Technical Sessions
Abstract Book

December 6 - 8, 2017

Nugget Casino Resort
Sparks, Nevada

Annual Meeting Program Chair
Eric M. Struhsacker
Consulting Exploration Geologist
Reno, NV
estrusacker@sbcglobal.net

Annual Meeting Program Co-Chair
Clark West
Global Mining Service/Marketing Manager
Agru America, Inc.
Reno, NV
cwest@agruamerica.com
# 2017 Technical Session Program

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MORNING SESSIONS | WEDNESDAY DECEMBER 6
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STATE & PROVINCE REPORTS (Part I)

Chaired by: Rich Perry, Administrator, Nevada Division of Minerals, Carson City, NV

Area of Interest - Mineral Deposits, Geology & Exploration

Session Description:
Want to hear about exploration and mining activities for the past year in western states and provinces? In this all-day session, state and province economic geologists will provide an update on the latest activities in their respective areas, and discuss new opportunities for exploration and mineral development.

• Legislative Streaming of Mine Permitting in Oregon, Ian Madin, Deputy Director & Chief Scientist, Oregon Department of Geology & Mineral Industries, Portland, OR

Abstract
The 2017 Oregon Legislature passed Senate Bill 644, which is intended to streamline mine permitting in Oregon. The most important change is that in specific Eastern Oregon counties County land use approval for large non-aggregate mines no longer needs to meet statewide land use standards, with a few very narrow exceptions. The bill also provides a mechanism for resolving conflicts between these mines and adjacent agricultural uses. The conflict resolution options include financial mitigation negotiated by the mine and affected agricultural interests.

For aggregate mines non-aggregate mines that do not meet size threshold, the Department of Geology and Mineral Industries is now required to issue a provisional permit to an applicant who has satisfied all of the Department’s requirements but has not yet obtained all of the other permits necessary to proceed with mining. The bill provides that no mining may occur until those other permits or approvals are in place.

The Calico Resources is anticipating submitting a consolidated application for their Grassy Mountain gold project, which will be the first such application ever received. Permitting agencies, led by DOGAMI have been preparing to respond to the application, and contractors are in place to help with detailed technical review and the development of the necessary Environmental Assessment and Socioeconomic impact study. A multi-agency workshop was held in November to walk all involved parties through the application process steps.


Abstract
Eight major metal mines and an equal number of coal mines produced in 2017. In addition there were at least 40 industrial minerals producers, several hundred construction aggregate producers, placer gold producers and various small mines and quarries contributing to the mining sector. Coal and copper are expected to be the top mineral products by value. The BC Ministry of Energy Mines and Petroleum Resources is tracking 350 -400 mineral and coal exploration projects, as is typical of recent years.

The Brucejack gold mine began commissioning in early 2017 and attained commercial production in July. Myra Falls, a suspended polymetallic producer is working toward a 2018 re-start, as is Silvertip, recently purchased by Coeur Mining Inc. Development and
mining began on an underground operation at Bonanza Ledge, previously site of a small open pit gold mine.

Among major proposed mines, KGHM Ajax anticipates an imminent decision on environmental certification of the Ajax copper-gold porphyry.

Public exploration companies have claimed discoveries or announced significant exploration results at various target types including epithermal and orogenic gold veins, precious metals enriched massive sulphide, mafic intrusion hosted nickel-copper, and porphyry copper-gold.

- **Idaho Mining and Exploration, 2017, Virginia Gillerman, Associate Research Geologist, Idaho Geological Survey, Boise, ID**

**Abstract**

In recent years, Idaho mining and minerals activity has been hampered by low metal prices and a mine closure, but in 2017 metal prices, particularly for silver and gold, were rebounding and the economic outlook favorable, providing impetus and investment dollars for renewed exploration in several Idaho districts in 2017. The USGS estimate of Idaho’s value of nonfuel mineral production for calendar year 2016 was $654 million, ranking 33rd among the states. Principal Idaho commodities by value were phosphate rock, construction sand and gravel, silver, lead, and crushed stone. Three large, open pit phosphate mines operated in Caribou County. But in Shoshone County, union workers at Hecla’s Lucky Friday mine went out on strike March 13, 2017, and the mine remained closed throughout the summer and into the fall. Production continued at the Galena mine, also a deep, underground silver mine.

On the exploration front, Midas Gold, Inc., submitted a mine and restoration plan to the U.S. Forest Service in September, 2016, initiating the NEPA process. Midas seeks to develop a gold-antimony mine in the historic Stibnite district in Valley County. The proposal plans for remediation of the open pit and restoring the river for fish migration at the end of mining. In addition to permitting, Midas also drilled. Otis Gold reported good results on a new ore zone at the Kilgore project in eastern Idaho. Rising cobalt prices, prompted new interest in the Idaho Cobalt Belt by eCobalt (formerly Formation Capital) and newcomer, US Cobalt, Inc., who acquired and was drilling the Iron Creek property. Another newcomer, Phoenix Global Mining, drilled the Empire mine property at Mackay. Additional 2017 mining and exploration news for Idaho will be summarized.

• **Utah’s Non-Fuel Minerals Industry, Ken Krahulec, Economic Geologist, Utah Geological Survey, Salt Lake City, UT**

**Abstract**

Utah’s 2016 nonfuel mineral production increased about 10% over 2015 to an estimated $2.8 billion. This includes about $1.2 billion in base metals, $0.2 billion in precious metals, and $1.4 billion in industrial minerals. Each of these three sectors increased in 2016, with the greatest percentage annual increase (25%) in precious metals due to both increased production and higher metal prices. The Bingham Canyon porphyry copper-gold-molybdenum-silver open pit remained the state’s premier nonfuel mineral operation with 2016 production valued at just over $1 billion. Other important metals include magnesium at over $300 million and beryllium at about $73 million. In 2016, Utah’s industrial minerals increased about $76 million. The most important industrial minerals are sand & gravel at $376 million, cement at $161 million, sulfate of potash at $159 million, salt at $147 million, sulfuric acid at $129 million, phosphate at $96 million, lime at $71 million, and crushed stone at $70 million. Utah’s nonfuel mineral production is expected to increase by roughly $170 million again in 2017.
MORNING SESSIONS | WEDNESDAY DECEMBER 6... (continued)

STATE & PROVINCE REPORTS (Part 1)... (Continued)


Abstract

Mineral exploration in Yukon experienced a significant turnaround in 2017. Exploration expenditures for the year are expected to exceed $CAN 100 million and development expenditures should exceed $CAN 63 million by year end. This is nearly double the 2016 levels! The resurgence in activity can be attributed to a number of significant deals by major mining companies in the past 18 months; starting with the Goldcorp buyout of Kaminak Gold Corp and its Coffee Project, as well as deals by Barrick Gold, Newmont Mining, Coeur Mining and Agnico-Eagle. The White Gold district continues to be active, but the new Selwyn Basin gold discoveries are attracting their fair share of attention, too.

In July, Victoria Gold announce that it had secured financing for the construction of the Eagle Gold Mine in central Yukon. On August 18, the company broke ground; they have been very active on site trying to get the earth works completed prior to freeze up.

The surge in the price of zinc over the past year is re-invigorating the base-metal explorers. BMC Minerals is progressing with the environmental assessment on the Kudz Ze Kayah volcanogenic massive sulphide (VMS) project. The Tom and Jason sedimentary exhalative deposits were acquired by newly listed Fireweed Zinc, and the company has conducted an aggressive exploration program in their first year. New life has been breathed into the Blende Mississippi Valley Type (MVT) deposit by Blind Creek Resources and the Mel MVT Deposit by Benz Mining. In October, Yukon Zinc announced it was working to develop a plan to re-start the Wolverine mine, a zinc-rich VMS deposit.

The Yukon Geological Survey (YGS) is focused on supporting the exploration and mining community. The YGS has been busy digitizing, compiling and posting legacy exploration data online as well as providing the regional geological framework to allow companies continued exploration success.

MINING IN SOUTH AMERICA

Chaired by: Rob Valceschini, P.E., Mining Group Lead, Geo-Logic Associates, Inc., Sparks, NV

Area of Interest - Mineral Deposits, Geology & Exploration

Session Description:

Mining in South America involves many variables and challenges including changing political regimes, socio-economic considerations, unique environmental considerations, high altitude, extreme rainfall, rugged terrain, high seismicity and project development logistics to name a few. Despite these challenges economic mineral deposits continue to be mined and developed. This session provides insight into how these many challenges are being addressed in today’s volatile metals market.

- Permitting, Logistics and Socioeconomic Experience in South America, Larry Morasse, Construction Manager, Barrick, Reno, NV
MINING IN SOUTH AMERICA... (continued)

- Seismic Design of Tailings, Heap Leach Pads and Water Storage Dams with Specific Emphasis on the High Seismicity Encountered in South America, Dr. Neven Matasovic, P.E., G.E., Principal Engineer, Geo-Logic Associates, Newport Beach, CA
- Mining in South America, South American Manager, AGRU America

GROWTH COMPANIES – Is Exploration Coming Back in Style?

Chaired by: Joseph Anthony Kizis, Jr., President & Director, Bravada Gold Corporation, Reno, NV

Area of Interest - Business & Finance

Session Description:

Exploration and mining companies are again thinking about growth now that the devastating multi-year downturn in the sector appears to be largely behind us. Those companies that survived are positioning themselves to take advantage of increased investor interest in their assets, and new companies are being formed to explore for and to develop mineral deposits. Exploration, particularly in safe jurisdictions like Nevada, is again being funded. You can’t find if you don’t look after all, and sooner or later that means sufficient funding to conduct drilling.

We will begin this session with a market perspective of what growth means to investors, and then several companies will present their plan to deliver growth to their shareholders.

- Trends in Exploration Financing, John Kaiser, Founder, Kaiser Research Online, Moraga, CA

Abstract

Since the emergence of National Instrument 43-101 in the wake of the Bre-X scandal in 1997 there has been a substantial expansion in the focus and degree of exploration activity conducted by exploration juniors. During the eighties and nineties the exploration focus was mainly on generating targets and drill testing them with the goal of making a new discovery. Exploration work was generally funded by secondary public offerings sold to retail investors during the eighties, when big discoveries such as Hemlo and Eskay Creek captured the public’s imagination. The funding mechanism shifted to private placements during the nineties as sophisticated investors and institutions were attracted by the scale of discoveries such as the Ekati diamond discovery, the Pierina gold discovery and the Voisey’s Bay nickel-copper discovery. Once a discovery became apparent the junior either farmed out delineation work to a major or was bought out by a major, often well before a resource estimate was published. During the five year bear market that followed 1997 a greater emphasis was accorded the “prospect-generator-farmout” funding model where a junior specialized in generating prospects whose target testing was funded by another major or junior which typically had the right to earn a majority interest in the project. The emergence of the super cycle in 2003, followed quickly by gold’s ascent to an eventual peak of $1,900 in 2011, which reversed the long term downtrend in real metal prices, spurred a shift from discovery exploration to demonstrating the feasibility

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of deposits found during past exploration cycles and discarded as sub-economic. The promise provided by higher trending metal prices lured unprecedented institutional capital into the junior sector to fund feasibility demonstration work on projects majority controlled by the juniors. The majors, in an effort to replenish depleting resources, resorted to buying out juniors with advanced projects. The combination of new supply mobilization and a lacklustre economic recovery after the 2008 financial crisis resulted in weak metal prices and a bear market for resource juniors from 2011 through 2015. During the bear market royalty and streaming deals emerged as a popular mechanism for funding ongoing feasibility demonstration work on advanced projects still owned by juniors. Discovery exploration by juniors, effectively in a bear market since 1997 with a few isolated exceptions such as Eleonore, Frutta del Norte and Borden, ground to a halt during the 2011-2015 bear market. The majors had their fill from acquisitions of the prior decade, and reduced their own exploration focus to mine-site or brown-fields work. Structural changes in the financial sector such as the “client relationship model” curtailed the role of brokers as a gateway of risk capital to the juniors from both retail and accredited investors while institutional investors could not justify holding positions in juniors with tiny market capitalizations. The “prospect-generator-farmout” model was dead due to lack of interest from majors and the absence of a retail market for juniors interested in farming into the projects of other juniors. A key factor in the rising retail aversion to discovery exploration juniors was the realization that new rules allowing short-selling on a down-tick was destroying the function of the market as a price discovery mechanism for exploration plays. The market’s waning interest in the “optionality” trade, namely the belief that higher metal prices will pull marginal deposits into the money, spawned a focus in 2016 on re-thinking marginal systems through new discovery exploration funded by institutional capital, of which Osisko’s Windfall is the leading example. At the same time producers embraced a new funding model whereby they bought 19.9% equity stakes in juniors with district scale exploration projects. While they secure rights to maintain their equity percentage, they do not secure project earn-in rights. The junior benefits from technical advance and the endorsement perceived by other investors. This strategy allows majors to capitalize their “exploration expense” and diversify their exposure among different juniors. But it has not solved the problem of funding for juniors trying to generate targets for grassroots or conceptual exploration that can lead to brand new discoveries, discoveries which more likely than not will be “blind” or “under cover” and thus require considerably more capital to generate a drill target. The solution to this funding problem lies with enabling retail investors to invest directly in exploration juniors without relying on the brokerage industry and to better understand the “size of the prize” the junior hopes to deliver as a new discovery. Canadian security commissions have taken a tentative step in allowing retail investors to participate in private placements. The other problem, which involves doing “back of the napkin” economic geology about the potential outcome, something done by the juniors internally but which they cannot share with the public until backed by a 43-101 report, needs to be solved in order to attract a robust retail market to the exploration juniors. One solution under development is a crowd-based online platform which allows anonymous “untrusted” individuals to visualize the economic value of a potential outcome and share it in a public space for others to critique. The ability to evolve an influential reputation in a competitive social eco-system would discourage individuals from sharing
implausible scenarios. Such “shared outcomes” can be changed anytime to reflect new information and automatically update to reflect current metal prices. Given a universe of 2,000 ASX and TSX/TSXV listed juniors whose disclosures are governed by the 43-101 and JORC reporting standards, populated with 3,000 plus projects, such a crowd-based system would serve to channel global investor interest into the resource juniors, rapidly educate investors about geology and mine economics, and function as an efficient risk capital allocation mechanism that bypasses the shrinking brokerage sector funding gateways. The presence of an externalized outcome expectation range with a consensus valuation would not only help investors manage their “bets” on a multitude of exploration projects, but it would also limit the destructive downward bias of algorithmic trading in the resource junior market. It would also offset what many regard as the stifling effect of reporting standards by turning these “events” into arbiters as to who among the crowd was closest to the outcome.

- **Profitable Growth Through Consolidation of Three Mines and A Mill in Northern Nevada,** Brian Morris, Senior Vice President, Exploration, Klondex Mines Ltd, Reno, NV

**Abstract:** Klondex Mines Ltd. was founded in 1975 after acquiring the Fire Creek property, located in Lander County, Nevada. Over the next 40 years, several exploration programs were conducted on the property primarily focused on evaluating the potential for a shallow open pit resource.

In 2004, a shift was made in exploration to focus on deep feeder structures looking for the presence of high-grade epithermal veins. The exploration model was successful with the discovery of a bonanza-grade vein system. In April 2011, underground development was initiated to establish underground platforms to continue exploration and definition drilling.

In 2012, a significant transformation in the executive management of Klondex occurred with the appointment of Mr. Paul Huet as the corporation’s President and CEO. At that time, Klondex had a market cap of approximately $35M, was burdened with debt and was essentially insolvent. Mr. Huet had a clear vision to move the corporation forward to a niche class of mining. His strategic vision of consolidating properties in Nevada, to be serviced by one centralized mill, was realized with the purchase of the Midas mine and mill facility from Newmont in February 2014. This strategy continued with the acquisition of the Hollister mine in October 2016. The result was to create tremendous synergies and operational flexibility. Three producing operations, filling one central mill. The consolidation of this group of assets had been discussed within the industry for many years, however, until now, it had never successfully been executed.

An opportunity to replicate this Nevada business model to Canada surfaced in January 2016, with the purchase of the True North mine and mill facility in Bissett, Manitoba. This strategy continues to evolve with the recently announced acquisition of Bison Gold Resources Inc. (Bison) including the Ogama-Rocklands property 20 km south east of the True North milling facility. Bison’s Ogama-Rocklands 43-101 technical report (2013), provided an inferred resource estimate of 337,000 Au ounces, with a grade of 8.17 g/t. Klondex intends to continue developing this resource with the objective to process future ore at its nearby True North mill facility. This transaction secures another source of ore feed for the True North mill, again providing essential operational flexibility and optionality, similar to our strategy deployed in Nevada.

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A fundamental component of this successful business model entails building a management team with demonstrated career experience in mining and exploration of narrow vein systems. This unique knowledge and experience is directly contributing to increasing resources for sustainable development. Our business model of supporting company growth through maximizing our assets is leading to improved efficiencies across all operations. Klondex has grown rapidly since 2012 and is on track to achieve its 2017 production guidance of 225,000 Au equivalent ounces, from production of 107,860 Au equivalent ounces in 2014.

Moving forward, the Company is focused on organic growth. With exceptional exploration potential at all of its properties, a talented and focused management team, and strong operating cash flows from its existing operations, the Company is well positioned to continue its path of becoming a profitable mid-tier gold producer.


**Abstract:**

- Targeting near-term +100 increase to gold production
- Delivering a growth profile of low-cost, high-margin production
- Demanding high-returns on owner invested capital
- Distributing monthly dividends to maximize total return to owners
- Six consecutive years of profitability and organic growth (2011 - 2016)

Gold Resource Corporation is a shareholder focused Precious Metal Producer. Current operations at our Oaxaca (Mexico) Mining Unit have successfully returned over US $110M in dividends to shareholders since initiating commercial production in 2010. With a positive cash balance and no burden of debt, we sought to invest in a second favorable mining jurisdiction and chose Nevada through the Company subsidiary GRC Nevada Inc. Our goal is to diversify and expand the Company’s growth profile. In less than two years of undertaking evaluation and acquisition (coinciding with a downturn in precious metal markets), the Company has secured four (4) high-grade gold properties with 100% ownership interest in three and an option to acquire 100% interest on the fourth.

Our approach in Nevada is a consolidated effort of acquiring closely situated properties where we aim to utilize a synergistic mining approach with shared equipment, facilities, management and lower capital expenditures (CAPEX), while benefiting from excellent proximity to infrastructure. Our initial goal in Nevada is to attain annual production of ~40,000 ounces of gold for a minimum of ten (10) years and to grow from there. We are currently advancing our flagship Isabella Pearl property towards production, which is on track for development and production in 2018 (subject to permit timing, funding and construction timeframes) with an estimated mine life of at least four (4) years. Our Company has a unique corporate strategy of acquiring, developing and operating projects that have the potential to rapidly return the initial capital required to put them into production.

The Company’s Aguila Project in Oaxaca, Mexico generated US$36M in mine gross profit during the first 12 months of commercial production, with initial capital required to put
the project into production at US$34M. We aim to continue our return on capital metric standards, lean-cost and cash-positive approach with our Nevada Mining Unit. Our Nevada land position consists of 27,000 acres spread over four properties located in the central Walker Lane Mineral Belt where we are focused on high-grade gold open pit heap leach opportunities. Currently our portfolio includes Isabella Pearl (191,000 Oz Au P&P at 2.18 g/t Au average), Mina Gold with 1.6 Million Tonnes @ 1.88 g/t Au average (historic 3rd party estimate), and the East Camp Douglas and Gold Mesa (formerly Clay Peters) exploration stage properties. All our Nevada properties have surface or near surface high-grade gold and warrant further exploration and development.

- Paramount Gold Nevada Corp.; Unlocking Value through Acquisition and Enhancement of US Gold Properties, Glen Van Treek, President, CEO, Director, Paramount Gold Nevada Corp., Winnemucca, NV

Abstract: Paramount Gold Nevada Corp. (“Paramount”) is an emerging growth company, formed through the spin-out of Nevada properties following Paramount Gold and Silver Corp’s merger with Coeur Mining in 2015. Soon after listing on the NYSE American: PZG, Paramount completed the acquisition of Calico Resources USA Corp (“Calico”) and its high-grade Grassy Mountain property in mid-2016, which was followed by the initiation of the Prefeasibility Study (“PFS”). Paramount is focused on advancing its high-grade Grassy Mountain project (“Grassy”) to production, and then plans to use the cash flows from the operation to advance its Sleeper deposit in Nevada.

Grassy Mountain has a Preliminary Economic Assessment (“PEA”) with an M&I resource of 1.7 million ounces of Au, located on private land in Malheur County, eastern Oregon. The PFS, initiated in August 2016, will focus on the high-grade underground resource. Studies have begun on the resource, metallurgy and process methods, geotechnical characteristics (underground and facilities), hydrology, mining and infrastructure.

A thirty hole, drilling program was completed using RC collars and core tails. The program was planned to better define underground economic mineralization, acquire material for metallurgical optimization and comminution testing and geotechnical studies for rock characterization. The resource upgrade program was successful and was followed by the drilling and completion of monitoring wells to define the hydrological model. Assays have been received for all drilling, confirming the high-grade mineralization. Some of the gold intercepts encountered are: 47.5 m (140 ft.) @47.5 g/T in GM16-02; 38.7 m (127 ft.) @10.3 g/T in GM17-10; 29.6 m (97 ft.) @6.15 g/T in GM17-18; 31.1 m (102 ft.) @6.09 g/T in GM17-26. An updated resource will be incorporated as part of the PFS, which is expected to be completed in the first quarter of 2018.

Metallurgical/Processing studies are being completed by Ausenco. The historic metallurgical studies at Grassy indicated approximately 95% recovery using a combination of gravity separation and CIL of gravity tails, electrowinning recovery, and cyanide detoxification. Further metallurgical/process studies are in progress to refine the flowsheet and the most efficient grinding size. Geotechnical studies for the underground operation are in progress and being completed by Golder. Studies include rock stability, rock quality, preferred mining methods and the requirements for backfill. Additionally, Golder is completing the Tailings Site Facility design, and the required geotechnical studies associated with all of the site facilities. SPF Water Engineers is working on the hydrological model for incorporation into the mine plan and at the request of State Regulators. MDA is working on the mining model, along with infrastructure and water requirements.
The Oregon State Regulations ("OAR") which govern mining in Oregon define the Department of Geology and Mineral Industries ("DOGAMI") as the lead agency in the Consolidated Application process, with cooperating State Agencies (ODEQ, ODFW, OWRD, OSHPO, etc.), Malheur County and Federal Agencies (BLM, EPA, etc.) as partners. Calico Resources USA Corp is a wholly owned subsidiary of Paramount and continues to be the operating company at Grassy Mountain. Calico initiated the permitting process in 2012 and following the purchase by Paramount, activities accelerated. A new Notice of Intent ("NOI") was submitted to DOGAMI, followed by Baseline Data Collection Work Plans and Work Plans for all activities that occur within the Permit Area defined in the NOI. Baseline data collection is in progress, with all seasonal work complete. The Plan of Operations ("POO") was submitted to the BLM, and HDR, Inc, the contractor chosen by the BLM to complete the Environmental Impact Statement ("EIS"), has commenced work on the EIS. Paramount's PFS work was based on the existing PEA, which envisions a 1,000 tpd underground operation with an average head grade of 5.35 g/T Au, that will produce in excess of 50,000 ounces of gold plus silver credits per year, during a nine-year mine life.

The Sleeper Project consists of a district-scale land package in north-central Nevada, which includes the historic high-grade Sleeper Mine and over 15,500 hectares (38,300 acres). The PEA was completed in 2015 which defined the following: 1) M&I resource of 3.4M oz Au and 30.8M oz Ag @ 0.36 g/T Au and 3.3 g/T Ag; 2) 9 year open pit heap leach operation; 3) CapEx of $175M; and 4) Life of Mine cash operating costs of $529. The PEA recommends additional metallurgical studies and drilling to convert the resources into reserves. Currently, State-required environmental compliance activities are ongoing.

Both Grassy Mountain and Sleeper have excellent potential for discovery of additional mineralization. Defined expansion targets plus additional targets within the large land packages have been targeted using geologic mapping, rock and soil sampling, and geophysical methods.

Paramount Gold aims to reduce corporate risk by focusing on: 1) Location—US only; 2) Mid to Advanced Stage Projects; 3) Strategic, industry-focused major stockholders; 4) Industry-Experienced Management and Board; and 5) Quality Projects. We believe that Grassy Mountain and Sleeper fit well within those objectives. Paramount is always looking for quality properties that fit our objectives.

- **Contact Gold - A New Look at the Pony Creek Project, Southern Carlin Trend, Matt Lennox-King, President/CEO, Contact Gold Corp., Vancouver, BC, CANADA**

**Abstract:** Contact Gold is a new Nevada gold exploration company that listed on the TSX-V exchange in June of 2017. Our team is comprised of veteran geologists and venture capitalists with a successful track record of discovering ore bodies and raising capital. Contact’s land position in Nevada totals 281 square kilometers, hosting numerous known gold occurrences; from early exploration to resource definition stage. Our current focus is on the Pony Creek, Dixie Flats, and North Star projects which cover 127 square kilometers of wholly owned, unpatented mining claims on BLM ground on the southern Carlin Trend between the Railroad-Pinion and Bald Mountain districts where significant, new discoveries and resource/reserve additions have recently been announced.

Significant gold mineralization was discovered by drilling in the 1980’s at Pony Creek and Dixie Flats, including a Newmont drill hole that returned 2.88 g/t over 99m at Pony.
Contact Gold... (continued)

Contact act has a large database from this previous work including data for over 200 drill holes, rock and soils sampling, geophysical surveys and surface mapping.

Our 2017 exploration program includes plans for 8,000 meters of shallow RC and deep core drilling, detailed mapping and soil and rock sampling. Exploration will target, in particular, the Pennsylvanian/Permian overlap sequence that was ignored by previous explorers, as well as the traditional target at the top of the Devonian Devil’s Gate Limestone.

- **Riverside Resources- 2018 Outlook and Catalysts- Growing through innovation, partnership and focus, John-Mark Staude, President/CEO, Riverside Resources Inc., Vancouver, BC, CANADA**

**Abstract:** Riverside Resources has succeeded over the past decade to generate a portfolio of royalty assets, open pit high quality precious and base metal assets, and seeded the development of over 8 new companies while continually gaining partner funding of more than double Riverside’s self investment. This has allowed the Riverside company to grow and the approach will be discussed in the talk. For the coming 2018 year, Riverside will have partners drilling for gold, silver, copper both at a discovery and resource level. Riverside has a broad shareholding in partner companies where Riverside, through an active management business approach, works to acquire quality assets, add significant high value exploration and idea generation, then partner for drill testing and further de-risking. Riverside retains a royalty, cash and share ownership, and in most cases a property ownership through providing turn key technical services and on the ground, on site operational expertise.

Riverside has a focus on metals that can fit with the growing world demand and in this presentation Riverside CEO, John-Mark Staude, will touch upon world metal demand outlooks, supply shortages, rarity of new discoveries, and the focus it takes to come up with and own the best quality assets. Riverside focuses in western Mexico, USA and Canada as it strives to generate the resources that can feed into the growing Asian marketplace.

Riverside is a publicly traded on the Canadian and USA stock exchanges and continually seeks new projects, as well as finding partners for its existing assets, as Riverside aims to grow in partnership with other like-minded value-generating management teams and well funded companies.

**UNDERGROUND TECHNOLOGY AND INNOVATIONS TO OPTIMIZE EFFICIENCIES**

Chaired by: **Ian McMullen, Klondex Mines Ltd., Reno, NV**

**Area of Interest - Operations**

**Session Description:**

The aim of this session is to align selected mining methods, reflecting current ore control and modeling practice, with applicable mining technologies where doing so enhanced profitability by maximizing value through improved grade, minimal dilution, and protection of costs. Presentations should include any relevant experiences, applicable real world solutions, and clearly demonstrate current or future efficiencies associated with mining method selection.

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UNDERGROUND TECHNOLOGIES... (continued)

- **Auxiliary Ventilation Best Practices for Optimized Underground Operations, Pedram Rostami, PhD, CAPM, Project Manager, Stantec, Tempe, AZ**

  **Abstract:** This presentation provides a summary of common practices and solutions observed in various mining operations that benefit auxiliary ventilation planning and design in underground metal mines. Main topics identified in this presentation include the following three areas: ventilation ducting, auxiliary system arrangements, and implementation and maintenance. These areas were further investigated to establish common best practices, as shared by a veteran mine manager and ventilation engineers. This presentation outlines these best practices to assist ventilation engineers, technicians, and operational managers with day-to-day operational challenges.

- **Installation of a Thin Spray-on Liner Ground Support System at the Cote Blanche Mine Production Shaft, Greg Sutton, Project Manager, Cementation USA Inc., Sandy, UT**

  **Abstract:** The Cote Blanche Mine is a major producer of salt located on the Gulf of Mexico in southern Louisiana, and is owned by Compass Minerals.

  Following a rigorous internal review of safety systems throughout the company, in this case a remedy was sought to mitigate risks associated with unlined portions of the shaft. Compass Minerals made a decision in 2015 to install a thin spray-on liner ground support system in the unlined portion of the shaft.

  Compass Minerals entered into agreement with Cementation USA to complete the work, which included engineering and fabrication of work decks to fit the existing configuration, cleaning the walls, spraying the liner material and installing the rock bolts.

  This presentation will discuss the challenges and successes that went along with this innovative new shaft liner system installation including scheduling, coordination, methodology, and includes the final results of the project. Other potential applications for this support system in the mining industry will be discussed as well.

- **GeoShack, Dan Hendriks, VP Sales - Mining Group, GeoShack, Dallas, TX**

  **Abstract:** The traditional system of monitoring and control of a mining operation consisted of truck counts, spreadsheets, unknown activities by non-visible equipment, operator perception and often intuitive decision-making processes.

  With the advent of automatic, real-time data acquisition, much of this system has changed. We now have a bird’s eye view of the entire operation and observe the vital statistics of every activity within the mine.

  Critical machine data can be pulled from a wide range of vehicle types and vendors in real-time to a single source for reporting and display.

  - If a circuit is over-trucked while another circuit has a hanging excavator, resources can be redirected immediately.
  - Trucks communicate their real-time payload during the loading process to the excavator so that payload targets can be achieved.
  - Machine health data is transmitted in real-time to warn of impending breakdowns. It is now possible to observe temperature increases of a $50,000 tire and pull the truck out of a circuit before the tire fails.
Mining companies take advantage of real-time data from multiple sources and sensors to give them a competitive edge in today's demanding market.

- **Re-Thinking Grade Control in Narrow Vein and Other Highly Selective Underground Mine Situations**, Donald Eugene Cameron, Principal Cameron Resource Consulting, LLC, Liberty Lake, WA

**Abstract:** Highly selective underground operations, generally mining veins or narrow strata, require the highest geologist/ore tonne ratio of any mining scenario. Some computer-assisted mine mapping packages have been introduced in the last two decades, but there has been an absence of practical and holistic solutions for daily grade control. Production geologists really need simple and cost-effective tools that improve quality and efficiency of sampling, data management, data analysis and reporting, not only mapping. An important benefit of applying appropriate new technologies is a leveling of organizations and higher collective knowledge. For grade control data collection, inexpensive and user-friendly tablet software is replacing paper, resulting in lower license and maintenance costs and higher database integrity while preserving a workflow that includes tried-and-true scaled geology sketches and photos. Face Manager is software for calculating face grades, production grades and tonnages and reports. Examples of methods and equipment for chip sampling and drilling, both old and new, are discussed in the context of quality, efficiency and practicality. Sample support, geologic controls and sample integrity should be synchronized across mine sampling, drilling, core logging and face mapping as much as possible. Ore control methods must consider operational impact and sequencing, while at the same time the quantity and cost of sampling should be secondary to sample quality and sampling density. Continual cost and periodic commodity price pressures will drive further innovation in grade control methods and perhaps revive a few of the best practices used in the past.

**BASELINE SUCCESS: The Path to Efficient Permitting**

Chaired by: Benjamin Veach, P.E., Principal, Stantec Consulting Services, Inc., Reno, NV

**Area of Interest - Environmental**

**Session Description:**

State and Federal permitting requirements continue to change throughout the mining life cycle. The costs of Exploration, Mining, and Reclamation are tied to complex schedules and require a comprehensive approach to properly manage the expenditure of increasing amounts of capital.

This session is designed to explore current topics and to discuss impacts to schedules from the paradigm of environmental and cultural aspects of permitting in mining. The various elements from the Plans of Operations through NEPA permitting and on to Reclamation for both mines and exploration projects will be discussed. Meet the people that can explain current Sage-grouse rules in plain English. Hear how experts compete for internal capital to balance schedules with the costs of permitting. Gain insights from the regulatory perspective that see things work as they should.

- **Baseline Groundwater as a Foundation on which to Build a Successful Permitting Action**, Rachael Peavler, MS, Hydrologist and NEPA Specialist, MWH Global, Salt Lake City, UT

(continued on next page)
Abstract: The development of a new project or a new project phase is exciting and often complex. It involves multiple stakeholders, financial considerations, and technical specialists. It is normal to focus on the end goal and the immediate steps that need to be taken to achieve that goal. It also may be easy to envision what that end goal will look like when the project is complete as well as measure the future benefits of meeting that goal. It is generally difficult, however, to plan for the more elusive project components whose benefit is less self-evident. Sometimes, the immediate steps, such as collecting baseline groundwater characterization groundwater data, can easily be forgotten or postponed. But just like the sewer pipeline in your house, you will be happy to have it. Conducting groundwater data collection and evaluation in the early phases of a project will likely save project costs and will certainly save time related to permitting, assessing risks, and planning for environmental mitigation systems. Strategies for conducting baseline groundwater data collection and an example of a successful case study are highlighted in this presentation.

- **Greater Sage-grouse: Baseline and Mitigation Requirements Post ARMPA**, Christopher Jasmine, Rangeland Ecologist, Newmont Mining Company, Elko, NV

Abstract: Implementation of the Nevada and Northeastern California Greater Sage-grouse Approved Resource Management Plan Amendment (ARMPA) has been challenging for all involved. Through various projects, Newmont has developed experience and perspective on navigating aspects of the ARMPA.

This process has proven to be challenging with many unknowns as project proponents move through the process. There are several options for management and mitigation, and all have their advantages and disadvantages. Newmont will share its views on what is working for them and how they are navigating the mitigation framework for Greater Sage-grouse. This presentation will include information on Newmont’s Sagebrush Ecosystem Conservation Program including proponent driven mitigation options and how Newmont is using the Nevada Conservation Credit System (CCS) on their mine and ranch properties. Discussion includes challenges, opportunities, strategies, and options for assessing project debits and developing credits before and during National Environmental Policy Act (NEPA) analysis of a proposed action. Attendees will learn how to address sage-grouse management and mitigation for their own projects and how others within the mining realm are currently using the CCS with regards to Greater Sage-grouse mitigation.

- **Navigating Cultural Resource Baseline Studies; Implementing Section 106**, Jason Spidell and Barbi Malinky Harmon, Kautz Environmental Consultants, Inc., Reno, NV

- **Baseline Studies, Success and Failure**, Mark Hall, PhD, Field Manager, Winnemucca District, Bureau of Land Management, Winnemucca, NV

- **Secretarial Order 3355 for Streamlining NEPA: Application for Mining and Exploration Projects**, Michele Lefebvre, PhD, NEPA Project Manager, Stantec, Keaau, HI

Abstract: The Secretary of the Interior published Secretarial Order (S.O.) No. 3355 to “enhance and modernize the Department’s NEPA processes, with immediate focus on bringing even greater discipline to the documentation of the Department’s analyses and identifying opportunities to further increase efficiencies.” S.O. 3355 identifies directives for infrastructure projects including page limits, timelines, and other review streamlin
Secretarial Order 3355...(continued)

ing processes for NEPA reviews conducted by the Department of the Interior (DOI). S.O. 3355 was issued on August 31, 2017, in response to Executive Order 13807 which was issued on August 15, 2017. Applications of these directives to mining and exploration projects on DOI projects will be considered. How will these directives be implemented? Are agencies applying these directives to non-infrastructure projects? Will these apply to projects where NEPA has already been initiated? Will other agencies follow? Are there potential risks/advantages of applying these directives? Although the answer to these questions are not yet clear, this talk will discuss implications and strategies to minimize risks as well as present ideas for streamlining the NEPA process for mining and exploration projects on public land.

BEFORE YOU DIG: Talk to your Landman!

Co-chaired by: Cathy Suda, Manager, US Land & Assets, Teck American Incorporated, Spokane, WA and Tracy O. Guinand, Professional Consultant, Tracy Guinand Land, LLC, Reno, NV

Area of Interest - Legislative & Public Affairs

Session Description:

It takes more than just locating your claims to conduct mineral exploration and development. This session, developed with assistance from the Nevada Landman’s Association, will provide overviews of importance for surface access and use of land, water law, joint venture agreements and other requirements for claim holders.

- Surface Access and Use for Mining Projects on Federal Lands, Wells Parker, Partner Energy & Natural Resources and Ben Machlis, Partner Regulatory Affairs Group, Dorsey & Whitney LLP, Salt Lake City, UT

Abstract: A mineral deposit is only valuable if it can be accessed and developed. Securing and maintaining sufficient surface access and use for exploration, development and operations is critical to the economic viability of any mining project. In most active mining states, the largest surface owner is the Federal government, so nearly every mining project will require access over and use of Federal lands. This presentation will provide a primer on obtaining surface access and use rights over Federal public lands for resource development. The presentation will specifically address surface access to and over unpatented mining claims and federal mineral leases located on BLM and Forest Service lands, access over and across severed surface estates that contain Federal minerals (split estate lands), and FLPMA rights of way.

- Water Law, Jeff Faillers, Attorney at Law, Harris, Thompson & Faillers, Reno, NV

- The Good The Bad and the Ugly-- The Benefits and Burdens of Mining Claim Ownership on Federal Lands and Associated Environmental Risks (CERCLA and more), Joshua Cook, Partner, Energy, Environment & Natural Resource, Crowley Fleck PLLP, Billings, MT

Abstract: This presentation covers the advantages and risks that come with owning mining claims on public lands, from the historic benefits intended under the General Mining Law, and the process of self-initiating your own mineral rights, to the changes and

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approaches taken by government in recent years. In addition to covering the upsides of mining claim ownership, including extralateral rights, access rights, and ancillary rights associated with tunnel sites and mill sites, this presentation will cover the downsides and risks associated with holding such property interests today. Central to the risks currently associated with mining claim ownership are possible consequences associated with being labeled a “potentially responsible party” under CERCLA, and the precautions mining claimants should take before locating claims over historic mine properties. The Tenth Circuit case of Chevron Mining v. United States of America, issued this past July, is a game-changer from an environmental liability perspective, but mining claim owners should know how this case affects them and their dealings with federal agencies.

• Joint Venture Agreements Now, John Katchen, Of Counsel, Holland and Hart, Anchorage, AK

Abstract: A fundamental question facing mineral developers and investors centers on how to structure the deal and govern the relationship between co-venturers or partners. Historically, mining companies have elected to organize as a joint venture. While joint ventures have withstood the test of time, they have been found wanting by some. In more recent years, companies have elected to organize as limited liability companies. This talk will contrast JVs and LLCs and discuss recurring issues related to management and control, insolvency, liability, abandonment responsibilities, dispute resolution, and respective duties by the parties under JV agreements and LLC agreements.

AFTERNOON SESSIONS | WEDNESDAY DECEMBER 6
SESSION TIMES: 2:00 - 5:30  COFFEE BREAK 3:35 - 4:20

STATE & PROVINCE REPORTS (Part II)
Chaired by: Rich Perry, Administrator, Nevada Division of Minerals, Carson City, NV
Area of Interest - Mineral Deposits, Geology & Exploration

Session Description:
Want to hear MORE about exploration and mining activities for the past year in western states and provinces? In this all-day session, state and province economic geologists will provide an update on the latest activities in their respective areas, and discuss new opportunities for exploration and mineral development.

• Mining Issues Facing New Mexico in 2017, Virginia McLemore, Senior Economic Geologist, New Mexico Bureau of Geology and Mineral Resources, Socorro, NV

Abstract: New Mexico’s energy and mineral wealth is one of the richest endowments of any state in the United States. For example, in 2015 New Mexico ranked in production: 8th in the nation in natural gas production (1.23 trillion cubic feet, MFC. ~$6.5 billion), 6th in crude oil (147 million barrels, ~$7.1 billion), 12th in coal (20 million tons, $691 million), 2nd in copper (397 million pounds, $997 million) and carbon dioxide (106 billion cubic feet, $112 million), and 1st in potash (1.4 million tons, $491 million) and zeolite and perlite production. New Mexico has significant reserves of natural gas (14.4 trillion cubic
Mining Issues - New Mexico... (continued)

feet) 4th in crude oil (1,486 million bbls), uranium (64 million tons ore at 0.14% \( \text{U}_3\text{O}_8 \) or 179 million lbs \( \text{U}_3\text{O}_8 \) at $50/lb), coal 167 million short tons of recoverable reserves, potash (>522 million tons) and other commodities.

Some of the mining issues facing New Mexico in 2017 include legacy issues of past mining activities form negative public perceptions of mining. These issues involve physical hazards, including open shafts, adits, unstable slopes or back (roof) and environmental issues. Some inactive mines have the potential to contaminate the environment or present a hazard to health and safety. Lower commodity prices results in closed mines and little exploration. In many areas conflicts arise between mining and other activities, especially over water rights. Coal production is expected to continue to decline, which will result in decreased revenues and laid-off workers. There is a shortage of young geologists and engineers to explore for, develop, mine, permit these commodities and evaluate their effect on the environment—math and science skills are critical.

New Mexico is responding by teaching students about the mining industry and issues. NMBGMR with other universities and state agencies are cooperating and forming a monitoring program of the Animas River watershed and the potential effects to New Mexico. NMBGMR and NM Tech is working with the state and federal AML (abandoned mine land) programs to evaluate other areas in New Mexico for potential environmental concerns. NMBGMR with other universities and examining environmental issues with uranium mines in NM (New Mexico’s Experimental Program to Stimulate Competitive Research, NM EPSCoR).

• **Gold in the Selwyn Basin: more than just a base-metal province**, Patrick Sack, Economic Geologist, Yukon Geological Survey, Whitehorse, YT, CANADA

• **Nevada Mineral Exploration Update**, John Muntean, Director, Center for Research in Economic Geology, Nevada Bureau of Mines and Geology, University of Nevada Reno, Reno, NV

**Abstract:** In 2016, Nevada led the U.S. once again in value of non-fuel mineral production at $7.65B. Nearly 90% of value came from the production of nearly 5.5 million ounces of gold in 2016. Barrick and Newmont accounted for 78% of the production. Other significant commodities produced in Nevada include copper ($371M), silver ($152M), aggregate ($298M), diatomite ($44M), gypsum ($37M), limestone ($34M), and barite ($22M). Nevada is the only source of domestic lithium production, totaling $23M value in 2016. Active mining claims at the end of 2016 totaled 180,032, compared to 171,930 at the end of 2015. Gold exploration remained flat in 2016 with a minimum of 55 projects drilled in 2016 compared to 64 in 2015. The number of projects drilled by major companies nearly equaled the number of projects drilled by junior companies, the first time in over a decade. Most projects by majors were brownfields, including Cortez Hills/Goldrush (Barrick), Carlin trend (Newmont), and Bald Mountain (Kinross). Large exploration projects for gold being run by mid-sized junior companies include Marigold (Silver Standard) Pinion/Railroad (Gold Standard Ventures), Fire Creek and Midas (Klondex), Keystone (Nevada Gold Corp.), Cove (Premier Gold), and Eastside (Columbus Gold). Coeur carried out an aggressive drill program at it Rochester silver mine, the only drill project targeting silver. Only minor drilling for copper was undertaken in the Yerington district, and Nevada Zinc continued to drill shallow oxide zinc mineralization at its Lone Mountain project. After gold, lithium was the next commodity that received the most attention. Placer claims for lithium accounted for 46% of the 19,039 new claims staked

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Nevada Mineral Exploration... (continued)
in 2016, mostly near Clayton Valley in southwestern Nevada. Several projects were drilled in 2016 and 2017 by junior companies including Pure Energy Metals, Daijin Resources, Cypress Development, and Nevada Sunrise.

• **USGS Update**, Tom Crafford, Mineral Resources Program Chairman, US Geological Survey, Reston, VA

Abstract: The talk will be an update on the activities of the USGS’s Minerals Program.

• **Alaska’s Mineral Industry in 2017: Mine and Exploration Updates**, Mike Catsi, Business Development and Communications Director, Alaska Industrial Development and Export Authority, Anchorage, AK

Abstract: Alaska’s diverse metallogenic provinces, consistent ranking as a top area of the world for under explored mineral-resource potential, and world-class gold, copper, lead, zinc, and coal deposits continue to attract exploration capital. The Alaska government encourages resource development by providing new airborne geophysical surveys and geological datasets, AIDEA partnerships with private entities to finance infrastructure, and the Large Mine Permitting Team that coordinates permitting.

Exploration-stage projects are the primary driver of Alaska’s exploration expenditures in 2017. Significant drilling programs were carried out at the Aktigiruq, Bornite, Donlin Gold, Golden Summit, Groundhog, Herbert Gold, Palmer, Pyramid, Sam, Shorty Creek, Tetlin, Stellar, Unga, and Valdez Creek properties. Surface sampling and geologic evaluations were conducted at ~10 other exploration projects. The Arctic, Graphite Creek, Livengood, and Willow projects are being advanced through PFS or PEA studies, and Donlin Gold initiated permitting.

Mining companies prioritized exploration efforts in and around active operations to maximize discovery success. Kensington mine is focusing on potential resource conversion and expansion within the Main ore body and nearby Raven vein, as well as defining the high-grade Jualin deposit discovered in 2015. Pogo is mining their new East Deep zone and investing in discovery and delineation of additional nearby gold zones. Green’s Creek has yet again succeeded in replenishing resources to maintain their 10-year mine-life. Red Dog mine has enough reserves to last more than a decade and nearby deposits likely will add to the mine’s life. Progress is being made to reopen the Nixon Fork gold mine, and Usibelli coal mine continues to supply Alaska power plants.

**CRITICAL MINERALS FOR TECHNOLOGY AND ENERGY: EMPOWERING COMMUNICATION AND CONVENIENCE**


**Area of Interest - Mineral Deposits, Geology & Exploration**

**Session Description:**
This session will focus on presentations that describe the upstream and downstream “life cycle” (geology, production, consumption, material flow, recycling) of critical and
small-market mineral commodities. The focus will be on commodities that may not be as well known, but are important for manufacturing, technology and energy applications. Many of these commodities reappear periodically in industry exploration marketing campaigns when upstream supply chain disruptions occur. Exploration groups pursuing capital to explore for these lesser known commodities are often viewed as chasers of the “commodity of the month,” yet when successful in entering the market these commodities can provide long term stability for the downstream part of the supply chain.


Abstract: Cobalt (Co) is a potentially critical mineral. The vast majority of cobalt is a by-product of Cu and/or Ni production. Cobalt is increasingly used in magnets and rechargeable batteries. More than 50% of primary Co production is from the Central African Copperbelt (CACB). The CACB is the only sedimentary rock-hosted stratiform copper district that contains significant cobalt. Its presence may indicate significant mafic/ultramafic rocks in the local basement. The balance of primary Co production is from magmatic Ni-Cu and Ni laterite deposits. Cobalt is present in several carbonate-hosted sediment-hosted deposits in back arc and rift environments associated with mafic/ultramafic rocks. Metasedimentary Co-Cu-Au deposits (e.g. Blackbird, ID), IOCG deposits, and the Five Element Vein type of deposits (e.g. Cobalt, Ont.) contain varying amounts of cobalt. None of these deposit types show direct links to mafic/ultramafic rocks; the deposits may result from crustal-scale hydrothermal systems capable of leaching and transporting Co from great depths. Hydrothermal deposits associated with ultramafic rocks, typified by the Bou Azzer district of Morocco, represent a primary cobalt deposit. The talk will examine the possibility for different styles of cobalt deposits within the United States.


Abstract: Two minerals, bertrandite and beryl, are necessary to ensure a stable supply of high-purity beryllium metal, alloys, metal-matrix composites and beryllium-oxide ceramics for industrial applications. Bertrandite from the volcanic-related Spor Mountain deposit, Utah, is currently the sole U.S. source of beryllium; beryl is derived mainly from pegmatite-related deposits of Brazil, China, Madagascar, Mozambique, and Portugal. High-purity beryllium metal is classified as a strategic and critical material by the U.S. Department of Defense because it is used in products that are vital to national security. For example, beryllium metal composites, which combine the fabrication ability of aluminum with the thermal conductivity and highly elastic modulus of beryllium, are ideal for producing aircraft and satellite structural components that require a high stiffness-to-weight ratio and low surface vibration. And, beryllium-oxide ceramics are used in missile guidance systems, cell phone transmitters, and are critical to medical technologies, such as magnetic resonance imaging (MRI) machines, lasers, and portable defibrillators. The U.S. has been the dominant supplier of beryllium to global markets since the opening of the Spor Mountain mine. New studies are underway by the USGS to better understand the geologic setting and geochemical processes that formed the world-class deposit at Spor Mountain and the global impacts of potential changes in material flow.
The U.S. is expected to remain self-sufficient with respect to most of its beryllium requirements. The U.S. is one of only three countries that currently process beryllium ores and concentrate them into beryllium products. Identified resources of beryllium worldwide have been estimated to be more than 80,000 metric tons. About 65 percent of these are in U.S. resources of bertrandite, and the rest are in resources of beryl in other countries. World beryllium reserves are not sufficiently well delineated to report consistent figures for all countries.

Gallium is dispersed in small amounts in many minerals and rocks where it substitutes for elements of similar size and charge, such as aluminum and zinc. At the present time, gallium metal is derived mainly as a byproduct of the processing of bauxite ore for aluminum as it occurs in low amounts (~50 ppm) in diaspore-boehmite and gibbsite. Lesser amounts of gallium metal are produced from zinc residues left over in the processing of sphalerite ore from three main deposit types (sediment-hosted, Mississippi Valley-type, and volcanogenic massive sulfide). Gallium technologies have large power-handling capabilities and are used for wireless infrastructures, cable TV transmission, power electronics, and satellites. Gallium is used in integrated circuits containing either gallium arsenide (GaAs) or gallium nitride (GaN). Smartphones are the leading end use of all GaAs applications. GaAs is also used in the manufacture of optoelectronic devices (LEDs, photo detectors, and solar cells), which are important for aerospace and telecommunications applications and medical equipment, and for defense applications requiring high-performance computers. Uses for advanced GaN-based products are expected to increase in the future because GaN power transistors operate at higher voltages and with a higher power density than GaAs devices.

The U.S. is expected to meet its current and projected future needs for gallium through imports and domestic refining and recycling. The USGS estimates that world resources of gallium in bauxite exceed 1 billion kilograms, and a considerable quantity of gallium is likely present in world zinc reserves. However, only a small percentage of gallium in bauxite and zinc ores is recoverable using current methods because processing techniques to separate aluminum, zinc, and other byproduct critical metals (for example, germanium and indium) compete for gallium in source materials.

A Global Overview of Ta-Nb Resources, Klaus Schulz, Research Geologist, U.S. Geological Survey, Eastern Mineral & Environmental Resources Science Center, Reston, VA

Abstract: Niobium (columbium) and tantalum are transition metals whose properties of hardness, conductivity, and resistance to corrosion largely determine their primary uses today. The leading use of niobium (about 80 percent) is in the production of high-strength steel alloys used in pipelines, transportation infrastructure, and structural applications. Tantalum’s major use is in electronic capacitors for high-end applications, including cell phones, automotive electronics, computer hard drives, and implantable medical devices such as pacemakers. Niobium is primarily derived from the complex oxide minerals of the pyrochlore group ((Na,Ca,Ce)₂(Nb,Ti,Ta)₂(O,OH,F)₇), which occur in some alkaline granite-syenite complexes and carbonatites. Tantalum is derived mostly from the mineral tantalite ((Fe,Mn)(Ta,Nb)₂O₆), which occurs as an accessory mineral in rare-metal granites and pegmatites, particularly lithium-cesium-tantalum (LCT)-type pegmatites.
A Global Overview of Ta-Nb... (continued)
mattites. Brazil is the world's leading niobium producer, accounting for about 90 percent of production, mostly from weathered material derived from carbonatites (e.g., Araxá, Catalão). Brazil and Canada have the largest identified niobium resources. Australia and Brazil had been the leading producers of tantalum mineral concentrates, but recently the Democratic Republic of the Congo and Rwanda have become the leading producers. Artisanal mining of columbite-tantalite (also called “coltan”) is conducted in many countries in central Africa. The United States has not reported any niobium or tantalum production since 1959 and meets its current needs through imports of mineral concentrates and alloys and through recovery from foreign and domestic alloy scrap that contains the metals. NioCorp is currently developing a niobium deposit at the Elk Creek carbonatite complex in Nebraska.

• New approaches to recovering critical minerals and recycling e-waste in the copper smelting process: Limiting waste, increasing efficiency and creating value, Dr. Colin Nexhip, Chief Advisor, Rio Tinto, South Jordan, UT and Todd Malan, VP External Affairs & Communications, Rio Tinto, Washington, DC

Abstract: The United States currently imports more than 50 per cent of the 41 metals and minerals that are key to clean energy applications, so finding new ways to extract them from the country’s own resources is high on the US Department of Energy’s (DOE) agenda. The team at the Critical Materials Institute (CMI) – a DOE “Innovation Hub” led by the Ames Laboratory - focuses on technologies that make better use of these uncommon minerals and metals. And now, a new partnership with Rio Tinto is aiming to ensure the US fully leverages the domestic resources needed for global leadership in clean energy, and combines CMI’s research capabilities, materials science and computing power with Rio Tinto’s global operational expertise.

Many of these critical minerals occur in ore bodies of copper – one of the core metals in Rio Tinto’s portfolio. Here Rio Tinto Kennecott’s copper operations in Utah, and the Resolution Copper project in Arizona, will play a central role in the CMI partnership – lending their processing facilities, raw materials and skilled teams to the research. The research will focus on improving the recovery of critical minerals and metals from three sources: mineral ore (using samples from Kennecott and Resolution), tailings (materials currently considered to be waste products of mineral processing), and electronic waste (such as spent mobile phones, computers and solar panels).

Rio Tinto Kennecott operates the Garfield smelter, one of the cleanest in the world, and one of only three such facilities in the US. Along with producing 20 per cent of US copper demand, Kennecott’s smelting process already recovers co-products such as gold, silver, selenium, molybdenum, and sulfuric acid. The CMI partnership will explore the potential for recovering additional critical mineral by-products from Kennecott ores. Meanwhile, the Resolution Copper project has the potential to meet an additional 25 per cent of US copper demand, and may be a source of other metals such as molybdenum, scandium and rhenium.

The presentation will provide an overview of Rio Tinto Kennecott’s fully integrated copper value chain (mining of copper ore through to refining of copper cathode), and the various co-products that are currently produced from copper-making, as well as potential to recover further co-products such as rhenium, tellurium, bismuth, lithium and platinum. Outline of the Rio Tinto's contribution to the three research areas within CMI will also be discussed.
NEW MINING IN OLD DISTRICTS

Chaired by: Tim Arnold, Vice President of Operations, Pershing Gold Corp., Lovelock, NV

Area of Interest - Business & Finance

Session Description:

It has been said that the best place to explore for a new mine is next to an old one. Considering land ownership, infrastructure, and improved prices for commodities, old mining districts are certainly getting scrutinized. This session will feature new(ish) mines and projects that are in or near production in historic mining districts. They will update us with the status of the project or operation, and hopefully bring back some memories of places many of us have worked or visited. Or, read about in history books...

• Restarting the Revenue-Virginius Mine - You Can Teach a New Miner Old Tricks, Brian Briggs, CEO, Ouray Silver Mines, Inc., Ouray, CO

Abstract: The Revenue-Virginius Mine is located in Southwestern Colorado approximately 5.5 miles southwest of the City of Ouray. After the outcrop discovery of the Virginius vein in 1876 the property was purchased in 1880 and developed by the Caroline Mining Company under the direction of A.E. Reynolds. The earliest work occurred at an elevation of approximately 12,700 feet and development of the mine progress downward through the 1,100-foot internal Virginius shaft to the 14th level. From 1888 to 1893 the 7,800-foot-long Revenue Tunnel was developed to intersect the Virginius vein approximately 900' below the bottom of the Virginius shaft and a new mill constructed at the mouth of the portal.

Under the supervision of the Mine Superintendent, Hubbard Reed, the extremely narrow Virginius vein was mined successfully using resuing as the mining method. Using this method, the mine produced over 25 million oz of silver, 159,000 oz of gold and 108 million lbs of lead from 1880 through 1912 when the Revenue Mill burned down.

From 1916 through 2000 many leasers and mining companies endeavored to re-open the mine, however, few if any of the later operators took the lessons of Hubbard Reed and the use of resuing to profitably mine the Virginius Vein to heart. The recent re-opening of the mine and construction of the underground mill by Star Mining and then continued under Fortune Minerals from 2011 through 2015 again failed to investigate resuing as a potential mining method. In 2015, Ouray Silver Mines Inc (OSMI) became the operator of the property through a default arrangement with the capital lender to Fortune Minerals.

From 2016 through the present OSMI invested significant capital in underground development, drill programs, geologic modeling, engineering studies, and most significantly the development of a resue test stope to re-learn the hard-won lessons of Hubbard Reed. During this same period, Ouray Silver Mines completed both a Pre-feasibility Study in 2016 and a NI 43-101 compliant Feasibility study in 2017. Both studies were based data collected from the resue test stope which proved Virginius vein can be successfully mined by resuing with an expected average dilution under 20%.

The old tricks learned by Hubbard Reed form the basis for the future re-start of the Revenue-Virginius Mine.

• Premier’s Cove Project: To Mine or Not to Mine?, Brent Kristof, Senior Vice President Operations, Premier Gold Mines Limited, Reno, NV
Premier’s Cove Project...(continued)

Abstract: This presentation updates Premier Gold Mines Limited’s Cove Project as the company works to complete a Preliminary Economic Assessment in the fourth quarter of 2017. A brief history of the property, key risks and opportunities, and the economic potential of the project will be discussed.

In March, 2017 indicated resources were 0.61 Mt @ 11.57 g/t for 228,000 oz. and inferred resources were 3.38 Mt @ 12.18 g/t for 1,322,000 oz. using a cutoff grade of 5.6 g/t and a gold price of US $1,400/oz.

The goal is to optimize the business case that can be advanced to an underground test mining program followed by a feasibility study and commercial production. Significant investments have been made toward understanding key drivers such as hydrogeology, dewatering, and metallurgical characteristics of the potentially economic resources.

Premier is permitted under an Environmental Assessment to complete an exploration decline that includes 120,000 tons of test mining. The intent is to collar the portal in the first quarter of 2018 and begin decline development toward the test mining area in the Upper Helen Zone. Development and test mining will occur over a two year period.

• The Reopening of Relief Canyon, Tim Arnold, Vice President Operations, Pershing Gold Corporation, Lovelock, NV

Abstract: The Relief Canyon Mine was opened by Lacana Mining in 1984, and mining ceased under Pegasus in 1989. Subsequently, Firstgold Corp. built a state of the art processing facility in 2007-2008, however, mining did not resume prior to the property being placed in care and maintenance in 2010. Pershing Gold Corporation (PGLC) acquired the Relief Canyon mine in August, 2011. Since acquiring the project, PGLC has grown its land position from 1,100 to ~25,000 acres, and has drilled 415 core and 89 reverse circulation holes to expand the resource and to develop and test targets away from the historical pits. All the permits are in hand to start production and mine through Phase I of the project. A June 2017 Pre-feasibility study on Relief Canyon shows robust economics, with an 89% IRR and an NPV(5%) of $145M at $1,250 Au/oz. The PFS projects an H1-2018 construction startup, and gold production in Q3-2018. This presentation will focus on the status of the reopening of the Relief Canyon Mine.

• The Restoration and Redevelopment of the Stibnite Gold Project, John Meyer, Vice President Development, Midas Gold Idaho, Inc., Boise, ID

Abstract: The Stibnite Gold Project is unlike any other mining project. We have located a world-class gold and antimony deposit in an area in need of environmental repair. We have the opportunity to take an area damaged by 100 years of mining, and improve the water quality, wildlife habitat, fisheries and vegetation, while bringing new jobs to the community and helping grow Idaho’s economy.

The Stibnite Gold Project site has a long history of mining; a lot has changed since the first miners found the site more than a century ago. Today, we understand the environmental sensitivities of the area and have increasingly high standards guiding our design and future development work. In fact, with restoration as our goal, we can use mining to rewrite the site’s legacy.

• The Hasbrouck Project - Hills of Gold, Sandy McVey, COO, West Kirkland Mining, Inc., Vancouver, BC, CANADA

(continued on next page)
The Hasbrouck Project... (continued)

Abstract: The Hasbrouck Gold Project consists of two hills rising out of the valley floor just south of Tonopah. The larger deposit is Hasbrouck Peak - John Livermore started modern exploration there in the 1970s. Hasbrouck had seen some underground mining in 1920 but the old-timers never found the high-grade gold they needed. Eleven companies subsequently owned Hasbrouck Peak, including such well-known names as Saga Exploration, Echo Bay, Coeur, Franco-Nevada, Euro-Nevada, Newmont, and Vista Gold. Each increased the understanding of the deposit’s geology and metallurgy, and by the time West Kirkland acquired it had +300 boreholes, multiple metallurgical test programs, and little further work was needed for West Kirkland to fully engineer and permit the property.

The second and smaller deposit is Three Hills. Also well-explored since the 1970s, it has nearly 300 boreholes and multiple metallurgical programs performed since the 1970s. Together, Hasbrouck Peak and Three Hills host a +1 million ounce gold resource.

West Kirkland plan to mine 15,000 tons per day for two years at the fully-permitted Three Hills, then mine Hasbrouck Peak at 17,500 tons per day for a further six years, to produce 594,000 gold-equivalent ounces. The low strip ratio (1:1) and good heap-leach recovery (75%) support an IRR of 43%, an NPV(5) of US$120 million and US$47 million initial capital. This just might be the right time for planning and drilling to stop at the Hasbrouck Gold Project, and building and mining to finally start.

SURFACE MINING - ADVANCED TECHNOLOGIES FOR THE INDUSTRY

Chaired by: Kanaan Hanna, Mining Engineer, Consultant, Littleton, CO

Area of Interest - Operations

Session Description:

This session will cover technological advancement and case studies that have improved safety, productivity, and lowered costs in open pit mining operations. Topics will include, open pit optimization, geotechnical monitoring and modeling, blasting, autonomous equipment, 2D/3D satellite imagery and geological mapping, business improvements, and maintenance practices. Talks include:


Abstract: Downhole geophysical logging (sometimes referred to as e-logging) is used regularly for mining, geological, geotechnical, hydrogeological, environmental, and numerous other applications. The tools can be applied in nearly all rock types and geological settings. Often, clients are unaware of applications of downhole logging tools that have the potential to enhance exploration and recovery activities. In other cases, clients require unique data collection specific to a particular site or geologic setting. Over 40 years of serving multiple sectors of the mining industry, including hard rock, aggregate, and coal, provides numerous examples of site-specific geophysical logging
Downhole Geophysical Logging…(continued)
applications and unique industry experiences. Acoustic Televiewer (ATV) work is often associated with geotechnical assessment, which often involves collection of Rock Quality Designation (RQD) data. While RQD should not be derived from ATV data, comparison of RQD from rock core and from ATV can provide insight with regard to subsurface conditions. Sonic logging data is often used to define variations in rock strength and to provide guidance for optimization of blasting operations. Density logging to determine in-situ density for aggregate reserve tonnage estimation allows for more accurate prediction of production tonnages. Due to the significant costs associated with drilling holes for mining activities, it is important to get the most value possible out of each hole drilled. Downhole geophysical logging provides important data in a cost-effective manner and enhances the value of each hole.

• UAV Applications for Mine Tailings Surveying and Monitoring, Johnny Lyons-Baral, Applications Engineer, Hexagon Mining, Tucson, AZ

Abstract: UAVs are currently swarming the above ground mining world. However, their use over large areas is still limited. Short battery life, small aircraft elevation regulations, and limited payload capacity of small UAVs have restricted most mine-ready UAV to short flights of small areas. For this reason, mines have struggled to adequately use UAVs for tailings surveying and monitoring. With gradually increasing battery lives and increasing small UAV payloads, large area photographic surveys are on the increase as well. This leads to the next challenge for using UAVs for large areas – data processing and analyses. As anyone who has conducted a photogrammetric survey of a large area can tell you, processing 1000s of photos into 3D point clouds and DSMs and orthomosaic imagery creates large data files and takes a very long time. And each downstream step can also create more large data files. Not only is storage and processing speeds difficult, but also data transfer across networks or over the internet and even from software to software throughout the workflow. This presentation evaluates the UAV workflow for mine tailings. The results show that newer aircraft can make faster work of mapping large mine areas and that certain software combinations with integration can improve data management headaches.

• Probability Theory in Pit Slope Stability Evaluation, James A. Cremeens, Chief Geotechnical Eng./Sr. Executive Manager, and Zach P. Fox, Geotechnical Engineer, Knight Piésold & Co., Denver, CO

Abstract: The methods, assumptions, software and significance of results of probabilistic slope stability analyses are presented. Refinements in software, hardware and methodology means that probabilistic slope stability analyses are no more costly than using deterministic methods. The development of probability density functions for slope stability model input parameters is discussed. Examples of the development of more favorable slope geometry recommendations using probabilistic methods, resulting in significant improvements in mine economics are discussed.

• It’s All About The Data, David Prance, Director Business Development, Trimble Mining, Willetton, WA, AUSTRALIA

Abstract: IoT, Digitisation, Data Lakes, Big Data, Machine Learning and the list grows. There are so many initiatives, technologies and new ways of thinking about how we want to receive, create and act on information derived from raw data. The key element to all the above is DATA.

(continued on next page)
SURFACE MINING..(continued)
It’s all about the data.. (continued)
It is no secret that the value of the data produced by many mining applications has most likely not been fully realized since it has not readily been collected and integrated by mining companies for a reliable, complete view across mining operations.

In a purely tonnes and time based reporting system, performance metrics are calculated and reported for selected time periods and intervals of time. However, many of the systems which are the sources of data for production and performance reporting also record information about where the activities have taken place and where material has been mined.

There is now an opportunity to present performance metrics and measures in both the temporal and spatial domains and regardless of the ultimate goal or initiative they all need data as the base foundation.

An enterprise mining information system unlocks data and metrics by consolidating data across functional areas into a managed data environment for a complete view of mine productivity and profitability used in planning, operations and finance. It also provides an opportunity to visualise performance metrics and measures in both the temporal and spatial views.

In this presentation attendees will gain awareness of Trimble’s Connected Mine products and how they support:

- Data being the cornerstones of successful development and implementation of an enterprise mining information system
- Unlocking the secrets about the mine which are buried in all that trusted data.
- Using spatial data views to find the unexpected in all that data.

CULTURAL RESOURCES BEST PRACTICES:
PLANNING, IMPLEMENTING AND TROUBLESHOOTING -
Understanding the Process and Divining Future Trends in Cultural Resource Issues in Mining Projects

Co-Chaired by: Tom Lennon, Ph.D., RPA, President Western Cultural Resource Management, Inc., Boulder, CO and Connie Rogers, Partner, Davis Graham & Stubbs LLP, Denver, CO

Area of Interest - Environmental

Session Description:

This technical session discusses best and evolving practices for National Historic Preservation Act (NHPA) Section 106 compliance and mitigation. We will again focus on planning, implementation and trouble-shooting issues, along with tips and strategies for engaging in a production discussion with state and federal agencies and other stakeholders. At the initial planning stages, industry has the best opportunity to understand and manage levels of effort, schedules, reporting, agreement document stipulations, mitigation measures, monitoring, discoveries, and more. Using hard-earned experience, we
Cultural Resources... (continued)
will explore means of cooperation to make the process more efficient and effective. This
session will also address how, and whether, to coordinate NEPA compliance with NHPA
106 Process compliance. This session will also address state cultural resources laws and
offer suggestions for coordinating compliance with both state and federal standards.

The presentation will involve panel member presentations and discussion with partici-
pants. In addition to Tom and Connie, we are assembling a panel of experts to join us in
this discussion. Panel members:

- Tom Lennon, Ph.D., RPA, President Western Cultural Resource Management, Inc.,
  Boulder, CO
- Connie Rogers, Partner, Davis Graham & Stubbs LLP, Denver, CO
- Laura Granier, Partner, Holland & Hart, Reno, NV
- Karen Bennett, Attorney at Law, Environment Energy & Natural Resources, Clark
  Hill, Washington, DC

MORNING SESSIONS | THURSDAY DECEMBER 7
SESSION TIMES: 8:00 - 11:30  COFFEE BREAK 9:35 - 10:20

MINING DEVELOPMENT IN THE MIDWEST: GREATEST STATES OPERATIONS AND DEVELOPMENT
PROJECTS
Chaired by: Frank Ongaro, Executive Director, MiningMinnesota, Duluth, MN

Area of Interest - Mineral Deposits, Geology & Exploration

Session Description:
The advancement of base and precious metal mining development projects is bringing
opportunity to the Midwest. Great Lakes States are attracting global investment and
poised to lead the way in responsible development of the metals that make our modern
society possible.

This session will highlight several of the development projects and proposals moving
forward in the region and their exemplary efforts toward environmental responsibility.
Talks include:

- Permitting & Litigation Update, LaTisha Gietzen, Public & Community Relations,
  PolyMet Mining, Hoyt Lakes, MN
- Eagle Mine: Managing Costs and Expanding Operations, Matt Johnson, External
  Relations Manager, Eagle Mine, Skandia, MI

Abstract: In the first three years of operations, the Eagle Mine team found opportunities
and challenges in managing daily production in a metal market downturn. Today, the
Eagle team is simultaneously planning for growth with new ore reserves, and closure
due to the short life of mine.

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MORNING SESSIONS | THURSDAY DECEMBER 7...

MINING DEVELOPMENT IN THE MIDWEST... (continued)

- **TMM Project Engineering Update**, Glenn Barr, Director of Engineering, Twin Metals Minnesota, St. Paul, MN

  **Abstract**: The TMM Project is focused on designing, constructing and operating an underground copper, nickel, platinum, palladium, gold and silver mining project. Located in northern Minnesota, approximately nine miles southeast of the city of Ely and 11 miles northeast of the city of Babbitt, the TMM Project targets minerals within the Maturi deposit, part of the Duluth Complex geologic formation.

  TMM continues to advance compact and efficient designs for a project that will process approximately 20,000 tons of ore per day. Ongoing studies are focused on detailed engineering, economic and site-specific environmental studies of the project details, facilities locations and more. These studies will culminate in the formal mine plan of operation (MPO). Pending a resolution of its federal mineral rights, TMM expects to submit the MPO in the next two years.

  This presentation will provide an update and overview of the TMM Project, including current mining, processing, and tailings management concepts.

- **Building a Safety Centered Team: A Drilling Company’s Perspective**, Julian J. Collins, President and CEO, IDEA Drilling LLC, Virginia, MN

- **Resurgence of Gold Exploration in Upper Midwest Greenstone Belts**, William F. Rowell, CPG, Consultant, Minneapolis, MN


  **Abstract**: Encampment Minerals (EMI) is a private US company with a portfolio of Cu-Ni-PGM-Au properties in Minnesota and Wyoming encompassing approximately 62,000 acres. Properties range from demonstrated resources to conceptual targets. The Minnesota properties are in the well-recognized Duluth Complex. The Wyoming properties flank the Cheyenne Belt, a cratonic suture of Proterozoic age in Southeastern WY.

  EMI’s approximately 50,000 acres in the Duluth Complex include targets for massive and disseminated magmatic sulfide Cu-Ni-PGM mineralization and recently recognized Fe-Ti-V mineralization. Properties include:

  - **Serpentine Deposit**: a large tonnage, near-surface deposit of disseminated Cu-Ni-PGM; also zones of high grade mineralization, including an intercept of 3.1 feet @ 5.26% Cu, 1.44% Ni and 2.04 g/t TPM;
  
  - **South Filson Creek**: two deposits of disseminated Cu-Ni-PGM mineralization as well as high grade targets;
  
  - **Wyman Creek Deposit**: disseminated Cu-Ni-PGM deposit with substantial tonnage potential and untested massive sulfide targets;
  
  - **Siphon, Skibo**: Massive magmatic sulfide targets, possible Noril’sk or Eagle model; drill intercepts to 12.1 feet grading 2.96% Cu, 0.81% Ni, 1.2 g/t PGMs;
  
  - **Titac**: Fe-Ti-V mineralization in mafic-ultramafic bodies intrusive to the Duluth Complex.
Encampment Minerals...(continued)

EMI’s approximately 12,000 acres in SE Wyoming flank the Proterozoic Cheyenne Belt, with well-recognized magmatic sulfide Cu-Ni-PGM mineralization and little modern exploration. Drill targets for massive and disseminated mineralization have been defined. Exploration models include Thompson and Raglan analogues, and layered mafic intrusives. Additional targets recently recognized include orogenic gold-VMS, Fe-Ti-V oxides, and IOCG mineralization.

- **Are Midwest States Inviting Investment: End of the Wisconsin Mining Moratorium**, Stephen V. Donohue, PH, Vice President - Mining, Foth Infrastructure & Environment, LLC, Green Bay, WI, and Frank Ongaro, Executive Director, MiningMinnesota, Duluth, MN

**Abstract:** From the 1970’s through the late 1990’s Wisconsin experienced significant interest from the mining industry related to the discovery and exploration of polymetallic mineral deposits. During that period of time Wisconsin experienced the development of the Flambeau deposit and repeated efforts to develop and permit the world class zinc deposit known as the Crandon deposit. The development and exploration of these resources was vigorously opposed by well networked opposition groups that repeatedly attempted to pass legislation to hinder and outright block development. As a result of this pressure, Wisconsin passed in 1998 a moratorium on the permitting of new nonferrous metallic mining projects referred to as sulfide deposits. Since the passage of the moratorium, considerable efforts have been made to lift it. In early November of 2017, Wisconsin passed legislation that reforms Wisconsin’s metallic mining law by lifting the moratorium. The new legislation also makes other changes to Wisconsin’s Mining Law to improve permitting process certainty. This presentation will summarize the latest legislation that will once again open Wisconsin to investment from the mining industry.

- **The Value of Minnesota State Lands/Trust Lands**, Aaron M. Vande Linde, School Trust Lands Director, Minnesota Office of School Trust Lands, St. Paul, MN

**LITHIUM -**

**What is in your battery? Where does the Lithium come from? Where will it come from?**

Co-Chaired by: **Ruth A. Carraher,** Geologist, C&M Consultants, Reno, NV and **Paul Dockweiler,** Senior Geologist, Geosynctec Consultants, Las Vegas, Nevada

**Area of Interest - Mineral Deposits, Geology & Exploration**

**Session Description:**

Lithium Brines are presently the largest source of Li production, with Li-bearing pegmatites having been an historically significant source. Lithium is presently being produced from brines in Nevada, Argentina, Bolivia, Chile, and China, and production from pegmatites in Australia. Development of pegmatites in Canada, China, and Finland is in progress, as well as development of Li-bearing clays in Serbia and Mexico.

This session will cover the geology of Li brines, Li-bearing pegmatites, Li-bearing clays, and the relationship of high Lithium content to the melting of continental crust and subsequent caldera development.

(continued on next page)
• **Li Enrichment in Intracontinental Rhyolite Magmas Leads to Large Li Clay Deposits in Caldera Basins**, Tom Benson, Researchers, Stanford University, Stanford, CA

**Abstract:** Lithium (Li) is classified as an energy-critical element due to the increasing demand for Li-ion batteries used in mobile electronics, the electrical power grid, and hybrid and electric vehicles. This study demonstrates that lake sediments preserved within intracontinental rhyolite calderas have the potential to host Li deposits on par with some of the largest Li brine deposits in the world. Li concentrations of rhyolite magmas formed in a variety of tectonic settings are measured in situ using SHRIMP-RG on homogenized quartz-hosted melt inclusions. Rhyolite magmas that formed within thick, felsic continental crust display moderate to extreme Li enrichment (1,500 – 9,000 ppm), whereas magmas formed in thin crust or crust comprised of accreted arc terranes contain Li concentrations less than 500 ppm. When the Li-enriched magmas erupt to form calderas, the cauldron serves as an ideal catchment within which meteoric water that leached Li from nearby caldera-related tuffs and lavas can accumulate. Additional Li is supplied to the system through low-temperature hydrothermal fluids along ring fractures as remnant magma solidifies and degasses. Li-bearing clays form in this setting at moderate temperatures and low pH, and when preserved in the geological record, can lead to a large Li deposit like the ~2 Mt deposit in the McDermitt Caldera, Nevada. Previously unidentified Li resources may occur in the 100+ identified calderas in the western United States young enough to preserve altered caldera lake sediments.

• **Lithium-bearing Clays in the Western United States: Minerology and Lithium Content**, Lisa Stillings, Research Geologist, USGS, Reno, NV

**Abstract:** Hectorite is, arguably, the most well-known Li-bearing clay. It is a smectite, first described at California’s Hector mine, and used for commercial applications such as drilling muds, paints, cosmetics, deodorants and other specialty clay products. Its rheological properties provide emulsion stability, viscosity, and spreadability to products in the cosmetics industry. Its rheology and thermal stability make it useful for oil-based drilling fluids in deep boreholes with temperatures up to 350°F.

In recent years Li-bearing clays have been evaluated for their potential as a Li resource, needed for Li batteries and renewable, mobile power. To investigate the nature of clay as a Li resource, a suite of Li-bearing clays have been collected from Miocene to Pliocene-aged sediments in basins of saline and evaporative lakes, and a caldera lake, in the Western US. Geochemical and mineralogical analysis have been conducted for samples from Lyles AZ, Franklin Mills CA, Hector CA, Fish Lake Valley and Clayton Valley NV, and from the caldera lake at McDermitt NV.

All samples are Mg- and F-rich. Most are smectite (hectorite), although illite (tainiolite) is found at McDermitt and mixed-layer smectite-illites have been identified in the Esmeralda Formation of Clayton Valley NV. Li content ranges from 0.05 – 0.71 % in bulk sediments, and 0.12 – 1.24% in clay separates.

The suitability of clay as a Li resource is dependent upon both the concentration of Li and the position of Li in the crystal structure of the clay. In the smectite clays of our sample suite, Li is found in the octahedral layer, whereas in the mixed-layer smectite-illite clays Li is found as an exchangeable cation in the in the interlayer. It is argued that the mixed-layer smectite-illite clay may be more suitable as a Li resource because Li may be more easily extracted from the interlayer than from the octahedral structural layer.
LITHIUM...(continued)

- **Rhyolite Ridge - A Hydrothermal Lithium-boron Deposit, Esmeralda County, Nevada**, Peter Nicholson, Consultant Geologist, Global Geoscience Ltd., North Sydney, NSW, AUSTRALIA

Abstract: Stratiform mineralisation is hosted by interbedded carbonaceous mudstone, sandstone, limestone and chemical sediments. The sequence is layer cake over the area of outcrop and drilling. The sandstones have a probable turbidite origin. Intraformational folding and incipient brecciation is common. Mineralisation occurs in several lenses within a stratigraphic interval of about 400m. Lithium is mainly contained in sepiolite and boron in searlesite. Higher grades of boron occur in the centre and bases of lenses. The highest concentrations of lithium are at lens peripheries and at the tops of individual lenses. Mineralisation contains anomalous As, Ag, Mo, Sb and W. The South Deposit has a Resource of about 400 million tonnes of 0.9% lithium carbonate, 2.9% boric acid and 1.7% potassium sulphate including a high-grade lens of 65 million tonnes of 1% lithium carbonate, 9.1% boric acid and 2.2% potassium sulphate. The high-grade lens is amenable to open pit mining as it is about 20m thick and dips from the surface to at least 250m. Mineralisation is soluble in dilute sulphuric acid. Infill drilling and metallurgical test work are in progress with the aim of completing a preliminary feasibility study in the first half of 2018.

- **Genesis and Emplacement of Lithium Pegmatites**, Gary Pearse, MSc Geol, P.Eng., Jill A. Z.Pearse, Equapolar Research, Ottawa & Jill A. Z.Pearse, PhD, Universidad de Los Andes, Columbia, ON, CANADA

Abstract: Generally, lithium pegmatites are syntectonic, related to activity including intrusion of the parent granite, and are emplaced in mobile zones in sedimentary and/or volcanic piles. This is important. Virtually all researchers in the field make passing reference to the structural aspects of the host rocks without appreciating the physical characteristics of them that permit dilation of the receiving chamber and retention of the still pressurized pegmatitic fluid at shallow depth in the crust for its quiet crystallization and final solidification. This is the first time this model has been described in a geological forum and an animated presentation of it is given. It was developed over a long career in the evaluation of rare-metal pegmatites as both geologist and engineer and it explains the essential features of pegmatites.

Classically, pegmatite fluids evolve in composition from a crystallizing parent granite intruding at moderate depth. As crystallization proceeds, ubiquitous silica, alumina, soda and potash undergo reduction in the residual fluid and magmatic water concentrates, still with abundant dissolved silica, alumina, soda and potash, and accumulates along with rare elements Li, Rb, Cs, B, Be, F, Ta, Nb, Sn, REE, and other elements that are not compatible with crystal structures of common mica-quartzo-feldpathic minerals forming in the main granite body. This mobile residual fluid, much less dense than the main magma, rises to the top or ‘cupola’ of the intrusion as granite crystallization continues.

Doming and fracturing overhead, thereby reducing the pressure somewhat, initiates a “first boiling” of the water in the cupola, which at ~300 -350C is near its critical point (374C), further extending the fracturing upwards. Should the overlying rocks be brittle to the surface and the pressure in the system be sufficient (adequate water and other volatiles), an explosive rhyolite volcano results. If, however, the fracture is attenuated in a sedimentary-volcanic pile, the laminated, ductile pile domes up and the pressurized pegmatite fluid forces stratigraphic layers apart hydraulically, forming elongated tabular (continued on next page)
LITHIUM... (continued)

Genesis and Emplacement... (continued)

chambers where the pegmatite can, in the ideal case, crystallize with minimal disturbance, starting from the host rock walls inward into the fluid. The final magmatic water concentrates to a point where there is a second boiling and this fluid may breach the chamber and create mariolitic cavities above the pegmatite which are lined with euhe- dral crystals of beryl, topaz, tantalum, Rb-Cs-Li -lepidolite, pollucite etc.

Diagnostic mineralogy traces the classical fractionation, path, and distribution of minerals from the parent granite to the final emplacement. Moreover, the model also explains the common provenance of all lithium resource sources including brines, hectorite clays and other sources. The classic giant Whabouchi deposit of Nemaska, Inc. in the James Bay region of Quebec is under development and is used as the principle example. Co-author Jill Pearse created the animated model. She is the co-author of the paper: Sombrero Uplift Above the Altiplano-Puna Magma Body published in ‘Science’, October, 2012.

• Do Geothermal Systems Play a Role in Lithium Brine Enrichment in Nevada Playas?, Catherine Hickson, Director, COO, and Mark Coolbaugh, Director, Dajin Resources Corp., Vancouver, BC, CANADA

Abstract: The supercharged exploration target during the past three years is Lithium. Numerous companies have entered the race to identify both hard rock and brine-based deposits and many of these explorers have focused on Nevada. Nevada hosts potential brine deposits within the internally drained basins that make up the Basin and Range covering the western US and Nevada and Utah in particular. Only one operating lithium brine mine exists in the US, and it is found in Clayton Valley, Nevada. The question remains as to what other lithium brine deposits exist in the US. In general, lithium brine deposits are pre-request on a set of geological and climatological factors: 1) a source of lithium, 2) an extraction mechanism, 3) a transport mechanism, 4) a trap (closed basin), 5) a suitable solar evaporation rate, and 6) scale (mass flux of lithium and limited dissolved salt competition). Geothermal fluids may contribute to more efficient and selective extraction of lithium from basin sediments and basement rocks; they may help transport the enriched fluids due to thermal upwelling; and finally provide long term mass flux that over sufficient time leads to significant endowment in basins. The basins of western Nevada have many of these prerequisites, but are dominated by clastic sediments and have relatively high subsidence and sedimentation rates. For these reasons it is likely that lithium-enriched brines are deeper than in the mature basins of South America. Since few basins in Nevada have had deep drilling, paleo-brines may remain to be discovered at depths not yet investigated by exploration companies.

• Lithium Supply and Market; Past, Present and Future, Pablo Cortegoso, Consultant - Lithium Projects Development, SRK Consulting, Denver, CO

Abstract: Growing demand for lithium as a cathode material in rechargeable batteries, particularly for electric vehicles, prompted a global search for more resources in recent years. As a result, global lithium prices show year-on-year growth since 2010. Prices for this commodity in the overall market have begun to accelerate since October 2015. On paper, global lithium resources can meet demand. Even though several projects plan to come online in the next few years, only a handful of producers around the world represent the current lithium supply. How will the supply/demand balance be affected with this new projects? Will the lithium ‘oligopoly’ be disrupted by the newcomers? Will the
Lithium Supply and Market... (continued)
lithium pricing bubble explode due to a possible oversupply? What will Nevada’s role be in the new lithium world scheme?

This presentation will examine the past, current and future aspects of the global lithium market. We will assess current and future possible producers, technological breakthroughs that could affect production costs and provide a realistic view of the demand and supply future.

• **Overview of Lithium Brine Evaluation Methods, with Examples from Silver Peak (NV) and Beyond, Mark King, President, Groundwater Insight, Inc., Halifax, NS CANADA, Andy Purbis, Albemarle, Inc., Steve Shikaze, Laura Weaver & Ben Bolger, Matrix Solutions, Inc.**

Abstract: This presentation will discuss the technical framework used to evaluate lithium brine deposits. Public documentation of these Resources is relatively new to the mining world, dating back to only the late 2000’s.

In the evaluation framework that has become relatively standard over the past few years, lithium brine Resources are estimated within a Conceptual Model that describes 1) the hydraulic properties of permeable stratigraphic units (aquifers) and, 2) the distribution of lithium grade throughout those units. Lithium brine Reserves are estimated in a subsequent stage, through the application of numerical flow models, designed to predict the recovery of brine from a simulated production wellfield. Like solid mineral deposits, estimation of brine Reserves is also informed by economic considerations and other “modifying factors”.

Discussion of the framework will be illustrated with examples from Albemarle’s lithium brine mine in Clayton Valley, and other brine deposits. The Clayton Valley mine has operated since the mid-1960’s, and the technical constraints of the deposit have become more complex over the years. The technical methods and lessons learned from Albemarle’s work in Clayton Valley and other sites have relevance to the current global situation, where the evaluation of lithium brine prospects is at an all-time high.

**DOING BUSINESS CROSS-BORDER - OPPORTUNITIES AND PITFALLS**

Chaired by: **Robert Maynard, Partner and Chair, Mining Industry Group, Perkins Coie LLP, Boise, ID**

**Area of Interest - Business & Finance**

**Session Description:**

This session will address various notable land and mineral title, financing, regulatory, and other issues encountered by U.S. based companies pursuing mining ventures in Canada, Mexico, or further abroad and by companies based outside the U.S. pursuing mining ventures in the U.S., including cross-border joint ventures. Panelists will include a Foreign Corrupt Practices Act and anti-bribery law expert, a veteran landman, and executives from companies with experience with cross-border projects. Important elements for successful projects and pitfalls to avoid will be covered, with examples. Audience questions and discussion will be encouraged.

• **Foreign Corrupt Practices Act and other Cross-Border Business Practice Compliance Issues, Markus Funk, Partner, Chair of the White Collar & Investigations Practice, Perkins Coie, Denver, CO**

(continued on next page)
DOING BUSINESS CROSS-BORDER...(continued)

• Land and Mineral Title Issues, W. Kirk Williams, Manager, Mineral Title Services, LLC, Boise, ID

• Panel: Practical Insights Regarding Cross-Border Project Business Structure, Finance, Regulatory and Other Issues:
  1. Overview; U.S. Project Requirements and Issues, David Deisley, Executive VP and General Counsel, NovaGold Resources, Vancouver, BC, CANADA
  2. Overview; Canadian Project Requirements and Issues, Samuel Li, Senior Associate, Fasken Martineau LLP, Vancouver, BC, CANADA
  3. Overview; Mexican Project Requirements and Issues; John-Mark Saude, President/CEO, Riverside Resources, Inc., Vancouver, BC CANADA
  4. Environmental and Other Regulatory Requirements and Issues, Jay Gear, Corporate Environmental Director, Coeur Mining, Inc., Chicago, IL

ALASKA

Co-Chaired by: Deantha Crockett, Executive Director, Alaska Miners Association, Anchorage, AK and Mike Satre, Manager of Government and Community Relations, Hecla Greens Creek Mining Co., Juneau, AK

Area of Interest: Operations

Session Description:
Alaska’s mining industry is seeing big changes in 2017, and thanks to changes within the federal government, for the better. Hear from industry representatives on an uptick in exploration investment, new partnerships to pursue mineral deposits, how industry is responding to rapidly changing regulation, and how the State is leveraging its place as a top mineral potential jurisdiction. Talks include:

• Alaska Mining 2017: the State of the State, Curt Freeman, President, Avalon Development Corp, Fairbanks, AK

• Reform at the Department of the Interior, Steve Wackowski, Senior Advisor to the Secretary, Alaska, U.S. Department of the Interior, Anchorage, AK (Tentative)

• Geology and Mineralization of the Main and North Peak Au-AG-CU Deposits, Peak Project, Alaska, Curt Freeman, President, Avalon Development Corp., Fairbanks, AK (speaker) and Brad Juneau, President, Contango ORE, Inc., Houston, TX

• Trilogy Metals: Advancing the Ambler Mining District in Alaska by Forming Strong Partnerships, Rick Van Nieuwenhuyse, President, Trilogy Metals, Vancouver, BC CANADA

• Pebble: A Path Forward, John Shively, Chairman, Pebble Project, Anchorage, AK

• Resource Expansion at Coeur Alaska Kensington Gold Mine (Jualin Exploration Drilling Project) Michelle Deal, Exploration Geologist, Coeur Alaska- Kensington Gold Mine, Fairbanks, AK
MINE CLOSURE AND RECLAMATION

Chaired by: Dustin Wasley, PE, Principal Engineer, GeoEngineers, Spokane, WA

Area of Interest: Environmental

Session Description:

The mining industry and land management agencies contend with significant technical, legal, and financial considerations for mine closure. Mine closure challenges run the gamut from remediating turn-of-the-century abandoned/inactive mines to closing modern operations. This session will present case studies and technical presentations on closure criteria and approaches from the mining industry and land management agencies. Talks include:

- **Nevada’s Mine Closure and Reclamation Programs**, Thomas Gray, Closure Branch Supervisor, Nevada Division of Environmental Protection, Carson City, NV

  **Abstract:** Nevada’s Bureau of Mining Regulation and Reclamation (BMRR) has a worldwide reputation for effective regulation of the mining industry to ensure environmental protection and a vibrant economy. BMRR administers two separate but interrelated programs: water pollution control and reclamation. BMRR is 100% self-funded through permit fees. Nevada’s main requirement for mine closure is chemical stabilization to eliminate the potential for degradation of groundwater and surface water. The main reclamation requirement is bonding to ensure a safe and productive post-mining land use. Reclamation includes regrading, covering, and revegetation, which must also meet closure requirements for chemical stabilization where there is a potential to degrade waters. Additional detail is now required for closure plans early in the mine life due to changes in reclamation regulations requiring bonding for mine-impacted water management and process fluid stabilization. This presentation will walk through regulatory requirements, techniques for closure, long-term monitoring, and provide some case studies.

- **Mother Lode Mine - Re-examining Mercury Bioaccumulation Following Hot Spot Removal Action, 15 years later**, Ryan Tobias, Senior Biologist, GeoEngineers, Bend, OR

  **Abstract:** A Removal Action was completed at the Mother Lode Mercury Mine in Central Oregon in 1999. The cleanup met the Removal Action Objectives, consolidating all mercury-containing waste material exceeding the recommended cleanup level. In 2007, a watershed study identified elevated concentrations of mercury in redband trout fish tissue downstream from the cleanup. In 2011, follow-up examination indicated total mercury was elevated in physical media, while methyl mercury accounted for a significant percent of the total mercury present in stream biota. While the original Removal Action reduced risks to human receptors, further data collection identified ongoing mercury and methylmercury accumulation in fish to levels exceeding consumption advisory levels. Moreover, data indicate long-term ecological risks to piscivorous wildlife. This presentation provides a summary of the original efforts to reduce mercury input to the Canyon Creek watershed, lessons learned since the Removal Action, and efforts going forward to mitigate these impacts.

- **A Case Study for Final Closure of a Mine Site, Santa Fe Calvada Mine, Nevada**, John Cooper, Principal Engineer, and Steve Boyce, SRK Consulting, Elko, NV, and Steve Wilbur, Victoria Gold

(continued on next page)
MORNING SESSIONS | THURSDAY DECEMBER 7...

MINE CLOSURE AND RECLAMATION...(continued)
Santa Fe Calvada Mine, Nevada... (continued)

Abstract: This paper presents a case study for the final closure of heap leach pads and
dumps for an inactive open-pit gold mine in Nevada with the focus on management of
draindown solution from the leach pads. Design and lessons learned in the permitting
and construction phases will be discussed. Several options were considered for long-
term fluid management including soil covers for the leach pads, evapotranspiration cells,
infiltration galleries and evaporation cells (E-cells). Evapotranspiration cells and galleries
were subsequently eliminated as viable options. The E-cell was HDPE doubled-lined
and included a leak collection and recovery system. The primary liner was covered with
soil for protection and a medium for solution storage. The Design criteria included zero
discharge, passive fluid management, minimal maintenance, limited surface water
expression, and provide for safe access for monitoring. As the site receives low annual
average precipitation of around 6.8 inches and a high potential evaporation of around 55
inches with low flow rates, the criteria could be met with passive E-Cells and soil-cov-
ered leach pads. The E-cell design included elements that reduce long term monitoring
and maintenance requirements. The E-cells were constructed in the summer of 2016 so
it is too early to gage the success; however, inspection of the E-cells in the spring of 2017
revealed no open water was present in the E-cells.

• From Mine to Wildlife Corridor: Mineral Hill Mine Tailings Storage Facility Recla-
mation and Closure, Jardine, Montana, Debbie Johnston, Vice President - Mining,
Morrison Maierle, Missoula, MT

Abstract: Tailings placement in the Mineral Hill TSF was completed in 2000 and a soil
cover was placed over the stack. Later, about 25% of the stack area was capped with
HDPE liner. Recent studies showed that inflows have added to the moisture content
internal to the TSF. Morrison-Maierle was contracted to provide engineering design for
a design to totally encapsulate the tailings. The goal was to reduce inflow and infiltration
to the tailings, which should reduce the total volume of outflow reporting to the water
treatment plant. Following the completion of the encapsulation of the tailings, the flows
reporting to treatment decreased to 60% of the pre-liner placement value, and the
trend appears to be continuing. As a result of the reduction in the volume of treatment,
Kinross was able to negotiate a conservation easement with interested parties that
enabled a divestiture of the property.

• Khayyam Mine EE/CA: Investigation Challenges and Risk-Based Justification for
No-Action Response. Prince of Wales Island, Alaska, John Bingham, Senior Associ-
ate Engineer, Hart Crowser, Seattle, WA

Abstract: The former Khayyam Mine and workings (closed in 1907) are located on a
remote part of Prince of Wales Island, Alaska. The site is located in sensitive alpine,
forest, riparian, and aquatic habitat. Site investigation was done to support an engi-
neering evaluation and cost analysis (EE/CA) to identify the need for, and best methods
for, potential remediation of mine related impacts. The investigation included collecting
samples and site information to perform streamlined human health and ecological risk
evaluations, and to compare removal action alternatives using EE/CA criteria. Waste
rock, ore, and soil were found to have total metals (e.g., arsenic) concentrations that
exceeded state screening criteria. However, the risk evaluation found no complete
exposure pathway for humans and only potentially complete exposure pathways for
ecological receptors from soil and in-stream sediment. Institutional controls only were
Khayyam Mine... (continued)
identified as the preferred alternative in the draft EE/CA because it is more protective of the environment than other alternatives considered. The temporary and permanent impacts of construction access in roadless areas with sensitive and mature habitat was determined to have higher ecological impacts than the effects of release of hazardous substances under existing conditions. CERCLA guidance allows the selection of a remedy that does not achieve certain regulations, if documentation shows that compliance at a site will result in greater harm than other alternatives (i.e., some contamination may be better left unremediated in remote pristine environments).

PUBLIC LANDS SESSION -
Capitalizing on Recent Executive and Secretarial Orders to Reduce Barriers to Mineral Exploration and Development on Public Lands
Chaired by: Debra Struhsacker, Senior Vice President, Pershing Gold Corporation, Lovelock, NV

Area of Interest - Legislative & Public Affairs

Session Description:
President Trump’s recent regulatory reform and public lands Executive Orders and Interior Secretary Zinke’s Secretarial Orders hold great promise in reducing some of the impediments to mineral exploration and development on the Nation’s public lands. This session will focus on opportunities for the mining industry to work with the Trump administration to capitalize upon these Executive and Secretarial Orders. Session speakers will present ideas for using the Executive and Secretarial Orders to reduce land use and access restrictions, to shrink or revoke some withdrawals, and to improve the permitting process.

• Keynote Speaker: Secretary Zinke’s Secretarial Orders, Kathleen Benedetto, Senior Advisor, BLM, Washington, DC

Abstract: The Department of the Interior and Bureau of Land Management are on the front lines of the Administration’s efforts to reduce regulatory burdens that limit economic growth and undercut America’s ability to access raw materials domestically. At the BLM, we are embracing our multiple use and sustained yield mission with renewed enthusiasm, understanding that when America’s landscapes are working, Americans are working. Secretary Zinke is giving the BLM the tools to begin removing some of these barriers by setting clear priorities and issuing Secretarial Orders that require DOI agencies to improve public access to public lands. Priorities of interest to this group include: sustainably develop our energy and natural resources, restore trust and be a good neighbor, strike a regulatory balance, and modernize our infrastructure. Orders to reduce regulatory burdens and streamline review under the National Environmental Policy Act hold a great deal of promise as we retool how proposed projects are reviewed. In addition, the BLM recently dropped plans to withdraw from mineral entry 10 million acres of lands in six Western states (Idaho, Montana, Nevada, Oregon, Utah and Wyoming) in potential sage-grouse habitat when it was determined that mineral development over the proposed 20 year withdrawal period would impact fewer than 10,000 acres.

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PUBLIC LANDS SESSION... (continued)

- The Office of Management and Budget’s Role in Executive Orders, Danielle Jones, Senior Policy Analyst, Office of Management and Budget, Washington, DC
- The Trump Administration’s Use of Executive Orders to Shape its Regulatory Reform Agenda, Thomas Perry, Partner, Marten Law, Boise, ID

Abstract: The Trump administration is placing a great deal of emphasis on its regulatory reform agenda largely through the issuance of multiple Executive Orders (EOs), use of the Congressional Review Act (CRA), and partial implementation of proposed cuts to agency budgets across all sectors of the economy. The administration has also made effective use of selective treatment of the litigation portfolio it inherited from its predecessor.

While still in a formative state, the Trump administration is having success persuading courts to temporarily freeze ongoing litigation to better assess its long-term options. But the judicial branch has also shown a willingness to analyze promptly indefinite requests to freeze or administratively stay challenged regulations, which in turn, has forced the administration to unwind these regulations though the lengthy rulemaking process.

This presentation will review the Trump administration’s use of the CRA and EOs to achieve its regulatory goals, followed by an examination, with examples from previous administrations, of the litigation options available to the new administration for reaching its policy objectives.

- An Effective AND Efficient NEPA Process – Secretary Zinke’s NEPA Streamlining Order and Beyond, Laura Granier, Partner, Holland & Hart, Reno, NV
- Public Policy Benefits of Privatizing Public Lands, Allen Freemyer, President, Freemyer & Associates PC, Washington, DC

AFTERNOON SESSIONS | THURSDAY DECEMBER 7

SESSION TIMES: 2:00 - 5:30  COFFEE BREAK 3:35 - 4:20

LARGE LEFT LATERAL LEAPS TO GEOLOGIC


Area of Interest - Mineral Deposits, Geology & Exploration

Session Description:

This year we will continue the tradition of provocative talks, accentuated by “inspired” discussions and commentary. Of course we will count on (un)conventional beverages to help. The session is targeting presentations on the cutting edge of exploration science. This is a forum for unusual deposit types and a chance to bring to the light of day new and/or great leaps in exploration, exploration technology, exploration philosophy, or the development of mineral projects.
• **Soil Survey from Hell- Murphy’s Law Applied to Exploration Geochemistry**, Alan Morris, Consulting Geologist, RMGIS, Spring Creek, NV

**Abstract:** The case studies presented in this talk are true; the names, locations, and dates have been changed to protect the innocent.

A company who shall not be named had conducted a soil survey on a property in Nevada but the data did not look right when plotted; several elements plotted with color bands along the sample lines, giving the maps a Hudson’s Bay blanket pattern. After months of puzzlement, reanalysis, and heated discussions, the problem was traced to the analytical lab where a blank calibration standard wasn’t.

On another nearby property, soil results from a step-out survey did not pick up the expected pattern seen previously. Field checks of the sample locations revealed the sample numbers that were to increase from east to west were increasing from west to east. Field protocols of recording the actual GPS coordinates of the sample were not followed. The sample collection contractor ate several days of work to correct the locations.

“Trust but verify” is a phrase associated with Reagan-era arms control agreements; it is also important when dealing with assay labs, sample collectors, and data bases. Standards, both pulps and unprepped material, are mandatory. Field checks of geochemical sample sites both provide geologic information and serve as a check on the samplers. Computer tools for interpretation of geochemical results can provide deeper insight into the data but it is essential that the data is correct before it is loaded into the program.

• **Pumpelly’s Rule Revisited: the Great Falls Tectonic Zone and Idaho-Montana Porphyry Belt and the itsy bitsy structures in the big ore deposits in between**, Chris Dail, Exploration Manager, Midas Gold Idaho, Inc., Donnelly, ID

**Abstract:** In 1894, Raphael Pumpelly, a USGS geologist first noted and described the striking similarities between various geologic features at different scales and he and his coauthor’s paper became one of the fundamental tenants or “rules” of field geology. This talk will discuss the application of Pumpelly’s Rule as it applies to ore deposits in the Great Falls Tectonic Zone and Idaho-Montana Porphyry Belt, a long known, but little discussed and poorly explored geologic feature passing through central and eastern Idaho into western Montana. Numerous world class metallic mineral ore deposits occur along this trend and are related to repeated reactivation of major Crustal-scale, Regional-scale, District-scale and Deposit-scale structural features. This is prime area for “trendology” for those that like to look at maps showing alignments of ore deposits and their competitor’s drill rigs for guides to future exploration areas. Examples from several deposits in the region will be discussed along with the exploration significance of application of the “rule.”

• **Drilling Optimization**, Clint Streadbeck, Country Manager, USA, AMC USA, LLC, Salt Lake City, UT

**Abstract:** AMC is a mineral industry focused drilling fluids provider servicing mining and exploration sites worldwide. AMC’s main focus is to develop proactive solutions to optimize the drilling processes. In 2012 AMC introduced its new centrifugal mud cleaning system known as the AMC SOLIDS REMOVAL UNIT (SRU). This equipment allowed customers to clean and remove diamond core cuttings down to nearly 5-8 micron in size. It allowed sites to drill boreholes “sump-less” and through “close loop system” application. AMC has now recently introduced its AMC BOS UNIT™ and AMC BOS FIX™ product

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AFTERNOON SESSIONS | THURSDAY DECEMBER 7... (continued)

LLLL - GEOLOGIC...(continued)

Drilling Optimization... (continued)
to drilling projects throughout the western states producing amazing results. Down the borehole, you can’t always predict when or how things will go wrong. AMC’s patent pending Borehole Optimizations System (AMC BOS™) anticipates fluids loss, high torque and unstable zones, even in the most difficult conditions- making operations smoother and more predictable. AMC’s commitment is to help optimize the drilling process and we want to show you the newest industry changing technology.

•  Thinking Slow and Slowly: Exploration, Cognition and Geo-logical Fallacies, Geoff Burtner, Geologist, Oriented Targeting Solutions, Sacramento, CA

Abstract: Geology, and especially mineral exploration, is an imperfect-information game. In addition to artificial constraints like budget, field time and talent, geologists have to contend with the natural constraints of an opaque planet, variable exposure and mineralizing systems which operated in environments and on time-scales totally alien to everyday human experience. Making exploration decisions in this context requires the formation of geological interpretations based on solid observation, extrapolation from similar systems and the experience of the interpreting geologists. While errors introduced by the first two ingredients can be mitigated somewhat by high-quality, ongoing education of geologists, the errors of interpretation introduced by the thought processes of the geologists are harder to identify. The most modern understanding of human cognition and decision-making suggests that the information gap filling strategies used to create interpretive models in unfamiliar, imperfect-information situations are the most likely habits to be tainted by biases and logical failures. Further, these failures can be exacerbated by the very experience that makes geologists confident in their decisions. This talk examines the exploration and interpretation decision-making processes through the lens of cognitive science and identifies common cognitive pitfalls that can trap geologists into non-predictive models and leave deposits in the ground for geos with more perfect information...or less bias...to find.

•  UFO’s, Seismotectonics, Wave-Energy Funneling and Precious Metals. Mysterious connections between (super)natural phenomena, an eclectic dissertation project & mineral exploration, Justin Millard, Ralph J. Roberts Center for Research in Economic Geology, University Nevada-Reno, Reno, NV

Abstract: Emerging research indicates that seismotectonics plays a critical role in the formation bonanza epithermal veins, a geologic phenomenon in their own right. Recent introspections suggest that other geologic phenomena that are not recognized to have a direct relationship to mineral deposits may be manifestations of important mechanisms influencing deposit formation. For millennia, Japanese scholars have recorded light phenomena preceding or in conjunction with major earthquakes. In the past century, people have also witnessed light phenomena, often attributing it to UFOs without recognizing the association to major fault zones and earthquakes. Eventually termed earthquake lights (EQL), they have been documented recently at the 2009 Aquila, 2011 Tohoku, 2014 South Napa, and 2016 Kaikoura earthquakes. Evidence suggest that steeply dipping faults and mafic dikes hosted within structures, in preferred tectonic settings, act as charge carriers when under great deviatoric stresses preceding and during earthquakes. Charges generated at depth, migrate towards the surface where they are believed to cause a dielectric breakdown of air resulting in light outburst. It has also been suggested that the piezoelectric properties of quartz may play a role in near-sur
UFO’S...(continued)
face light generation. In unrelated seismological investigations, relay zones in steeply
dipping faults serve to funnel and trap seismic energy from proximal earthquakes.
Trapped energy serves to promote long-lived episodes of micro seismicity that previously
gone undetected, observed as aseismic creep, without ideally situated dense seismic
arrays. Analysis of the multi-scalar structural controls of low sulfidation epithermal
deposits indicates that they form in very distinct structural settings that when compared
to the structural settings of EQL and seismic wave-funneling events, are often analogous.
Collectively, these phenomena indicate that unique geo-circumstances are responsible
for the manifestation of each. Is it coincidence that all phenomena occur under similar
circumstances?

FINDING AND ACCESSING CAPITAL - What Miners Should Know
Chaired by: Tim Alch, Financial Analyst, Managing Partner, TAA Advisory LLC, Edgewater, NJ

Area of Interest - Business & Finance

Session Description:
Your discovery, project and or mining company is at a point where more capital is needed: What should you think about? Do in advance? What types of capital are best? What is the impact of capital available? Including streaming, royalty, off-take agreements, etc.? What are recent trends in mining finance? What has changed in the past year? Join us for a lively discussion with leading experts who will talk about recent deals done and answer your questions.

• Finding and Accessing Capital – What they did not tell you!, John Mark Staude, President, CEO, Riverside Resources, Inc., Vancouver, BC CANADA

Abstract: Founding Riverside Resources and several other companies has given the chance to learn in some cases the hard way. Some key factors for finding sticky capital versus flighty short term funding include having a relationship with the investors. It is not all about fees and instead alignment and shared commitment for value delivery. This brings trust and when financial returns are given, trust grows from the investor. The responsibility for delivering on goals and particularly financial sustained gains is required although not always fully under management’s control. Creativity in deals, innovation in business plan, and agility in operational delivery are key to accessing capital and once received the time frame for financial gains and delivery is relatively short; however, if provided then further sticky capital is accessible and the snow ball effect begins. Pareto 80-20 Rule dominates in finance and partnering and being one of the 20% is critical to grow and access capital throughout the business or commodity price cycle. During the deep lows, when confidence is low, capital is scarce, opportunities abound, yet investors are afraid. The trust, previous successes, and team approach play a vital role. A strong lead investor who has on-goingly delivered positive returns is often a cornerstone for landing big and much more affordable capital.

• Accessing Capital - How Funding Exploration, Development, Operations & Closing are Adjusting to the New Normal for Mining, Alain Haliimi, Head of Metals Mining Americas, Commonwealth Bank of Australia, New York, NY

(continued on next page)
Accessing Capital... (continued)

Abstract: In a capital intensive industry direct access to capital remains one of the key challenges for mining companies. With the mining industry adjusting to the new normal, juniors and mid-tiers companies are looking at “alternative source of financing”. This session will discuss key fundamentals on how the industry is re-adjusting and how companies/projects are getting financed. These topics will be further explored as we look at project case studies and discuss key considerations and challenges from recent companies success.

• Role of QP’s in Making a Resource/Reserve Report Useful for Bankers and Investors - Key points that make a report trustworthy, Abani Samal, Principal, GeoGlobal LLC, Salt Lake City, UT

Abstract: A resource/reserve technical report contain many important points such as exploration progress, mining method, processing, extraction details and various financial aspects of the project. A team of qualified persons (QP) sign-off on the information provided in the report. When a financial institution reads the report, they are interested to know the risk factors in the reported resources, which they would like to address sometimes soon. A QP/CP should provide the information clearly discussing the known risk factors and also help the readers to make right decisions from reading the report.


Abstract: Mining projects and companies contribute to communities to obtain acceptance through community engagement. Conducting stakeholder analysis and classifying results in a matrix of supporting, neutral, non-supporting provide information, but may not provide much information on what aspects of the project are supported. Recent research suggests classifying factors into groups: environmental, economic, social, governance demographics factors provide context for developing effective community engagement.

• What Institutional Investors Need in Order to Consider Investing in Your Company, Doug Sherrod, Managing Director, Corporate Finance Advisory, CPM Group, New York, NY

Abstract: Most institutional investors (funds, PE firms, family offices and SWFs) follow a well-worn process when identifying, assessing and then managing investments in the metals & mining sector. Often their investment vehicle operates within a specific mandate from its own investors. What are the informational elements that institutional investors require just to take a serious look at opportunities, what is their investment approval process and how do they approach monitoring and managing their portfolio?

• Statue Update: Combining Project Finance with Streaming and other Alternate Sources to Finance Project Development, Cynthia Urda Kassis, Partner and Co-Head of Mining & Metals Group, Shearman & Sterling LP, New York, NY

Abstract: Because of the gap in availability of funding from traditional sources, mining companies over the past 8-10 years increasingly turned to alternative financing sources such as streaming companies, private equity investors, commodity traders, sovereign wealth funds and the like to cover their funding requirements. As a result,
Statute Update... (continued)
as the price cycle turns positive for a number of minerals and mining companies look
to grow through greenfield/brownfield project development and acquisitions, tradi-
tional sources of financing are finding that they must finds ways to coexist with the
investments made by the alternative financiers in the intervening years as many of the
mines/projects now being developed, expanded or bought have alternative investments
attached to them. Conversely, to realize the full value of their investments, alternative
financiers must do the same with traditional sources unless they intend to provide 100%
of the funding required. In addition, particularly for larger projects a funding gap often
continues to exist today unless both traditional and alternative sources are tapped. As
of yet, no market standard exists on the arrangements needed to marry these different
financing arrangements. However, patterns are starting to emerge. This talk will explore
those patterns and what the main drivers of the resolution of the key issues tend to be.
It will also highlight steps which mining companies can take to facilitate the resolution of
these issues on a timely basis.

- Recent Trends and Issues - Miners Seeking Capital Should Know About, Neal Rigby
  PhD, Eeng, AIM, MIMMM, Corporate Consultant, SRK Consulting, Denver, CO

MINING HYDROLOGY

Co-Chaired by: Ronald T. Parratt, Environmental Specialist, Newmont, Reno, NV and
Mike Hardy, P.E., P.G., WRS, Project Manager, Lumos & Associates, Reno, NV

Area of Interest - Operations

Session Description:

Water as it relates to or is impacted by mining activities has rapidly become a critical
aspect to how mining companies and their sites operate. Surplus supply, deficit supply,
operations, process, monitoring, permitting, and reclamation activities on site and
within the mining communities affect the mining process. This session seeks to provide
information as it relates to the water activities, and challenges of mining companies and
their sites, and to foster communication to address the water challenges of the mining
industry.

- Hydrologic Evaluation of the Yankee Doodle Tailings Impoundment, West Ridge
  Area, Silver Bow County, Montana, Robert Anderson, Senior Hydrogeologist/Water
  Specialist Principal, Hydrometrics, Inc., Helena, MT

Abstract: Montana Resources, LLP, in conjunction with Hydrometrics, Inc. and Knight
Piésold, completed a detailed hydrogeologic and geotechnical investigation of the Yan-
kee Doodle Tailings Impoundment area near Butte, Montana. The investigation included
an extensive drilling and monitoring well completion program, geologic, hydrologic
and geochemical characterization, and groundwater modeling to support design and
permitting of proposed impoundment modifications. The primary objective of the
investigation was to ensure that site hydrogeologic conditions will prevent uncontrolled
seepage from the impoundment to the surrounding groundwater system as the tailings
pond level increases.

The investigation results show the local bedrock groundwater system to be a double
porosity, semi-confined fracture flow system with bedrock hydraulic conductivity values
on the order of 0.03 ft/day (10⁻⁷ m/sec). The quartz-monzonite bedrock contains several
(continued on next page)
MINING HYDROLOGY... (continued)

Yankee DoodleTailings... (continued)

East-west trending geologic structures which heavily influence groundwater flow in the vicinity of the impoundment. Two areas of depressed groundwater elevations were identified west of the impoundment with the lower head areas representing critical control points for maintaining long-term hydrodynamic containment within the tailings impoundment. In response, a number of hydraulic control elements were incorporated into the impoundment design, and augmented groundwater recharge evaluated as a means to increase hydraulic heads in the two areas of lower groundwater levels, if necessary.

- **A Method to Incorporate Highwall Runoff into Pit-Lake Water Balance Calculations**, Connor Newman, Hydrogeohemist, Nevada Division of Environmental Protection, Carson City, NV, Daniel Stone, Principal Hydrogeologist, Itasca Denver, Inc., and Wonyong (Alan) Jag, Senior Project Hydrogeologist, Itasca Denver

**Abstract:** Pit lakes, and the various predictive models related to them, have rapidly become a major issue in mining permitting. An understanding of pit-lake hydrology is now required in the pre-feasibility stage of the mining life cycle, so that any possible issues related to predicted pit-lake water quantity or quality impacts may be addressed. Predictions of possible environmental impacts are commonly made using groundwater flow and aqueous geochemical modeling codes, which are respectively used to predict pit-lake water budgets and pit-lake water quality.

Of the various processes that govern the predicted water budget of a pit lake, the volume of highwall runoff is commonly overlooked in terms of potential impact on both the stage and filling rate of the final pit-lake. Groundwater models generally use a scalar to calculate the volume of highwall runoff from the incident precipitation volume on highwall surfaces. While this method does account for attenuation of surface water in transit to the pit lake, the scalar used varies dramatically from site to site, and is not well constrained or supported by empirical evidence.

We present a more detailed method of calculating the volume of highwall runoff. In contrast to the method of a simple runoff-scalar, this method incorporates site-specific information on the final pit surface and estimated runoff characteristics. Additionally, this method is based on previous research both in Nevada and other arid climates on the relationship between rainfall intensity and runoff. Our method is paired with the LAK2 package of the numerical groundwater modeling code MODFLOW.

- **Electronic Leak Detection and Leak Location Methods on Geosynthetic Liners in the Mining Industry**, Shawn Calendine, Geoscientist/Marketing & Development Director, hydroGEOPHYSICS, Inc., Tucson, AZ

**Abstract:** Over the last 45 years geosynthetics have rapidly become a critical component in the operation and reclamation activities of mine sites. Geosynthetic liners are an integral component in the management of water activities in the mining industry and are routinely used as containment barriers in the mining process. Physical examination of the many different varieties of geosynthetic liners can suggest that these materials are a robust barrier; however, when subjected to the harsh mining environment, they can be easily damaged. Consequently, the potential for leaks to occur over the lifespan of these containment systems is high. Left undetected, these leaks can increase the risk of shutdowns, regulatory fines, and extreme remediation costs. While the theory of electri
Electronic Leak Detection... (continued)

cal leak location works the same for many geosynthetic lined systems, proper consideration towards the potential challenges may determine the survey’s success or failure. In this discussion we will present an overview of geosynthetic leak location methods, and possible challenges related to the leak location process for fluid covered and earthen covered liners associated with containment structures in the mining industry.

- **Crossroads-Pipeline Pit Expansion Dewatering, 2017 Update**, Brian Peck, Senior Hydrogeologist, Barrick Gold of North America - Cortez Mine, Crescent Valley, NV
- **Water Polution Control Permitting in Nevada for Metals Mining**, Shawn Gooch, Staff Engineer, Bureau of Mines Regulation and Reclamation, Carson City, NV

**LARGE LEFT LATERAL LEAPS FOR ENVIRONMENTAL PROFESSIONALS – IF I RAN THE WORLD...**

Chaired by: **David Steed**, Mining Business Line Lead and **Ken Houser**, Senior Principal, SWCA Environmental Consultants, Salt Lake City, UT

*Area of Interest - Environmental*

**Session Description:**

Representatives from agencies, industry, legal firms, and the political world, discussing how they would change the regulatory and permitting landscape. Each speaker has one slide to show how they would change the permitting process. Open forum discussion focusing on such potential topics as:

- What should the Trump administration do in 2018 to make America Great Again?
- Long-term liabilities, how can we limit our exposure—or at least quantify them—while still being a responsible miner?
- What is the ONE thing that could be done right now to make NEPA work for everybody—agencies, mining companies, environmental groups?
- What is the ONE thing that Congress could change to make NEPA work for everybody in the long-term?
- Endangered Species Act—does it go too far? How can it work better?

Panel members include:

- **Connie Rogers**, Partner, Davis Graham & Stubbs, Denver, CO
- **Katherine Arnold**, Director of Environment, Rosemont Copper Company, Tucson, AZ
- **Christopher Thomas**, Partner, Perkins Coie LLP, Phoenix, AZ
- **Gene Weglinski**, Senior Permitting Coordinator, Donlin Gold, LLC, Anchorage, AK
- **Nick Enos**, Principal Geoscientist, BGC Engineering, Bend, OR
- **Ron Rimelman**, Vice President Environment, Health, Safety & Sustainability, Nova-Gold, Salt Lake City, UT
EMBRACING ONLINE TOOLS FOR REPUTATION MANAGEMENT & EXTERNAL OUTREACH

Chaired by: Trevor Hall, President, Clear Creek Digital, Wheat Ridge, CO

Area of Interest - Legislative & Public Affairs

Session Description:

Communication tools, particularly social and online networks, are becoming increasingly important to the external communications and outreach of a mining operation. This session will provide an environment where mining professionals can learn current communication trends for brand and reputation management, crisis communication, and online external outreach.

- Mining and the Paradigm Shift in Communications: Why it Matters for the Industry, Trevor Hall, President, Clear Creek Digital, Wheat Ridge, CO

Abstract: The technological advances in communication tools and hardware have resulted in a complete paradigm shift in information gathering and sharing. Mobile equipment, social media and the Internet of Things provides immediate response to our inquiries and our dialogue.

These innovations have direct implications for mining companies throughout the lifecycle of a mine. From exploration to reclamation, people are now able, and often willing, to speak of mining operations even without any involvement from the mining company.

In this presentation, we’ll discuss how mining companies and service providers can utilize these communication trends to expand their stakeholder engagement, listen to online public dialogue, and enhance the social license to operate. We’ll take a look at where people are organizing online and what online networks the public uses to find and share information and ideas.

- Perception is Reality: Engaging the Public in the Information Age, Adam Hawkins, President, Global External Relations, Phoenix, AZ

Abstract: Are you prepared to face the public with your project plans? Are you communicating in language your audience can understand? Knowing the right steps can shave months, if not years off, of bringing your project online. Public relations expert Adam Hawkins leads a presentation and discussion on public engagement in a digital age and demystify your interactions with the public and help you earn the hearts and minds of your community.

- Engaging New Stakeholders and Investors using Online Communications, Sean Kingsley, Vice President Finance, Secova Metals Corp., Vancouver, BC, Canada

Abstract: The mineral exploration & mining industry has changed forever since 2008. Gone are the days where investors would speculate on a good story being told on the phone. In my opinion and the entire investing communities best interest this is for the better. A new age of investors has been entering the industry, and like the world around us they don’t have time for hours to do due diligence unless your story merits it.

In today’s times, the best management teams with high quality mineral projects can easily raise the capital needed to potentially create jobs and boost economies with another mine going into production. My focus for this talk is not for those guys, it’s to share with
you some tools and strategies of what the junior companies aka the little guys can do to

*Engaging New Stakeholders... (continued)*

try and leverage some attention for their grass-roots exploratory projects. With enough exposure & capital raised to develop these projects there’s a chance that eventually it can become a take-over target for those guys to develop into a mine.

Items to be covered: internal databases, news dissemination in North America & Germany, social media platforms such as Twitter, Facebook & LinkedIn, 3rd party marketing partners, newsletter writers, video creations and drones.

- **In Case of Emergency: Break-Glass-Tweet. Your world is social. Are you?** Devon Coquillard, Communications & Outreach Manager, American Exploration & Mining Association, Spokane, WA

Abstract: Social media platforms extend far beyond social networks they originally sought to create and are something we should all be familiar with at this point. These platforms extend users reach into digital spaces far beyond the immediate geographical space of the user and can do so quickly. These two features are critical in crisis. When individuals, agencies or companies need to reach the public and their stakeholders effectively and in a timely manner they should choose social media.

For mining companies, who have a great responsibility to meet the social contract given to them by communities and the inclusive process of mine permitting which requires involvement of other stakeholders, it is absolutely necessary to have a comprehensive communications strategy that includes social media.

The simple fact is people spend more time on social media sites than any other type. These sites have indeed made the switch from internet fringe to an official channel for information. In order to serve their communities’ and stakeholders, the mining industry needs to utilize these tools; especially during crisis’. Successful communications strategies, particularly during an emergency, must be both timely and relevant, with regular updates and elaborations & social media is the tool to use. However, it is not enough to ONLY tweet or Facebook in an emergency, cultivating the online community and utilizing social media outside of and before emergency situations improves communications and allows companies to control their narrative. It serves as an established and known channel that will be referenced when you need it most. The rapidness in which information can be disseminated (or corrected) is really where social media is indispensable.

- **Legislative & Public Affairs: Affectively Building Public Awareness Accurately Using Emerging Technologies**, Shane Goosney, Senior Project Specialist, Stantec, Tempe, AZ

Abstract: In today’s rapidly changing and competitive information pipeline, the medium is the message. The mining industry must be attentive to all opportunities available to gain a symbiotic relationship with those it wishes to communicate. Using Building Information Management (BIM), Visualization software and technologies as data gathering and communication tools, companies can leverage the latest equipment and procedures to coordinate and streamline the distribution and dissemination of information to the public and regulatory agencies. This presentation will demonstrate how the effective use of 3D modeling and visualization tools can be leveraged in conjunction with current and emerging equipment and processes, including advanced digital technologies, to produce more effective communication conduits, resulting in clearer and more accurate perceptions for all stakeholders. The presentation will illustrate the use of info graphics, virtual and augmented reality combined with interactive models to convey and shape how the
As exploration in the Great Basin heats up once again, alongside a rising gold equities market, interesting geological concepts are being developed and tested. With an increasing need for new mines, more companies are exploring early-stage prospects that present real opportunities for discovery. Because surficial indications of mineralization can often be more subtle than in the past, creative approaches and innovative thinking, applied along with conventional boots-on-the-ground exploration, are as important as ever. This session will highlight early-stage exploration projects, some of which have seen significant activity in the past, along with others that may be less familiar. Talks include:

- **The Pony Creek Project - Systematically exploring for the next big gold discovery on the southern Carlin Trend**, Vance Spalding, VP Exploration, Contact Gold, Spring Creek, NV

**Abstract:** Contact Gold is a new Nevada gold exploration company that listed on the TSX-V exchange in June of 2017. Our 2017 exploration effort is focused upon the wholly-owned, unpatented mining claims covering 95 square kilometers at the Pony Creek project. Pony Creek is located on the southern Carlin Trend between the Railroad-Pinion and Bald Mountain districts where significant, new discoveries and resource/reserve additions have recently been announced.

Significant gold mineralization was discovered by stream sediment sampling followed by drilling in the early 1980's at Pony Creek, including a Newmont drill hole that returned 2.88 g/t over 99 meters. Contact has a large database from this previous work including data for over 200 drill holes, rock and soils sampling, geophysical surveys and surface mapping.

Sedimentary rocks exposed at Pony Creek range from the Devonian Devil’s Gate limestone up to the Pennsylvanian/Permian overlap sequence. Most of the gold encountered in drilling to date occurs beneath or proximal to an Eocene (44 Ma?) rhyolite intrusion in the Penn/Perm sandstones and conglomerates. Gold mineralization appears to be controlled by North, North-Northeast, and West-Northwest striking structures.

Our 2017 exploration program includes plans for 8,000 meters of shallow RC and deep core drilling, detailed mapping and soil and rock sampling. Exploration will target the Pennsylvanian/Permian overlap sequence in particular in areas that were ignored by previous explorers, as well as the traditional exploration target at the top of the Devonian Devil’s Gate Limestone.

- **The Keystone District on the Cortez Trend: An applied, comprehensive gold exploration program to a large early Tertiary goldbearing hydrothermal system**, Dave Mathewson, Vice President Exploration, US Gold Corporation, Elko, NV
Abstract: The Keystone Project is a district-scale, early-Tertiary intrusive-centered, lower-plate-hosted, domed, Carlin-type gold deposit discovery opportunity located in the heart of the north-northwest trending Cortez Gold Trend (Battle Mountain-Eureka Trend). Keystone land accumulation began with the mid-2015 agreement of two private companies: Americas Gold Exploration, Inc., controlled by Donald McDowell, and Nevada Gold Ventures, LLC, controlled by David Mathewson. The composite 2015 property position was increased to 256 claims by staking additional lands upon abandonment of a large existing third-party claim position. The property position was further increased to 373 claims by the end of 2106, and to 650 claims as of this date. 100% control of Keystone was acquired by US Gold Corp. in mid-2016. Through a reverse takeover completed June, 2017, US Gold Corp. became listed on the Nasdaq as USAU. US Gold Corp. also controls the Copper King porphyry copper-gold deposit in southeastern Wyoming, and the Gold Bar North property southeast of Keystone. The Keystone district has had a long history of multiple property positions controlled by various individuals and companies. Approximately 240 holes, to an average depth of about 300 feet, have previously been drilled. The geology was apparently poorly understood, and gold potential arguably under-appreciated. No systematic, modern-day, district-wide exploration has previously been conducted at Keystone.

In 2016, US Gold Corporation initiated detailed district-wide geologic mapping, detailed gravity, altered cobble and stream sediment sampling, and comprehensive soil and rock sampling. US Gold’s soil sample technique effectively eliminates exotic dilutive aeolian material from the soil material. Drilling commenced under three NOI’s, and an Environmental Assessment (EA) was initiated for expanded access with a pending 2018 Plan of Operations (POO). US Gold is supporting a UNR Department of Geology Master’s degree evaluating the characteristics and history of the complex Keystone intrusive system. 2016 drilling was comprised of five wide-spaced, vertical core holes; a sixth core hole was completed early 2017. Holes were drilled for information and to provide initial “tests” of potential target areas. Three RC holes were drilled in early 2017 to follow on an identified alteration zone of interest. A fall, 2017 drilling program providing additional, early assessment of several target areas is in progress. Drill results to date have been very informative and encouraging.

The Eastside Gold Deposit - a New Discovery in Esmeralda County, Nevada, Andy Wallace, President Columbus Gold NV, Cordex Exploration Co., Reno, NV, Peter Chapman, Bruce Delaney, Jon Vinson, Kevin Marks, Doug McGibbon, and James Greybeck

Abstract: Eastside, twenty miles west of Tonopah, Nevada, was discovered by surface sampling by experienced prospectors. The original Cordex sampling encountering gold at Eastside was by G.W. Delamare in 1974 immediately following the Cordex discoveries at Hasbrouck Mountain and Three Hills. Larry McIntosh sampled a larger and more significant zone of gold mineralization at Eastside about one mile north of Delamare’s sampling while prospecting for Cordex in 1997. Cordex chose not to work on the McIntosh showing at that time, but Jon Vinson of Cordex re-examined the McIntosh work in 2008 and 2009, and collected an additional 500 surface samples with the help of McIntosh. The positive results of that work led Cordex to lease the McIntosh showing, and stake additional claims.

Columbus Gold Corp. has provided all funding for Cordex work at Eastside and is the (continued on next page)
current owner of the property. The Eastside claim block covers about 27 square miles or 70 square kilometers covering the eastern and northeastern part of the Monte Cristo Range, including the previously known Castle, Berg, Black Rock, and Boss gold deposits on the south. The northern half of the claim block covers a young (7.2 mybp) rhyolite dome field containing at least 41 separate rhyolite flow domes ranging from 100 m. to 1,000 m. in diameter. Gold and silver mineralization occurs largely within the rhyolite domes and along their margins in Tertiary rhyolite breccias (eruptive equivalents of the rhyolite domes) and andesite lahars of the Blair Junction and Gilbert Formations.

Eastside is a classic example of a high-level, low-sulfidation, epithermal, gold and silver deposit. The uppermost level of alteration is solfataric, with snow white outcrops of very fine opal/chalcedony, alunite, and kaolinite which likely formed near the paleosurface at time of mineralization. Alteration grades downward into chalcedonic silica and kaolinite replacement, underlain at even lower levels by massive replacement zones of crystalline quartz, adularia and illite. Replacement alteration is cut by veins and stockworks of quartz, coarse adularia, and calcite (and quartz after calcite) becoming more common with increasing depth in the system. Most all the hydrothermally altered rocks are oxidized but several varieties of pyrite and marcasite are seen below 1,000 feet of depth and sporadically as trapped inclusions in dense replacement silica and quartz.

Most of the exploration work and drilling at Eastside has been concentrated in one square kilometer (the “Original Target”), where an open-ended resource of 721,000 ounces of gold equivalent has been identified. Detailed geologic and alteration mapping along with the collection of several thousand surface samples has identified several dozen target areas elsewhere on the property for future drilling.

- **Relationship of Mineralization to Dome Formation at the Gilbert South Property, Nye County, Nevada**, Mark Coolbaugh, Chief Geoscientist, and Lindsay Craig, Renaissance Gold, Inc., Reno, NV.

**Abstract:** The Gilbert South gold property hosts a low-sulfidation epithermal system in the Gilbert District of Esmeralda County, Nevada. The district includes multiple active exploration plays including the East Side and Castle projects being explored by Columbus/Allegiant Gold and the McLean Lode currently controlled by Hecla. Minor gold production in the early 20th century came from narrow high-grade veins cutting volcanic rocks. Drilling by multiple exploration companies in the last 30 years on the Gilbert South prospect has intercepted anomalous gold beneath surface exposures of widespread, shallow-level, chalcedonic quartz-carbonate veins. In spite of semi-continuous exploration activity over decades, detailed geologic mapping has not been found to provide context for drilling results. Geologic mapping by Renaissance geologists in 2016 and 2017 has clarified the geologic history and identified new exploration targets.

At Gilbert South, Tertiary volcanic and sedimentary rocks overlie the Ordovician Palmetto Formation. The Tertiary rocks include, from oldest to youngest, 1) late Oligocene-early Miocene felsic tuffs, including the Castle Peak Tuff, 2) early to middle Miocene dacites, andesites, rhyolites, and volcaniclastic sediments corresponding largely to the Blair Junction sequence, 3) a thin but laterally continuous tuffaceous sedimentary sequence that includes diatomite (McLeans sediments), and 4) middle Miocene Gilbert Andesite. Intrusive activity at Gilbert South is widespread and consists of dikes, sills, plugs, and flow-dome complexes of porphyritic dacite of the Blair Junction sequence, and a cluster of 10 or more shallow intrusives and domes of Gilbert Andesite.

In the western portion of the property, the existence of a possible volcano-tectonic depression pos-
sibly related to felsic tuff eruption is suggested by an increased thickness of Blair Junction volcanic rocks and a change in tuff exposure levels. The underlying Palmetto Formation has been extensively silicified and brecciated, possibly due to regional detachment faulting recently recognized by Gilbert South Property... (continued)

other workers. However, dacite dikes and sills believed correlated with the Blair Junction sequence have intruded into deformed Palmetto Formation at the contact with overlying felsic tuffs and are not sheared and brecciated. This together with the fact that vein systems continue across the unconformity, suggests that the majority of intrusive and hydrothermal activity in the area post-dates large-scale low-angle faulting, and that local intrusive rocks are rooted at depth. Most veins in the area strike north-northeast, consistent with west to northwest-directed extension. Hydrothermal veins and vein breccias are commonly well developed within and marginal to shallow intrusions. In one area, extensional step-over structures in vein systems coincide with the location of cryptodomes. At two other localities, structural preparation is best developed where vein systems intersect volcanic dome margins. These relationships are being used to define new drill targets by combining lithology, structure, and levels of vein formation into coherent hydrothermal exploration models.

- The Goldbanks Project: A lot of high grade smoke, but where’s the fire?, Chad Peters, Exploration Manager, Nevada, Premier Gold Mines Ltd, Reno, NV

Abstract: LOCATION: The Goldbanks property is located in Pershing County, Nevada, approximately 50 kilometers south of the town of Winnemucca. The project is a 50-50 JV between Premier Gold Mines Ltd. (Premier) and Kinross Gold with Premier being the operator. Mean elevation is 1,600m (5,250ft.) above sea level.

STORY: The Goldbanks project is situated along the prolific Northern Nevada Rift (NNR) structural trend, host to numerous low sulfidation epithermal deposits including the Midas (~5.0 Moz Au) and Sleeper (~2.5 Moz Au) gold mines. The property has seen near continuous exploration from multiple operators since discovery of the shallow oxide Main Zone deposit in the 1980’s and is currently one of the largest known epithermal systems in Nevada without a defined high grade feeder vein. The property is host to numerous gold prospects, several past producing mercury and antimony occurrences and two potentially open-pittable resource areas; the Main Zone and satellite KW zone (Ellis & Stroup 2015). The Golden Devil was a conceptual target developed by Kinross exploration in 2012 and subsequently drilled in 2013 to test the western margin of the basin model. All three intersected a brecciated mafic dike complex of unknown age containing multiple intercepts of >10.0 g/t Au with a highlight vein intercept of 192.00 g/t Au and 10,850.00 g/t Ag across a drilled length of 1.1 m. Premier entered into a 50-50 JV earn-in agreement with Kinross in August 2016 with the goal of defining a high grade vein system at the Golden Devil. Two holes were drilled in 2016 but were unsuccessful in repeating previous Kinross intercepts. As a result, the first half of the 2017 exploration program was focused on detailed X-sections, re-logging, geochemical analysis and field work to re-interpret the geologic model and answer multiple questions raised during the 2016 program, including:

1) Does the Golden Devil target have the potential to be a continuous vein system?
2) How is the complex structural fabric of the Goldbanks basin controlling the strike and dip of the high grade?
3) Are the Main Zone, KW Zone and Golden Devil the same age?
4) Can we use existing SWIR and geochemical data to model zonation patterns (continued on next page)
and vector toward high grade?

The second half of the program consisted of a two phase 30,000’ drilling campaign to test the re-interpreted geologic model, which saw significant changes, including a shift from steeply east to steeply west dipping normal faults as the primary basin forming structures. Premier technical staff completed phase I drilling in Q3 which successfully confirmed the new structural model as well as returned multiple high grade intercepts ranging from 6.0 -10.0+ g/t Au and up to 3000.0 + g/t Ag across multiple targets. Phase II drilling will be complete in Q4 and will use the refined structural model to test the Golden Devil fault target directly up-dip of the discovery intercept as well as along strike in hopes of defining a high grade feeder vein within this highly prospective epithermal system.

MINERAL PROCESSING/EXTRACTIVE METALLURGY FOR MINING SUSTAINABILITY

Co-Chaired by: Melanie M. Bond, PE, Owner/Principal Engineer, Bond Minerals Services and Engineering, PLLC, Lead, SD and Dr. Courtney Young, Department Head Metallurgical and Material Engineering, Lewis S Prater Distinguished Professor, Montana Tech, Butte, MT

Area of Interest - Operations

Session Description:

A selection of papers intended to inform early stage project managers of the many mineral processing and metallurgical testing options available to support the development goals of the project while promoting an early look towards environmental sustainability of future operations. Talks include:

- **Global Mining Capital Estimation and Project Execution Failure**, Dr. Corby Anderson, Harrison Western Professor, Department of Metallurgical & Materials Engineering, Colorado School of Mines, Golden, CO

  **Abstract:** During the recent metals Super Cycle, there were significant instances of Capital destruction and startup challenges. Now, after a brief respite, there is renewed global activity. However, the underlying critical aspects and technical demographics that caused this destruction still remain today if not more so. This presentation outlines this issue and offers options to ameliorate it.

- **The Use of Pilot Scale HPGR Crushing in Metallurgical Testing for Heap Leach Optimization**, David Kruth, Metallurgical Engineer, Kappes Cassiday and Associates, Reno, NV

  **Abstract:** Heap leaching is an economically viable method of processing many moderate and low grade metallic ores. Size reduction of the ore is a significant operational expense but may be required to achieve acceptable extractions. Advances in comminution efficiency led to the development of high pressure grinding rolls (HPGRs). The mechanisms of HPGR comminution are different from typical tertiary crushing. The application of compressive forces in HPGR comminution increases the crushing efficiency of many ore types and may lead to the preferential liberation of minerals. Consequently,
the size distributions of HPGR products are not the same as typical tertiary crusher products. HPGR crushing generally produces a higher percentage of fines for a comparable conventional crush size. The change in the product distribution may have a significant impact on the leaching characteristics of the ore.

**Pilot Scale HPGR... (continued)**

The laboratory test work required for heap leach design can be extended to include HPGR integration. Additional fines in the crusher product may improve the leach kinetics and the overall recovery, but it may also decrease the heap permeability and increase the reagent requirements. HPGR design testing provides the information to appropriately size an industrial machine but does not account for other factors. A comparative analysis of conventionally crushed and HPGR crushed material through agglomeration, percolation and leach test work will indicate additional impacts of adding an HPGR to a new or existing circuit.

- **Prediction of Performance of a Vertical Stirred Mill Using a Bond Ball Mill**, Danielle Rocha, PhD Candidate, Dept. of Metallurgical Materials Engineering, and Dr. Hugh B. Miller, Associate Professor, Mining Department Colorado School of Mines, Golden, CO

**Abstract:** The use of ball mills for fine grinding is an inefficient process and has contributed to the increasing popularity of vertical stirred grinding mills in the minerals industry. Over the last decade, the performance and energy efficiency of stirred milling technology has become a preferred alternative to ball mills for fine and regrinding operations. The difficulty encountered in fine grinding is the increased resistance to comminution small particles when compared to coarse particles. Therefore, increased energy inputs are then necessary to raise the number of stress events in a mill to contribute to the comminution of fine particles. This work presents a hypothesis of a methodology to predict the product size distribution of a vertical stirred mill using a Bond ball mill. The Population Balance Model (PBM) was used to empirically analyze the performance of a vertical mill and a Bond ball mill. The breakage parameters obtained for both grinding mills are compared to determine the possibility of predicting the product size distribution of a vertical mill based on the results obtained from a Bond ball mill. The biggest advantage of this methodology is that most of the minerals processing laboratories already have a Bond ball mill to perform the tests suggested in this study. Preliminary results show the possibility of predicting the performance of a laboratory vertical stirred mill using a Bond ball mill.

- **Key Critical Support for Exploration and Project Development Using Automated Mineralogy**, Sarah Prout, Senior Mineralogist, Jake M, Lang, Global Metallurgy Manager, & Bernie C, Yeung, Mineralogist/Account Executive, SGS Minerals Services, Burnaby, BC CANADA

**Abstract:** Today, there are currently several automated mineral analysis systems on the market that can be used to provide large volume, low cost, quantitative mineral abundance data providing confidence and detail on domain definition and block modelling. QEMSCAN (Quantitative Evaluation of Minerals by Scanning Electron Microscopy) is but one of these technologies. It can be used to provide such mineralogical data which gives resolution on the identification of the minerals of interest such as the metal and silicate phases that can be critical to the advancement of a property to a feasibility stage. Elemental deportment can be used to define the occurrence of a metal within the deposit in terms of its recovery from a metallurgical perspective, which cannot be defined by as-

(continued on next page)
saying alone; whereas silicate phases can provide such details as define alteration zones. The data can be taken to the next level in terms of providing geometallurgical proxy values for predictive rougher recovery through flotation and hardness. All of this data can be added to resource modelling software; for example, the in-house SGS Genesis

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MINERAL PROCESSING ... (continued)

Automated Mineralogy... (continued)

package providing three-dimensional models combining data interpretation and analysis including geochemical, mineralogical and geometallurgical data to domain the ore body.

• Pyroprocessing of Copper Smelter Slag into Reusable Products, Natalie Deringer, Student, CAMP, Montana Tech, Butte, MT

Abstract: Slag is seen as a necessary, but deleterious, product of pyrometallurgical processing. Recent investigations have shown that legacy mining slags and current slags can be repurposed into one or more economic products. After careful initial characterization of the material, a flux is formulated and used to convert the slag into iron-rich metal as well as secondary slag which can be used as feed to the iron/steel and glass industries, respectively. By understanding the nature of the fluxes, it is possible to ensure that the secondary slag meets the criteria for the target markets. Current investigations have included evaluating temperature and fluxes to optimize production of metal and measuring Vickers hardness, crush strength, melt viscosity and density to control properties of the secondary slag. By shifting the thought process of waste products being economic by-products, the mining industry can continue to reduce the environmental footprint while improving the bottom line.

• Mining Sustainability by Tailings Repurposing and Water Treatment, Dr. Courtney Young, Dept. Head Metallurgical and Material Engineering, CAMP, J. Downey, D. Hutchins, L. Twidwell, H. Huang and A. Das

Abstract: Montana Tech has been engaged in repurposing tailings and treating waste water for quite some time. These commodities have been recycled in various capacities to help sustain the mining industry. Recent efforts include treating ARD for metal recovery, manufacturing synthetic lunar soil, improving sand quality for making concrete, and remediating industrial waters contaminated with heavy metals. These efforts are specifically reviewed; however, other efforts are discussed. It is noted that most efforts are universal; however, some are specific but can be expanded for use at other sites.

ABANDONED MINE LANDS (AMLs)

Chaired by: Ronald Breitmeyer, Assistant Professor of Geological Engineering, University of Nevada, Reno

Area of Interest - Environmental

Session Description:

There are an estimated 400,000 abandoned mine features in the State of Nevada alone. Those features include everything from minor prospect ground disturbances to massive mill sites and tailings disposal areas, generally classified as physical safety hazards or environmental hazards. Of the 400,000 features some estimate as many as 20,000 of those may pose environmental hazards and risks to human health or the environment. There is considerable uncertainty about the environmental risk factors.
posed by abandoned mine lands (AMLS) due to limited records and data available for many of these sites. Additionally, given the vast number of sites likely to exist, there is a dearth of current site characterization and investigation. The Nevada Abandoned Mine Lands Environmental Team (NAMLET), led by the NDEP AML Program, is a coalition of several state and federal agencies, members of the mining industry, as well as non-profit organizations and the Nevada System of Higher Education, with a common goal to formulate ideas and solutions for characterizing and remediating environmental risks posed by AML hazards.

This session would include presentation of collaborative projects between NDEP, the University of Nevada, federal agencies, and private industry aimed at developing tools and human resources in the interest of correcting environmental issues created by historical and legacy mining activities. This session would provide an opportunity to share interesting projects among those interested in AML issues, and learn from others working in the field. The session would also provide opportunity to share ideas and reflections on AML issues amongst all stakeholders. Talks include:

- **Academic-Agency-Stakeholder Partnerships for AML Research and Development**, Ronald Breitmeyer, Assistant Professor of Geological Engineering, University of Nevada, Reno
- **Bridging Soft Soils and Voids when Reclaiming Abandon Quarries**, Marco Isola, Eric Michaels and Phil Sledge, Maccaferri, Inc.
- **Monte Cristo Mining Area Non-Time-Critical Removal Action: Challenges Overcome and Lessons Learned**, Bernard Kronschnabel, Cascade Earth Sciences
- **AML Project: Inventory and Characterization of Inactive/Abandoned Mine (AML) Features in New Mexico**, Virginia McLemore, New Mexico Bureau of Geology and Mineral Resources

**Abstract:** Legacy issues of past mining activities forms negative public perceptions of mining, and inhibits future minerals production in the state. There are tens of thousands of inactive or abandoned mine features in 274 mining districts in New Mexico (including coal, uranium, metals, and industrial minerals districts), however many of them have not been inventoried or prioritized for reclamation. Abandoned mine lands (AML) are areas that were mined and left unreclaimed where no individual or company has reclamation responsibility (also called inactive, legacy and orphaned mines). These may consist of excavations that have been deserted and where further mining is not intended. The New Mexico Abandoned Mine Lands (AML) Bureau of the New Mexico Mining and Minerals Division (NMMMD) estimates that there are more than 15,000 abandoned mine features in the state, and has safeguarded over 2,300 mine openings since inception in 1981. The U.S. Bureau of Land Management (BLM) recently estimated that more than 10,000 mine features are on BLM lands in New Mexico and only 705 sites have been reclaimed. Most of these mine features do not pose any physical or environmental hazard and many more, pose only a physical hazard, which is easily but costly to remediate. But a complete inventory of these features is needed. Some of these inactive or abandoned mine features can pose serious health, safety and/or environmental hazards, such as open shafts and adits (some concealed by deterioration or vegetative growth), tunnels and drifts that contain deadly gases, highwalls, encounters with wild animals, radon and metal-laden waters. Other sites have the potential to contaminate surface water, groundwater and air quality. Heavy metals in mine waste piles, tailings and acid mine drainage can potentially impact water quality and human health. Many state and federal agencies and mining companies have mitigated many of the physical safety hazards by closing some of these mine features, but very few of these reclamation efforts have examined the long-term environmental effects. There is still potential for environmental effects long after remediation of the physical hazards, as (continued on next page)
found in several areas in New Mexico (for example Terrero, Jackpile and Questa mines). The NMBGMR in cooperation with the Mineral Engineering Department at New Mexico Tech and the NMAML program is conducting research on legacy mine features in New Mexico. The objective of our research is to develop a better procedure to inventory and characterize legacy, inactive or abandoned mine features in New Mexico.

**MORNING SESSIONS | FRIDAY DECEMBER 8**

*AML’S.. (continued)*

*AML Project - New Mexico... (continued)*

Mexico. This project will inventory, characterize, and prioritize for remediation the mine features in New Mexico for the NMAML Program. The project involves field examination of the mines features and collecting data on the mine features. Samples are collected to determine total whole rock geochemistry, mineralogical, physical, and engineering properties, acid-base accounting, hydrologic conditions, particle size analyses, soil classification, shear strength testing for stability analysis, and prioritization for remediation, including hazard ranking. Not only are samples collected for geochemical and geotechnical characterization, but the mine features are being mapped, evaluated for future mineral-resource potential, and evaluated for slope stability.

- **Effects of Modeling Decisions on Bounding Estimates of Percolation at an Unlined Tailings Disposal Facility with Limited Monitoring Data,** *Spencer Whitman, University of Nevada, Reno*

**MINE CLOSURE AND REMEDIATION**

Chaired by: **Nick Rauh, Mountain/Midwest Technical Manager, Agru America, Inc., Fernley, NV**

*Area of Interest: Environmental*

*Session Description:*

Mine closure is a critical component of environmental management in the mining industry. A thorough mine closure and reclamation plan is a complicated and often overlooked aspect in the design life of a site. This session will present technical presentations and case studies on the closure and remediation process from shut down to post-closure monitoring from mining professionals and land management agencies. Talks include:

- **The Value of a Detailed Temporary Closure Plan - Save Your Assets,** *Steve Boyce, P.E. Principal Consultant, SRK Consulting, Inc., Elko, NV*

- **Closure of Waste Rock Facilities in Nevada Using Composite Covers, a Modern Solution to Historical Issues,** *Chris MacMahon, Senior Engineer, Golder Associates, Reno, NV*

- **Lowering the Carbon Footprint and Extending the Life-Cycle of Metal and Coal Surface Mines,** *Raymond Donelick, Business Development Manager, BiMBy Power*
Brazil, Viola, ID

- Critical Geohydrologic Aspects of Evaporation-Cells for Process Solution Management, Rob Valceschini, P.E. Principal Engineer, Geo-Logic Associates, Reno, NV

LEGISLATIVE & REGULATORY AFFAIRS

Chaired by: Laura Skaer, Executive Director, American Exploration & Mining Association, Spokane, WA

Area of Interest: Legislative & Public Affairs

Session Description:

The Trump administration has brought renewed optimism for our industry. Industry experts and congressional staff will offer their insights on key legislative, regulatory and judicial issues facing the industry. Topics to be discussed may include: Greater Sage-grouse; CERCLA 108(b) financial assurance; Strategic and Critical Minerals legislation; Permitting reform; Mining Law reform; Waters of the U.S. rulemaking; and what to expect in 2018. Topics will be narrowed prior to the meeting.

Speakers include:

- Congress and Project Streaming: Past, Present, and Future, Fred R. Wagner, Partner, Venable LLP, Washington, DC
- Kathleen Benedetto, Senior Advisor BLM, Washington, DC
- Glenn Casamassa, Associate Deputy Chief, National Forest System, Washington, DC
- Matt Ellsworth, Government Affairs Manager, American Exploration & Mining Association, Spokane, WA
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