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## THURSDAY, JANUARY 25

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This signature session will provide an update on mineral exploration and mining activities in British Columbia, Yukon, and Alaska. The content will link the latest geoscience information with the latest mineral exploration and mining industry activities. This session is geared to providing prospectors, exploration geologists, engineers, miners, financial analysts, investment organizations and senior industry leaders with a solid foundation and a vision to succeed. Please join us as we celebrate the successes of the past year in mineral exploration and mining, and gear up for the discoveries ahead.

PROGRAM

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Mineral and coal production for 2017 continued to be a major contributor to the economy of British Columbia. In 2017, over 80% of this value is forecast to be from combined coal and copper production. During the year, an increase in commodity prices for precious metals, base metals and coal contributed to base metal and coal mine restarts. This included the Wolverine open pit metallurgical coal mine in northeastern British Columbia and the underground Quinsam thermal coal mine on Vancouver Island. In late 2017, work was being carried out at the Myra Falls underground base and precious metal mine on Vancouver Island in anticipation of an early 2018 official restart.

The Brucejack mine of Pretium Resources Inc. declared official commercial production in July. Brucejack is British Columbia’s only major precious metal mine.

A number of high profile metal and coal projects continued to advance with respect to permitting. Highlights include the issuance in March of Environmental Assessment approvals from both the federal and provincial governments for the Kemess Underground project of AuRico Metals Inc. In November a friendly acquisition of AuRico Metals by Centerra Gold Inc. was announced. In December, HD Mining International Ltd. received federal approval for its Murray River metallurgical coal project in northeastern British Columbia. Provincial approval had been granted in 2015. Work also continued on industrial mineral projects including environmental assessment and project evaluation for phosphate, silica, jade, gypsum, magnesite, graphite, limestone and aggregate.

Significant metal exploration programs continued to be carried out in British Columbia. For the first time since 2012, there was an increase in exploration expenditures for the province. Highlights include a new grassroots precious metal discovery by GT Gold Corp. at its Tatogga project, new results for Seabridge Gold Inc.’s Iron Cap deposit and encouraging results from Garibaldi Resources Corp.’s E&L project.
Mineral exploration in Yukon experienced a significant turnaround in 2017. Exploration expenditures for the year are expected to exceed $C87 million and development expenditures should exceed $C63 million by year end. This is nearly double 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 area gold discoveries are attracting their fair share of attention, too.

In July, Victoria Gold announced that it had secured financing for the construction of the Eagle Gold Mine in central Yukon. On August 18, the company broke ground; they were very active on site completing road, camp and earthworks prior to freeze-up.

The surge in the price of zinc over the past year is reinvigorating 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.
Alaska’s diverse metallogenic provinces, underexplored mineral resource potential and world-class gold, copper, lead, zinc and coal deposits continue to attract exploration capital. Alaska’s estimated total exploration spending in 2017, including near-mine, advanced-exploration and development-stage, and early exploration projects is at least US$90 million, nearly twice the spending observed in 2016. Ten projects spent more than $1 million. In 2017, Alaska had five lode metal mines (Red Dog, Fort Knox, Pogo, Kensington, Greens Creek), one coal mine (Usibelli), over 235 placer mines, and ten advanced-exploration and development-stage projects (eight active; three with drill programs).

With increasing metal prices and capital availability in 2017, there is renewed optimism, and companies in Alaska had numerous exploration successes and discoveries. Alaska had at least 39 active early stage exploration projects throughout the state, primarily focused on gold and base-metals. Drilling programs to advance exploration and development projects were carried out at the Arctic, Aktigiruq, Bornite, Donlin, Golden Summit, Golden Zone, Groundhog, Herbert Gold, Icy Cape, McCord, Palmer, Pyramid, Round Top, SAM, Shorty Creek, Shumigan, Stellar, Tetlin and Valdez Creek properties.

The Alaska government encourages resource development by providing geological datasets and maps, airborne geophysical surveys, Alaska Industrial Development and Export Authority partnerships with private entities to finance infrastructure and coordination efforts led by the Large Mine Permitting Team.
New geoscience informs mineral exploration and can expand its footprint, underpinning a New Generation of Discovery. This session, Expanding Exploration Space, will communicate front-line geoscience initiatives that are helping expand the footprint of exploration across the northern Cordiller. Topics will cover deposit to regional scales, serving first-hand research on established and nascent deposits while engaging contemplation on new exploration environments.

**PROGRAM**

- **Regional Stratigraphic and Tectonic Setting of Base Metal Occurrences In the Yukon**
- **Structural and Stratigraphic Setting of Vein-Hosted Gold Occurrences in Eastern Yukon**
- **Carlin-Type Gold in Eastern Rackla Belt of North-Central Yukon: Geological Setting, Controls on Ore Style and Geometry and Open Questions**
- **Tectonic Controls and Structural Modification of Porphyry and Epithermal Systems: Examples From KSM, Red Mountain and Big Bulk, Northwest British Columbia**
- **Development of an Integrated 3d Model and Distal Expression of the Highland Valley Copper System, South-Central British Columbia**
- **Nickel: A Cordilleran Perspective**
- **Tiny Yet Powerful - Apatite For Exploration**
- **Sweat, Sap And Emanations – What Trees And Snow Can Reveal About Hidden Mineralization And Processes**
Yukon is host to significant base metal resources contained in a range of deposit types. The most significant resources are found in sedimentary exhalative (SEDEX) and volcanogenic massive sulphide (VMS) deposits of Paleozoic age, although additional occurrences also include Mississippi Valley type (MVT) and “Nick-style” (Ni-Mo-Zn-PGE) deposits. In this presentation, we will review the Paleozoic tectonic evolution of the northern Cordillera, including development of the western continental margin of Laurentia and onset of arc magmatism in the peri-Laurentian terranes, and the setting of major base metal occurrences in Yukon.

New geoscience informs mineral exploration and can expand its footprint, underpinning a New Generation of Discovery. This session, Expanding Exploration Space, will communicate front-line geoscience initiatives that are helping expand the footprint of exploration across the northern Cordillera. Topics will cover deposit to regional scales, serving first-hand research on established and nascent deposits while engaging contemplation on new exploration environments.
CARLIN-TYPE GOLD IN EASTERN RACKLA BELT OF NORTH-CENTRAL YUKON: GEOLOGICAL SETTING, CONTROLS ON ORE STYLE AND GEOMETRY AND OPEN QUESTIONS

TIME: 2:15 PM – 2:35 PM


In east-central Yukon, the Rackla belt occurs along the northern boundary of the Selwyn Basin. It comprises Neoproterozoic (Windermere Supergroup and Hyland Group) sedimentary rocks overlain by Cambrian to Carboniferous strata. The succession is complexly faulted and folded and several phases of deformation are documented, but their kinematic and timing remain poorly constrained. Toward the eastern end of the Rackla belt, major faults split in several structures suggesting that the displacement is distributed through several branching splays (‘horsetail structure’) in this area.

Gold was discovered at several locations in the eastern part of the Rackla belt through follow-up work by ATAC Resources Ltd. on a stream sediment survey. Between 2010 and 2017, an extensive exploration program, including more than 90 km of drilling, targeted several mineralized zones. These zones share many similarities with Carlin-type deposits of western United States and are considered to be among the best examples of this type of mineralization outside of Nevada. The mineralized zones are hosted in two Neoproterozoic impure carbonate-dominated intervals and in a Paleozoic siltstone/mudstone unit, at the contact with less permeable strata. Key features such as the association of gold with micron-scale arsenian pyrite rims, the common occurrence of realgar and orpiment, a proximal decarbonatization with local zones of vuggy silica, the very low base metal content, and the co-enrichment in a series of diagnostic pathfinder elements (i.e. Au, As, Hg, Tl, Sb) indicate that the eastern Rackla belt gold mineralization is ‘true’ Carlin-type.

Despite these common traits, ore styles vary significantly and the mineralized zones are frequently associated with brecciated intervals that were formed through sedimentary, hydrothermal, and/or tectonic processes. This attests to the opportunistic nature of mineralizing fluids that exploit permeable pathways, regardless of their origin. The relative timing of mineralization
and deformation remains to be firmly established. It is presently unclear if strata were already steeply-dipping or not prior to the infiltration of the gold-bearing hydrothermal fluids. Resolving this issue is of crucial importance in the understanding of the original geometry of the hydrothermal system and in the identification of potential impermeable barriers that may have focussed hydrothermal fluids, which is essential in defining exploration vectors in the region.

TECTONIC CONTROLS AND STRUCTURAL MODIFICATION OF PORPHYRY AND EPITHERMAL SYSTEMS: EXAMPLES FROM KSM, RED MOUNTAIN AND BIG BULK, NORTHWEST BRITISH COLUMBIA

TIME: 2:55 PM – 3:15 PM

Gayle Febbo, Exporation Petrology Inc.; Lori Kennedy, University of British Columbia; JoAnne Nelson, BC Geological Survey; Bram van Straaten, BC Geological Survey; Hayley McIntyre, University of British Columbia; Richard Friedman, University of British Columbia

Recent regional and detailed mapping studies in the Golden Triangle of northwest BC suggests that porphyry and epithermal systems were emplaced in Early Jurassic pull-apart basins along reactivated basement structures. For example, we propose that the Kerr, Sulphurets, Mitchell, Iron Cap, Snowfield and Brucejack deposits of the Sulphurets district were emplaced in synmineral, pull-apart basins at right stepovers along north-striking dextral strike-slip faults. In addition, plutonism, vein geometry, alteration and metal patterns at Mitchell reflect a strong east-west trend attributed to east-west striking fault bends. Similarly, the Kerr deposit reflects north-south trends and first order structural control. The Sulphurets district deposits were subsequently deformed during mid-Cretaceous east-west shortening. The contraction resulted in 1) separating the once contiguous Mitchell and Snowfield deposits along an east-southeast-directed thrust fault, 2) the reactivation of Jurassic faults and 3) folding of porphyry veins in conjunction with the development of a heterogeneously developed cleavage, the intensity of which is a direction function of hydrothermal alteration type. In this talk, we will describe the tectonic setting and structural modification of the Mitchell-Snowfield and Kerr porphyry systems and apply this knowledge to recent geological mapping of the Big Bulk Cu-Au porphyry prospect and the Red Mountain Au-Ag epithermal deposit.
Understanding the distal features of economic deposits is essential for the exploration of new and potentially buried targets. Subtle expressions of hydrothermal fluid alteration and identification of the fluid pathways are imperative for defining vectors towards mineralization. Extensive geological and geophysical studies were conducted at the Teck Resources Limited owned and operated Highland Valley Copper mine, which is hosted in the late Triassic Guichon Creek Batholith (GCB). Pre- and syn-GCB magmas were emplaced over at least 11 million years with the main facies of the batholith forming between approximately 211 and 207 Ma. This long period of magmatic activity increased the fertility of the region through magmatic crystallization, mixing and oxidation, which culminated with the formation of the HVC porphyry Cu-(Mo) deposits. Hot, hydrous fluids released during the formation of mineralization produced high temperature alteration mineral assemblage of quartz-potassium feldspar-biotite-sulfide-mica adjacent to the deposits and assemblages of albite-white mica-epidote-calcite-tourmaline-prehnite distal from the main ore centres. Extensive field mapping was conducted over a 40 km by 30 km area with over 1000 samples of both fresh and altered rock types in the region collected for petrologic and analytic evaluation. Airborne magnetic and radiometric surveys, as well as ground and airborne gravity surveys, were reprocessed and used to develop a new 3D model of the batholith and porphyry centres. The model was constrained using the lithochemical and petrophysical properties of all the samples collected for the study and in addition was
Nickel sulphide and laterite deposits account for nearly 100% of global nickel production. Almost all nickel sulphide deposits are attributed to the emplacement of large volumes of anomalously hot, mantle-derived, ultramafic magmas near major lithospheric boundaries. Nickel-rich laterite deposits are typically formed in tropical regions of the Earth by deep surficial weathering of Ni-rich protoliths.

Past and prospective producers of nickel in British Columbia are unconventional and associated with neither anomalously hot melts of the mantle nor surficial weathering of ultramafic rocks. Instead, they occur as relatively small mafic to ultramafic bodies formed in convergent margin settings (e.g. Giant Mascot, Turnagain, E & L), or have formed through hydrothermal alteration of nickel-rich mantle tectonite and formation of Ni-Fe alloy awaruite (Decar). This talk will place the nickel deposits of the Canadian Cordillera in the context of current models of nickel metallogeny.
Apatite has been long recognized as a useful indicator mineral because it is resistant to weathering, is widespread in most rocks and mineral deposits, and its chemistry fingerprints different host rocks and deposit-types. This talk will outline the apatite discrimination approach developed by Mao et al. (2016) and its application to detrital apatites in till down-ice from known porphyry and other styles of mineral occurrences in central British Columbia. Detrital apatite grains recovered from basal till firmly identified up-ice alkalic porphyry Cu-Au, porphyry Cu±Mo±Au and porphyry Mo sources. Mechanical dispersal of apatite grains up to 12 km down-ice from bedrock sources of mineralization exceeds the extent of the associated geochemical anomalies in till by several kilometres. The effectiveness of the apatite discrimination diagrams for Au-Cu and W skarns, orogenic Au veins, Kiruna-type IOA, iron-oxide Cu-Au breccias, and orogenic Ni-Cu deposits is yet to be tested elsewhere, but detrital apatites assigned to W skarn and orogenic Au deposit-types are consistent with till geochemical anomalies, detrital chalcopyrite and gold grain counts, and regional geology in the studied areas. Although the apatite discrimination method of Mao et al. (2016) cannot directly identify epithermal Au-Ag deposits, which may be linked with porphyry systems, geological and geochemical data provide sufficient evidence to distinguish epithermal apatites. These orientation studies provide a practical protocol for the application of the apatite exploration tool, together with regional geology and till geochemistry and mineralogy, in underexplored greenfield areas such as the glaciated Nechako Plateau of central British Columbia.

**TINY YET POWERFUL - APATITE FOR EXPLORATION**

**TIME: 3:55 PM – 4:15 PM**

Alexei S. Rukhlov, BC Geological Survey; Mao Mao, BC Geological Survey; Stephen M. Rowins, BC Geological Survey, University of Victoria; Adrian S. Hickin, BC Geological Survey; Travis Ferbey, BC Geological Survey; Aaron Bustard, BC Geological Survey; Jody Spence, University of Victoria; Laurence A. Coogan, University of Victoria
SWEAT, SAP AND EMANATIONS – WHAT TREES AND SNOW CAN REVEAL ABOUT HIDDEN MINERALIZATION AND PROCESSES

TIME: 4:15 PM – 4:35 PM

Colin Dunn, Colin Dunn Consulting Inc.; David Heberlein, Heberlein Geoconsulting

Plant exudates are any materials that are transpired, excreted, secreted or otherwise leak out of plants or emanate from them. Trees and shrubs are leaky systems that transpire gases and liquids, and secrete some of their ‘life-blood’ liquids that can congeal on plant surfaces as sap. We have investigated their potential use as exploration sample media.

At the Woodjam Cu porphyry, 65 km northeast of Williams Lake, waxes leached from foliage samples were enriched in Cu, Mo and Zn over mineralization. The analysis of congealed sap collected from white spruce trunks indicated strong multi-element signatures including Cu, Mo and several pathfinder elements related to the underlying mineralization. Experience gained at Woodjam permitted refinement of methods on samples from a larger survey around the Endako Mo mine, 160 km west of Prince George. Saps collected soon after they had exuded from the trees had strong signature in Mo, Re, Bi, U, REE, Th, K, Rb, P, Na, Mn, Cs, Ag and Sr.

Fluids transpiring from white spruce foliage were collected by placing plastic bags over the twigs and foliage for a day. At Woodjam these fluids yielded significantly higher concentrations of Cu, Mo, As, Tl and S over mineralization than at background sites. Over Au mineralization at Mt. Washington, Vancouver Island, compared to background sites the halogens (F, Br, Cl and I) were elevated in fluids transpired from mountain hemlock foliage. At the same sites, emanating gases were collected in buried devices containing activated charcoal and resins: evidence of elevated halogen concentrations near mineralization was compelling. Similarly, profiles of snow pack cored in April from a few sites in the same area yielded concentrations of Br and I that decreased upward, indicating a steady flux from beneath.
Increased zinc prices have generated significant market interest and exploration activity surrounding this important base metal. This session will highlight the perspectives of industry experts to provide a snapshot of several zinc deposit models and the companies that will capitalize on favourable market conditions.

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The fundamental backdrop for lead and zinc has continued to remain positive as the effects of the well-publicized mine supply events of 2015/2016 continue to be felt. After exhausting zinc concentrate stocks in the first half of 2017, smelter outages and falling refined supply led to record metal deficits in 2017. Similarly, the lead market was in sizeable deficit as primary refined supply underperformed. The next stage of this story has now turned to the Chinese winter and to what extent smelters will be able to secure sufficient working feed to operate fully through the first half of 2018. For zinc, further refined market deficits to squeeze stocks to critical levels in the first half of 2018 are expected. This should support a continued price rally which begins to constrain demand.

The fundamentals of lead, and importantly the ability of primary lead (mined) output to fill the gap between demand and secondary supply, remain tied to developments at zinc/lead mines. As existing cash margins for zinc/lead miners have surged since the second half of 2017, this should support further exploration, development, re-starts and the next generation of mines.

History shows, however, that high zinc (and lead) prices persist only over transient periods due to high degrees of supply elasticity. A key question for explorers and developers is whether the presently high price environment will continue or collapse with an expected wave of additional mine supply.

One interesting aspect of this question is tied to the existing capacity in the smelting industry. On the lead side, there is no shortage of smelting capacity to recycle lead scrap, and though the picture on the primary side is clouded by greater flexibility in feed mixes with the advent of direct smelting technologies, it is unlikely there will be a shortage of capacity to treat primary lead concentrate in the foreseeable future. Conversely, the primary zinc smelting sector has suffered from relative underinvestment over the past 2-3 years. Indeed, financing smelter investment when concentrate availability is tight and spot treatment charges at historic lows has been difficult.

While China will undoubtedly drive the bulk of primary zinc smelting capacity growth over the next few years, we believe this growth will underperform mine supply. Concentrate stocks may recover swiftly over the next few years – driving up treatment charges, smelter revenues and ultimately investment into incremental
Mining-focused private equity got its start in the late 1990s when a dearth of public equity available for junior mining companies in the wake of Bre-X was recognized. Early investments targeted scoping through feasibility stage projects and consisted of a range of financing structures, but equity and convertible loans were the most common. As returns were generated and the sector evolved, other funds were created and/or adopted similar structures and strategies. While mining-focused private equity did not stand out amongst the many forms of financing available for junior mining during the rise of the commodities super-cycle through the early 2000s, the global financial crisis struck the industry hard in 2008. Despite a strong, but brief recovery into 2011, the industry has been through a declining and very difficult environment for junior mining finance over the past six years. Early in the current downturn, private equity was painted in the press as the saviour to the importance of secondary supplies, existing primary smelter capacities should be sufficient to treat the rising flow of lead concentrates in the years ahead.

PRIVATE EQUITY OPPORTUNITIES: FROM EXPLORATION TO DEVELOPMENT

TIME: 9:10 AM – 9:40 AM

Russ Cranswick, Partner – Head of Opportunities Fund, Resource Capital Funds

Mining-focused private equity may now be at a crossroads. While many of the existing and newly forming funds are concentrating in, or moving toward, the construction and operating phases of projects, only a select few are focused on the earliest stage of the mining development cycle – exploration. Exploration-focused private equity investors need to see strong, committed management teams with well thought out strategies to both advance their projects and opportunistically finance them in a way.
Lithium-ion batteries for the electric car are dramatically tightening global supply and demand conditions for lithium and cobalt. Lithium demand will more than double by 2025, even with conservative assumptions on electric car penetration. The ability of the industry to finance and bring on stream sufficient quantities of high-specification lithium hydroxide for battery makers will be challenged. Electric vehicles also promise a brighter future for key base metals — nickel and copper.

THE ART OF THE DEAL: HOW MAJORS INTERACT WITH JUNIOR EXPLORERS

There has been a downward trend in grassroots exploration as a proportion of total exploration expenditures over the past decade, especially in the gold sector. As producers have been forced to write down their reserves due to lower gold prices, finding projects that generate double-digit returns has become more difficult. Major gold producers have shrunk their exploration budgets and focused on brownfields exploration which is a lower risk endeavor but not necessarily one that generates high returns at these gold prices. Their shrinking project pipeline has led some producers to fund programs conducted by junior exploration companies as a proxy for their grassroots exploration programs. The deals that result from this interaction are examined.
Investor sentiment toward the global mining industry has improved markedly over the past two years. However, the copper-focused exploration sector has largely been unable to capitalize on the new momentum, with global budgets for 2017 only rising by 8% over 2016 levels — well below the 14% increase in the aggregate budget for all nonferrous commodities. Copper exploration efforts on the ground improved as 2017 progressed, but they trailed the rapid increase in activity levels recorded at gold and other projects. With copper prices also improving as the year progressed, we expect greater increases in exploration budgets and activity in 2018.

Supply disruptions could be a major feature of the copper market in 2018, perhaps even more so than in 2017. Multiple labour contract renewals — with their associated risk of strikes — are due for renegotiation, and there may be more weather-related disruptions as well. While copper mine production is nevertheless expected to grow by more than 4% year over year, slightly lower global refined demand growth will likely cause markets to be in deficit. With extra demand sources in electric vehicles, and with One Belt, One Road projects expanding traditional uses for copper, we expect market tightness throughout the medium term.

THE GLOBAL ECONOMY AND COMMODITY PRICES: SPECIAL EMPHASIS ON GOLD

TIME: 11:20 AM – 12:00 PM

Martin Murenbeeld, President & Chief Economist, Murenbeeld & Co.

The outlook for the gold price in 2018-19 in terms of the bullish and bearish factors that are likely to dot the landscape will be discussed concluding with a most-likely price scenario, and two alternative price scenarios.
Increased zinc prices have generated significant market interest and exploration activity surrounding this important base metal. This session will highlight the perspectives of industry experts to provide a snapshot of several zinc deposit models and the companies that will capitalize on favourable market conditions.

**PROGRAM**

1. Sediment-hosted Zinc Systems: Examples from Teck  
2. Arizona Mining's Taylor Deposit – A World Class Zinc, Lead and Silver Discovery  
3. Driving Value Through Successful Exploration: Resource Growth During Favourable Zinc Market  
4. Kipushi Cu-Zn Deposit in the Central African Copperbelt, DRC - New Insights and Implications  
5. Ayawilca, Peru: a Large and Growing Resource in a World-class Zinc Belt  
Global sources of zinc sulphide production span a range of sedimentary basin and platform, e.g. sediment-hosted massive sulphide (SHMS) deposits; rifted arc, e.g. volcanogenic massive sulphide (VMS); and convergent magmatic arc (e.g. skarn, carbonate replacement (CRD) and epithermal) environments, each of which can host significant orebodies and attractive exploration targets. Long life, high throughput and low-cost zinc production, however, is dominated by sediment-hosted systems, rendering these a particularly attractive target type.

Among the sediment-hosted zinc ore systems, varying deposit classification schemes have been proposed, reflecting tectonostratigraphic setting, local host rocks, and variable timing of mineralization relative to host rock deposition and diagenesis. Two-fold classification schemes are common in the geoscience literature, separating sediment hosted zinc systems into carbonate- and clastic-hosted groups, dominated by Mississippi Valley Type (MVT) and Sedimentary Exhalative (SEDEX) deposits. Irish Type (Irish) and Broken Hill Type (BHT) systems are commonly considered as sub-classes of the carbonate- and clastic-hosted groups respectively.

Here, a four-fold classification of major sediment-hosted zinc sulphide deposits is preferred, recognizing key differences between each of the MVT, SEDEX, Irish and BHT end-members. It is also recognized that transitional models between these end-member types is possible.

Spanning the breadth of zinc deposits types, Teck Resources Limited (“Teck”) has a long history and commitment to zinc exploration and mining. This history dates back to the amalgamation of various assets to form the Consolidated Mining and Smelting Company of Canada, or Cominco, in 1906, and initial production from the famed Sullivan deposit in southeast British Columbia in 1909. Examples of past and present Teck mines and projects will be presented including VMS (San Nicolas), skarn (Antamina), BHT (Sullivan) and MVT (Pend Oreille) environments, as well as our predominant focus on SEDEX systems.

Among SEDEX ore systems, the Red Dog camp of deposits represents a truly world-class district, which has yielded multiple discoveries over a more than 40 year history, and has supported mining for more than 25 years. Long-term commitment to integrated geoscience and exploration
efforts has resulted in advancement of exploration targets at Anarraaq and Aktigiruq, which have the potential to extend mining in the Red Dog district for decades to come.

ARIZONA MINING’S TAYLOR DEPOSIT – A WORLD-CLASS ZINC, LEAD AND SILVER DISCOVERY

TIME: 2:00 PM – 2:25 PM

Donald Taylor, Jack Mueller and Scott Burkett, Arizona Mining Inc.

Arizona Mining Inc.’s (AMI) Taylor Deposit is a new zinc-lead-silver discovery located in the Patagonia Mountains approximately 100 kilometers southeast of Tucson, Arizona on its 100% owned Hermosa Property. The Taylor Deposit is a carbonate replacement-type (CRD) sulfide deposit in the early stage of development.

AMI controls approximately 20,000 acres of unpatented and 450 acres of patented mining claims in the district. The complex geology of the area consists of multiple intrusive phases intruding into Permian carbonates and younger Cretaceous and Jurassic volcanics. The area also hosts several copper-bearing volcanic breccias and one known porphyry copper deposit (Red Mountain).

The Taylor Deposit mineralization occurs as strata-bound replacements, chimneys and fracture-controlled replacements at the Jurassic volcanic/Permian Concha limestone contact and along preferential stratigraphic horizons in the Permian aged Concha, Scherrer and Epitaph formations. The mineralization occurs as coarse-grained sphalerite, galena, chalcopyrite and pyrite with silver values ranging from 1 to 1,500 g/t. Deposit-scale zinc-lead ratios are approximately 1:1, although locally these can vary greatly. Analytical data from individual and concentrate samples indicate that silver is closely associated with galena, and sphalerite to a lesser extent. In April 2017 AMI released the results of a Preliminary Economic Assessment completed by AMC Mining Consultants (Canada) Ltd. The study indicated an after-tax net present value (8%) of US$1.3 billion with an internal rate of return (IRR) of 42% and payback period of 1.7 years. The study was based on a resource, at a 4% zinc equivalent cut-off grade, comprised of measured and indicated resources of 72.5 million tons grading 10.5% zinc equivalent and inferred resources of 38.6 million tons grading
116% zinc equivalent. Based on test work, metallurgical recoveries for the zinc, lead and silver averaged 92.7%, 95.4% and 92.5%, respectively.

AMI continues to expand the deposit through exploration drilling with a feasibility study scheduled for completion in mid-2018. Production is scheduled for late 2020.

**DRIVING VALUE THROUGH SUCCESSFUL EXPLORATION: RESOURCE GROWTH DURING FAVOURABLE ZINC MARKET**

**TIME: 2:25 PM - 2:50PM**

Daniel Marinov and Tim Kingsley, Trevali Mining Corporation

Trevali is a zinc-focused, base metals mining company with four operating mines (Santander, Caribou, Perkoa and Rosh Pinah) and several exploration projects. Trevali has a 10-year track record of adding value for shareholders by focusing exploration activities on highly prospective, under-explored projects in countries that offer security of tenure and support mineral deposit development.

Santander mine is located 200 kilometres northeast of Lima, Peru. The mine is situated in a cluster of high-grade zinc-lead-silver carbonate replacement deposits within the Central Peruvian Polymetallic Belt (a major global producer of silver, zinc and silver). Since 2008, Trevali has enjoyed almost 10-years of accretive resource growth and replacement at Santander mine.

The Caribou mine is located 50 kilometres west of Bathurst, New Brunswick, within the Bathurst Mining Camp. The camp contains 46 mineral deposits with defined tonnages, the majority of which are associated with Cambro-Ordovician felsic volcanic rocks. Resource expansion drilling in 2016 and 2017 will add significant inferred tonnage this year and the Caribou horizon remains an attractive target along strike and down dip.

The Perkoa zinc mine is located 130 km west of the capital city of Ouagadougou, Burkina Faso. Perkoa is one of the highest-grade zinc (+15% Zn) volcanogenic massive sulphide (VMS) deposits in the world and is the only known zinc deposit in the Boromo greenstone belt, which also contains orogenic gold and porphyry-style mineralization. Massive sulphide mineralization is associated with a repeated/folded sequence of tuffs and andesites. The Perkoa district is highly prospective for further VMS discoveries.
The Kipushi Cu-Zn-(Pb-Ag-Ge) deposit has produced ~60Mt at 6.8% Cu, 11.0% Zn. Kipushi is an atypical, late- to post-orogenic, discordant, vein- and replacement-style Copperbelt deposit, hosted in Nguba Group on the north-dipping limb of a north-northeast-verging anticline, at the abrupt structural juxtaposition of dolostones and siltstones of the Kakontwe and Katete formations with a wedge of similarly oriented siltstones and sandstones (“Grand Lambeau”). The lowermost Kakontwe is now recognized as microbial (reef-facies) dolostone upon which accumulated non-reefal Kakontwe-Katete carbonates. The abrupt and highly sinuous termination of these strata – the “Kipushi fault” – represents the lateral edge of a carbonate edifice that was subsequently the focus of deformation and mineralization. Juxtaposed Grand Lambeau strata represent deeper water siliciclastics and local fore-reef debris. The carbonate termination may lie above an older, undocumented syn-sedimentary fault. A halokinetic megabreccia occupies the anticlinal core and truncates the juxtaposed strata and the orebodies.

Kipushi’s individual orebodies differ in host lithology and setting. Mineralization focused at the steeply west-plunging intersection of the “fault”/edifice and Kakontwe-Katete contact. Copper and zinc occur as veins and replacive massive sulphides adjacent the “fault”/edifice, as moderately west-plunging replacive sulphide pods in the upper Kakontwe and (copper) veinlets within the Katete formations. Zinc also occurs as steeply south-plunging, ~pipe-like replacive massive sulphide orebodies in the Kakontwe dolostones (e.g. “Big Zinc”).

KIPUSHI CU-ZN DEPOSIT IN THE CENTRAL AFRICAN COPPERBELT, DRC – NEW INSIGHTS AND IMPLICATIONS

TIME: 3:10 PM – 3:25 PM

Structural controls on mineralization are varied and incompletely defined. Most ore and veins are focused at/near rheological litho-stratigraphic boundaries. The steeply north-plunging “fault”/edifice sinuosity parallels its intersection with strata and is likely ~syn-sedimentary. A steep southwest-dipping regional foliation post-dates the “fault”/edifice. Some ore veins predate foliation development. The distinct plunges of the pipe-like zinc orebodies and sulphide pods appear co-structural with the intersection of foliation and the “fault”/edifice and Kakontwe-Katete contact, respectively. Improved understanding of Kipushi’s setting and ore controls will aid exploration in Proterozoic basins.

AYAWILCA, PERU: A LARGE AND GROWING RESOURCE IN A WORLD-CLASS ZINC BELT

TIME: 3:25 – 4:00 PM

Graham Carman, Alvaro Fernandez-Baca, and Luis Giraldo
Tinka Resources Ltd

The Ayawilca zinc (tin) project is located 250 kilometres northeast of Lima in the Andes of central Peru, at elevations of between 3,900 and 4,300 metres. Ayawilca is located 40 km northwest of Cerro de Pasco, a large carbonate replacement polymetallic deposit (CRD) that has been mined continuously for centuries. The Ayawilca Zinc Zone, a new CRD discovery for central Peru, was discovered by Tinka in 2013.

Zinc mineralization at Ayawilca lies at depths of 120 metres to 400 metres depth, and remains open in a number of directions and at depth. Mineralization occurs in the form of flat-lying massive sulphide ‘mantos’ ranging from 10 to 30 metres thick, which merge into ‘chimneys’ up to 200 metres thick at West Ayawilca and South Ayawilca in the hinge of an anticline. Zinc occurs as marmatite and sphalerite accompanied by pyrite, pyrrhotite, magnetite and galena. The zinc mineralization is accompanied by high values of indium. Mineralization is hosted by the Pucará Group, a Triassic-Jurassic carbonate unit known throughout central Peru, which is flat lying and around 200 metres thick. Pucará limestone is overlain by flat-lying Goyllar Group sandstones which are generally unmineralized except for narrow zinc-rich veins. Beneath the limestone is phyllite ‘basement’, the contact believed to be represented by a low-angle thrust fault.

Tin mineralization is hosted separately from the zinc in pyrrhotite-rich iron sulphide mantostypically 10-15 metres thickbeneath the zinc mineralization and typically in contact with phyllite. Cassiterite is
accompanied by minor chalcopyrite within the pyrrhotite - pyrite - quartz mantos. The source of the tin and zinc mineralization is believed to an intrusion further to the east and at depth, which has not yet been identified.

Based on 45,000 metres of drilling from 2012 to 2017 and results to October 2017, the Ayawilca Inferred Mineral Resources (as estimated by RPA Inc. of Toronto) consist of 42.7 million tonnes grading 6.0 % zinc, 0.2 % lead, 17 g/t silver & 79 g/t indium (or 7.3 % zinc equivalent), AND 10.5 million tonnes grading 0.63 % tin, 0.23 % copper, & 12 g/t silver (or 0.70 % tin equivalent).
The Casino porphyry deposit is situated in western Yukon, 380 km northwest of Whitehorse. Volcanogenic massive sulfide (VMS) deposits are important global resources of zinc and can be classified into zinc-rich, zinciferous, and anomalous based on global geological resource data. Zinc-rich deposits have Zn>6.1% (geometric mean + one standard deviation) and >1.27Mt of contained Zn (>90th percentile for all deposits globally).

Deposits that are high-grade with Zn>6.1% but have <1.27Mt are considered zinciferous, whereas deposits that have high tonnages and >1.27Mt of contained Zn, but low-grades (Zn<6.1%) are considered anomalous deposits. Collectively, deposits with abundant Zn are collectively referred to as Zn-enriched deposits.

Zinc-enriched deposits are preferentially associated with VMS sub-types that are associated with felsic volcanic and/or sediment rocks (i.e., bimodal felsic, bimodal mafic, and felsic siliciclastic sub-types). They are found preferentially in Phanerozoic sequences, but there are also significant deposits found in Archean and Paleoproterozoic belts. Furthermore, throughout Earth’s history Zn-enriched VMS deposits show a distinct secular evolution with peaks in total contained Zn in the late Archean (~2.7 Ga), Paleoproterozoic (~1.9-1.8 Ga), Cambrian-Ordovician (~510-460 Ma), and Devonian-Mississippian (~390-355 Ma), with subsidiary peaks in the Mesoarchean (~3.0 Ga), Neoproterozoic (~0.75 Ga), Mesozoic (~220-200 Ma), and Cenozoic (~110-90 Ma).

The controls on Zn-rich VMS deposits, include: 1) association with extensional accretionary orogens, albeit during the early stage of arc/back-arc rifting where they are associated with high temperature magmatism; 2) association with sediment-rich belts, often underlain by evolved continental crust; 3) local and basin-scale anoxic conditions; 4) semi-permeable cap rocks (e.g., barite, volcaniclastic rocks, mudstones), which facilitate zone-refining and grade increases; and 5) some large and/or high grade deposits are associated with magmatic fluids and volatiles.

Identification of locations on the planet where a number of these processes have been active is critical for increasing the probability of exploration success and reducing exploration risk.
There has been renewed interest in mineral exploration this past year and a number of companies have stepped up their activity. This session will highlight exciting discoveries from around the world that demonstrate the clever and effective groundwork that has been done during the recent tough down-cycle over recent years.

**PROGRAM**

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Sama Resources Inc. is focused on exploring the newly discovered Yacouba Layered Complex and to develop the Samapleu nickel-copper-cobalt-platinum group element (PGE) deposits in Ivory Coast, West Africa.

The Samapleu mineralization is typical of a layered pipe-like intrusion or conduit hosted nickel deposits. These rare types of intrusions host the world’s largest nickel copper deposits such as Jinchuan (515 Mt at 1.06% nickel), Voisey Bay (137Mt at 1.68% nickel) and Kabanga (52Mt at 2.65% nickel).

The newly discovered mafic-ultramafic Yacouba Layered Complex has been identified through exploration work performed by Sama since 2009.

The Yacouba complex is composed of layered dunites, websterites, gabbros, gabbro-norites, diorites, anorthosites and magnetite-rich gabbro/anorthosite units. These 2.1 Ga assemblages are intrusive through the gneissic and granulitic assemblage of the Man Archaean Rise (3.5–2.7 Ga). Geological sequences of the Yacouba complex are forming dismembered and stretched assemblages that are either present as sub-vertical packages or as large sub-horizontal packages.

The complex can be traced discontinuously along a NE-SW corridor of at least 30 km long and by at least 10 km wide. It is open to the west, the south and to the northeast.

The Yacouba complex is characterized by its ultramafic to mafic feeder system (peridotites, pyroxenites, chromitites and minor gabbros or gabbro-norites). The complex also displays a sub-horizontal succession of noritic to anorthositic assemblages extending over a surface area of at least 25 square kilometres.

Ultramafic and mafic rocks of the complex host the Ni-Cu sulphides (pyrrhotite-pentlandite and chalcopyrite) and Pt and Pd minerals (Bismutho-tellurides, sulpharsenides). Nickel and copper mineralization are present as sulphide disseminations to massive sulphides veins and lenses.
DISCOVERY AND GEOLOGY OF KHARMGTAI PORPHYRY BRECCIA COPPER-GOLD DEPOSIT, GURVANSAIKHAN, SOUTHERN MONGOLIA

TIME: 9:00 AM – 9:20 AM

Andrew Stewart, Managing Director & CEO, Xanadu Mines; Joe Lo Grasso, Consulting Geologist, Xanadu Mines; Mat Brown, Chief Geologist, Xanadu Mines; Darryl Clark, Non-Executive Director, Xanadu Mines; Kevin Tomlinson, Chairman, Xanadu Mines

The Kharmagtai porphyry copper-gold deposit is located within in the Middle Palaeozoic Gurbansaikhan Belt of southern Mongolia, approximately 120 kilometres north of the world-class Oyu Tolgoi copper-gold project. The porphyry district consists of a cluster of cogenetic gold-copper-porphyry centres and late stage mineralized magmatic-hydrothermal tourmaline breccias emplacement within a composite calc-alkaline quartz diorite intrusive complex.

The Kharmagtai district was first explored by joint Russian-Mongolian geological expeditions from 1964 to 1982. In 2002, Ivanhoe Mines Mongolia in joint venture QGX (Quincunx) identified three areas which host significant porphyry related copper-gold mineralization.

Early porphyry alteration and mineralization at Kharmagtai are associated with a cluster of diorite porphyry dykes and stocks intruded into a quartz diorite intrusive complex and sediments. Porphyry style vein stockworks in Stockwork Hill, Copper Hill and White Hill comprise a common sequence of veining, including early magnetite (M veins) to irregular to sheeted high temperature, granular-textured composite laminated quartz veins (A and B veins). Porphyry stockwork mineralisation is crosscut by late massive sulphide (chalcopyrite – pyrite C veins) associated with feldspar-destructive, intermediate argillic to phyllic alteration, and overprints early potassic-sodic to propylitic alteration assemblages associated with the porphyry mineralization.

Early stockwork mineralization is superimposed by magmatic-hydrothermal tourmaline breccias. These tourmaline breccias form part of a major copper-gold mineralised breccia system with significant exploration potential. The tourmaline breccia complex is host to late oxidized, mineralizing fluids which have introduced significant copper and gold mineralization. Similarly, to the C veins, mineralization within the tourmaline breccias is associated with intermediate argillic to phyllic alteration where copper and gold has used earlier alteration as a reductant for precipitation of economic mineralization; the two are currently believed to be coeval.
Previous exploration recognized local domains of pyrite and chalcopyrite associated with tourmaline breccias in and around the porphyry deposits at Kharmagtai but did not consider the breccias favourable for mineralisation. The complex was explored as a traditional porphyry target with stockworking being the main target of drilling. Xanadu geologists have recognized that most of the copper and gold mineralization is late and overprints the porphyry mineralisation, and that the breccias are host to significant, high grade mineralization. This recognition opens extensive areas outside the porphyry centres to exploration. Tourmaline breccias at Kharmagtai crop out extensively several kilometres east of Stockwork Hill and Copper Hill. Xanadu’s recent discovery of significant domains of chalcopyrite ± gold cemented breccias deeper in the tourmaline breccia complex raises questions as to the prospectivity of the entire breccia complex for Cu-Au mineralization, based on what has been found in the roots of other mineralized magmatic-hydrothermal breccia pipes.

GENERATING PROSPECTS IN UNDEREXPLORED COVERED METALLOGENIC BELTS OF NORTHERN CHILE

TIME: 9:20 AM – 9:40 AM

Darryl Lindsay, Business Development Manager; Ricardo Gonzalez, Exploration Manager; Patricio Fernandez, Chief Geologist, Sociedad Quimica y Minera de Chile S.A. (SQM S.A.)

SQM S.A., a Chilean mining company, holds approximately 3 million hectares of mineral concessions in northern Chile, from which it is producing lithium, nitrates, potash, iodine and other specialty chemicals. The company’s vast resource base for nitrates and iodine has only been periodically and selectively explored for metals since 1996 despite some of the mineral concessions having existed for over 30 years. Due to third party exploration requests during cycles of increasing copper metal prices, SQM implemented a restrictive exploration option and joint venture business model active through 2013. In 2014, within the midst of the metals price/exploration/mining down-cycle, SQM built a specialized exploration team tasking them with the discovery of copper deposits containing a minimum of 1 Mt fine copper that could produce 50 000 t of fine copper per year. Synergistically with the exploration prospects identified by the exploration team, a prospect generator business model was implemented with its primary objective of advancing the discovery of
metal deposits. Over the last 4 to 5 years, via its own exploration and exploration by option partners, over 1,000,000 hectares of green fields has been explored with a total investment of upward of US$55 million.

Of the mineral concessions controlled by SQM, approximately 2.5 million hectares assure the current and future production of its iodine and nitrate resources. These concessions in turn overlie known metallogenic belts including the coastal Jurassic-Cretaceous copper belt that includes iron-oxide copper-gold (IOCG), strataform and porphyry copper styles of mineralization, for example Antucoya, Michilla, Mantos Blancos, Mantos Verde and Andacollo; the Paleocene belt of porphyry copper and epithermal silver and gold deposits, for example Sierra Gorda, Spence, Centinela, El Peñon, Guanaco, Cachinal, Amancayo, and Relincho; and the Eocene-Oligocene belt of giant porphyry copper deposits, for example Quebrada Blanca, Cerro Colorado, El Abra, Chuquicamata, Escondida, and El Morro-Fortuna.

SQM’s exploration team, through the reinterpretation of mineralization age trends, exhumation levels, Miocene block faulting, and by application of old-fashioned boot and hammer (sub-)outcrop mapping, has identified and compiled over 120 exploration prospects of which to date 56 are exploration drill-ready targets, principally within the Jurassic-Cretaceous copper belt. Of the total prospects, SQM has scout drilled 18 confirming the presence of mineralizing systems in seven of prospects. An additional 25 prospects have been identified and tested by exploration option alliance partners with variable success.

This series of porphyry copper-molybdenum style, IOCG/strataform, and possibly intermediate to low sulfidation epithermal deposits discovered to date in this new Cretaceous (?) metallogenic (sub-)belt north of Antofagasta, and similar to the Antucoya copper oxide discovery in 2003 (now in operation by Antofagasta Minerals), are the subject of current studies including radiometric age determinations and litho-geochemical and trace element (REE) characterizations to determine source rock permissibility for potentially economic copper deposits.
The Los Chapitos property is approximately 620 km southeast of Lima, Peru and covers 10,527.35 hectares and is located 15 kilometres inland from the coastal town of Chala, and the Pan American highway. In July 2015, Camino Minerals signed an option agreement to acquire 100% of the Los Chapitos property by making staged payments over 4 years totaling US$500,000 and issuing 500,000 shares of Camino.

The Chapitos copper-oxide project is situated along the margins of two parallel geological belts extending along the South American coast from Lima to central Chile. The immediate Coastal Belt hosts numerous mineral occurrences characterized as iron-oxide copper-gold (IOCG) deposits. These include the Mina Justa deposit which is located 100 km to the northwest of Chapitos. Mine Justa hosts a resource of 374 million tonnes grading 0.74% copper and 9 g/t gold, and is underlain by Jurassic age sediments and volcanoclastics of the Chocolate Formation which were subjected to potassic metasomatism at 142 Ma. Around 104 Ma, alteration related to intrusion of the coast batholiths introduced pyrite and magnetite into tectonic breccias formed along listric faults in a regional detachment surface. Between 95 – 99 Ma, relatively low temperature brines caused by dewatering of the Canete Basin east of the Andes, traveled along the detachment surface and sulphidized the magnetite, depositing copper sulphides in its place.

The Chapitos area is primarily underlain by lower Jurassic stratified volcanoclastic sediments, andesitic tuffs, pyroclastics and flows of the Chocolate Formation. These volcanics and sediments are locally brecciated and partially intruded by the hypabyssal Bello Union andesites of early Cretaceous age, as well as the late Cretaceous medium to coarse grained monzonites of the Linga Supergroup. Tertiary dykes cut the entire sequence and are generally barren.

The mineralization found on the project is dominantly chrysocolla, malachite, and tenorite in the oxide zone which is often intermixed with chalocite, bornite, and minor amounts of native copper. In the sulphide zones, chalcopyrite is the dominant mineral. The copper mineralization generally carries silver values which range between 5 and 10 ppm and very minor amounts of gold. The high grade sulphide mineralization is structurally controlled in what is believed to be part of the regional feeder system. These zones generally have a halo of oxide mineralization. Extending away from the feeder zones are beds of brecciated pyroclastic units forming lithogically
controlled zones of oxide and secondary sulphide mineralization that are 50 to 100 m thick and which are interbedded with magnetite rich andesitic tuffs.

Camino has completed over 16 000 m of diamond drilling since starting work in May 2017. Most of this work was focused on the Adriana Zone where the high-grade feeder zone is localized in the northwest trending Diva Fault. Where northeast cross structures intersect the feeder zone, brecciation is enhanced in the pyroclastic beds resulting an increase in thickness and extent of the lithologically controlled mineralization. Drilling is expected to recommence starting February 2018 with the aim of completing the initial resource estimation sometime in the third quarter of this 2018.

ANTAKORI CU-AU-AG PROJECT, NORTHERN PERU: A MONSTER IN THE MAKING!

TIME: 10:20 AM – 10:40 AM

Kevin B. Heather, Stewart Redwood, Hubert Gamarra, John Black and Exploration Staff, Regulus Resources Inc.

The AntaKori Project, Cajamarca Province, Peru, has a NI 43-101 inferred sulphide mineral resource of 295 Mt at 0.36 g/t Au, 0.48% Cu and 10 g/t Ag. This is based on 17 954 m of historical drilling in 70 holes. Regulus acquired the project in 2014, and in 2017 started a Phase 1, 15 000 m to 18 000 m diamond drill program. This will be completed in mid-2018 with an updated resource in late 2018.

The project is located within the world-class Au-Cu-Ag belt of northern Peru. It is adjacent to the Tantahuatay high-sulphidation epithermal (HS) Au mine (Compañía Minera Coimolache, Buenaventura-Southern Peru; 150 816 oz Au produced in 2016); 7 km NW of the Cerro Corona Porphyry Cu-Au mine (Gold Fields; 149 100 oz. Au and 29 900 t Cu produced in 2016); and 32 km NW of the Yanacocha HS gold mine (Newmont-Buenaventura; 655 000 oz Au produced in 2016).

AntaKori is characterised by calcic-skarn and porphyry-related Cu-Au-Ag mineralization (low As) overprinted by high-sulphidation Cu-Au-Ag mineralization (high As), and by carbonate-base metal Au-Ag-Pb-Zn-Cu mineralization (very low As). Mineralization is principally hosted in prograde and retrograde exoskarn in the Cretaceous Chulec and Inca Formations, as well as in quartz-anhydrite veinlets.
in quartzites of the Farrat Formation. Skarn mineralization is dominated by magnetite-chalcopyrite-pyrite. Additional mineralization is hosted within breccias and porphyry intrusions. The porphyry system responsible for the skarn mineralization has yet to be discovered, however alteration vectors and geophysical anomalies indicate several targets.

The Cretaceous rocks are locally overlain and cross-cut by Middle Miocene (12.7-13.2 Ma) intermediate to felsic volcanic and subvolcanic rocks of the Tantahuatay center of the Calipuy Formation, which hosts HS Au-Ag-Cu mineralization with enargite-tennantite-pyrite. The HS mineralization partially overprinted the skarn along the southwest side of the property. The system is, in turn, locally overprinted by younger, carbonate-base metal Au-Ag-Pb-Zn-Cu mineralization related to late stage rhyolite stocks and flow domes of Upper Miocene age (8.7-8.5 Ma).

Significant intersections from the current drill program include 189.3 m at 1.54% Cu, 1.05 g/t Au and 11.9 g/t Ag (2.40% CuEQ), including 110.7 m at 2.34% Cu, 1.63 g/t Au and 17.9 g/t Ag (3.67% CuEQ) in HS mineralization (drill hole AK-17-001); 523.9 m at 0.65% Cu, 0.47 g/t Au and 7.93 g/t Ag (1.05% CuEQ) in HS and skarn mineralization (hole DHSF17-160); and 328.05 m at 0.42% Cu, 0.22 g/t Au and 8.63 g/t Ag (0.66% CuEQ) in HS and skarn mineralization (hole AK-17-002).

SARAMACCA GOLD DEPOSIT – A NEW OROGENIC GOLD DISCOVERY IN THE GUIANA SHIELD

TIME: 10:20 AM – 10:40 AM

Caroline Laplante, Exploration Country Manager – Suriname, Rosebel Gold Mines; Samuelle Gariepy, Senior Exploration Geologist, Rosebel Gold Mines; Craig MacDougall, SVP-Exploration, IAMGOLD Corporation

The Saramacca gold deposit is located in the Republic of Suriname, South America, 100 kilometres southwest of the capital city of Paramaribo and 25 kilometres southwest of IAMGOLD’s Rosebel Gold Mine. The deposit occurs within the Marowijne Greenstone Belt of the Paleoproterozoic Guiana Shield, largely constrained between 2.26-2.08 Ga. The Guiana Shield is regionally extensive, extending from the Amazon River in Brazil to the Orinoco River in Venezuela, covering an area of more than 900 000 square kilometres. Fundamental to exploration, the Guiana Shield has
undergone prolonged chemical weathering, reflecting a humid, tropical paleo-climate that may have started as far back as the Cretaceous period. The chemical weathering has produced a well-preserved, laterite/saprolite profile, which locally extends up to 100 metres in depth from surface.

The Marowijne Greenstone Belt is divided into the Paramaka and Armina formations, dominated by volcanic basalts and a mixed metasedimentary, greywacke–mudstone sequence, respectively. These are in turn overlain unconformably by the Rosebel Formation, comprising quartz-rich arenites interlayered with polymictic conglomerates. The Saramacca gold deposit is hosted by metabasalts of the Paramaka Formation. Younging from southwest to northeast, the main units of the Paramaka Formation are a lower massive basalt successively overlain by a thin, amygdular basalt unit and a thick unit of pillowed basalt. Rocks have been metamorphosed to greenschist facies and have developed an assemblage of actinolite-chlorite-epidote-plagioclase.

Mineralization is principally hosted within a series of north-northwest trending, brittle-ductile, sub-vertical fault zones ranging between two to forty metres in width and currently defined over a strike length of 2.2 kilometres. Several sub-parallel structures have been identified in the hanging wall, which to date lack the continuity of the primary fault structures, but are also mineralized. The primary structures are localized along or near the contact between massive and pillowed basalt units, and strong, penetrative shear fabrics are observable in drill core in proximity to the faults. Various kinematic indicators suggest that the northeast block moved up relative to the southwest block.

Mineralization is open at depth in primary or fresh rock, and extends to the surface through thick, soft saprolite and laterite surficial layers. Mineralization is associated with hydrothermal dolomite occurring as veins and breccias carrying pyrite, minor arsenopyrite and locally visible gold. The dolomite breccias are characterized by repeated crack-seal and dilational infill textures. Veins are often folded and boudinaged.

IAMGOLD declared an initial NI 43-101 compliant resource estimate for the Saramacca deposit (effective August 28, 2017) comprising 14.4 million tonnes of indicated resources grading 2.2 g/t Au for 1.0 million contained ounces, and 13.6 million tonnes of inferred resources grading 1.18 g/t Au for 518 000 contained ounces. Exploration drilling is ongoing to further
In late 2016, a gold rush took place approximately 50 km south of the town of Karratha in the Pilbara region of Western Australia. Metal detectorists discovered gold nuggets along a northeast-trending, 8 kilometre-long corridor originating at the 50 km mark on the Karratha-Tom Price highway. Early in 2017, Novo Resources Corp. determined the nuggets were derived from weathered Archean conglomerate horizons at the base of the Archean Fortescue Group. After staking approximately 7 000 square kilometres covering parts of the prospective Fortescue basin, Novo struck additional land deals over subsequent months growing its position to approximately 10 000 square kilometres by late August 2017. In July, Novo announced the discovery of in situ gold nuggets in conglomerate at the Purdy’s Reward prospect, a place where the gold-bearing conglomerates daylight along a series of low, rolling hills. Metallurgical test work performed on this bulk sample determined most gold is coarse taking the form of flattened water-worn nuggets. A calculated head grade of 67 g/t Au was determined for this sample. In addition to coarse gold, Novo has recognized a component of fine gold occurring in 1-3 mm wide halos of particles surrounding nuggets. Such fine gold is likely a product of chemical remobilization following burial.

Gold-bearing conglomerates lie unconformably on older basement rocks of the Pilabra Craton. Mafic igneous rock boulders and cobbles dominate clast composition of gold-bearing conglomerates. Vein quartz, metamorphic rock and granitic clasts are also present, but minor. Sandy matrix is comprised of quartz and particles of mafic rock. Pillowed and autobrecciated Mt. Roe basalt lies conformably atop the gold-bearing conglomerate package and is believed to be penecontemporaneous with sedimentation based upon observations of pepperitic contacts between basalt and sediment. If correct, these conglomerates would be similar in age to the Mt. Roe basalt, approximately 2.75-2.78 Ga.

Novo is currently exploring the Karratha gold project through aggressive trenching and drilling. Due to the nuggety nature of mineralization, Novo recognizes that bulk sampling is the most critical means of determining grade and potential viability of this unusual gold system. Over the remainder of 2018, Novo plans to utilize diamond core drilling for assessing geology and trenching to obtain bulk samples. Bulk samples are subjected to extensive metallurgical testing to gather processing data as well as determine grade.
The Soledad project is in Ancash province of central Peru, approximately 260 km north-northwest of Lima and 35 km south of Barrick’s Pierina mine. The project is part of the Ticapampa-Aija Mining District in the Cordillera Negra, a region with a long history of exploration and mining. Previous exploration identified numerous high-grade quartz-tourmaline-sulfide breccia pipes that crop out at surface. Whereas the mineralization hosted in the breccia pipes is impressive in terms of grade and vertical extent, previous explorers were focused on a blind mineralized porphyry target inferred to be the source of the breccia mineralization. Chakana is focused on testing the breccia pipes to determine if they host economic mineralization.

The breccia pipes are principally hosted in the Calipuy group volcanic rocks, consisting of andesite flows, tuff and rhyolite with a composite thickness of over 2 000 m. A secondary host is granodiorite that intrudes the volcanic rocks. A 16 000 m drill program was initiated August 16, 2016, designed to determine the geometry of several previously drilled pipes, determine the true grade profile by drilling across the pipes, define an initial inferred resource on two of the pipes and test a number of targets across the property.

Drilling to date has focused on Breccia Pipe #1, where previous drilling confirmed a vertical extent of mineralized breccia from surface to 490 m depth where the drill hole deviated out of the breccia pipe. Based on previous IP surveys and a recent CS/NS-AMT survey, the pipes are thought to extend much deeper. Highlights from the first two holes completed by Chakana are: 1) 146.6 m with 2.51 g/t Au, 48.6 g/t Ag and 0.77% Cu from surface, including 44 m with 3.92 g/t Au and 29.6 g/t Ag and 102.6 m with 1.91 g/t Au, 56.8 g/t Ag, and 1.1% Cu from 44 m; and 2) 209 m with 2.22 g/t Au, 69.6 g/t Ag and 0.96% Cu from surface, including 40 m with 4.21 g/t Au, 18.6 g/t Ag, 74 m with 3.31 g/t Au, 65.5 g/t Ag, and 1.11% Cu from 40 m, and 64 m with 0.72 g/t Au, 139.1 g/t Ag and 1.84% Cu from 145 m.

The breccias have dimensions of 50-100 m diameter at surface with separation between the pipes of 300-500 m. The breccia is polymictic and contain clasts reflecting the adjacent host rock, either andesite or granodiorite. Contacts with the wall rock are sharp, and there is a well-defined halo.
away from the contact characterized by sheeted quartz-sericite-sulfide veining with decreasing intensity within 3 m of the contact. Mineralization is hosted within the matrix of the breccia and consists of quartz-tourmaline-sulfide. Clasts of andesite are generally tabular in shape, forming “shingle” texture, and are strongly altered to quartz-sericite-tourmaline. Grades are typically highest on the margins of the breccia bodies where permeability was best developed. Based on initial petrography, the sulfide assemblage includes chalcopyrite, hypogene chalcocite, digenite, pyrite, arsenopyrite and an unidentified silver-sulfide phase. Sphalerite and galena are common on the margin of the breccia or within veinlets in the fractured host andesite. Gold occurs as free blebs in the 20-100 m size range within pyrite.
The Canadian Highlights Session will engage speakers from an exciting selection of gold and uranium projects from across Canada. These projects represent the various stages of the exploration cycle and will be of interest to explorationists, project development professionals and financiers.

**SESSION CHAIR:** ALBERT CHONG, WHEATON PRECIOUS METALS AND MAGGIE LAYMAN, BARKERVILLE GOLD MINES LTD.  
**SPONSORED BY:** ACQUIRE TECHNOLOGY SOLUTIONS PTY LTD.

**PROGRAM**

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Many gold deposits and prospects of eastern Nunavut are hosted or associated with Neoarchean banded-iron formations (BIF) but display a diversity and complexity of styles largely related to Paleoproterozoic structures. For instance, at Meliadine gold is associated with a crustal-scale fault and its splays. In contrast, the Portage and Goose deposits of the Meadowbank mine are associated with intensely poly-deformed BIFs, as is the case for the Three Bluffs exploration project. At Amaruq, folded BIFs are associated with steeply-dipping high-strain zones and associated(?) shallowly-dipping vein systems, whereas gold at the Vault deposit is associated with shallow-dipping sericite-carbonate shears.

Although the studied gold zones are controlled by Paleoproterozoic structures, gold is hosted in Neoarchean rocks. Therefore, there is a possibility for an Archean heritage on the gold budget and important aspects of gold metallogenesis in Nunavut are currently being tackled; such as the timing of gold introduction, its source, and the age and nature of the major ore-forming events in the region (i.e. Archean versus Paleoproterozoic).

Understanding the timing relationship can provide some insight into whether gold was introduced into the system during the Archean and remobilized afterwards, or introduced during the Paleoproterozoic. More specifically, ongoing work at Amaruq includes structural mapping at the deposit.
scale, drill core logging, geochemical characterization of the host rocks and mineralized zones, U-Pb ID-TIMS/SHRIMP geochronology on zircon, Re-Os geochronology, radiogenic and stable isotope analyses on sulphides.

The ore zones of the Amaruq project are hosted in a 250 m-thick Neoarchean volcanosedimentary sequence intercalated with chert and silicate-facies iron formations. The two main ore zones, i.e. Whale Tail and IVR, exhibit different styles of mineralization and alteration. The Whale Tail zone is primarily characterized by discordant to stratabound pyrrhotite-arsenopyrite-loellingite-gold replacement-type mineralization in chert and iron-formation with a tight spatial relationship to quartz veining and silicification. The ore zones at IVR consist of gold-bearing quartz-carbonate veins developed at, or near contacts between favourable units or reverse fault zones.

The arsenopyrite at Amaruq is generally coarse grained and present in quartz veins, strongly silicified chert bands and amphibole-rich layers in cherts. Arsenopyrite has been extensively sampled for Re-Os geochronology. Rhenium is generally very low in most Amaruq arsenopyrite samples analyzed to date and no precise isochron age can be obtained. To date, samples from the Whale Tail zone of Amaruq have yielded some provisional data. Preliminary model ages suggest a major time span with the youngest model ages at ca. 2250 and the oldest at ca. 2650 Ma. These interim results need refinement and additional analyses are in progress. Preliminary and partial Pb isotope data indicate that there is large spread in the 206Pb/204Pb and 207Pb/204Pb ratios. This suggests source mixing and heritage in agreement with the Re-Os model ages.

Our research in Nunavut indicates that gold mineralization results form a long, multiphase hydrothermal history. Moreover, the oldest model ages at Amaruq suggest that the Archean basement and host rocks may have played an active role in forming the Paleoproterozoic gold systems.
EXPLORATION STRATEGIES
AT THE BACK RIVER GOLD PROJECT, NUNAVUT

TIME: 2:00 PM – 2:25 PM

Angus Campbell; James Maxwell; Stacie Jones, Sabina Gold & Silver

The Back River Gold Project is 100% owned by Sabina Gold and Silver and is located in the north eastern portion of Archean Slave Province, approximately 520 km northeast of Yellowknife, Northwest Territories. Sabina acquired the project in 2009 and has added significant high-grade resources, with the discovery of the Umwelt, Llama and Echo deposits on the Goose property which is host to 70% of the currently defined gold endowment. Outside of the Goose property additional resources and numerous high potential targets have been advanced throughout the 80 km long district-scale belt. Sabina anticipates production to begin in 2021 at the Goose property with a life of mine production of 2.3M oz. over approximately 12 years.

The host Archean aged Beechey Lake Group has been deformed into a steeply dipping, tightly folded sequence of greywacke, mudstone and interbedded iron formation. Host geology is an interbedded sequence of oxide (magnetite, chert, grunerite) iron formation, silicate (iron silicate and chert) iron formation and clastic sedimentary rocks typical of turbidite deposits. Gold mineralization is associated with silicification and amphibole and chlorite development within favourable structures and lithologies, as well as sulphidization of host iron formation units producing pyrrhotite, arsenopyrite, pyrite and locally visible gold.

Exploration targeting is driven by a multidisciplinary approach that has benefited greatly from a large 30 plus year database of previous work. Sabina’s success is defined by developing a strong target pipeline while continuing to add value and increase overall gold resources. The integration of historic data with geophysical surveys, detailed mapping and multi-element geochemistry successfully delineates prospective iron formation sequences. Stratigraphic and structural interpretation is vital in the development of the key exploration criteria which includes: 1) favourable host rocks, primarily iron formation however potential exists in surrounding sedimentary units, 2) a structural setting with prospective structural traps, commonly fold hinges, and 3) structures acting as fluid conduits. Applying the key exploration criteria allows for the identification and prioritization of greenfield targets while also enabling the aggressive exploration and expansion of zones of known mineralization.
Continued exploration success is exemplified by recent drill results from the 2017 season. Significant results released in the past year include drill hole intercepts from both the Llama Extension, a 525 m down plunge extension from the current Llama resource, and from the Umwelt Vault zone, a robust high grade zone within the Umwelt deposit. The Vault Zone is being explored for expansion both down dip and down plunge where drill hole 17GSE511B returned multiple Au zones starting at 734.0 m with 13.5 m at 16.86 g/t Au including 7.95 m at 27.11 g/t Au. Drill hole 17GSE516B from the Llama Extension zone returned an interval of 38.55 m (from 667.4-705.95 m) at 9.48 g/t Au including 21.25 m at 14.43 g/t Au and 1.0 m at 52.83 g/t Au.

Goldcorp’s portfolio of mines in Eastern Canada includes those at Red Lake and at Porcupine, where the geological framework of multiple deposit styles has been established by over a century of exploration; Musselwhite, where exploration over the decades since discovery was concentrated in one small area of the greenstone belt; and Eleonore, which is a novel metasediment-hosted deposit and the first world-class orebody discovered in the region.

With a renewed focus on organic growth through brownfields exploration, the areas around the known mines have seen accelerated exploration programs. How the exploration programs have been approached is in part a reflection of the data already available. A different approach is required in data-rich areas such as Red Lake and Porcupine, and data-poor areas such as Musselwhite and Eleonore. This presentation will discuss the approaches taken by Goldcorp, and some of the advances achieved and pitfalls encountered.
The Windfall Lake project is an intrusion-related gold deposit located approximately 200 kilometres northeast of Val-d'Or, Abitibi, Quebec. The property occurs within the Urban-Barry Greenstone Belt located in the eastern part of the Abitibi Subprovince, in the Superior Craton.

The Windfall Lake deposit occurs in an ENE-oriented corridor within the east-west Urban-Barry belt that extends over 135 kilometres and is up to 20 kilometres wide. Within that corridor, weakly deformed tholeiitic volcanic rocks (~2718 Ma) dominated by andesites and dacites are intruded by three generations of northeast to east-trending calc-alkalic porphyry dikes and plugs (~2697-2698 Ma). Folding and faulting created a regional trans-tensional event playing an important role in the emplacement of the porphyritic intrusions. The intrusions are intimately associated in space and time with the gold mineralization.

The three generations of porphyritic intrusions, dominated by dyke swarms, occur within a narrow 1.6 Ma time bracket. The first suite, pre-mineralization, is composed of grey fine-grained granodiorite and is characterized by small quartz phenocrysts and xenoliths of the host rocks, including diatreme breccias. Strong potassic alteration is associated to the emplacement of those dikes. The second suite is composed of granodiorite dike swarms characterized by large quartz phenocrysts. This phase is associated with the main gold mineralization event that brought tourmaline-quartz-sericite alteration. The last suite of dikes, post-mineralization, is of shallower dip and composed of reddish, hematized quartz monzonite porphyries crosscutting the previous two suites. Structurally, the first two suites are subvertical, oriented NE and plunge toward NE at 35 degrees while the last phase is oriented NNE and dips 45 degrees towards the SE.

Before Osisko Mining’s involvement in the project, the bulk of gold mineralization occurred in Windfall Main Zone, defined by a series of sub-vertical lenses plunging to the NE along the Zone 27, Caribou, and Mallard corridors. These corridors all present the same style of mineralization: the gold is associated with pyrite occurring as disseminations, stockworks and breccias at the contact between the volcanics and the porphyritic dikes. The mineralized envelopes average 5
metres in thickness and are characterized by strong silica-tourmaline alteration inside a wider sericitic alteration halo.

The 800 000 m drilling program initiated in 2015, and still ongoing, led to the discovery of the Lynx deposit, located to the NE of the Main Zone. The Lynx mineralization differs from the Main zone by its abundance of pervasive silica alteration, lack of pyrite stockworks and relative abundance of visible gold. The Lynx deposit is in complex relationship with the two granodioritic dike phases, older gabbro dykes and the SW dipping Bank fault located to the south of both deposits. The drilling program is also expanding the Underdog zone, a deep mineralized zone located under the Main Zone that is characterized by contact mineralization and silica-pyrite-sericite alteration associated with a composite stock of the three main dike phases.

The Windfall and Lynx deposits represent a well-preserved intrusion-related gold deposit that is part of a larger magmatic – hydrothermal system. Understanding the genesis and the geometry of this system is a key factor for additional gold discoveries in the Urban-Barry greenstone belt.

GEOLOGY OF THE GRYPHON URANIUM DEPOSIT, WHEELER RIVER PROJECT, SASKATCHEWAN

TIME: 3:35 PM – 4:00 PM

Dale Verran, Vice President Exploration, Denison Mines Corp.

The Gryphon deposit is a high-grade uranium discovery located on the Wheeler River property between the McArthur River uranium mine and the Key Lake mill complex in the southeastern portion of the Athabasca Basin. The Gryphon deposit was discovered in early 2014 and its mineralized footprint has continued to expand with subsequent drilling campaigns. In late 2015, the deposit was initially estimated to contain 43.0 million pounds U3O8 in the inferred resource category (834 000 tonnes grading 2.3% U3O8). An updated mineral resource estimate is expected to be completed in late 2017, which will include additional mineralization discovered during 2016 and 2017. The Gryphon deposit remains open in numerous areas with potential for future resource growth.

The Gryphon deposit is primarily basement-hosted, contained within crystalline basement rocks of the Wollaston Supergroup below the sub-Athabasca Basin.
unconformity, and is situated from 520 to 850 metres below surface. The deposit occurs along a northeast trending, southeast dipping lithostructural corridor and is located within a regional jog in the basement stratigraphy. The deposit is comprised of structurally-controlled, stacked mineralized ‘lenses’ which have been grouped A through E according to their location relative to the major reverse, brittle fault zones. The A, B and C series lenses plunge to the northeast along the principle fault zone (the G-Fault) which occurs along a rheological contact between hanging wall graphite-rich pelitic gneisses and a more competent pegmatite-dominated footwall. The lenses are conformable to stratigraphy along a dominant S1 foliation and are intimately associated with brittle fault strands and the graphite-rich pelitic gneisses. The plunge of the lenses is controlled by structural dilation as a result of reverse-sinistral faulting over shallower S1 foliation dips. Higher grades and thicknesses correspond with larger fault displacements. A prominent conformable ‘quartzite’, occurring along the G-Fault, is interpreted to represent a zone of pre- or syn-mineralization silicification.

Additional basement mineralization occurs within the pegmatite-dominated footwall (D series lenses). This mineralization is associated with a subordinate, parallel reverse fault zone (the Basal Fault) and extensional relay faults that cross-cut the stratigraphy and connect to the G-Fault. The recently discovered E series of lenses occur along the G-Fault, up-dip and immediately along strike to the northeast of the A, B and C series lenses, within the upper basement or at the sub-Athabasca unconformity.

Mineralization within the Gryphon deposit lenses is dominated by massive, semi-massive or fracture-hosted uraninite and associated clay alteration minerals. A distinctive, but spatially limited, geochemical and clay-rich alteration halo is evident surrounding mineralization occurring preferentially in basement pelitic gneisses and extending upward into the basal portion of the Athabasca sandstone along the fault structures.

An understanding of the geology of the Gryphon deposit has led to the development of an exploration model. This model is being utilized with geophysical and drilling data to expand the deposit and to generate targets along Wheeler River’s numerous prospective lithostructural corridors.
The Arrow Deposit is on NexGen’s Rook I property located within the southwest Athabasca Basin. It is the largest undeveloped, high-grade uranium deposit in the world. Since discovery during February 2014, Arrow has rapidly grown into the third-largest uranium deposit in the Athabasca Basin, based upon the March 2017 mineral resource update. The deposit remains mostly open and the property is largely undrilled.

Rapid expansion and additional discoveries continue at Arrow and elsewhere on the Rook I property through on-going aggressive drilling programs. Most recently, exploration has resulted in the discovery of significant mineralization at the South Arrow Discovery, which is located 400 m south of the Arrow Deposit on a separate, but parallel, conductive structure.

Arrow represents one of the most significant blind mineral discoveries in history. The area surrounding the deposit is blanketed by a sequence of cover up to 120 m thick comprised mostly of recent Quaternary glacial deposits and Cretaceous mudstones, with veneers of Devonian and Proterozoic Athabasca Group sandstones. Geophysics is a key tool in what can be described as a methodical, inter-disciplinary, and collaborative approach to discovery. Magnetic, gravity, electromagnetic and resistivity/IP data have all contributed to a better understanding of the Arrow Deposit and the surrounding search space. The geophysical data has aided in the interpretation of lithology, prospective structural traps and zones of hydrothermal alteration ultimately contributing towards an optimized targeting and prioritization process. This exploration process has resulted in significant uranium discoveries on the Rook I property.

Three-dimensional (3D) geophysical surveys and modelling represent one aspect of cutting-edge innovation in mineral exploration. At Arrow, 3D ground resistivity/IP characterization surveys were completed during the fall of 2016 and 2017. The resulting 3D model identified a large resistivity anomaly having a strong spatial association with the Arrow Deposit. Additionally, a second large anomaly was...
identified in the 3D resistivity results located 400 m south of Arrow. Through integration with other datasets, the anomaly was prioritized for immediate drill testing and the third drill hole in the area intersected significant uranium mineralization representing the South Arrow Discovery. Drilling confirmed that the source of the resistivity anomaly was a combination of clay alteration and a series of discrete graphitic and locally mylonitic shear zones, very similar to the alteration and host lithologies present at the Arrow Deposit. A compilation of multiple geophysical datasets was critical in the discovery of the Arrow Deposit. The addition of 3D resistivity/IP surveys and modelling to this geophysical arsenal lead to an expedited discovery at South Arrow. The continued approach of completing geophysical compilations, that include 3D surveys and modelling prior to drill testing, provides an exciting future for expanding known mineralization at Arrow and Arrow South, and towards additional discoveries on the Rook I property.
This Technical Session will present the highlights of some of the exciting and innovative exploration programs across a range of various commodities and deposit types that are operating in BC, Yukon and Alaska.

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The Saddle gold-silver discovery lies within 10 kilometres of Highway 37 and within a similar distance from grid power. Two broad styles of mineralization have been identified to date: high-grade epithermal gold-silver, and porphyry copper-gold +/- silver. These styles occur along two roughly east-west trending km-scale anomalous geochemical and geophysical trends, Saddle South and Saddle North. Epithermal mineralization, which has been the main target to date, occurs along the length of the Saddle South trend and toward the western end of the Saddle North trend, while porphyry-style mineralization appears to be restricted to Saddle North and toward its eastern end.

Epithermal-style mineralization is of transitional low sulphidation type, with higher-grade sections characterized by semi-massive to massive quartz-carbonate sulphide veins and veinlets, as well as quartz-carbonate vein-breccias. Sulphides consist mainly of pyrite with subordinate sphalerite, galena, chalcopyrite and local sulphosalts. The vein systems intersected to date show excellent grades across significant widths, and they display good continuity. The immediate host rocks also display significant amounts of disseminated to aggregate pyrite on the mm- to cm-scale and this wallrock “support” also appears to carry gold. Closely associated alteration consists of sericite, carbonate (commonly Fe carbonate?), sericite and chlorite. Host rocks to the mineralizing epithermal systems consist of fragmental volcanic and subordinate volcanioclastic rocks, most probably belonging to the lower part of the Lower Jurassic Hazelton Group.

The porphyry-style mineralization along the Saddle North trend is largely hosted by Early Jurassic(?) monzonitic intrusive rocks that have intruded the Hazelton Group. Gold and copper values are not associated with the suite of pathfinder elements typically found with epithermal-style mineralization found farther west at Saddle North and at Saddle South. Rather, they bear greater similarities to largely intrusive-hosted mineralization in nearby Cu-Au porphyry systems, such as North Rok and Castle (Colorado Resources) and the Red-Chris deposit (Imperial Metals), which all lie within 25 kilometres.
ADVANCING THE MACMILLAN PASS ZINC-LEAD-SILVER PROJECT

TIME: 9:20 AM – 9:40 AM

Brandon Macdonald, Jack Milton, George Gorzynski, Jill Moore, Fireweed Zinc

Located at Macmillan Pass, Yukon, the Tom and neighbouring Jason Zn-Pb-Ag deposits together represent one of the largest undeveloped Zn-Pb deposits in North America. The deposits are hosted by late Devonian shale-siltstone sequences within the MacMillan Pass member of the Portrait Lake Formation of the Earn Group. Vent complexes in SEDEX systems are rarely preserved but they are present at both Tom and Jason, underlying the stratiform mineralization. Ankerite-siderite-quartz veining, massive pyrite-pyrrhotite-galena, breccia textures, and discordant veins characterize the vent complexes, and they typically carry high grades of Pb and Ag.

The Tom and Jason deposits were discovered in 1951 and 1975, respectively. The deposits have lain dormant for many years, with the last significant exploration activity occurring in 1991. Fireweed Zinc optioned the Tom and Jason deposits in late 2016, and consolidated the land position by adding a significant adjacent claim holding later in 2017. Following an IPO in June 2017, Fireweed Zinc completed an exploration program on the Tom and Jason property, including a 2200 metre drill program, helicopter VTEM-magnetic survey, surficial geochemistry, and geological mapping program. Fireweed drilled the Tom West, Tom East and Jason Main zones with high-grade intersections intercepted in all zones. The 2017 drill program focused on in-fill and step-out drilling of known zones. In 2018, Fireweed Zinc intends to continue in-fill and step-out drilling, in addition to executing an aggressive exploration program in the search for an entirely new Zn-Pb-Ag deposit.
The White Gold property is located approximately 95 km south of Dawson City, Yukon and consists of 1835 claims covering approximately 36,265 hectares. The property was previously explored by Underworld Resources from 2007 – 2009 and Kinross Gold from 2010 – 2012 and includes the Golden Saddle and Arc deposits with a combined historic resource of 1 million ounces of gold.

White Gold Corp. purchased the White Gold property from Kinross in the summer of 2017 and initiated an exploration program on the property including airborne and ground geophysics, geochemical surveys, geologic mapping, and 44,322 m of RC and 12,950 m of diamond drilling over 35 holes on the Golden Saddle, Arc, Ulli’s, and GS East target areas.

Highlights of the drilling include:

- WHTGS17RC-001 - 3.98 g/t Au over 32.0 m, including 5.51 g/t Au over 21.3 m
- WHTGS17RC-010 – 3.99 g/t Au over 28.96 m, including 10.1 g/t Au over 10.67 m
- WHTGS17DD-170 – 4.57 g/t Au over 34.0 m, including 6.3 g/t Au over 21.0 m

The 2017 drilling program was designed to infill gaps in the historic resource areas and test for subparallel zones of mineralization in both the Golden Saddle and Arc deposits based on revised modeling and interpretation of the historic data. The 2017 results confirmed the revised interpretation and an updated resource estimate for the property is in progress and anticipated in Q1 2018.
CARLIN-TYPE GOLD MINERALIZATION AT THE RACKLA GOLD PROPERTY, YUKON

TIME: 10:00 AM – 10:20 AM


The Rackla Gold Property encompasses over 1700 square kilometres in east-central Yukon and is comprised of three Project areas: the 100% owned Osiris Project, which hosts the Conrad, Osiris, Sunrise and Ibis Carlin-type gold zones; the 100% owned Rau Project, which hosts the Tiger Gold Deposit and nine other carbonate replacement gold prospects; and, the Orion Project, an early stage Carlin-type gold exploration area subject to an earn-in agreement with Barrick Gold Corporation.

Gold mineralization on the Osiris Project occurs within many lithologies but is best developed at contacts, within fold hinges, and at structural intercepts in silty limestone sequences where alteration is characterized by decarbonitization and silicification accompanied by peripheral calcite flooding. Mineralization within non-calcareous rocks is typically associated with fault breccias and/or intense fracture development. Significant late stage realgar and orpiment occur proximally to gold.

The 185 km long property covers Neoproterozoic to Mississippian marine clastic and carbonate rocks deposited along a fault-controlled paleo-continental margin. All discoveries made on the property are the result of grassroots targeting of stream sediment anomalies in a structural and stratigraphic setting bearing strong resemblances to northeastern Nevada.

In 2010 ATAC made Canada’s first discovery of Carlin-type gold mineralization at the Osiris Zone. Since then, Carlin-type gold mineralization has been discovered at the Osiris, Conrad, Sunrise, Ibis, Anubis and Orion zones.

The most advanced target within the Osiris Project is the Conrad Zone. Drilling between 2010-2015 targeted a folded contact between limestone and siltstone. In 2017, ATAC targeted fault corridors where high-grade mineralization was noted near the 350 and 650 faults. Results from drilling of these faults in 2017 demonstrated they play an important role in the mineralizing system at Conrad such as in hole OS-17-238 which intersected 12.50 m of 20.78 g/t Au.
The Brucejack Project, 100% owned by Pretium Resources Inc., is part of the Sulphurets Au-Ag-Cu camp, located in the Coast Mountains, 65 km north of Stewart, British Columbia, Canada. Historical work by Newhaw Gold Mines in the late 1980s and 1990s focused on regional mapping and sampling which produced 16,000 surface samples over the 40 square kilometers which cover Snowfield and Brucejack. This led to the discovery and delineation of the West Zone deposit and its current Measured and Indicated resource of 900,000 ounces of gold and 42 million ounces of silver. In 2006, Silver Standard began exploration on the Snowfield porphyry copper-gold system, and in 2009 they started working at Brucejack, initially using widely spaced drilling to test for bulk tonnage gold mineralization. That first program produced the first extreme grade gold samples, including hole SU-12 which intersected 16.9 kg/t gold (the best intersection to date is 41.5 kg/t gold).

In December 2010, Pretium purchased the project and began detailed exploration of the Valley of the Kings. Over the next 5 years, Pretium would increase the total amount of drilling to over 260,000 metres on surface and 102,000 metres underground, and would complete a 10,000 tonne bulk sample. While individual drill holes did produce spectacular results, they only had meaning when taken in context of the drilling around them. This meant the drill spacing had to be 10 metre centers or less to define Measured resources.

As part of the natural progression of the exploration programs, the Company also completed airborne and ground geophysical surveys over the project, detailed surface and underground mapping, detailed geochemical analysis, and several academic studies. While these greatly increased the understanding of the geology and the origins of the precious metal system, the only thing that had any direct relationship to mineralization was drilling and assaying for gold.

As of the June 2014 Technical report, Valley of the Kings has a Measured and Indicated resource of 8.7 million ounces of gold and 7 million ounces of silver. The system is open at depth and in both directions along trend. The exploration potential includes an Inferred resource located 400 metres east of the mine, the Flow Dome Zone, which was discovered in 2015, and numerous targets elsewhere on the project.

The Brucejack property is part of a 1250 square kilometre claim group of which 800 square kilometers cover volcanic terrain which is prospective for both epithermal
gold and VMS systems. Over the past two years, Pretium has completed regional airborne geophysical studies, local ground MT and IP surveys, and collected over 11,000 prospecting and 175 geochronological samples. Compilation of the regional data has provided a unique perspective of how the older island arc terrain along with its porphyry and epithermal systems relate to the younger back arc basin rift environment. This work has so far identified three areas with significant gold values that will be drilled as part of the 2018 exploration program. While Valley of the Kings is a significant new discovery, it appears to be far from the end of the story.

IDM MINING’S RED MOUNTAIN PROJECT: GROWING BC’S NEXT HIGH-GRADE UNDERGROUND GOLD MINE

TIME: 11:10 AM – 11:30 AM

Rob McLeod, President and CEO, IDM Mining

IDM Mining’s Red Mountain Project, located 15 km east of the town of Stewart in the golden triangle of Northwest BC. Discovered in 1989 the property was explored extensively until 1996 by Lac Minerals Ltd. and Royal Oak Mines Ltd, with 466 diamond drill holes (130,000 m) and over 2000 m of underground development. Additional work was completed by North American Metals Corp., and Banks Island Gold Ltd. Since acquiring the project in 2014, IDM Mining has undertaken exploration work involving mapping, sampling and 190 underground and surface drill holes (40,000 m). This has culminated into identifying a high-grade, bulk-minable underground gold-silver deposit with an 8.75 g/t Au measured and inferred grade, and an average thickness of 16 m, and a traceable mineralized horizon 800 m north of the resource area.

The main ore bodies are northwest trending, and split by strike-slip faults. The ore bodies form 1-40 m true thickness, crudely tabular zones within the Hillside porphyry, volcanoclastic-sedimentary contact zones and intrusive breccias. The main gold-bearing sulphide is pyrite with a gold-bearing pyrrhotite halo being locally significant.

The Red Mountain Gold Project has excellent exploration potential as glacial ice has retreated throughout the property allowing for IDM to conduct surface work in previously unexplored areas adjacent to known high-grade showings. Recent surface work has identified multiple prospects and the new discovery at Lost Valley. Initial observations show a highly variable range of textures which have likely been formed due to “nested” structures which host gold-silver mineralization.
The Palmer Project is an advanced stage, high-grade volcanogenic massive sulphide (VMS) project that is found within the Alexander Triassic Metallogenic Belt that includes the Greens Creek and Windy Craggy VMS deposits. The project is in a very accessible part of coastal Southeast Alaska, with road access to the property and within 60 kilometers of the year-round deep-sea port of Haines. In 2017, Constantine completed a US$7.0 million exploration program that included approximately 10,000 metres of drilling, airborne geophysics, road construction and environmental programs. The work was funded by the newly formed joint venture between Constantine (51%) and Dowa Metals & Mining Alaska, Ltd (49%). The 2017 drill program was a tremendous success, including both the discovery of a new high-grade base and precious metal zone ("AG Zone") and the expansion and upgrade of the South Wall deposit.

AG Zone is a new VMS discovery, located 3 km from the known 8.1 million tonne South Wall-RW Zone inferred resource. To date, drilling has defined the steeply-dipping AG Zone over a strike length of 225 m and a vertical dip length of 275 m, with all edges open to expansion. The discovery confirms the multi-deposit district potential for the Palmer project. Assay highlights include 24.6 m grading 260 g/t silver, 0.5 g/t gold, 1.4% zinc, 0.5% lead including 1214 g/t silver, 1.3 g/t gold in a 2.7 m subinterval (CMR17-94). A step-out 60 m to the northwest intersected 20.4 m grading 9.9% zinc, 0.2% copper, 14.4 g/t silver, 0.1 g/t gold (CMR17-96). Mineralization is well zoned, consisting of a lower zinc-dominant footwall zone, and an upper silver-gold barite-rich zone at higher stratigraphic levels. As is typical elsewhere on the Palmer property, mineralization occurs across a thick interval of stratigraphy and is present at more than one horizon. Mineralization styles includes massive and semi-massive sulphide and barite, and feeder style stringers and replacement. The South Wall and RW Zones host an inferred resource estimate (May 2015) of 8.1 million tonnes grading 1.41% copper, 5.25% zinc, 0.32 g/t gold and 31.7 g/t silver. The resource is open in multiple directions, with drilling in 2017 successfully expanding the mineralized zones. The highlight was an intersection of 45.4 meters grading 2.5% copper, 7.4% zinc, 39 g/t silver, 0.3 g/t gold (CMR17-82) in an area poorly tested by previous drilling.
Mineralization of the South Wall resource is both laterally and vertically zoned, with conductive pyrite-chalcopyrite dominant massive sulphide and copper-rich feeder style mineralization located in the core of sulphide lenses, flanked by volumetrically more abundant, weak to non-conductive barite-sphalerite dominant mineralization.

NEW RICHES FROM OLD DATA; A REVALUATION OF LEGACY DATA FROM THE CASINO DEPOSIT, YUKON

TIME: 11:50 AM – 12:10 PM

Ken Witherly, President, Condor North Consulting ULC; Scott Thomas, Principal Geophysicist, Condor Consulting, Inc.; Daniel Sattel, Principal, EM Solutions LLC

The Casino porphyry deposit is situated in western Yukon, 380 km northwest of Whitehorse. Casino was discovered in 1969 as a result of drilling a geochemical anomaly. Since then numerous companies have undertaken extensive exploration work. Western Copper and Gold Corporation (WCG) currently owns Casino and is moving the project through permitting. A reserve containing 4.5 billion pounds copper and 8.9 million oz gold has been published for the deposit.

The primary data sets for evaluation were aeromag, radiometrics and a Titan IP-MT survey. GSC had noted a strong potassium response associated with Casino. This work also suggested that basic radioelement ratioing could help discriminate the altered intrusive rocks found at Casino from other barren potassium rich rocks in the area. An assessment of the magnetic results suggested that Casino was part of a larger magnetically-defined intrusive complex, although Casino itself is a relative magnetic low.

The Titan data were re-processed with 2D and 3D codes. For the IP-resistivity results, the earlier assessment by the survey contractor appeared to be distracted by strong heterogeneity of response in the upper 200 metres; Condor interpreted to be caused by the weathering profile. Large features at depth in both the resistivity and chargeability appear to be more primary features associated with the hypogene portion of the deposit. The MT results show a strong discrete response at depth. This is a new target previously unrecognized and deemed worthy of testing.
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