



**Silo Fires - Prevention and Response
February 14, 2019
Prince George, BC**

- 8:30 AM to 9:00 AM Continental breakfast and networking
- 9:00 AM to 9:15 AM Scott Bax, Pinnacle Renewable Energy & Mike Tasker, WorkSafeBC -
Introductory remarks
- 9:15 AM to 10:30 AM Henry Persson, RISE Research Institute of Sweden - Part 1
Topics:
Silo firefighting procedures
Limiting oxygen
Nitrogen supply and injection equipment
Foam injection
Silo discharge
Personal safety consideration
- 10:30 AM to 10:45 AM Coffee break
- 10:45 AM to 12:00 AM Henry Persson, RISE Research Institute of Sweden - Part 2
Alternative extinguishing tactics
Causes of fires: spontaneous ignition versus external ignition
Review of silo types
Silo fire prevention methods
Mobile gas equipment
ISO 20024 Safe handling and storage of solid biofuel pellets
- 12:00 AM to 12:30 PM Quiz for all participants, review and discussion of answers
- 12:30 PM to 1:00 PM Lunch
- 1:00 PM to 1:25 PM Scott Bax, Pinnacle Renewable Energy - Retrofitting silos with nitrogen injection
equipment
- 1:25 PM to 1:50 PM Shawn Bells, Pacific BioEnergy - Extinguishing a smoldering silo fire at Pacific
BioEnergy's Prince George pellet plant
- 1:50 PM to 2:05 PM Darren Marutt, Pacific BioEnergy - Tools for silo risk assessment and site
procedures
- 2:05 PM to 2:20 PM Fahimeh Yazdanpanah, UBC Biomass and Bioenergy Research Group - The fire
risk from wood pellet self-heating in silos
- 2:20 PM to 2:35 PM Kent Desmond, Fike Canada - Explosion protection science for silos

2:35 PM to 2:50 PM Coffee break
2:50 PM to 3:05 PM John Iverson, Prince George Fire Department - experience with silo fires and review of training needs
3:05 PM to 3:30 PM Mike Tasker and Jenny Colman, WorkSafeBC - Process Safety: Silo Risk Assessment Using Bowtie Analysis
3:30 PM to 4:00 PM Scott Bax, Pinnacle Renewable Energy & Mike Tasker, WorkSafeBC - facilitated discussion of a potential action plan for future collaboration between industry, emergency responders, WorkSafeBC and Office of the Fire Commissioner

SILO WORKSHOP SPEAKERS

Scott Bax, Senior Vice President, Pinnacle Renewable Energy & Chair of WPAC Safety Committee

Scott Bax is Senior Vice President of Operations for Pinnacle Renewable Energy where he is responsible for Pinnacle's six BC pellet plants. Scott believes excellence is achieved through Pinnacle's greatest asset – its people – together with robust management systems and a focus on continuous improvement. Before joining Pinnacle in August 2013, Scott acquired over 20 years of forestry experience in various logging and wood manufacturing operations throughout Canada and the USA, notably as manager of Interfor's western redar manufacturing operations and a logging company in Louisiana, USA. He has also worked as a performance improvement management consultant specializing in the forest sector.

Scott holds a BSc (Environment) from University of Guelph and received his MBA and Master of Forestry (MF) from the University of Alberta.

Shawn Bells, Vice President, Operations, Pacific BioEnergy

Shawn joined Pacific BioEnergy in 2010 and has been involved in the forest industry for the past 25 years. Shawn practiced all aspects of forestry from silviculture to harvesting before transitioning to operations in both sawmilling and value added plywood manufacturing. Shawn is a Registered Member of the Association of BC Forest Professionals and holds a BSc In Forest Resource Management from the University of Alberta.

Jenny Colman, Human Factor Specialist, WorkSafeBC

Jenny Colman is currently working as a human factor specialist for WorkSafeBC's Risk Analysis Unit. In this role she currently facilitates the 'Bowtie' risk analysis for process industries and is active in supporting the department with human factor / system safety expertise. Jenny received her undergraduate degree from Loughborough University in ergonomics and human factors, with a focus on workplace systems and human error. Her master's degree is in human factors and system safety, from the University of Lund, Sweden.

Jenny has approximately 20 years of experience in occupational health and safety. Her career started in prevention, where she provided information about standards, regulations and guidelines. In 2004, she became a subject matter expert for WorkSafeBC's Fatal and Serious Injury Investigations, where she worked for 11 years.

She is Canadian Registered Safety Professional (CRSP) and has served on the Canadian Standards Association committee for developing the first standard for incident investigation and prevention. She also has a provincial instructor diploma and teaches safety and incident investigation to a variety of industry sectors as well as the OH&S Simon Fraser University program.

Kent Desmond, Western Regional Manager, Fike Canada, Inc.

Kent Desmond is the Western Regional Manager with Fike Canada, Inc. where, for over 25 years, he has been involved with dust explosion protection strategies, solutions, and equipment pertaining to a wide range of industries including wood, biomass, agriculture, plastic, metals, foods, pharmaceuticals, and petrochemicals.

Kent holds a bachelor of education degree from the University of Alberta and is a Third Class Power Engineer.

John Iverson, Fire Chief, Prince George Fire Rescue

John Iverson has been Prince George's fire chief since 2013. Iverson joined the city as a firefighter in April 1987 and was promoted to the rank of captain in July 2009. During his career, Iverson has had considerable involvement with the IAFF Local 1372 and the Professional Firefighters Association and held various positions for nearly 20 years. He was promoted to the management ranks as the deputy chief of operations, in March 2011, took on his current role in August 2013.

Darren Marrutt, Safety and Environmental Manager, Pacific BioEnergy

Darren joined Pacific BioEnergy in November of 2017. He has worked in lumber, chemical and pellet manufacturing industries for close to 30 years with the last 14 years being in a safety and environment role. Safety program design, risk identification and control, incident investigation, ISO auditor training, process safety and behaviour-based safety are some of the elements that he has gained knowledge in from his past and present experiences.

Gordon Murray, Executive Director, Wood Pellet Association of Canada

Since 2009, Gordon Murray has been the executive director of the Wood Pellet Association of Canada where he works as an ardent advocate on behalf of Canadian producers, traders, ports, terminals, shipping companies, equipment suppliers and all those who want to participate in growing a safe and prosperous wood pellet industry. Prior to his role with

WPAC, Gordon worked in operations and finance in the wood products industry. Gordon has a bachelor of science in forestry from the University of British Columbia. He is both a registered professional forester and a chartered professional accountant.

Henry Persson, Silo Fire Expert

Author of the seminal *Silo Fires – Fire extinguishing and preventive and preparatory measures*, Henry Persson is renowned worldwide as a top expert on silo fires. Henry works at the RISE Research Institute of Sweden in the Fire Safety Engineering Department. He has worked for more than 30 years with testing and research, with his main focus on fire and fire safety problems in industry and the fire service, and with fire extinguishing as his specialist field.

Mike Tasker, Occupational Safety Officer, WorkSafeBC

Mike is an Occupational Safety Officer with WorkSafeBC. In his capacity as an Officer for over 20 years he is charged with conducting health and safety inspections, consultations and education in a wide range of industries.

Prior to joining WorkSafeBC, Mike spent 20 years working in a wide range of industry positions, including supervision and safety management. In 2004, he achieved national accreditation as a "Canadian Registered Safety Professional" through the Canadian Society of Safety Engineering.

Prior to joining WorkSafeBC's Process Safety Team, Mike spent 3 years working closely with the wood pellet industry on WorkSafeBC's Wood Pellet Initiative.

Fahimeh Yazdanpanah, University of British Columbia, Department of Chemical and Biological Engineering

Fahimeh Yazdanpanah is a Research Associate in the Department of Chemical and Biological Engineering at the University of British Columbia and the founder of Spark Biomass Consulting Inc. Her research has been focused on storage of solid biofuels, off-gassing, self-heating, pelletization and torrefaction. She has received her PhD and MASc from Chemical and Biological Engineering Department at the University of British Columbia (UBC) and she holds a bachelor's degree from Amirkabir University of Technology. She has co-authored more than 50 technical report and peer-reviewed publications in the field. She has also presented in a number of international conferences.