CoalSMART 2017

23 February 2017

Presented By: Western Canadian Coal Society

CoalSMART 2017

Forum Agenda

8:00 – 9:00	**Registration, Tradeshow & Continental Breakfast** Sponsor: **Certispec Services**	**Granville Room / Burrard Room**
9:00 – 9:15	**Welcome and Opening Remarks** Melanie Mackay, President, Western Canadian Coal Society	**Granville Room**
9:15 – 10:00	**Assessing the potential for toxic effects on sensitive aquatic habitat following remediation of a coal train derailment at Burnaby Lake** Dr. Shannon Bard, Hemmera	**Granville Room**
10:00 – 10:45	**Producing Clean Coal from Western Canadian Coal Fields using the Water-based Boner Jig Process** Melanie Mackay, Carbonization Research Association Heather Dexter, Birtley Coal & Mineral Testing (GWIL Industries)	**Granville Room**
10:45 – 11:00	**Coffee Break & Tradeshow** Sponsor: **Intertek**	**Granville Room / Burrard Room**
11:00 – 11:45	**Transformative Technologies: MineSight xViewer, Point Cloud Mesher & GeoLogic** Liam Murphy, Hexagon Mining	**Granville Room**
11:45 – 1:00	**Lunch & Tradeshow** Sponsor: **Birtley Coal & Mineral Testing (GWIL Industries)**	**Granville Room / Burrard Room**
1:00 – 1:45	**Stages of Coal Project Development – Lessons Learned** Sean Ennis & Mike Allen, Norwest Corporation	**Granville Room**
1:45 – 2:30	**Coal Deposits as Sources for Rare Earth Elements** Vinoth Kumar, PhD Candidate, University of British Columbia	**Granville Room**
2:30 – 2:45	**Coffee Break & Tradeshow** Sponsor: **Intertek**	**Granville Room / Burrard Room**
2:45 – 3:30	**BC Coking Coal Cargo Moisture** Ross Leeder, Canadian Carbonization Research Association / Teck Coal	**Granville Room**
3:30 – 4:30	**Panel Discussion: What Will It Take for a Comeback? One Year Later…** Moderator: Bob Bell, WCCS Panel Members: Angela Waterman, Waterman Resources Mike Allen, Norwest Corporation Robin Campbell, Coal Association of Canada Brent Lyon, Lyon Consulting	**Granville Room**
5:00 - 7:30	**Evening Reception** Sponsor: **Norwest Corporation**	**The Edge Social Grille & Lounge** *(Downstairs)*

Conference moderator: Kobie Koornhof

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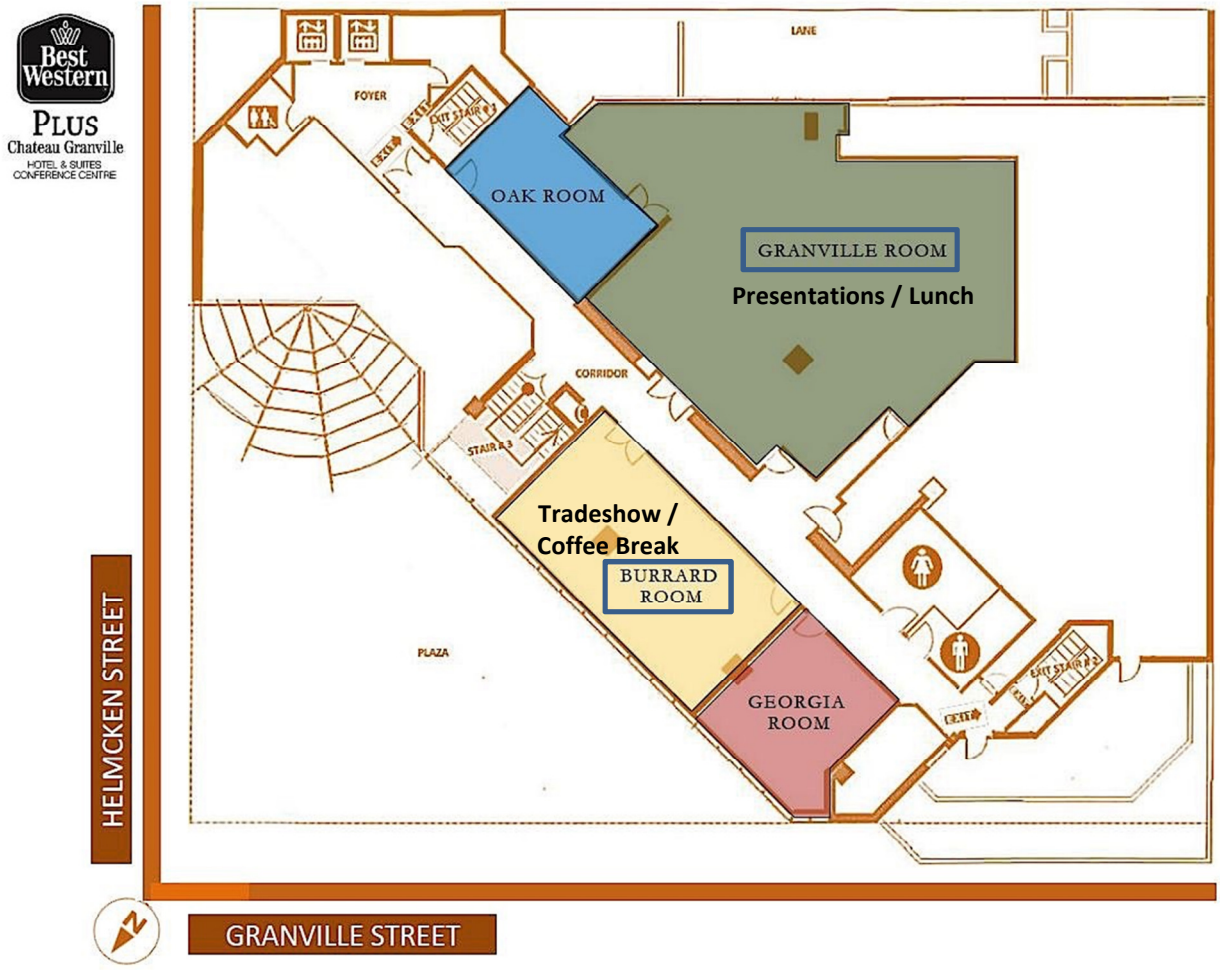
Forum Floorplan:



Reception Hosted by Norwest Corporation at:

THE edge
SOCIAL GRILLE & LOUNGE

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Assessing the potential for toxic effects on sensitive aquatic habitat following remediation of a coal train derailment at Burnaby Lake

Dr. Shannon Bard, Hemmera

There is a general paucity of information regarding the environmental impact of accidental spills of raw, washed coal in freshwater ecosystems. The January 2014 derailment of 3 coal-containing rail cars in Burnaby, BC resulted in coal being deposited throughout Silver Creek and Burnaby Lake, including an area located immediately offshore of turtle nesting locations. By May 2014, remedial efforts in both waterbodies resulted in >90% removal (by volume) of the accessible spilled coal. The remediation undertaken at and adjacent to Turtle Beach involved the salvage of juveniles and coal removal immediately offshore of the nesting beach at the confluence of Silver Creek and Burnaby Lake. In order to evaluate residual impacts from any unrecovered coal downstream of the spill area and associated temporal effects, aquatic impact assessments of the receiving environment were conducted in the spring of 2014 and 2015. The assessments focused on potential short- and long-term water and sediment quality impacts, using a weight-of-evidence approach. Study elements included evaluations of: chemical tracers of the spilled coal, water and sediment quality, sediment/porewater toxicity, bioaccumulation potential of sediment contaminants, and direct measures of remaining coal. Coal was present in downstream sediments and was associated with elevated concentrations of metals and contaminants in comparison with reference locations. Water quality was considered to be acceptable. Evaluation of aquatic invertebrate toxicity/bioaccumulation test data provided more specific information regarding bioavailability and potential for biological impact and temporal improvements, post-remediation. For both years and all locations - except for one station in 2014 - site sediments/porewater were non-toxic. These results suggest that the remediation efforts were successful in sufficiently reducing coal in sediment to concentrations posing a low potential for adverse impacts to aquatic receptors. It was recommended that sediments be left in place for the residual coal to attenuate naturally, as any further sediment removal would likely pose greater risks to aquatic receptors, through habitat disturbance and re-suspension and transport of residual coal particles over a broader area.

Dr. Shannon Bard, *Hemmera*

Dr. Shannon Bard brings more than 25 years of experience in environmental toxicology, human health and ecological risk assessment, environmental sustainability management, marine biology and habitat restoration, and biomedical research. In addition to servicing as Practice Leader for Biological Risk Assessment at Hemmera environmental consulting, she is the national Practice Leader for Scientific Innovation. She has extensive experience leading regional, national, and international multidisciplinary technical teams to tackle complex interdisciplinary environmental problems. A graduate of Stanford University and MIT, Shannon formerly was a professor of Environmental Science at Dalhousie University and Director of the Marine Ecotoxicology Laboratory. She was co-winner of the Senate Environmental Award and the inaugural winner of the national YTV Environmental Achievement Award.

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Producing Clean Coal from Western Canadian Coal Fields using the Water-based Boner Jig Process

Melanie Mackay, Canadian Carbonization Research Association & Heather Dexter, Birtley Coal & Minerals Testing (GWIL Industries)

The Canadian Carbonization Research Association (CCRA) in close collaboration with federal and provincial partners including Natural Resources Canada/CanmetENERGY, University of British Columbia, Gwil/Birtley Coal & Minerals Testing and Teck Coal, and Geoscience BC will be undertaking a project focused on washing metallurgical coal from various mine sites in British Columbia using water based and traditional organic liquids float/sink separations. Due to higher inherent ash, coal in British Columbia is almost always washed prior to coal and coke quality characterization. The coking characteristics for metallurgical coal deposit drill core exploration samples are both imperative and critical in properly evaluating project economics, which are intimately linked to the expected market price for the clean coal.

The main objective of the proposed project is to verify that the water-based Boner Jig cleaning equipment can be commercially used to wash a broad range of coal types found in British Columbia coking coal basins to ultimately produce representative clean coal composites leading to qualities of coal (Thermal rheology properties) and coke (Coke Strength after Reaction, CSR) that are either superior or at least equivalent to those achievable via conventional organic liquids treatment. If indeed found to be the case, this would benefit the coal industry in British Columbia, and globally by eliminating the potential negative effects of perchloroethylene and other organic liquids on coal and coke quality parameters and reduce the exposure of lab technicians/operators to these carcinogenic organic liquids.

Melanie Mackay, *Canadian Carbonization Research Association*

Melanie has been working in the coal industry for 14 years where she has specialized in the coal quality of the Gates and Gething Formation coals in Northeast British Columbia. She has been a technical member of the Canadian Carbonization Research Association since 2010 where she has been involved in researching the use of organic liquids in the washability of coal. She is an ISO – Canadian Advisory Committee Member for Solid Mineral Fuels. Melanie has an honours degree in Geological Sciences from the University of British Columbia and is a Professional Geoscientist registered with the Association of Professional Engineers and Geoscientists of British Columbia. She is also a co-founder and the president of the Western Canadian Coal Society.

Heather Dexter, *Birtley Coal & Minerals Testing (GWIL Industries)*

Heather is the Operations Manager at GWIL INDUSTRIES, Birtley Coal & Minerals Testing Division. She holds a diploma in Chemical Technology from the Southern Alberta Institute of Technology. She has 27 years of testing experience in thermal and metallurgical coal projects in both the laboratory and sample preparation areas; coal beneficiation through float sink testing, coal sampling in Coal Preparation Plants (water cyclones, heavy media circuits, spirals, froth flotation); quality control, research into coal froth flotation and reagents. She is an ISO – Canadian Advisory Committee Member for Solid Mineral Fuels and a voting member of the ASTM D05 on Coal and Coke.

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Transformative Technologies: MineSight xViewer, Point Cloud Mesher & GeoLogic

Liam Murphy, Hexagon Mining

This presentation will showcase transformative technologies from Hexagon Mining, including the MineSight xViewer, the Point Cloud Mesher, and the soon-to-be released GeoLogic.

The xViewer maximizes the capabilities of your graphics card for faster and smoother viewing of data in MineSight 3D. Millions of blocks can be displayed and worked with, giving you the flexibility to use large data quickly. The xViewer continues to push the boundaries of graphics systems for the best performance possible. Point Cloud Data is a new data type integrated with our software. It allows you to import and display hundreds of millions of points at once. The xViewer easily handles LIDAR data and other cloud data types.

On the modeling side, GeoLogic leverages the power of implicit modeling by sequencing surfaces and solids to create an airtight geological model. The outcome is an entirely reproducible, auditable geological model that can be quickly updated with new information. Fully integrated with the MineSight Planning Suite, GeoLogic provides geologists with smart, time-saving modeling.

Liam Murphy, *Hexagon Mining*

Liam Murphy is a Technical Support Supervisor at Hexagon Mining, a global provider of surface and underground smart mining solutions connecting design, planning and operations technologies for safer and more productive mines. Prior to joining Hexagon Mining (previously MineSight) in 2011, Liam worked as a Scientific Officer for the British Geological Survey based out of the Natural History Museum in London, UK. He graduated with honours from the University of Leeds (UK) with a degree in Geological Sciences.

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Stages of Coal Project Development – Lessons Learned

Sean Ennis & Mike Allen, Norwest Corporation

The mid to late 2000s saw the development of numerous coal operations with the resurgence of the metallurgical coal industry in western Canada. The presentation will focus on the mine evaluation and development process, specifically focused on coal. A look at the risks associated with different development strategies will be discussed through the lens of what has worked, where the risks are, what has changed specifically with regards to the permitting process, and how to best mitigate the risks associated with coal mine development.

Sean Ennis, *Norwest Corporation*

Mr. Ennis works in both the areas of mine engineering and mine geotechnical/geoenvironmental engineering. He has over twenty years of experience in the mining industry. He is involved in geotechnical and geo-environmental issues related to mining, including mine waste management, slope stability and mine closure for metal, coal and oil sands projects. He has site experience in various disciplines of the mining industry such as short and long range mine planning, surveying, project management, and site investigation. He is registered as a professional engineer in Canadian and United States jurisdictions. He is also a qualified person under Canadian National Instrument 43-101 regulations.

Mike Allen, *Norwest Corporation*

Mike has worked in the western Canadian coal fields for the last 15 years. During this time, he has held management roles at all the operating mines in North Eastern British Columbia except for Quintette. He has also been involved with the permitting of six coal mines in the region from the initial design and permitting stages, through to the operation stage of the Trend Mine expansion. Mike is a passionate fly fisher and enjoys stalking the elusive Bull Trout of the Sukunka and Wolverine rivers.

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Coal Deposits as Sources for Rare Earth Elements

Vinoth Kumar Kuppusamy, M.Eng.

With an increasing technological advancement from clean energy to high tech applications, the role of rare earth elements (REEs) in the 21st century is imponderable. Consequently, the demand for these materials has also risen tremendously. It is estimated that the conventional rare earth ore deposits will be exhausted in 10 – 15 years. Coal deposits in US, China, and Russia have unusual rare earth anomalies, which have attracted researchers to explore coal and its by-products as a potential source for these elements. This presentation will review abundance of REEs in coals with special attention to British Columbian coals, the mode of occurrence & mineralogy of REEs in coal and the potential extraction methods to recover the REEs.

Vinoth Kumar Kuppusamy, *M.Eng., University of British Columbia*

Vinoth is a first-year mineral processing PhD student at the University of British Columbia. He is currently working with Dr. Maria Holuszko on "Characterization and Extraction of Rare Earth Elements from Coal and its by-products". He holds a Bachelors of Engineering in Mining Engineering from Anna University, India and completed his Master of Engineering in Mining Engineering from the University of British Columbia. He worked at Kearl Oil Sands mine for 8 months as a co-op student in Short Range Mine Planning. He is also the recipient of the CIM 2016 Graduate Student Award.

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BC Coking Coal Cargo Moisture

Ross Leeder, Canadian Carbonization Research Association / Teck Coal

At Western Canadian ports, coal vessel moisture control is important to meet dust, handling, shipping, customer and contractual limitations. Coal moisture levels are initially set at the mine processing plant where the coal is mechanically and thermally dried. However dust suppression spraying, rain and stockpiling and reclamation practices also impact coal moisture levels both as loaded on a vessel and later at the user. This presentation will discuss control of coal cargo moisture levels, including a review of CCRA investigations of coal stockpile moisture migration.

Ross Leeder, *Canadian Carbonization Research Association / Teck Coal*

Dr. Ross Leeder is currently a technical marketing consultant for Teck Coal Ltd., and is an active technical member with the Canadian Carbonization Research Association (CCRA). He has been working in the coal industry for over 40 years and has worked been employed at many coal mines and properties including: Quintette, Elkview, Line Creek, Greenhills, Fording River and Cardinal River. Ross obtained his BSc and PhD from the University of British Columbia and has published many research papers related to coal quality for cokemaking.

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Panel Discussion:
What will it take for a comeback? One year later…

Moderator: **Bob Bell,** Western Canadian Coal society

Panel members: **Angela Waterman,** Waterman Resources
Mike Allen, Norwest Corporation
Robin Campbell, Coal Association of Canada
Sean Ennis, Norwest Corporation

At CoalSMART 2016, our panel discussion focused on what it would take to restart coal mining operations in British Columbia. Now that we have experienced recent increases in metallurgical coal prices, we will revisit the panel to get an update on the state of a potential recovery in the coal mining industry in British Columbia. An essential aspect of the discussion will be audience participation with variety of views and ideas encouraged.

Bob Bell, *Western Canadian Coal Society*

Mr. Bell has had a long and distinguished career in the coal sector in Canada. He is a mining engineer and business administration graduate with more than 27 years' experience in the Canadian coal industry and in international coal markets. He brings executive management experience with experience in coal mine development, marketing, logistics and operations including mine planning, management of the environment and First Nations relationships. He has strong technical marketing skills, has overseen major capital projects, business development and mergers and acquisitions.

Mr. Bell has a well-established network in the Canadian coal industry and has served in the past on the board and as Chair of the Coal Association of Canada. He also served two terms as Chair of Neptune Bulk Terminals (Canada) Ltd., one of the largest bulk commodity export terminals in western North America. He currently serves on the boards of the Western Canadian Shippers Coalition and the Western Canadian Coal Society.

Mr. Bell's education includes a degree in Mining Engineering from McGill University in Montreal, a Master's degree in Business Administration from Queen's University in Kingston Ontario and the Directors Education Program (ICD.D) from the Rotman School of Management/Institute of Corporate Directors.

Angela Waterman, *Waterman Resources*

Angela Waterman has over 20 years of diverse experience in the mining industry with wide-ranging knowledge of the sector covering commercial, technical and project development aspects. She has an in-depth knowledge of the regulatory regime and extensive advocacy experience with governments, First Nations and stakeholders.

Educated at the University of British Columbia, Faculty of Science, she earned a Bachelor degree in biology. She is a member of the British Columbia Technical Research Committee on reclamation http://www.trcr.bc.ca/, a member of the Association for Mineral Exploration Land Use Committee http://www.amebc.ca/, and past Vice President of Environment of the Mining Association of British Columbia.

Previously, she was Manager of Environmental-Regulatory Affairs for NEMI Northern Energy & Mining and at Peace River Coal Inc., a subsidiary of Anglo American Metallurgical Coal. She is currently the Director of Environment and Government Affairs for Telkwa Coal Limited, a subsidiary of Allegiance Coal.

Mike Allen, *Norwest Corporation*

Mike has worked in the western Canadian coal fields for the last 15 years. During this time, he has held management roles at all the operating mines in North Eastern British Columbia except for Quintette. He has also been involved with the permitting of six coal mines in the region from the initial design and permitting stages, through to the operation stage of the Trend Mine expansion. Mike is a passionate fly fisher and enjoys stalking the elusive Bull Trout of the Sukunka and Wolverine rivers.

Robin Campbell, *Coal Association of Canada*

As a 4th generation coal miner who has spent over 30 years in the industry, Robin Campbell understands the issues facing coal from the inside out. Starting his mining career in 1973, and transitioning specifically into coal in 1979, he has held positions ranging from loader operator to various executive postings. As former treasurer and President of the United Mine Workers of America Local 1656, Robin has local perspective and understanding of the challenges miners and their families are facing during this economic downturn. He also served as a representative of the International Union of the UMWA and gained global perspective of the industry.

Robin also served as MLA for West-Yellowhead in the Alberta Legislature from 2008 to 2015. He was appointed to Cabinet as the Government Whip in 2010 and then served as Minister of Aboriginal Relations, Minister of the Environment and most recently as Minister of Finance and Treasury Board until May 2015. His experience as a public servant and insight into the workings of government translate well into his role at the Coal Association of Canada.

Robin accepted the role as President of the Coal Association of Canada in November, 2015 and is leveraging his decades of experience to help preserve jobs and ensure the coal industry remains an important part of our economy.

Brent Lyon, *Lyon Consulting*

Brent Lyon is a Professional Engineer that has worked with thousands (yes, thousands) of engineers and geoscientists as they select their career path. He's been a manager, an executive recruiter, a business development lead, and even provided expert witness testimony and reports on the employability of engineers and geoscientists in BC. He's seen tens of thousands of resumes in his career, and he's been enlisted as a public speaker and trainer by numerous organizations. He is currently the Principal of Lyon Consulting, and executive search firm.

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Join us in the *both the* ***Granville Room*** *and*

Burrard Room for the

CoalSMART 2017

Trade Show

8:00am – 4:30pm

Companies showcasing their projects & products include:

Elk Valley Environmental Services

Geotech Drilling Services Ltd.

GRIP - Global Resources for Industrial Projects

Specogna Exploration

Upcoming WCCS Events

Call for Presenters!

The WCCS is looking for topics and presenters for our 2017 monthly events. If you are interested please contact

Melanie Mackay (mmackay@westerncoalsociety.ca)

CoalSMART 2017 Sponsors

The Western Canadian Coal Society is a non-profit, volunteer-run society. Sponsors such as these enable us to offer free monthly events and less costly conference fees to our participants. Thank you for your support!

Intertek

NORWEST CORPORATION

GWIL Birtley Coal & Minerals Testing Division

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LORING LABORATORIES LTD.

Thank you Neptune Terminals for hosting
The CoalSMART 2017 Field Trip!

Neptune TERMINALS

CoalSMART 2017

Thank you for attending CoalSMART 2017

The Western Canadian Coal Society hosts monthly networking events from September to June. If you would like to receive notices of the events, or be added to our mailing list please email us at:

registrar@westerncoalsociety.ca

http://westerncoalsociety.ca