



**CENTRE OF
TRAINING
EXCELLENCE
IN MINING**

Facilitating Collaborative and Innovative
Training for BC's Mining Industry

Underground Miner Training Project Final Report





The Underground Miner Training Project is led by the BC Centre of Training Excellence in Mining (CTEM) and is funded through the Sector Labour Market Partnerships (SLMP) Program under the Canada-British Columbia Labour Market Development Agreement. Extensive amounts of industry, community and post-secondary training providers' knowledge, time and effort at both the individual and organizational level made the project possible.



This program is funded by the Government of Canada
and the Province of British Columbia.

The views and opinions expressed in this report are those of its author(s) and not the official policy or position of the Government of British Columbia.

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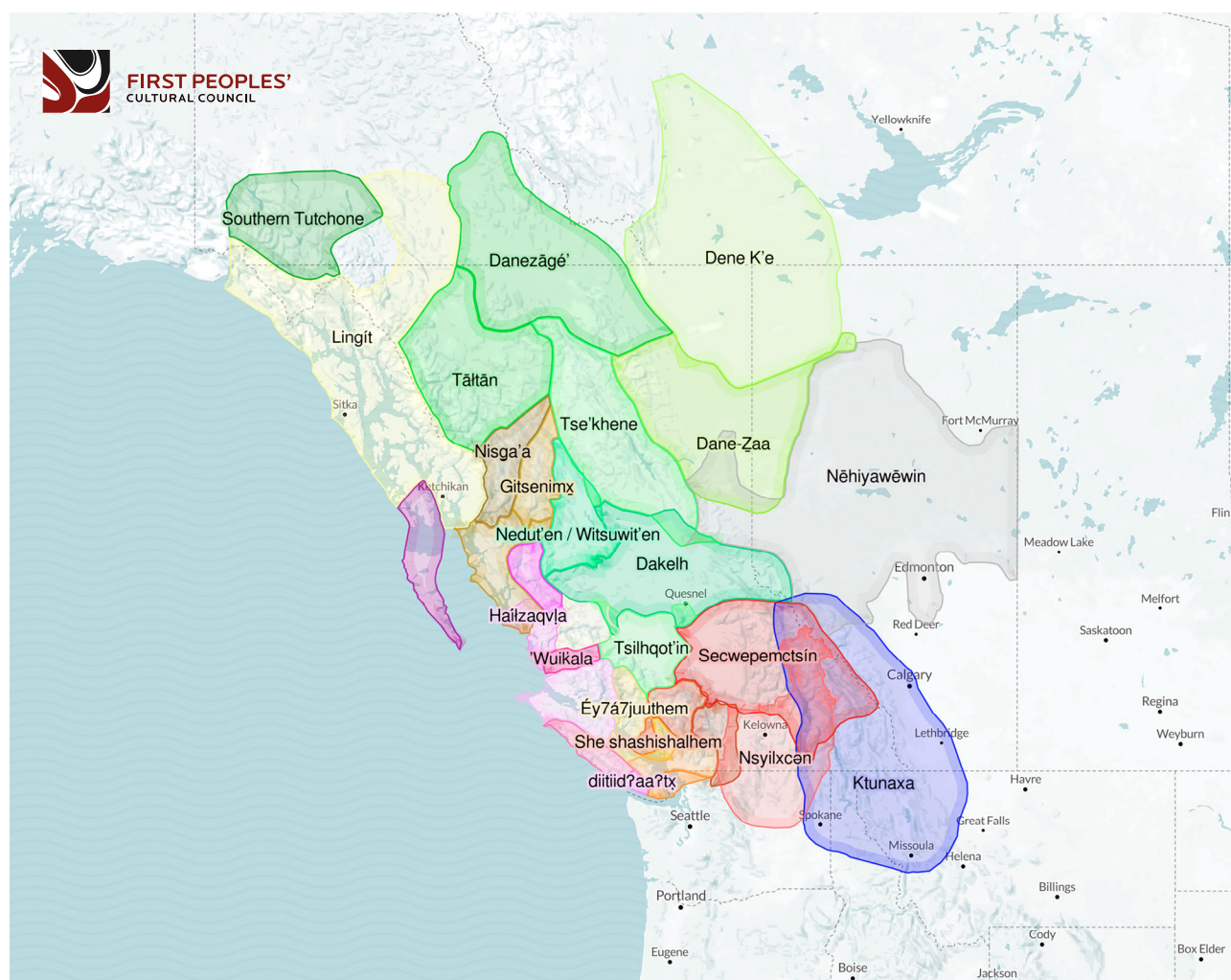


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i. Territorial Land Acknowledgement

CTEM operates as a virtual hub and collaborates with numerous First Nations communities in British Columbia. With this understanding, CTEM acknowledges the Traditional Territories of all Nations in British Columbia.



Source: First Peoples' Cultural Council

ii. Executive Summary

Through its continued labour market research, the Mining Industry Human Resources Council (MiHR), has identified underground miners as one of the most difficult occupations to recruit which is further compounded by the lack of provincial curriculum for underground miners. In response to this, the BC Centre of Training Excellence in Mining (CTEM) oversaw the development and advancement of a program to support underground miner training in British Columbia. This work was funded by the Government of Canada and the Government of British Columbia through the Ministry of Post-Secondary Education & Future Skills (Ministry).

Four related and distinct projects, funded through the Sector Labour Market Partnerships (SLMP) Program, are now complete: sector engagement (Phase 1), the 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia* (Phase 2), strategy development for the mining sector's future skills and training (Phase 3), and implementation (phase 4). Howegroup was contracted as Secretariate for the project and separately to conduct the external evaluation, write the cohort and interim reports, and the final report including the sustainability plan. Additional contractors supported the project throughout the duration and extensive input was provided through in-kind contributions. This final report provides an account of Phase 4.

The purpose of Phase 4 was to implement the provincial curriculum framework and transferable skills toolkit by providing training at three different mine sites in urban, rural, and remote locations. The requirements were to convene a Project Governance Committee (PGC), maintain a consultative process, have consideration of and be consistent with recommendations identified in *the 2017 Mining Jobs Task Force Report and the Sector LMP Phase 3 Underground Miner 2018 Final Report*, develop underground miner learning resources specific to each of the three mine sites, ensure that participants' learned skills are captured in the MiHR Canadian Mining Skills Registry, ensure the project is objectively evaluated, and deliver underground miner learning resources in collaboration with industry and training providers.

Leadership

The project was guided by a Project Governance Committee (PGC) and three site-specific subcommittees. The purpose of the PGC was to provide high-level oversight and put forward recommendations for the project and review and validate deliverables, and the purpose of the subcommittees was to provide regional context and use their expertise to provide input into and validate site-specific deliverables. The PGC was comprised of representatives from community, industry, post-secondary training organizations, CTEM, and the Ministry (sitting as ex officio). The PGC met nine times between October 2020 and May 2023. The Urban Subcommittee met 16 times between October 2020 and December 2021, the Rural Subcommittee met 10 times between



May 2021 and February 2023 and the Remote Subcommittee met eleven times between November 2020 and October 2023. A minimum of six subcommittee meetings were anticipated; the frequency of subcommittee meetings was dependent on individual site delivery. Additional meetings specific to site delivery logistics were held as needed and the Urban Subcommittee representatives met with other Subcommittee representatives to share learnings. Committees were able to utilize the diversity, combined expertise, and collective knowledge of its members to provide valuable guidance on the Underground Miner Training Project.

The participant cohorts

A total of 60 participants completed the training in five cohorts in urban, rural, and remote locations. The majority of participants (62 per cent) at the three sites had no prior experience in the mining sector, while 25 per cent had less than one year of mining experience. Out of the 60 participants, 59 completed the training and this high completion rate is attributed to the wrap-around supports received by participants during the training and the in-depth selection process. The individual that did not complete the training was unable to due to family reasons and was invited to return at a future training opportunity. Seventy-seven percent of participants identified as cisgender men and most participants fell within the 25-44 year age range (60 per cent), with 30 percent per cent in the 18-24 year range, and 10 per cent in the 45-64 year age range. Thirty-nine percent of participants completed high school, four per cent did not complete high school, and 27 per cent had completed some post-secondary training with the same percentage having completed post-secondary schooling. Ninety-six percent of participants were born in Canada and 49 per cent identified as Metis, First Nations, or Inuit.

Sixty-eight per cent of participants were trained in the communities in which they lived. Ninety-seven percent of those who completed the training were employed on contract during their six-month on-the-job skills development. Seventy-two percent of participants indicated they were aware of the MiHR Canadian Mining Certification Program and 100 per cent of participants had a profile within the MiHR Canadian Mining Skills Registry post-training (in many circumstances the company or trainer set up profiles on behalf of the participants).

Achievement of outcomes

Each cohort delivery went through an evaluation process; the primary purpose of the evaluation was to validate participants' learning through the implementation of the underground miner provincial curriculum framework. Specifically, the evaluation examined the intended and achieved changes in knowledge and skills at the three sites across the province. The secondary purpose of the evaluation was to explore the effectiveness of the model in providing learning resources and delivering training. The following provides an account of evidence of achieved short-term outcomes, as identified in the evaluation framework developed prior to commencement of the training.

SHORT-TERM OUTCOMES (1-2 YEARS)

DEMONSTRATION OF OUTCOME

Curriculum

- Learning resources validated
- Learning resources used at three sites (urban, rural, and remote) were found to be effective and customizable to the local context by trainers and industry representatives.
- Training participants increased knowledge, skills to work in mining, and transferable skills. Participants demonstrated a slight increase in knowledge from 3.22 to 3.34 on a 4-point scale, measured by 'work readiness'; 93 per cent of participants reported 'yes' and 4 per cent 'somewhat' to having more skills to work in mining; 72 per cent of participants reported 'yes' and 24 per cent 'somewhat' to having more skills to work anywhere.
- Project subcommittees and the Project Governance Committee validated the learning resources by reviewing them from various subject matter lenses and confirmed their satisfaction and sector relevance.

Local training and access

- Participants access local training
- Industry utilizes trusted learning resources
- Training is affordable and accessible
- 69 per cent of training participants indicated they accessed training in the community where they lived.
- Participants reported minimal barriers. Wrap-around supports minimized the impact of remaining barriers (as per cohort reports 1 through 5).

Participant knowledge and skills

- Increase in participant knowledge
- Participant is aware of skills advancement
- Participant is aware of transferable skills
- Skills learned are captured in the MiHR Canadian Mining Skills Registry
- Participants are ready for entry-level positions
- Industry and participants value and apply transferable skills
- Participants demonstrated a slight increase in knowledge 3.22 to 3.34 on a 4-point scale, measured by 'work readiness'.
- 93 per cent of participants reported 'yes' and 4 per cent 'somewhat' to having more skills to work in mining.
- 72 per cent of participants reported yes and 24 per cent 'somewhat' to more skills to work anywhere.
- 72 per cent of participants were aware of the MiHR Canadian Mining Certification Program post-training.
- 100 per cent of participants had a profile on MiHR Canadian Mining Skills Registry post-training.
- Trainers indicated through interviews that participants were ready for entry-level positions.
- 58 of 60 participants were hired and retained following training.
- During interviews participants indicated appreciation for new skills that will support employment in mining and other related fields.
- During interviews trainers indicated participants had strengthened employability.

Overall, the training received an excellent rating by participants; 67 per cent rated the training as 'excellent' and 30 per cent rated the training as 'very good.' Ninety-eight percent of participants would recommend the training to a friend or family members and 2 per cent indicated they would 'maybe' recommend it.



“From start to finish training was excellent. The instructors went over everything I felt was important for when you get onto your crew to start working. I left the course feeling confident to do my job safely and properly. I really enjoyed the class and hands-on training.”

– PARTICIPANT SURVEY RESPONDENT

just training participants), access to all areas of the mine for tours, and recognition (certification) provided by a post-secondary institution. Challenges to be addressed included the need for broad organization and site involvement, bringing human resources into the project early on, more time to develop training, additional funding for training, more availability and access to equipment on-site for participants, more communication about the project and more time between funding approval and commencement of the training.

The PGC identified financial strategies to support ongoing training sustainability, including applying to existing provincial grant and funding programs and seeking partnerships with communities, training organizations and mine sites for future training. It will be important to work with the Mining Industry Human Resources Council (MiHR) on opportunities for federal funding to support skills requirements, provide a national curriculum, increase understanding of the impacts and incorporation of innovation and technology on training and to leverage the MiHR Canadian Mining Skills Registry database for assessments and skills recognition.

Sustainability

Successes and challenges were documented throughout the project to inform the final sustainability plan. Success factors included collaboration, learning supports and training. Examples of collaboration included access to the CTEM provincial framework, Indigenous liaison support, and established committees to bring diverse perspectives and ensure the inclusion of key influencers. Learning supports included grant funding to offset the high cost of training, wrap-around supports for participants to minimize barriers they may be facing, hiring participants on contract during the training, and including industry HR to support onboarding. Training included cultural activities, making cultural awareness training accessible to all workers (not



Conclusion

In conclusion, the Underground Miner Training Project (UMTP) has been developed to align with recommendations and goals from two previous separate deliverables: The 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia*, developed by MiHR and the *Underground Miner Curriculum and Toolkit Sustainability Plan (2018)*, developed by Howegroup for CTEM. The training aligns with the two recommendations from *Preparing for the Future*; (1) to strengthen collaborative partnerships between employers and government to support labour market information collection and strategies for attraction, retention, and transition of mining workers through mine life cycles, and (2) to build upon findings to develop strategies to address critical job vacancies and support a sustainable workforce. The evaluation found that the UMTP has met the goals of the project and achieved the short-term outcomes identified in the logic model. Finally, transitional and sustainable activities including industry acceptance, financial sustainability, and participant support (curriculum, learning supports, training, and local workers) have been identified for future underground miner training in BC.

1. Introduction

a. Project background

The project was developed in response to the clear need identified across BC's mining industry, post-secondary training providers, and local communities to establish provincial underground miner baseline skills, transferable skills, and curriculum. The 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia*, identified the underground miner occupation as in-demand and lacking a sufficient supply of individuals being trained to meet this demand. The Mining Industry Human Resources Council (MiHR) reported in 2013 that BC lacked the adequate provincial curriculum for underground miner training and that underground miners were one of the most difficult occupations to recruit. In response to this gap and need, CTEM established an underground miner committee to address the upcoming need for future underground miners in the province. The BC Centre of Training Excellence in Mining (CTEM) then oversaw the development and advancement of a program to support underground miner training in British Columbia. The work was funded by the Government of Canada and the Government of British Columbia through the Ministry of Post-Secondary Education & Future Skills (Ministry).

Sector Labour Market Partnership Agreements have five distinct phases. Phase 1, sector engagement, was established and completed with in-kind funding from Post-Secondary Policy & Programs Division of the Ministry and did not require additional funding from the SLMP program. Additionally, the 2017 BC Mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia* had already confirmed the need (Phase 2), therefore the project started utilizing SLMP grants at Phase 3, strategy development for the mining sector's future skills and training, and Phase 4, implementation. Phase 3 included bringing post-secondary training providers, community members, and industry together to confirm baseline skills, create tools for assessing transferable skills and develop a curriculum framework to be adapted per site. The deliverables for Phase 3 included a sustainability plan as part of the final report "*Underground Miner Final Report: A Sector Labour Market Partnership – Phase 3 Project*". As part of the implementation (Phase 4), learning resources were developed and training was implemented and evaluated at three different sites (urban, rural, and remote).



b. About the BC Centre of Training Excellence in Mining

CTEM is a province-wide virtual hub that facilitates collaborative and innovative training solutions for the mining industry and BC communities. Its mission is to connect industry, students, communities, and training providers to meet their respective employment needs by playing a leading role in determining industry skills requirements, facilitating related training, and supporting partners. CTEM has been in operation since 2013 and is funded primarily through grants from the government of BC with additional support from partners. CTEM works to bring together all parties interested in mining training to: foster innovation to improve outcomes; build partnerships to create more effective programs; enhance the competitiveness of British Columbia's mining sector; build awareness of all the training options for careers in mining; match students, job seekers and employers; and support other appropriate initiatives that will continue to build on a provincial reputation for producing highly skilled workers.

c. About the Underground Miner Training Project

The provincial Underground Miner Training Project was developed in 2017 and 2018 with subject matter expertise and is comprised of three modules. The first module provides theory and common competencies, the second provides site-specific theory and the third module provides hands-on equipment training. Due to the site-specific nature of underground mines, the second and third modules are frameworks that require additional information to be site relevant. The curriculum is aligned with MiHR's National Occupational Standard for Underground Miner, enabling individuals to document their training and experience, which can be used in their path toward certification through MiHR's Canadian Mining Certification Program (CMCP).

The curriculum framework developed previously by CTEM was adapted for BC specific implementation at three sites – urban, rural, and remote. The project also partnered with MiHR to capture and record transferrable skills associated with underground miner training in the Canadian Mining Skills Registry.¹

¹ MiHR's online Canadian Mining Skills Registry allows for transferable skills associated with the National Occupational Standard to be captured and recognized at a national level and ladders into advanced-level training, supporting skills development and job sustainability.

d. Project purpose and objectives

The purpose of the project was to implement the provincial curriculum framework and transferable skills toolkit by providing training at three different mine sites in urban, rural, and remote locations. The project requirements were to:

- a. Convene a Project Governance Committee (PGC) comprised of representative organizations, project partners, and the province as an ex officio member, responsible for providing guidance on the project and reviewing and validating deliverables.
- b. Maintain a consultative process with mining sector stakeholders throughout the term to ensure engagement, feasibility, commitment, and validity of the development, implementation, and evaluation of the project.
- c. Have consideration for and be consistent with the recommendations identified in the *2017 Mining Jobs Task Force Report* and the *Sector LMP Phase 3 Underground Miner 2018 Final Report*, during development, implementation, and evaluation of all pilot programming.
- d. Develop underground miner learning resources specific to each of the three mine sites and ensure that participants' learned skills are captured in the Canadian Mining Skills Registry, administered by the Mining Industry Human Resources Council (MiHR).
- e. Ensure an objective evaluation of the project based on the evaluation strategy provided in the *Sector LMP Phase 3 Underground Miner 2018 Final Report*.
- f. Deliver the underground miner learning resources in collaboration with industry and training providers for three cohorts at each mine site.

e. Scope of this report

This report provides an overview of accomplishments, PGC and subcommittee work, updates to learning resources, alignment with recommendations from the 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia*, and the *Underground Miner Curriculum and Toolkit Sustainability Plan (2018)* developed by Howegroup for CTEM, and key evaluation findings including cohort reporting. The report provides an account of activities from the beginning of the project in the Fall of 2020 to completion in May 2023, evidence of project impact and an ongoing sustainability plan.

2. Project Activities Summary

A summary of cohorts is provided in this section followed by key accomplishments, an overview of learning resources and training deliverables, alignment of work to date with previous background work, project oversight through the PGC, and local guidance through the subcommittees.

a. Cohort summary

Five cohort reports detailing participant demographics, the validation of participants' learning from the implementation of the curriculum framework and the effectiveness of the model in providing learning resources and delivering training were completed. Highlights from the three sites: urban, rural, and remote are presented in this section.

Table 1. Cohort report summary

COHORT	NUMBER OF PARTICIPANTS	COHORT REPORT #
Site 1 cohorts (urban)		
October 26 to November 17, 2020	6	1
November 30 to December 22, 2020	8	1
February 22 to March 15, 2021	8	2
July 5 to 27, 2021	7	3
August 2 to 24, 2021	8	3
September 13 to October 5, 2021	7	3
Site 2 cohort (rural)		
November 15, 2021 to February 18, 2022	12	4
Site 3 cohort (remote)		
March 12, 2023 to May 10, 2023	4	5
Total number of participants	60	

Participant demographics detailed education and employment background (Table 2). The captured training demographics provided the number of participants, number of trainers, type of training methods used; and learning outcomes including transferrable skills taught, certification achieved, completion rate, and employment rate which are provided in detail in the cohort reports.

Of the 60 participants, the majority at the three sites had no prior experience in the mining sector (62 per cent), while 25 per cent had less than one year of mining experience. Most participants fell within the 25-44 year age range (60 per cent), with 30 per cent in the 18-24 age range, and 10 per cent in the 45-64 year age range. Seventy-seven percent of participants identified as cisgender men. Thirty-nine percent of participants completed high school, 4 per cent did not complete high school, and 27 per cent had completed some post-secondary training with the same percentage having completed post-secondary training. Ninety-six percent of participants were born in Canada and 49 per cent identified as Metis, First Nations, or Inuit.

Sixty-eight per cent of participants were trained in the communities in which they live. Ninety seven percent of those who completed the training were employed on contract during their six-month on-the-job skills development. Seventy-two percent of participants indicated they were aware of the MiHR Canadian Mining Certification Program and 100 per cent of participants had a profile within the Canadian Mining Skills Registry post-training (in many circumstances the company or trainer set up profiles on behalf of participants).

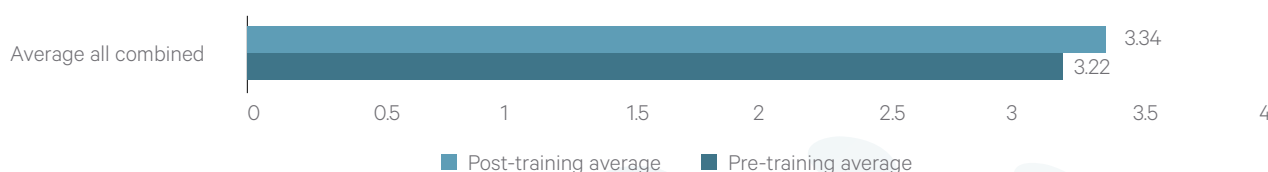
Table 2. Participant demographics

Variable	Participants (percent)
No experience	6%
Less than one year	8%
1-2 years experience	8%
3-4 years experience	7%
5+ years experience	8%
September 13 to October 5, 2021	7%
18-24	30%
25-44 years	60%
45-64 years	11%
Men (identified as cisgender men)	77%
Women (identified as cisgender women)	23%
Not completed high school	8%
High school Diploma	39%
Some post-secondary training	27%
Completed post-secondary training	27%
Trained in community where they live	68%
Aware of the MiHR Canadian Mining Certification Program post-training	72%
Created a profile on the MiHR Canadian Mining Skills Registry post-training	100%
Born in Canada	96%
Not born in Canada, lived here 5+ years	4%
Metis, First Nations, or Inuit	49%

The validation of the curriculum explored two aspects; intended and achieved changes in knowledge, and effectiveness of the model in providing the learning resources and delivering training.

The evaluation explored changes in knowledge through self-reported work readiness skills, pre- and post-training through nine constructs, such as learning for work, using technology, writing emails, etc. Aggregated for all sites, there was a slight increase in self-reported knowledge (average, all combined 3.22 pre-training to 3.34 post-training on a 4-point scale) as shown in Figure 1.

Figure 1. Self-reported work readiness skills (4-point scale)



“ Completely blows a resume with heavy equipment out of the water. It’s a 1000-fold increase in skills. If there was a central database we could use, say every six months we are hiring, I’d use this in my hiring. Networking and word of mouth is critical in the industry. ”

– COMPANY REPRESENTATIVE

Participants were also asked to rate their experience pre- and post-training through nine constructs including workplace safety, working with energy sources and operating vehicles. Aggregated, there was again a slight increase in self-reported experience (average, all combined 2.78 to 2.83). It is the opinion of the evaluators that the survey questions asked and/or the use of a survey to collect this information do not accurately reflect the changes in knowledge of the participants, as they do not correlate with the visible improvement in employment skills and satisfaction with the training. It was shared by a committee member that the participants, not recognizing what the training entailed, may have ranked themselves higher at the start of training, skewing the results.

Ninety-three percent of participants agreed ‘yes’ they had more employability skills to work in mining following the training and 72 per cent agreed ‘yes’ they had more employment skills to work anywhere and 24 per cent agreed they had gained ‘somewhat’ more skills, as shown in Figures 2 and 3. Interviews conducted with industry and trainers aligned with participants’ perceptions of increasing their employability skills.

Figure 2. Self-reported increase in employment skills to work in mining

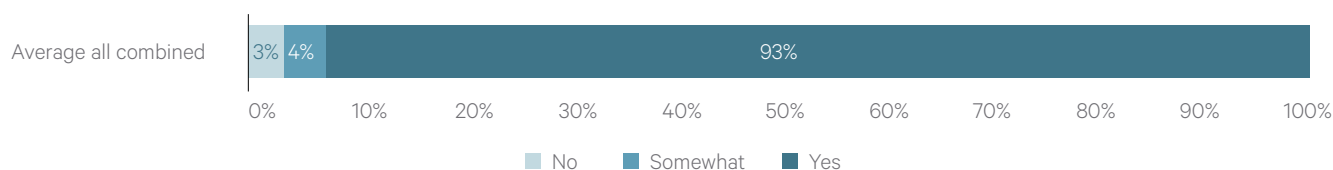
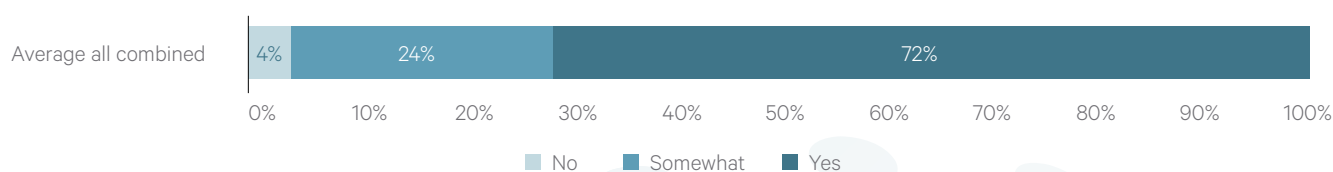


Figure 3. Self-reported increase in employment skills to work anywhere



Overall, the training received an ‘excellent’ rating by participants (67 per cent rated the training as ‘excellent’ and 30 per cent rated the training as ‘very good’). Ninety-eight percent of participants ‘would recommend’ the training to a friend or family members (two per cent indicated ‘maybe’), as shown in Figures 4 and 5.

“From start to finish training was excellent. The instructors went over everything I felt was important for when you get onto your crew to start working. I left the course feeling confident to do my job safely and properly. I really enjoyed the class and hands on training.”

– PARTICIPANT SURVEY RESPONDENT

“The training was well put together. The instructors did a very good job presenting to us. It’s probably the best course I have ever taken.”

– PARTICIPANT INTERVIEW RESPONDENT

Figure 4. Rating of training by participants

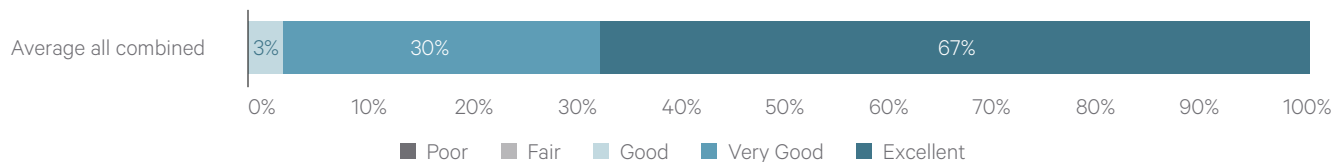
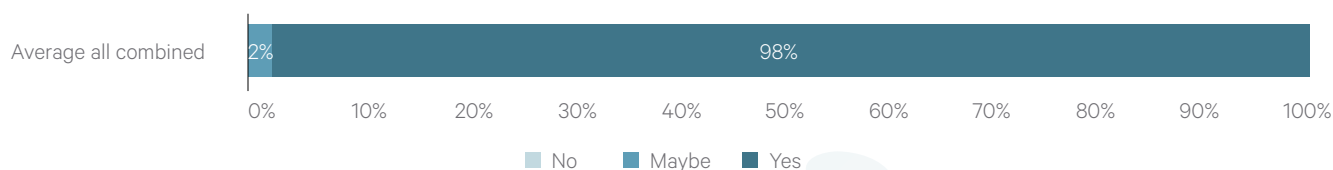


Figure 5. Participants' willingness to recommend the training



“ I would definitely recommend the training, but in a slightly different format, with more hands-on learning. This project will save the community of Wells. We need this to work. ”

– PARTICIPANT INTERVIEW RESPONDENT

CASE STUDY 1:

Before entering the mining industry, Kelsey, a Métis woman from Quesnel, had worked mostly in customer service jobs and taken a course in electrical foundations, but was not able to find any work at that time. She was looking for a change, something more hands-on, and her aunt sent her a link to another course the College of New Caledonia (CNC) offered. While searching online Kelsey stumbled on the Underground Miner Training Project instead. In her own words, “I took a chance and I’m liking it; I love the shift work, the one week on and off is amazing!” Kelsey enjoyed the hands-on training and the time spent underground the most, and while Kelsey would have appreciated even more hands-on training, she believes she is now better skilled and more confident to work underground and that she would recommend the training program to someone interested in pursuing a career in mining.

CASE STUDY 2:

Jazmin, a 22-year-old member of the Tahltan community has known about the industry her entire life. The majority of her family worked in mining camps; her dad, grandpa, uncles and cousins. Jazmin shared that “as an adult I realized you make good money in this industry.” She said that at the time she wasn’t interested in going to school, but as she was working minimum wage, she realized she needed something better and that this training program felt like a good opportunity. Jazmin said she found the entire program useful and while she most appreciated the hands-on learning with the mentors, she also found the classroom learning beneficial, “there was a lot I didn’t know.” When asked what would have made the training better Jazmin said she would have liked to have more time on the equipment and to learn more specific details such as required fluids and she would have also liked to learn more about the mine in general to understand how the different roles fit together.

When asked if she would recommend the training Jazmin said “absolutely” and that she was very glad she waited to get into the industry to have the support of this training program. “It’s amazing for people just starting out.” Knowing that mining is a male dominated industry, Jazmin said it was intimidating at first but with “having so much family here, and now [that] I know people on the crew, I’m a lot more comfortable.”

Jazmin said her skills and confidence have increased because of the training. “During my first week I was very stressed out and wondered what I got myself into and the rotating shift work and long days were hard at first, but now I’ve spent time with mentors and in a mine environment I feel more confident. I found this program to be amazing.”

CASE STUDY 3:

Derian was previously working in the construction industry. When asked what led him to mining, he spoke about the economic value to the community. “I have heard nothing but good things about the mine from the community, from the way managers hold themselves and the attitude toward safety, to the relationship with the First Nations community.” Derian liked the hands-on learning the most and would have liked even more orientation on mine mapping. Compared with other training Derian said, “this is the most personable and hands-on training I have had. Going into the mine early on is extremely useful.” When asked if he feels better skilled to work at the mine, Derian is optimistic, “New Afton has definitely realized that skill comes with time. Giving us the background is what is key with this program. They want us to learn and to do things safely and to be a team member. We will keep learning from the people who have been doing this for years and that is exactly why the trainers have been so great, with all their experience.” Derian says he feels confident to work at the mine; “The key thing is to work safe. They have taught us that and having that mind set will set us up for success.”

Training success factors included appropriate lead-time to prepare for and organize the training; access to materials and resources; timely access to equipment and enough time on equipment; a classroom to work in; management support for trainers; teamwork between trainers; administrative and operational staff; the experienced and cooperative foremen of each crew; extra training support for larger groups (train-the-trainer); experienced trainers who can share personal experiences/mistakes, mentors; and modifying delivery style to fit the personality of the group.

“Before the company invests time into people, it’s a good recruitment and training tool. It gives [participants] a taste of shiftwork and working underground, it’s exposure. This training program is less expensive than dealing with untrained or unsafe employees. This program is really meeting the needs of industry.”

– TRAINER

Key recommendations to improve the training included more availability and on-site access to equipment; more hands-on training on equipment; refresher classroom training once roles are assigned; and consideration of training provided on a shift cycle. Additional recommendations included mentorship provided to those providing the training; the need to update training to reflect changes in technology; more exposure to the work environment; essential skills to be updated to include a new 'skills for success model'; identifying trainers, MiHR Assessors and mentors in advance of training so they could participate in the classroom and inform the curriculum prior to training starting; and utilizing equipment simulators to augment access to training on equipment. It was noted that it would also be beneficial to have more lead time from confirmation of funding approval to training commencing in order to improve participant recruitment, establish the pre-training supports required by participants, and to develop relationships at the mine site and within community.

Quantitative and qualitative analysis of the evaluation data indicate the training delivery model was effective and that the curriculum was relevant. The delivery of training in small groups, in mixed mediums, and by experienced trainers contributed to its success; the training was well-received and highly rated (as found in the surveys and interviews) by industry representatives, trainers and participants. Participants felt they increased their skills to work in mining, but also their transferrable skills. PGC and subcommittee members also confirmed through facilitated discussions that the training also further validated the curriculum.

b. Accomplishments

The following table provides an account of accomplishments, as measured against the project workplan, approved by the Ministry (Table 3).

Table 3. Status of activities (September 2020 – May 2023)

	ACTIVITIES	STATUS
Establish and engage a Project Governance Committee (PGC)	Confirm PGC members commitments	Complete
	Convene PGC meetings and utilize member expertise	Complete Nine PGC meetings have been held with significant member engagement at each meeting: <ul style="list-style-type: none"> • October 2020 • November 2020 • March 2021 • May 2021 • October 2021 • April 2022 • October 2022 • April 2023 • May 2023
Evolve and enhance the provincial curriculum framework to be site specific for three different locations	Confirm three sites	Complete <ul style="list-style-type: none"> • Site 1: New Gold/New Afton-Thompson Rivers University (TRU), Kamloops • Site 2: Osisko Metals/Barkerville Gold Mines - College of New Caledonia (CNC), Quesnel/Wells • Site 3: Tahltan Nation Development Corporation, Newcrest/Red Chris - TRU, Contact North
	Develop site specific learning resources	Complete <ul style="list-style-type: none"> • Site 1 created and implemented the learning resources with 12 cohorts. • Site 2 reviewed the curriculum, adapted it as needed, and implemented it with one cohort. • Site 3 reviewed the curriculum, adapted it as needed to train heavy equipment operators, in collaboration with SkilledTradesBC, to provide a pathway for participants to be ready to transition to the underground miner jobs that will become available at site as the project progresses to underground mining (from the current above surface site). One cohort was trained.
Provide 'industry trainer' training for trainers at confirmed sites	Confirm trainers at each site	Complete
	Deliver 'industry trainer' training	Complete

ACTIVITIES		STATUS
Implement the underground miner training at three different mines sites that have different extraction methods and are in an urban, rural, and remote location while also recognizing transferable skills	Confirm logistics for training	Complete
	Develop and deliver survey and interviews to capture data	Complete <ul style="list-style-type: none"> • Site 1 (n=44 participants) • Site 2 (n=12 participants) • Site 3 (n= 4 participants)
	Implement training at selected sites	Complete
	Verify learnings/ transferable skills and register them in the Canadian Mining Skills Registry	Complete
	Complete cohort reports	Complete <ul style="list-style-type: none"> • Five cohort reports have been completed: three for Site 1, one for Site 2, and one for Site 3.
	Confirm transferable skills	Complete
	Confirm learnings	Complete
	Update learning resources as needed	Complete
Capture learnings from the implementations to update the provincial curriculum framework, benefit future applications, support the updated sustainability plan	Synthesize data collected from surveys and interviews	Complete <ul style="list-style-type: none"> • Refer to the five cohort reports
	Compile learnings and information in report and presentation format	
	Update sustainability plan	Complete

Table 4 provides the status of key milestones to date, as outlined in the workplan approved by the Ministry.

Table 4. Status of key milestones (September 2020 – March 2024)

KEY MILESTONES	DATE	STATUS
Project Management Workplan	March 11, 2020	Complete
Evaluation Methodology and Tools	March 30, 2020	Complete
Learning Resources - Site 1	October 1 2020	Complete
Interim Report #1	December 11, 2020	Complete
Learning Resources – Site 2	March 29 2021	Complete
Learning Resources – Site 3	March 02, 2022	Complete
Interim Report #2	June 30, 2021	Complete
Interim Report #3	March 11, 2021	Complete
Completion of Training – Site 1	September 2021	Complete
Completion of Training – Site 2	February 2022	Complete
Completion of Training – Site 3	May 2023	Complete
Draft Final Report	June 2023	Complete
Final Report	November 2023	Complete
Presentation Materials	February 2024	Complete

c. Learning resources and training deliverables

Development of the learning resources was a collaborative effort among industry post-secondary training providers and community partners. The learning resources prepared for and delivered to all three sites covered theory and hands-on site-specific equipment training aligned with MiHR's Underground Miner National Occupational Standard. Prior to starting training, participants were required to undergo health checks and receive personal protective equipment. Site 1 had a pre-training site tour while Sites 2 and 3 were remote and too far from the participants' location to do a pre-training tour, but efforts were made to provide a tour as close to the start of training as possible. Site 1 designed skills training to be five weeks in total; two weeks of theory and three weeks of hands-on training. The training was designed to have participants be proficient and receive sign-off on a number of common underground pieces of equipment and on one larger piece, a haul truck. This was achieved at the first site but not fully completed at the second site due to lack of access to equipment; instead, it was completed during participants' six-month on-the-job skills development time. The third site was unique in that participants were trained on equipment above ground that they will later learn how to operate underground when the mine transitions.

The skills training for Site 2 took place over 11 weeks; six weeks of theory at CNC and five weeks of hands-on training at the Barkerville Gold Mine (BGM) site. In addition to the 11 weeks of training, there was a two week break for the winter holiday and a one-week pause due to COVID-19. After this, Site 2 changed the training delivery format to a hybrid of online and in-person which occurred quickly due to strong partnerships with CNC and BGM, and remained in place until participants recovered from COVID-19 symptoms.

At Site 3 the training was aligned with SkilledTradesBC's Road Builder/Heavy Equipment Operator (HEO) program learning outcomes and MiHR's National Occupational Standard's common competencies. The training was run fully at the mine site with collaboration with Thompson Rivers University (TRU) who had previously delivered the Road Builder program in remote locations. It provided a combination of workplace safety training, underground miner fundamentals, and 140+ hours of hands-on training, which is significantly higher than the standard industry training hours of 40 hours per piece of equipment. The HEO training provided the foundation for the full Road Builder program which takes approximately three years. Curriculum delivery was adapted to reflect the constraints of remote delivery where possible, for example, SkilledTradesBC adapted their training to allow the Traffic Control Course to be run in an online format as that portion of the training is typically required to be in a city.

“ We are working with some of our mentors to become trainers. This is increasing capacity internally. This isn’t just about basic training for year one, this is about supporting progression. ”

– INDUSTRY REPRESENTATIVE

The integrated learning model enabled participants to learn in a variety of styles including classroom theory and hands-on learning on equipment with the trainer and with mentors. Having the training at site allowed participants to join in tailgate meetings with the crew where they had the opportunity to observe and participate in safety discussions.

All three sites built in mentor support for participants, which not only supported the participants but also increased capacity at the mine sites for leadership development. In addition to mentorship support, Indigenous liaisons were present at each site to support participants in different

capacities. For example, the College of New Caledonia (CNC) had a large number of Indigenous training participants, all of who took part in the program ‘Working Effectively with Indigenous Peoples’ and were accompanied by 18 mine employees also attending the training. Examples of cultural elements brought into the training at CNC included: healing ceremony, smudging ceremony, drumming circle, and speaking with Elders. The first site had some Indigenous trainers, and the third site was led by TNDC which is the business arm of the Tahltan Nation, enabling participants to be mentored and supported on-site by Indigenous individuals.

The project achieved the target population of local and diverse workers; nearly all participants were from the local communities. For Site 2 the goal was to recruit 50 per cent Indigenous trainees, and it achieved 75 per cent. With both the first and second site noting the need to recruit more women, the first site ran an all women cohort through the training at a later date. All participants at the third site were Indigenous and the majority identified as cisgender women.

The training had a strong focus on skills recognition to support transferrable skills, with theory validated through short quizzes, and hands-on training validated through competency evaluation. Skills learned through training were recognized through three levels of skills recognition: industry stand-alone certifications, post-secondary training certification, and through the MiHR Canadian Mining Certification Program and skills and knowledge were captured in MiHR’s Canadian Mining Skills Registry.

All participants received local skills recognition through the post-secondary training provider for the completion of the BC underground miner training and Site 2 also received recognition for the portion of the Road Builder trades training completed and the common competency training. Each site continued with on-the-job skills development aligned with earning the MiHR national certification for underground miner through the Canadian Mining Certification Program (requiring a minimum of 1,000 hours on equipment following completion of the BC portion of the training).

The immediate need for underground miners at Site 1 allowed for the participants in the training to be contract employees; participants completing the training then had the opportunity to be hired as full-time employees. The urban location allowed for participants to easily commute from their homes to the university (TRU) and the site which minimized travel time and cost and allowed for easy access to classrooms for theory training and the mine site for tours and hand-on training.

Site 2 participants were provided a training wage during the training, those that were hired full time signed employment contracts at the celebration ceremony and CNC awarded training participants a Certificate of Completion that can be used as evidence in MiHR's Canadian Mining Certification Program. Moving forward, CNC is working toward providing a credential for the UMTTP that will satisfy both organizations' standards, and be eligible for MiHR's Canadian Mining Training Recognition Program, which recognizes mine training programs delivered by employers, educational institutions and training organizations that align to MiHR's National Occupational Training Standards.

Site 3 participants received an honorarium during their training and all four participants were offered employment at the mine site as haul truck drivers after the training. There was also a community celebration planned for the day they wrote their exam but unfortunately it was postponed due to two deaths in the community and the main highway closure.

d. Alignment of work to date with previous report recommendations

The Underground Miner Training Project was developed in alignment with recommendations and goals from two previous deliverables: The 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia*, and the *Underground Miner Curriculum and Toolkit Sustainability Plan (2018)*, developed by Howegroup for CTEM. This project aligns with the two recommendations from *Preparing for the Future: Mining Labour Market Outlook for British Columbia*:

1. Strengthen collaborative partnerships between employers and government to support labour market information collection and strategies for attraction, retention, and transition of mining workers through mine life cycles.
2. Build upon findings to develop strategies to address critical job vacancies and support a sustainable workforce.

Table 5 identifies the extent to which the Underground Miner Training aligns with objectives and goals identified in the *Underground Miner Curriculum and Toolkit Sustainability Plan (2018)*:

Table 5. Alignment with objectives and goals identified in the Underground Miner Curriculum and Toolkit Sustainability Plan (2018)

OBJECTIVE: THE UNDERGROUND MINER CURRICULUM AND TOOLKIT IS CUSTOMIZABLE	
Delivery of the underground miner training is blended	Aligns
Curriculum is taught by industry subject matter experts	Aligns
Additional supports are provided to industry newcomers	Aligns
Curriculum is expanded to include training for underground mine rescue	N/A
Students are able to apply for student loans to take the training	N/A
A repository of certifying information for mines is developed	In progress
Capacity is developed for training through a site-sharing model	In progress
OBJECTIVE: THE UNDERGROUND MINER CURRICULUM AND TOOLKIT IS ACCEPTED AND TRUSTED AS THE INDUSTRY STANDARD	
Alignment with MiHR's National Occupational Standard for Underground Miner	Aligns
Tracking of common competencies with MiHR's portal for Underground Miner	Aligns
Awareness across the mining industry and post-secondary training institutions about the Curriculum and Toolkit	Aligns
The Curriculum and Toolkit is respected by industry and post-secondary training providers	Aligns
The Curriculum and Toolkit is endorsed by the provincial government (Ministry of Energy, Mines and Low Carbon Innovation)	Incomplete
The Curriculum and Toolkit is endorsed by WorkSafeBC	Incomplete
Qualified entry-level workers	Aligns
Inform the sector that the training is reliable and trustworthy	Aligns
OBJECTIVE: THE UNDERGROUND MINER CURRICULUM AND TOOLKIT HAVE SUSTAINABLE FUNDING WHICH ALLOWS FOR LONG-TERM PLANNING	
Funding for the implementation phase is secured	Aligns
Three implementation sites are delivering training	Complete
The Curriculum and Toolkit is self-sustained (e.g. through cost-recovery model options and alternative funding sources)	In progress

e. Project Governance Committee (PGC)

The PGC was comprised of representatives from community, industry, post-secondary training organizations, CTEM and the Ministry (sitting as ex officio). The purpose of the PGC was to provide high-level oversight and put forward recommendations for the project and review and validate deliverables. The PGC capitalized on the diversity and expertise of its members to provide guidance on the Underground Miner Training Project based on their combined expertise and collective knowledge.

The PGC met virtually – in part due to COVID-19 – but also as a way of reducing the burden of travel (time and cost), particularly for rural and remote participants. The dates and details of the meetings are provided in Table 6.

Table 6. Project Governance Committee meetings

PGC MEETING DATE	PROJECT GOVERNANCE COMMITTEE MEETING NOTES
October 14, 2020	A significant portion of the meeting dedicated to establishing the foundation for the PGC including getting to know each other, confirming the PGC purpose, reviewing the Terms of Reference, reviewing the project details, understanding the role of the PGC, and providing insight and expertise to the project. The PGC discussed potential risks, successes, and actions and reviewed and contributed to the draft evaluation tools and methodology.
November 25, 2020	The PGC reviewed subcommittee updates, discussed items for inclusion in the interim report and shared project successes and challenges to-date with respect and the lessons learned.
March 4, 2021	The PGC met for an update and touch point for committee members. The group reviewed project updates, and Howegroup presented highlights from Interim Report #1.
May 26, 2021	An update was provided, and questions were addressed regarding rural and remote definitions in the context of the project (rural is drive-in/out through mine transport and may have a camp on-site) and remote (fly in/out, no ability to drive, camp on-site). The PGC received an update on the subcommittees and highlights from cohort reports #1 and #2 were provided. PGC members provided thoughts on successes, challenges, and reflections.
October 14, 2021	The focus of the meeting was primarily to provide updates to the Committee including an overall project update; a presentation sharing highlights of the evaluation results from Site 1, including learning outcomes and effectiveness of the training model and, an update on the three subcommittees.
April 14, 2022	The focus of the meeting was on reviewing highlights from cohort reports #3 and #4 and interim report #3. The PGC was asked to reflect on where the UMTF is now and the evaluation results, and to identify important considerations moving forward, including success factors and challenges.
October 4, 2022	The PGC met for a project and subcommittee update and to discuss the sustainability plan for the UMTF, including project successes to maintain; financial strategies to support sustainability; a transition plan to support moving from pilot to ongoing programming; and risks and mitigation strategies.
April 22, 2023	The PGC met for a project and subcommittee update. The final report table of contents was shared so PGC members were aware of what to expect in the final report. As well, a working draft of the sustainability plan was shared, including the goals, tactics and timelines for training and information sharing, industry acceptance, and financials. The PGC was asked to keep in mind while reviewing that things may have changed from what was envisioned four years ago to what has actually happened.
May 26, 2023	During the final PGC meeting highlights of Cohort Report #5 were shared and a roundtable discussion took place regarding the impact the PGC has had on the UMTF, what about the PGC worked well, how the role of the PGC be improved, what members have you incorporated from their involvement on the PGC into their own work, and what members are personally taking away from their involvement on the PGC.

f. Subcommittees

Each of the three sites had its own subcommittee. The purpose of the subcommittees was to provide regional context and expertise and provide input into, and validate, deliverables. The subcommittees capitalized on the diversity, expertise, and collective knowledge of its members to provide valuable regional perspective on the Underground Miner Training Project.

Site 1 | Urban: Kamloops (New Gold/New Afton-Thompson Rivers University)

New Afton, owned and operated by New Gold Inc., is an operational underground gold-copper mine located in Kamloops, within the traditional territory of the Stk'emlupsemc Te Secwepemc Nation. In partnership with Thompson Rivers University (TRU), training was provided to ready a labour force in Kamloops. The site benefitted from New Gold having employee capacity to support the facilitation of the training; human resources to support the interview and vetting process; Indigenous employees to support cultural awareness; and skilled underground miners to support the development of site-specific content, learning resources and training implementation. As the trainers had worked at the site and used the equipment, they were able to provide theoretical and hands-on training to supplement the learning resources. The extensive experience, logistical, and operational capabilities of the TRU and New Afton partnership ensured the provincial training framework and learning resources were adapted for this site and that the training provided met industry needs.

After the site completed training, they shared learning resources and lessons learned with Site 2 (CNC-BGM) via discussions and an on-site underground mine tour. Evaluation data was captured, and three cohort reports written. Highlights to note from this site delivery include: training was adjusted for COVID-19; training was offered in 12 person and 6-8 person cohorts; curriculum and delivery schedule was updated after each cohort; the site continued with the training model; the site supported knowledge transfer to other pilot sites; local recognition has been achieved through a TRU certificate; and there was national recognition from MiHR.

Site 2 | Rural: Quesnel/Wells (Barkerville Gold Mines - College of New Caledonia)

Barkerville Gold Mines (BGM) is solely owned by Osisko Development Group and is located outside the town of Wells, BC in the Cariboo Region. The College of New Caledonia (CNC) is located in Prince George with regional locations including Quesnel, offering vocational and university credit programming. CNC is dedicated to providing education to local residents by removing barriers and providing supports to enhance completion rates. CNC has a strong Indigenous commitment with established supports for Indigenous learners, making it an excellent partner to deliver the Underground Miner Training Project. BGM and CNC are located within the Traditional Territory of the Lhatako Dene.

Numerous planning and subcommittee meetings took place until January 2022. Discussions focused on internal capacities, roles, and responsibilities, protocol with local Indigenous Groups, support of the development of the curriculum, the blended training model, recruitment of participants, and implementation of training.

The BGM | CNC group were welcomed to the New Afton mine site in October 2021 for an underground mine tour, and to have discussions with training participants, mine leadership, and trainers. This discussion provided important details on success factors from the perspective of all three groups that were then adopted and adapted by the BGM | CNC group.

During the final subcommittee meeting a training update was provided and a discussion took place regarding the graduation celebration and cohort wrap-up meeting. The group reflected on the original hopes for the training and found that their hopes were not only met, but exceeded, finding the training inclusive, engaging, culturally responsive; opportunities for hands-on learning; a safe working environment; and a diversity of participants.

One cohort report was completed for this site, providing an account of the training and experience for 11 participants, 75 per cent of whom were Indigenous. A key success of this cohort was grounded in the commitment and relationships between BGM and CNC to deliver training that responded to local industry needs by building a diverse, local workforce.

Site 3 | Remote: Golden Triangle (TNDC and Newcrest/Red Chris - Thompson Rivers University and Contact North)

In partnership with industry, post-secondary training providers, community and government, the Tahltan Heavy Equipment Operator (HEO) Training Program was delivered on-site at the Newcrest Red Chris Mine. Specifically, Tahltan Nation Development Corporation (TNDC) partnered with the Tahltan Central Government (TCG), the Government of British Columbia, CTEM, Thompson Rivers University (TRU), Contact North BC, Finning Canada, Mining Industry Human Resources Council (MiHR), Newcrest Mining Limited, and SkilledTradesBC.

Tahltan Territory, located in remote northwest British Columbia, is home to approximately 70 per cent of BC's resource rich Golden Triangle, including two of the 10 operating metal mines in BC (Red Chris and Brucejack). Tahltan Territory accounts for approximately 14 per cent of Canada's exploration expenditures, approximately three per cent of the global exploration budget, \$295 million of mineral exploration expenditure, and \$1.05 billion of total projected mining production values.²

The Tahltan HEO Training Program was developed to address skills gaps in industry by combining equipment training in the Tahltan Territory with on-the-job practical operating work and camp-life experience. In addition to building capacity within the Tahltan community, the training project integrated Tahltan regional and traditional knowledge on local projects while creating capacity within senior Tahltan operators and leveraging their skills through a mentorship program.

The Red Chris mine site is owned by Newcrest Mining Limited and Imperial Metals as a joint venture with 70 per cent and 30 per cent ownership respectively. It is a copper-gold operation located in northwest BC approximately 18 km southeast of the Iskut village, 80 km south of Dease Lake, and 12 km east of Stewart-Cassiar Highway 37; Terrace and Smithers are approximately 500 km to the south. This is a remote mine site requiring individuals to fly-in-and-fly-out of Dease Lake and then bus to the mine site and stay at the accommodations provided on-site. The mine site is transitioning from open pit to underground mining.

The subcommittee met five times to support Site 3 implementation, incorporating lessons learned from previous sites and adapting the project as needed to meet the unique needs of the remote community and the HEO and underground miner training.

² <https://www.tahltanheo.com/about>

During the February 2023 subcommittee meeting, the group had a detailed discussion around training delivery needs, specifically what makes the context of remote training unique, what has and has not worked well in the past, and the vision for training in the future. Highlights included the following: unique elements to remote training include fitting training into an active mine site (i.e. no classroom or camp space so having to work around shut downs); honouring shift work when participants aren't able to go home at the end of the day; lack of momentum when people are off shift and not on-site for two weeks; lack of access to resources; drug testing and transportation; lack of access to equipment and once access is secured, actually getting equipment to the site; finding instructors; lack of infrastructure such as cell/email service at sites and in communities; and general geographical challenges such as cost and time to travel to locations.

Challenges/barriers identified in previous training opportunities were:

- Training not being relevant, transferrable, recognized/valued, developed in partnership with industry, delivered in partnership between learners and trainers, promoted, offered at a time/format that's feasible to those working; training too lengthy, costly, or offered too far out of community (challenges with off hours).
- Inadequate screening during the learner selection process.
- Lack of community or Elder involvement in identification and selection of participants.

What had worked well in previous training opportunities were:

- Careful trainer selection
- Training allowance
- Elder involvement
- Adequate learner selection
- Employer participation
- Flexibility in prerequisites
- Training offered in the community
- Employer engagement
- On-site learning
- Mine site visit(s)
- Instructors familiar with remote areas
- One-on-one contact with participants (follow-up support)
- Information session prior to training start-up
- Cultural understanding
- Partnership with employers and trainers (e.g. learners paid while attending training)
- Short training opportunities first to see who is invested (e.g. industry certificates)

- Opportunity to customize programs to community/regional needs
- Providing incentive supports
- Keeping a cohort as a group during training, on-the-job training, and in shift work
- Timing of training (e.g. fitting training into slower times on site to allow for easier access to tours and equipment, and avoiding holiday breaks or key times in communities)
- Having a community member being available and ready to step in to remove barriers as needed
- Flexibility with training partners

Based on the project, the vision for training in remote regions includes: local training for local jobs; training that can be ready to be delivered when needed; a system that is there to provide the supports needed for remote training (which is very different than what is available and accepted as the norm); partnership between industry and training organization (to ensure the skills being taught are what industry needs); training provided by local individuals to build capacity within community, sustainable and scalable training; barriers to delivering training in remote communities addressed; local people to be working and contributing to the local economy; support people to build skills through training; and shared ownership (equal investment from training and industry).

3. Evaluation Activities Summary

The primary purpose of the evaluation was to validate participants' learning from the implementation of the underground miner provincial curriculum framework. Specifically, the evaluation examined the intended and achieved changes in knowledge and skills at the three delivery sites across the province. The secondary purpose of the evaluation was to explore the effectiveness of the model in providing learning resources and delivering training.

The objective of the evaluation was to respond to the following two overarching evaluation questions:

1. Is the training impacting participants' knowledge and skills? This evaluation question will primarily be addressed through the participant and trainer surveys, addressing areas such as mining knowledge, mining skills, job-readiness skills, and participant safety.
2. To what extent is the delivery model effective at achieving learning outcomes? This evaluation question will explore elements of the learning resources (including recommended revisions), training delivery, partnerships, success factors and lessons learned.

There were four evaluation groups: individuals receiving training (the participants), trainers (those delivering the training), company or community representatives, and the PGC.

a. Evaluation methods and tools

Measurement tools were designed to assess and enhance the implemented training. Intended outcomes and indicators for success are illustrated in the logic model (Appendix B). The following formal measurement tools were designed to gather both quantitative and qualitative feedback from participants, trainers, company, and community representatives, and the PGC (Table 7). Surveys were designed to be succinct with primarily quantitative questions and interviews were designed to provide an in-depth account from all evaluation participants.

Table 7. Evaluation tools

MEASUREMENT TOOL	DESCRIPTION
Participant surveys: pre and post-training	A paper and/or online survey of all participants to explore the change in knowledge and skills achieved through the training. This includes a pre (baseline) and post survey after training is completed. (An online/mobile survey has been provided if internet is available during the training or at the mine site, otherwise paper will be used to ensure high response rate). The survey was slightly adapted for the remote site to reflect the heavy equipment operator training. Cultural questions were found to be irrelevant for this site and were removed.
Trainer survey	An online survey was conducted for the first cohort with Site 1 to explore the extent to which the learning resources and training delivery was effective to provide ready-to-work individuals, to identify areas for improvement/revision, lessons learned and participant information (e.g. number of participants, level of learnings). While the survey provided useful information for the first cohort report, there were few changes from one cohort to another at the first site, and the evaluators determined that interviews were more effective moving forward for delving into key success factors, areas for improvement and lessons learned.
Company or community representative survey	An online survey was conducted for the first cohort with Site 1 to explore the extent to which the learning resources and training delivery is achieving the desired impact on improving participant knowledge and skills as well as identifying for improvement/revision. While the survey provided useful information for the first cohort report, there were few changes from one cohort to another at the first site, and the evaluators determined that interviews were more effective for understanding key success factors, areas for improvement and lessons learned.
Project Governance Committee ongoing input	PGC members were engaged via online surveys and roundtable discussions to explore the effectiveness of industry and community partnerships, success factors, areas for improvement, and lessons learned.
Participant interview guide	Interviews focus on the effectiveness of the training, improvements in knowledge and skills, impact of the training on their employment and areas for improvement.
Trainer interview guide	Interviews focus on the extent to which the learning resources and training delivery was effective to support the delivery of training, to identify areas for improvement/revision, lessons learned and participant information (e.g. number, level of learnings).
Company or community representative interview guide	Interviews were conducted on the effectiveness of the learning resources and training delivery, areas for improvement and underlying rationale for recommended revisions. As well, ongoing input was garnered formally through facilitated discussions and informally through conversation during subcommittee and planning meetings.
Site visit	A site visit was conducted for the first site upon completion of the last cohort. This allowed for participant interviews to be conducted in person and for an in-person knowledge translation session to occur with subcommittee members from Site 1 and 2.

Table 8 provides the intended short-term outcomes, as identified in the evaluation framework prior to commencement of the training, alongside the evidence of achievement of these outcomes. Medium- and long-term outcomes would not be expected at this time; they are identified in the logic model for reference (Appendix B).

Table 8. Demonstration of short-term outcomes

SHORT-TERM OUTCOMES (1-2 YEARS)	DEMONSTRATION OF OUTCOME
Curriculum	
Learning resources validated	<ul style="list-style-type: none"> Learning resources were used at three sites (urban, rural, and remote) and were found to be effective and customizable to the local context by trainers and industry representatives. Training participants increased knowledge, skills to work in mining, and transferable skills. Project subcommittees and the PGC validated the learning resources by reviewing them through various subject matter lenses, indicating satisfaction and sector relevance.
Local training and access	
Participants access local training	<ul style="list-style-type: none"> 69 per cent of training participants indicated they accessed training in the community where they lived, noting that at Site 3 all participants were trained fully at site and therefore no training took place in the community.
Industry utilizes trusted learning resources	<ul style="list-style-type: none"> Learning resources from Site 1 were trusted and utilized to build the learning resources for Sites 2 and 3. All three sites' learning resources are trusted as leading standard and being used by MiHR to develop the training into a national delivery model.
Training is affordable and accessible	<ul style="list-style-type: none"> Participants reported minimal barriers due to extensive work by all sites to identify and address them. Wrap-around supports minimized the impact of remaining barriers (as per cohort reports 1 through 5).
Participant knowledge and skills	
Increase in participant knowledge	<ul style="list-style-type: none"> Participants demonstrated a slight increase in knowledge 3.22 to 3.34 on a 4-point scale, measured by 'work readiness'.
Participant is aware of skills advancement	<ul style="list-style-type: none"> 93 per cent of participants reported 'yes' and 4 per cent 'somewhat' to having more skills to work in mining. 72 per cent of participants reported 'yes' and 24 per cent 'somewhat' to having more skills to work anywhere.
Participant is aware of transferable skills	<ul style="list-style-type: none"> 72 per cent of participants were aware of the MiHR Canadian Mining Certification Program post-training.
Skills learned are captured in the Canadian Mining Skills Registry	<ul style="list-style-type: none"> 100 per cent of participants had a profile on MiHR's Canadian Mining Skills Registry post-training.
Participants are ready for entry-level positions	<ul style="list-style-type: none"> Trainers indicated through interviews that participants were ready to entry-level positions. 58 of 60 participants were hired and retained following training.
Industry and participant values and apply transferable skills	<ul style="list-style-type: none"> During interviews participants indicated appreciation for new skills that will support employment and other related fields. During interviews trainers indicated participants had strengthened employability.

b. Project successes and challenges

The following section highlights the key success factors and challenges that were captured throughout the project and used to inform the sustainability plan (see Section 5). The success factors and challenges were shared from all of the cohorts and may have been specific to one site or delivery, or common over multiple cohorts.

Success factors

Collaboration

- Having access to the CTEM provincial framework to ensure alignment with provincial and national standards and previous training to use as templates and inspiration.
- Indigenous liaison (or other community knowledge) at the onset of developing the training and integrated throughout the training.
- Establish diverse committees so all perspectives are considered.
- Including key influencers at the onset to represent community, industry, and training providers.
- Companies have trained entry-level employees (increasing the labour pool).
- Community sees a pathway to employment through this training.
- Project based funding was leveraged with additional grants and in-kind support, dependent on delivery needs.

Learning supports

- Project funding provided to offset the high cost of the theory and hands-on equipment training and on-the-job training.
- Additional supports to participants were provided as needed (e.g., personal protective equipment, gas cards, post-secondary learning supports and safe spaces, opportunity for driver's licenses) through already established resources or by additional grants.
- Participants were hired by the mine during the training on contract.
- Participants were paid a wage or subsidy while taking the training.
- Jobs were available upon completion of the training.
- Including industry HR as part of the conversation to support the onboarding of participants.

Training

- Integrating Indigenous knowledge and cultural practices for all students to learn about Indigenous history.
- Indigenous awareness training available to current workers as well as training participants.
- Access to the mine site for tours.
- Trainers and mentors were local with many having worked at the mine site.
- Local post-secondary trainers provided recognition of the training alongside MiHR's national training recognition.

Challenges

Challenges regarding the partnerships among/involving industry, training providers, and community include the need for:

- Commitment, involvement, and coordination throughout the company (e.g. Human Resources, training departments, senior leadership, site resources, supplies and logistics).
- Expanded on-site training capacity (e.g. training facilities, equipment accessibility, trainers, assessors and mentors).
- Industry representatives (e.g. operations managers, trainers, etc.) to be part of the conversation earlier on in the project development.
- More time to develop the training and extra time for identifying community members who could be part of the training.
- Additional project funding support to allow for more access to equipment and trainers.
- More ongoing communication about the project.
- More time between funding approval and commencement of training.
- Need to train local trainers and mentors to have capacity to deliver training.

4. Sustainability

In order to sustain the learnings, collaborations, and partnerships created during the implementation phase, the following sustainability plan outlines project successes to maintain, financial strategies, and risks and mitigation strategies. This is followed by a comprehensive plan identifying transitional and sustainable activities.

a. Project successes to maintain

The PGC identified the following project successes to be carried forward to support ongoing sustainability:

1. Training and participant support through a blended and flexible curriculum with both locally and nationally recognized skills.
2. Ensure participants have access to mentors.
3. Community supports to reduce barriers.
4. Hire participants as temporary employees during training.
5. Hire the ‘right’ trainer, developing them locally, and sharing trainers and training knowledge across sites will further support long-term sustainability.
6. Industry acceptance is closely linked to MiHR’s common competencies, a component of MiHR’s National Occupational Standards and Canadian Mining Certification Program.
7. Ongoing awareness and promotion to the sector by industry spokespeople; using KPIs to demonstrate the effectiveness of the training and impact to the sector will be crucial as will securing buy-in from large, small, and private operators.

These successes have been brought forward and detailed in the following transitional and sustainability plan.

b. Financial strategies to support sustainability

The PGC identified financial strategies to support ongoing sustainability of the training including applying to existing provincial grant and funding programs and working in partnership with the community for funding sources to partially cover the training cost. Finally, it will be important to work with MiHR for opportunities for federal funding to support skills requirements, innovation, and technology and to leverage the MiHR curriculum to share with all mining employers (participant and trainer workbook and PowerPoint) to encourage employers to training to the same standards.

It will be important to establish expectations with respect to who will hold the financial responsibility for future deliveries, particularly that the company assumes the training costs as demonstrated in Site 1. For example, the expectation will need to be established that if the company is looking for employees, then there is a cost associated with training employees, which will be of benefit to the company in the long-run. It is important to note that it is easier for sites located in urban environments that have access to experienced workers (with job experience or easy access to training) compared with rural and remote locations that have significantly greater barriers to accessing training and reduced labour market experience.

c. Risks and mitigation strategies

The PGC identified the following potential risks to moving the training from pilot phase to ongoing project sustainability along with mitigation strategies (Table 9).

Table 9. Risks and mitigation strategies

RISK	MITIGATION STRATEGY	PARTNER RESPONSIBILITY
The UMTF does not move beyond being a pilot project	Work with partners to leverage diversified funding.	CTEM, MiHR
Lack of relationship building between partners: training provider, industry, and community	Understand relationship building takes time and start having conversations early onto develop communication and trust.	Industry, Training Providers, Community
Lack of participant/community desire to be involved in training	Work with employers to establish commitment of employment/future opportunity at the end of the training; develop a site that is welcoming to local community members; provide training that is designed with local expertise and community involvement.	Industry, Training Providers
Leaders in the field move on or retire	Invest time in knowledge sharing and succession planning for key leaders in the field	Industry, Community, Training Providers
Lack of organizational culture to support the training	Provide cultural sensitivity training and awareness; have training spaces and workspaces that are open and respectful to all diversity.	Training Providers, Industry
Lack of mentors, trainers, and assessors to provide training	Work with partners to identify potential mentors, trainers, and assessors; reduce barriers to transitioning from underground miners into mentors, trainers, and assessors (e.g., computer literacy); provide skills development and recognition for them.	CTEM, MiHR, Industry, Training Providers
Lack of participants in rural and remote locations	Provide skills development and reduction of barriers to local communities to prepare for training in community and continued on-site.	Community, Training Providers, Industry
Aging population and gaps in knowledge transfer	Promote and support a train-the-trainer model.	CTEM, MiHR

d. Sustainability plan

The following provides a comprehensive sustainability plan identifying transitional and sustainable programming.

TRAINING AND PARTICIPANT SUPPORT

GOAL	TACTIC	TIMELINE	RESPONSIBILITY
Curriculum			
Training is regularly updated to align with MiHR's National Occupational Standards	MiHR Underground Miner Development Committees review and update standards regularly. New standards will be available in August 2023 at which time CTEM may need to update training	August 2023 and ongoing	CTEM
Have training capacity at site and in the community	Provide support to industry and communities to identify and provide skills development for current workers to become mentors, trainers, and assessors.	Ongoing	CTEM, Training Providers, Industry, Community
The delivery of the Underground Miner Training Project is blended and flexible	Offer training using multiple methods (e.g., classroom, online, on mine site and in community) to meet community and site-specific needs.	Ongoing	CTEM, Training Providers, Industry, Community
Create recognizable certificate (branded) such as Shiftboss training, Blaster certification	Completed: training is certified by MiHR and CTEM.	Completed	N/A
Local and national completion recognition	Provide local and national certificate of competency under the Canadian Mining Certification Program.	Ongoing	CTEM, MiHR
	Post-secondary training providers certify training through Educational Councils, where relevant.	Ongoing	Training Providers with support from CTEM, Industry
Supervisory/early manager training is developed to support younger/less experienced workers (to bridge the gap of retiring managers and new talent)	Build on best practices (i.e. Australian Mining Leaders Program , Emerging Leader Program , and Mining Skills Australia programming).	Ongoing	CTEM, Training Providers, Industry, Community

GOAL	TACTIC	TIMELINE	RESPONSIBILITY
Learning supports			
WorkBC understands the mining sector and the needs of industry, trainers, and participants	Build relationships and increase awareness with WorkBC	6-12 months	CTEM with support from Training Providers and Industry
Additional supports are provided to new underground miners	Use mentors at mine sites to support new underground miners to the industry (i.e. someone who is familiar with the site and the culture and can troubleshoot as needed).	Ongoing	Industry
	Collaborate with training providers and community organizations to offer additional participant learning supports as needed (e.g., time off for training, travel and living supports).	Ongoing	CTEM, Training Providers, Industry, Community
	Participants are hired as employees (probationary) during training process	Ongoing	Industry, Training Providers
	Make clear what participants can expect from employers such as safety, employment laws, etc.	Ongoing	CTEM, Training Providers, Industry, Community
Participants or training providers are able to apply for participant loans or training grants to support the training	The curriculum delivery is 14 weeks, or longer, in duration to qualify participants for loans such as the Future Skills Grant .	Ongoing	CTEM, Training Providers
Participants are supported through flexible community supports	Participants are provided with bridge funding while waiting for employment to commence.	Ongoing	Industry, Training Providers
	Wrap around supports pre-, during, and post-training.	Ongoing	CTEM, Training Providers
	Removal of barriers to access and participate in training	Ongoing	Industry, Training Providers
A repository of certifying information for mines is developed	Compile a list of post-secondary training organizations that provide training	1 year and ongoing	CTEM, Industry Associations
	Compile a list of trainers (at the organizational and individual level)	1 year and ongoing	CTEM, Industry
	Compile a list of available on-site/ simulator training locations	1 year and ongoing	CTEM and Industry

GOAL	TACTIC	TIMELINE	RESPONSIBILITY
Training			
Industry, post-secondary, and trainers collaborate to build and maintain a foundation for local training	Create opportunities for relationship-building, brainstorming, and collaboration	6-12 months, ongoing	CTEM, MiHR
Industry, post-secondary training providers, and trainers collaborate to support local training	Build partnerships between employers and training providers to allow for collaboration and sharing (e.g., New Afton model of TRU and New Afton delivering hybrid model).	Ongoing	CTEM, MiHR, Training Providers, Industry
Capacity is developed for training through a site-sharing model	Create a site-sharing agreement to allow for participants to visit and train at active mine sites.	1 year	CTEM, MiHR
	Facilitate site-sharing among users	1 year	CTEM, MiHR
Curriculum is taught by industry SMEs	Recruit and develop trainers who have industry experience (e.g., retired miners)	Ongoing	Training Providers, Industry, MiHR
Ensure the 'right' trainers are available	Recruit from underrepresented groups; broad spectrum of backgrounds	Ongoing	Training Providers, Industry, MiHR
	Develop trainers locally with a vision of long-term sustainability	Ongoing	Training Providers, Industry, MiHR
	Work with industry to share trainers	Ongoing	CTEM, Training Providers, Industry, MiHR
	Ensure trainers are emotionally intelligent to support communication with participants	Ongoing	Training Providers, Industry
	Ensure trainers have access to a list of resources (or resources are available online).	Ongoing	CTEM, Training Providers, Industry, MiHR
	Promote the opportunity to trainers through social media, video and personal stories	Ongoing	CTEM, Training Providers, Industry, MiHR
Local workers			
Employment opportunities exist for participants once they complete training	Large, small, and private operators are aware and engaged in the training. These operators understand the importance of job opportunities for participants post-training.	6-12 months	CTEM, MiHR, Industry
Qualified entry-level workers	Employers and community have access to curriculum to confirm training content.	6 months and ongoing	CTEM, Industry, Training Providers
	Mining sites conduct skills assessment of current and potential employees to verify skills (without having to retrain).	1 year and ongoing	CTEM, Industry, Training Providers,
	Employers have access to the Canadian Mining Skills Registry to confirm training was completed.	Ongoing	CTEM, Industry, MiHR

INDUSTRY ACCEPTANCE

GOAL	TACTIC	TIMELINE	RESPONSIBILITY
Promotional material is readily available and easily accessible	Create one-pager / link that is easily shareable by employers to promote the training.	6-12 months	CTEM, MiHR, Industry
Project successes are shared in order to support industry acceptance	Create infographics of KPIs (evaluation results) to demonstrate effectiveness of the project, include testimonial quotes from trainers, industry, and participants.	6-12 months	CTEM, MiHR, Industry
Learners track, in MiHR's Canadian Mining Skills Registry (online database), the common competencies acquired	Post participant skills development in MiHR's Canadian Mining Skills Registry and track statistics over time.	Ongoing	Industry, MiHR
	Increase awareness of MiHR's National Occupational Standards and Canadian Mining Certification Program.	Ongoing	Industry, MiHR
MiHR elevates the training to a national program, aligned with National Occupational Standards, to provide local and national recognition	Awareness materials are developed (print, digital and online).	Ongoing	Industry, MiHR
	Promote through social media, video, news blasts, onsite at mines.		
	MiHR to regularly share promotional materials on website and social media.		
	Participants with MiHR share their stories to promote the training.		
	Identify multiple industry spokespeople to communicate success stories and benefits of the curriculum and toolkit in-person and online, including MiHR Ambassadors .		MiHR
	MiHR board members champion and promote the training within their networks and associated conferences:		
	<ul style="list-style-type: none"> • Prospectors & Developers Association of Canada • Canadian Institute of Mining, Metallurgy and Petroleum • Canadian Diamond Drilling Association 		
Lifelong learning is encouraged	Leverage MiHR's Canadian Mining Skills Registry to communicate updates on processes for efficient sharing with employees		CTEM, Training Providers, Industry, MiHR

GOAL	TACTIC	TIMELINE	RESPONSIBILITY
There is awareness across the mining industry, communities, and post-secondary within each region about the curriculum and toolkit	Presentation at MiHR board meeting in Vancouver	6 months	CTEM, industry, MiHR
	Presentation at Mining Association of BC Managers' Meeting		
	Hold a session at the Canadian Institute of Mining, Metallurgy and Petroleum		
	Identify other mining associations and post-secondary institutions to target with presentations.		
Inform the sector that the training is reliable and trustworthy	Communicate the content and learning outcomes/benefits of the training	6 months and ongoing	CTEM, Industry, Government, MiHR, Training Providers
	Secure buy-in inclusive of large, small, and private operators	6 months and ongoing	CTEM, Industry, Government, MiHR, Training Providers

FINANCIAL STRATEGIES

	TACTIC	TIMELINE	RESPONSIBILITY
Continued funding for implementation is secured	Develop cost recovery model options; blended model based on location and capacity of organization as well as rural vs. remote training deliveries (impacts costs and responsibilities).	6 months	CTEM, Industry, Government, Training Providers, MiHR
Awareness and interest are built in communities and industry	Highlight where employers are seeing success, communicate the financial benefits for companies such as access to trained workers in a competitive job market.	6-12 months	CTEM, Industry, Government, Training Providers, MiHR
The Curriculum and Toolkit are self- sustaining	Secure ongoing government/industry funding (i.e., long-term funding commitment).	6-12 months	CTEM, Industry, Government, Training Providers
	MiHR's Canadian Mining Skills Development Strategy provides funding for trainers to support individuals newly trained through both Mining Essentials (for Indigenous people) and Mining Potential (for youth, newcomers, and women).	6-12 months	CTEM, Industry, Government, Training Providers
	Showcase BC as a place to build a diverse workforce, creating meaningful work opportunities in communities.	6-12 months	CTEM, Industry, Government, Training Providers
	Support individual sites to develop and facilitate implementation of preferred cost-recovery model recognizing needs and costs differ between sites.	3-5 years	CTEM, Industry, Government, Training Providers
	Seek alternative funding sources (e.g., rural and remote, land-use).	Ongoing	CTEM, Industry

5. Project Budget Update

The UMTF was established to be a blended budget of grant funding and in-kind funding. This has been exceeded with more than anticipated in-kind funding being provided by industry throughout the project. As of the date of this report, the project is on track to expend all its funding by end of the contract delivery. It is noted that items specific to the UMTF are still being finalized.

6. Conclusion

The Underground Miner Training was developed to align with recommendations and goals from two previous deliverables: The 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia*, and the *Underground Miner Curriculum and Toolkit Sustainability Plan (2018)*, developed by Howegroup for CTEM.

The UMTP aligned with the two recommendations from the 2017 BC mining labour market information study by CTEM, *Preparing for the Future: Mining Labour Market Outlook for British Columbia*:

1. – To strengthen collaborative partnerships between employers and government to support labour market information collection and strategies for attraction, retention, and transition of mining workers through mine life cycles.
2. To build upon findings to develop strategies to address critical job vacancies and support a sustainable workforce.

The evaluation finds the goals of the UMTP project have been met:

- The PGC has provided guidance on the project and reviewed and validated deliverables. In addition, each of the three sites had its own subcommittee, with the purpose being to provide regional context and expertise and provide input into, and validate, deliverables.
- A collaborative consultative process has been maintained with mining sector stakeholders to ensure engagement, feasibility, commitment and validity of the development, implementation, and evaluation of the project.
- Recommendations identified in the 2017 *Mining Jobs Task Force Report and the Sector LMP Phase 3 Underground Miner 2018 Final Report* have been the foundation for the development, implementation, and evaluation across the three sites:
 - Site 1 | Urban: Kamloops (New Gold/New Afton-Thompson Rivers University)
 - Site 2 | Rural: Quesnel (Barkerville Gold Mines - College of New Caledonia)
 - Site 3 | Remote: Golden Triangle (Tahltan Nation Development Corporation and Newcrest/Red Chris – Thompson Rivers University and Contact North)
- Learning resources have been developed and training has been implemented at three different sites (urban, rural, and remote), in partnership with community, industry and post-secondary institutions.
- Participants' learned skills were captured in MiHR's Canadian Mining Skills Registry.
- An independent evaluation of the project has taken place based on the evaluation strategy provided in the *Sector LMP Phase 3 Underground Miner 2018 Final Report*.

The project reached the target population of local and diverse workers; nearly all participants were from the local communities. For Site 2 the goal was to recruit 50 per cent Indigenous trainees and it achieved 75 per cent, although there are improvements to be made in recruiting more women. This was not the case at Site 3 where all participants were Indigenous and the majority identified as cisgender women. These successes are attributed to intentional relationship-building, taking time and creating space for collaboration with Indigenous communities, working with Indigenous liaisons, and ensuring Indigenous awareness was incorporated into the training.

The training had a strong focus on skills recognition to support transferrable skills, with theory validated through short quizzes, and hands-on training validated through competency evaluation. Skills learned through training were recognized through three levels of skills recognition: industry stand-alone certifications, post-secondary training certification, and through MiHR's Canadian Mining Certification Program and skills and knowledge was captured in MiHR's Canadian Mining Skills Registry (skills recognition database).

Short-term outcomes have been achieved:

- Learning resources validated
- Participants access local training
- Industry utilizes trusted learning resources
- Training is affordable and accessible
- Increase in participant knowledge
- Participants aware of skills advancement
- Participants aware of transferable skills
- Skills learned captured in the Canadian Mining Skills Registry
- Participants are ready for entry-level positions
- Industry and participants value and apply transferable skills

To sustain the learnings, collaborations, and partnerships created during the pilot phase, a sustainability plan has been developed that outlines successes to maintain, financial strategies, and risk and mitigation strategies as well as transitional and sustainable activities.

- Key project successes to be carried forward to support ongoing sustainability include:
 - Training and participant support through a blended and flexible curriculum with nationally recognized skills. Ensuring participants have access to mentors, are provided supports to reduce barriers and are hired as temporary employees during training. Hiring the 'right' trainer, developing them locally, and sharing trainers across sites will further support long-term sustainability.
 - Industry acceptance is closely linked to the common competency component of MiHR's National Occupational Standards and Canadian Mining Certification Program as well as ongoing awareness and promotion to the sector by industry spokespeople. Using KPIs to demonstrate the effectiveness of the training and impact to the sector will be crucial as will securing buy-in from large, small, and private operators.
- Financial strategies to support sustainability include:
 - Working with the provincial government for support of CTEM's role.
 - Negotiating and bidding for federal funding to address gaps in existing training with transferrable skills being the focus and seeking partnership models with academic institutions and mine sites.
 - Working in partnership with local communities for funding sources to partially cover the training cost.
 - Working with MiHR for opportunities for federal funding to support skills requirements, innovation, and technology and to leverage the MiHR curriculum to share with all mining employers to encourage employers to train to the same standards through alignment with the National Occupational Standards.
- Risk mitigation strategies include:
 - Working with MiHR to leverage funding.
 - Understanding relationship building takes time, work with employers to establish commitment employment/future opportunity at the end of the training.
 - Investing time in succession planning for key leaders in the field.
 - Providing cultural sensitivity training and awareness.
 - Promoting and supporting a train-the-trainer model.

Transitional and sustainable activities have been identified for training and participant support (curriculum, learning supports, training, and local workers); industry acceptance; and financial sustainability.

Appendix A: Committee Membership

Project Governance Committee

- Freda Campbell, Tahltan
- Lana Eagle, Consultant, CTEM Advisory Council
- Wynona Giannasi, Howegroup (facilitator)
- Brianna Gibson, Métis Nation NBC (proxy for Jason Chan)
- Roben Hislop, CanMine Contracting
- Jennifer Hystad, Howegroup (facilitator)
- Dana Imbeault, Mining Industry Human Resources Council (MiHR)
- Eric Kohtakangas, Cementation Americas
- Nicole McLaren, Consultant, CTEM Advisory Council
- Gary Patsey, Nisga'a Nation
- Cassandra Puckett, Tahltan
- Leanne Shaw, Procon Mining
- Shervin Teymouri, UBC
- Vashti Thiesson, Ministry of Post-Second Education and Future Skills (Ex officio)
- Jill Tsolinas, CTEM

Urban Subcommittee

- Taylor Faith Blenkarn, Mining Industry Human Resources Council (MiHR)
- Michelle Buchanan, New Afton, New Gold
- Heather Hamilton, Thompson Rivers University (TRU)
- Ron Hart, New Afton, New Gold
- Mark Lapointe, Thompson Rivers University (TRU)
- Logan Reese, New Afton, New Gold
- Jill Tsolinas, CTEM

Rural Subcommittee

- Hayley Archer, Barkerville Gold Mines
- Gayle Campbell, College of New Caledonia
- Lori Gagnon, College of New Caledonia
- Wynona Giannasi, Howegroup (facilitator)
- Jennifer Hystad, Howegroup (facilitator)
- Cara Lenoir, CTEM
- Dawn Leroy, Realize It Development
- Tim Lofstrom, College of New Caledonia,
- John Renaud, Barkerville Gold Mines
- Jorlene Russell, Barkerville Gold Mines
- Vashti Thiesson, Ministry of Post-Secondary Education and Future Skills (Ex officio)

Remote Subcommittee

- Ann Ball, Tahltan Central Government
- Freda Campbell, Skeena Resources
- Tracy Donnelly, Northern Lights College
- Wynonna Giannasi, Howegroup (facilitator)
- Brianna Gibson, Metis Nation BC
- Jennifer Hystad, Howegroup (facilitator)
- Pascale Larouche, Mining Industry Human Resources Council (MiHR)
- Cara Lenoir, CTEM
- Gary Patsey, Nisga'a
- Cassandra Puckett, Tahltan Central Government
- Tina Reed, Contact North
- Richard Resener, Northern Lights College
- Vashti Thiesson, Ministry of Post-Second Education and Future Skills (Ex officio)
- Jill Tsolinas, CTEM
- Lee Vincent, Tahltan Nation Development Corporation

Appendix B: Logic Model

Activities and inputs	Outputs	Short-term Outcomes (1-2 years)	Medium-term Outcomes (2-3 years)	Long-term Outcomes (4-5 years +)	Indicators	Data Source
Curriculum						
<ul style="list-style-type: none"> Learning Resources Industry and PCG recommendations 	<ul style="list-style-type: none"> PCG meetings Learning resources with recommended revisions 	<ul style="list-style-type: none"> Learning resources validated 	<ul style="list-style-type: none"> Learning resources are relevant and trusted source for industry 	<ul style="list-style-type: none"> Learning resources are updated and utilized at additional locations 	<ul style="list-style-type: none"> Industry and PCG satisfaction rating 	<ul style="list-style-type: none"> Industry survey and interviews PCG survey and interviews
Local training and access						
<ul style="list-style-type: none"> Cost of training Sites Trainers 	<ul style="list-style-type: none"> Participant recruitment # individuals trained Location of home/ training Hours trained Modules completed Delivery type 	<ul style="list-style-type: none"> Participants access local training Industry utilizes trusted Learning Resources Training is affordable and accessible 	<ul style="list-style-type: none"> Participants gain knowledge and skills Industry has trained workers 	<ul style="list-style-type: none"> Local people are trained to work in local mines across BC Mine accesses local, trained workers for skill development 	<ul style="list-style-type: none"> Local training Industry/ training partnerships 	<ul style="list-style-type: none"> Industry survey Participant survey Trainer survey
Participant knowledge and skills						
<ul style="list-style-type: none"> Learning resources Job-ready skills Transferable skills 	<ul style="list-style-type: none"> # participants Amount of hours of training # modules completed # participants in Canadian Mining Certification Program # participants employed following the pilot 	<ul style="list-style-type: none"> Increase in participant knowledge Participant is aware of skills advancement Participant is aware of transferable skills Participants are ready for entry-level positions Skills learned captured in Canadian Mining Skills 	<ul style="list-style-type: none"> Industry has increased availability of trained workers Participants/ Industry are updating learned skills in the Canadian Mining Skills Registry Training is affordable and accessible 	<ul style="list-style-type: none"> Local people are trained to work in local mine Mine accesses local, trained workers Participant is employed utilizing learned skills Participant progresses their career path through Canadian Mining Certification 	<ul style="list-style-type: none"> Number of individuals trained Amount of hours trained Number of modules completed Participant satisfaction Participant skills Trainer satisfaction Industry satisfaction Workers advancing through CMCP 	<ul style="list-style-type: none"> Participant survey and interviews Trainer survey and interviews Industry survey and interviews



Activities and inputs	Outputs	Short-term Outcomes (1-2 years)	Medium-term Outcomes (2-3 years)	Long-term Outcomes (4-5 years +)	Indicators	Data Source
		<ul style="list-style-type: none">• Registry• Industry and Participant values and applies transferable skills	<ul style="list-style-type: none">• Participant is employed utilizing learned skills• Industry and Participant values and applies transferable skills	<ul style="list-style-type: none">• Program• Industry and Participant values and applies transferable skills		