49th Annual CMA (Canadian Mineral Analysts) Conference and Exhibition

PROGRAM AND ABSTRACTS

September 11-14, 2017

HOSTED BY:

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New Gold would like to take the opportunity to acknowledge that we are on the traditional territory of the Secwepemc (Shuswap) Nation. New Gold-New Afton works closely with the Stk'emlupsemc te Secwepemc Nation (SSN), as per the Participation Agreement, signed in 2008. The SSN consists of the Tk'emlups te Secwepemc and Skeetchestn Indian Bands, and is one of the seven historic Divisions of the Secwepemc Nation.

Welcoming Messages

The Honourable Cathy McLeod

As the Member of Parliament for Kamloops – Thompson – Cariboo, it's an honour to welcome you to the 2017 Canadian Mineral Analysts Conference & Exhibition.

Kamloops is incredibly proud to host this conference again. It's been over 30 years since mineral analysts last gathered here in 1983 and 1986. Mineral exploration and mining has been a key part of our region's history going back over a century to the days of the Cariboo Gold Rush. It's now a $6 billion industry for the province of British Columbia.

I hope you will explore the city and region while you're here for the next few days. We're known for outstanding recreational opportunities, including mountain biking, golf, hiking and boating. You are more than welcome to return in the winter for skiing and snowboarding at the Sun Peaks Resort.

Over the coming five days, I invite each of you to experience what makes Kamloops so memorable, the beauty of our foothills, the kindness of our people, and the rich and diverse artistic culture.

Welcome to our beautiful region, and I wish you a fantastic conference and exhibition.

Cathy McLeod, Member of Parliament (Kamloops – Thompson – Cariboo)

His Worship Arjun Singh Deputy Mayor, City of Kamloops

On behalf of my colleagues on Council and the citizens of Kamloops, I am very pleased to welcome you to the 49th Annual Canadian Mineral Analysts Conference. This year's conference is being hosted by New Gold's New Afton Mine.

As Canada's Tournament Capital, Kamloops is Canada's premier location for hosting tournaments; high-performance training camps; and provincial, national, and international competitions and cultural events. We hope you will have the opportunity to visit some of our first class facilities during your stay.

While you are here, we hope you will visit the many attractions for people of all ages that are available throughout the city. In the heart of downtown, you will find our Art Gallery, Kamloops Museum & Archives, and the beautifully restored St. Andrew's on the Square. The North Shore boasts the Spirit Square, which allows visitors to discover the rich history of the area and provides a gathering space for events such as the Farmers' Market. A unique blend of shops, boutiques, restaurants, bakeries, premier coffee bars, and old-world style delicatessens can be found throughout our city.

We are proud of the warm hospitality we know you will find here in Kamloops, and we know you will have a great experience. Thank you for visiting us.

Yours truly,

Arjun Singh
Deputy Mayor

Jane McCaw – President, KEG - Kamloops Exploration Group

On behalf of the Directors and members of the Kamloops Exploration Group, I would like to welcome all the participants to the 49th Annual Canadian Mineral Analysts Conference in Kamloops. This conference is all about bringing expertise together, learning new ideas and seeing what is on the forefront of your industry.

Welcome and enjoy the conference.

Chairperson's Message

Welcome to the 49th Annual Canadian Mineral Analysts Conference! Thank you for taking time from your busy schedule to join us in Kamloops for the week of September 10th-14th, 2017. I look forward to meeting you and hope that you are able to connect with colleagues and exhibitors at the Conference to learn something new and interesting this year.

We are excited to have the CMA conference here to showcase our city and the hub it is for mineral analysts. Kamloops has a rich history of mining and exploration and it has evolved into a unique city where mining, forestry, academics and tourism intersect. The landscape of this area allows our residents and visitors to take advantage of scenic camping, fishing and hiking. We are also home to Canada's second largest ski resorts and a great place for outdoor recreation both in the summer and winter.

Kamloops was originally settled by the Secwepemc people who hunted and fished the area before the first settlers from Europe. The Secwepemc people have had a significant role in shaping our community and we hope that each of you is able to attend the Social at the Secwepemc Museum & Heritage Park. This site is a fantastic site for our get-together and we hope you enjoy hearing about the Secwepemc ways and see the many artifacts on site.

We have a pre-conference social planned for those that arrive on Sunday. The craft brewing revolution has come to Kamloops and we are happy to be home to a number of these breweries. We will visit two breweries to learn about the beer making process and sample the local flavours.

We are fortunate to have a local university, TRU, which provides our labs with many promising young graduates. The scheduled tours for the Conference include a tour of the University lab, our Water Treatment Facility, and Domtar. This tour has been designed to show the diversity of analytical chemistry outside of mineral analysis and, perhaps, provide you with ideas for different approaches to solving analytical issues. Every laboratory that I have visited has given me insight into what we could do to improve our lab. Attendees can take this opportunity to learn something that will benefit their lab as well.

We also have a mine tour for those that would like to visit one of our local mines. The New Afton Mine is an underground block cave mine, and the tour is expected to be a unique experience for attendees. As host of this year's Conference, New Afton mine is located 10 kilometers from Kamloops and located within the asserted traditional territories of the Stk'emlupsemc te Secwepemc Nation (SSN), comprised of the Skeetchestn Indian Band and Tk'emlups te Secwepemc. Together, New Gold and SSN work together to foster an effective mutually beneficial relationship. New Afton is a proud supporter of the conference and looks forward to providing a glimpse into all of the parts that work together to produce our copper/gold concentrate.

We have many great events, gifts and prizes lined up for the Conference. In recognition of Canada's 150th birthday this year, we have Canada Mint silver coin sets for our speakers as well as a ¼ oz. gold coin for the winner of the Best Technical Talk. Good luck to all our speakers! We appreciate the time and effort you have put in to sharing your findings on research, new and current advances in the field and challenges that you have met in your lab. We are also fortunate to have a number of exhibitors attending this year and the diversity of booths that you will have the opportunity to visit throughout the week is fantastic! We appreciate the efforts of all of the exhibitors as well and encourage you to visit each of the booths and vote for your favourite.

Finally, I would personally like to thank the sponsors for their generous contributions as well as this year's Organizing Committee. Without everyone's support, we could not have put together what we believe will be a great Conference this year. Thank you all for coming to Kamloops!

John Andrew
Chief Chemist
New Afton Mine, New Gold Inc.

Conference Overview

Events

Kamloops Craft Brewery Tour – Sunday September 10, 2017 **

An early bird beer tour with transportation provided leaves the Conference Centre lobby at exactly **5:30 pm** on Sunday. Tour participants will taste the applied chemistry at two local breweries in Kamloops: ***Iron Road Brewing*** *and* ***The Noble Pig***. Space is limited, register early.

Welcoming Reception – Monday September 11, 2017 **

A wine and cheese reception will be available for all registered delegates and guests on Monday from **6:00 pm** to **8:00 pm** in the Exhibit Hall area. Refreshments and hors d'oeurves sponsored by **VWR International**.

Continental Breakfasts – Tuesday and Wednesday September 12th & 13th

Fuel your brain for active listening during talks with continental breakfast at **7:30am Tues & 7:30am Wed** in the Exhibit Hall. Sponsored by **Metrohm** and **ColdBlock Technologies**.

Snack Breaks – Tuesday and Wednesday September 12th & 13th

Coffee, Tea and snacks will be served in the Exhibit Hall **during technical talk breaks** Tuesday & Wednesday. When you snag a snack and coffee, take the time to chat up the exhibitors and thank the sponsors of the treats: **Activation Laboratories** and **Leco**.

Buffet Lunch – Tuesday September 12th

A buffet lunch will be served in the Exhibit Hall at **11:30 am** on Tuesday in the Exhibit Hall. Be sure to leave room for the Gala dinner tonight and thank our lunch sponsor, **PerkinElmer**.

Exhibit Happy Hour – Tuesday September 12, 2017

Celebrate the conclusion of Day 1 by mingling with other delegates and meet vendors in the Exhibit Hall area. Refreshments and appetizers will be served at **5:00 pm**, thanks to sponsorship from **ThermoFisher Scientific**.

Gala Banquet Dinner - Tuesday September 12th **

In keeping with CMA tradition, an evening of food and entertainment is planned in the Theatre with buffet dinner service starting at **6:00 pm.** Live music by Evan Wilds with a guest appearance from Morgan Andrew is sponsored by **Assaynet**. Dinner sponsored by **New Gold Inc**. Wine sponsored by **Agilent**.

Best Technical Talk and Best Exhibit Booth

One ballot per delegate for each of Best Technical Talk and Best Exhibit Booth can be found in your registration package. **Please drop off your vote at the Registration Desk at Noon on Wednesday September 13.** There is a Trophy for Best Exhibit and a ¼ oz. gold coin for Best Technical Talk. These prizes are sponsored by **Rocklabs** and will be awarded at the CMA Business Lunch on Wednesday.

CMA Business Lunch and Business Meeting - Wednesday September 13th **

Find out the winners of Best Technical Paper and Best Exhibit as well as attend our annual general meeting for the Canadian Mineral Analysts with official announcement of our next conference location. Buffet lunch starts at **11:30 am**. Thanks to the sponsor of lunch: **Teck Highland Valley Copper**.

First Nations Tour - Wednesday September 13th **

Metals and minerals have been an important part of the history of the Tk'emlúps area. Sign up and join a tour of the Secwepemc Museum and Heritage Park showcasing the cultural and traditional lives of the Secwepemc People. Transportation, tour and catering is sponsored by **New Gold Inc.** Transportation for boarding to the museum arrives at the Hotel & Conference Centre at **2:10 pm**.

** Admittance to these limited capacity events is by ticket only. Please ensure you have your ticket on hand upon arrival.

Exhibits Overview

The Exhibits will be held in the Ballroom on the Ground floor of the Coast Kamloops Hotel and Conference Centre.

Exhibit Hours

Exhibit Hall Times		
Exhibitor Set-up	Monday September 11, 2017	10:00 am to 4:00pm
Exhibit Hall Hours	Monday September 11, 2017	6:00 pm to 8:00 pm
	Tuesday September 12, 2017	7:00 am to 4:00 pm
	Wednesday September 13, 2017	7:00 am to 12:00 pm
Exhibit Tear-down	Wednesday September 13, 2017	12:00 pm to 3:00 pm

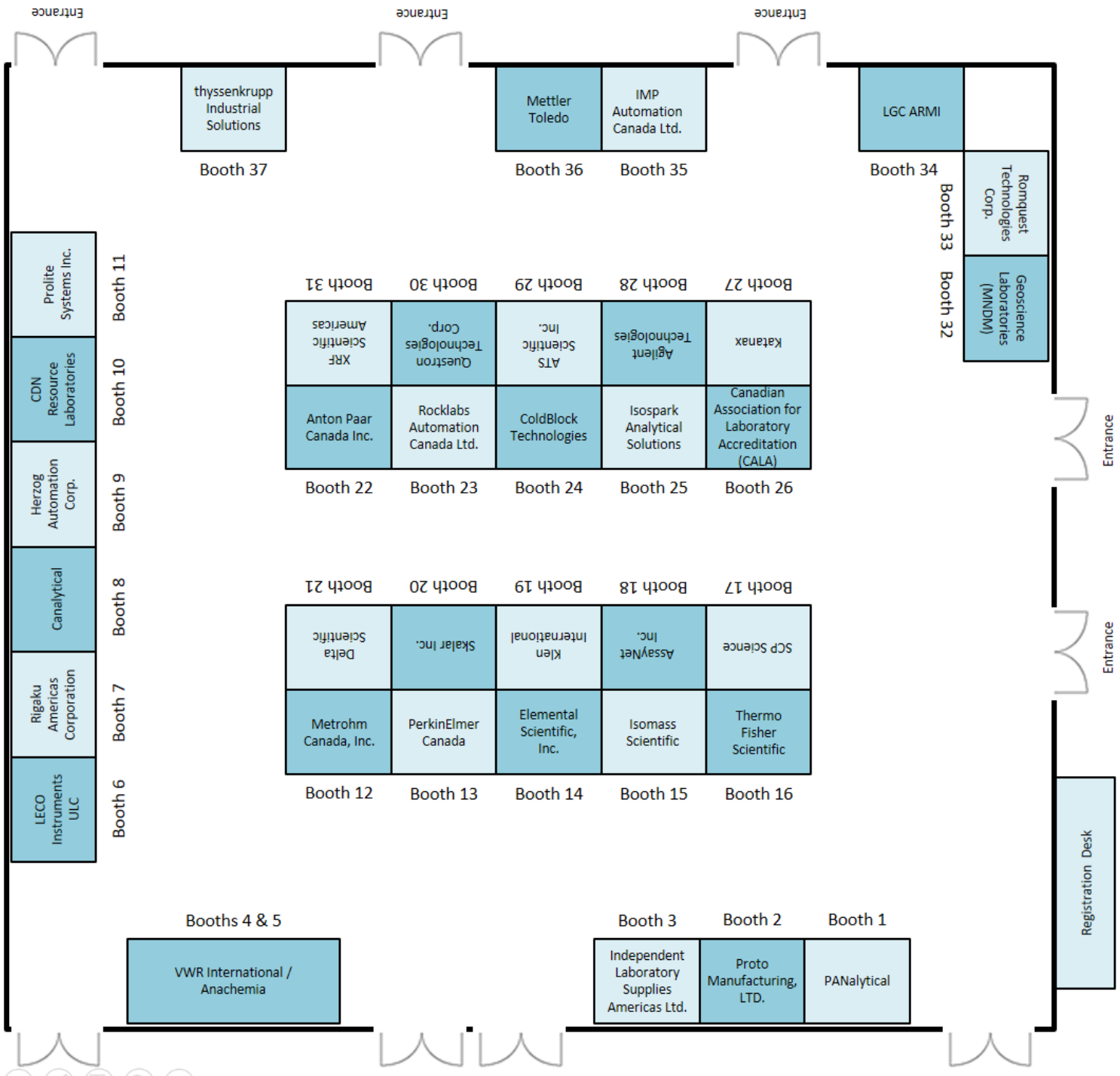
Exhibitor List

Booth #	Company Name	Booth #	Company Name
1	PANalytical	20	Skalar Inc.
2	Proto Manufacturing, LTD.	21	Delta Scientific
3	Independent Laboratory Supplies Americas Ltd.	22	Anton Paar Canada Inc.
4-5	VWR International / Anachemia	23	Rocklabs Automation Canada Ltd.
6	LECO Instruments ULC	24	ColdBlock Technologies
7	Rigaku Americas Corporation	25	Isospark Analytical Solutions
8	Canalytical	26	Canadian Association for Laboratory Accreditation (CALA)
9	Herzog Automation Corp.	27	Katanax
10	CDN Resource Laboratories	28	Agilent Technologies
11	Prolite Systems Inc.	29	ATS Scientific
12	Metrohm Canada, Inc.	30	Questron Technologies Corp.
13	PerkinElmer Canada	31	XRF Scientific Americas
14	Elemental Scientific, Inc.	32	Geoscience Laboratories (MNDM)
15	Isomass Scientific Inc.	33	Romquest Technologies Corp
16	Thermo Fisher Scientific	34	LGC ARMI
17	SCP Science	35	IMP Automation Canada Ltd.
18	AssayNet Inc.	36	Mettler Toledo
19	Klen International	37	thyssenkrupp Industrial Solutions

Best Exhibit Prize

Please fill out your ballot for best exhibitor and drop off at the Ballot desk near the theatre by **NOON on Wednesday September 13**. The winner gets a trophy!

Exhibit Hall Floor Plan



Exhibitors

Agilent Technologies www.agilent.com **Booth #28**	**Agilent Technologies** leads the industry with robust, reliable instruments that provide the ability to analyze, confirm and quantify substances of interest. Our workflow solutions enable you to maintain stringent practices from sample preparation, through analysis, to final report. When combined with our informatics architecture, large quantities of data can be managed while preserving the integrity and security of the results. Agilent offers a complete line of GC, LC, MS and Spectroscopy instruments and technologies, as well as the related consumables, support and services. For more information visit our website.
Anton Paar Canada Inc. www.anton-paar.com **Booth #22**	**Anton Paar** develops, produces and distributes highly accurate laboratory instruments as well as process measuring systems and provides custom-tailored automation and robotics solutions worldwide.
AssayNet Inc. www.assaynet.com **Booth #18**	**AssayNet** is a LIMS supplier for minesite labs. AssayNet's team has leveraged its experience in Minesite Assay Laboratories to offer a total solution for managing lab data. AssayNet has built its success on a thorough knowledge of the industry, a high degree of professionalism, and strong commitment to its clients.
ATS Scientific www.ats-scientific.com **Booth #29**	Since 1989, **ATS Scientific Inc.** has been providing sales and service to the Canadian Scientific Community for a wide range of high quality analytical instrumentation, sample preparation and materials processing equipment. They provide national leading expertise in powders and materials characterization laboratory technologies and offer immediate delivery on a variety of products. All products sold are supported by factory trained Technical Sales/Support and Service Representatives with well over 250 years combined customer support. Application driven consultations including sample evaluations and instrument demonstrations are routinely offered to their clientele.
Canadian Association for Laboratory Accreditation (CALA) www.cala.ca **Booth #26**	**CALA Inc.,** is an internationally recognized accreditation body serving both public and private sector testing laboratories in Canada and abroad. CALA delivers a comprehensive range of services including laboratory accreditation, training and proficiency testing. Laboratories that gain CALA accreditation can provide assurance to their customers about their laboratory's quality and competence based on their participation in a rigorous program of inter-lab comparison and on-site assessments based on international standards. CALA proficiency testing enables laboratories to monitor their performance and compare their results against their peers. CALA training ultimately supports laboratory best practices and continuous improvement in their laboratory environment. Visit www.cala.ca for a full overview of our services.
Canalytical www.canalytical.com **Booth #8**	**Canalytical** is an ISO 17025-certified company that represents quality manufacturers such as Teledyne Leeman Labs, Shimadzu Scientific Instruments and Applied Rigaku Technologies. The Leeman Labs products are ICP-AES and Mercury analyzers, including the Hydra C combustion Mercury system. The Shimadzu product portfolio includes the AA, Arc/Spark OES, Physical Testing and Balance lines. Rigaku manufacturers a full lune of EDX-XRF analyzers.

CDN Resource Laboratories www.cdnlabs.com **Booth #10**	**CDN Resource Laboratories Ltd.,** CDN Labs., is a Canadian-based company specialized in the development of site-specific and off-the-shelf certified reference materials for the mining and exploration industry since 1991. CDN Labs. was established in 1982 in Delta B.C. as a commercial laboratory specializing in geochemical analysis and fire assaying by Cliff Sanderson, Duncan Sanderson and Neil Fuge. In 1991 CDN Labs. started producing custom assay standards for major mining companies. In 1998, we shut down our assaying facility and focused on expanding our business on producing high quality, off-the-shelf certified reference materials for many major, mid-tier and junior mining and exploration companies around the globe.
ColdBlock Technologies www.coldblock.ca **Booth #24**	**ColdBlock™ Technologies** offers a novel and innovative sample digestion technology, ColdBlock™ Digestion. This versatile and very rapid, patented technology shortens the sample digestion process from hours to minutes with reliable and precise results consistently demonstrated across a variety of sample types.
Delta Scientific www.delta-sci.com **Booth #21**	**Delta Scientific** is registered to ISO 9001:2008 and specializes in supplying chemicals, consumables, equipment, ICP & ICP-MS standards & components, AA & XRF supplies and proficiency testing standards.
Elemental Scientific, Inc. www.icpms.com **Booth #14**	**Elemental Scientific** has been providing high-quality solutions to meet the specialized needs of labs worldwide. Specifically, for this venue, we will be promoting the prepFAST-MC™ which is a fully automated, low pressure chromatography system that isolates elements of interest from the sample matrix and collects multiple discrete eluent fractions for precise isotopic analysis. The syringe-driven system allows sample loading, multiple acid washes, column conditioning and elution cycles all at user-defined intervals (time, volume and flow rate). Visit Booth 14 to discuss!
Geoscience Laboratories (MNDM) www.mndm.gov.on.ca **Booth #32**	The **Geoscience Laboratories** (Geo Labs) within the Ministry of Northern Development and Mines (**MNDM**) provides research quality geoanalytical data in support of the program of the Mines and Minerals Division and the minerals industry client groups. Geo Labs is a full-service inorganic analytical facility, specializing in research grade analysis and services to the Ontario Geological survey, government academia, and the private sector.
Herzog Automation Corp. www.herzogautomation.com **Booth #9**	**Herzog Automation Corp.** is the leading supplier of manual and fully automatic sample preparation systems for spectrographic and x-ray analysis, tube delivery systems for sample transport, and laboratory automation for the cement, mining, steel and aluminum, industries. Please visit our website at www.herzogautomation.com for our full product line.
IMP Automation Canada Ltd. www.impgroup.com **Booth #35**	**IMP Automation** delivers automated process sampling and automated robotic laboratory solutions to the mining and minerals sector in Canada, Australia, the United States, South Africa and Brazil. These include automated sampling, sample preparation and analytical systems for iron ore, gold, nickel, copper, aluminum, steel and zinc. IMP has installed, commissioned and continue to support the three largest fully automated robotic mining laboratories in the world.

Independent Laboratory Supplies Americas Ltd. www.indlabsupplies.com **Booth #3**	**INDEPENDENT LABORATORY SUPPLIES (ILS)** is an independently owned and operated company focusing solely on the supply and service of all your Mining Assay Laboratory requirements. Our head office is in Perth, Australia, and we are pleased to announce the opening of Independent Laboratory Supplies Americas Ltd (ILS Americas), which provides our existing services to mining companies within North, Central and South America. Our new office and warehouse is in Sudbury, Ontario. ILS Americas is now starting to provide and distribute laboratory equipment, reagents and day-to-day consumables as well as laboratory technical services, such as audits, technical evaluations and onsite laboratory design and construction.
Isomass Scientific Inc. www.isomass.com **Booth #15**	**Isomass Scientific Inc.** is an independent, full service company that has served Canadian and American scientists since 1981. Our business revolves around supplying well proven, world class scientific instruments and providing the support required by our customer to obtain the very best of analytical results. With our Partners we provide instruments, consumables, parts, Service and Training for all of the instruments we provide and those from many other manufacturers as well.
Isospark Analytical Solutions www.isospark.com **Booth #25**	**ISOSPARK** is the exclusive Canadian distributor for Ametek's material analysis division representing the Spectro and EDAX brands. Ametek is a market leader in OES and EDS technologies. In 2014, we became the environmental and academic distributor for Los Gatos Research, a member of the ABB Group. Specializing in trace analysis and stable isotope measurements in gas and water samples. ISOSPARK provides tailored solutions aimed at solving the unique challenges and requirements of our customers. We offer turnkey solutions including post sales application and service support. Our mission is to provide outstanding support and value new and existing customers by building long term relationships. ISOSPARK is committed towards providing transparent feedback and exceeding your expectations.
Katanax www.katanax.com **Booth #27**	**Katanax** manufactures and sells electric fusion machines (fluxers), used in inorganic sample preparation for XRF, ICP and AA. Equipment is easy to install, use and maintain. Affordable, fully automatic, energy efficient, produces highly accurate and reproducible results.
Klen International www.klen.com.au **Booth #19**	**KLEN International** (ISO 9001 accredited) is the premier supplier of fire assay consumables within the mining and geochemical assay laboratory market. Based in Perth, Western Australia, KLEN's specialty is the manufacture of premium quality fire assay flux and certified reference materials as well as the supply of crucibles, cupels, reagents and all your laboratory needs. The KLEN team also offers free consolidation services as well as warehousing and distribution options throughout Canada and USA.
LECO Instruments ULC www.leco.com **Booth #6**	**LECO** has been providing technologically advanced products and solutions for inorganic, organic, and metallographic analysis for over 80 years, including elemental analyzers for carbon, sulfur, hydrogen, nitrogen, and oxygen, and glow discharge spectrometers. Our metallographic product line features a variety of sectioning machines, grinders/polishers, mounting equipment and supplies, microscopes, and hardness testers.

LGC ARMI
www.lgcstandards.com
Booth #34

LGC ARMI is a supplier of certified reference materials and sample preparation solutions for XRF, ICP and Optical Emission instrumentation. ARMI produces CRM's for carbon, low alloy and tool steels, stainless and high temperature steels, nickel alloys, cobalt alloys, copper, brass and bronze alloys, titanium alloys, and aluminum alloys under its IARM brand. We also produce custom reference materials for geological and industrial applications. In addition to reference materials, ARMI provides sample preparation equipment including mills, grinders, and dissolution and fusion instruments. Our expertise is in helping our customers obtain accurate analytical results by providing the right sample preparation and the right calibration materials for their applications.

Metrohm Canada, Inc.
www.metrohmca.com
Booth #12

Metrohm is one of the world's most trusted manufacturers of high-precision analytical instrumentation for chemical analysis. Metrohm was founded in 1943 by engineer Bertold Suhner in Herisau, Switzerland. Today, we are present in 200 countries with our own subsidiaries and exclusive distributors.
Instruments for Ion Chromatography, Titration, and Electrochemistry make our portfolio for ion analysis complete. We are the Market leader in Titration worldwide, and the fastest growing Ion Chromatography company in the world. Near-infrared and Raman spectroscopy is another, strongly growing segment of our portfolio. All of our products are manufactured in Switzerland – from the microchips to the software – ensuring outstanding Swiss quality. Every product is available in both lab and online-process scale which allows us to meet the needs of both small and large organizations.
In 1982, all shares of Metrohm were donated to the Metrohm Foundation. The Metrohm Foundation, which does not have any influence on the company's business operations, sponsors students in the natural sciences, supports charitable and philanthropic purposes and, above all, safeguards the independence of the Metrohm company. Being part of a foundation also ensures Metrohm can never by bought or sold, so customers can rest assured Metrohm will be there to support them indefinitely.

Mettler Toledo
http://www.mt.com
Booth #36

METTLER TOLEDO is a global manufacturer and marketer of precision instruments for use in laboratory and industrial applications, with solutions that provide value through improved product quality, accelerated and automated processes, increased efficiency and regulatory compliance. We have a complete line of products capable of delivering what you need no matter what you're measuring and a strong worldwide leadership position. In addition to a broad product offering, we have one of the largest global sales and service organizations among precision instrument companies. www.mt.com

PANalytical
www.panalytical.com
Booth #1

PANalytical is the world's leading supplier of analytical instrumentation and software for X-ray diffraction (XRD) and X-ray fluorescence spectrometry (XRF), with more than half a century of experience. PANalytical was founded in 1948 as part of Philips and was formerly known as Philips Analytical.

PerkinElmer Canada
www.perkinelmer.com
Booth #13

With approximately 9,000 employees serving over 150 countries, **PerkinElmer** is a $2.1 billion global leader committed to innovating for a healthier world. We are passionate about providing customers with an unmatched experience as they help solve critical issues. Our innovative detection, imaging, informatics and service capabilities, combined with deep market knowledge and scientific expertise, help customers gain earlier and more accurate insights to improve lives and the world around us. PerkinElmer accelerates scientists' ability to detect, monitor and manage contaminants and toxic chemicals impacting our environment and food supply. We will be focusing on our inorganic solutions at the CMA including AA, ICP and ICPMS technologies.

Prolite Systems Inc.
www.prolitepiping.com
Booth #11

Prolite Systems Inc. is a Canadian based international thermoplastic manufacturer, custom fabricator and distributor specializing in dual laminates and many other types of plastic industrial and municipal corrosion resistant process equipment.
Our custom fabrication facilities affords us to be the leader in design of thermoplastics, dual laminates, fume hoods, acid scrubbers, piping and tanks.
Our services include everything from design and manufacturing, to transport and installation.

Proto Manufacturing, LTD.
www.protoxrd.com
Booth #2

PROTO Manufacturing is a leading provider of portable and laboratory-based x-ray diffraction (XRD) systems for the characterization of materials. Our uniquely versatile and customizable powder diffractometers have been developed to provide the ultimate solution for your measurement needs. Choose from our 600-Watt compact benchtop configuration, or our 1200-Watt Theta/Theta laboratory model. Equipped with powerful photon counting detectors, our powder diffractometers have extremely fast data collection capabilities and accurate data. Our product line also includes residual stress and retained austenite measurement systems, Laue single-crystal orientation systems, x-ray tubes and custom XRD systems.

Questron Technologies Corp.
www.qtechcorp.com
Booth #30

Questron Technologies Corp. Company Profile - Manufacturer of durable, long-lasting acid digestion equipment. We provide analytical laboratories, interested in metals analysis, with innovative and complete solutions for their sample preparation needs. Since the early 1990's, Questron has been at the forefront of design for microwave, block and automated block digesters, microwave ashing and automated dispensing/diluting equipment. Questron supplies worldwide in the mining, agriculture, environmental, and food industries. Questron's team of experienced engineers and application specialists provide customized designs to accommodate customer's special and unique sample prep needs. Visit us at www.QTechCorp.com or contact us at 1-844-323-1223 or info@qtechcorp.com for more information.

Rigaku Americas Corporation
www.rigaku.com
Booth #7

Rigaku provides the world's most complete line of X-ray diffraction and X-ray fluorescence instruments and components. Systems include the MiniFlex 6G benchtop XRD, Supermini200 benchtop WDXRF, SmartLab multi-purpose diffractometers with SAXS and in-plane capabilities, DMAX Rapid II micro-diffraction systems, SMAX3000 small angle scattering systems, ZSX Primus Series of high-powered WDXRF spectrometers.

Rocklabs Automation Canada Ltd. www.scottautomation.com **Booth #23**	Established in 1969 **ROCKLABS** delivers sample preparation equipment to mining clients, commercial laboratories and research institutions. This is through the supply of specialized equipment including crushers, pulverizers and sample dividers for the mining of gold, silver, platinum and palladium. ROCKLABS can also create custom solutions to fit unique needs and situations. ROCKLABS equipment has been exported to over 100 countries and is also a world-leading producer of high-quality Certified Reference Materials, recognized as the most accurate and reliable reference materials globally and are tested and certified. ROCKLABS also has chemists, geologists and statisticians contributing ongoing advice and support.
Romquest Technologies Corp www.romquest.com **Booth #33**	**Romquest Technologies** is the exclusive Canadian distributor for reputable manufacturers of high quality analyzers and consumables from Europe and USA. Our product lines include: Eltra Elemental Analyzers, Eurovector CHNS/O and N-Protein Analyzers, Belec Optical Emission Spectrometers, Elvatech XRF Analyzers, LAC Laboratory furnaces and dryers, Radwag Balances & Scales and Alpha Resources consumables, supplies and certified standards for elemental analyzers/ICP/AA/MS.
SCP Science www.scpscience.com **Booth #17**	**SCP** is a privately-owned manufacturer and distributor of analytical instruments, digestion equipment, reagents and certified reference materials for the spectroscopy market. Products include CONOSTAN – oil calibration and verification standards; NOVAWAVE – automated microwave digestion tunnel system; DigiPREP – family of graphite block digestion systems; distillation systems; ICP supplies; XRF supplies; and AA supplies.
Skalar Inc. www.skalar.com **Booth #20**	**Skalar** established in 1965 as a producer of analyzers for the laboratory and process industry. Skalar analyzers have proven to be the most reliable and economical choice in today's modern routine laboratory. List of our analyzers: San^{++} Continuous Flow Analyzer for testing of water & soil. BluVision™ Discrete analyzer designed to perform basic colorimetric analysis for the environmental field. Formacs^{SERIES} Total Organic Carbon / Total Nitrogen analyzers in water. Primacs^{SERIES} Carbon and/or nitrogen analyzer in solid samples. Robotic analyzers Automation is available for BOD, COD, Test kit applications (ST-COD, TP, TN etc.), pH, Conductivity (EC), Alkalinity, Carbonate/Bicarbonate, Turbidity, Color & Ion Selective Electrodes (ISE) applications.

Thermo Fisher Scientific www.thermofisher.com **Booth #16**	**Thermo Fisher Scientific Inc.** is the world leader in serving science, enabling our customers to make the world healthier, cleaner and safer. We have more than 37,000 employees worldwide and serve over 350,000 customers within Geochemistry, pharmaceutical and biotech companies, universities, research institutions and government agencies, as well as environmental and industrial process control settings. Serving customers through two premier brands, Thermo Scientific and Fisher Scientific, we help solve analytical challenges from routine testing to complex research and discovery. Thermo Scientific offers customers a complete range of high level analytical instruments as well as laboratory equipment, software services, consumables and reagents to enable integrated laboratory workflow solutions. Fisher Scientific provides a complete portfolio of laboratory equipment, chemicals, supplies and services used in healthcare, scientific research, safety and education. Thermo Fisher Scientific Vision: Continue to be the Global Leader in Serving Science Mission Statement: To Enable Our Customers to Make the World Healthier, Cleaner and Safer Whether our customers are discovering cures for cancer, reducing air pollution, ensuring food safety, or protecting us from terrorist threats, they depend on us for the tools they need. Core Values: Integrity, Intensity, Innovation and Involvement We fulfill our mission by working every day in our accordance to these values which all employees called the “4 I’s”. They are the core of who we are and how we define ourselves.
thyssenkrupp Industrial Solutions www.thyssenkrupp-industrial-solutions.com **Booth #38**	The *Industrial Solutions business area* of **thyssenkrupp** is a leading partner for the engineering, construction and service of industrial plants and systems. Based on more than 200 years of experience we supply tailored, turnkey plants and components for customers in the chemical, fertilizer, cement, mining and steel industries. The *Mining Technologies business unit* supplies a full range of machinery, systems, equipment and services for the extraction, processing, storage and transportation of raw materials. For grinding and preparation of Minerals, thyssenkrupp offers the optimum solution for every application, including Lab automation systems for monitoring and optimization of the process.
VWR International / Anachemia www.vwr.com **Booth #4-5**	**VWR** is a company that has been supplying mining laboratories with quality products for over 60 years. Since our inception as a chemical manufacturer, we have grown to become a full-line international distributor, representing some of the leading manufacturers in the laboratory equipment, products and consumables markets. We can and do supply virtually everything required to start and operate a full lab.
XRF Scientific Americas www.xrfscientific.com **Booth #31**	**XRF Scientific Limited** is an Australian listed company (ASX: XRF) based in Perth, Western Australia. XRF manufactures equipment and chemicals, which are distributed to production mines, construction material companies and commercial analytical laboratories, in Australia and overseas, and used in the preparation of samples for analysis. XRF’s technology is used to measure the composition and purity of materials and is mainly applied in industrial quality control and in process control for manufacturing processes in industries such as metals and mining, construction materials, chemicals and petrochemicals. XRF’s products help customers to improve product quality and performance, increase productivity and yield and reduce downtime and waste. Its businesses have established positions in their specialized markets.

Workshops September 11, 2017

About the Instructor: Wesley Johnson, PhD, FCIC.

Dr. Johnson completed his PhD in Inorganic Chemistry at the University of Washington, is a Certified BC Assayer and was the Chemistry Department Chair at Okanagan University College where he taught analytical and aqueous environmental chemistry. In his role as owner of Quality Analysis Consultants, he has developed and presented workshops for analysts in sampling, 17025 topics and fire assaying. He has acted as a consultant in minerals analysis problems for many commercial and mining labs. Also, he helped numerous laboratories attain ISO Standard 17025 accreditation in North and South America and acts as Lead assessor and technical assessor for ISO Standard 17025 accreditation assessments. wesleymjohnson@shaw.ca Phone/fax: (205)-474-0697

Workshop 1: Traceability in Chemical Measurements 7:00am to 11:30am

The workshop on Traceability will discuss the importance of and how to be able to compare results from different laboratories, analysts, methods and even times with confidence. We do this by using trusted standard reference materials and the international system of units (mass, time, length etc.).
Breakfast will be provided for the morning session at **7:00 am** as well as a coffee and snack break.

WORKSHOP OUTLINE

1. **Introduction**
2. **Traceability**
- Definition and its implications
3. **EURACHEM/CITAC Guide Principles**
- Method development
- Method validation
- The elements giving traceability
4. **Principles of Traceability**
- Identifying the measures
- Measurement units, standards and scales
5. **Validation, Uncertainty and Traceability**
- Method validation/uncertainty
- SI units
6. **Elements Giving Traceability**
- Method selection and validation
- Influence factors
- Choice of reference standards
- Estim. Measurement Uncertainty
7. **Calibration and Traceability**
- Certified Reference Materials
- Pure materials
- Matrix reference materials
8. **Reference Materials and Traceability**
- Reference material criteria
9. **Examples**
10. **Discussion**

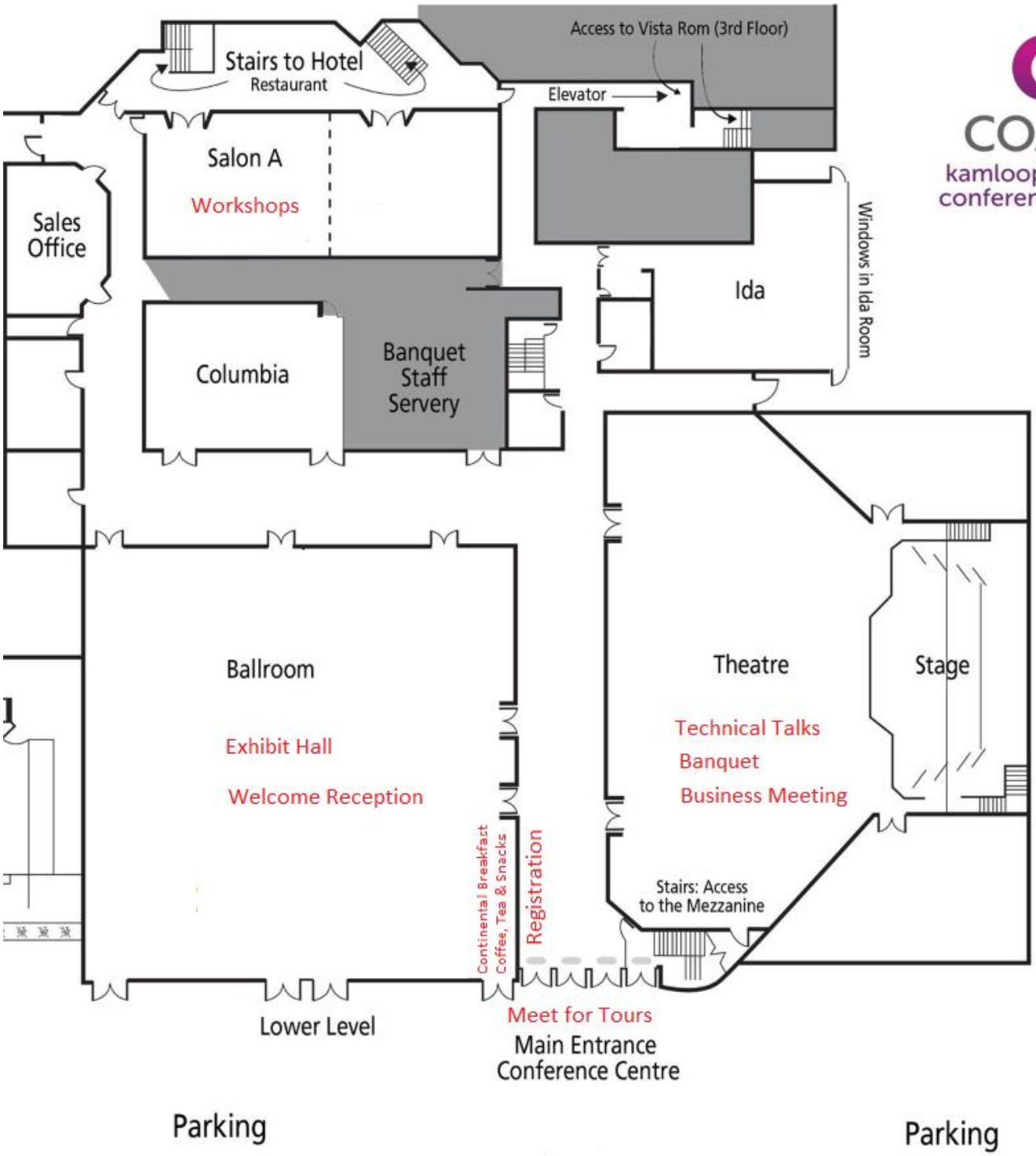
Workshop 2: Method Validation 11:30 am to 4:00 pm

The Method Validation workshop will describe a means of developing a method with, or of proving that a method has a stipulated level of precision and accuracy. This allows the laboratory to establish and retain its reputation for reliability. Lunch will be provided for the afternoon session at **11:30am** to start the session. Midway through there will be a coffee and snack break.

WORKSHOP OUTLINE:

1. **Introduction**
- What is method validation?
- Why is method validation necessary?
- When should methods be validated?
2. **Method Validation**
- Instrument validation
- Computer and software validation
- Validation responsibilities
- Degree of validation
- Analytical requirement
- Validation tools
3. **Validation of performance parameters**
- Confirmation of identity and selectivity/specificity
- Limits of detection and quantitation
- Working linear range
- Accuracy and trueness
- Precision (repeatability and reproducibility)
- Measurement uncertainty
- Sensitivity
- Ruggedness (or robustness) the Ruggedness test
- Recoveries
4. **Discussion**

Conference Centre Map



Technical Sessions Tuesday Sept 12, 2017

Time	Presenter	Organization	Title
Morning Session Chair: Mark Springford / Elizabeth Sirianni			
8:20	John Andrew Chief Fred Seymour	New Gold Inc. Tk'emlúps te Secwépemc	OPENING REMARKS
8:40	Cathy Wylie	Canadian Association for Laboratory Accreditation	Are You Ready for the New ISO/IEC 17025 Standard?
9:00	Tyson Bodor	Thompson Rivers University	Method Development for Determination of Xanthate Compounds in Mining Process Waters by Capillary Electrophoresis
9:20	Gregory R. Schmidt	Thermo Fisher Scientific	Modern XRD in the Mineral Industry: Speed, Accuracy and Resolution
9:40	Robert Sloan P. Eng	ALS Metallurgy	Selection of Digestion Method for Geochemical Determinations
10:00	***COFFEE BREAK***	***Activation Labs***	***SPONSORED in Exhibit Hall***
10:30	Don Thompson	SCP Science	SCP Science Easy Prep Sample Handler-Automates Pre and Post Digestion sample Preparation for Atomic Spectroscopy Laboratories
10:50	Ruth Merrifield and Andrew Rams	PerkinElmer Inc	Determination of Metal Content within Geological Materials Utilizing the PerkinElmer NexION 2000 ICP-MS
11:10	Anne-Catherine Breton	Claisse, a PANalytical Company	Using the Appropriate Fusion Method to Prepare Your Samples for XRF Analysis: A Case Study of Service Laboratories Processing Mining Samples
11:30	***BUFFET LUNCH***	***PerkinElmer***	***SPONSORED in Exhibit Hall***
Afternoon Session Chair: Susie Kelly / Elizabeth Sirianni			
13:00	Timothy Elliot	Independent Laboratory Supplies Americas Ltd.	Introduction to the PAL1000 and Leachwell tablets
13:20	Erick Helmeczi	Brock University	Determination of gold by microwave plasma emission following MIBK extraction and ColdBlock digestion
13:40	Weimin Yang Ph D. and Daniel Kutscher	ThermoFisher Scientific	Ultra Trace Analysis of Platinum Group Metals (PGM) in Rock Samples using the Thermo Scientific iCAP TQ ICP-MS
14:00	Maureen Leaver	Natural Resources Canada/CCRMP	Observations on CCRMP and PTP-MAL Data
14:20	***COFFEE BREAK***	***Activation Labs***	***SPONSORED in Exhibit Hall***
15:00	Marcus Burnham	Geoscience Laboratories, OGS	ICP-MS analysis of aqua regia extractions - revamping an old method with new technologies to meet diverse needs
15:20	Weimin Yang Ph D. and John Schmelzel	ThermoFisher Scientific	Working With High Matrix samples on ICPMS
15:40	Arkady Buman	Bruker AXS Inc.	Good Laboratory Practices for XRF Analysis in the Mining Industry

Technical Session Wednesday Sept 13, 2017

Time	Presenter	Organization	Title
Morning Session Chair: Jerico Gaspar / Elizabeth Sirianni			
8:00	John Andrew	New Gold Inc.	OPENING REMARKS
8:20	Kristin Leftwich	PROTO Manufacturing	A case for the Benchtop X-ray Powder Diffractometer
8:40	Marc-André Gagnon, Ph.D	Agilent Technologies Canada	Handling High TDS & Difficult Matrix Analysis with the Agilent 5110 ICP-OES
9:00	Edgar F. Paski	Analytical Innovations	Assayer's Conundrums on Calibration
9:35	Benoit Bouchard	Katanax Inc.	The glass network theory driving your daily fusion process
9:55	***COFFEE BREAK***	***LECO***	***SPONSORED in Exhibit Hall***
10:10	Gilles R. Groulx and Laura Oelofse	ATS Scientific Inc.	Utilizing Portable XRF in a cloud-based data storage and dissemination system for overall process measurements at-line for near real time process control and optimization
10:30	Andrew Rams and Andrew Toms	PerkinElmer and Elemental Scientific	Increasing Laboratory Productivity Through Increased Automation Using the PerkinElmer Avio 200 ICP-OES Connected to the ESI prepFAST2 Automated Sampling System
10:50	Pamela Wee	Agilent Technologies Canada Inc.	Introducing Agilent's Second Generation ICP-MS/MS, the 8900 QQQ for Unprecedented Spectral Interference Control, Extreme High Sensitivity, and High Matrix Tolerance
11:10	Kristin Leftwich	PROTO Manufacturing	Advances in Benchtop XRD Versatility: Relative Humidity and Temperature Measurements with the AXRD Benchtop
11:30	***BUSINESS LUNCH***	***TECK HVC***	***SPONSORED in Theatre***

Tuesday Morning Technical Abstracts

Are You Ready for the New ISO/IEC 17025 Standard?

Cathy Wylie *8:40 am*
Canadian Association for Laboratory Accreditation, Ottawa ON, Canada

The ISO/IEC 17025 standard is under-going significant revisions. The standard went to Final Draft International Standard (FDIS) in July 2017. Voting on the FDIS will close in early fall and if the vote passes, it is anticipated that the new version will be published late in 2017. Laboratories will have a limited time line from the published date to conform to the new standard.
Is your laboratory ready to make the transition to ISO/IEC 17025:2017?
This session will provide an overview of the major changes to the ISO/IEC 17025 standard, the most up-to-date transition details, and how these will impact your quality system. Leave with an understanding of how and when your laboratory needs to conform.

Notes:

Method Development for Determination of Xanthate Compounds in Mining Process Waters by Capillary Electrophoresis

Author: Tyson Bodor
Thompson Rivers University, Kamloops BC

9:00 am

Xanthates; a family of chemical compounds used to aid froth flotation in the mining industry, are used every day by mining companies across the globe. Potassium amyl xanthate (PAX) is the most commonly used floatation agent, but the market for xanthates is not sufficiently strict on their proper labelling. This gives rise to a large variation in PAX composition, and inconsistencies in the amount needed per volume of water. Since there are eight different xanthate compounds found in industry, all of which have different masses, it is important to know the exact make-up of each bag of xanthates. Using capillary electrophoresis (CE) a novel method was developed for separating and quantifying each of the available xanthate compounds. This was achieved by using industry standards of all available compounds, testing variations on a method, and adjusting said method until it was satisfactory for each xanthate. Method optimization involved buffer, voltage, pH, and detector modification. Once a reproducible method was developed, mixtures of the compounds were prepared and analyzed to validate the process. All available xanthate standards were quantitatively separated and positively identified in various concentration mixtures. Once the method was developed and fully validated, samples were analyzed from different suppliers and characterized both qualitatively and quantitatively for their xanthate composition.

Modern XRD in the Mineral Industry: Speed, Accuracy and Resolution

Author: Gregory R Schmidt
Thermo Fisher Scientific

9:20 am

The current paradigm of mineral research demands not only accuracy but speed from not only the equipment, but those running it. X-ray diffraction, once thought a plateaued technique, has evolved to fit these needs. Thermo Fisher Scientific is pushing the boundaries of speed and accuracy with the introduction of the ARL Equinox line of diffractometers. Through the use of the curved position sensitive (CPS) detector technology and a fixed geometry goniometer, a stable platform has been created for a multitude of analysis environments which can provide rapid data collection. Combined with modern software technology, it is possible to progress from powdered sample to report in a matter of minutes. Quantitative analyses of mineral samples are routinely performed with data collected at a fraction of the time once required using previous technologies.

Selection of Digestion Method for Geochemical Determinations

Robert Sloan P. Eng
VP ALS Metallurgy, Kamloops BC, Canada

9:40 am

Geochemical determination results can vary depending on the digestion method employed. The digestion method should be selected based on a knowledge of the geology/mineralogy and the objectives of the geochemical analysis. The assayer is in a unique position to provide input towards the best determination method which will meet the needs of the geologist, engineer, or mineralogist. The presentation will include case studies which highlight the effect of digestion method for samples containing elements such as copper, lead, zinc, iron, silver, and barium, and provide some guidance on which determination method should be employed.

Notes:

Tuesday Morning Post Break Technical Abstracts

SCP Science Easy Prep Sample Handler-Automates Pre and Post Digestion sample Preparation for Atomic Spectroscopy Laboratories

Don Thompson *10:30 am*
SCP Science, Baie D'Urfe QC, Canada

The Easy Prep Sample Handler is a flexible automation system designed to adapt to most Digestion and ICP/ICP-MS Racks , tubes and vessels. The flexible system allows for Automation of routine repetitive process for Sample Handling in Atomic Spectroscopy Labs.
Automated Pre and Post Digestion sample preparation processes including; sample dilutions, serial dilutions, Normalizations, sample transfers, Aliquoting and Calibration Curve Preparation.
Up to 7 reagents can be used including HF. Intuitive method development software allows programing of rinsing, stirring, pump flushed, "breaks for Digestions" included as part of the processes.

Determination of Metal Content within Geological Materials Utilizing the PerkinElmer NexION 2000 ICP-MS

Ruth Merrifield and Andrew Rams *10:50 am*
PerkinElmer Inc, Woodbridge Ontario, Canada

Throughput, uptime, and accuracy are important benchmarks for geochemistry testing laboratories. In this regard, the new NexION 2000 ICP-MS was used to analyze Geological reference materials for all elements from Li to U (including two internal standards) after acid digestion of the samples. It was demonstrated that a mixed gas approach working in KED mode was capable of accurately analyzing all elements while eliminating the need for correction equations and decreasing analytical analysis times to increase throughput and confidence in analytical results. We report recoveries of geological standards, spike recoveries and limits of detection across the mass range.

Using the Appropriate Fusion Method to Prepare Your Samples for XRF Analysis: A Case Study of Service Laboratories Processing Mining Samples

Anne-Catherine Breton *11:10 am*
Claisse, a PANalytical Company Quebec, Canada

After a short introduction on fusion and a quick overview of the major elements that need to be taken into consideration to ensure the success of this sample preparation technique, we explain the consequences of interchanging three fusion methods to prepare three different types of samples (copper concentrates, limestone and rare earth elements) for XRF analysis.

The goal of this presentation is to demonstrate that numerous factors influence the success of a fusion, and that there is no universal fusion method since all samples have their own characteristics. Consequently, a method that is optimized for a specific type of samples should always be used to avoid flux spills, damage to your platinum-ware and poor analytical results.

Notes:

Tuesday Afternoon Technical Abstracts

Introduction to the PAL1000 and Leachwell tablets

Timothy Elliot *1:00 pm*
Independent Laboratory Supplies Americas Ltd. Sudbury Ontario, Canada

Mineral Process Control's (MC) PAL 1000 PULVERISE AND LEACH machine can simultaneously pulverize and leach a batch of 52 large (~1kg) samples enabling Gold values to be obtained within two hours of samples arriving at the laboratory.
Leachwell Assay Tabs have been formulated for fast cyanide leach gold assaying, each Assay Tab weighs approximately 10 g and contains the appropriate amount of reagents (~% 75% NaCN and ~25% LeachWELL) to facilitate a 1 hour leach when used according to instructions The leach rate for gold for example is approximately 1 micron per minute!
Large samples can now be assayed accurately and very quickly (same time frame as Aqua Regia). Poor reproducibility (scatter) when coarse gold is present is minimized meaning results can be consistently produced.

Determination of gold by microwave plasma emission following MIBK extraction and ColdBlock digestion

Erick Helmeczi *1:20 pm*
Brock University St.Catharines Ontario, Canada

Although MIBK extraction of gold-bearing sample digests has been well established for several decades, new research from the Brock University group has changed the nature of this extraction process. Firstly, we have shown that the use of reverse aqua regia is superior to aqua regia for these digestions (high sulfide ores can be treated initially by nitric acid).
Furthermore, the use of L-cysteine to stabilize low concentrations of gold in the diluted digestate may change the redox regime in solution, and generate a gold(I)-cysteine complex. This new chemistry required investigation of the extraction process to determine whether MIBK remains the best solvent for this extraction. Microwave plasma atomic emission (Agilent Technologies) with and additional introduction of air, to prevent carbon build-up, provides a versatile alternative finish to AAS for the analysis of these samples. We shall report results from a number of samples, prepared by ColdBlock(TM) digestion, and describe the details of the new procedure for the determination of gold.

Ultra Trace Analysis of Platinum Group Metals (PGM) in Rock Samples using the Thermo Scientific iCAP TQ ICP-MS

Weimin Yang Ph D. and Daniel Kutscher *1:40 pm*
ThermoFisher Scientific

Granodiorite, Silver Plume (GSP-2) contains many challenging interfering elements for platinum group metals such as Hf, Nb, or Sr. Several digested samples of GSP-2 were spiked with Au, Pd, Ir, and Pt and then subsequently analyzed on a triple quad ICP MS. Several reaction modes were used to determine the best approach to obtaining sub ppt detection limits of these precious metals.

Observations on CCRMP and PTP-MAL Data

Maureen Leaver and Diane Desroches
Natural Resources Canada/CCRMP Ottawa Ontario, Canada

2:00 pm

For over 40 years, CCRMP has received a considerable amount of data from laboratories worldwide for the preparation of certified reference materials. Similarly, in the last 19 years, Proficiency Testing Program – Mineral Analysis Laboratories (PTP-MAL) has also received a great deal of data. The amount of data is statistically large enough that trends in analytical methods, accuracy and precision are evident. The interpretation of data from recently released materials and cycles of PTP-MAL will be discussed.

ICP-MS analysis of aqua regia extractions - revamping an old method with new technologies to meet diverse needs

Marcus Burnham
Geoscience Laboratories, OGS Sudbury Ontario, Canada

3:00 pm

In many fields of mineral and/or environmental analysis, metals, semi-metals, and other leachable components are extracted from pulverized samples using a blend of concentrated hydrochloric and nitric acids (aqua regia, sensu lato) and analyzed for either specific metals or a broad range of analytes. At the Geoscience Laboratories (Geo Labs) of the OGS, aqua regia analyses are used for base line studies of lake and surficial sediment chemistry, environmental monitoring, and/or mineral exploration research. To accommodate the number of samples characteristically associated with geochemical surveys, the range of analytes that are requested, and the widely varying concentrations present in the received samples (within a single analytical routine) requires high degrees of efficiency and robustness, factors that were important during the recent purchase, commissioning, and development of methods on a new ICP-MS instrument and peripherals. We will show how, by applying the collision cell capabilities of a Thermo iCAP-Q, the on-line micro-dilution methods of a prepFAST autosampler system, and more rigorous off-line data processing techniques, it has been possible to considerably reduce sample and standard consumption and improve sample turnaround times while increasing the working range and scope of the method and expanding the range, type, and quality of analyses that can be offered.

Working With High Matrix samples on ICPMS

Weimin Yang Ph D. and John Schmelzel
ThermoFisher Scientific Bannockburn Illinois, USA

3:20 pm

There are several techniques for handling high matrix samples that are becoming more common. This talk will take an in depth look at Argon gas dilution, on-line liquid dilution, and sampling depth adjustment on the iCAP RQ ICPMS as methods for handling high sample matrix in the mass spectrometer. Argon gas dilution is a reduction in sample volume with Argon introduced to the aerosolized sample path to create a dilution of the sample by the added gas. On-line dilution refers to an increased volume of internal standard with respect to the sample volume to dilute the sample. Finally, moving the sampling depth of the cones in the plasma can be used to sample matrix. A comparison was made of these techniques by analyzing the oxide levels, internal standard recoveries, spike recoveries, and detection limits in high matrix samples (ICSA, ICSAB, Sea Water).

Notes:

Good Laboratory Practices for XRF Analysis in the Mining Industry

Arkady Buman
Bruker AXS Inc. *3:40 pm*

Good laboratory practice (GLP) is very important for any analytical laboratory. It is required for any accreditation if you want your laboratory to be recognized and acknowledged for the quality of your results. Mining laboratory with XRF instruments is no exception.
In order to follow GLP you need to have and understand the selection and optimization process for every parameter of your XRF instrument – power on the X Ray tube, selection of the analytical lines, crystals, collimators, detectors and measurement time. That process will be discussed and optimum selections recommended for each parameter. After your calibration is optimized and completed, it is crucial to have tools to maintain it, check standard and drift correction standards will be discussed.
Sample preparation is one more crucial element in XRF analysis. It has to be reproducible and reliable, in modern instruments sample preparation error is by far the major component of the errors in the XRF analysis. The process of how to evaluate the sample preparation error will be shown.

Wednesday Morning Technical Abstracts

A case for the Benchtop X-ray Powder Diffractometer

Kristin Leftwich
PROTO Manufacturing Taylor Michigan, USA *8:20 am*

This talk will focus on the basic differences between the types of x-ray powder diffractometers, with an emphasis on recent advances in the technology used in benchtop configurations. These advances have increased the accuracy and resolution of benchtop systems such that they are now a viable option for geological laboratories. This talk will address available options for benchtop units, the advantages of different x-ray tubes, sample stages, detectors and optics. Each section will include several types of geological samples to illustrate the versatility of benchtop systems for various applications. This information can help laboratory managers make more informed decisions about their XRD purchases and avoid over- or under-purchasing options, which can cause loss in productivity and/or financial resources.

Handling High TDS & Difficult Matrix Analysis with the Agilent 5110 ICP-OES

Marc-André Gagnon, Ph.D
Agilent Technologies Canada *8:40 am*

Working with brines or acid digests/fusions of soils, sludges, or minerals samples often leads to high amounts of total dissolved solid (TDS). In addition, these samples are typically rich in spectral information. Therefore, these complex matrix effects often lead to difficulties in obtaining reliable analysis by ICP-OES. The Agilent 5110 ICP-OES system was designed to face the most challenging samples without making any compromise on sensitivity and productivity. Several features have been implemented to specifically eliminate and help overcoming matrix interference artefacts. This unique vertical-torch and synchronous dual-view system allows measuring low and high element concentrations at the same time in samples containing up to 30% TDS. Still, working with high concentration solutions remains a challenge as rinsing and conditioning represent especially time-consuming steps in such cases. The fully integrated advanced valve system (AVS6/7) allows efficient rinsing of the sample introduction system and helps minimizing carry-over effects. Due to their high (and diverse) mineral content, the analysis of high TDS samples leads to spectral-rich data. For this reason, the Agilent system provides an automated spectral deconvolution approach that helps overcoming these situations. Several examples will be shown to illustrate the robustness, accuracy and reliability of the 5110 ICP-OES system for difficult matrix analysis.

Assayer's Conundrums on Calibration

Edgar F. Paski
Analytical Innovations North Vancouver, British Columbia, Canada

9:00 am

Do I need special starting materials for making up my standards? Why?
Is it OK to use something other than a straight line for my calibration plot?
How many standards do I need?
Which r^2 value should I use?
How often do I need to check my calibration, what acceptance criteria should I use?
What is the ISO assessor going to make me do?

These are some of the common questions assayers ask about calibration ("standardization") of measuring devices in the assay lab. For instrumental methods like AA, ICP-OES, XRF there are choices to be made, the appropriate choice depends on what is "suited for purpose" - the intended use of the assay results. Classical methods such as gravimetry and titrimetry have a more limited range of choices. Guidance on how to make choices that are suited for purpose will be given in this presentation.

Topics covered:

- ISO/IEC 17025:2017 requirements for calibration in testing laboratories,
- Metrological traceability – what it is and how to achieve it,
- Calibration curve algorithms – how to select an appropriate model for an assay method,
- Acceptance criteria for calibration and how often it needs to be applied,
- Matrix matching of calibration standards to sample materials presented to an instrument.

The glass network theory driving your daily fusion process

Benoit Bouchard
Katanax Inc.

9:35 am

Borate fusion no longer needs to prove its superiority as a sample preparation method for XRF. However, it can sometimes be quite a challenge for analysts when comes the time to prepare a new sample type, which might require a different flux, and still produce an optimal glass disk. While some convenient and easy-to-use theories have been devised and used in the last decades, some important exceptions were left unexplained. In recent years, Katanax and other members of the analytical community have started to use the "glass theory" to better explain the behavior of oxides into the flux matrix. Indeed, a fusion is in fact a dissolution of the sample's oxides into a low-melting-point glassy flux matrix. The purpose of this presentation is to demystify the chemistry behind the borate fusion, with the help of the glass network theory.

Notes:

Wednesday Post Break Technical Abstracts

Utilizing Portable XRF in a cloud-based data storage and dissemination system for overall process measurements at-line for near real time process control and optimization

Gilles R. Groulx and Laura Oelofse 10:10 *am*
ATS Scientific Inc.

In the processing facility, the metallurgist and process engineers have to keep track of the concentrations of materials at all stages of the process.
Sometimes there are automated measuring systems that do this, but very often they do not have this facility. The use of Portable XRF can be excellent throughout the entire process - float feeds, float cell optimization, tails and concentrates to provide near real time results to indicate the degree of optimization of the processes. Most customers have full on-site laboratories with high end XRF, AA, ICP and Fire Assay capabilities. Many of these customers choose to use Portable XRF as a fast, efficient screening tool to selectively support optimized utilization of the higher end equipment and optimize analysis speed or quicker data turnaround to critical plant process control information.
in addition to Flotation Feeds, Concentrates and Tails, portable XRF shows utility for measuring SX (Solvent Extraction) EW (Electro Winning) plants Raffinates, Pregnant Solutions, Electrolyte solution and measuring metals in liquids – and the results are excellent and available in the cloud in near real time. Portable XRF represents a step forward in streamlining mining processes and providing additional cost reductions.

Considering that there are at least three types of XRF instruments (EDX, WDX - sequential and simultaneous) which are suitable for mining applications the selection criteria showing the benefits for each type of instrument will be discussed.

Increasing Laboratory Productivity Through Increased Automation Using the PerkinElmer Avio 200 ICP-OES Connected to the ESI prepFAST2 Automated Sampling System

Andrew Rams and Andrew Toms *10:30 am*
PerkinElmer and Elemental Scientific Woodbridge Ontario, Canada

A common source of error in laboratory results can come from the preparation of samples before they are even introduced to an analytical instrument for measurement. Automation is an effective way to maintain control of aspects of sample preparation, such as dilution. The newly introduced Avio 200 ICP-OES was connected to an ESI prepFAST2 autosampler to make use of its fast sample introduction and on-line dilution and internal standard addition abilities. Certified reference materials (CRMs) were digested in concentrated acid and the resulting solutions were transferred directly to test tubes for analysis on the Avio 200 without any additional dilution steps. The prepFAST2 was used to perform the dilutions usually performed by technicians on a wet lab benchtop, but in a controlled and repeatable manner using automated syringes. The combination of features provided by the Avio 200 and prepFAST2 instruments result in reduced operating costs for laboratories. Results of analyses performed on CRMs will be presented.

Notes:

Introducing Agilent's Second Generation ICP-MS/MS, the 8900 QQQ for Unprecedented Spectral Interference Control, Extreme High Sensitivity, and High Matrix Tolerance

Pamela Wee *10:50 am*
Agilent Technologies Canada Inc. Mississauga Ontario, Canada

Since its launch in 2012 as the world's first ICP-MS/MS, the Agilent 8800 QQQ rapidly established itself in diverse industries from routine production labs to advanced research to manufacturing. Based on an uncompromised design, the two full-size hyperbolic quadrupole mass filters (QMF) provide wing overlap removal unmatched by any ICP-MS. Chemical pre-separation cannot remove wing overlaps from a massive spectral peak of the same elemental ion.
Both QMFs deliver better than unit mass resolution. This is critical for the successful resolution of spectral interferences using gas ion chemistry in a reaction cell which resides between the QMF. Cell gases are chosen for the chemical resolution of spectral interferences, for the provision of adequate sensitivity for reliable calibration and detection, and for fast sample throughput. Real world samples contain co-existing elements that can react with the cell gases, creating unwanted product ions that cause new interferences. Simply by setting the first QMF to one desired mass, say at M amu, all ions with masses < (M - 1) and > (M + 1) are prevented from entering the cell.
With the new Agilent 8900 QQQ, sensitivities are doubled without compromising the already low CeO+/Ce+ and Ce++/Ce+ ratios, matrix tolerance enhanced to 25% NaCl, ten-fold increase in detector dynamic range, faster detector dwell times, and faster cell gas switching. Many examples will be shown.

Advances in Benchtop XRD Versatility: Relative Humidity and Temperature Measurements with the AXRD Benchtop

Kristin Leftwich *11:10 am*
PROTO Manufacturing Taylor Michigan, USA

From Martian soils to Canadian cements, relative humidity and temperature measurements help us understand how materials behave under non-ambient conditions in real time. This presentation will illustrate the variety of ways in which new compact benchtop XRD systems can solve problems previously tackled only with large-scale laboratory systems. The AXRD Benchtop has the flexibility to incorporate new hardware, making complex measurements possible with a convenient, small instrument.

Notes:

New Afton Mine Tour – 7:15am to 4:00pm Sept 14, 2017

A bus will pick you up at the Coast Kamloops Hotel and Convention Centre at **7:20 am**. A bagged lunch will be provided. **Appropriate attire is required for the tour: long sleeved tops (no hooded tops and/or jackets) and long pants. The use of contact lenses is not permitted for Underground Tours, and prescription glasses, if necessary, must be worn instead**. New Afton will do a check on the attire and if anyone has not met the requirement then they will not be permitted to go on the tour. Proper PPE will be provided and must be worn in order to participate. When registering, please ensure to provide sizing information.

About the Mine & Mill

The New Afton Mine occupies the site of the historic Afton Mine, a previous operation of Afton Operating Corporation (owned by Teck Resources), and includes an open pit, underground workings, historic support facilities, a concentrator and tailings facility. The New Afton deposit extends to the southwest from immediately beneath the Afton Mine open pit. New Afton began production in June 2012 and began commercial production ahead of schedule in July 2012.

The New Afton deposit comprises part of a larger copper-gold porphyry district situated within the prolific Quesnel Trough island-arc terrane, host to many of British Columbia's major copper and gold districts. Pre-mineral country rocks consist of intermediate to mafic volcanic country rocks belonging to the Triassic Nicola Formation. Regional scale fault zones act as the principal controls to the emplacement of the batholithic rocks and related porphyry-style mineralization in the area. The bulk of the New Afton deposit occurs as a tabular, nearly vertical, southwest plunging body measuring at least 1.4 kilometres along strike by approximately 100 metres wide, with a down-plunge extent of over 1.5 kilometres. The deposit remains open to the west and at depth.

Mineralization is characterized by copper sulphide veinlets and disseminations localized at brecciated margins between altered porphyry intrusives and Nicola volcanic country rocks. Copper occurs primarily as chalcopyrite and lesser bornite, with secondary chalcocite and native copper occurring in the upper nearer-surface parts of the deposit. Gold occurs as sub-micron grains associated with copper sulphides.

Since the start of the current underground block cave operation in July 2012, exploration at New Afton has focused on extending the mineral resource below the current B-Zone block cave reserve. This work has resulted in the completion of a feasibility study for the C-Zone mineral resource. The C-Zone resource remains open to further growth both laterally and down plunge to the west.

The New Afton mill was designed to process 11,000 tpd (4 Mtpa) of ore at full capacity and has operated up to 17,800 tpd due to a mill expansion and operational improvements. It is a copper concentrator that generates a bulk concentrate by recovering and upgrading copper, gold, and silver. The mill processes a blend of hypogene, transition and supergene ores using crushing, grinding, concentration and dewatering processes. Mineral separation is by gravity concentration and differential flotation and includes regrinding. Life-of-mine recoveries are expected at approximately 84% copper, 82% gold and 70% silver.

About the Tour

The tour will be split up into two groups. In the morning session, one group will be going underground while the other group will tour the surface facilities. The groups will meet for lunch and switch tours. The underground tour will take you through the inner workings of the mine. We will focus on safety, production and mineralogy. The surface tour will take place in the Laboratory, Tailings Facility and Mill, with a focus on how we safely extract and measure the valuable copper and gold from the ore that has been brought to surface. We will go through how we approach safety, as well as, all of the challenges and successes that we have had to date. Please feel free to ask questions and take pictures for personal use, however, please note that pictures are not allowed to be shared on any public or social media platforms such as Facebook or Instagram. New Afton looks forward to hosting you on this tour.

Analytical Tour: KCWQ/TRU/Domtar 7:35am to 4:30pm Sept 14, 2017

This year we decided to showcase a tour that would both be unique to Kamloops as well as present laboratories and analyses that you wouldn't normally be exposed to at the CMA. We hope that the parallels and differences between the mineral analysis environment and the places on this tour spark your interest!

A bus will pick you up at the Coast Kamloops Hotel and Convention Centre at **7:40 am**. A bagged lunch will be provided. **Tour participants will need closed toed shoes and long sleeves.** PPE will be provided and must be worn in order to participate. Please let us know if you can bring your own safety glasses.

Kamloops Centre for Water Quality – 8:10 am to 9:20 am

Kamloops
Canada's Tournament Capital

The Kamloops Centre for Water Quality **(KCWQ)**, commissioned in 2005, uses innovative membrane filtration technology to provide high quality drinking water to residents and visitors.
"Green" building technology was used extensively in the construction of the KCWQ, to maximize efficiency, prevent pollution, and contribute to the sustainability of our community.
The KCWQ also contains laboratories and classrooms built as part of a research and training partnership between the City of Kamloops, Thompson Rivers University and Zenon Environmental Inc. This "Centre for Safe Water Excellence" will provide opportunities for water quality research and training in a working water treatment plant, the first facility of its kind in North America.

Thompson Rivers University (TRU) 9:45 am to 12:45 pm (Lunch at noon)

THOMPSON RIVERS UNIVERSITY

Tour Facilitators: Dr. Kingsley Donkor, Dr. Sharon Brewer, Dr. Jonathan Van Hamme

The tour at TRU will cover visits to the Analytical Chemistry Laboratories and the Biocatalyst and Bioproduct Development Facility (BBDF). The Analytical Chemistry facility houses an Agilent Quadrupole Time-Of-Flight Liquid Chromatography/Mass Spectrometry (Q-TOF LC/MS) System, a 500 MHz Nuclear Magnetic Resonance instrument, an Agilent Gas Chromatography-Mass Spectrometry (GC-MS) system, Beckman-Coulter Capillary Electrophoresis systems equipped with photodiode array, ultraviolet, and laser-induced fluorescence detectors. Also available are a peptide synthesizer and a state-of-the-art Matrix-Assisted Laser Desorption/Ionization Time-of-Flight (MALDI-TOF) Mass Spectrometer. The BBDF houses stirred tank receptors for culturing and fermentation studies and an equipment for Two-Dimensional Difference Gel Electrophoresis (2D DIGE) and protein purification system used for proteomic studies as well as a fluorescence purification imager and robotic spot picker. In addition, there is a state-of-the-art IonTorrent Personal Genome Machine (PGM) Genetic Sequencer for molecular biology and sequencing.

Domtar 1:00 pm to 4:00pm

Domtar

HISTORY	Built by Weyerhaeuser in 1972. $450 million invested in capital improvements since 1994. Third turbo-generator installed in 2003. Became part of Domtar in 2007.
MILL PERFORMANCE	Annual pulp production capacity of 354,000 tonnes (ADMT). 1 pulp line.
PRODUCTS	Cellulose fibers: Papergrade bleached softwood kraft (NBSK) and specialty pulp grades.
ACHIEVEMENTS	FSC Controlled Wood certified, PEFC Chain-of-Custody certified ISO 14001, ISO 9001 2008 BC Export Award for Sustainability

2017 CMA Organizing Committee

New Afton Mine - New Gold Inc.		
Sponsorship, Social, and Accommodations Lead		
Chair: John Andrew	John.Andrew@newgold.com	250 377 2885
Technical Program, Tours & Short Courses Lead		
Co-Chair: Elizabeth Sirianni	Elizabeth.Sirianni@newgold.com	250 377 2105
Banquet and Food Lead		
Jerico Gaspar	Jerico.Gaspar@newgold.com	250 377 2106
ALS Metallurgical – Kamloops		
Registration and Exhibition Leads		
Brenda Tremblay	Brenda.Tremblay@alsglobal.com	250 828 6157
Simone Bawtree	Simone.Bawtree@alsglobal.com	250 828 6157
Teck Highland Valley Copper Partnership		
Program and Abstract Lead		
Kerstin Johansson	Kerstin.Johansson@teck.com	250 523 2443
Technical Program, Tours & Short Courses Lead		
Susie Kelly	susief2003@yahoo.com	

NEXT YEAR -2018 CMA Organizing Committee

Teck Metals Ltd- Trail BC		
Conference Chair:	Richard Bredl	Richard.Bredl@teck.com
Conference Co-Chair	Jennifer Boss	Jennifer.Boss@teck.com
Social Programs Chair	Jessica Fullerton	Jessica.Fullerton@teck.com
Technical Program Chair	Keith Lepla	Keith.Lepla@teck.com
Exhibition Chair	Richard Magner	Richard.Magner@teck.com
Registration Chair	Donna Thorne	Donna.Thorne@teck.com
Treasurer	Scott Daniels	Scott.Daniels@teck.com

Notes

Conference Schedule

Monday September 11, 2017		
Registration Desk	Conference Entrance	7:00 am to 4:00 pm
Exhibitor Set-up	Ballroom	10:00 am to 4:00 pm
Workshop #1 (+breakfast)	Salon A/B	7:00 am to 11:30 am
Workshop #2 (+lunch)	Salon A/B	11:30am to 4:00 pm
Welcoming Reception Exhibit Hall	Ballroom	6:00 pm to 8:00 pm
Tuesday September 12, 2017		
Registration Desk	Conference Entrance	7:00 am to 2:00 pm
Continental Breakfast	Ballroom	7:30 am to 8:20 am
Exhibit Hall	Ballroom	7:30 am to 4:00 pm
Morning Technical Session	Theater	8:20 am to 11:30 am
Coffee Break	Ballroom	10:00 am to 10:30 am
Buffet Lunch	Ballroom	11:30 am to 1:00 pm
Afternoon Technical Session	Theater	1:00 pm to 4:00 pm
Coffee Break	Ballroom	2:20 pm to 3:00 pm
Exhibit Happy Hour	Ballroom	5:00 pm to 6:00 pm
Gala Banquet Dinner	Theater	6:00 pm to 9:00 pm
Wednesday September 13, 2017		
Continental Breakfast	Ballroom	7:00 am to 8:00 am
Exhibit Hall	Ballroom	7:00 am to 11:30 am
Morning Technical Session	Theater	8:00 am to 11:30 am
Coffee Break	Ballroom	9:55 am to 10:10 am
CMA Business Lunch	Theater	11:30 am to 1:00 pm
CMA Business Meeting	Theater	1:00 pm to 2:00 pm
Exhibit Tear-Down	Ballroom	12:00 pm to 3:00 pm
First Nations Tour	Bus Leaves Coast Kamloops Hotel & Conference Centre 2:15 pm	2:10 pm to 5:00 pm
Thursday September 14, 2017		
New Afton Tour	Bus Leaves Coast Kamloops Hotel & Conference Centre 7:20 am	7:15 am to 4:00 pm
Analytical Tour	Bus Leaves Coast Kamloops Hotel & Conference Centre 7:40 am	7:35 am to 4:30 pm

NEXT YEAR'S CONFERENCE INFORMATION:

2018 Canadian Mineral Analysts Conference and Exhibition

50th Annual CMA

Trail & Rossland, British Columbia

September 9-13, 2018

Prestige Mountain Resort

Hosted by Teck Resources Limited

Conference Chair –Richard Bredl - Richard.Bredl@teck.com

http://www.prestigehotelsandresorts.com/locations/rossland/overview/index.php in Rossland.

Preferred conference rates have already been established: $129.95 (Standard) and $159.95 (Suites) quote "CMA2018" for this rate.