

2018 British Columbia Mine Reclamation Awards

September 18, 2019, Kimberley British Columbia

INTRODUCTION

Good evening everyone and welcome. For those of you who don't know me, my name is Brenda Bailey and I am the Manager of Environmental Geoscience and Permitting with the Ministry of Energy, Mines, and Petroleum Resources in BC. I am also the Treasurer of the Technical and Research Committee on Reclamation and a member of the Reclamation Awards Sub-Committee. And on behalf of the committee I will be presenting the Annual BC Mine Reclamation Awards.

The TRCR established the Annual Jake McDonald BC Mine Reclamation Award, shortly after the mine reclamation legislation was enacted in BC. This award is named for Jake McDonald, a former Senior Reclamation Inspector, and a pioneering practitioner with the BC Ministry of Energy, Mines and Petroleum Resources.

In addition to the this award, the committee can also recognize excellence in reclamation through category awards for metal mining, coal mining, sand and gravel operations, quarries, industrial mineral mines, placer mining, mineral exploration and coal exploration.

The awards may recognize work of various scopes and may be the result of a group effort or a single person's activities. These awards are assessed by the awards sub-committee based on:

- quality in research,

- innovation in techniques,
- quality of work undertaken,
- extent of land reclaimed, and,
- work of a high standard that has been conducted over a number of years.

I would like to acknowledge the thoughtful deliberations of the other committee members in the nomination evaluation process, Alan Gibson, with the Ministry of Environment and Climate Change Strategy, Jonathan Buchanan, with the Association for Mineral Exploration of BC, and Jennifer McConnachie, formerly with EMPR and now with Teck Resources Ltd.

This year I will be presenting 2 awards. Before presenting this year's awards, I will present the keeper trophy for the 2017 winner of the British Columbia Jake McDonald Mine Reclamation Award.

KEEPER TROPHY - 2017 JAKE MCDONALD MINE RECLAMATION AWARD

The winner of the 2017 Jake McDonald award was Teck Highland Valley Copper Partnership for its use of the Highland valley Copper tailings ponds and pit lakes for aquatic habitat and as passive water treatment facilities.

The Highland Valley Copper mine is located approximately 17 km west of Logan Lake BC. Mining in the area started in 1962 and continues to present day. In the early 1990s, HVC began to assess the potential of its tailings ponds and pit lakes to simultaneously function as aquatic habitat and as passive water treatment facilities.

The resulting progressive reclamation of the three tailings ponds, and the three pit lakes that has occurred over 20+ years demonstrates that Highland Valley Copper is a global leader in this area of mine reclamation science. The work demonstrates that tailings pond and pit reclamation can simultaneously achieve desired functions of aquatic habitat and passive water treatment, by harnessing natural processes and establishing native species. This research is not only important for HVC in their endeavour to achieve successful reclamation, but also for the mining industry as a whole.

Highland Valley Copper was recognized for their work in reclamation research and biomonitoring with the goal of achieving productive end land uses and improving water quality for aquatic mine facilities

I would now like to call upon Steve Hilts to come forward and accept the keeper trophy for the 2017 Jake McDonald Mine Reclamation Award for the Highland Valley Copper.

2018 METAL MINING RECLAMATION AWARD

The award for outstanding achievement for reclamation at a metal mine is presented to the Crown Contaminated Sites Program of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development, and AECOM Canada Ltd. for their work at the Atlin Ruffner Mill and Tailings Site, an orphaned lead zinc mine located 28 km northeast of Atlin BC.

Through a science-based risk ranking methodology CCSP determined the Tailings Facility at the Atlin Ruffner mine site posed a risk to the human health and the environment and was consequently ranked as a high priority for closure. This

resulted in the development of a detailed closure plan that evaluated options to mitigate the contaminant concentrations in significant exposure pathways and reduce long term risk associated with contaminant loadings. As part of the options analysis for the project, a water balance and water quality model for each remedial option was developed to quantitatively predict water quality in the receiving environment. Based on model results, in situ isolation of the tailings was selected as the preferred option.

The closure design isolated the tailings using a bituminous cover, and prevented clean water from contacting the tailings using a constructed engineered diversion and interception trenches. Remediation works conducted in 2017 and 2018 resulted in the desaturation of the tailings. Post remediation monitoring indicates that the passive system is functional and has reduced metals loadings to the shallow groundwater flow system downgradient of the site as we saw earlier today.

The automated water quality monitoring system implemented at the site will demonstrate the effectiveness of the system and allow for adaptive management going forward. The area can now be safely used by wildlife and the public.

On the merit of conducting detailed closure planning, including comprehensive water quality and water balance modelling, and consideration of the site-specific limiting factors to reclamation, the passive closure system for the Atlin Ruffner Mill and Tailings site is recognized today.

Comprehensive and purposeful planning is a critical component of successful reclamation and closure of legacy, as well as contemporary, mining disturbances. This project illustrates how spending the time to evaluate options and designing

site specifically is essential to meeting integrated objectives that comprise sound mine reclamation practice.

I now wish to call upon **Joanna Runnells**, with the Crown Contaminated Sites Program and Ryan Mills of AECOM to please come forward and accept the award for outstanding Metal Mine Reclamation Award for the reclamation of Atlin Ruffner Mill and Tailings site.

**ANNUAL BRITISH COLUMBIA JAKE MCDONALD MINE
RECLAMATION AWARD**

On behalf of the Technical and Research Committee for Reclamation, I am very pleased to announce that the recipient of the 2018 British Columbia Jake McDonald Mine Reclamation Award is Barrick Gold for their enhanced Tailings Storage Facility reclamation project.

Giant Nickel is a closed mine located approximately 10 km north of Hope, BC. The mine operated from 1959 to 1974, with initial reclamation works being completed in the mid 90's. At that time, the two tailings facilities contained an estimated 5 M tonnes of tailings, covering a 22ha footprint.

Initial reclamation activities included identification and characterization of seepage originating from the facilities, shaping of the Upper TSF to allow it to shed water, capping it with rock and topsoil, and allowing it to revegetate with native species. The Lower TSF, which had not been filled with tailings during operations, was left uncovered and developed a permanent water pond behind the facility's embankment.

When Barrick acquired property in 2001, it was considered to be in passive closure, requiring limited monitoring and maintenance. In 2015, Barrick initiated a comprehensive evaluation of the tailings storage facilities to determine if they met Barrick's internal standards and modern geotechnical and environmental requirements. Results of the assessment lead the company to undertake major reclamation works to improve the geotechnical stability, water management and environmental outcomes of the facilities. The objectives of this project were to:

- maximize the diversion of upslope runoff that would otherwise drain to the TSF;
- Grading to prevent water ponding and to promote runoff to spillways;
- enhance the stability of the TSF and,
- Construction of permanent collection and conveyance channels to assist the passive water treatment approach selected by Barrick

Activities over the 18 month project included:

- Construction of a diversion channel;
- Buttressing the existing Upper TSF embankments;
- Establishment of an underdrain system to drain the Upper TSF embankments;
- Construction or enhancement of three emergency spillways;
- Construction of a passive treatment trench for seepage from the Upper TSF;
- Realignment of a creek that was cutting past and saturating the Upper TSF south embankment;
- Dewatering, infill and shaping of the lower TSF to shed water;
- Geochemical characterization of the tailings; and,

- Shaping and revegetating all disturbance areas, planting approximately 4,000 trees in 2019.

The Project included a training and employment opportunities for local Indigenous Community members and was also completed in collaboration with local recreation groups who had been using the area to ensure continued, safe access to trail networks in the vicinity of the mine site. As part of the project, funding was provided to the Fraser Valley Dirt Rider's Association to allow them to finish grading, shaping and revegetation of a new camp site.

Barrick is recognized for taking the initiative to conduct works to improve the reclamation and closure outcomes to meet current mine reclamation standards as well as their own corporate standards. The company's approach of engaging with local user groups, involving indigenous community members in the activities, and utilizing local contractors to conduct the work is admirable.

This project demonstrates that reclamation of older, closed mine sites can be enhanced to meet modern standards and best available technologies, to meet regulatory requirements and the social, environmental, and economic needs of the surrounding communities. The work at the Giant Nickel mine also shows the benefit of having a multi-disciplinary team working collaboratively to refine designs as new information becomes available and new challenges are encountered.

I am pleased to present the 2018 Jake McDonlad Mine Reclamation Award to Allison Brown of Barrick Gold. Allison could not be here with us this evening. We will accept this award on her behalf.

CLOSING

This concludes the award presentations for this year. On behalf of the TRCR, I would like to congratulate the winners. And I would also like to recognize all of the companies and individuals that are so committed to mine reclamation throughout the province. We look forward to seeing you next year.