Kami Mining Project

Champion Kami Partner Inc.

Wabush, NL

TSD IV: Best Available Controls and Technology Study Report

Environmental Impact Statement

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REPORT

The Best Available Control Technologies (BACT) Study for Greenhouse Gas Emissions

Champion Kami Project

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Executive Summary

This Best Available Control Technology (BACT) Study for Greenhouse Gas (GHG) Emissions has been prepared to support the Environmental Impact Statement (EIS) for the Kami Mining Project. The purpose of the BACT Study is to provide an overview of the Project's GHG emission sources and to demonstrate that the Project will employ BACT, in accordance with s.12.1 of the Newfoundland Labrador Regulation 116/18, under the *Management of Greenhouse Gas Act* (MGGA).

The previous EIS estimated that the Project would emit 309 kilotonnes (kt) of carbon dioxide equivalent (CO_2e) on an annual basis during Operations (Alderon 2012). Since then, Champion has undertaken comprehensive engineering studies and incorporated technologies and practices into the Project, based on the findings, to reduce Project-related GHG emissions. The most significant of these measures, in terms of GHG emission reductions, is the proposed in-pit crusher and conveyor (IPCC) system for waste haulage. Based on pre-feasibility level engineering, the IPCC system is anticipated to reduce diesel consumption, and associated GHG emissions, by over half (over approximately 500,000 t CO_2e) at the Project, compared to conventional diesel haulage. Implementing this measure represents a significant reduction in GHG emissions for the Project, compared to the status quo (conventional diesel haulage).

The Project, as currently defined, is anticipated to emit approximately 64 kt CO_2e on an annual basis during Operations, representing a reduction of nearly 80% compared to the GHG emissions estimated in the previous EIS. As with the previous version of the Project, diesel combustion from the mobile fleet remains the main source of GHG emissions; accordingly, the BACT Study focused primarily on this emission source. However, it also considered other contributors to the Project's GHG emissions, including stationary combustion sources and loss of carbon sinks.

A BAT/BEP assessment was carried out, based on requirements in accordance with s.12.1 of the Newfoundland Labrador Regulation, under MGGA, to demonstrate that the Project plans to employ BACT for each identified emission source. Furthermore, the BACT Study provides a framework to build upon for future iterations of BAT/BEP assessments. The framework used to assess the BAT/BEP measures follows a stepped approach that evaluates technical feasibility, GHG reduction potential, economic feasibility and any additional considerations.

Based on the BAT/BEP assessment, there are no additional BAT/BEP measures that are considered to be technically feasible and have a high economic feasibility rating at this time. Therefore, the study demonstrates that the Project has incorporated BACT. Champion's feasibility study is planned for completion in 2026, and ongoing design optimization work for the Project is anticipated during this stage. Champion has committed to continue their evaluation of select BAT/BEP measures as the Project progresses to detailed engineering design and technologies under consideration continue to mature.

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1.0 INTRODUCTION

The Best Available Control Technology (BACT) Study for Greenhouse Gas (GHG) Emissions has been developed for the Champion Iron Limited (Champion) Kamistiatusset (Kami) Iron Ore Mine Project (the Project) to satisfy the relevant requirements of the Environmental Impact Statement (EIS), relating to Regulation 116/18 *Management of Greenhouse Gas Regulations* under the *Management of Greenhouse Gas Act* (MGGA) (Government of Newfoundland and Labrador 2019). Section 12.1 of the regulation states the following:

"An industrial facility is considered to meet the best available control technology requirements where the Lieutenant-Governor in Council is satisfied that the combination of machinery and equipment in the industrial facility:

(a) has the most effective greenhouse gas emissions control;

(b) has proven performance and reliability in comparable industrial facilities;

(c) is economically feasible, based on consultation with the operator; and

(d) complies with an Act or regulation relating to air pollution, occupational health and safety and fire and life safety."

The objective of the BACT Study is to provide an overview of the Project's GHG emission sources, an assessment of best available technologies and best environmental practices (BAT/BEP) based on requirements in accordance with s.12.1, under MGGA, and a rationale behind BAT/BEP measure selection for the Project. Furthermore, the BACT Study provides a framework to build upon for future iterations of BAT/BEP assessments.

1.1 Project Overview

The Kami Iron Ore Mine Project is a proposed iron ore mine in Newfoundland and Labrador. The Project site is located approximately 7 km southwest of the Town of Wabush, 10 km south of the Town of Labrador City, and 5 km northeast of the Town of Fermont, Québec.

The Project was originally proposed by the Alderon Iron Ore Corporation (Alderon) and underwent a provincial and federal environmental impact assessment from 2011 to 2013, including a comprehensive baseline program that was completed in 2011 and 2012. The Project was released from the provincial and federal environmental assessment process in 2014. In 2021, Champion Iron Limited (through its subsidiary 12364042 Canada Inc, referred to as Champion in this report) completed the acquisition of the Project from Alderon.

Champion is proposing several improvements to the Project design proposed by Alderon through the previous EIS. These proposed improvements include optimizations to the Project's water management strategy and modernization of the proposed ore handling, conveyance, and processing. Champion's objective for the Kami Project is to produce high-purity (>67.5%) iron concentrate, which can be used as direct reduction pellet feed for electric arc furnaces in the green steel supply chain.

1.2 Project Schedule and Phases

The overall Project schedule is summarized in Table 1. The Project will be implemented in four principal phases:

- **Construction**—to construct the physical infrastructure and associated structures necessary to bring the proposed mine into production. Construction will occur over a period of four years once permits and approvals have been received.
- **Operations**—to extract and process selected minerals from the ore body. The mine will have an estimated operational mine life of 26 years.
- **Closure and post-closure**—to reclaim land within the Project footprint to permit future use by resident biota and for Traditional and other land-use activities. Closure will occur over a period of 10 years after mining is completed, followed by post-closure activities.

Table 1: Life of Mine Outlook

Project Phase	Duration	Years
Construction	4 years	Year -4 to -1
Operations	26 years	Year 0 to 25
Closure	10 years	Year 26 to 35
Post-closure	40 years	Year 36+

2.0 ASSESSMENT OF PROJECT GREENHOUSE GAS EMISSIONS

The GHG emissions assessment for the Project was prepared for the EIS (Champion 2025) and is presented in **Chapter 5: Air Quality and Climate**. A breakdown of the Project's direct and indirect GHG emission sources during the Construction, Operations and Closure phases are provided in Table 2. Post-closure GHG emissions are expected to be minimal and were therefore not included in the assessment.

Direct GHG emissions from the Project will be generated by fuel combustion (diesel, gasoline) in vehicles, stationary equipment, and in the use of mine explosives. Indirect GHG emissions from the Project will result from purchased electricity. There are also upstream and downstream GHG emissions which could be associated with the Project; however, these emissions are outside of the scope of this assessment.

Table 2: Breakdown of Greenhouse Gas Emission Sources

Emission Source	Fuel Type	Construction (Year -4 to -1)	Operations (Years 0 to 25)	Closure (Year 26 to 35)
Scope 1: Direct Greenhouse Gas Emissions				
Mine haulage trucks	Diesel	X	X	X
Mine mobile equipment	Diesel, gasoline	X	X	X
Mine explosives	Bulk emulsion	X	X	
Mine on-site electricity generators	Diesel	X	X	X
Mine general stationary fuel combustion	Diesel	X	X	X
Scope 2: Indirect Emissions				
Mine purchased electricity	Electricity	X	X	X
Mill purchased electricity	Electricity	X	X	X

Table 2 shows that all the phases share emission source categories, except for mine explosives, which are not used during Closure. Table 3 provides a summary of the total Project GHG emission during each phase, including both direct and indirect GHG emissions.

The direct GHG emission assessment was conducted using guidance from the document "A Guidance Document for Reporting Greenhouse Gas Emissions for Large Industry in Newfoundland and Labrador" published in March 2017 (Government of Newfoundland and Labrador 2017). Indirect GHG emissions, not regulated under the MGGA, were estimated using current projections of electricity grid intensities from Canada's First Biennial Transparency Report under the Paris Agreement (Government of Canada 2024).

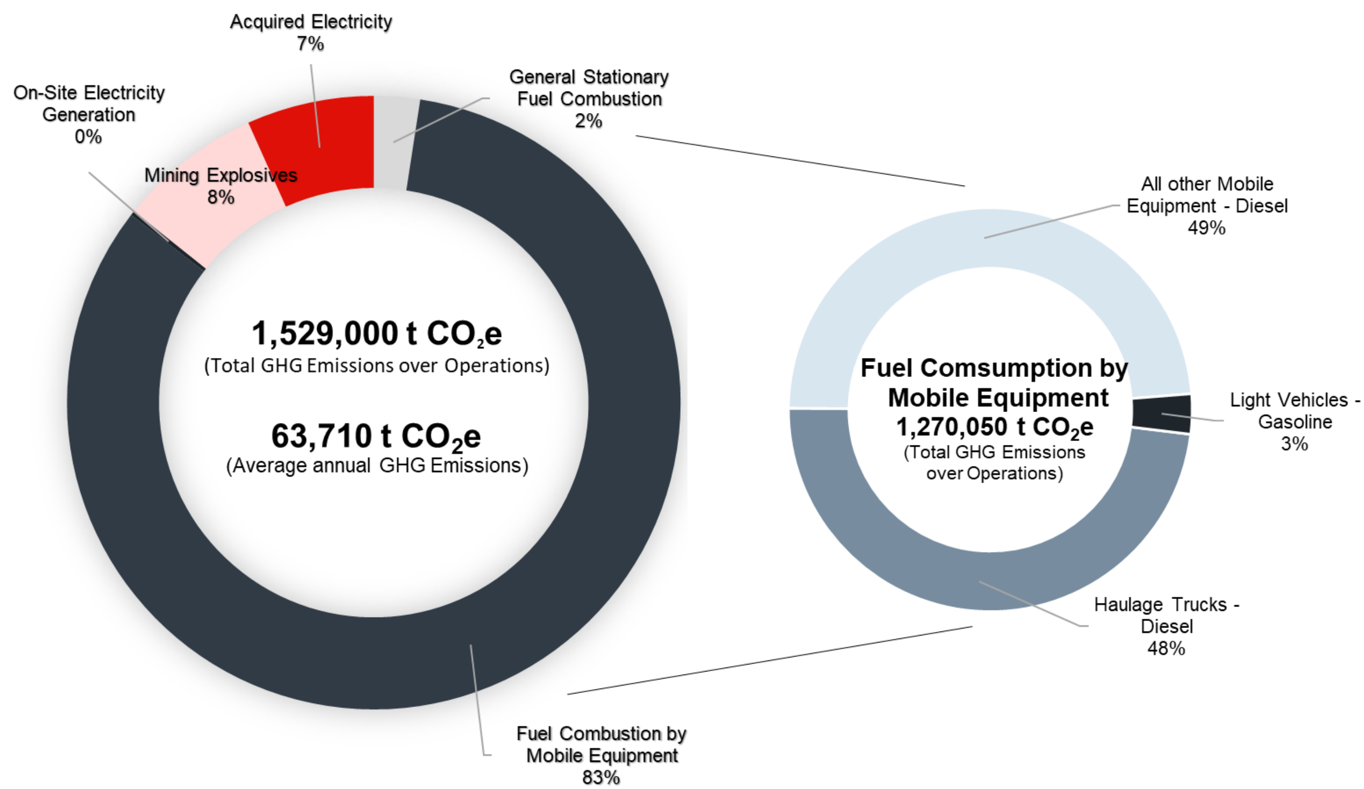
Table 3: Project Total and Average Greenhouse Gas Emissions (Direct and Indirect)

	Construction (Year -4 to -1)	Operations (Years 0 to 25)	Closure (Year 26 to 35)
Total GHG emissions (t CO_2e)	6,844	1,529,000	9,273
Average annual GHG emissions (t CO_2e per year)	1,711	63,710	4,636

GHG = greenhouse gas; t CO_2e = tonnes carbon dioxide equivalent.

Over the proposed life of mine, the Project will emit 1,545 kilotonnes (kt) carbon dioxide equivalent (CO_2e), where 99% of Project GHG emissions arise during the Operations phase. As such, the most significant opportunity to reduce Project GHG emissions lies within the Operations phase.

A further breakdown of Project GHG emissions related to the Operations phase, from years 0 to 25, is shown in Figure 1. This breakdown reveals that the majority (83%) of the GHG emissions are associated with fuel consumption in mobile equipment, which arise from two main sources: diesel-based haul trucks and diesel-based heavy equipment. Mining explosives (8%), acquired electricity (7%) and general stationary fuel combustion (2%) account for the remaining emission sources contributing to the Project GHG emissions. GHG emissions from on-site electricity generation is considered immaterial (0%).



t CO_2e = tonnes carbon dioxide equivalent; GHG = greenhouse gas.

Figure 1: Net Greenhouse Gas Emission during the Operations Phase

While not included in the net Project GHG emissions, additional consideration is given to loss of carbon sinks. Loss of carbon sinks due to land clearing were estimated as a loss of the ability of the cleared land to remove carbon from the atmosphere. Based on methods and inputs presented in the EIS (WSP 2025), it was estimated that the Project will result in the loss of sequestration of 87,000 t of CO_2, assuming a 100-year disturbance period.

2.1.1 Improvements from Previous Environmental Impact Statement

The previous EIS estimated that the Project would emit 308,729 t of CO_2e on an annual basis, with material haulage accounting for the largest share—equalling 209,500 t of CO_2e per year (Alderon 2012). This previous version of the Project relied on conventional hauling using haul trucks to transport ore and waste material.

Since then, Champion has undertaken comprehensive engineering studies to evaluate and identify the most cost-effective solutions for reducing GHG emissions associated with material haulage. As a result, an in-pit crusher and conveyor (IPCC) system has been incorporated into the Project design. The IPCC system will be used to transport mine rock from Rose Pit to the mine rock stockpile. The IPCC system is a semi-mobile structure that can be moved as the mining progresses through operations. Mine rock will be crushed by the IPCC system in the Rose Pit. Once crushed, mine rock will be conveyed up the pit ramp to surface, at which point it will be transferred to a conveyor. This overland conveyor will run for 2.5 km east to reach the mine rock stockpile.

The IPCC system optimizes waste haulage and reduces reliance on haul trucks, reducing the total number of haul trucks purchased by 30 trucks. Based on the internal engineering results, the IPCC system is estimated to reduce diesel consumption, and associated GHG emissions, by over half (over approximately 500,000 t CO_2e), compared to a conventional haulage fleet. Implementing this measure already represents a significant reduction in GHG emissions for the Project, compared to the status quo (conventional diesel haulage).

The second largest source of GHG emissions in the previous EIS was from the combustion of No. 2 fuel oil in boilers, accounting for 53,000 t of CO_2e per year (Alderon 2012). Champion have since replaced conventional boilers and incorporated electric boilers into the Project, avoiding nearly all the GHG emissions from this source.

Champion have also incorporated the following additional GHG emission measures into the Project (since the previous EIS) to further reduce Project-related GHG emissions:

- **Preserve carbon sinks**—Minimize areas of vegetation clearing and soil disturbance.
- **Prioritize electrical transmissions**—Install the transmission line within the first year of Construction to minimize consumption of diesel fuel for power.
- **Electric drills and shovels**—Champion plans to use six electric drills and four electric hydraulic shovels, rather than traditional diesel equipment.
- **Regular maintenance**—Regular vehicle maintenance will be undertaken to help maintain engine performance and fuel efficiency.
- **Anti-idling policy**—Policy that requires vehicles to be de-energized when not in use, such as during shift changes, when vehicles are unoccupied, and during loading of material.
- **Electric heating**—Champion plans to use electric heating in place of conventional fuel-based heaters. There are no current heating loads where fuel is combusted.
- **Energy efficiency**—The Project has accounted for the use of energy efficient equipment in the Mill and other buildings, where practical.

These proposed improvements result in an overall reduction of nearly 80% in GHG emissions compared to estimates in the previous EIS. Please note these reductions are based on the current Project definition and may be subject to change as the Project design progresses and technical and economic considerations are further evaluated.

3.0 BEST AVAILABLE TECHNOLOGIES AND BEST ENVIRONMENTAL PRACTICES ASSESSMENT

3.1 Methods

The steps followed to undertake the assessment of BAT/BEP measures to reduce Project-related GHG emissions include the following:

- **Step 1**—Listing of BAT/BEP measures that could potentially be applicable to the Project.
- **Step 2**—Analysis of the technology feasibility of the BAT/BEP measures. The list of technologies and practices was screened down to a shorter list of those that are technically feasible for the Project.
- **Step 3**—Analysis of the GHG reduction potential of the BAT/BEP measures carried forward.
- **Step 4**—Economic feasibility assessment of the BAT/BEPs carried forward. The list of BAT/BEP measures was screened down to a shorter list of those that are economically feasible for the Project.
- **Step 5**—Identify any additional considerations of the BAT/BEP measures carried forward.

The final step summarizes the assessment results and provides the rationale on whether the BAT/BEP will be selected for implementation at the Project. The BACT Study process outlined in this report is considered preliminary and reflects currently available information; however, it can be performed iteratively over the lifetime of a Project.

3.1.1 Step 1: Listing of Best Available Technologies and Best Environmental Practices Measures

A list of the BAT/BEP measures has been developed and is provided in Table 4, that address the main emission sources identified in Table 2.

Table 4: List of Best Available Technologies and Best Environmental Practices Measures

Emission Source	BAT/BEP Measure	Brief Description
Mobile fleet	IPCC (expand for ore)	Use of belt, pipe, or other electric conveyance system to transport materials.
	Battery electric haul vehicles	Vehicles designed with an electric powertrain powered by batteries.
	Hybrid electric haul vehicles	Vehicles designed with a hybrid powertrain to reduce fuel consumption and allow for more efficient use of the internal combustion engine. The electric drive technology is powered by a battery pack, which can charge when braking or with any extra power not used when the vehicle is moving.
	Electric tether or trolley-assisted haulage	Haul trucks with electric (or hybrid) powertrains, whereby it can connect or “tether” to an electrical source along key portions of a haul route, such as mine ramps, where energy needs are greatest.
	Hydrogen fuel cell haul trucks	Vehicles designed with an electric powertrain powered by fuel cells run on hydrogen gas.
	Biodiesel	Diesel fuel derived from biomass using the transesterification process, often used in blends with petroleum diesel.
	Renewable diesel	Renewable diesel is derived from biomass and is chemically identical to petroleum derived diesel. This allows for it to be used in existing vehicles and infrastructure made for conventional diesel.
	Hydrogen gas	Vehicle retrofits allow hydrogen-diesel fuel blends to be used for internal combustion engines.
	Autonomous vehicles	Automated vehicles, equipped with various sensors, GPS and advanced software to navigate and perform tasks in complex mining conditions.
	Fleet management	The coordination and oversight of a mine’s mobile fleet to ensure that equipment is used efficiently and maintained properly.
Stationary combustion – mine explosives	Surface miners	Continuous miners are a class of equipment that are electrically powered and use rotary cutter(s) to excavate material. The material is typically collected by gathering arms and fed to the rear of the machine via conveyor. This technology is commonly used in soft-rock operations. Continuous miners can be operated remotely or automated and are often used in conjunction with a conveyor system to achieve higher efficiency.
	Biodiesel	Diesel fuel derived from biomass using the transesterification process, often used in blends with petroleum diesel.
	Renewable diesel	Renewable diesel is derived from biomass and is chemically identical to petroleum derived diesel. This allows for it to be used interchangeably with conventional diesel.

Table 4: List of Best Available Technologies and Best Environmental Practices Measures

Emission Source	BAT/BEP Measure	Brief Description
Stationary combustion	Electric tether	Electric equipment can be tethered to an electrical source when in operation.
	Battery-powered	Electric equipment can be powered by batteries when in operation.
	Renewable diesel	Renewable diesel is derived from biomass and is chemically identical to petroleum derived diesel. This allows for it to be used in existing equipment made for conventional diesel.
	Biodiesel	Diesel fuel derived from biomass using the transesterification process, often used in blends with petroleum diesel.
	Hydrogen gas	Engine retrofits allow hydrogen-diesel fuel blends to be used for internal combustion engines.
Carbon sinks	Early rehabilitation	Areas where vegetation has been removed will be revegetated quickly and to the greatest extent possible with plants native to the region through progressive rehabilitation activities. As vegetation in reclaimed areas mature, carbon dioxide will be actively sequestered; therefore, re-establishing carbon sinks in disturbed areas as quickly as possible is considered an important progressive closure planning principle.

BAT/BEP = best available technologies and best environmental practices; IPCC = in-pit crusher and conveyor.

3.1.2 Step 2: Technical Feasibility Assessment

A technical feasibility assessment was conducted on each measure listed in Table 4. This assessment addresses technology readiness levels (TRLs), as defined in Table 5, as well as Project-specific regional conditions or limitations that impact the feasibility of the BAT/BEP measure.

This step specifically addresses the requirement stated in Section 12.1 of the regulation that the (measure)*:*

(b) has proven performance and reliability in comparable industrial facilities;

A measure is defined to be technically feasibility if the TRL is classified as 9, has proven performance and reliability in comparable industrial facilities, and for which there are no known technical limitations that would prevent its implementation. Measures with a TRL less than 9 are not considered to be technically feasible at this stage and are removed from subsequent assessment steps. However, while a measure with a TRL of 8 or 9 (with technical limitations) will not be considered technically feasible at the time of study, they will be identified for further study.

The results of the analysis of technical feasibility are discussed for each measure identified in Step 1 in Section 3.2, Assessment Results and Rationale.

Table 5: Technology Readiness Levels

TRL	Definition
Level 1: Basic principles of concept are observed and reported.	Scientific research begins to be translated into applied research and development. Activities might include paper studies of a technology's basic properties.
Level 2: Technology concept and/or application formulated.	Invention begins. Once basic principles are observed, practical applications can be invented. Activities are limited to analytic studies.
Level 3: Analytical and experimental critical function and/or proof of concept.	Active research and development is initiated. This includes analytical studies and/or laboratory studies. Activities might include components that are not yet integrated or representative.
Level 4: Component and/or validation in a laboratory environment.	Basic technological components are integrated to establish that they will work together. Activities include integration of ad hoc hardware in the laboratory.

Table 5: Technology Readiness Levels

TRL	Definition
Level 5: Component and/or validation in a simulated environment.	The basic technological components are integrated for testing in a simulated environment. Activities include laboratory integration of components.
Level 6: System/subsystem model or prototype demonstration in a simulated environment.	A model or prototype that represents a near desired configuration. Activities include testing in a simulated operational environment or laboratory.
Level 7: Prototype ready for demonstration in an appropriate operational environment.	Prototype at planned operational level and is ready for demonstration in an operational environment. Activities include prototype field testing.
Level 8: Actual technology completed and qualified through tests and demonstrations.	Technology has been proven to work in its final form and under expected conditions. Activities include developmental testing and evaluation of whether it will meet operational requirements.
Level 9: Actual technology proven through successful deployment in an operational setting.	Actual application of the technology in its final form and under real-life conditions, such as those encountered in operational tests and evaluations. Activities include using the innovation under operational conditions.

Source: (Government of Canada 2018).
TRL = technology readiness level.

3.1.3 Step 3: Greenhouse Gas Reduction Potential

A Project-specific GHG reduction potential has been estimated for the measures that were deemed technically feasible in Step 2. The GHG emission reduction potential is defined as the amount of GHG emissions that may be reduced with the BAT/BEP measure, relative to total Project GHG emissions.

This step specifically addresses the requirement stated in Section 12.1 of the regulation that the (measure)*:*

(a) has the most effective greenhouse gas emissions control;

A measure is defined to have a high GHG emission reduction potential if its implementation would reduce total Project GHG emissions by 25% or more. A moderate and a low GHG emission reduction potential if its implementation would reduce total Project GHG emissions by between 5% to 25% and less than 5%, respectively. Measures found to provide no reduction in GHG emissions or an increase in emissions at this step were eliminated and not carried forward to the next step. Ratings of high, medium or low GHG reduction potential are not considered in the elimination of measures but are instead provided to enable the eventual prioritization of technologies and practices if more than one was available for a given emission source.

While certain technologies and practices may provide a reduction in direct GHG emissions, they can also result in significant increases in upstream or downstream GHG emissions. When evaluating and discussing shifts in GHG emissions across various sources, upstream emissions are also included, where applicable.

The results of the analysis of GHG reduction potential are discussed in Section 3.2 for each measure identified as technically feasible from Step 2.

3.1.4 Step 4: Economic Feasibility Assessment

Evaluation of economic feasibility is based on the difference in capital and/or operational cost of the BAT/BEP measure relative to the cost currently defined by the Project.

> This step specifically addresses the requirement stated in Section 12.1 of the regulation that the (measure):
>
> *(c) is economically feasible, based on consultation with the operator.*

The economic feasibility assessment is a qualitative evaluation based on order of magnitude level costing information, informed by publicly available sources. Some measures have more detailed cost estimates available based on previous study carried out by Champion. Both capital costs and long-term operating costs will be estimated to evaluate total lifetime costs compared to the currently defined Project. Total lifetime costs, when expressed in today's monetary terms, are referred to as net present cost (NPC), a valuable tool for economic evaluation. While NPC is not being formally calculated in the BACT Study, the concept of NPC will be applied at a high level to compare the relative cost-effectiveness of different measures.

While NPC is a valuable tool for economic evaluation, a higher capital expenditure can limit the economic feasibility of a measure. Upfront capital investments are difficult to justify in mining as it can take several years for operations to become revenue-generating, making it challenging to balance high initial costs with delayed financial returns. Therefore, whether a measure has additional capital expenditure compared to the currently defined Project will be incorporated into the economic feasibility rating.

A measure is defined to have a high economic feasibility if its implementation would result in a lower NPC compared to the currently defined Project, and would require no additional capital expenditure. A moderate economic feasibility is defined by a lower NPC compared to the currently defined Project, but requires additional capital expenditure. A low economic feasibility is defined by a higher NPC compared to the currently defined Project. Measures that are found to have a low economic feasibility are eliminated from the process at this step. Measures that are found to have a high economic feasibility may be considered for implementation. Measures that are found to have a moderate economic feasibility may be considered for implementation at a later stage.

The results of the analysis of economic feasibility are discussed in Section 3.2 for each measure shown to have a GHG emission reduction potential in Step 3.

3.1.5 Step 5: Additional Considerations

Evaluation of additional considerations of the BAT/BEP measure carried forward that would provide additional rationale for implementation (or removal). Such considerations would also include identified adverse impacts on social, health or environment.

> This step specifically addresses the requirement stated in Section 12.1 of the regulation that the (measure):
>
> *(d) complies with an Act or regulation relating to air pollution, occupational health and safety and fire and life safety*

The potential effects are discussed for each measure in Section 3.2 carried forward from Step 4, where any additional considerations are identified.

3.2 Assessment Results and Rationale

This section provides an overview of the major emissions sources for the Project, followed by the assessment results for each measure identified in Table 4, including discussion on technical feasibility, GHG reduction potential, and economic feasibility, where applicable. The results and rationale for each step are also presented below and the final results are summarized in Section 3.3, Summary.

3.2.1 Mobile Fleet

This category accounts for the largest source of GHG emissions for the Project. The Project has currently proposed a haulage system which uses an IPCC system to crush and transport waste rock from the pit to the waste stockpile, and a fleet of haul trucks to transport ore from the pit to the primary crusher. With the exception of four electric shovels and six electric drills, the Project has a primarily diesel-based fleet, including haul trucks, loaders, excavators, bulldozers, and all other support equipment.

The use of mobile equipment peaks during Operations and is estimated to emit approximately 53,000 kt of GHG emissions per year, where the majority (97%) relate specifically to diesel-fuelled equipment. Haul trucks are estimated to consume approximately 9,200 kilolitres (kL) of diesel per year and all other mine equipment are estimated to consume approximately 9,450 kL of diesel per year. Each source accounting for approximately 40% of the Project GHG emissions.

Light vehicles, or personnel vehicle, consist of a gasoline-based fleet of pickup trucks, and are estimated to consume approximately 714 kL of gasoline per year, accounting for 2.5% of the Project GHG emissions.

The following measures were assessed to address mobile fleet GHG emissions: electrification, fuel switching, autonomous equipment, anti-idling policy, and fleet management systems (FMS).

3.2.1.1 Electrification

Electrification of an activity involves transitioning equipment that operate on conventional internal combustion engines (ICEs) powered by fuel combustion (such as diesel) to equipment that uses electric motors and drivetrains powered by electricity, either directly (through a power connection) or indirectly (via batteries or fuel cells). Electric motors are generally more efficient than ICEs, converting a higher percentage of electrical energy into mechanical energy, resulting in less energy waste and lower overall energy consumption.

Electrifying activities at the Project is an appropriate GHG emission reduction measure as the mine is supplied by a low-carbon intensity power source.

3.2.1.1.1 In-Pit Crusher and Conveyor (Expand for Ore)

As identified in Section 2.1.1, Improvements from Previous Environmental Impact Statement, the Project includes an IPCC system that will be used to transport waste rock from in-pit to the waste rock stockpiles. While the waste rock haulage is handled by the IPCC, the ore would continue to use conventional ICEs for transport to the primary crusher.

It is technically feasible to build on the current IPCC system to include the transport of ore material from the pit to the mill, in addition to the waste rock crushing and conveying. Based on pre-feasibility level engineering, incorporating ore crushing and conveyance into the IPCC system will reduce diesel consumption and associated Project GHG emissions by approximately 10%. Due to the reduced fuel consumption, Champion's preliminary engineering study shows that an IPCC system handling both ore and waste rock is economically feasible, and has a slightly improved NPC, compared to the IPCC system handling waste rock only. While the NPC is positive, there is an additional consideration related to a significant increase in required capital cost to construct additional crushing capacity and an additional conveyance system to the mill. Increasing capital costs at the beginning of the mine life, before any operating income, poses an economic barrier for implementation. A delayed approach has been considered for the IPCC system; however, it requires further evaluation.

IPCC for ore and waste will be carried through for future study and re-evaluated during detailed engineering design.

3.2.1.1.2 Battery Electric Vehicles

Battery electric vehicles (BEVs) power an electric drivetrain using batteries, eliminating the need for an ICE. Passenger vehicle BEVs are becoming common place on our roadways. Whereas the technology to enable commercialization and adoption for larger heavy-duty vehicles, such as haul trucks, is lagging behind the relatively smaller support equipment. The use of BEVs for surface haulage is at an advanced demonstration phase (TRL=8), where the two leading companies, Caterpillar and Komatsu, have electric haul trucks in testing, with aims for commercialization before 2030 (Jaswani 2024). Newmont have partnered with Caterpillar, and commissioned its first Early Learner Cat 793 XE at Newmont's Cripple Creek and Victor mine (USA) for operational testing in 2024 (Newmont 2024). While battery technology has sufficiently advanced to meet the performance demands of electric haul trucks, additional testing and proven operational performance are required for it to be considered technically feasible. BEVs for heavy equipment will be carried through for future study and re-evaluated during detailed engineering design.

Considering personnel transportation, Ford and GMC have both commercialized EV pickup trucks, which have seen successful adoption in Australian mines (TRL=9). In addition, Miller Technology, based in North Bay, Ontario, have commercialized their conversion kits for the Toyota Land Cruiser. These conversion kits have successfully converted diesel engines to lithium-ion battery at the Young-Davidson underground gold mine in Ontario (Miller 2022). While colder conditions are known to reduce battery ranges, there are operational procedures that can be implemented to avoid large winter range losses.

BEVs have zero tailpipe emissions and minimal indirect GHG emissions as the Project's electricity generation has a low GHG emission intensity; therefore, BEVs could potentially reduce nearly all the GHG emissions associated with light vehicles (<3% of the Project GHG emissions).

Comparing Ford's F-150 lightning (electric vehicle model) to the conventional F-150, the capital cost of BEVs is about 20% higher. While capital costs are higher, the operational savings from fuel costs are expected to offset the upfront expenses for the truck and the additional charging infrastructure (Riley 2024), resulting in a positive NPC. There are no adverse considerations identified.

This BEV option will be carried through for future study and re-evaluated during detailed engineering design, which will focus on available results from additional testing in colder environments.

3.2.1.1.3 Hybrid Electric

Hybrid electric vehicles for mining equipment is an emerging technology aimed at enhancing fuel efficiency and reducing emissions in heavy-duty vehicles. These trucks employ a hybrid powertrain that optimizes the ICE and integrates a smaller battery pack for the electric drive. The electric drive, powered by the battery pack, can provide additional acceleration, enabling the ICE to operate at more efficient speeds. This technology is particularly relevant for mining equipment, where BEVs are not feasible. Hybrid underground mine loaders have been through several commercial designs, with Komatsu launching the first hybrid loader in 2016. While hybrid electric excavators for surface fleets are also commercially available, hybrid electric haul trucks are in an earlier stage of development (TRL=8). Cummins is currently conducting field testing of their newly launched 220 t hybrid electric haul truck, commissioned at Baiun iron mine in 2024 (China) (International Mining 2024). First Mode Inc., who are also in partnership with Anglo American designing fuel cell electric vehicle haul trucks, offer hybrid electric retrofitting for two Komatsu haul truck platforms (First Mode 2024).

Similar to the BEVs, additional testing and proven operational performance are required for it to be considered technically feasible for heavy-duty vehicles. Hybrid electric vehicles will be carried through for future study and re-evaluated during detailed engineering design.

3.2.1.1.4 Electric Tether or Trolley-Assist

Mining equipment equipped with an electric tether can operate on a pure electric powertrain (BEV, fuel cell) or a hybrid powertrain where it can tether to an electrical source but can also run on an ICE when disconnected. Electric tethering has been commercially available for excavators, loaders and drills for many years for both open-pit and underground operations (TRL=9). As identified in Section 2.1.1, Champion plans to implement six electric drills and four electric hydraulic shovels at the Project. In addition, Champion have considered this technology for haul trucks, better known as “trolley-assist.” Implementation requires construction of electrical infrastructure along a portion of the haul route, and retrofitted haul trucks which connect to an overhead pantograph, or retractable arm, to connect to the power grid. Considering the installed electrical infrastructure required, these systems are best suited for more permanent haul routes and ramp sections, where trucks consume the most energy (and fuel), often driving fully loaded uphill. This technology is considered to be technically feasible, as seen through successful adoption at Boliden’s open-pit mine (Sweden) and Hudbay’s Copper Mountain (British Columbia).

While connected to an electrical source, there are zero tailpipe emissions and minimal indirect GHG emissions as the Project’s electricity generation has a low GHG emission intensity. However, based on pre-feasibility level engineering, the current IPCC system offers greater GHG emission reductions over a trolley-assist system installed on pit ramps, when compared to conventional haulage.

Trolley-assist (on ramps) will be carried through for future study and re-evaluated during detailed engineering design. Particular consideration would be given to trolley-assist (on ramps), if battery electric haul truck technology matures and can demonstrate proven performance in similar mine environments. In such a scenario, trolley-assist would enable a longer range for a battery electric haul fleet and could improve its overall technical and economic feasibility.

3.2.1.1.5 Hydrogen Fuel Cell

Hydrogen fuel cell electric vehicles are powered by hydrogen, which reacts with oxygen in a fuel cell to generate electricity, driving electric motors. This process produces only water vapour as a by-product. Fuel cell electric vehicles boast a significantly higher energy-to-weight ratio compared to BEVs, enabling greater energy storage, extended range, and reduced vehicle weight (Furo Systems 2018).

This technology has advanced into a demonstration phase (TRL=8) when relating to haul trucks, where Komatsu are continuing trials at their Arizona Proving Grounds, as well as the Mogalakwena (Anglo American) platinum mine in South Africa. While the technology is maturing, proven operational performance in a similar mine environment is required to be considered technical feasibility.

Furthermore, the current production of low-carbon hydrogen is both expensive and limited globally. Alberta is the largest hydrogen producer in Canada; however, they mostly produce grey hydrogen from steam methane reforming, venting process emissions to atmosphere (which has a higher emission intensity compared to “green” or “blue” hydrogen) (Government of Alberta 2024). Further to supply limitations, there are no bankable plans for national distribution networks, especially for reaching more remote sites. The current limited infrastructure for producing and delivering low-carbon hydrogen presents a significant barrier for implementation and will therefore likely not be carried forward to future study.

3.2.1.2 Fuel Switching

Fuel switching involves replacing higher carbon intensity fuels, such as diesel, with lower-carbon fuels like biodiesel, renewable diesel, or hydrogen. Depending on the chosen power generation equipment, some fuels can readily replace others without requiring any equipment or vehicle modifications or upgrades. These are called drop-in fuels and are discussed further in the following sections.

3.2.1.2.1 Biodiesel

Biodiesel is made by trans esterifying biomass feedstocks like oils, fats, and algae. Blends up to 20% (B20) can generally be used with little to no modifications to engine or fuelling infrastructure (Advanced Biofuels Canada 2024). Blends of 5% are considered common practice for many mining operations, especially during warmer months (TRL=9). For mobile fleet considerations in colder environments, selecting the appropriate biodiesel blend is critical, since higher biodiesel concentrations can increase the risk of fuel gelling and reduce cold-weather reliability. While standard diesel will tend to gel at around -40°C, biodiesel is closer to 0°C and is influenced by its constituent feedstock. A 10% blend (B10) was employed in a large, long-haul trucking fleet, through the full temperature range of an Alberta winter without additization or kerosene (Advanced Biofuels Canada 2024). As such, a B10 blend may perform adequately regarding cold flow for the surface mobile fleet of the Project.

Based on discussions with the diesel provider for the Project, Champion will not be able to secure biodiesel for the Project. Therefore, although biodiesel has proven performance and reliability in comparable operations and environmental conditions, due to regional procurement limitations, biodiesel is not a technically feasible option.

Biodiesel will be carried through for future study and re-evaluated during detailed engineering design, on the basis that procurement options have been identified.

3.2.1.2.2 Renewable Diesel

Renewable diesel, derived from biomass through processes such as hydrotreating, gasification, and pyrolysis, is chemically identical to petroleum diesel. As a “drop-in” fuel, it can directly substitute petroleum diesel without blending, allowing for 100% replacement in equipment and vehicles.

Renewable diesel has been successfully implemented across many industries, including mining (TRL=9). Rio Tinto’s Borax mine in California and Hudbay’s Copper Mountain (British Columbia) have successfully transitioned to using renewable diesel from conventional diesel in their mobile fleet equipment, demonstrating its readiness for implementation.

Canada is increasing production of renewable diesel, which is projected to be approximately 11 million litres per day (CER 2023). While there is a large production facility in Newfoundland (Braya Renewable Fuels), it is unclear whether the Project would have access to purchase, due to the high global demand. Based on discussions with the diesel provider servicing the region, Champion would not be able to secure renewable diesel for the Project. Therefore, due to regional limitations, renewable diesel is not a technically feasible option.

Renewable diesel will be carried through for future study and re-evaluated during detailed engineering design, on the basis that procurement options have been identified.

3.2.1.2.3 Hydrogen

Conventional diesel haul trucks can be retrofitted to accommodate hydrogen-diesel blends of up to 90% (New Atlas 2022), requiring a hydrogen injection system retrofit. However, there are no known examples of hydrogen used, or tested in mobile fleets (TRL=7/8). Furthermore, as identified in Section 3.2.1.1.5, Hydrogen Fuel Cell, current limited infrastructure for producing and delivering low-carbon hydrogen presents a significant barrier for implementation and will therefore likely not be carried forward to future study.

3.2.1.3 Autonomous Vehicles

The use of autonomous vehicles in mining fleets offers significant benefits, particularly in terms of safety and personnel allocation. Autonomous haulage systems (AHS) use on-board vehicle controllers, GPS, and obstacle detection and avoidance systems to operate mine equipment remotely.
This technology reduces the need for human operators, thereby minimizing the risk of accidents and improving overall safety.

Autonomous hauling in mining is becoming widely adopted worldwide, with Australian mine sites using the largest number of autonomous vehicles (TRL=9). Suncor's oil field operations in Alberta are also a leader in AHS deployment, with plans to deploy 91 AHS trucks by end of 2024 (Suncor 2024).

Based on pre-feasibility level engineering, Champion found that implementing AHS to the Project results in a 3% reduction in Project GHG emissions. Implementing AHS is expected to increase the capital costs of the haul trucks by 50%, along with additional AHS costs for communication systems. However, there are significant operational savings, including reduced fuel and labour costs while increasing productivity and traffic safety (Engholm et al. 2020), which ultimately results in a comparable NPC.

While the technology reduces the need for human operators and improves overall safety, it consequently may result in lower employment opportunity. A reduced workforce may impact social aspects of the Project. Alternatively, due to the remote location, AHS could be a benefit to the Project if there is not sufficient skilled labour in the region.

AHS technology will be carried through for future study and re-evaluated during detailed engineering design.

3.2.1.4 Fleet Management Systems

FMS that use on-board tracking devices can provide real-time data that enhances planning and use of underground mining equipment. These systems enable dispatchers to make immediate adjustments to which can reduce queue times and minimize idling. This directly cuts down on unnecessary fuel consumption and emissions, given mine equipment spends approximately 40% of its time idling (Scales 2018). Additionally, FMS optimize refuelling schedules and vehicle routes, ensuring that equipment operate more efficiently.

This technology is available for near-term implementation with a range of vendors providing FMS for mine sites (TRL=9). Increasing equipment use, while eliminating unnecessary idling time is estimated to reduce total mobile fleet emissions by about 3% (Teck 2014), which would result in a total Project emission reduction of 2.5%. Teck Resources Ltd have achieved significant financial savings through their implementation of FMS adverse considerations identified.

FMS will be carried through for future study and re-evaluated during detailed engineering design.

3.2.2 Stationary Combustion (Mine Explosives)

Stationary combustion related to mine explosives are estimated to consume between 5,000 to 30,000 t of emulsion per year during Operations (until Y23), accounting for 8% of the Project GHG emissions. The emulsion type explosive has an assumed carbon content of 5.5%.

The following measures were assessed to address GHG emissions for stationary combustion related to mine explosives: surface miners (electrification) and fuel switching.

3.2.2.1 Surface Miners

This technology uses electric machinery with rotating cutterheads to excavate material. The excavated material is typically collected and fed to the rear of the machine via conveyor. This technology is primarily limited to soft rock although technology advancements are being pursued for hard rock applications, although there are no known test operations (TRL=7). Wirtgen group has commercialized a surface miner (2200SM); however, it is only designed for rock with compressive strength up to 35 megapascals (MPa; Wirtgen n.d.). The rockmass at the Project has a compressive strength >35 MPa; therefore, this technology is not considered feasible.

Considering current technology readiness level, this option will not be carried through for future study.

3.2.2.2 Fuel Switching

The emulsion used for blasting purposes most commonly uses a diesel-based mixture. Lower-carbon fuels like biodiesel and renewable diesel can readily replace diesel.

3.2.2.2.1 Biodiesel

While biodiesel can be developed as a promising substitute for emulsion explosives (Li et al. 2023), there are no reports of mine sites directly using biodiesel in their explosives (TRL=8). Furthermore, as outlined in Section 3.2.1.2.1, Biodiesel, the current limited availability for biodiesel in the region presents a significant barrier. Biodiesel will be carried through for future study and re-evaluated during detailed engineering design, on the basis that procurement options have been identified.

3.2.2.2.2 Renewable Diesel

While renewable diesel is chemically identical to diesel, there are no reports of mine sites directly using renewable diesel in their explosives (TRL=8). As outlined in Section 3.2.1.2.2, Renewable Diesel, the current limited availability for renewable diesel in the region presents a significant barrier. Renewable diesel will be carried through for future study and re-evaluated during detailed engineering design, on the basis that procurement options have been identified.

3.2.3 Stationary Combustion (General)

Stationary Combustion are estimated to consume approximately 550 kL of diesel per year during Operations, accounting for 2% of the Project GHG emissions. The Project has currently defined the following equipment under stationary combustion: mobile air compressor, welding machine, water pump and light plants. Water pumps account for the majority of the stationary combustion GHG emissions, estimated at approximately 90% of the associated GHG emissions.

The following measures were assessed to address stationary combustion GHG emissions: electrification and fuel switching.

3.2.3.1 Electrification

Electrification of an activity involves transitioning equipment that operate on a traditional ICE to equipment that use electric motors, either directly (through a power connection) or indirectly (via batteries or fuel cells). Electric motors are generally more efficient than ICEs, converting a higher percentage of electrical energy into mechanical energy, resulting in less energy waste and lower overall energy consumption.

Electrifying activities at the Project is an appropriate GHG emissions reduction as the mine is supplied by a low-carbon power source.

3.2.3.1.1 Electric Tether

Electric equipment can be tethered to an electrical source when in operation. This technology requires equipment to operate within a certain radius. While the underlying technology is commercially available (TRL=9), the specific applications of the equipment are often in remote areas or away from established electrical infrastructure.

This technology is therefore limited by supporting electrical infrastructure within the working radius of the equipment and is deemed not technically feasible at this time. This option will be carried through for future study to better understand the electrical infrastructure design and whether the equipment, or a portion of the equipment, can be tethered to an electrical source.

3.2.3.1.2 Battery-Powered

Electric equipment can be powered by batteries when in operation. In general, this technology is commercially available; however, specific equipment requiring high power output is not yet commercially available. Equipment under consideration, such as the heavy-duty air compressors, welding machines and water pumps needed for the Project require high power output. While power densities are improving in batteries, there are no known applications where battery performance has been proven for the heavy study machinery under the Project conditions (TRL=7/8).

Light plants, however, require less power output and are therefore commercially available and proven in industrial applications (TRL=9). Battery-powered light plants are self-contained units that provide portable lighting using LED floodlights, typically powered by lithium-based batteries. Lithium-ion batteries generally perform better in cold weather compared to traditional lead-acid batteries. They have a higher power density and can maintain their performance more effectively at low temperatures (UFine 2014).

While LED technology is efficient, battery-only towers may not be as bright or wide-reaching as large diesel units (Heavy Equipment Appraisal 2024), especially those lighting open-pit mines. Therefore, battery units might be used for specific zones or short-duration tasks, while a portion can remain diesel-fuelled to handle larger coverage. Based on this consideration, it is proposed that half of the light plants be battery-only and could therefore reduce up to 50% of the fuel. Light plants are expected to consume approximately 59,000 L of diesel per year during Operations, and halving that consumption would reduce GHG emissions by approximately 2,000 t CO_2e over the duration of the Project.

While upfront capital costs for battery-based equipment are higher (up to two to three times) than for conventional equipment, the long-term savings through reduced fuel costs and minimal maintenance (Optraffic 2024) is expected to outweigh the initial capital expense and result in a comparable NPC.

Furthermore, the aspect of safety should be properly considered, as identified above that the battery-only units are not as bright or wide-reaching as large diesel units. While certain units would remain diesel-based, proper consideration is needed to ensure that those units would be designated for certain activities that require wide-reaching visibility, especially where human safety is a concern.

3.2.3.2 Fuel Switching

Lower-carbon fuels like biodiesel and renewable diesel can readily replace (or partially replace) diesel in conventional ICE equipment.

3.2.3.2.1 Biodiesel

As outlined in Section 3.2.1.2.1, diesel blends of up to 20% (B20) can generally be used with little to no modifications to engine or fuelling infrastructure; however, the current limited availability for biodiesel in the region presents a significant barrier.

Biodiesel will be carried through for future study and re-evaluated during detailed engineering design, on the basis that procurement options have been identified.

3.2.3.2.2 Renewable Diesel

As outlined in Section 3.2.1.2.2, renewable diesel can be used as a drop-in fuel; however, the current limited availability for renewable diesel in the region presents a significant barrier.

Renewable diesel will be carried through for future study and re-evaluated during detailed engineering design, on the basis that procurement options have been identified.

3.2.3.2.3 Hydrogen Gas

As outlined in Section 3.2.1.2.3, Hydrogen, conventional ICEs can be retrofitted to accommodate hydrogen-diesel blends of up to 90% (New Atlas 2022), requiring a hydrogen injection system retrofit. However, current limited infrastructure for producing and delivering low-carbon hydrogen presents a significant barrier for implementation and will therefore likely not be carried forward to future study.

3.2.4 Electricity Reduction Opportunities

Electricity consumption is estimated to be between 1,000 to 1,200 gigawatt hours (GWh) per year during Operations, accounting for 7% of the Project GHG emissions. The processing equipment account for the majority of the indirect electrical GHG emissions, estimated to be between 83% and 97% of the associated GHG emissions.

The design of crushing and grinding circuits (comminution) is typically an extensive process wherein equipment selection is highly dependent on ore properties and the requirements of subsequent milling/concentration steps. Changing any one of the pieces of equipment could result in cascading changes throughout the mill. For this reason, the assessment of BAT/BEP measures for comminution was screened out due to technical feasibility.

3.2.5 Carbon Sinks

Rehabilitating carbon sinks after Project disturbance is a lengthy process, as it requires restoring soil health, reintroducing native plant species, and allowing ecosystems to gradually rebuild, all of which can take decades to fully regenerate.

An environmental practice is to implement revegetation protocols in disturbed areas as quickly and to the greatest extent as possible with plants native to the region through progressive rehabilitation activities. This will give those areas an opportunity to re-establish carbon sinks in disturbed areas as quickly as possible, and is considered an important progressive closure planning principle that is possible to implement at any mine operation (TRL=9).

It was estimated that the Project will result in the loss of sequestration from carbon sinks, by about 870 t CO_2 per year. As the majority of the disturbed areas will remain active during Operations, it is assumed that up to 10% of the disturbed area would be available for early rehabilitation. This work would increase upfront costs, and may ultimately result in a higher NPC. However, the work could be planned to take advantage of existing equipment and operator availability to minimize costs. Furthermore, this rehabilitation work will support closure planning by providing valuable insights into the suitability of various vegetation types. It is also expected to reduce costs at the time of closure, thereby lowering the amount of financial assurance required. There are no adverse considerations identified.

3.3 Summary

A summary of the BAT/BEP measure assessment is presented in Table 6. There were no measures that are considered to be technically feasible and have a high economic feasibility rating; however, it is recommended that there be a focused re-evaluation of the BAT/BEP measures that were carried through to Step 5 during detailed engineering. In addition, select technologies that are in early stages of commercialization or have known technical limitations that would prevent its implementation, will also be re-evaluated during detailed engineering, using updated technical and economical information.

Table 6: Summary of the Best Available Technologies and Best Environmental Practices Measure Assessment

Emission Source	Technology Process	Step 2: Technical Feasibility (TRL)	Step 3: GHG Reduction Potential	Step 4: Economic Feasibility	Step 5: Additional Considerations	Next Steps
Mobile fleet	IPCC (ore and waste rock)	Yes (9)	Moderate	Moderate	–	**Prioritize:** re-evaluate during detailed engineering design.
	Heavy equipment Battery electric *light vehicles*	No (8)	–	–	–	Re-evaluate during detailed engineering design.
		Yes (9)	Low	Moderate	–	**Prioritize:** re-evaluate during detailed engineering design.
	Hybrid electric	No (8)	–	–	–	Re-evaluate during detailed engineering design.
	Trolley-assist	Yes (9)	(negative)	–	–	Re-evaluate during detailed engineering design.
	Hydrogen fuel cell	No (8)	–	–	–	
	Renewable diesel	No (9)	–	–	–	Investigate procurement options
Mobile fleet	Biodiesel	No (9)	–	–	–	Investigate procurement options
	Hydrogen gas	No (7/8)	–	–	–	
	Autonomous vehicles	Yes (9)	Low	Moderate	Reduction in labour Increased upfront capital costs	**Prioritize:** re-evaluate during detailed engineering design
	Fleet management system	Yes (9)	Low	Moderate	–	**Prioritize:** re-evaluate during detailed engineering design
Stationary combustion – mine explosives	Surface miners	No (7)	–	–	–	
	Renewable diesel	No (8)	–	–	–	Investigate procurement options
	Biodiesel	No (8)	–	–	–	Investigate procurement options
Stationary combustion	Electric tether	No (9)			–	Re-evaluate during detailed engineering design
	Battery-powered	Yes (9 – light plants only)	Low	Moderate	Potential reduction in visibility (safety)	**Prioritize:** re-evaluate during detailed engineering design
	Renewable diesel	No (9)	–	–	–	Investigate procurement options
	Biodiesel	No (9)	–	–	–	Investigate procurement options
	Hydrogen gas	No (9)	–	–	–	
Carbon sinks	Early rehabilitation	Yes (9)	Low	Moderate	–	**Prioritize:** re-evaluate during detailed engineering design

GHG = greenhouse gas; IPCC = in-pit crusher and conveyor; TRL = technology readiness level; – = XXX.

4.0 SUMMARY BEST AVAILABLE CONTROL TECHNOLOGY STUDY COMMITMENTS

There are no additional BAT/BEP measures that are considered to be technically feasible and have a high economic feasibility rating at this time. Therefore, the study demonstrates that the Project, as currently defined, has incorporated BACT.

The BACT Study is considered preliminary and reflects the decisions that can be made at this stage of the Project, with currently available information and may be subject to change as Project design progresses and technical and economic considerations are further evaluated. The following is a summary of commitments outlined in this BACT Study.

- Continue to evaluate mobile fleet options as the Project progresses to detailed engineering design and technologies under consideration continue to mature.
- Continue outreach to understand procurement options for low-carbon/renewable fuels with the Project's fuel supplier (or alternative suppliers, if available).
- Continue to evaluate the potential use of tethered/battery electric equipment to replace traditional diesel units during detailed engineering design.
- Develop and implement early vegetation rehabilitation strategies, where possible.

5.0 CLOSING

The reader is referred to the Study Limitations section, which precedes the text and forms an integral part of this report.

We trust the above meets your present requirements. If you have any questions or comments, please contact the undersigned.

Signature Page

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