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Treasurer's Report

Greetings! All of us on the board wish everyone well as we meet the challenges of the times we live in. Although life's 'norms' have drastically changed, there's still opportunities to get outside and enjoy your favorite hiking trails and discover new places with family and close friends. We are past due updating the Section and are excited to share updates and developments.

In February, prior to the onset of the pandemic and associated barriers to having in-person gatherings, the board held a Vision 2020 meeting in Woodridge, Illinois. The purpose was to explore a vision for our Section moving forward, and changes we can make to improve the fundamentals of our operations. We are excited to share more details with our membership at our Spring 2021 meeting!

We had planned a field trip to Indiana Dunes National Park for this past Spring, coordinating with experts from Indiana University Northwest and their busy calendars. Spring turned to Fall, and the field trip along with our Fall 2020 meeting was cancelled because of COVID-19. We are penciled in with IU-NW for the field trip in late spring 2021. We will also hold our Spring Meeting as a virtual event or in person, depending on health guidelines in place at that time.

In happier news, congratulations to our very own Dave Heidlauf, who was just elected as Treasurer of the AIPG National Executive Committee. Dave will continue to play an important role with our Section (to our good fortune!), but the search is now on for an interim president-elect. Are there any volunteers?

We enthusiastically look forward to getting together again, virtually and in person, to do the things we love...interacting with old friends and professionals, making new connections and sharing success stories and lessons learned.

The coronavirus provides new perspectives and challenges to all of us within the geosciences. To quote Dennis Pennington, President of the Pennsylvania Section, "this pandemic will affect the future of our profession. How we adapt will determine how successful organizations will become".

Ga. W. Carl

Best wishes and stay safe!

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NEWS & UPDATES

IL/IN Section Elections Postponed

The Section will be holding elections early next year to fill positions for the 2022-2023 calendar period. A notice of elections will be submitted to the membership in the spring, calling for nominations of AIPG members interested in serving as officers. The Nominating Committee seeks to balance the Board by geography, discipline and organization type/size. Any AIPG members are encouraged to submit an application to serve on the Section board.

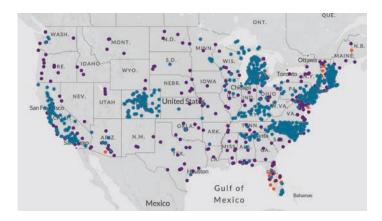
Please contact Craig McCammack cmccammack@v3co.com or anyone on the Board if you have questions or would like to throw your hat into the ring!

Continuing Education Credits - Record Keeping

You can now store all of your professional development credits and associated documentation in your AIPG membership record. Just log into your account at www.aipg.org and select 'Professional Development' under account settings.

Mapping the PFAS Contamination Crisis

The Environmental Working Group (EWG) has published an interactive map tracking PFAS contamination of drinking water in the United States. As of July 20, 2020, there were 1,582 sites in 49 states. The mapping portal can be viewed at the link: https://www.ewg.org/interactive-maps/pfas_contamination/



COVID-19 Safety Best Practices for Environmental Professionals

The environmental remediation company Regenesis has developed a COVID-19 safety webinar tailored to the environmental sector, it is available at: https://regenesis.com/en/webinars/2-thank-you-covid-19-safety-best-practices-for-environmental-professionals-working-in-the-field-and-at-home/

2021 Spring Meeting!

Our Section has canceled both the Spring and Fall meetings of 2020 due to the COVID-19 pandemic. It is our intention to hold a meeting in the Spring 2020 in one way or another, whether in person at the Morton Arboretum, or in a virtual / online format. We will inform the membership with an updated meeting announcement in the coming months.

Technical Resources for Addressing Releases of PFAS

The Interstate Technology and Regulatory Council PFAS Team released a 380 page report designed specifically to provide state and federal environmental staff, as well as stakeholders, project managers, and decision-makers a working knowledge of the current state of PFAS science and practice, this document was developed by a team of over 400 environmental practitioners drawn from state and federal government, academia, industry, environmental consulting, and public interest groups. It summarizes the current understanding of all aspects of PFAS from a broad perspective. The guide covers the definition of PFAS, their environmental behavior, evaluation of PFAS in the environment, techniques used to remediate PFAS, major concerns of communities and tribes, how to share PFAS knowledge, and special topics. ITRC has released 10 PFAS training modules to accompany the document that range from -13-30 minutes.

They can be accessed at:

https://www.youtube.com/playlist? list=PL4BkJPBpegFGf41mTSSKvQ9_bAQ4g M27X.

Topics covered include including sampling and analysis, treatment technologies, risk communication, human and ecological effects, fate and transport, and risk assessment and regulations, among others.

- Web-based document: https://pfas-i.itrcweb.org/
- ➤ PDF file: https://pfas-1.itrcweb.org/wpcontent/uploads/2020/04/ ITRC_PFAS_TechReg_April2020.pdf

Green and Sustainable Remediation: Frameworks and Tools



The goal of environmental remediation is to protect human health and the environment from the toxic effects of contaminants. But implementing remedies without considering sustainability has the potential to transfer impacts to unintended recipients.

Often, factors such as greenhouse gas emissions, energy usage, and community engagement are not assessed before investigations and remedies are designed and implemented.

Considering these factors throughout the investigation and remedy implementation process has the potential to lessen negative collateral effects of the cleanup while still achieving results protective of human health and the environment. The consideration of these factors is often referred to as Green and Sustainable Remediation (GSR), and increasingly includes attention to issues of resiliency.

The practice of GSR involves the site-specific employment of products, processes, technologies, and procedures that mitigate contaminant risk to receptors while making decisions that seek to balance community goals, economic impacts, net environmental effects, and resistance to effects from extreme weather and natural disasters.

Many state and federal agencies are just beginning to consider GSR and integrate related requirements into their regulatory programs. A working knowledge of GSR concepts, decision frameworks, metrics, and tools to conduct GSR evaluations on remedial projects allows consulting professionals to provide options for their clients and regulators.

GSR solutions are site-specific and must be tuned to the project goals. Individual products, processes, technologies, and procedures are not necessarily "GSR" by definition, as each choice must be evaluated in the context of stakeholder values.

As such, GSR is not a product that can be ordered in a box. Sustainable products, methods, tools, and procedures are constantly evolving; GSR considerations can be integrated during any and every phase of a project; and the scope and budget for GSR on each project will vary. Stakeholders, including consultants, often need assistance with decision-making processes.

One excellent resource for GSR decision frameworks and tools is the Interstate Technology and Regulatory Council (ITRC), a state-led non-profit coalition that works to

promote innovative environmental remediation technologies and processes. ITRC produces free documents and training on a wide variety of technical and regulatory subjects. ITRC content teams include public and private sector members from across the country and provide a broad national perspective.

ITRC released GSR guidance in 2012, which covered GSR best practices for environmental assessment and remediation. A recorded training session on the GSR guidance from 2014 is available on the ITRC training archive. While these documents and training resources are still quite useful, many lessons learned since 2012 need to be captured and shared, including resiliency to extreme weather events and wildfires. ITRC's "Resiliency Team" is currently working to update the GSR guidance, which includes frameworks for decision making, tools for analysis and review, and implementation strategies.

The updated guidance document and new fact sheets are planned for release in 2021. The updated guidance will integrate vulnerability with GSR and will discuss assessment and adaptation strategies, disaster preparedness, rehabilitated land, technical and regulatory barriers and opportunities, and best management practices developed by the states. The latest updates from the ITRC Resiliency Team can be found on the website: https://itrcweb.org/Team/Public?teamID=84

ITRC is only one of many sources of GSR guidance and tools available for every project phase, including sussing out the goals of stakeholders; choosing metrics, weightings, and boundaries; identifying solutions; and implementation and monitoring.

Many GSR tools are available from the fine sources listed below, go forth and do some couch learning today!

- > ITRC
- ➤ US EPA
- ➤ CalEPA
- ➤ Illinois EPA
- Minnesota PCA
- ➤ UK-based SURF
- > SERDP/ESTCP
- > ASTM

In addition, the AIPG 2021 annual conference theme is, "Role of Geoscientists for Resiliency, Sustainability, and Opportunities in the Changing Environment." The 2021 host state of California is experiencing a high frequency of extreme temperature and precipitation conditions, which has challenged the state's water resources, created geohazards, impacted where we grow the nation's food,

and is developing vulnerabilities along rising coastlines. The geoscientist's expertise has never been more important in solving our current challenges. Consider attending!

Indiana Journal of Earth Sciences

The Indiana Journal of Earth Sciences is a new open access serial publication of the Indiana Geological and Water Survey (IGWS), a research institute of Indiana University and the state-legislated archive for geologic and hydrologic data. The journal serves as the primary outlet for scholarly communication of the IGWS, it has a broad

mission to publish Earth science research about Indiana and the surrounding region.

So far, two volumes have been published. Volume 2 includes several technical reviews and three peer-reviewed articles. The volume includes a very interesting article about the history of the Indiana Geological and Water Surveys and two preliminary quadrangle maps.



Mosaic of IU Sample Gates

Most of the photographs used for the mosaic of the Sample Gates belong to the Indiana Limestone Photograph Collection. Curated by the Indiana Geological and Water Survey since 2012, this impressive archive consists of more than 26,000 architectural photos depicting quarries, mills, and buildings from the early to mid-1900s. The digitized photographs are stored on IU Libraries Image Collections Online (http://go.iu.edu/16dx) and can be viewed there. Other photos in the mosaic are from the research and outreach efforts of the Indiana Geological and Water Survey, as well as specimens from IGWS collections.





One Day Field Trip to West Beach, Central Beach, Mt. Baldy, Michigan City Lighthouse and Sheridan Beach



Stay tuned as we are tentatively planning to reschedule the field trip in the Spring of 2021, contingent on health and safety guidelines. An announcement will be made when plans are finalized.

Field Trip Leaders!

Erin Argyilan, PhD - Professor of Geology, IU Northwest Harvey Pokorny, PG - AIPG IL/IN Section

M E M B E R S C O R N E R

Paul Hohbach (CPG-11432)

Yellow leaves have all fallen from slender birch and black cottonwood trees in Fairbanks, Alaska. Within three weeks the weather went from warm, sunny and sixty degrees to grey and frozen with light snow on the ground. This close to the Arctic Circle, that snow will likely not melt until late April. Northern Star Resources Ltd. owns and operates the Pogo Gold Mine, located 100 miles east of Fairbanks, Alaska. Pogo Mine is on track to produce more than 200,000 ounces of gold this financial year from Paleozoic gneisses and schists intruded by Cretaceous granites and diorites. In September of this year, Northern Star proposed a merger with Saracen Mineral Holdings Ltd., this new business entity will create a group that is set to produce approximately 1.4 million ounces of gold during the next 12 calendar months. Main production centers are located in the greater Kalgoorlie area, at Yandal in Western Australia, as well as the Pogo Mine in North America. By ounces produced, this new Northern Star Group will rank as a top ten global gold producer.

If you like adventure Alaska is the place for you. Just drive out of the airport at one o'clock in the morning; you might see a lynx cross the highway in your headlights; he/ she gracefully sidesteps those annoying motorcar lights. Lynx always look annoyed with people! If you are an early riser, on your drive back to the airport, shortly after sunrise, mama moose and her two calves don't care if you stop and watch them crop tall grass, provided for her by the State of Alaska Highways Department - and your tax dollars.



Alaskans seek out unique ways to stay warm in winter - not just the family home or shelter. While wood stoves are popular, hot springs and resorts along arcuate Tintina Belt thrust faults

provide superheat, steam and swimming courtesy of continental drift. At the mine the best place to stay warm is in the Liese Main underground, where Mother Earth, Cretaceous metamorphic host rocks and plutonic intrusions localized superior grades of gold in quartz in sixty plus degree tunnels. Heating portals does however require massive amounts of energy to keep tunnel mouths from freezing solid.

At surface drill sites, where exploration contractors work outdoors in sub-zero weather all winter long, drillers and their helpers labour in their shirt sleeves day and night. How do they do this? Each leveled drill pad is built extra large, so that ramshackle tents can be slung over everything except turning drill steel. Heaters and blowers

blaze away, keeping everything toasty even in minus forty Fahrenheit temperatures. I wager that "experienced" drill helpers only forget to put their jackets and hats on once per season before they leave the tent! Typical core hole depths go hundreds of meters deep, so as long as the logistics keep equipment running, everyone stays happy.



There are many joys of winter work in these frozen Alaskan lands. The bears have gone to sleep in their shallow dens. No longer must men and women carry field artillery and keep a wary ear always trained upwind for rustling shrubs nearby. If you like the game called "what track is that", you can test your dectective skills by decifering lynx, from wolverine from wolf tracks. Jack London might be happy to know that the lone wolf still roams Alaskan wilds, alongside his smaller cousin the Artic fox. Another winter bonus is that the surface three meters of ground is frozen solid; normally walking on permafrost/ moss is like bouncing through a muddy trampoline – for miles. That frozen stuff is great going!

The State of Alaska has no major lottery like Powerball; so if you really get weary of all the adventure, hard work, long days (no - the pay is actually quite good) you can take a break and ask for free stuff in the town of North Pole, Alaska. The "official" residence of one Santa Claus is found here; Rudolf, six other reindeer (plus babies) and the sleigh are all waiting for you outside. Inside an army of small elves and large toy soldiers stand ready to sell you whatever you fancy for triple the usual price. Santa himself will sell you one square inch of land from his North Pole ranch for a mere fourteen dollars USD. Really! My wife bought a land share last year and we may even move here now! Merry Christmas from the frozen North and Bull Moose!

MEMBERS CORNER

IL/IN section members are invited and encouraged to share stories, photos, updates, and any developments that may be of interest to the section. Submissions will be published in the biannual newsletters. Please send all submissions to James Adamson at the link <u>Email Members Corner Submission</u>

REGULATORY UPDATES



Update on Illinois Site Remediation Program

Patricia Feeley, AEI Consultants - CPG 11020

The Illinois Environmental Protection Agency (IEPA) has created an expedited Site Remediation Program (SRP) review process, according to Greg Dunn, Deputy Chief, Bureau of Land, IEPA. Review of single reports (SI,

ROR, RAP or RACR) can be completed in less than 30 days or combination reports can be reviewed in less than 45 days. The Remedial Applicant must agree to a \$15,000 fee and overtime costs for the review of the report or reports. IEPA can prepare an agreement for the RA's signature. To date, six expedited review contracts have been executed by IEPA. Please contact Neelu Lowder or Todd Hall at IEPA for additional information.

An Update to the PFAS Conversation

September 30, 2020

We have been hearing about PFAS and PFOA (perfluorooctanoic acid and its salts, and perfluoroactanesulfonic acid and its salts, hereafter "PFAS") as emerging contaminants found in groundwater across the country. Environmental associations and our laboratory partners have been mentioning the emerging trend of PFAS as a low level contaminant. Lynn Smith – AIPG Illinois-Indiana Section Board Member presented on developing regulations related to emerging contaminants including PFAS. Even a movie released in November 2019 had PFAS as the contaminant of concern (Dark Waters, the movie).

On January 10, 2020, the US House of Representatives passed HR 535 PFAS Action Act of 2019. This bill requires EPA to regulate PFAS and designates certain PFAs as hazardous substances under CERCLA (perfluorooctanoic acid and its salts, and perfluoroactanesulfonic acid and its salts). Within five years, the EPA must determine whether the remaining PFASs should be designated as hazardous substances, individually or in groups. Public agencies and airports will be exempt from liability for remediation of certain releases of PFAS resulting from the use of fire fighting foam. However, POTWs and local water entities are not shielded from liability. The bill requires EPA to promulgate a national primary drinking water regulation for certain PFAS. The EPA must regulate the disposal procedures for materials containing PFASs or

aqueous film forming foam. For criminal penalty purposes, materials containing PFAS shall be considered hazardous waste. See the bill for more information: https://www.congress.gov/bill/I16th-congress/house-bill/535. On January 13, 2020, this bill was referred to committee within the Senate.

On a state level, Illinois EPA has proposed PFAS groundwater standards as proposed draft amendments to Class I and II groundwater standards in Illinois (January 2020). The following five compounds are presented with the following proposed standards:

Constituent	Standard (mg/L)
Perfluorobutane Sulfonic Acid (PFBS)	0.14
Perfluorohexane Sulfonic Acid (PFHxS)	1.40E-04
Perfluorononanoic Acid (PFNA)	2.10E-05
Perfluorooctanoic Acid (PFOA)	2.10E-05
Perfluorooctane Sulfonic Acid (PFOS)	1.40E-05

The IEPA has also included a combined PFOA and PFOS standard of 0.000021 mg/L. The draft amendments will be presented to the Illinois Pollution Control Board for further review, comment, and public comment process.

Michigan adopted drinking water Maximum Contaminant Levels (MCLs) for PFAS. Regulations

will cover roughly 2,700 public water supplies and exceeds the current US EPA guidance on the chemicals. The MCLs were proposed by Michigan Department of Environment, Great Lakes, and Energy (EGLE) and adopted by the legislature:

Constituent	Standard (mg/L)
Perfluorobutane Sulfonic Acid (PFBS)	4.20E-07
Perfluorohexane Sulfonic Acid (PFHxS)	5.10E-08
Perfluorononanoic Acid (PFNA)	6.00E-09
Perfluorooctanoic Acid (PFOA)	8.00E-09
Perfluorooctane Sulfonic Acid (PFOS)	1.60E-08
Perfluorohexanoic acid (PFHxA)	0.0004
Hexafluoropropylene oxide dimer acid (HFPO-DA)	3.70E-07

Pogo Mine - Alaska



Paul Hohback, CPG-11432

On February 21st, 2020 Northern Star Resources' Pogo Mine quietly poured their four millionth ounce of gold. Pogo is a bonanza gold deposit classed as "Intrusion-related" by Dr. Tim Baker, Craig Hart, and others (See Baker, T. 2002 and Hart, C. 2003).

Little public literature exists about Pogo. The Pogo property is located 90 miles east of Fairbanks, Alaska in the foothills of the Yukon, in T5S, R41E, Fairbanks Meridian. Modern exploration began with a regional gold and multielement sampling program undertaken by Geologists Jason Bressler and Tom Corbett of WGM Inc. In 1994, three strongly-mineralized holes were drilled into what would become one of North America's premier gold mines at Pogo.

Gold-bearing quartz veins are hosted in a sequence of amphibolite-grade paragneiss and orthogneiss of probable Proterozoic to mid-Paleozoic age (Hart, Craig et. al. p 250). Mid-Cretaceous-aged, granite plugs to granodiorite plutons and dikes intrude the gneisses, particularly along regional faults. These Proterozoic gneisses and Cretaceous granitoids form part of the Yukon-Tanana terrain, a gold belt which extends from Fairbanks into the historic Yukon Territory. Post-mineral tonalite intrusions and large-left lateral Paleocene post-mineral faults complete the overall stratigraphic and structural picture. Pleistocene glacial deposits mantle much of the exposed terraine.

Regional metamorphism of sediments to gneisses within the first period of deformation peaked sometime before 110 Ma. During retro-grade metamorphism, cooling transformed the ductile deformation of the metamorphic fabric to brittle (semi-ductile to brittle) deformation. During this change, a series of low-angle shears initiated large movements that transect the region. Pieces of oceanic crust were caught within these shear zones. In the second period of deformation that began around 106 to 109Ma,



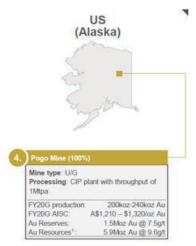
Goodpaster project - Au in Quartz

high angle structures, folding and westerly, superimposed foliation occurred. Hydrothermal fluids rose from depth along high-angle faults; enormous amounts of quartz were emplaced into receptive low-angle shears and narrow, extensional structures that splayed off shear zones. With

> quartz came "clots" of native gold, bismuth and telluride minerals that form much of the high-grade, plus 500° C

deposits. Subsequent gold mineral arrived with lower temperature pyrrhotite and arsenopyrite as fracture filling in quartz veins (Rhys, D., Rombach, C. et. al. 2003).

Quartz vein thicknesses can exceed 20 meters in the main Liese deposit! Altered felsic to intermediate dykes and plugs are spatially-associated with mineralization. Previously- conducted

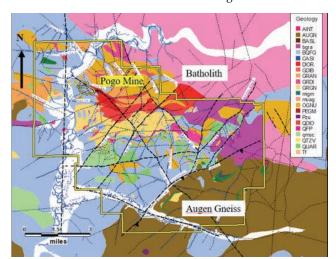


Pogo mine location

fluid inclusion analysis from the MDRU suggests that Pogo deposits initially formed at depths of roughly 8-10 kilometres (Baker, T. SGA Short Course Overview, slides 3 through 5 & others, 2007).

Current NSR gold resources at Pogo stand at 5.9 million ounces Au at 9.6gpt (0.28 opt Au). Northern Star's Exploration Group is actively drilling for both new deposits and prospecting historical, drillindicated areas of gold mineralization. The good

news is that this gold-bearing, structural system is aerially-extensive; the size and tenor of these deposits predict a very long mine life for Northern Star Resources at Pogo.



Pogo Project Geological Plan with Rock Units

References

Baker, T., 2002, "Emplacement depth and CO2-rich fluid inclusions in intrusion-related gold deposits": ECONOMIC GEOLOGY, v. 97, p. 1109–1115.

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Well Logs and Log Analysis for New Hires

Course Type: GOLI Online Course

Organization: American Institute of Professional Geologists

CRUs: 1.00

View Course



Course Type: GOLI Online Course
Organization: American Geosciences Institute
CEUs: 0.10
View Course



The Lower Cretaceous of Texas

Course Type: GOLI Online Course

Organization: American Institute of Professional Geologists

CBus: 1.00

View Course



Bedrock Well Exploration and Development Course Type: GOLI Online Course Organization: American Institute of Professional Geologis CEUs: 0.50 View Course



Illinois-Indiana Section of AIPG

Indiana-Illinois Section: http://www.aipg.org/Sections/IL-IN/IL-INaipg.htm

AIPG National Web Site: www.aipg.org

Section bylaws were approved by the Executive Committee on October 15, 1991