Coffee Mine Project:

Reclamation Research

Northern Latitudes Mining Reclamation Workshop

September 11, 2018

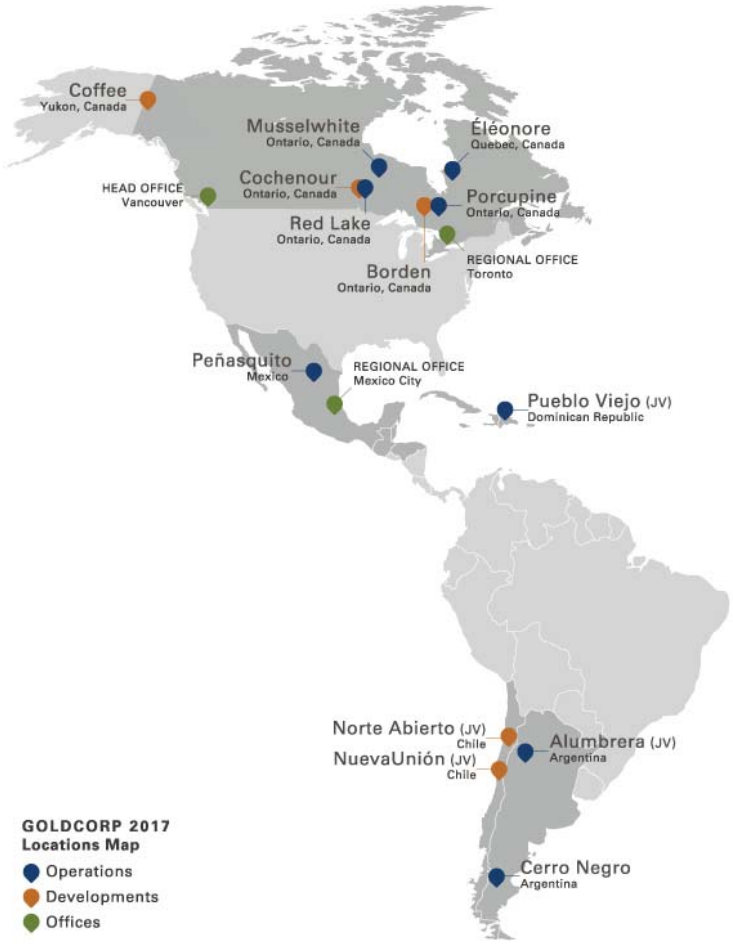
GOLDCORP

Presentation Overview

- About Goldcorp
- Coffee Gold Mine Overview
- Reclamation Research
  - Approach
  - Revegetation
  - Water Treatment

ABOUT GOLDCORP

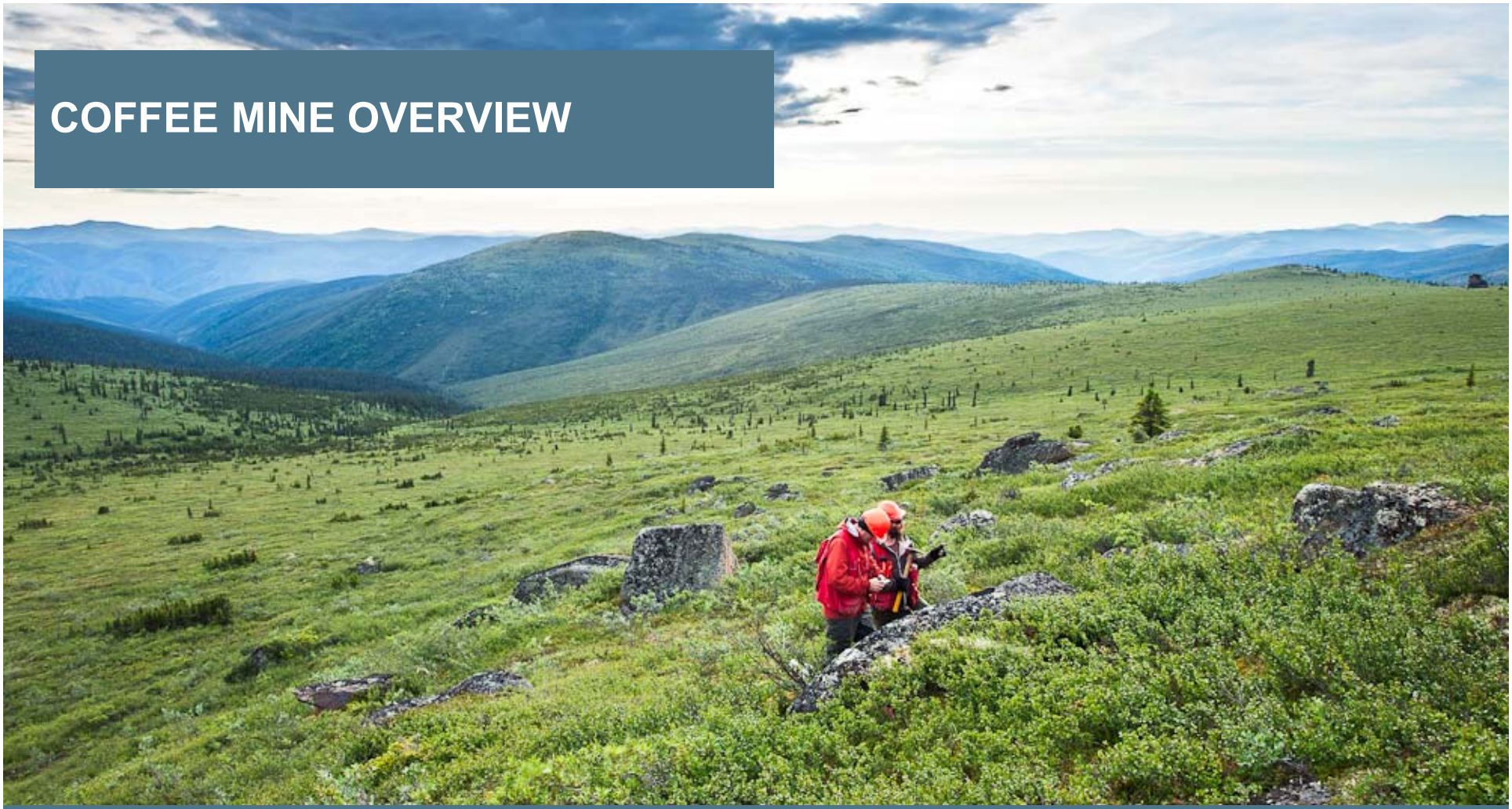
- Goldcorp is a leading gold producer focused on responsible mining practices with safe, low-cost production throughout North and South America
- Canadian company headquartered in Vancouver
- Over 15,000 employees worldwide
- Primary product is gold, with silver, copper, zinc and lead by-products
- Committed to responsible mining practices and well positioned to deliver long term value



COMMITTED TO OPERATING FOR EXCELLENCE

- Goldcorp subscribes to a number of industry initiatives to ensure we operate in accordance with industry best practice on environmental, safety, community and security issues.
- All Goldcorp sites (including Coffee) must implement the Sustainability Excellence Management System (SEMS), an integrated approach to safety, environmental, social and security performance to implement best practice.

COFFEE MINE OVERVIEW

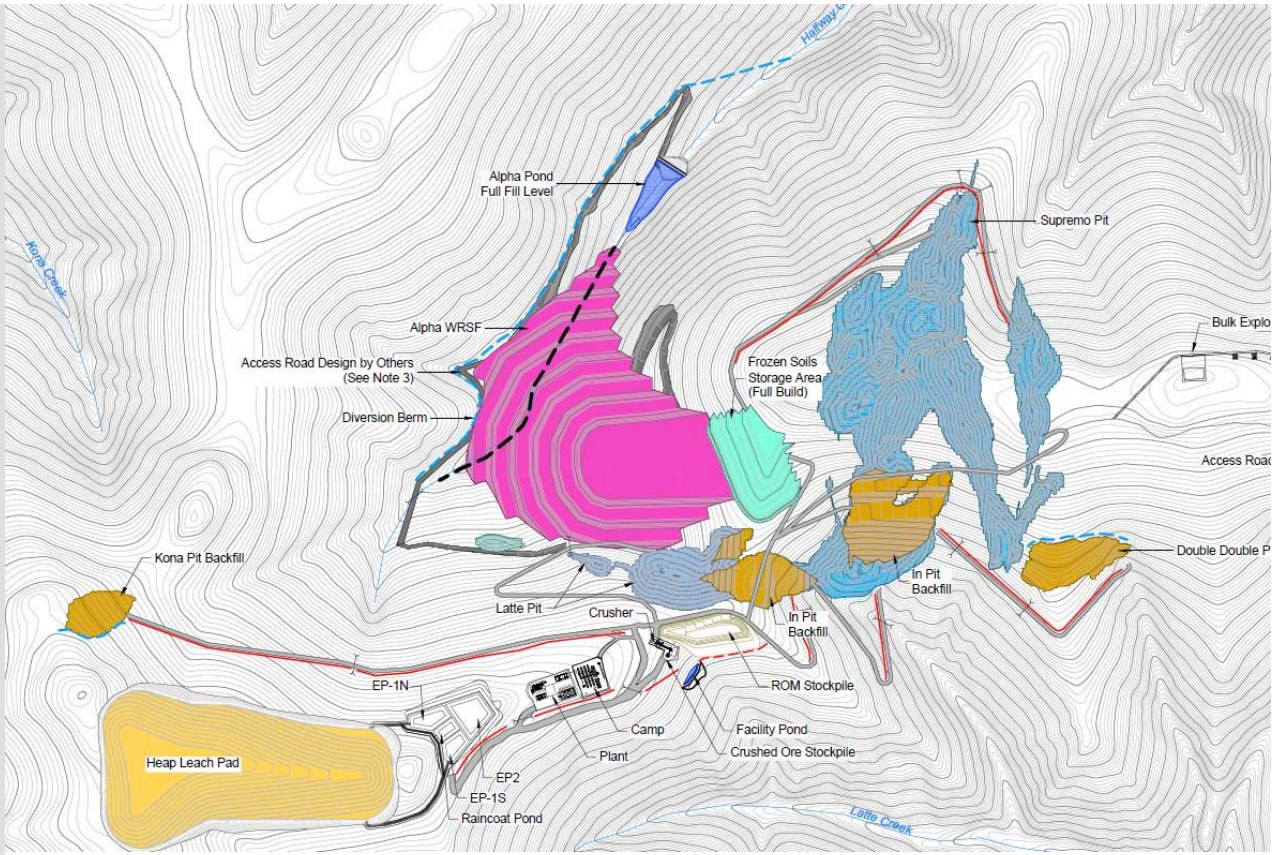


COFFEE MINE PROJECT LOCATION

PROJECT BASICS

Mine Site:

- Expected 10-12 year mine life with additional 11 year closure period
- 4 Open Pits, conventional truck-and-shovel operation
- Heap leach processing
- 1 permanent Waste Rock storage facility located in Halfway Creek drainage
- Soil Stockpiles for reclamation



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RECLAMATION PLANNING APPROACH

Understand current site conditions

Integrate closure into mine planning

Address areas of closure uncertainty

Consultation and engagement with First Nations

REVEGETATION RESEARCH

REVEGETATION RESEARCH

- Northern Terrestrial Restoration Course
- Determining Suitable Plants for Reclamation
- Reclamation Demonstrations
- Seed Collection and Mapping
- Nursery Planning
- Soil and Fertilizer Amendment Trials
- Soil Plug Trails
- Ecohydrological modelling

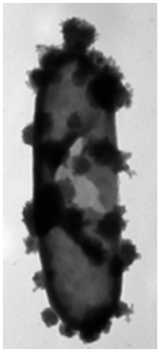
Water Treatment

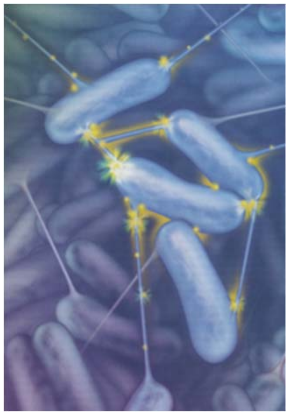
Water Treatment for Heap Leach Facility

- High pH solutions (pH 9.0 to 11.0)
- Solutions potentially elevated with parameters that are more soluble at high pH (e.g., arsenic,) or more soluble in the presence of excess alkalinity (e.g., uranium)
- Elevated concentrations of nitrogen species (most notably NO3-) from in situ CN degradation within the pad and residual explosives
- Potentially elevated levels of metals known to form metallo-CN complexes (e.g., Fe, Cu, Cd, Hg, Zn)
- Treatment options for Rinse Solutions:
  - Chemical – acceptable for CN and some metals and metalloids (e.g. As), but not
    Nitrogen species or U
  - Ion exchange/RO – expensive and produces concentrated solution

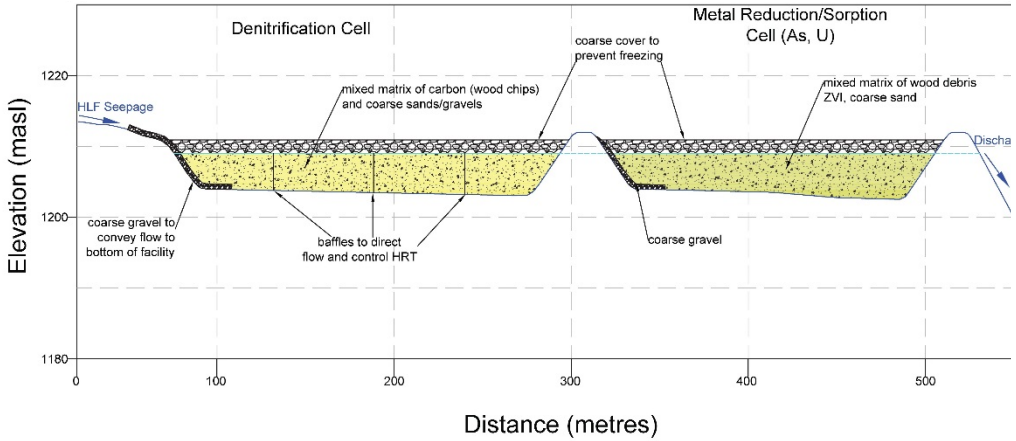
Biological Water Treatment for Heap Leach Facility

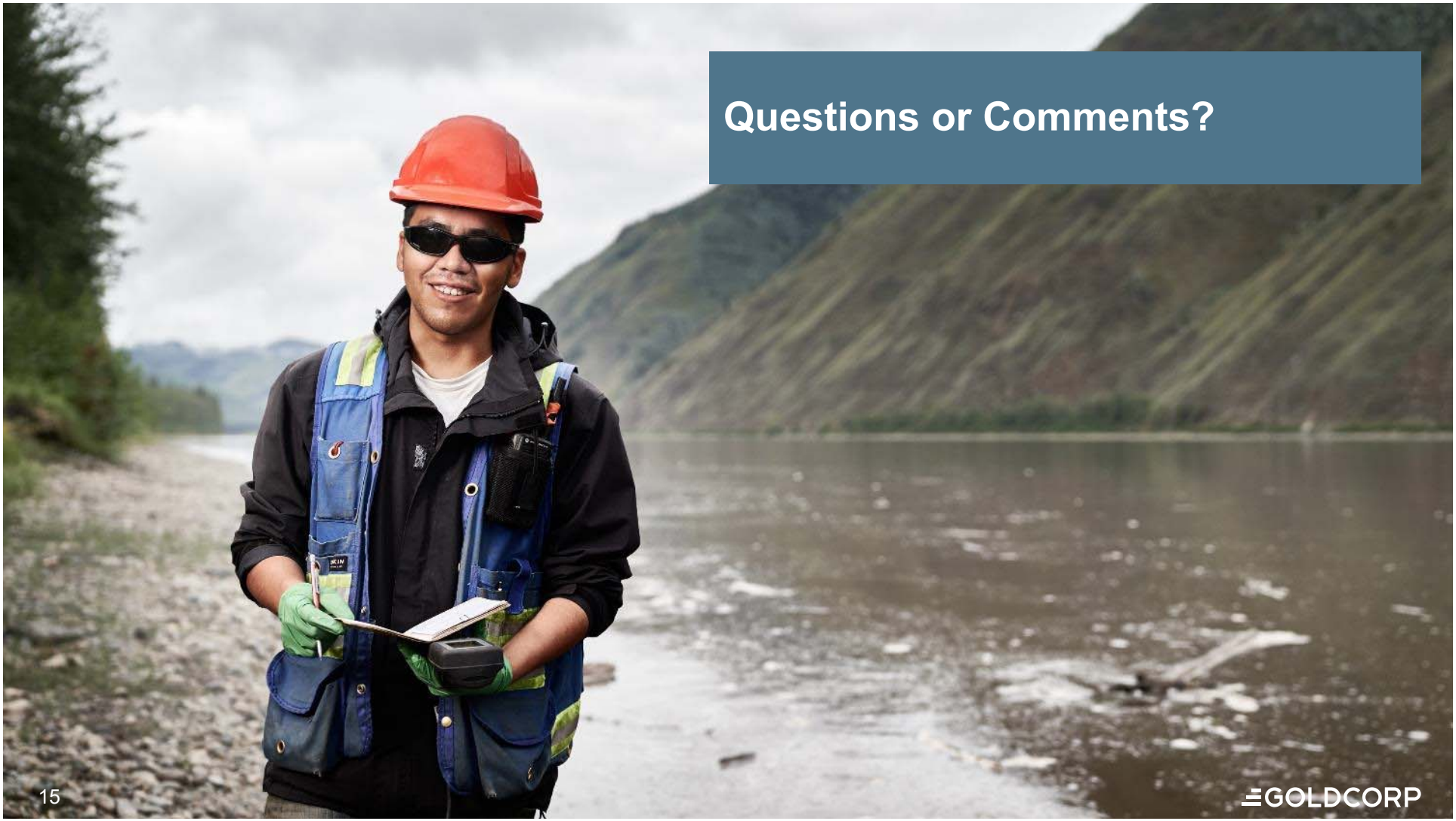
- Active Treatment – using Electro-Biochemical Reactor (EBR) Process
  - Directly supplies electrons to the microbes to provide energy for cell growth and contaminant reduction without adding excess nutrients





- Passive treatment – post closure
  - System can utilize strategies employed in both bioreactor passive treatment systems as well as permeable reactive barrier systems




Questions or Comments?

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Have a general question or feedback?

Connect with us through out

Community Feedback email!

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