations as they implement new technologies and advancement to the sustainable mine site.

Western States is proud to partner with our mining customers to help make their mine sites more sustainable and profitable. Whether you're looking to adopt an electric fleet, establish a hybrid power system, or install a microgrid to power your site, we're here to help our customers achieve their sustainability goals every step of the way.



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EAT

FUELING OUR ELECTRIC FUTURE FROM IDAHO'S BACKYARD



By Chris Paul, CEO & Director, Hercules Silver Corp.

he future is electric.

That is the overarching theme and ever-present goal of our modern-day society. Understandably so because reducing our current reliance on fossil fuels has a plethora of pros: it can help reduce pollution and our carbon footprint, help mitigate changes to our climate, create a more resilient energy system, and eliminate our reliance on foreign entities.

But the hard truth about an electric future is that we need mining to achieve it.

Mined minerals are the backbone of nearly all the components needed to electrify society. From the batteries in electric cars to the circuits that power technology, minerals are the key components of these systems. One of the most critical minerals for electrification is copper. It has key uses in building construction, electronics, technology, machinery, transportation, and even medicine.

So, if the future is to be green, it'll take copper to get us there. And Idaho may be the next great source of this critical mineral.

At the Hercules Property in Washington County, Idaho, Hercules Silver Corp. is currently exploring 4,246 acres of a historic silver district. The Hercules Project is a large scale, disseminated silverlead-zinc system that spans over 5.5 kilometres of strike adjacent to a major new copper porphyry target. The grades unearthed so far have exceeded all expectations, representing the first significant porphyry copper system discovered in the state of Idaho.

What does this mean for the Gem State? It means Idaho and its residents can expect to reap these benefits.





The domestic mining of copper and silver means all industry best practices will be upheld. Environmental safeguards have already been implemented from the start and will be to the finish, and with the use of modern exploration techniques, Hercules Silver makes it a priority to adhere to all ethical standards and regulatory requirements. Our team will be in constant, transparent communication with the various community leaders and elected officials in Washington County about our ongoing exploration. We also plan to work in conjunction with all involved agencies, including Idaho Fish and Game and the Idaho Department of Lands, as well as concerned environmental groups to answer any questions and gather feedback. Hercules Silver is responsibly planning ahead now to manage possible risks and ensure all parties' potential impacts are minimized.



Another plus is that more mining in Idaho means more quality, long-lasting job options for Idahoans, a boost in tax revenues for the surrounding towns, cities, and counties, and a major contribution of royalties to the state economy.

Hercules Silver's true aim is to build a positive legacy by delivering value to the community and beyond both during and after its operating life. And while there is no shortage of benefits that can be expected from the continuing exploration of the Hercules Project, the ability to help North America create greener, more conscientious energy sources is a driving force behind our work.

Idaho has the resources to electrify our world, and Hercules Silver is focused on developing these assets to help usher in a cleaner, brighter future. \blacktriangle

STAYING ONE STEP AHEAD AT THE DELAMAR PROJECT

By Tricia LaRue, Senior Permitting Specialist at Integra DeLamar

BANK FALLER WARDS

wyhee County is no stranger to mining. Since the 1860s, miners have flocked to southwestern Idaho to explore for gold and silver. And while past miners did find precious minerals at the DeLamar Project, even more untapped resources have since laid waiting for the next round of exploration.

Integra Resources has been heavily invested in the development of the historic DeLamar site since acquiring the pastproducing project. Over the past year, the DeLamar team, alongside a strong team of experienced consultants, has been actively preparing for the submittal of the Mine Plan of Operations (MPO) and beginning of the National Environmental Policy Act (NEPA) process in 2024.

Since the NEPA process is no small feat, our team has been laying the groundwork since 2020 to anticipate potential permitting pit falls and has made a concerted effort to collect all necessary data with modern, innovative techniques to best develop DeLamar's MPO.

How did Integra get to where we are now? Our team got right to work.

We recognized right away that our MPO would be the basis for any NEPA analysis, so we prioritized the collection of baseline data for the DeLamar Project through a third-party contractor, with a cost recovery plan in place with the U.S. Bureau of Land Management, and in early conjunction with several jurisdictional agencies, including the Idaho Department of Land. Idaho Department of Environmental Quality, U.S. Army Corps of Engineers, Idaho Fish and Game, and Idaho Department of Water Resources. In our more than 70 meetings and multiple site visits with these agencies, we reviewed all plans of study and interim baseline technical reports. Two critical paths of focus emerged: groundwater modeling and geochemical characterization.

To best prepare our MPO and reduce



the risk of challenging delays, our team worked with the agencies to develop and timely approve geochemical and groundwater modeling study plans. We knew these results would not only drive the project's engineering design but would also impact our permitting efforts for our cyanidation permit, point of compliance, and reclamation/closure plan. So, upon the various agencies' approval of the initial modeling plans, we incorporated those into our proposed mine feature design and reclamation/closure plan. We will also use the completed baseline studies and technical reports from DeLamar to develop the Draft Environmental Impact Statement next with an emphasize on modern, industry-best practices.

Once the MPO is formally submitted, Integra will stay engaged with all agencies and will determine the level of involvement for each after the Notice of Intent is published. The initiation of the NEPA process will involve a few other undertakings on our end, including the continuing involvement of the Integra engineering team so we can adjust the MPO as needed.

Our overarching goal is to keep the MPO as up to date with our NEPA

commitments as possible, so that once the Record of Decision is issued for the DeLamar Project, we can get straight to construction without needing to revisit the MPO.

Throughout this process, Integra has been focused on keeping the local community members and Tribal Nations informed of our progress and plans, and providing opportunities to submit feedback to ensure we are focusing on the things that matter most. Our hope is that reopening this gold-silver mine will create more high-quality opportunities for locals, add a boost to the local economy, and provide sustainable infrastructure that will serve generations to come.

Integra is proud to be at the helm of continuing the legacy of the DeLamar Project in Owyhee County. We believe that through early and open collaboration, we can create a responsible future mine that adds lasting value to the region. ▲



NATIVE ENVIRONMENT SOLUTIONS (NES): A BRIDGE FOR INDUSTRY, TRIBAL, AND COMMUNITY ENGAGEMENT

By Hayley Rambur and Erick Robinson, Native Environment Solutions LLC

hose fortunate enough to have been in attendance of the 2023 Idaho Mining Conference were provided firsthand diverse perspectives on the prospects and challenges of exploration, development, and operating mines in Idaho.

Amid these diverse perspectives, whether they came from Idaho Governor Brad Little, Deputy Assistant Secretary for Land and Minerals Management U.S Department of the Interior Steve Feldgus, or from one of the many session presentations, a common theme stood out: the need for enhancing engagement between mining companies, Tribal governments, and local communities. The spotlight was placed on the necessity for Tribal engagement to occur as early as possible in the permitting process. However, there was no explicit roadmap or implementation plan proposed for how to do this.

So, how do companies proceed with this advice to "engage" and turn it into actions without a design for building bridges for engagement? How can projects prioritize early engagement with Tribes when they must also navigate respecting and supporting the roll of the government-to-government consultation process? How can mining companies ensure that they are conducting an effective engagement process that is proactive and meaningful not only to the company, but also to Tribal neighbors as well? If you stay out of litigation, check every box, and operate a mine, does this mean engagement ends?

The Biden-Harris Administration's Interagency Working Group on Mining Laws, Regulations, and Permitting published their Final Report on Recommendation to Improve Mining on Public Lands in September of 2023. The report states: "In short, for Tribal engagement efforts to be meaningful, those efforts must occur much earlier, ideally before mining interests expend significant resources on exploration and then continue through the entire exploration and mine development process." The mining industry, agencies, and Tribal governments are all in agreement that early, often, and meaningful engagement are not just critical, but a necessity to fostering what it means to be not only a conscientious company, but a conscientious mining state.

Native Environment Solutions LLC (NES) is an Idaho-based company that provides direct answers and solutions to these questions and needs. NES is founded upon a deep knowledge of Tribal and local values based on both technical services, environmental compliance, and Tribal engagement approaches. Our model is based on close working relationships with Tribes throughout Idaho. It is critical that NHPA Section 106 is considered as early as possible. The fragmentation of NEPA and Section 106, and the consequent separation of governmentto-government consultation during these permitting stages, has led to disputes caused by a misunderstanding that environmental concerns are separate from cultural concerns. Supporting sustainable project development through third party engagement will offer a win-win solution for both mining companies, and the local communities they operate in (Figure 1).

By using alike methodologies, mining projects are provided an additional layer of assurances around Tribal consultation and engagement processes. This will provide companies with the tools to build long-lasting and sustainable relationships with

By using alike methodologies, mining projects are provided an additional layer of assurances around Tribal consultation and engagement processes.

Figure 1: NES provides a nexus that enhances the consultation and communication between mining companies, Federal agencies, Tribal governments, and local communities throughout the permitting process.



Federal

Agencies

Tribal Governments and Local Communities

Tribal governments and local communities. NES is fortunate to have a unique perspective and approach that is founded upon personal and professional experiences between environmental compliance, Tribal, and local communities across various regions of the United States. The need for enhancing engagement between mining companies, Tribal governments, and local communities is not just a focus here in the Gem State, but Idaho mining has the unique opportunity to set the stage and standard on how to do it right at a national scale.

Mining

Companies



IDAHO GEOLOGICAL SURVEY LOOKS BACK ON 2023 SUCCESSES

By Virginia Gillerman, Reed Lewis, and Christopher Tate, Idaho Geological Survey (IGS)



EXPLORATION 2023 PRELIMINARY

daho's mineral industry had an active year in 2023 with mines in north Idaho and southeast Idaho's phosphate district operating as usual, but there were a few surprise setbacks at both exploration and operating properties. Overall, commodity prices were decent but not outstanding, and inflationary labor and materials costs were a concern. Permitting timelines and legal issues remained a top industry concern. Federal interest in domestic supplies of critical minerals and concerns for the vulnerability of international supply chains provided fuel for both research and exploration in Idaho, and the state's diverse geology and mineral resource base offered multiple opportunities. A major highlight of the year was the exciting new copper discovery announced in the fall by Hercules Silver Company. Two significant negative news items were the suspension of final construction at the Idaho Cobalt Operation due to low cobalt prices and the judicial decision to revoke approval of Bayer's Caldwell Canyon phosphate mine already under construction.

Figure 1 shows the location of the two "world-class" mining districts in Idaho: the Coeur d'Alene district (also known as Silver Valley) in Shoshone County in northern Idaho, and the Phosphate district in Caribou County in southeastern Idaho. Both districts have had mines operating for over 100 years. The red dots on the map indicate exploration projects for a variety of commodities although gold and silver were the prime targets with base metals and critical minerals, particularly cobalt and rare earth elements (REEs), also being targeted.

Two deep underground mines operated in the Silver Valley. Hecla's Lucky Friday mine at Mullan mines silver as well as lead and zinc from the Gold Hunter vein system. The mine had produced about three million ounces of silver by the end of July before a fire in the #2 Shaft, a secondary escapeway for the mine, shut down operations. Though the fire was put out, the needed shaft repairs and bypass construction will keep the mine closed for the remainder of the year. Americas Gold & Silver Corporation was producing silverlead concentrates from the Galena mine and mill and installing a new hoist (Figure 2) for the Galena Shaft. They also had drilled 39,000 feet of core for exploration and development in the first half of the year. The new hoist and final shaft repairs





Left: Figure 2. Naulu installed Caluma mine boilt dam with eable. Abore: Figure 2. Experament

Left: Figure 2. Newly installed Galena mine hoist drum with cable. Above: Figure 3. Emergency remediation and removal of historic tailings at Stibnite.

should enable increased production next year. On the western end of the district, the Bunker Hill Mining Corporation was working on a rapid restart of the historic Bunker Hill zinc-lead-silver mine to mine the Newgard-Quill zinc orebody. The company was planning a new building to house the used mill equipment stored at the cleaned-up site. They also enlarged and replaced the Russell portal for better mining equipment access. Just west of the Bunker, Silver Valley Metals was engaged in surface exploration at the Ranger-Page project, a unitized land package with little modern work. They trenched structural and vein targets delineated from modelling of historic workings and last year's surface geophysics and geochemistry work. At Murray, just north of the Coeur d'Alene district, Idaho Strategic Resources, formerly New Jersey Mining, continued mining gold-quartz veins at the Golden Chest mine. They were mining a newly intersected high-grade vein and production increased. The ore goes to their mill at Kellogg.

In southeast Idaho, open-pit phosphate mining continued as usual at Simplot's

Smoky Canyon mine, Bayer's Blackfoot Bridge mine, and Itafos' Rasmussen Valley mines. Three large processing plants in the region employ hundreds of people to manufacture phosphoric acid fertilizer and elemental phosphorus. Itafos received a mine permit for their Husky/ North Dry Ridge property and started initial construction. However, Bayer was shocked by Judge Winmill's decision in July to vacate the Record of Decision for their already permitted Caldwell Canyon mine plan, which had been in construction for two years. The decision to overturn the U.S. Bureau of Land Management's permitting document was due in part to concern over the potential sage grouse habitat and cumulative effects. Both the agency and company are "back to square one" for Caldwell Canyon and likely to try again for a mine permit.

Numerous small industrial mineral operations were active and construction sand and gravel was a sought-after commodity due to a busy building boom in southern Idaho especially. Exploration for metals, shown in Figure 1, took place across Idaho. At Stibnite in Valley County, Perpetua Resources was awaiting the Final Environmental Impact Statement (FEIS) on the proposed Stibnite Au-Sb mine in Valley County. It is scheduled to be released by the U.S. Forest Service near the end of the year. The company conducted an EPA-sanctioned Consent Order remediation of tailings (Figure 3) and other waste material left on-site from mining activities during World War II. They also received \$15 million from the Department of Defense to develop a new domestic antimony supply chain suitable for munitions.

The highlight of 2023 was a major new porphyry copper discovery by Hercules Silver Company at their Hercules property in the Western Idaho accreted terrain. Mesozoic volcanics comprise part of an ancient volcanic assemblage that is exposed along the Seven Devils Mountains and further south into Adams and Washington counties. The old Hercules Ag-Mn mine had seen shallow drilling by Anglo-Bomarc and others from the 1960s to 1980s but not in modern times. Targeting a blind IP chargeability anomaly, the company drilled several holes (Figure



4) and in early October announced assays from HER-23-05 that intersected 185 meters of 0.84 percent Cu with 111 ppm Mo from 246 meter to 431-meter depth. Within that was a higher-grade zone of 45 meters assaying 1.94 percent Cu. Full assay results from subsequent holes have not yet been announced but the alteration was reportedly similar. The system has a shallow-level, outer halo of manganese carbonate alteration with assays as high as two to three percent Mn over tens of meters. Manganese is on the list of critical minerals defined by the U.S. government. Historic maps of the area are part of the Don Adair collection donated to the Idaho Geological Survey in 2022.

Integra Resources continued work in southwestern Idaho at their De Lamar mine project. Over the winter and spring, they drilled stockpile and backfill areas with sonic and reverse circulation drills. The work added a half-million ounces of Au-equivalent to a resource which they plan to propose for a heap leach operation at the old Kinross mine site.



Integra also did geotechnical drilling next to the pit on Florida Mountain (Figure 5) and conducted numerous permittingrelated studies. In southeastern Idaho, Liberty Gold had another all-year drilling program and announced very good gold intercepts at their Black Pine project, also in a previously mined district, but with new discoveries under gravel cover at the Rangefront targets in Cassia County. Near Salmon, Revival Gold was drilling at the Beartrack and nearby Arnett Creek properties with 18 core holes, totaling 3350 meters, drilled during 2023.

Idaho Strategic Resources completed surface sampling and other work on three rare-earth properties near Salmon: Diamond Creek, Lemhi Pass, and the Mineral Hill district. Megado and U.S. Critical Materials also had claims for rare



earths. Activity in the Idaho Cobalt Belt decreased in 2023 as the price of cobalt declined significantly due to supply and demand and shifts in battery chemistry preferences. Electra Battery Materials was assessing its Iron Creek property and hoped to drill next year. In March, Jervois announced that it would suspend final construction of the Idaho Cobalt Operation mine and mill facility in Lemhi County. However, the U.S. Department of Defense awarded the company \$15 million for drilling and a feasibility study for construction of a U.S. cobalt refinery. Jervois' initial refinery option was in Brazil.

Several other exploration projects were active for both base metals and precious metals as shown in Figure 1. Phoenix Copper was active near Mackay and Kennecott was exploring near Leadore. An encouraging note was that Centerra Gold was considering reactivation of the giant Thompson Creek molybdenum mine in Custer County. Molybdenum prices had risen to about \$25 per pound in October 2023; the company's Langeloth metallurgical facility in Pennsylvania is one of the few such complexes in the hemisphere. In summary, interest in mining and exploration in Idaho was still robust, though economic, political, and permitting factors remained significant in the U.S.

The Idaho Geological Survey continued to provide the public and the mineral industry with data gained through geologic mapping, reconnaissance sampling of rocks and stream sediments,

Figure 6. Index map of the Salmon area showing areas of geologic mapping, plus location of the Idaho cobalt belt (blue diagonal pattern), Mineral Hill new project area (the two orange-shaded quadrangles to the north with REE occurrences as red dots).

> mineralogic characterization, and data preservation methods, such as digitizing historic geochemical data of the region. Work on the three-year, USGS Earth MRI-funded, geochemical investigation of the Western Phosphate Field in Idaho, Montana, Wyoming, and Utah included several field visits to active mines and stratigraphic sections as well as collection of hundreds of geochemical samples.

> New in 2023 was the initiation of the Mineral Hill REE project northwest of Salmon, also funded through the USGS Earth MRI program (Figure 6). Geologic mapping, geochemical sampling, and geochronologic work will be completed during a multi-year effort. Rare earth and niobium occurrences at Mineral Hill are part of a larger belt of critical mineral deposits, including REE-bearing carbonatites and guartz veins, that extend from the Lemhi Pass area southeast of Salmon, north-northwest into Montana. and eventually Canada. The Mineral Hill REE district is largely underlain by metamorphosed Proterozoic dioritic and granitic rocks that host small carbonatite lenses.

> An important contribution bv the IGS is the collection of surface measurements of magnetic susceptibility (magnetite content) and uraniumthorium-potassium content to better understand the distribution, age, and controls of mineralization in both areas (Figure 7). These efforts will help with interpretation of the cooperative USGS-Industry aeromagnetic and radiometric survey of this area that was released in 2022 (Figure 8). The surface magnetic susceptibility data gathered to date was released in March 2023 as a Digital Analytical Data Series consisting of over 2,900 measurements in the Salmon area and the Idaho panhandle.



Figure 7. Measuring U-Th-K concentrations using a hand-held gamma-ray spectrometer in the Mineral Hill REE district northwest of Salmon.



The 2023 field season also saw continued geologic mapping and research in the Idaho cobalt belt of east-central Idaho on projects funded by Earth MRI and industry partners (Figure 6). The Idaho cobalt belt consists of strata-bound copper-cobalt deposits with a complex history. The IGS completed the second phase of field work for a USGS Earth MRI (critical minerals) project in the Idaho cobalt belt by releasing the Blackbird Creek and Opal Lake quadrangles at 1:24,000 scale (Figure 6). An additional three quadrangles northwest of Salmon that were mapped as part of USGS STATEMAP Program were also released. These maps will assist ongoing exploration both for cobalt-copper and gold deposits.

The IGS also organized the 6th Belt Symposium, held jointly with a Tobacco Root Geological Society meeting, in Salmon in July 2023, bringing together over 130 representatives from industry, IGS, USGS, and various academic institutions for presentations as well as field trips to the Pope-Shenon copper property, Iron Creek copper-cobalt

Figure 8. Airborne radiometric map of the Idaho cobalt belt and surrounding region showing thorium concentration. Results of IGS thorium measurements (in ppm) determined by a handheld spectrometer from surface outcrops are shown by the colored dots. Some of the airborne anomalies have been interpreted to match the elevated Th concentrations indicated by the surface measurements (Airborne radiometric data from https://doi.org/10.5066/P9TLBM4U)



Figure 9. Left: Map showing IGS mineral property file scan progress. Right top: Data preservation specialist Jacob Eldredge with part of the Adair collection's oversize rolled and folded maps. Right bottom: Creatively relaxing the folded maps (on the wall) while cataloging and layout of flat maps and documents prior to scanning and data entry.

property, Diamond Creek REE property, Cardinal REE property, and the Beartrack gold mine. A conference publication included field trip guides and articles on the regional geology and mineral deposits.

For over 15 years, IGS, in conjunction with the Idaho Department of Lands and U.S. Geological Survey, has been involved with digital data preservation activities. These efforts have resulted in the scanning of historic mine maps, assays, geologic and mine reports, images, and drill-hole maps, amounting to over 20,000 documents including digitized video files (Figure 9). All are available for download at no cost to the public. Data preservation efforts at IGS have resulted in millions of dollars of investment in the state of Idaho from the mining industry, particularly during exploration. Other users of IGS Data Preservation products include students, academics, historians, anthropologists, genealogists, hobby

miners, gem collectors, and state and federal agencies.

Web map applications are the primary portal for discovering and obtaining data concerning Idaho mines and oil and gas extraction and exploration activities. There were upgrades to both products. The Database of oil and gas wells of Idaho: 1903-2022 publication is now available for download with additional LAS files available through our web map application.

This year the Survey completed rebuilding our 33-year-old Mines and Prospects of Idaho database from scratch, including low-level normalization of data. To keep pace with changes in software and technology while accommodating backward-compatibility, SQL Server and ESRI ArcGIS Enterprise databases were utilized in workflows for generating and distributing spatial Mines data. The popular MDB format is available to users for download. A new beta Microsoft Access application for interacting with Mines data is included with the download of the IGS DD-1 publication.

The IGS also began cataloging and processing an extensive collection of material donated by Don Adair, an exploration geologist who worked extensively in Idaho for decades (Figure 9). Processing of documents is currently underway for sites of interest to industry including the IXL and surrounding areas near Cuprum, the Blue Dog and Almaden properties in Washington County, and the CuMo deposit in the Grimes Pass area. The Survey is also processing previously cataloged material for Idaho properties in the Pullman 1°x2° USGS quad.

For information on any of the products and databases released by IGS, please visit the Survey's webpage at www. idahogeology.org. ▲

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