Decontamination and Deconstruction of the Giant Mine Roaster Complex: Risks, Challenges, Lessons Learned and Successes

Gordon Woollett, P.Eng. - AECOM Canada Ltd.
Sarah Preston, G.I.T. - Parsons Canada Ltd.
Presentation Outline

• Context
• Introduction
• Project Driver
• Sources of Risks, Challenges and Lessons
  – Assessment
  – Worker Exposure
  – Decontamination
  – Deconstruction
• Summary of Accomplishments
• Conclusion
Context: Site History
Introduction: Roaster Complex
Project Driver: Risk

• Roaster Complex Decontamination and Deconstruction
  – Part of Advanced Site Stabilization Plan (SSP)
  – Driver: risk of physical injury and of contaminant exposure to on-site workers, neighbouring communities and the environment
Project Driver: Risk

- A detailed waste audit of the Roaster Complex completed in 2012 identified:
  - ~1,400 m³ (in-situ) of arsenic trioxide hazardous waste in the kilns, tanks, reactors, air handling infrastructure and on building internal surfaces
  - ~850 m³ of porous structural materials (such as bricks, wood) impregnated with hazardous concentrations of arsenic
  - ~1,300 m³ (in-situ) of arsenic-dust impacted asbestos-containing material
  - cyanide compounds mixed with arsenic (in some process vessels) and with asbestos
  - residual sodium cyanide and cyanide-containing liquids
  - ~60 m³ of other hazardous wastes (PCBs, mercury, chemicals, fuel and oil)
Assessment: Risks and Challenges

- Emergency work done in the winter.
- Exposure (arsenic trioxide, asbestos, cyanide)
- Exposure (cold)
- Limitations imposed by structural conditions
- Darkness
Worker Exposure: Risks and Challenges

• Changing regulatory requirements for assessing worker exposure and risk from medical monitoring results
• “Interference” from non-occupational sources of arsenic (food, cigarettes)
• Problematic identification of source of exposure
Worker Exposure: Lessons Learned

• Good housekeeping, good hygiene practices and appropriate PPE are the best first line of defense

• Medical monitoring is a very valuable second line of defense for the protection of workers’ health

• Good documentation is essential when non-occupational sources of exposure interfere with medical monitoring results
Decontamination: Risks and Challenges

• Hazardous Materials Abatement: Arsenic, Cyanide, Asbestos
• Worker Protection
• Waste Volume and State
Decontamination: Lessons Learned

- Established controls for simultaneous abatement of arsenic, asbestos and cyanide
- Increased PPE Standards
- Dust Suppression
Deconstruction: Risks and Challenges

- Structural Disrepair
- Chimney Stack (46 m)
- Internal Equipment
Deconstruction: Lessons Learned

• Engineered Plans and Innovative Approaches
• Modified Deconstruction
• Secondary Decontamination
Summary of Accomplishments

• The Roaster Complex was decontaminated and deconstructed over two work seasons, thus eliminating significant risks to on-site workers, neighbouring communities and the environment

• Approx. 2,200 m³ of non-hazardous waste was segregated

• Approx. 22,200 kg of non-arsenic hazardous waste was containerized and disposed off-site

• Approx. 9,200 m³ of arsenic hazardous waste was safely containerized
Conclusion

• We accomplished what we set out to do.
• The immediate risks to site workers, neighbouring communities and the environment have been eliminated.
• Next challenge

Before

After
Questions

Acknowledgements

We would like to thank the following people for their contributions:

- Mr. Miguel Larivière, Senior Engineer, AANDC
- Mr. David Hango, Project Manager, PWGSC
- Ms. Cathy Corrigan, Senior Engineer, AECOM Canada Ltd.
- Mr. Richard Mathieson, EHS Group Manager, Golder Associates
- Mr. James Carss, Program Director, Parsons Canada Ltd.