2022 Virtual Mackenzie Valley Resource Management Act (MVRMA) Workshop Series: Session 2: Closure and Reclamation

WORKSHOP REPORT

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Mark Cliffe-Phillips, Executive Director
Mackenzie Valley Environmental Impact Review Board
200 Scotia Centre, 5102-50th Ave, Yellowknife, NT X1A 2N7
mcliffephillips@reviewboard.ca

Prepared By

Stratos Inc.
1404-1 Nicholas Street
Ottawa, Ontario K1N 7B7
www.stratos-sts.com

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Executive Summary

Co-management Boards in the Mackenzie Valley and the federal and territorial governments typically host an annual workshop on the *Mackenzie Valley Resource Management Act* (MVRMA) for community representatives, Indigenous organizations and governments as a key engagement activity to support an effective co-management system. Given the ongoing COVID-19 circumstances, the MVRMA Workshop Planning Committee chose to host a series of four virtual half-day workshops in 2022 rather than the typical several-day long in-person workshop once per year. The topics of the virtual workshop were based on a survey conducted in Fall of 2021.

The second instalment of the four-part virtual workshop series was held on June 8 and 9, 2022 and focussed on the closure and reclamation process in the Mackenzie Valley. The workshop was intended to share knowledge, ideas and experiences on existing co-management processes with regard to closure and reclamation and provide information on current closure and reclamation-related initiatives in the Mackenzie Valley.

Approximately 120 participants joined the virtual workshop on both Day 1 and Day 2 representing government employees, co-management board members and staff, industry representatives, and Indigenous government/organization employees. The virtual session included presentations, panels, virtual engagement tools, and open question and answer periods to explore, develop and clarify concepts within the workshop scope. See Appendix A for the Agenda.

Day 1 of the workshop included an initial presentation from representatives of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) on their perspectives of the Colomac Mine closure and reclamation process to set the stage for the workshop's focus. Additionally, a set of three presentations were then delivered to introduce general closure considerations and build participant awareness on more specific closure and reclamation topics, such as progressive reclamation and security.

Day 2 of the workshop began with an armchair discussion on the importance of Traditional Knowledge in closure planning in the Mackenzie Valley with representatives from a range of personal and professional experiences. The workshop closed with three presentations reflecting on the past and looking toward the future of closure and reclamation in the Mackenzie Valley.

Overarchingly, several key themes emerged from this Closure and Reclamation Workshop through the presentations and ensuing dialogue, including:

- Early and frequent engagement in the project development phase with Indigenous communities and other interested parties is key in successful mine closure and reclamation planning.
- For meaningful engagement, both youth and Elders should also be involved in the engagement process.
- Braiding Traditional Knowledge with Western Science helps strengthen efforts to achieve shared goals in successful closure and reclamation.

- Closure and reclamation planning must consider socioeconomic impacts to be equally as important as environmental impacts.
- Consistency among the closure and reclamation processes across the North is key to successful closures of mine sites.

Introduction

Co-management Boards in the Mackenzie Valley and the federal and territorial governments host an annual workshop on the *Mackenzie Valley Resource Management Act* (MVRMA) for community representatives, Indigenous organizations and government as a key engagement activity to support an effective co-management system. The second instalment of the four-part virtual workshop series was held on June 8 and 9, 2022 focusing on the closure and reclamation process in the Mackenzie Valley. The workshop was intended to share knowledge, ideas and experiences on existing co-management processes with regard to closure and reclamation and provide information on current closure and reclamation-related initiatives in the Mackenzie Valley.

The workshop was attended by participants from the government, co-management boards, Indigenous organizations, and industry representatives. Throughout the event, participants heard from a number of panelists and speakers to provide varying perspectives and expertise on closure and reclamation initiatives. The workshop purpose and goals are noted below. See Appendix A for the Agenda.

Workshop Purpose

- To help familiarize participants with the co-management and integrated system of land and water management established through the MVRMA.

Workshop Goals

- Share knowledge, ideas and experiences on existing co-management processes with regard to closure and reclamation.
- Provide information on current closure and reclamation-related initiatives, projects, and opportunities for engagement.

The Workshop Planning Committee was responsible for the delivery of the workshop. Stratos Inc., an ERM Group company (Stratos) was engaged to support the design and facilitation of the workshop, provide technical support and prepare this report. A full list of the Workshop Planning Committee and Stratos Delivery team members can be found in Appendix B.

About This Report

This report provides a detailed account of all presentations and discussions from the two sessions. Much of the content is the opinion of speakers and participants and reflects a range of views. This report can be used to inform the next steps to be taken by industry, co-management boards and the government as they work to advance closure and reclamation processes with improved Indigenous involvement in the Mackenzie Valley. Links to the presentations are available and can be accessed at the Mackenzie Valley Land and Water Board website.

Synopsis of Day 1 (June 8, 2022)

The first day of the closure and reclamation workshop opened with an acknowledgement of the virtual setting the workshop was being held in (which will continue throughout the entirety of the series); however, it was noted that all participants work, live, and play on Indigenous lands[1]. Michael van Aanhout, Stratos facilitator of the workshop instalment, acknowledged the unceded Algonquin Anishinaabe Territory he was joining in from and further acknowledged all of the First Peoples and Nations who have lived in relationship with the land and waters of this land since time immemorial. Following on these remarks, participants were invited to provide a personal land acknowledgement in the Chat. Many attendees identified that they were located across Canada ranging from Yellowknife, to Inuvik, to Ottawa and so on.

Michael then formally opened the workshop with a few remarks from his personal experience relating to closure and reclamation in the Northwest Territories (NWT).

- He shared that he has had the good fortune of working in the NWT for over 20 years.
- In 2001, Michael was part of the team that was created to develop the business case and initial plan around what eventually became the Northern Contaminated Sites Program (NCSP). That team spent the summer of 2001 in Yellowknife and Whitehorse pulling the files on many of the abandoned mine sites that will be talked about during the session and made the case to fund the NCSP.
- Michael has also supported the Giant Mine remediation efforts spanning many years. He shared that a highlight for him was being invited to be an expert witness during the public hearings in the environmental assessment of the Giant Mine Remediation Program. He noted that it was extremely powerful to be able to see the co-management regime under the MVRMA alive and working and to hear the community members and Elders share their stories and concerns.
- Michael then spoke about the National Orphaned and Abandoned Mine Initiative (NOAMI) established in the early 2000s. He noted that it has gained international attention and brings together jurisdictions from across Canada, including the NWT, as well as representatives from Indigenous organizations, environmental groups, and social non-governmental organizations (NGOs) to work collaboratively to develop tools to help address legacy and abandoned mines, but also to prevent them in the future. Early in 2020, Michael had a chance to assist in reinvigorating NOAMI. He commented that Natural Resources Canada (NRCan) is now in the process of relaunching the program with a multi-stakeholder team.
- Michael also highlighted his role as facilitator for the Mining Association of Canada's (MAC) National Community of Interest Advisory Panel, which is comprised of 12 Canadians representing a broad spectrum

[1] NOTE: The first instalment of this workshop series opened with a land acknowledgement of the Chief Drygeese Traditional Territory from Tanya Lantz, Community Outreach Coordinator with the Mackenzie Valley Land and Water Board, and a drumming circle hosted by Bobby Drygeese and the Yellowknives Dene Drummers. This meaningful opening was provided to begin the entire four-session virtual workshop series in a good way.

of communities that are impacted by the mining industry. The group meets twice a year to provide advice and improve the overall performance of the mining industry. One of the two meetings is typically held in a mining community; some of the previously visited communities include: Elk Valley, BC, Val-d'Or, QC, Fort McMurray, AB, Nunavik, QC, and Princeton, BC. Michael described how this role and the work of the Panel has informed and inspired his thinking on mine closure and reclamation.

- Tying this experience together, Michael reflected on a common theme he has observed over time, that being the arc of the relationship between communities and mining beginning in the past and the way things were done, and the legacy of those practices coming now to the forefront in the present where government, Indigenous organization and environmental representatives have been coming together to seek better environmental and social outcomes throughout the lifespan of the mine.
- Michael concluded by stating that the closure and reclamation workshop focuses on the key theme of working together for a more sustainable future which will be advanced through the discussion, stories and ultimately the actions that arc from the past through to the present in support of a better future.

Colomac Mine Site Remediation Project: Keynote Presentation

Andrew Richardson
Project Officer, CIRNAC

Andrew Richardson has been with the Contaminant and Remediation Division (CARD) of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) since 2006, working on many projects in the Northwest Territories but concentrating on projects in the Tłı̨chǫ region. Andrew came to CARD from the Environmental Consulting industry, where he had worked for several consulting and remediation companies since the early 1990s.

George Lafferty
Community Consultation Officer, CIRNAC

George Lafferty is a member of the Tłı̨chǫ Government in Canada's Northwest Territories. After graduating from high school in Ottawa, Ontario, George started worked with the Government of Northwest Territories (GNWT). After several years with the Territorial Government, George went on to complete the Management Studies Program in Fort Smith, NWT, and started work with the NWT Housing Corporation (NWTHC) in Yellowknife, NWT.

In 2002-07, George worked with Tłı̨chǫ Logistics and then in December 2007 he officially started employment with the federal Government of Canada. George now works closely with his Tłı̨chǫ Elders and Aboriginal Organizations Leadership on the Federal Contaminated Sites Remediation Projects. One of his first projects was to help develop a Remedial Action Plan for the Mine Remediation Projects in the Tłı̨chǫ Region, using the Traditional and Ecological Knowledge of his Elders. George believes Traditional Knowledge from the Elders is the key to successful remediation projects and a positive step in

building trust. George is also a strong supporter of providing education and continues to encourage youth to study hard and consider a career in Science Technology.

Colomac Mine Site Remediation Project

Andrew Richardson began the presentation by outlining that frequently, when companies come to the North to begin a project, they assume that there is no use for the land, just empty space, but that is very rarely the case. George Lafferty shared a bit of background on the traditional land uses and highlighted that anywhere you go in the NWT, the land is being used. Indin Lake, nearby the Colomac site, has sustained generations of Tłı̨chǫ people and has been the primary source of shelter, clothing, and food for time immemorial. The Colomac area has also been a migration passageway for the Bathurst Caribou population for generations. They would move along the lakes adjacent to the Colomac site, which was an important consideration during remediation phase because it was such a key landmark to the wildlife and had the potential to dramatically affect the local population if not managed well.

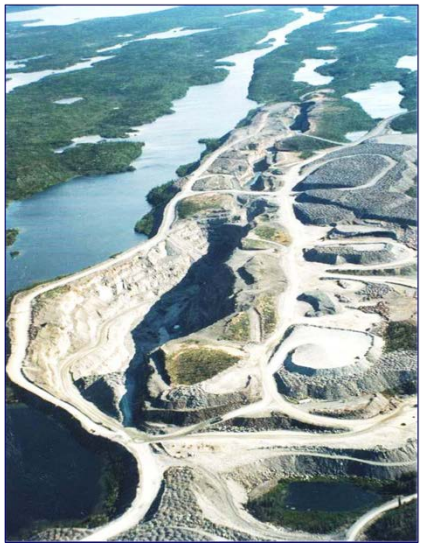


Figure 1: An aerial view of the Colomac Mine.

An Introduction to the Colomac Mine Site

Andrew continued the presentation by providing background context of the Colomac mine site. The mine itself was developed in the late 1980s and was put into operation by 1990. He stated that the Colomac mine was an open pit gold mine with three pits and a mill directly on-site, so rather than shipping the ores, the gold was refined, recovered, and poured into bricks directly on-site. He reflected on the small amount of gold recovered in the rock, resulting in 35 million tonnes of waste rock and 11 million tonnes of tailings. The site remained in operation until it shifted into care and maintenance in 1997. After two years in care and maintenance, the company that owned Colomac went bankrupt and the cost of closing and remediating the site fell on the taxpayers of Canada, as the site was turned over to the Crown.

Initial State of the Colomac Mine Site

As a result of the operations and the massive amounts of waste produced, Andrew stated that there were a lot of serious problems to remediate. For example, the lake adjacent to the Colomac site appeared as though it was ready to overflow due to the breach in the dam that was retaining it, causing the dam to act more like a sieve, filling the lake to capacity.

Additionally, Andrew described that the tailing ponds had deposited into one another creating a tailings contaminated area. The tailings were surface level, so in the warm summer weather, they would dry up and the contaminated sediments would blow high concentrations of cyanide across the site.

Andrew also recalled the operations at the mill on-site that would use a tremendous amount of petroleum diesel per day. There were nine large tanks used to contain all of the fuel and during the time of operation, there were over 70,000 litres of fuel spilled into the tank area where none of the oil was contained, and instead leaked into the rock beneath. The oil had spilled onto the ice and had to be remediated using a controlled burn.

He further described that any mill chemicals were used during operation to treat the rock and recover the gold. These chemicals had spread across the site and the adjacent land because they did not have management measures in place.

Site Clean-up and Remediation Planning

In 2002 to 2005, as CIRNAC began to plan full-scale remediation, immediate priorities had to be addressed. Water was pumped out of Tailings Lake that was ready to overflow and pumped into an open pit, which gave opportunity for CIRNAC to treat the water in the tailings and the pit, and to rebuild the dam that had caused the original failure. Andrew highlighted that CIRNAC undertook other small aspects of remediation work, including the treatment of the dust, oily water, and other accumulations of materials around the mill and petroleum storage.

Partnership with the Tłı̨chǫ Government

Andrew continued his presentation, describing how CIRNAC partnered with the Tłı̨chǫ government very early on in the remediation process. To foster the partnership, site visits were conducted throughout all times of the year for the Elders to see the progress of the work being done on-site. When the Remedial Action Plan was being developed, CIRNAC put together options for moving forward with remediation and invited the Tłı̨chǫ community members to various meetings to discuss and share feedback. Andrew highlighted that much of the feedback given from the Elders became an integral part to successful completion of the remediation project because of their vast knowledge of the area, the wildlife, and the needs of the Tłı̨chǫ people for generations to come. Following initial engagement, CIRNAC received the water licence and land use permit needed to move into full-scale remediation.

Figure 2: A site tour of the Colomac Mine being conducted with Tłı̨chǫ Elders.

Tłı̨chǫ-Guided Caribou Management Project

As the presentation continued, George outlined the three main remediation measures the Tłı̨chǫ Elders wanted to see done to protect the caribou on the Colomac site, including:

1. An alternate caribou pathway to make it safe for caribou travel around the waste rock pile
2. The creation of cliff boulders to make it safe for the caribou to recognize the boulders and avoid the risk of falling off of the cliff
3. A fence built around the Tailings Lake area so that the caribou would not drink the contaminated water

The Tłı̨chǫ people led a project to protect the caribou from the contaminated water of Tailings Lake and built the fence surrounding the area. George explained how he and a team of Tłı̨chǫ community members also created a caribou pathway around Steeves Lake to encourage the caribou to migrate around the waste rock.

Figure 3: The Tłı̨chǫ-Guided Caribou Management Team developing the fence to protect caribou from contamination.

Andrew highlighted that the Tłı̨chǫ Elders contributed a most valuable piece of Traditional Knowledge with respect to the work being done to protect the caribou from harm associated with climbing up and being trapped in the waste rock. Andrew also recalled that the Government of Canada's initial proposal was to develop a large berm around the site and regrade the waste rock. After some discussion with the Tłı̨chǫ Elders, they suggested placing blockages on the roads ahead of the waste rock to prevent the caribou from climbing it. The Government of Canada was able to create Texas Gates instead of doing a large-scale movement and berm development, which saved millions of dollars thanks to the knowledge shared by the Tłı̨chǫ Elders.

Fish Health in the Surrounding Colomac Lakes

One of the greatest concerns of the Tłı̨chǫ was with the lakes and waterways that surrounded the Colomac site and the effects of the chemicals on the fish within the lakes. CIRNAC sent biologists to test the water quality and fish health through tissue testing, who verified that the fish all appeared to be healthy. Andrew reflected on how this was great news, however, CIRNAC believed that there was a better way to verify this information in a way that the Tłı̨chǫ would be more accepting of.

CIRNAC invited the Tłı̨chǫ to host a fish tasting and palatability site tour, where the Elders went into the lakes to fish, specifically in Steeves Lake and Baton Lake which were at risk of most contamination, brought the fish back to shore and held a fish fry with the youth. The Tłı̨chǫ reported that the fish looked healthy when they were fileted and tasted good. This method allowed the Tłı̨chǫ to see on their own accord that the fish were healthy and confirmed what the scientists' results had shown.

Figure 4: Tłı̨chǫ Elders and youth conducting the fish tasting and palatability test on the Colomac Mine site.

Capacity Building for the Tłı̨chǫ People

Throughout the closure and remediation process, one of CIRNAC's main objectives was capacity building. Andrew highlighted that throughout the project there was an on-the-job training and mentorship program to advance the understanding of Tłı̨chǫ citizens with respect to abilities that would be useful in the North, such as heavy equipment operations, truck driving, construction, and environmental mentorship.

Another cause for concern at Colomac was the health and safety of all of its workers. Throughout the remediation project, health and safety training was given and included a general health and safety training for all employees, WHMIS training, HazMat training, and all other health and safety training, as required.

Capacity building programs were also offered to the Tłı̨chǫ youth through science camps to expand their understanding and knowledge of science and the work being done in the mines. The science camps introduced youth to different science topics and environmental mentorship. Andrew highlighted that CIRNAC also brought environmental stewardship presentations to the schools in the Tłı̨chǫ region to try and build interest in the youth to follow a path in science that they could then expand upon and bring back to the Tłı̨chǫ community.

Figure 5: Tłı̨chǫ youth participating in the science camps offered on the Colomac site.

All of the training and mentorship programs were held in collaboration with the Tłı̨chǫ government to build capacity within the Tłı̨chǫ government and its citizens.

Colomac Remediation Project Completion

Andrew and George spoke to the end of the Colomac remediation project and how a monument was erected at the mine site. The monument has three sides: one for describing the site before development, one describing the mine operation, and one describing the site remediation and closure that occurred – all in English, French, and Tłı̨chǫ. A ceremony was held to commemorate the placement of the monument and celebrate the closure of the Colomac site. All of the people that worked at the Colomac site received plaques commemorating their contribution to the clean-up of the site.

Figure 6: Tłı̨chǫ Elders commemorating the completion of the Colomac Mine remediation project alongside the site monument.

Over the last 10 years since the closure of the Colomac site, CIRNAC has been performing post-closure monitoring. Five years after closure, there was work needed to clean up monitoring wells that were installed to clean the petroleum spills and repair the berms put in place prevent the caribou from climbing the waste rock. Two-week long training programs were implemented for the Tłı̨chǫ people to teach environmental remediation techniques and small equipment training. Small camps were constructed for participants to stay on-site when the program ended, and each were awarded a certificate for completing the program.

Andrew concluded the presentation by sharing with the audience that on-the-job training has remained on-site with job shadowing to continue to involve the Tłı̨chǫ people. All of the results to date have indicated that remediation of the Colomac site continues to be successful as planned.

Question and Answer with Andrew Richardson and George Lafferty

The following questions were posed to Andrew and George:

- There is real interest around the discussion of the caribou and the fence protecting them from drinking the contaminated lake water. Is the fence still in place around Tailings Lake?
  The fence was only in place for about four to five years and was brought down in 2009 because we (CIRNAC) were able to successfully treat the water of Tailings Lake to the quality that it was able to be discharged naturally into the environment. The tailings that were also a dangerous attraction for the caribou were capped with a layer of clean rock, which permitted safe passage for the caribou.

- Can you elaborate on your comment about "*validating what the scientists said*" when speaking of the fish tasting and palatability test?

Before we ran the fish palatability test, we wanted to ensure that the fish were healthy. We had the biologists go out into the surrounding lakes, primarily Steeves Lake, which was of most concern, and conduct various tests on the fish to get a baseline of their health. From the tests, the biologists stated no apparent effect on the fish in the lake. To gain acceptance from the Tłı̨chǫ community, we invited them to perform their own method of testing, which was the fish tasting and palatability test. The test drew the same conclusion of the fish health and confirmed what the scientists had reported.

- A number of people have indicated their interest in training as it involves youth. Can you elaborate further on the youth training and where the capacity funding came from?

  Contribution agreements were used to fund many of the programs. Each year had a different funding amount, and the capacity building was turned into different programs each year in order to provide many different opportunities for the Tłı̨chǫ people.

- Was the hydrocarbon contamination managed on site with in-situ treatment or were the hydrocarbons removed off-site?

  Almost all of the hydrocarbon contamination removal was done on-site. The biggest issues were with the large areas at the shoreline of Steeves Lake where the sediments were heavily impacted with hydrocarbons. There was a lot of free product in the bedrock immediately below the tank firm, which was spreading parallel with the lake. Due to the manner in which the cracks and folds were in the bedrock in the area, the hydrocarbons were going towards the camp and the mill, not straight into the lake. If you go to Colomac today and go to some of the wells that are still present, you can still pull product up out of the ground, however, the product is no longer moving since it has no place to go. We brought in a vacuum unit to remove as much of the hydrocarbon out of the rock as possible. The soil that was impacted with hydrocarbon was treated on-site through a landfarming process to be treated down to acceptable concentrations. The greenest part of the Colomac site today is the former hydrocarbon-impacted soil.

- How thick was the rock cover on the tailings to provide safe passage for the caribou?

  The clean rock cover was one metre thick.

- Colomac was 20 years ago, and processes have changed, but how was the closure planned? Was it Canada approaching the Tłı̨chǫ with ideas for confirmation, or was the process a true co-management process?

  The project development was a combined effort from all parties – from the Government of Canada and the Tłı̨chǫ people. The approach at the time was ad hoc, as it was done on an item-by-item basis rather than attempting to use a global closure criteria. It comes down to the question: *what is closure?* There is a dam on-site at Colomac, which requires a water licence. You will have to hold on to that water licence for as long as you have the dam on-site, therefore there is no walk away from the Colomac site. If there is never a walkaway, what do you mean by closure?

Due to time constraints, Andrew and George were unable to answer all of the questions that were posed to them live. Andrew provided written answers for the remainder of the outstanding questions, which can be found in Appendix C.

Colomac Mine Site: Participant Engagement

Following Andrew and George's presentation on the closure and reclamation of the Colomac mine site, participants were invited to answer a few questions to encourage engagement.

First, participants were invited to **share one abandoned mine that they know of**, where the results were shown as a Word Cloud to demonstrate the most popular answers by font size. Some of the answers included:

- Colomac mine
- Giant mine
- Pine Point mine
- Tundra mine
- Rayrock mine

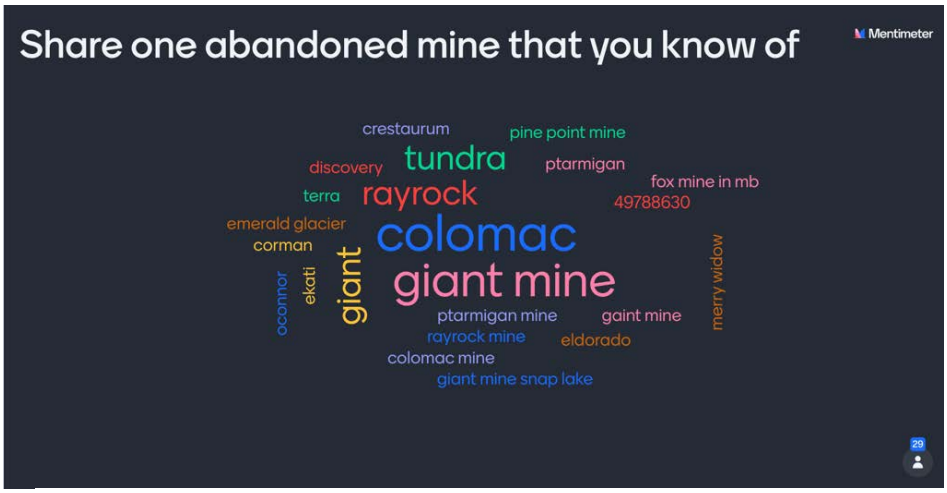


Figure 7: A snapshot of the Word Cloud generated from participants sharing one abandoned mine that they know of.

Next, participants were invited to **share one lesson that could be learned from the Colomac mine site and be applied elsewhere.** Some of the answers included:

- "Collaboration is the best way forward."
- "Start engagement early in the process, even before operation begins."
- "Validation of Western science with Indigenous understanding and engagement with Elders is a key community engagement strategy."
- "Education of locals and youth to assist with the monitoring and reclamation is extremely valuable."
- "Interacting with the communities to utilize Traditional Knowledge when developing remedial options can help save resources."
- "It is key to pass on results of engagement so that newly operating mines can get an advanced start on the closure planning process."
- "The importance of balancing engagement and consultation with addressing imminent environmental threats."
- "Progressive reclamation is extremely helpful."
- "Relationship building with the Indigenous people affected by the mine is critical."

To view all answers collected during engagement, see Appendix D.

Morning Break Video: Kòk'etì: Walking with Caribou

During the break on Day 1, a film was played for participants. *Kǫ̀k'etì: Walking with Caribou* is a film developed by the Tłı̨chǫ Government in collaboration with Trail Films, which focuses on the Tłı̨chǫ people's relationship with the Bathurst caribou that migrate across their traditional territory, and has been a source of food, clothing, and cultural identity since time immemorial. The video was shown in its entirety over the course of the two days' breaks. The film can be accessed on the Tłı̨chǫ Government website.

Presentations on Considerations for Closure and Reclamation

Following the morning break, three speakers representing various co-management boards and government departments involved in the closure and reclamation process in the Mackenzie Valley presented to introduce general closure considerations and dove deeper into specific closure and reclamation topics, including progressive reclamation and mine security deposits. Access to the slide decks of these presentations can be found on the WLWB website.

Catherine Fairbairn
Environmental Officer, Mackenzie Valley Environmental Impact Review Board

Meghan Schnurr,
Senior Technical Advisor, Wek'èezhìi Land and Water Board

Lorraine Seale
Director, Securities and Project Assessment, GNWT Department of Lands

Considering Closure During Environmental Assessment

Catherine Fairbairn, Environmental Officer, Mackenzie Valley Environmental Impact Review Board (MVEIRB)

Catherine started by outlining that the Mackenzie Valley Environmental Impact Review Board (MVEIRB) is responsible for the environmental assessments (EAs) in the five regions of the Mackenzie Valley. EAs are conducted for projects that are either more likely to cause significant adverse impacts or are a source of public concern. MVEIRB is able to determine what aspects are considered as part of the EA, which is where closure is considered, as a responsibility delegated to MVEIRB through the MVRMA.

There are three guiding principles that MVEIRB must consider when determining which elements of closure will be factored into the EA, including:

1. The protection of the environment from significant adverse impacts.

2. The protection of the social, cultural, and economic well-being of residents and communities.
3. The importance of conservation to the well-being and way of life of Indigenous peoples.

The NWT has a long history of poorly closed mine sites; many of which were closed before the MVRMA was in place, so there are many lessons that can be learned from the mistakes of the past. Three mine sites with lasting contamination include:

- Giant Mine: This mine is located right outside of Yellowknife with extensive arsenic contamination that has killed at least one small child in the 1950s and caused various other significant illnesses over time.
- Rayrock Mine: While this mine has a small physical footprint, it has had a widespread area of effect, such that now Tłı̨chǫ people avoid this area. Elders have stated that they do not go into the exclusion zone around the site even though it was only in operation for two years.
- Pine Point: This mine is now being rejuvenated, but the original mine was not properly remediated and has left long-lasting scars on the landscape from various pits and roads used in operation.

Catherine used these three sites to emphasize the importance of adequately considering closure well in advance of the development of the project to help lead to better closure and remediation results. She highlighted a few of the major challenges in assessing closure within EAs. The challenges Catherine noted include:

- Closure is a long way off when EAs are conducted ahead of construction, so it becomes difficult to predict impacts.
- Future conditions are unknown, especially with climate change at play. It is difficult to understand what the landscape will look like in 15 to 30 years when mines will be ready for closure.
- The projects themselves can change over time, resulting in expansions or amendments that can alter the impacts significantly.
- Technology can become more efficient and MVEIRB does not want to limit technologies and future options for the developer unnecessarily.
- Some projects do not have a closure period (i.e., a road). Some projects are meant to operate forever, so developer responsibilities need to be considered in various ways.

Catherine spoke to a possible solution for these challenges – for example a development certificate, which is a proposal that is not in place yet but eventually will give MVEIRB the ability to go back and revisit some of its measures over time based on subsequent changes.

MVEIRB assesses closure at a high level, in comparison to the government and the Land and Water Boards (LWBs). The MVEIRB considers evidence from the developer (i.e., conceptual closure and reclamation plans) and evidence from parties, such as Indigenous groups and governments, about impacts that may happen and mitigation that is required during closure. The main focus from their perspective is on the lasting well-being of people, maintaining the way of life of Indigenous peoples, sustaining communities and landscapes, and protecting the environment.

Catherine also highlighted some of the critical questions MVEIRB always asks when conducting an EA, including:

- Where should waste rock or waste products be stored?

- What will the site look like up close and from a distance?
- How will the site be used after closure?
- Will the site require long-term (perpetual) care of infrastructure?
- What is the role of local stewardship and monitoring into the future?

Many of the above questions are difficult to answer so far in advance of closure, which has caused some closure scenarios to go back into the EA phase in order to specifically focus on a closure plan.

Catherine outlined two closure case studies to highlight lessons learned and key takeaways.

- She spotlighted Giant Mine again due to the trauma and anxiety that stemmed from this project and the lack of knowledge in respect to its widespread arsenic contamination. After the owning company declared bankruptcy and the mine fell into federal care, closure and remediation of the project went to MVEIRB for environmental impact assessment which allowed MVEIRB to concentrate on the best options to close the site and remediate it for future use. This consideration led to the Health Effects Monitoring Program to be used as an oversight body to ensure the site is remediated in a way that community members can trust.

- Next, Catherine spoke about the processed kimberlite storage at Diavik Diamond Mine. Diavik is currently an active mine moving towards closure, but through operation they have been running out of room for some of the tailings at their tailing management facility, despite having raised the dam several times. Diavik has considered storing some of the processed kimberlite into pits they have already dug on-site, rather than raising the dam once again. This solves the problem of storage but raises other environmental concerns; including how people will use the area again because the dykes around the pits will be breached at closure and the pits would be reconnected to the surrounding lake. Diavik required an EA, so MVEIRB was able to focus on the specific environmental and social impacts the two alternatives would cause. Catherine noted that MVEIRB invited input from the local people to understand if community members would stop using the area. MVEIRB focused their efforts on specific water quality objectives, Traditional Knowledge, modeling and more community engagement to start to identify the best alternative.

Catherine concluded her presentation by speaking about the key takeaways that can be carried forward from the lessons learned from these case studies to improve assessing impacts of closure better in the future. The key takeaways include:

Talk about what acceptable closure looks like

Support the LWBs by helping to identify closure goals and objectives

Analyze alternatives and complete the risk assessment

Be clear about what the permanent features of closure will be

Carefully consider social and cultural impacts

Expectations for Closure and Reclamation Planning

Meghan Schnurr, Senior Technical Advisor, Wek'èezhìi Land and Water Board (WLWB)

Meghan began her presentation by mentioning the voiceover video on the history of closure and reclamation in the Mackenzie Valley that was sent to participants ahead of the workshop and can be found on the WLWB website.

She opened her remarks by explaining that "Closure and Reclamation" are the processes and activities that are actioned to return an area to an acceptable environment after a project is complete. Historically, major projects have resulted in numerous abandoned project sites throughout the North and have created major environmental liabilities, such as Colomac and Giant Mine. Many of the sites were abandoned by the operator and closure has fallen to the Government of Canada with the financial burden left to taxpayers. In recent decades, improvements to closure and reclamation planning have been made because of advancements in scientific knowledge and incorporation of Traditional Knowledge. Meghan highlighted that as multiple diamond mines are getting close to closure in the Mackenzie Valley, closure planning is a very important and pertinent topic for the LWBs and for northerners more broadly.

The LWBs are responsible for the regulation of water use and deposit of waste. By law, both MVEIRB and the LWBs play a key role in ensuring modern closure and reclamation planning standards are upheld. Plans for closure are discussed with the initial project application and an increasing level of detail is required through the life of a project. The LWBs issue licences and permits with legally binding conditions as they relate to closure planning. Within the Mackenzie Valley, policy and guidelines outline the expectations for closure planning and speak to the fact that closure planning should be flexible and allow for adjustments as the life of the project advances. Recently, the LWBs and the Government of the Northwest Territories (GNWT) jointly updated the closure cost estimating guidelines, which describe the expectations when estimating the cost to clean up a site if it were to be abandoned. This cost is then required to be posted with the government and is commonly referred to as security; the amount is determined by the LWBs. Although all types of projects require closure activities, these guidelines currently apply to mining and advanced mineral exploration and Meghan explained that her presentation was meant to focus on the closure of major projects that would trigger the need for a water licence.

Meghan outlined that closure guidelines describe that all projects should be designed so that closure aims to achieve the same minimum standard or goal – to return the mine site and affected areas to viable, and where practicable, self-sustaining eco-systems that are compatible with a healthy environment and with human activities. This standard minimum goal is supported by four cluster principles, which are:

- Physical stability – closure and reclamation will not be successful in the long-term unless all physical structures are designed such that they do not pose a hazard to human, wildlife, aquatic life, or environmental health and safety.
- Chemical stability – chemical constituents released from the project components should not endanger human, wildlife, or environmental health and safety.
- Future use – the land should be safe for future use; the closure plan must align with future use plans.

- No long-term active care – all practical efforts to ensure that any project component that remains after closure does not require long-term active care and maintenance.

In conjunction with the cluster principles, the company must develop closure objectives to describe what the closure activities are aiming to achieve and typically specific to a given project component (i.e., air quality levels are safe for people, vegetation, aquatic life, and wildlife.) Once the objectives are established, the company can then consider what closure activities should be completed to fulfill these objectives and identify various options to achieve closure. Once a closure activity is selected and approved by the LWBs, the proponent can then begin the final engineering and design phases for closure. After the closure activity is completed, the LWB assesses the activity using closure criteria to measure the success of selected closure activities in meeting the established closure objectives. After the assessment, the security may be returned to the proponent in part or in whole. Throughout the entirety of the process, the LWBs require a public process where the Board will seek input from all parties before making a decision.

Meghan continued by highlighting that the LWBs always encourage progressive reclamation, which are the closure and reclamation activities that are conducted during the operating phase of the project, wherever possible. She outlined several benefits of progressive reclamation, including:

- Advantages of cost and operating efficiencies;
- Opportunities for learning;
- Shortens the timeframe for achieving the closure objective post-closure; and
- Opportunity to reduce the site liability/security if closure is demonstrated to be completed.

Companies are required to post a financial deposit with the government before starting a project to ensure that the operator bears the cost of closure. The Boards and the GNWT have guidance documents and standardized tools to estimate the costs of closure and assume that a third-party company will complete all of the work. It includes the consideration of northern factors, such as winter roads and associated regulatory costs. The Boards have the ability to increase or decrease security throughout the life of a project if sufficient evidence shows that the total liability has changed. This can happen if there are changes to the project itself or to the closure plan and associated closure activities. Planning for any changes to security require a public process and an opportunity for all parties to be heard before the Board makes a decision.

Meghan concluded her presentation by stating the importance of engagement in the closure planning process and the importance and benefits of starting and continuing important conversations early in a project, regardless of its project life.

Reclamation Securities Management: Overview

Lorraine Seale, Director, Securities and Project Assessment, GNWT Department of Lands

Lorraine provided MVRMA context, outlining that the MVRMA is an integrated and coordinated system where several components work together to consider many factors to make good resource management decisions, regardless of ownership and jurisdiction. There are many opportunities for Indigenous government, community members, and others to participate in closure planning and security determination. Along with the co-management boards, the GNWT is a partner in the MVRMA system and participates actively in the processes.

Lorraine reiterated that a security deposit is the funds held by the appropriate authority, whether that be the GNWT, the federal government, or another landowner, that can be used if a project is later abandoned, in order to maintain and reclaim the site. In the Mackenzie Valley, the securities can be held under the land use permits or the water licences, which is the most common, or under land leases or environmental agreements. Lorraine noted that although the presentation generally references large and complex mining projects, securities are set and held for a wide range of land and water uses, including small projects.

For land use permits and water licences, the applicable LWB determines the security amount, using the RECLAIM cost estimator tool, after seeking input from the proponent and reviewers. There is often discussion around different elements of the estimate and sometimes a public hearing is held before the Board assesses all of the evidence and makes a decision on the security amount.

Once the Board has set the amount of security to be held by the GNWT, they are to make the decision about what form of security is acceptable – typically cash or irrevocable letters of credit (ILOCs), similar to a certified cheque from the bank. There are other forms of security that can be considered on a case-by-case basis, granted it meets the same required criteria.

As of June 1, 2022 the GNWT holds approximately $738 million in reclamation security. For some larger projects, there is extra security held under instruments other than the land use permit or water licence.

Lorraine echoed that security amounts can change or be returned due to new development or changes to development and refinements in associated closure costs. Following progressive reclamation or the final closure of a site, the security can be returned to the proponent of a site. Before return of the security, a LWB review process must occur allowing for public engagement and input from Indigenous governments.

The GNWT will continue to participate in regular updates to Board guidelines and other policy tools. The GNWT is also continuing to develop their legislation, regulations, and policies that are relevant to closure and securities, all within the context of the integrated and coordinated MVRMA system.

Question and Answer for the Considerations of Closure and Reclamation Speakers

Participants were invited to pose questions via the Q&A or chat functions to the presenters. The questions posed for the three presenters include:

- Catherine, does MVEIRB attach conditions to the environmental assessments?
  If MVEIRB determines that there may be significant adverse impacts, we can include the requirement for the developer to take certain measures, and then the LWBs take those measures and turn them into conditions in the water licence. MVEIRB does not write conditions per se, but they are added by the LWBs to become legally binding measures and are written in law in the water licence/land use permit, as well.

- Meghan, how do you see Traditional Knowledge informing decision-makers, monitors, and regulators now and in the future?
  I believe that it is important to consider Traditional Knowledge throughout the closure planning process. We have seen Traditional Knowledge groups formed through closure planning. With the hope of informing closure planning that comes to the Boards, we have seen some specific examples. At the Diavik site, culturally used criteria are under development, such that we would be evaluating water quality not only based on scientific knowledge, but also based on different Traditional Knowledge requirements that have been heard from different parties. I think Traditional Knowledge has to be viewed in a holistic way and incorporated into the closure plan.

- Meghan, what is the definition of clean rock?
  The expression was meant to be a very high-level example and I do not believe there is an exact definition of clean rock. In this example, it meant that the rock was not potentially acid-generating or meta-leaching. This is something that is evaluated through each process as the evidence and geochemical characterization comes in.

- What portion of mines closed in the last 20 years were closed successfully by the operator and what portion of mines closed in the last 20 years became the responsibility of the government with costs covered by the taxpayers?
  To our knowledge, no mine has successfully transitioned from operations to closure. There are many legacy sites, such as Colomac, Rayrock, Giant; one mine currently in temporary closure; and two operating mines that have completed progressive reclamation – one of which is Diavik, which is moving towards the end of operations in 2025.

- Meghan, do the security deposits include costs for post-closure objectives, such as long-term monitoring and are the security deposits re-visited should they turn out to be insufficient to cover the actual closure cost?

  Closure costs are meant to include the costs of post-closure monitoring and maintenance for a site and those are all based on the best estimation at the time, so with any changes to the closure plan those costs are re-evaluated. If there was any indication that those costs needed to be updated to reflect aspects such as a longer duration of monitoring or higher frequency, costs could be adjusted at any stage of the project.

- What are some of the tools we have available in the NWT to encourage reclamation beyond relying on security return?

  Meghan: The financial incentive of the return of security is the most significant mechanism we have at hand. Some of the other benefits that can really help encourage reclamation include the public's view of a site and the lessons that can be learned from cross-progressive reclamation (i.e. doing the work early can provide real time data of what is happening on site). Progressive reclamation can also be an opportunity to evaluate costs of closure and reclamation, as it is often cheaper for an operator to start the work while they have the equipment and personnel already on site.

  Lorraine: I agree that the financial incentive is certainly important, and the learnings done gained while in operation. I'd also like to add that the progressive reclamation is often a continuing theme in the development of the closure plan, and it may be an element of the agreements that a proponent has developed with Indigenous governments and communities. It helps everyone move forward together towards good closure of a site.

- Meghan, can you provide an example of when an assumption is used, and how often assumptions are used?

  The assumptions do vary throughout the life of a project. When you are looking at a conceptual closure reclamation plan, there are a lot of assumptions in that the project has not been fully designed and constructed, so the project makes certain assumptions based on the information as to how they believe the site will look post-closure. The idea is that the increasing level of detail throughout the planning process will reduce the number of assumptions, as we learn more about what the project will actually look like at the end of operation and how that will influence the post-closure environment.

- Meghan, the price of fuel is significantly higher now than when the security deposits' cost assessments would have been calculated and set. Will the amounts of these deposits be revisited or adjusted?

  In the tool used to estimate the security costs, there is a unit cost which estimates what the actual cost to do a specific activity will be. When it relates to fuel, there are often standardized costs that are included in the RECLAIM tool itself. The tool is updated to reflect what the current day costs would be. There is also always opportunity to suggest that any given cost must be increased or decreased at a certain time, if there is sufficient evidence to indicate that decision. Inflation is often incorporated into the closure cost estimate.

The intent of the RECLAIM tool is that it is updated throughout the life of the project to ensure that costs reflect those total liabilities on-site.

- Meghan, in what phase of the project or development are security deposits collected? Are they collected all in one payment or in different increments?

  Security is required before a project is to start. The policy speaks states that the security needs to reflect the total liability at the site at a given time. For larger projects that may have several stages of development, they have phased increments for paying that security as construction milestones progress and new liabilities are created.

- Lorraine, what is the GNWT's advice for when citizens in the NWT are seeking binding conditions on concerns that the LWBs do not address, such as wildlife, food security, and community impacts and wellness?

  I would suggest looking for projects that are regulated by the LWBs because they are required to have engagement plans, which does include the requirement to engage with the public and Indigenous governments who can raise concerns about particular changes people would like to see. I would recommend using the tools of the democratic process to express concerns to public governments about the changes you would like to see.

- Lorraine, should securities for the existing operating mines be reconsidered or updated in light of the Reimagining Closure conversation and dialogue? Are there any implications of that conversation and process for how the various parties are going to look at the closure cost estimate and how they are applied?

  I have not been directly involved in the Reimagining Closure process, but I have reviewed the reports. To my knowledge, there has not been any specific discussion to date of changing securities as a result of Reimagining Closure. Securities are legally binding processes under the LWBs authorities to set security based on the current approved closure and reclamation plan. Any proponent that may come forward with a change to their plan as a result of the Reimagining Closure plan would still need to go through public engagement and assessment of the evidence by the LWBs.

- Meghan, is carbon emission from a project operation considered during security cost estimation?

  To my knowledge, it is not currently included. It only reflects specific project activities and what the specific costs of those activities would be.

Day 1 Closing Reflections

Before ending the first day of the workshop, participants were invited to use a virtual engagement tool to **share one key takeaway from the day's session.** Some of the answers include:

- "Closure is the most important part of a project."
- "Community engagement needs to be multi-faceted."
- "Collaboration is incredibly important."
- "Have conversations about closure early, have them often, and have them in respectful ways so that we can work together in a good way."
- "Despite legacy sites, there are examples of positive work on closure planning."
- "Progressive reclamation is an important part of closure."

To view all answers collected during engagement, see Appendix D.

Synopsis of Day 2 (June 9, 2022)

The second day of the virtual workshop was held on June 9, 2022 focusing on the importance of Traditional Knowledge in closure planning and current closure and reclamation initiatives in the Mackenzie Valley.

As a warm-up to the second day of the workshop, participants were invited to share **one thing that caught their interest from the previous day's discussion.** Some answers expressed by the participants include:

- "Youth science camps and other training programs."
- "Ensuring that we talk together early on about what our expected outcomes and goals for a mine area will be after closure is vital."
- "The braiding together of Western science and Indigenous knowledge at Colomac."
- "Early and frequent engagement is the key to project success."
- "Collaboration with all interested parties."
- "There is a lot of collective knowledge in the NWT."

Armchair Discussion: Traditional Knowledge in Closure Planning

Michael van Aanhout of Stratos moderated an armchair discussion with representatives from various personal experiences in the Mackenzie Valley to speak on the importance of Traditional Knowledge in closure and reclamation planning. Ms. Rosy Bjornson, Dr. John B. Zoe, and Dr. April Hayward participated in an interactive roundtable of questions to share their experience with Traditional Knowledge in closure planning and to provide advice to participants to improve the ways Traditional Knowledge could be better used in the closure and reclamation process. Following the questions posed by Michael, participants were invited to pose questions to the panelists using the Q&A and chat functions. As time permitted, the below questions were asked of the panelists.

Ms. Rosy Bjornson
Environment Manager,
Ni Hadi Xa

Dr. John B. Zoe
Senior Advisor,
Tłı̨chǫ Government

Dr. April Hayward
Chief Sustainability Officer,
Mountain Province
Diamonds Inc.

Please share with us your lived experience of mine closures and reclamation. What did you observe or feel?

Rosy:

I grew up here in the NWT. I have lived in Fort Resolution for my entire life, which is next to Pine Point – a lead and zinc mine in operation from the 1960s to the late 1980s. In the first 10 years of my life, Pine Point was a big thing for us in our community because we had the opportunity to leave our small town with dirt roads and drive 30 minutes into a community with paved streets, arcades, gas stations, and grocery stores with such a diversity of people.

All of a sudden in the late 1980s, a lot of people started to move home and many young families came back from Pine Point, however, there was not any housing available for them in our community. They had to adjust back into their traditional lifestyle since transitioning from the bigger, urban center. The government stepped in and built a few houses for them, but I remember that we didn't have much of an economy, so the young people had to try and get a job at the local sawmill.

The Elders always said that Pine Point was rejuvenating itself, which I have seen over my lifetime. There was a big fire outside the town, in Hay River, so it already looked like nothing was there. Now when you drive by there, you still see those rocks, but they are slowly becoming covered in vegetation.

Some beneficial aspects came out of the mine closure, such as the roads that people can use when they go hunting, and the animals are starting to come back. Had the mine stayed in operation, we would have gone to Pine Point for school rather than Hay River. When we would drive to school and pass Pine Point, the water levels in the nearby creek were so low due to the high-water usage at the mine. Now the creek has high water levels and the fish are flowing through – I can see the changes of the land happening over time.

I think a lot of our youth would have had a better chance at careers if Pine Point never closed, but there are other opportunities available in the North and other mining areas. Our Elders have been miners for the past 100 years and have been involved in prospecting, staking and mine development, and now today we are involved in the stewardship of mining. We have come a long way with respect to the industry and in collaboration with the government and First Nations.

"Our Elders have been miners for the past 100 years and have been involved in prospecting, staking, and mine development, and now today, we are involved in the stewardship of mining. We have come a long way with respect to the industry..."
- Rosy Bjornson

John B.:

My experience comes from a collective knowledge going back to the earlier impacts when land was transferred away from us without our knowledge, and eventually transferred back to Canada when it came into Confederation. With mining, it started with the treaties when they gave the right to do explorations – that is where our beginnings

start because we were already without power. All that we could do was observe. People began logging our landscape. They logged where the early cat train trails were made, where the exploration sites were happening, and we also observed how they were recruiting undocumented labour for foraging, hunting, fishing, etc.

We would have to avoid these exploration sites because they have big holes in the ground, and take measures to not eat anything in that area, even though the traditional hunting trail still went through the area. A lot of the activity going on at the time involved the undocumented usage of people for that exploration, so one of the things that we have been doing with early mining was trying to document a lot of these experiences.

April:

Most of my experience with closure and reclamation is through my career. Although I do come from a family who lived in an area that was part of a hydroelectric dam community, and later, as the plant became more mechanized, the community was shut down and all of the houses in that community no longer exist.

Largely my experience is on the industry side through working on several projects in the North, specifically at the Ekati Diamond Mine, and now with Mountain Province Diamonds Inc., which owns 49% of the Gacho Kué Diamond Mine. Mount Province has some exploration projects in the area and is trying to work together with community members, government, Indigenous organization, and co-management boards to ensure we get on the right track for closure and reclamation over the long-term.

> *"The longer I work in this field, the more I realize that getting together and talking about what the long-term vision is for a given site is so important. A lot of what happens on the land with mining begins in the construction phase, so it is critical to have the important conversations early so that we don't run into situations that we have in the past…"*
> *- Dr. April Hayward*

The longer I work in this field, the more I realize that getting together and talking about what the long-term vision is for a given site is so important. A lot of what happens on the land with mining begins in the construction phase, so it is critical to have the important conversations early so that we do not run into situations that we have in the past, as outlined through Rosy and John B.'s stories.

There are a lot of examples of how closure has been done really poorly in the past and I think a lot of companies are now paying more attention to not just what the environmental impacts are, but also thinking about what the socio-economic impacts might be and having conversations with communities to mitigate those risks. I believe things are changing really quickly and, in my experience, the conversations are starting to sound a lot different than they have in the past, in a much more meaningful way.

How have you seen Traditional / local / Indigenous knowledge being considered in any step of the closure process?

Rosy:

When I was working with the Deninu Kue Nation in Fort Resolution as the Interim Measures Agreement Coordinator, one of my roles was to work with CIRNAC with respect to the Great Slave Lake Remediation Project. I would come into Fort Resolution, and CIRNAC would have meetings with selected Elders from nearby communities, and we would sit and discuss all of the historical mines being reclaimed. The Elders would chat about what they wanted to see done in regard to closing and capping off the various boreholes and covering up hills of leftover rock. The Elders would also be taken on mine visits and involve the youth through job shadowing and revegetation work. This would give the Elders opportunity to share stories with the youth about hunting, fishing and trapping in the area.

CIRNAC would bring everyone together in meetings to discuss different objectives that they would like to set forth and then would present optional conceptual plans to review with the Elders. They would provide maps to encourage the Elders to share their stories and Traditional Knowledge from their experiences as miners.

> *"We've come a long way in the process, however, we're still trying to get people to understand that it is the land of the people; not theirs to own, but theirs to take care of. Listening to the Elders and ensuring their voices are heard is crucial because they are the ones that walk the land, yet don't leave a footprint."*
> *- Rosy Bjornson*

Over your lifetime, you'll be stuck in a dilemma in your job and you think you have it tough, but then you remember all of the stories of Elders who have lived through very difficult circumstances, and you will recall what they did to overcome those challenges. Our lives are very simple now, and to sit in a room and discuss mining plans and processes means a lot. Previously these conversations were not happening.. We have come a long way in the process, however, we are still trying to get people to understand that it is the land of the people; not theirs to own, but theirs to take care of. Listening to the Elders and ensuring their voices are heard is crucial because they are the ones that walk the land, yet don't leave a footprint.

John B.:

Industry has been documenting most things from the get-go because it is their business and their objective is to ensure they have financing, and the best possible way to get a licence without all of the effort that is associated with it. It appears that the biggest effort goes into figuring out how to deal with Indigenous communities – and so far the only way that it has been dealt with is under the pressure of hearings.

We have a lot of information. We know when the early geological surveys are being done, we have place names to describe exactly where it happened, when it happened, how they were observed by the people in the bush at the time, and where all of the prospectors have prospected. We see their work, we see the old broken rifles still on the ground, we see the fireplaces and the abandoned exploration sites, and we see the barrels still there with big

warning signs, “do not cross.” If they are in a hunting area, it is very difficult to avoid. There are winter roads that have been built over traditional portages because those were the safest places for the old cat trains to go.

So, we have lived experiences that we have documented, but when it comes to hearings, it is always under pressure and we have to rely on the Elders to try and have an impact. Sometimes they do not have the chance to fully convey their message because of the time constraints. We know that on the Western front, they now have 100 years of experience documented, and we now have 100 years of expressing these things over and over with our dwindling of knowledge every time an Elder passes. Every mining industry project should have the same length of time of operations in the collection of Traditional Knowledge in that area before, during, and after because the exploration of those lands has an impact on us. In the 1990s, we finally got employment only because of Impact and Benefit Agreements (IBAs) that allow for some restraint and measurement of how industry can keep a cap on how much we can be involved in mining.

“We know that on the Western front, they now have 100 years of experience of documentation, and we now have 100 years of expressing these things over and over with our dwindling of knowledge every time an Elder passes.”
- Dr. John B. Zoe

We need to ensure that the type of research that goes into the mining of resources is equal to how we collect our Traditional Knowledge. Mining does not stop and knowledge compounds over time. I have observed over time that we are always scrambling for Traditional Knowledge. I have to keep the knowledge in my head because there is no documentation about our engagement with mining. If we’re going to talk about mining, the tendency is to always talk about the impact of a certain thing that may have happened, but the long-term effects is something we have never looked at and that can only happen through research and investment. When we talk about investments into infrastructure, roads, or opening up more lands, we need to invest equally into the collection of Traditional Knowledge.

“When we talk about investments into infrastructure, roads, or opening up more lands, we need to invest equally into the collection of Traditional Knowledge.”
- Dr. John B. Zoe

April:

My experience has been very similar to Rosy's, and one of the things that I have noticed over time is that there has been a real evolution of how conversations happen around closure and reclamation. I think we still have a long way to go as a community of people who are living and working on the land, but I have seen things change in a positive way.

> *"…at the time there was a definitive separation between Western science and Traditional Knowledge in the [closure] planning process. We're starting to see now that there is a closing of the gap between what historically was thought to be very different ways of doing things and an acknowledgement that we all have the same goal in terms of understanding what the best practice is going forward."*
> *- Dr. April Hayward*

When I first started working in the North, about 10 years ago, everyone was really grappling with what the best process was for planning for closure and reclamation, and we still are, but at the time there was a definitive separation between Western science and Traditional Knowledge in the planning process. We are starting to see now that there is a closing of the gap between what historically was thought to be very different ways of doing things and an acknowledgement that we all have the same goal in terms of understanding what the best practice is going forward.

The best practice for planning involves understanding Western science measurements and the data that comes from it, but the reality is that there is such an important aspect of understanding how animals might move across the site or how vegetation might come naturally into a site that has been disturbed by mining. This information comes from talking to people who have lived on the land for their entire lives and the people who have connections to that knowledge through what has been passed down by their ancestors over time.

The nature of the conversation has changed in a good way, and continues to change with adjustments as we go forward in terms of understanding how best to work together to get the best outcome going forward in both environmental and socioeconomic aspects.

I appreciate John's point about the pressure of hearings. Having had the privilege to hear a number of Elders speak about their experience on the land, it is not something that can or should be rushed. Taking the time to have those conversations outside of the specific regulatory process and to be on the land with the Elders makes the information-sharing process such a powerful experience. Even if getting out on the land with the Elders is not possible, but as Rosy stated, sitting down with maps and having a conversation about the sorts of activities that have happened there and what the concerns going forward are great ways to establish a path forward. I have seen greater integration in terms of purpose and trying to find the right outcomes over time. I am excited to see where it goes from here because I think the conversations continue to evolve in a meaningful way.

What advice would you have to those in the audience here today to improve the ways that Traditional Knowledge could be better involved in project closure and reclamation work?

Rosy:

Personally, consistency is the top priority, especially when it comes to the LWBs, the Review Board, industry, government, and First Nation and Métis organizations. Being consistent in respect to your position when you are a First Nation and Métis organization is critical. You cannot ever change your position because it is your land and your title that you have lived on since time immemorial. When it comes to each application that comes across your desk, utilize the Elders' knowledge to ensure that you are getting the correct land uses in that area with the correct names and titles.

Consistency is one of the biggest things for me in my position as manager for Ni Hadi Xa. I would like to see more Indigenous-led oversight boards across the North, and Indigenous-led does not mean that the person sitting at the board of directors has to be Indigenous, but they are representing an Indigenous party as stewards of the land. Consistency is one of the biggest things when it comes to incorporating Traditional Knowledge because the Elders, the youth, and the land users are so knowledgeable.

I become frustrated when I see numerous new developments and the process is not kept consistent. There are different agreements being developed for each community, despite all of the processes having similar outcomes. The Elders still use the land and know there needs to be consistency of the Traditional Knowledge being incorporated, no matter the size of the development. It is hard to know what is going to happen at the exploration stage, but companies still know what they are mining for.

I really stress the importance of interviewing the Elders in-person in the communities with a map in hand. They will be able to share which way the water is flowing, when the fish will come, and what birds will fly overhead. Elders' knowledge is priceless, regardless of the billions of dollars you may extract from the land…the Elders' knowledge is more valuable because they were there long before the mine and will be there after it closes through their generations of children to follow.

"Elders' knowledge is priceless, regardless of the billions of dollars you may extract from the land…the Elders' knowledge is more valuable because they were there before the mine and will be there long after it closes through their generations of children to follow."
- Rosy Bjornson

All interested communities should be brought together to create one consistent IBA across the board. We are at a point where our voices are being heard a little bit more, but I still believe the process needs to be more consistent.

John B.:

I think training in the regulatory process is very important, specifically training in being sensitive and taking into consideration the fullness of Traditional Knowledge. With these new agreements, we set up regulatory regimes to have representation on public boards to make space for consideration of knowledge that was not taken into consideration before, and to be part of the implementation process.

There are still sites that exist where we know our ancestors went to break off rocks to make arrowheads and spear points and some of them are disturbed with prospecting. Only we can protect these sites and history, but we are not on the ground because we are in communities where our land is continually overtaken by the resources from the mining industry and turned into hunting camps and fishing lodges, and other activities that we don't participate in. If we do try to be involved, there are a lot of barriers to go through because it is very systemic. The systemic issue will not be solved overnight, even with regulatory changes. During that process, we need to continue these open dialogues.

I was involved in the early archaeological surveys where we went out with the Elders and they talked about the impact of Traditional Knowledge through early mining. The early mining that was happening was used to try and strengthen our knowledges, but the only way that we could be involved was through an impact benefit agreement (IBA). We have used those benefit agreements to introduce the youth to the landscape and the trails of our ancestors, which we have done since 1995, but we were struggling with financing up until we had an IBA. The IBA was needed to prepare people for the impact of mining and to learn about what they could do to help themselves. The small amount of funding was invested into the trails to sensitize the next generation about the landscape and how it was important in preparing them for acquiring Traditional Knowledge.

We need to look at how the United Nations Declaration for the Rights of Indigenous Peoples (UNDRIP) can be applied to exploration to look for the impacts of mining on the land, the people, the knowledge, the education, and the health – all things that derive from those benefits and are on the negative side. The systems of government that work in those areas are systemic and we need to ensure that those systems make some accommodations so that our communities are involved in the decision-making process.

We need to look at the Truth and Reconciliation Commission (TRC) Calls to Action and ask how they apply to mining. UNDRIP and the TRC are significant international declarations that have world order around it, so the Government of Canada has an obligation to listen. We must ask ourselves: How do we implement those commitments together? How do UNDRIP and the Calls to Action apply to the impact on our traditional way of life that we never had a say on before? We need to develop it together within our jurisdictions. We must use all of the tools available to ensure that the doors are open to using this knowledge in implementation so that we are not continually exploited.

April:

My advice is that the conversation needs to be open from the very early stages of the project. John raised a number of tools and frameworks that can be used to help shape and frame the conversation. Rosy was speaking of working together in a very direct way. Being able to work together on the land with Elders that are now retired to provide advice on closure and reclamation is extremely valuable because they have boots to the ground experience working on the day-to-day operations of the mine. The more closely we work together, the better the relationship will be for the integration of Western science and Traditional Knowledge.

The reality is that whenever there is development, there will be environmental and socio-economic impacts, so having conversations and working together very early helps to inform what the right balance is between the environmental and socio-economic impacts. I have seen big changes in how those conversations have happened with the tools that are available to discuss what the best approach and outcomes are. This will hopefully continue to change and be enriched over time; I have seen on the industry side that there is a lot of willingness to have much more in-depth con versations about the nature of the socioeconomic impacts and what makes sense for particular communities and individuals. I am quite certain that it will continue and propel us further in a better way as we move towards future closure and reclamation of nearby sites.

Question and Answer with the Armchair Discussion Panelists

Participants were invited to pose questions to the panelists, as noted below:

- Socioeconomic impacts can be devastating at closure, so these issues should be planned for in the same way we plan for environmental issues. How can we do this?
    - *John B.*: I think the narrative has to change because every year the Government of Canada makes an announcement, and it spills over to the GNWT and the provinces, talking about initiatives and investments into mining and resource development. When they talk about initiatives and investments and make arrangements with the local communities, Canada looks at it as welfare, rather than investment. That is the way it has always been, even though Indigenous people are working firsthand, we are looked at differently because we come from the tail end of that investment, rather than getting the recognition right up front as to how it should be mentioned. Those investments are just as valid as the ones that are receiving it, based on the treaties and output that we are building. We were here before Canada, and so the things that are systemic that we need to continue to work on by having tough conversations might have edges. We have been living on the edge for the last 100 years, and during this time we have just been trying to make sure that our voices are being heard.
    - *Rosy*: When it comes to socioeconomic impacts, they need to be considered as a priority, like the environment because we are part of the environment as a part of the food chain. Those are things that should be considered when the scoping sessions are occurring, and we are talking about closure.
    - *April*: If you look at a lot of the mining companies, there are programs that are intended to try and address the "*what happens after closure"* question from a socioeconomic standpoint. The programs make sure that there is local procurement and opportunities for business development, and to support business development for training and education, which have proven to be valuable in my past experience. It ultimately comes back to what makes sense for communities and I have heard Elders express their concern for the future of the youth who want more integration with industry of various sorts. There is a real opportunity to broaden the conversations about how industry can help to support communities beyond mine closure. I would like to encourage everyone to think about what makes sense for their community and then talk to the representatives of the companies who are working on the land and have a conversation about what that should look like moving forward to ensure we are using the best practices to support the communities in a way that best fits them.

- Traditional Knowledge can help us understand what people might be giving up in terms of hunting, fishing, and other interests to the land. Should there be free, prior, informed consent (FPIC) with Traditional Knowledge?
    - *Rosy*: Definitely. When industry comes into traditional territory, they should meet with Chief and Council first before they meet with the LWBs. That way they receive direction and can then go to the LWB with some knowledge of where to begin. Prior consent is needed because sometimes an application is submitted to the LWB who identifies the land as a spiritual place or a place of great environmental value, however, if industry went to the Chief and Council first, they would have saved themselves a great deal of money. We have to live in coexistence and work together instead of working backwards, which is seen a lot of the time.
    - *John B.*: I want to acknowledge that everything starts from the treaties, where we are supposed to be working together, yet it has been one-sided. A lot of the implementation of the treaties was used so that we were put into a ward system with no say, which still continues today to a large degree. Being in a ward means that all aspects of our lives, including health, education, and social services have been delegated by governments, churches, and other social services, where we do not always have the full benefit – that will take a long time to unravel. Going back as far as 1971, Jimmy Bruneau said that we need to live together…we need to work within both of our systems and learn each other's ways to move forward together. It was also coined by our Elder, Elizabeth Mackenzie, that we need to be strong like two people. We should be working together and sharing in the spirit of the treaties to work on implementation of these agreements. I think what we are doing today is an implementation of that because it starts with discussion.
    - *April*: FPIC and UNDRIP are really important because they have been brought forward on a global scale that apply on all land. I echo from Rosy the importance of companies knowing where to go first to discuss their project ideas and start conversations so that there is no confusion, and everyone is on the same page from the beginning. On the industry side, I hear a lot of new companies unsure of who to reach out to within the NWT since they come in completely unaware of how the system works. I believe that as a community of people that work in the mining industry in the North, we need to figure out how to get the funnel flowing in the proper direction to get people talking to the right people from the beginning. I do not believe that it is intentional, but rather a matter of not knowing where to begin.

"I hear a lot of new companies unsure of who to reach out to within the NWT since they come in completely unaware of how the system works. I believe that as a community of people that work in the mining industry in the North, we need to figure out how to get the funnel flowing in the proper direction to get people talking to the right people from the beginning. I do not believe that it is intentional, but rather a matter of not knowing where to begin."
- Dr. April Hayward

Figure 8: A snapshot of the Day 2 Armchair Discussion Panelists and Moderator, including Michael van Aanhout, Rosy Bjornson, Dr. John B. Zoe, and Dr. April Hayward.

Closure Initiatives in the Mackenzie Valley

The Closure Initiatives in Mackenzie Valley session included presentations from representatives of the Office of the Regulator of Oil and Gas Operations (OROGO), Diavik Diamond Mine, and the Wek'èezhìi Land and Water Board (WLWB) to discuss ongoing initiatives, projects, and opportunities for engagement with regard to closure and reclamation. Access to the slide decks of these presentations can be found on the WLWB website.

Pauline De Jong
Regulator, Office of the Regulator of Oil and Gas Operations

Gord Macdonald,
Closure Manager, Diavik Diamond Mine

Ryan Fequet
Executive Director, Wek'èezhìi Land and Water Board

OROGO's Role in Closure and Reclamation

Pauline De Jong, Regulator, Office of the Regulator of Oil and Gas Operations (OROGO)

Pauline began her presentation by outlining OROGO's role in closure and reclamation under the *Oil and Gas Operations Act* (OGOA) as part of the integrated resource co-management in the Mackenzie Valley. OROGO regulates the abandonment, meaning a permanently plugged well that has been cut and capped below the surface of the ground, and decommissioning of oil and gas infrastructure, including wells, pipelines (except transboundary pipelines), and other facilities. OROGO regulates the infrastructure under the Act for the purposes of safety, environmental protection, and conservation of resources.

When OROGO is regulating abandoned and decommissioned oil and gas infrastructure, Pauline noted that they are often working with other regulators in the process, such as the LWBs. The abandonment activity that OROGO regulates is often completed fairly early on in the overall closure and reclamation process before other reclamation activities can take place on the land. In terms of the kind of coordination that OROGO does, Pauline identified that they try to work with other regulators so that they can meet their obligations to protect human and environmental safety. Some examples include:

- During the winter work season, they facilitate weekly meetings with the industry and other regulators involved so that they can coordinate their inspection activities and address any concerns about gaps or overlap.
- Conduct joint inspections with other regulators to share resources and knowledge of the site.
- When an activity is over, OROGO is contacted by a regional land use officer to ensure that OROGO is content with their work on the site before the officers permit closure.
- Coordinate with the Oil and Gas Land Tenure System to ensure both are satisfied with what is going on at a site before they release tenure.

Pauline noted that a majority of the upcoming closure activities will be driven by deadlines in the *Well Suspension and Abandonment Guidelines and Interpretation Notes*; that is because in those guidelines, OROGO established a deadline for the abandonment of suspended wells. If a well were to be suspended and production is never resumed, it is expected that the well is to be abandoned within six years to prevent the number of suspended wells left on the landscape. Most of the wells in OROGO's authority were suspended before Devolution in 2014 or before the guidelines were first issued in 2017, meaning the wells are now due for abandonment before March 31, 2023. Pauline highlighted that 80+ wells are due for abandonment within the next four years in the Mackenzie Valley region.

Pauline concluded her presentation by speaking to the upcoming closure activity in four regions of the Mackenzie Valley, including the Gwich'in, Sahtú, South Slave, and Deh Cho.

In the Gwich'in region, there is only one suspended well, the Aurora College Training Well in Inuvik. The well is scheduled to be abandoned by the end of March 2023. In the Sahtú, there are 10 wells delayed in their deadline to be abandoned to 2024 because these wells are in locations where it is a two year process to get the equipment up

and mobilized to the site. Due to the issues with COVID-19, the timelines were delayed. The South Slave region contains the majority of the well abandonments that are slated to happen over the next several years. The Cameron Hills Field is the location of most of the abandonments in the South Slave and will be occurring over the next three fiscal years. Also in the South Salve region is the Suncor Tathlina N-18 well, which is scheduled for abandonment in the 2022-23 fiscal year and will be abandoned August 2022 in a heli-portable operation. All 26 wells in the Deh Cho region are scheduled for abandonment in the 2022-23 fiscal year. Pauline noted that there are five operations involved. It is not just a matter of wells that must be decommissioned, but also the associated infrastructure.

Progressive Reclamation Opportunities and Challenges for Mine Closures

Gord Macdonald, Closure Manager, Diavik Diamond Mine

Gord presented on progressive reclamation as an aspect of Diavik Diamond Mine's closure plan. Diavik defines progressive reclamation as closure activities undertaken concurrent with mine operations, as opposed to after mine operations are complete.

Gord highlighted the ***opportunities*** associated with progressive reclamation of mines, including:

- Schedule – shortens the time required to complete closure activities.
- Efficiency – utilizes materials already loaded in haul trucks, eliminating double handling.
- Backhaul – takes advantage of empty trucks leaving the mine site.
- Cost – takes advantage of mine operations equipment and operators.
- Employment – extends duration of operating positions.
- Monitoring – early start to collection of closure performance data.
- Commitment – demonstrates closure intention.

Gord provided an overview of the ***challenges*** associated with progressive reclamation, including:

- Production mindset – operations are appropriately focused on production.
- Cost deferral – typical preference to delay closure expenditures.
- Limits mine optionality – commits to doing closure vs. sale.
- Demotivating – creates challenges to retain employees as operations ramp down, emphasis on progressive reclamation makes this harder.
- Reluctance – general reluctance by governments and operators to accept closure as a reality.
- Regulatory – key regulatory instruments are not designed for progressive reclamation, assume closure activities occur post-operations.
- Risk – current regulatory system burdens operators to accept varying degrees of risk when advancing progressive reclamation due to regulatory uncertainty.
- Security – slow and uncertain return of security process limiting benefits of conducting progressive reclamation.

Gord described a case example on the North Country Rock Pile (NCRP). Diavik has a pile of potentially acid-generating rocks that have been segregated by geochemical reactivity. The NCRP was intentionally placed there so that it could be managed separately at closure from the rest of the construction materials on-site. The closure plan is, and always has been, to re-slope the pile to take it from an angle of propose to a 3 to 1 angle, put a layer of tilt (a smaller particle material), and then cover it with three meters of rock to design it so that all of the potentially acid-generating material is frozen within the pile. The design was intended to make the NCRP look like a naturally-occurring esker and allow for caribou to safely navigate over and across. The work is expected to be complete by the end of 2023. Since Diavik is still in operation, transporting the material to the NCRP is actually substantially cheaper to move as progressive reclamation rather than during the closure phase because of the direct haul of reclamation materials.

A seepage water quality mitigation program and the landscape is what the cover was principally designed for. Gord highlighted that Diavik has a Traditional Knowledge panel that helped test a 15-meter-high pile, rather than the real 80 meter high pile, built as a research project to test the actual performance of a pile from a thermal and geochemical perspective. It is a fully instrumented pile, but it gave the opportunity to show the panel what the slope and the material would be like at closure. Gord noted that it was on this basis that Diavik received the direction and support from the panel and regulators on the finished landscape product.

Land and Water Boards of the Mackenzie Valley: Ongoing and Upcoming Initiatives

Ryan Fequet, Executive Director, Wek'èezhìi Land and Water Board (WLWB)

Ryan referred back to the joint guidelines mentioned by Meghan and Lorraine, which outline the expectations for how to set security, how to adjust it throughout the life a project, and how to refund security as closure is eventually completed. These guidelines apply to projects that require a water license and/or a land use permit; the projects that are typically smaller and simpler, only require a land use permit.

There was a tool that was initially developed by the federal government many years ago for estimating the liability of the clean-up of each respective site, but over the years, that tool became outdated as expectations evolved and more was learned about the real cost of cleaning up sites in the North. A new tool was developed for these projects that only require a land use permit, in collaboration with landowners, is called the Estimator. The Estimator is an easy-to-use Excel document that provides a more accurate estimate of the liability for smaller projects.

The Boards worked on this initiative with landowners and approved the Estimator in December 2020. During its development, many interesting questions were asked such as: are there certain types of activities (e.g., such as tourism, or wood cutting, etc.) where securities may not need to be held, or is there a certain minimum amount of security that warrants all of the administration and taxpayer money to hold those funds, and many more. So, before the Boards implement the new tool, they are currently discussing these and other questions with landowners about the best way to implement it and are developing a policy to outline how the tool will be implemented. The implementation policy for the Estimator is hoped to be completed as early as the summer of 2023.

Ryan noted that he started working with the Boards in 2007, and at that time there was historically more guidance for closure and reclamation in the field of oil and gas because there was a national oil and gas regulator (NEB, now CER). Because mining was, and is, very prominent in the NWT, joint guidelines to help outline the expectations for the closure and reclamation of mining and advanced exploration were developed over a three-year period and were approved in 2013. In 2017 the guidelines related to security were developed and in the subsequent few years there were a lot of lessons learned about closure and security and the security guidelines were updated and released this past January 2022. One of the initiatives the Boards have committed to, as part of its recently launched strategic plan, is to identify the best way to bring collective knowledge together, including local knowledge, Traditional Knowledge, and Western science. Ryan highlighted the importance of effective engagement in successful planning for closure and reclamation to provide an opportunity for everyone to be a part of the process and allows for collective knowledge, whether local, Traditional, or Western science, to be incorporated and combined together.

Ryan highlighted the term "relinquishment" as a major topic that needs some attention in the near future. By using the term relinquishment, Ryan highlighted the relinquishment of liability, not security or the money. Companies who have water licences undergo the closure and reclamation planning process as outlined in the guidelines, security is held and the amounts adjusted throughout the life of the project activities to reflect the liability on site, and eventually after closure criteria have confirmed that the respective closure objectives have been achieved, a company receives their security back. However, it is not clear in the NWT what happens in the long-term as far as if and when a company is no longer liable, or if that liability is transferred to the landowner. With components of operating mines permanently closing at Ekati, Snap Lake in temporary care and maintenance, and Diavik moving towards the end of operations in 2025, this is an area that requires our attention.

To learn more about the Strategic Plan for the Land and Water Boards of the Mackenzie Valley 2022-2026, please visit the WLWB website.

Ryan invited participants to share their thoughts on the questions and prompts that the Boards had prepared in order to receive input to help guide them in identifying the best path forward on guidance relating to closure. The questions and prompts are below.

1. What do you believe to be the most important question to ask when a project is initially being considered?
   Some of the answers include:
   - "Who are the land users and who should I be talking to?"
   - "How does the community want to be engaged?"
   - "Can the project costs to Traditional Knowledge and the environment be justified?"
   - "How does the project affect Indigenous peoples and their way of life?"
   - "How has the proponent consulted with Indigenous groups on closure before coming to regulators? What topics were discussed and mentioned in terms of socio-economic, environmental, and cultural impacts?"

- "What are the long-term effects of the project on local communities and how does the proponent plan to mitigate these effects?"
- "Where is the proposed footprint of the project and what input from Indigenous land users has been gathered on the footprint?"
- "What is the proven track record of the proponent in terms of closure and reclamation, including in the North, in Canada, and anywhere else globally?"
- "Does the proponent have the funding commitment to accomplish closure and reclamation?"

2. Share one other industry that would benefit from having guidance on closure planning. Some of the answers include:
    - Oil and gas
    - Power utilities
    - Waste management
    - Quarry works
    - Sewage lagoons

3. Rank on a scale of 1 to 5 (1 = not needed; 5 = needed significantly) what people need to be more involved in closure planning in the Mackenzie Valley. The results were shown as an average between 1 and 5 to demonstrate the average ranking. The average rankings include:
    - Improved communications/relationships: 4.3/5
    - Engagement opportunities: 4.1/5
    - Funding: 3.9/5
    - Time: 3.6/5
    - External expertise: 3.1/5

4. Rank on a scale of 1 to 5 (1 = not important; 5 = extremely important) how important it is to be engaged in these ways during the closure planning process. The results were shown as an average between 1 and 5 to demonstrate the average ranking. The average rankings include:
    - Pre-public review workshop: 4.3/5
    - Public review: 4.1/5
    - Post-public review workshop: 3.9/5
    - Drafting: 3.1/5
    - Gap analysis: 3/5

5. Share any other suggestions you have to ensure projects are successfully closed and reclaimed. Some of the answers include:
    - "Engagement with both youth AND Elders."
    - "Understand the community's desires for the land."
    - "Start face-to-face engagement early."
    - "Need the contribution of Indigenous Knowledge, values, and beliefs."

- "A commitment to the long-term."
- "Take actions informed by the next seven generations."
- "Adaptive management of social and cultural impacts going into closure and reclamation."
- "Consistency in engagement early on with youth, land users, and the Elders involvement."
- "Look at the predicted vs. actual outcomes of the closure and reclamation – do they meet the needs of the people?"
- "Consider the lives of the local people and their desires for the future of their environment."
- "Hold proponents accountable if their mine sites are not successfully closed."
- "Opportunities for youth to learn tradition is key."
- "More involvement in options analysis during closure planning."
- "Ensure all parties are engaged during the review process with the integration of Indigenous Knowledge with Western science."

To view all answers collected during engagement, see Appendix D.

Question and Answer for the Closure Initiatives in the Mackenzie Valley Speakers

- Pauline, who is ultimately responsible when/if the abandoned wells fail?
  We do know that some portion of the wells do fail. If we look at Southern Canada, they have many more wells than the North and understand better what the likelihoods are. The Jean Marie River Well was abandoned many years ago and because the community came to OROGO with concerns about it, we went out and looked at it to determine that it needed repair. In those situations, the first thing we do is go looking for the operator that was responsible for the well and its abandonment and try to get them to take responsibility. In the case of the Jean Marie River Well, it was Imperial who has since stepped up and taken responsibility for the repairs. In the event that we cannot find the operator, it would fall to the GNWT and become their responsibility to repair and re-abandon the well.

- Pauline, do the operators of the wells have all of the necessary permits required to do the abandonment, such as land use permits and water licences under the MVRMA?
  I believe for the most part, yes, there are some that are in progress. OROGO's process for issuing an operations authorization well approval does not require that the land use permit and the water licence be in place before we can issue it because the land use permit and the water licence are normally associated with accessing the site. You reach a point where OROGO's operations authorization will not be very helpful unless operators have the necessary land use permit and water licence in place. At this point, however, the vast majority of operators do have those permits in place.

- Pauline, Devolution states that old mines sites are to be reclaimed by the federal government and yet it does not seem to be the same for oil abandonment and reclaiming cost by GNWT?
  There was consideration for oil and gas sites in the Devolution Agreement. Chapter 6 of the Devolution Agreement addresses the potential need to remediate abandoned oil and gas sumps or well sites:

- Sections 6.22 through 6.29 describe what actions must be taken by the GNWT (or the Aboriginal Party, for sites on Settlement Lands) and what information must be provided to the Government of Canada if there is a concern with these sites. This can happen at any time after devolution. The Government of Canada would use that information to determine whether the site is a New Site Requiring Remediation under the Agreement.
- Sections 6.30 through 6.36 describe the dispute resolution process that applies if the parties do not agree with Canada's decision.
- Section 6.37 through 6.42 describe the Government of Canada's obligations for remediation of the New Site Requiring Remediation.

- Gord, will Diavik Diamond Mine be setting up a Traditional Knowledge panel comprised of Elders and youth? Is it/will it be intergenerational?
  Yes, we have had one for about 13 years. We are having our 16th session and we took the panel to the site yesterday. They have been advising us on the closure designs from a Traditional Knowledge perspective and they are now working on a Traditional Knowledge watching program (i.e. how we will, from the Traditional Knowledge perspective, monitor the performance of closure through their eyes). We have five Indigenous groups that we work with and each of them nominate two Elders, a male and a female. The Elders have requested that a youth be involved as well from each of the Indigenous organizations.

- Gord, with Rio Tinto Exploration continuing to explore in the area, what closure activities would proceed vs. be put on hold if a sufficient resource was found to continue operations with development of another resource or resources? Can you comment on results of exploration?
  There has not been anything found to date. The whole objective of exploration is to make sure that we are not going to close and then at a later date, find a resource. We are very hopeful that we do find something, but that has yet to occur.

- Gord, for an open pit mine, how do they fill the hole they built, or do they just leave it and let nature take its toll or erosion to come in…do they fill it up with all the gravel they take out?
  Open pit mines are backfilled with water.

- Ryan, are there any examples from recent history in the NWT where the regulators under the MVRMA regime levied fines or other penalties as a result of a proponent not meeting obligations?
  The simple answer is YES, there has been varying enforcement actions in recent years.

- Gord, does the cost of progressive reclamation come from the original security deposit, and if not, why? Is progressive reclamation just an option for a development to move forward ahead of the closure activities and schedule? Lastly, does the development receive a land use fee refund?
  It is a very common misunderstanding that the security we post for closure with the government is something that we can use for closure. It is not used for closure, but rather giving a closure fund to the government if we do not do our job; if we abandon the site, the money is there for the Crown to do the

closure activities. We can get a refund on the security as we complete closure activities, but there is a significant lag between the time we make the expenditure and the time that we receive the refund. This is a learning experience for all of us, but I still believe it will be a key instrument in motivating companies to do closure work earlier to be able to get a quicker and more complete reduction in their security.

- Gord, does Diavik plan on remedying the socioeconomic impacts that would affect employees who will be without work with the impending closure of the site?
  The socioeconomic and human relations aspects of closure are a big part of the work we are doing now. Although we are approximately three years out from closure, we will be starting to go over the workforce reduction program over the next three years and have a strong people programming in place to assist employees in finding other opportunities whether that be back in their community, within another mining company, or finding something within Rio Tinto in another location. We do fully recognize that the opportunities in the North for reemployment of people will be a challenge and will be one of the bigger impacts of Diavik closing.

- Pauline, how often does Canada remediate abandon wells in the NWT?
  In general, it would depend on who the landowner is for the particular area. The best example I have is the Norman Wells area. That area was not devolved, so we do not regulate that area, in which case, if there was ever to be an issue, it would have to be the Government of Canada that would be responsible for remedying the problem. Relatively recently, there were a group of wells just south of Hay River that were abandoned long ago. They need repair, which was done through the federal government's National Contaminated Sites Program and was regulated through the National Energy Board at the time.

- Gord, why is there no Traditional Knowledge Elder Advisor Panel for the Environmental Monitoring Advisory Board (EMAB) and yet exists in Rio Tinto? EMAB is a board that implements the Diavik Diamond Mine Environmental Agreement?
  The Traditional Knowledge Panel that works with Diavik had started as a panel with EMAB, however, the panel identified that it was bit frustrating working with Diavik through EMAB. It was difficult for both of us to have an indirect relationship. It was in agreement with EMAB that we decided we would work directly with the panel rather than through EMAB, which has allowed us to have a much more direct relationship and receive input from the panel. Having EMAB in between was causing communication challenges.

- Gord, will Diavik have science camps for community use to comprehend and be involved in progressive reclamation?
  We have had the equivalent of science camps, including aquatic camps and fish camps where youth have been involved heavily, which has been valuable to everyone. As I mentioned before, we are developing a Traditional Knowledge Watching Program, and we expect that to involve youth as well. We are receiving feedback from Elders to have youth continue to be involved in that program so that they can learn what needs to be monitored and what occurs on the site.

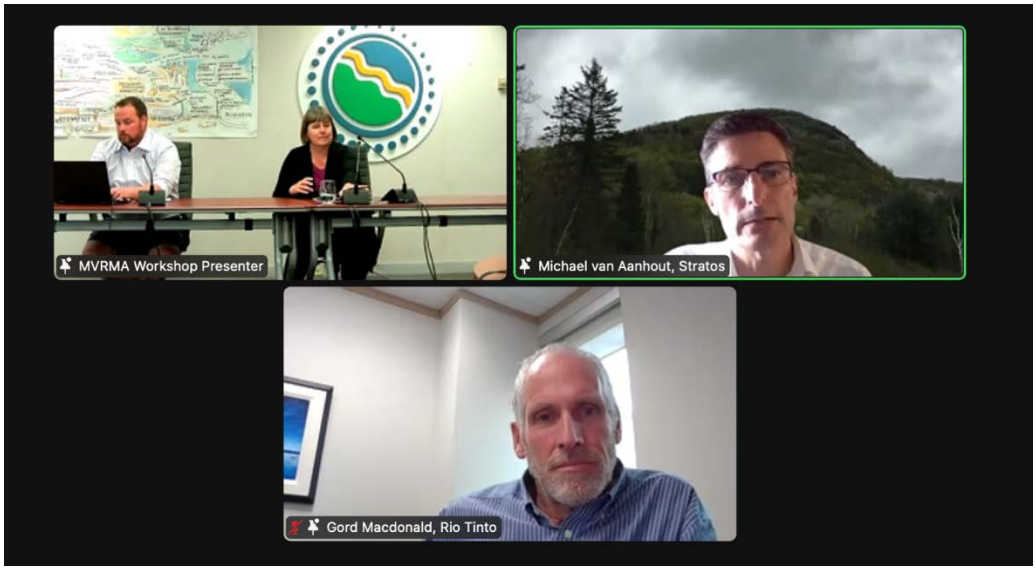


Figure 9: A snapshot of the Closure Initiatives in the Mackenzie Valley Speakers and Moderator, including Ryan Fequet, Pauline De Jong, Michael van Aanhout, and Gord Macdonald.

Closing Thoughts

To conclude the second instalment of the MVRMA Workshop Series, Michael summarized the closure and reclamation topics discussed over the two-day event for the audience and announced that the final two virtual workshop sessions of the year will be:

- Engagement and Consultation on September 28 and 29, 2022
- Climate Change on December 14 and 15, 2022

The registration details for the September workshop on Engagement and Consultation will become available closer to the workshop date.

Michael closed the session by thanking all of the panelists and speakers over the two days. He also thanked participants for being so engaged and working together in a collaborative way to gain a better understanding of the closure and reclamation process in the Mackenzie Valley.

Appendix A: Agendas

Day 1: Wednesday, June 8, 2022 (9am – 12pm MDT)

8:45 - 9:00	**Virtual check-in** *We ask that you sign in to Zoom in advance to ensure a proper start at 9am*
9:00 - 10:15	**Welcome & Guest Speaker – *Andrew Richardson & George Lafferty*** *After our Opening Welcome remarks, we will have guest speakers share their perspectives on closure and reclamation processes for the Colomac site followed by a Q&A session.*
10:15 - 10:30	*Break*
10:30 - 12:00	**Considerations for Closure and Reclamation** *In this session, we will introduce general closure considerations and then dive deeper into specific closure and reclamation topics including progressive reclamation and security. Speakers include representatives from the Land & Water Boards, Mackenzie Valley Environmental Impact Review Board, and GNWT Department of Lands. Following the presentations, there will be time for questions and comments from participants.*

Day 2: Thursday, June 9, 2022 (9am – 12pm MDT)

8:45 - 9:00	**Virtual check-in** *We ask that you sign in to Zoom in advance to ensure a proper start at 9am*
9:00 - 10:15	**Armchair Discussion: Traditional Knowledge and Closure Planning** ***Panelists: Rosy Bjornson, Dr. John B. Zoe, Dr. April Hayward*** *We will have representatives from various regions of the Mackenzie Valley speak on the importance of traditional knowledge in closure planning, followed by a Q&A session.*
10:15 - 10:30	*Break*
10:30 - 12:00	**Reflections and Looking into the Future: Closure & Reclamation in the Mackenzie Valley** *This session will include presentations from the Diavik Diamond Mine, OROGO, and the Land and Water Boards on ongoing initiatives, projects, and opportunities for engagement with regard to closure and reclamation. Presentations will be followed by a discussion session.*

Appendix B: Workshop Planning Committee

STRATOS DELIVERY TEAM

- Barb Sweazey, Project Advisor
- Michael van Aanhout, Facilitator
- Julia Ierullo, Notetaker / Reporter
- Rebecca Lafontaine, Tech Lead
- Nolan Qamanirq, Tech Support

MVRMA WORKSHOP PLANNING COMMITTEE

- Sarah Elsasser (WLWB)
- Ryan Fequet (WLWB)
- Mark Cliffe-Phillips (MVEIRB)
- Eileen Marlowe (MVEIRB)
- Kate Mansfield (MVEIRB)
- Tanya Lantz (MVLWB)
- Shelagh Montgomery (MVLWB)
- Jody Pellissey (WRRB)
- Marcy MacDougall (CIRNAC)
- Malorey Nirlungayuk (GNWT)
- Melissa Pink (GNWT)

About Stratos

Our Vision

A healthy planet. A productive and engaged society. A clean, diversified and inclusive economy.

Our Mission

We work collaboratively with governments, Indigenous peoples, business and civil society to navigate complex challenges, develop integrated and practical solutions and support societal transitions that result in sustainable outcomes.

Stratos runs its business in an environmentally and socially sustainable way, one that contributes to the well-being of our stakeholders – clients, employees and the communities in which we operate. Reflecting this commitment, we have an active Corporate Social Responsibility program. For more information about our commitments and initiatives, please visit our Web page: www.stratos-sts.com

Appendix C: Complete Question and Answer

Due to the time constraints for each speaker segment and the strong audience engagement, some questions were not answered live. The outstanding questions are listed below according to segment and written answers were provided.

Day 1

Question and Answer with Andrew Richardson and George Lafferty

- **Regarding the ore quality and the amount of waste rock and tailings created due to low ore quality, has this had any impact on decision making criteria for evaluating economic viability of new projects to prevent a similar abandonment in the future?**
  During the environmental assessment we would not specifically focus on the ore quality from an economic perspective but would look at what the impacts of the resulting tailings or other waste that would result from the increased volumes produced. When assessing alternative means of the project design or mitigation we assess the technical and economic feasibility and the environment of the alternative means.

- **How was arsenic contamination managed/remediated at the Colomac site?**
  Arsenic was not associated with the rock at Colomac. Concentrations of arsenic in water and soil were generally below CCME guidelines.

- **Did the "Texas Gates" work over the years to prevent caribou from going up the waste rock?**
  After 10 years, we have had no reports of the caribou passing through the gates.

- **What about caribou going up on the rock piles but not going via the gates? Were the rock piles monitored for caribou or other animals?**
  The rock is very coarse. The Elders told us that caribou would not try to climb this type of coarse rock for fear of breaking their legs. We have not observed caribou near this coarse rock, which tends to support the Elders' assessment.

- **How did you work with dissenting ideas from the community? Separately, what was the best approach in for community taking on and educating need for maintenance and upkeep of remediation elements or longer-term operation and reporting?**
  Dissenting opinions are always possible. We listened to the community members and then worked with the Community Government to come up with an agreeable solution. In our experience, training and education of community members is an on-going challenge. It has best been coordinated between the remediation project and the Community Government. We have successfully used the BEAHR program

(Building Environmental Aboriginal Human Resources) for training in environmental topics; however, there are other programs available.

- **The goal of the science camp was to help the students understand the principles of environmental science. Was there a measure of the outcome of that exercise?**
  While we did reviews and questionnaires, we did not have a test at the end of the course, as we wanted the learning to be relaxed and fun. We did poll the participants to see if they found the course interesting and to see what would improve the course.

Question and Answer for the Considerations of Closure and Reclamation Speakers

- **Are roads as a major development required to undergo an environmental assessment?**
  The Review Board conducts environmental assessments on projects, including roads, that might have significant adverse effects or might be a cause of public concern.

- **The option of reimagining the closing mines infrastructures has been a recent discussion.**
  We recognize that the GNWT-INF, GNWT-ITI, CANNOR, and several companies embarked on a dialogue with Parties during the last year to discuss life after diamond mining in the NWT, with a focus on how to best leverage human capital, knowledge, and physical assets in the Slave Geological Province. The final report can be found here and the overall website can be visited here.

- **The other thing that needs to be taken into consideration for remediation of the mine site is what kind of mineral are you working with. TG hired a group of specialists for the uranium Rayrock mine and the specialist advised us the site will never be reclaimed or recovered back to its original site, no matter how best you can remediate the site. Which is true...something to consider for the people living near or downstream of the contaminated site. There will always be this sore site in your backyard.**
  Absolutely. The specific nature of a project makes a huge difference for how it should be closed and how it even can be closed. This needs to be very clear as the project is developed, during engagement, and during the EA so that everyone understands what is being discussed.

- **The legacy of Giant mine is a good example of what not to do, in mining...at all fronts…How can we prevent this type of mining practices from happening again?**
  Great question - and that's exactly why this topic was selected for one of these four virtual workshops! The framework in the Closure Guidelines is intended to ensure that End Land Use is considered up front in project planning, closure objectives are intended to ensure everyone is clear about what should be achieved at the end of a project, closure criteria are intended to ensure success can be measured, and post-closure monitoring (by people on the ground) is how we ensure the land and water heals. While Giant Mine did have a security of $1M posted, that was not a sufficient amount to clean up the site. More recent guidance and policies about securities, for example estimating the costs from a third-party lens, ensures that there will be enough money to clean up a site should a project site be abandoned. The gap is closing...

- We can come up with the best closure and reclamation plans, but we need to know who will ensure that these plans will be implemented and followed...long after the company has left the country.

  Agree - implementation is key! Historically, and before the MVRMA came into force in 1998 and the LWBs were established as institutions of public government in the years following, closure planning was much less transparent and inclusive. In this newer co-management system, operators require water licences and/or land use permits to carry out their activities and those authorizations remain in place until such time as they are no longer required by the legislation. So current mines and resource development projects must develop and implement closure plans and maintain the appropriate amount of security. There are inspectors on the ground, involvement of communities, and on-the-land monitors who support environmental monitoring and compliance with approved closure plans. We are also seeing more and more closure plans including post-closure monitoring that involves the nearby communities and land users.

- Security deposits by proponents are an attempt partially to address the issue of accountability. How would you come up with an amount that will be adequate to address issues with closure plans and how long should the security deposit be held?

  The security deposits are set by the LWBs to reflect the costs for a third-party contractor to implement the closure plan. Guidance and standardized tools exist to assist the estimation of closure costs. The Boards seek input from all parties before making a decision on the security deposit. The security amount should reflect the total liability on site. Security should only be reduced, if this liability is reduced (i.e., a Company provides evidence that closure activities have been successfully completed). Demonstration of a successfully closed mine is anticipated to require decades of post-closure monitoring before security could be completely returned.

- I have past experiences of watching a lot of money spent to clean up environmental messes from abandoned mining, yet the very next day after the clean-up is complete, mining companies come in and stake out the areas again. How can this be allowed? Who is allowing this?

  The landowner would enter into an agreement with the government department that manages the site (whether federal, territorial, or Indigenous). They would then recommend restrictions to the respective LWB on the project's authorizations in order to mitigate impacts to reclaimed areas. These would then be conditions that inspectors enforce. An example of this scenario is the remediation of the former Colomac site and the current mineral exploration being conducted by Nighthawk Gold Corp. Inc. (there are site restrictions to protect the previous remediation and the ongoing monitoring as an annex to Nighthawk's Land Use Permit that can be viewed here.

- I would be interested to hear comments on how to address impacts of exploration in closure and reclamation planning, where the regulatory requirements for exploration are quite minimal even though the impacts are great.

  The co-management system in the Mackenzie Valley includes regulations for the use of land and water that indicates when a water licence and/or a land use permit is required. These authorizations regulate activities, and which authorization is required is dependent on the potential impacts of those activities. The

closure guidelines come into play when a water licence is needed. This allows the level of effort and scrutiny from the regulators and all parties to be commensurate to the activities and the potential impacts of those activities.

Day 2

Question and Answer for the Armchair Discussion Panelists

- **Sounds to me that Traditional Knowledge mapping, Elder inputs, wildlife and hunting information should be part of the very early planning process - to see the documentation of environmental and Traditional Knowledge before the project planning process can even start - and the project plans can then incorporate all of that information.**

  Absolutely. This is a huge potential area of growth and improvement. Gathering and incorporating this information early in the process can better address impacts and also allows the developer to plan their project based on the information, rather than making changes later. The Review Board is working on a guideline that requires and encourages this work for major projects that are likely to go to EA.

- **What would the panel think about including a compulsory education program for working in the North on these big projects, including the company directors and camp workers – just like health and safety training – to gain respect across the board?**

  Here is a measure from the environmental assessment from the new Tłı̨chǫ highway to Whatì. It is not a mine, but could be used as an example for future and on-going mine developments. "To mitigate the Project's impact on Tłı̨chǫ culture and well-being of Tłı̨chǫ residents, the developer will require that the P3 operator has culturally appropriate and specific policies in accordance with those set out by the Tłı̨chǫ government, GNWT departments and federal government. The P3 operator will have policies and programs in place for employee cultural orientation, approved by the Tłı̨chǫ Government, for all non-Tłı̨chǫ workers, including awareness of special cultural norms and practices."

- **What phase of mining do you feel Traditional Knowledge implementation should most be used: exploration, construction, operations, closure or post closure monitoring? Should it be done equally through all those phases?**

  The Closure Guidelines describe that closure plans need to give careful consideration to how climate change could influence the long-term success of closure activities, including uncertainties associated with permafrost, precipitation, ambient/water temperature etc., in the future. The Guidelines describe that design for closure should consider conservative predictions and not only historical data. In addition, the Boards' standard Water Licence conditions have made the consideration of climate change a requirement of Closure and Reclamation Plans.

Question and Answer for the Closure Initiatives in the Mackenzie Valley Speakers

- **Pauline, how many wells were chosen by companies to be abandoned versus how many are still ongoing/being used?**
  The well abandonments are based on the timelines in OROGO's guidelines, not the company's choice. None of the wells in OROGO's authority are currently producing and all are scheduled for abandonment by the end of 2025-26.

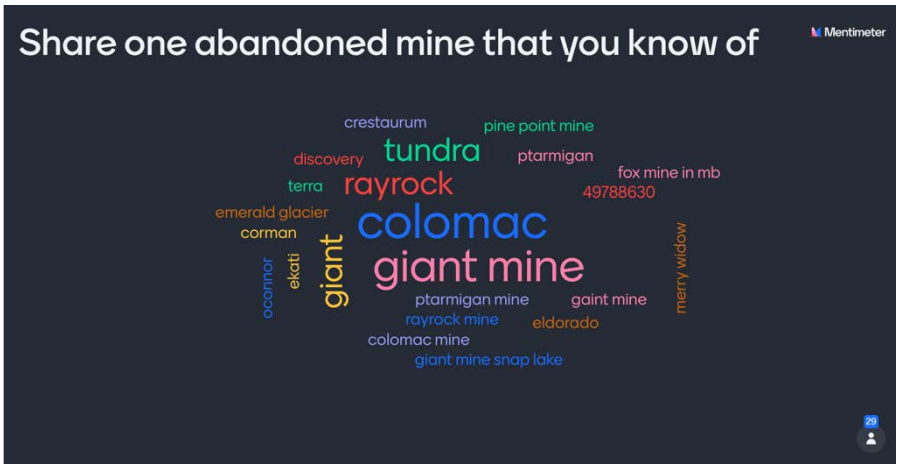
Appendix D: Mentimeter Questions and Results

Mentimeter is a virtual engagement tool that allows facilitators to utilize interactive polls, quizzes, and Word Clouds to encourage feedback and interaction with the workshop audience. Throughout the workshop session, participants were invited to use the tool to answer various questions and prompts related to the workshop material. Over the two-day event, 73 unique participants used the platform to submit answers and feedback.

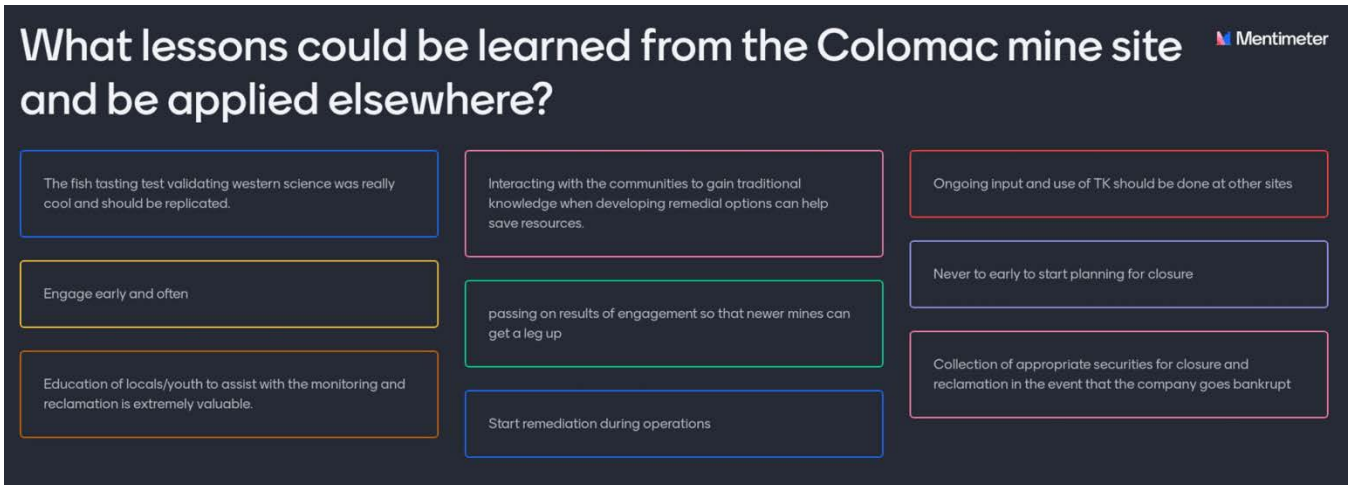
Below are the questions/prompts asked over the two-day period and all of the answers provided by participants.

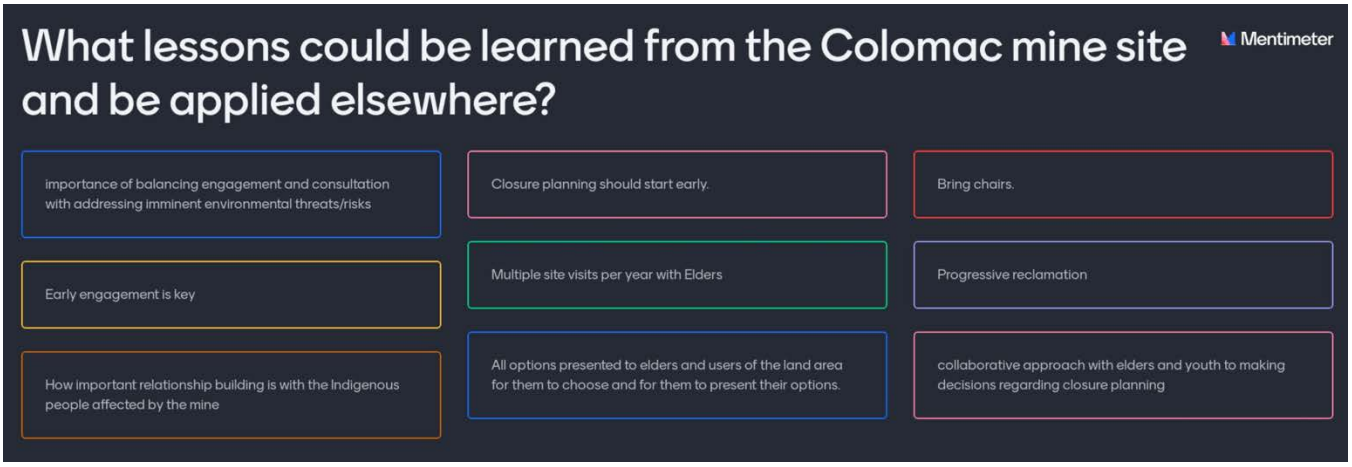
Day 1

Share one abandoned mine that you know of.

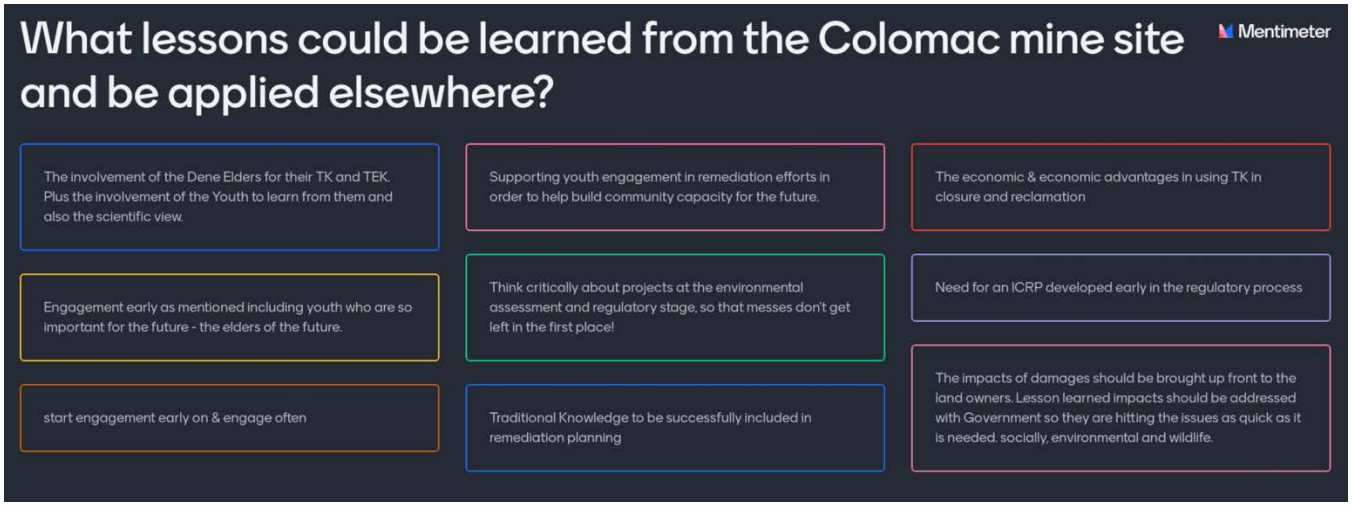


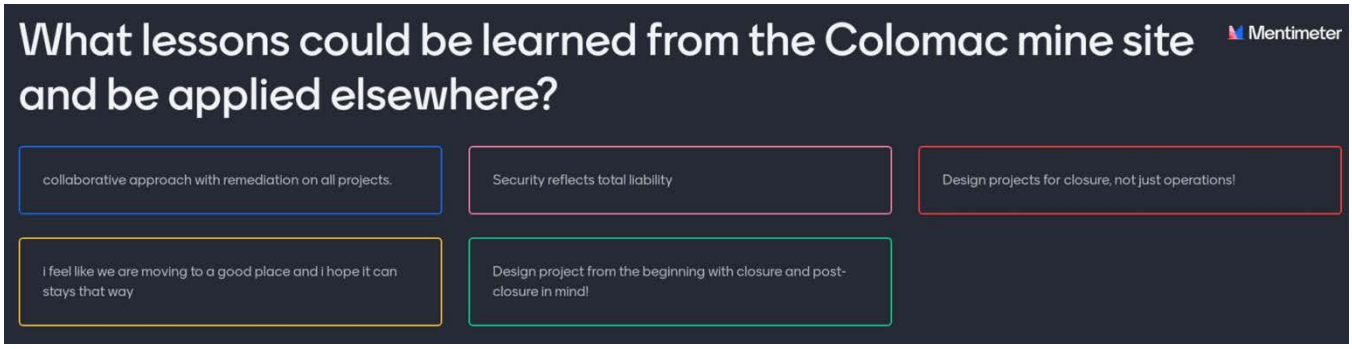
What lessons could be learned from the Colomac Mine site and be applied elsewhere?






What lessons could be learned from the Colomac mine site and be applied elsewhere?
Mentimeter
Listening to Elders input and implementing their ideas
Risk Mitigation vs Closure...
The value of TK in informing activities
Cultivating community trust and knowledge about remediation, especially on the safe consumption of country foods.
Collaboration is the only way to go. Elders bring the perspective needed as to what is natural or not.
Youth engagement and science camps
The incorporation of community in planning and construction - and it's adaptability to other projects was excellent. Community involvement in construction and job shadowing is something I have talked to community members about.
Compliance monitoring and consequences during mine operations by regulators to prevent environmental contamination
The government should play a large role in regulation of mine sites, which they now do. The rules have changed, the mining industry has changed. How we speak about it needs to change too, or we will loose out on economic opportunities. Misconceptions


What lessons could be learned from the Colomac mine site and be applied elsewhere?
Mentimeter
The involvement of the Dene Elders for their TK and TEK. Plus the involvement of the Youth to learn from them and also the scientific view.
Supporting youth engagement in remediation efforts in order to help build community capacity for the future.
The economic & economic advantages in using TK in closure and reclamation
Engagement early as mentioned including youth who are so important for the future - the elders of the future.
Think critically about projects at the environmental assessment and regulatory stage, so that messes don't get left in the first place!
Need for an ICRP developed early in the regulatory process
start engagement early on & engage often
Traditional Knowledge to be successfully included in remediation planning
The impacts of damages should be brought up front to the land owners. Lesson learned impacts should be addressed with Government so they are hitting the issues as quick as it is needed. socially, environmental and wildlife.

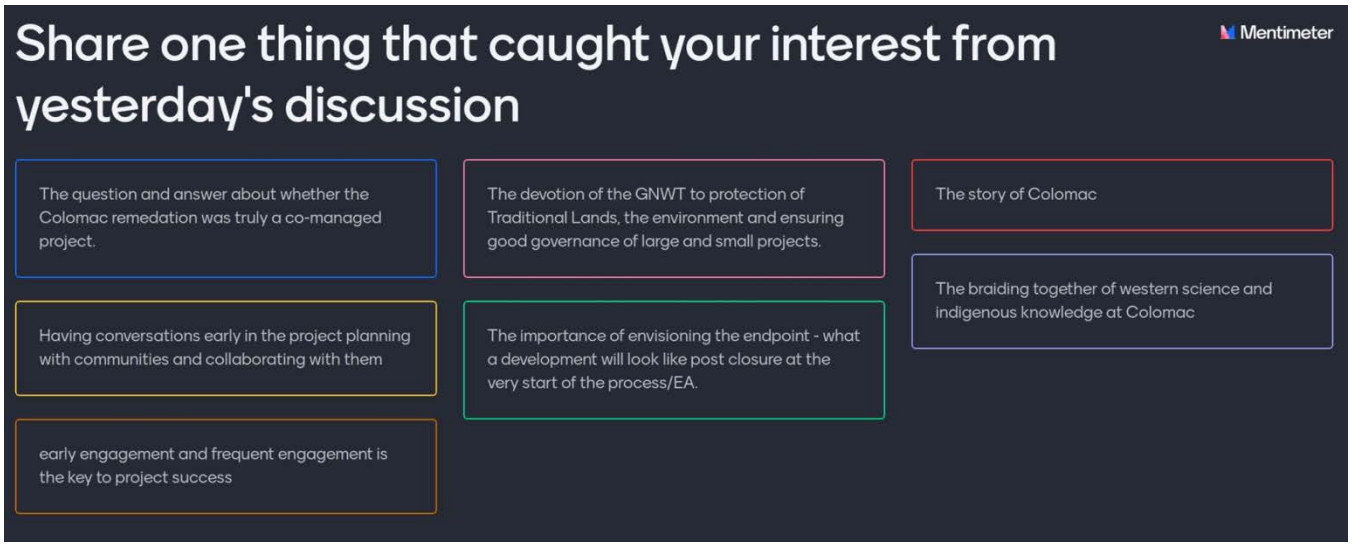

What lessons could be learned from the Colomac mine site and be applied elsewhere?
Mentimeter
collaborative approach with remediation on all projects.
Security reflects total liability
Design projects for closure, not just operations!
i feel like we are moving to a good place and i hope it can stays that way
Design project from the beginning with closure and post-closure in mind!

Share one key takeaway from today's session.

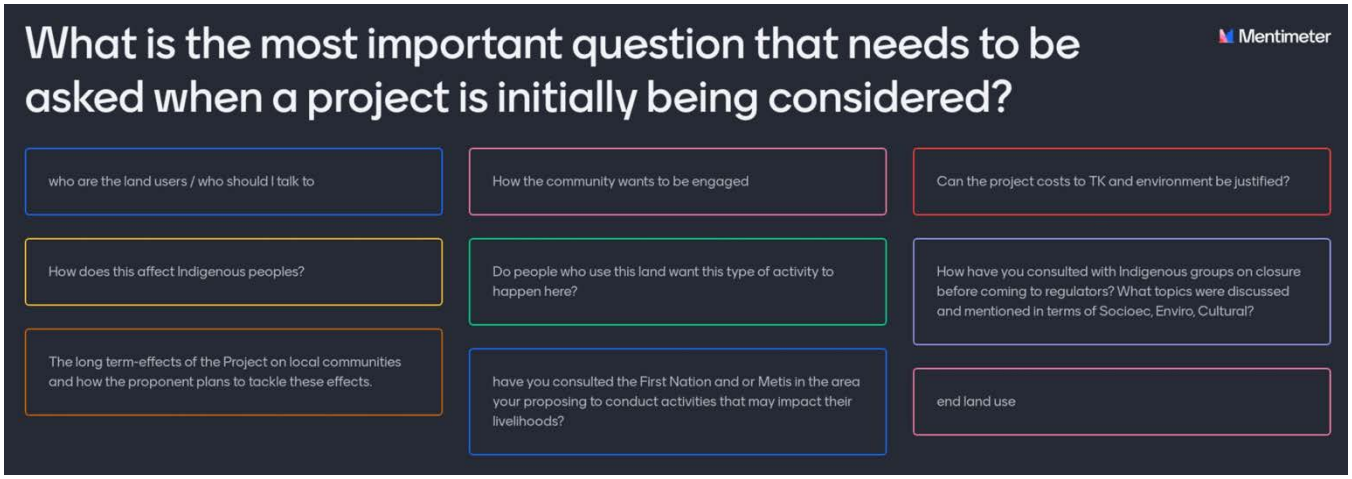

Share one key takeaway from today's session
Mentimeter
Importance of TK input into Closure planning and getting closure and reclamation plans from conceptual phase to interim plan as early as possible in the life of mine
there are a lot of misconceptions in this space
Happy to see commitment to, and level of detail in, reclamation and closure plans for active projects! Such an important part of the process!

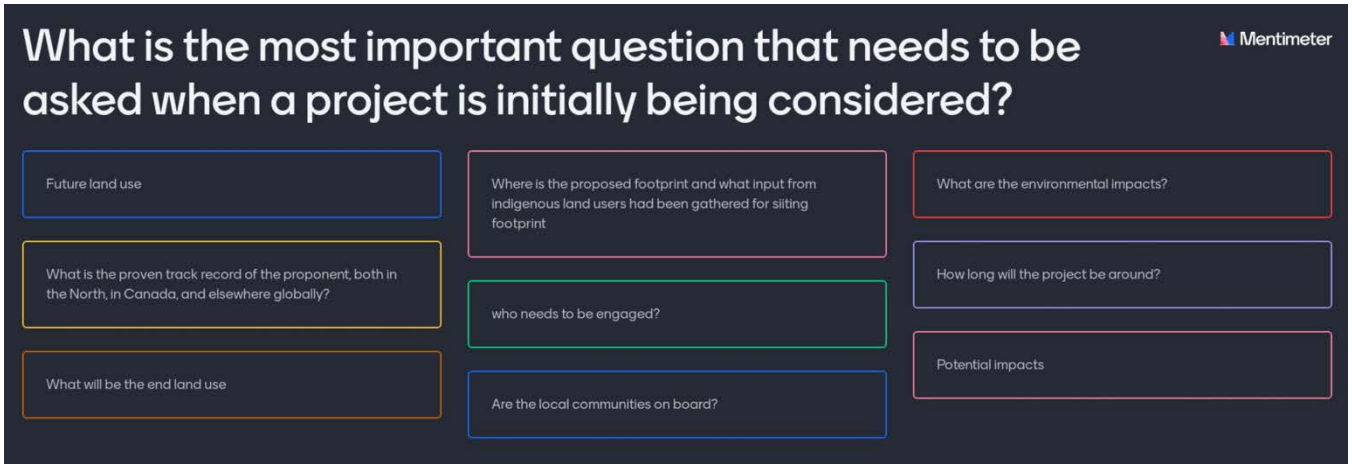
Day 2

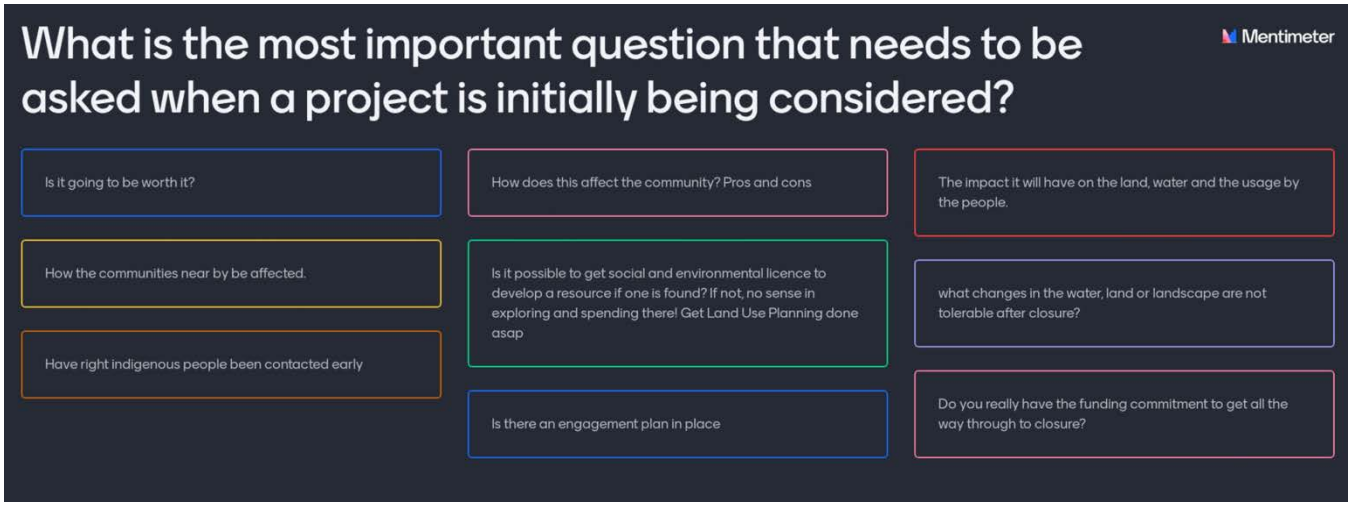
Share one thing that caught your interest from yesterday's discussion.



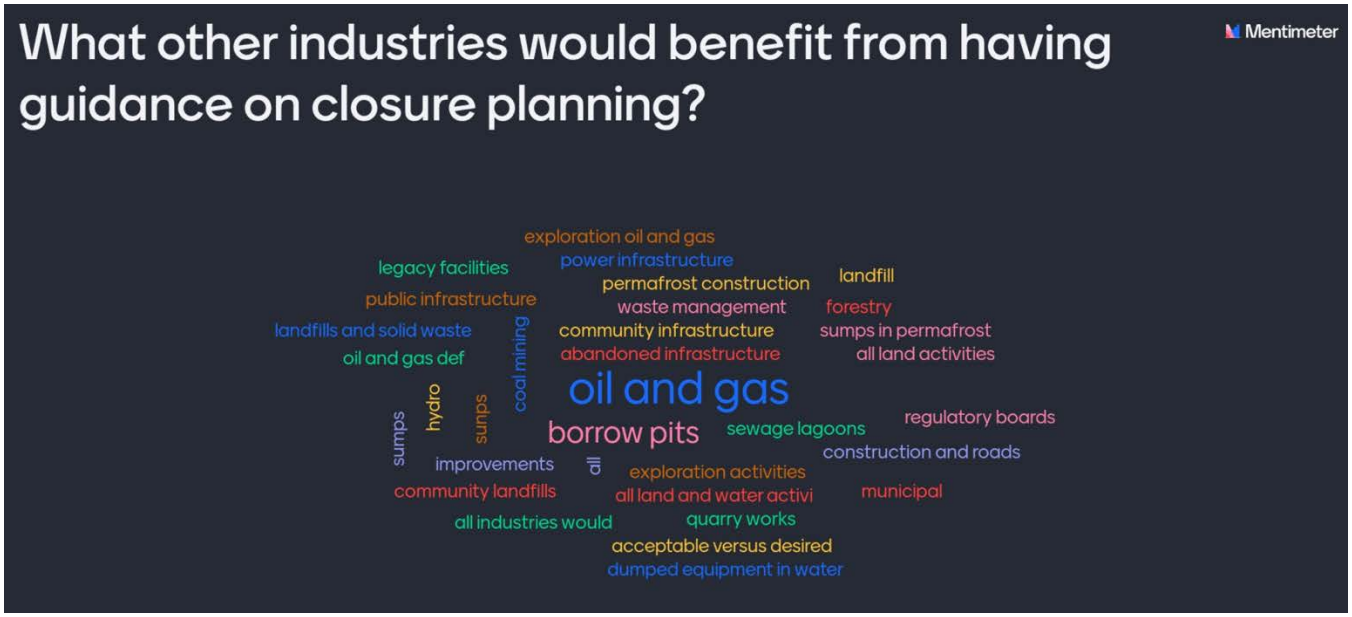
What is the most important question that needs to be asked when a project is initially being considered?







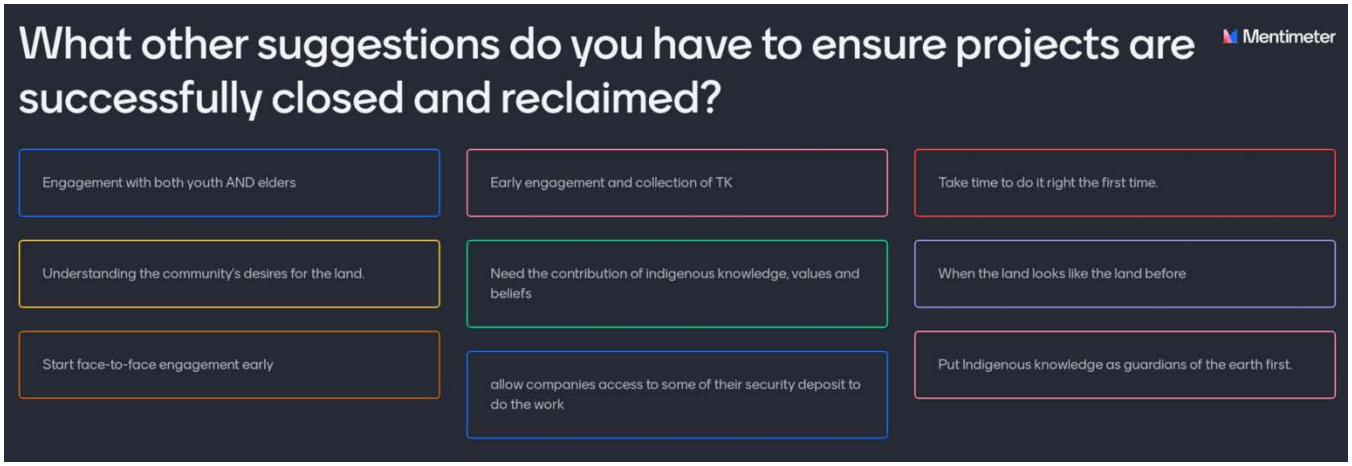
What other industries would benefit from having guidance on closure planning?

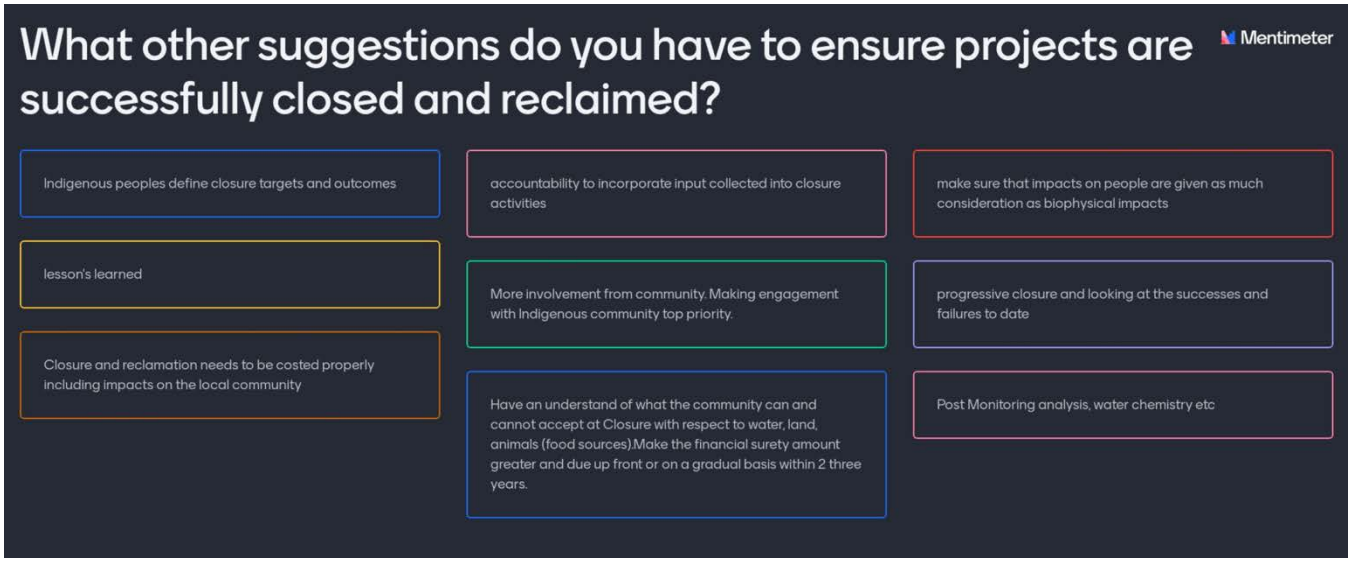


What do people need to be more involved in closure planning in the Mackenzie Valley?

How important is it to be engaged in these ways during the closure planning process?

What other suggestions do you have to ensure projects are successfully closed and reclaimed?




What other suggestions do you have to ensure projects are successfully closed and reclaimed?
Mentimeter
Indigenous peoples define closure targets and outcomes
accountability to incorporate input collected into closure activities
make sure that impacts on people are given as much consideration as biophysical impacts
lesson's learned
More involvement from community. Making engagement with Indigenous community top priority.
progressive closure and looking at the successes and failures to date
Closure and reclamation needs to be costed properly including impacts on the local community
Have an understand of what the community can and cannot accept at Closure with respect to water, land, animals (food sources).Make the financial surety amount greater and due up front or on a gradual basis within 2 three years.
Post Monitoring analysis, water chemistry etc


What other suggestions do you have to ensure projects are successfully closed and reclaimed?
Mentimeter
Long term social closure plannjng
allow reclamation deduction from royalties as it is a cost of mining
A clear relinquishment process
More involvement in options analysis during mine planning and closure planning.
Ensure all disciplines are engaged during the review process. Indigenous knowledge integrated in the FCRP with the scientific knowledge